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City of Fort Lupton

REGULAR MEETING AGENDA

Tuesday, November 2, 2021
7:00 PM
130 South McKinley Avenue

Zo Stieber, Mayor
Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Mike Sanchez, Ward 3
David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

Pledge of Allegiance

Call to Order

Roll Call

Persons to Address Council - This portion of the Agenda is provided to allow members of the audience to present comments to the City Council. The City Council may not respond to your comments this evening, rather they may take your comments and suggestions under advisement or your question may be directed to the appropriate staff member for follow-up. Please limit the time of your comments to three (3) minutes - Mayor Stieber

Approval of Agenda

Review of Accounts Payables

a. November 2, 2021 Accounts Payable

Consent Agenda - Consent Agenda items are considered to be routine and will be enacted by one motion and vote. There will be no separate discussion of Consent Agenda items unless a Councilmember so requests, in which case the item may be removed/moved from the Consent Agenda.

a. October 16, 2021 City Council Special Meeting Minutes

b. October 19, 2021 City Council Meeting Minutes

c. AM 2021-172 Authorize The City Administrator to Execute an Agreement with Smartnet to Host a Leica Geosystems Global Navigation Satellite System on City Property

d. AM 2021-175 Approve Mayor's Signature for Letter of Support for the Highway 52 Planning and Environmental Linkages Study (PEL) and Access Control Plan (ACP) Study

e. AM 2021-177 Authorization for Mayor to Sign an Indemnification Agreement Between Peerless Tire Co., City of Fort Lupton and the Fort Lupton Housing Authority

f. AM 2021-178 Authorize the Mayors Signature to the Jacobs Contract Amendment 2

g. AM 2021-180 Approval to Authorize the Mayor to Sign Resolution Adopting the Weld County Multi-Juisdictional Hazard Mitigation Plan

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h. AM 2021-181 Approving a Resolution Accepting the City of Fort Lupton Participate in the Opioids Settlement

Public Hearings - Public Hearings allow members of the audience to present comments and questions to the City Council on the item being presented. Comments and questions may be limited to three (3) minutes- Mayor Stieber

a. AM 2021-182 Approve a Resolution Accepting the Cottonwood Greens PUD Preliminary Plat & Preliminary PUD Plan for Filing No. 4

b. AM 2021-183 Adopting an Ordinance Amending Chapter 18 Building Regulations of the Fort Lupton Municipal Code and Adopting by Reference the 2018 International Building and Fire Codes and Enacting a New Section for the International Swimming Pool and Spa Code

Action Memorandum

a. AM 2021-184 Approve a Resolution Accepting the Cottonwood Greens PUD Final Plat and Final PUD Plan for Filing No. 4

b. AM 2021-171 Approving the Agreement for Municipal Planning Services with Todd Hodges Design, LLC as the Planner for the City of Fort Lupton for a Two (2) Year Term

c. AM 2021-173 Approve the Purchase and Installation of a HVAC Unit for the Aquatics Area of the Recreation Center from Innovative Mechanical Solution for an Amount not to Exceed $285,717.00

d. AM 2021-174 Award Contract to Burns & McDonnell Engineering Company, Inc. for $1,897,540.00 for Design and Permitting of Metro Lift Station and Pipeline Project from the Utility Fund

e. AM 2021-176 Approve Changes to Employee Benefit Plans for a Total Cost of $1,108,124.55 per Year

f. AM 2021-179 Authorize the City Administrator to Accept a Proposal From Dig Deep to Provide Grant Seeking Services for the City of Fort Lupton for an Amount of $5,000.00 per Month

g. AM 2021-185 Approving Resolution 2021Rxxx Establishing the Fee Schedule for Regulated Marijuana

Information Memorandum

a. IM 2021-005 Complete an Employee Opinion Survey for the Cost of $2,900.00-4,600.00

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b. IM 2021-006 Increase Proessing Fees Assessed on all Court Credit Card Payments

c. IM 2021-007 Increase of New Public Library Facility Budget

Staff Reports

Mayor/Council Reports

Future City Events

a. November 2, 2021 Upcoming Events

Adjourn

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City of Fort Lupton

Check Report

By Check Number

Date Range: 10/20/2021 - 11/02/2021

Vendor Number / Payable #	Vendor Name / Payable Type	Post Date	Payment Date / Payable Description	Payment Type	Discount Amount / Discount Amount	Payment Amount / Payable Amount	Number
Bank Code: Golf Course-Golf Course							
000285	COLORADO DEPARTMENT OF REVENUE		10/20/2021	Regular	0.00	3,274.51	84771
102021-1	Invoice	10/20/2021	GOLF-SEPTEMBER 2021 SALES TAX		0.00	3,274.51	
000160	BREAKTHRU BEVERAGE GROUP		10/26/2021	Regular	0.00	196.23	84772
341427504	Invoice	10/14/2021	GOLF-BEVERAGES-PRD SHOP		0.00	196.23	
000239	CITY OF FORT LUPTON		10/26/2021	Regular	0.00	42,247.28	84773
FIN2021170	Invoice	10/01/2021	Golf ComData Purchases		0.00	2,295.11	
FIN2021184	Invoice	10/01/2021	GOLF-PAYROLL EXPENSE 5/29-6/11/21 PAID ...		0.00	37,895.13	
FIN2021193	Invoice	10/01/2021	GOLF-REIMBURSE COMCAST INV124688818 ...		0.00	168.46	
FIN2021216	Invoice	10/01/2021	GOLF-REIMBURSE COMCAST INV126599845 ...		0.00	166.27	
FIN2021232	Invoice	10/01/2021	Golf ComData Purchases		0.00	1,780.90	
FIN2021302	Credit Memo	10/14/2021	GOLF-PINNACOL WORK COMP INV 20576279..		0.00	-54.02	
FIN2021304	Invoice	10/14/2021	GOLF-EMP ASSISTANCE PROGRAM DEC2020		0.00	5.18	
FIN2021306	Invoice	10/15/2021	GOLF-POSTAGE FOR MAY20-PRD SHOP		0.00	28.05	
FIN2021309	Invoice	10/15/2021	GOLF-STANDARD INV LTD, LIFE, AD&D CORR...		0.00	42.43	
FIN2021310	Credit Memo	10/15/2021	GOLF-US TREASURY COVID WAGES CREDIT/...		0.00	-80.23	
002723	EAGLE ROCK COMPANY OF COLO		10/26/2021	Regular	0.00	129.05	84774
8258213	Invoice	10/18/2021	GOLF-BEVERAGES-PRD SHOP		0.00	129.05	
001734	GOLF ASSOCIATES ADVERTISING CO INC		10/26/2021	Regular	0.00	2,517.03	84775
283355	Invoice	10/07/2021	GOLF-SCORECARDS-PRD SHOP		0.00	2,517.03	
000567	HIGH COUNTRY BEVERAGE CORP		10/26/2021	Regular	0.00	563.75	84776
W-6083860	Invoice	10/18/2021	GOLF-BEVERAGES-PRD SHOP		0.00	563.75	
000735	LL JOHNSON DISTRIBUTING		10/26/2021	Regular	0.00	517.18	84777
1139107-00	Invoice	10/04/2021	GOLF-PIPE/WIRE-MAINT		0.00	465.82	
1867324-00	Invoice	10/05/2021	GOLF-FILTER/OIL-MAINT		0.00	51.36	
000736	LOCKETT REFRIGERATION, LLC		10/26/2021	Regular	0.00	989.19	84778
06118	Invoice	10/05/2021	GOLF-FRIDGE REPAIR-PRD SHOP		0.00	989.19	
000768	MASEK GOLF CAR OF COLORADO		10/26/2021	Regular	0.00	885.37	84779
01-70857	Invoice	10/15/2021	GOLF-GOLF CART REPAIR-PRD SHOP		0.00	885.37	
000999	SHAMROCK FOODS COMPANY		10/26/2021	Regular	0.00	1,002.28	84780
23785017	Invoice	10/14/2021	GOLF-FOOD-PRD SHOP		0.00	1,002.28	
001052	SWIRE COCA-COLA, USA		10/26/2021	Regular	0.00	453.67	84781
14348213809	Invoice	10/15/2021	GOLF-BEVERAGES-PRD SHOP		0.00	453.67	
001207	WESTERN DISTRIBUTING INC		10/26/2021	Regular	0.00	150.00	84782
661407	Invoice	10/15/2021	GOLF-BEVERAGES-PRD SHOP		0.00	150.00	
000024	ACE HARDWARE OF FORT LUPTON		11/02/2021	Regular	0.00	31.28	84783
91331	Invoice	10/24/2021	GOLF-SPRAY BLOWGUN/COUPLER-PRO SHOP		0.00	31.28	
000239	CITY OF FORT LUPTON		11/02/2021	Regular	0.00	32,581.41	84784
FIN2021315	Invoice	10/22/2021	GOLF-PAYROL EXPENSE 10/2-10/15/21 PAID...		0.00	32,576.72	
FIN2021317	Invoice	10/22/2021	GOLF-EMPLOYEE ASSISTANCE PROGRAM N...		0.00	4.69	
000307	COMCAST CABLE COMM, LLC		11/02/2021	Regular	0.00	23.76	84785
0025494 NOV21	Invoice	10/18/2021	GOLF-CABLE-PRO SHOP		0.00	23.76	
000417	EASY PICKER GOLF PRODUCTS		11/02/2021	Regular	0.00	2,376.00	84786

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Vendor Number / Payable #	Vendor Name / Payable Type	Post Date	Payment Date / Payable Description	Payment Type	Discount Amount / Discount Amount	Payment Amount / Payable Amount	Number
0168049-IN	Invoice	10/15/2021	GOLF-BALL WASHER-PRO SHOP		0.00	2,376.00	
000567	HIGH COUNTRY BEVERAGE CORP		11/02/2021	Regular	0.00	543.65	84787
W-6088654	Invoice	10/25/2021	GOLF-BEVERAGES-PRO SHOP		0.00	543.65	
001417	JOE PATE		11/02/2021	Regular	0.00	21.90	84788
101321	Invoice	10/13/2021	GOLF-TOOL PURCHASE REIMBURSEMENT-P...		0.00	21.90	
001052	SWIRE COCA-COLA, USA		11/02/2021	Regular	0.00	360.29	84789
24908200214	Invoice	10/22/2021	GOLF-BEVERAGES-PRO SHOP		0.00	360.29	
001895	TERMINIX		11/02/2021	Regular	0.00	143.00	84790
412909465	Invoice	10/05/2021	GOLF-PEST CONTROL-PRO SHOP		0.00	143.00	
001105	TOSHIBA FINANCIAL SERVICES		11/02/2021	Regular	0.00	236.90	84791
455653592	Invoice	10/15/2021	GOLF-COPIER LEASE-PRD SHOP		0.00	236.90	
001183	WAXIE SANITARY SUPPLY		11/02/2021	Regular	0.00	94.50	84792
80388437	Invoice	10/20/2021	GOLF-JANITORIAL SUPPLIES-PRO SHOP		0.00	19.36	
80390742	Invoice	10/21/2021	GOLF-JANITORIAL SUPPLIES-PRO SHOP		0.00	27.89	
80394741	Invoice	10/22/2021	GOLF-JANITORIAL SUPPLIES-PRO SHOP		0.00	47.25	
001198	WELD COUNTY PUBLIC HEALTH		11/02/2021	Regular	0.00	430.00	84793
IN0029686	Invoice	10/18/2021	GOLF-2022 RETAIL FOOD LICENSE RENEWAL...		0.00	430.00	
001224	XCEL ENERGY-GAS		11/02/2021	Regular	0.00	170.18	84794
752321796	Invoice	10/15/2021	GOLF-GAS BILL 9/16-10/15/21-PRO SHOP		0.00	170.18	

Bank Code Golf Course Summary

Payment Type	Payable Count	Payment Count	Discount	Payment
Regular Checks	37	24	0.00	89,938.41
Manual Checks	0	0	0.00	0.00
Voided Checks	0	0	0.00	0.00
Bank Drafts	0	0	0.00	0.00
EFT's	0	0	0.00	0.00
	37	**24**	**0.00**	**89,938.41**

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Vendor Number / Payable #	Vendor Name / Payable Type	Post Date	Payment Date / Payable Description	Payment Type	Discount Amount / Discount Amount	Payment Amount / Payable Amount	Number
Bank Code: Pooled Cash-Pooled Cash							
000285	COLORADO DEPARTMENT OF REVENUE		10/20/2021	Regular	0.00	10.22	70410
102021	Invoice	10/20/2021	REC-SEP 2021 SALES TAX		0.00	10.22	
001301	AAA AUTO PARTS INC		10/26/2021	Regular	0.00	62.79	70411
125501	Invoice	10/13/2021	GF-OIL-PARKS		0.00	45.52	
125502	Invoice	10/13/2021	GF-FILTERS-PARKS		0.00	17.27	
002890	ABRAHAM RAMIREZ		10/26/2021	Regular	0.00	4.00	70412
101921	Invoice	10/19/2021	GF-DUPLICATE CHARGE FOR REPORTS		0.00	4.00	
000034	ADT SECURITY SYSTEM		10/26/2021	Regular	0.00	127.49	70413
50576495 OCT21	Invoice	10/01/2021	CPR-SECURITY MONITORING-COM CTR		0.00	127.49	
000037	ADVANCED URGENT CARE AND OCC MED		10/26/2021	Regular	0.00	190.00	70414
71966	Invoice	10/11/2021	GF-DOT PHYSICAL/HEP B VACCINE-HR		0.00	190.00	
001293	AMAZON.COM		10/26/2021	Regular	0.00	420.17	70415
113-0072063-023...	Invoice	10/07/2021	GF-MASKS-FAC		0.00	44.97	
113-0486801-789...	Invoice	10/01/2021	GF-SAFETY SUPPLIES-FAC		0.00	113.99	
113-0775488-254...	Invoice	10/01/2021	GF-SAFETY GLASSES-FAC		0.00	105.67	
113-3428906-462...	Invoice	10/07/2021	GF-WASTES COMPLIANCE GUIDES-PARKS		0.00	149.95	
113-8738560-486...	Invoice	10/01/2021	GF-RULER-FAC		0.00	5.59	
000108	AUSMUS LAW FIRM PC		10/26/2021	Regular	0.00	22,369.50	70416
7269	Invoice	10/01/2021	GF-JUN-SEP9 LEGAL FEES		0.00	22,369.50	
000230	CINTAS FIRST AID & SAFETY		10/26/2021	Regular	0.00	14.01	70417
5079363954	Invoice	10/08/2021	REC-FIRST AID SUPPLIES		0.00	14.01	
000233	CIRSA/PC		10/26/2021	Regular	0.00	1,833.73	70418
211826	Invoice	10/15/2021	GF-ADD BALL FIELD LIGHTS/SIGNAGE RENE...		0.00	1,833.73	
000253	CO DEPT OF PUBLIC HEALTH AND ENVIRONMENT		10/26/2021	Regular	0.00	14,035.00	70419
WU221112029	Invoice	10/04/2021	UF-ANNUAL PERMIT FEE 7/1/21-6/30/22-...		0.00	13,920.00	
WU221112884	Invoice	10/04/2021	UF-PRETREATMENT PERMIT FEE 7/1/21-6/3...		0.00	115.00	
002608	COLONIAL FLAG FOUNDATION		10/26/2021	Regular	0.00	7,411.84	70420
464	Invoice	10/01/2021	GF-FIELD OF HONOR FLAGS-COM EVENTS		0.00	7,411.84	
002651	COLORADO COMMUNITY MEDIA		10/26/2021	Regular	0.00	277.88	70421
38264	Invoice	10/15/2021	GF-PUBLIC NOTICES		0.00	277.88	
000306	COMCAST BUSINESS		10/26/2021	Regular	0.00	2,210.30	70422
131413311	Invoice	10/01/2021	Comcast Acct 930000301		0.00	2,210.30	
000307	COMCAST CABLE COMM, LLC		10/26/2021	Regular	0.00	150.65	70423
0124495 OCT21	Invoice	10/01/2021	CPR-CABLE-COM CTR		0.00	150.65	
000311	COMPLETE MAILING SOLUTIONS		10/26/2021	Regular	0.00	222.54	70424
146203	Invoice	10/15/2021	GF-POSTAGE MACHINE INK-ADMIN		0.00	222.54	
002892	DISPLAY SALES		10/26/2021	Regular	0.00	1,152.00	70425
SO-330737-1	Invoice	10/07/2021	CPR-BANNERS-COM CTR		0.00	1,152.00	
002891	EDWARD MCMILLAN		10/26/2021	Regular	0.00	75.00	70426
2006746	Invoice	10/07/2021	REC-PRORATED MEMBERSHIP REFUND		0.00	75.00	
002655	FRONT RANGE LANDFILL INC		10/26/2021	Regular	0.00	1,460.00	70427
62555	Invoice	10/15/2021	GF-TRASH VOUCHER REDEMPTIONS-LEGIS		0.00	1,460.00	
002888	FTL LAND ASSEMBLAGE LLLP		10/26/2021	Regular	0.00	1,148.52	70428
101421	Invoice	10/14/2021	GF-REFUND DUPLICATE PMT OF FIN2019026...		0.00	1,148.52	
000655	JOHN DEERE FINANCIAL		10/26/2021	Regular	0.00	776.08	70429

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1168165	Invoice	10/13/2021	GF-EQUIPMENT REPAIR-PARKS		0.00	776.08	
000691	KONE INC		10/26/2021	Regular	0.00	140.80	70430
962019116	Invoice	10/01/2021	REC-MAINTENANCE		0.00	140.80	
000865	OFFICE DEPOT		10/26/2021	Regular	0.00	116.76	70431
203239956001	Invoice	10/07/2021	GF-NOTEBOOKS-PW SHOP		0.00	20.99	
203282614001	Invoice	10/07/2021	GF-NOTEBOOKS-PW SHOP		0.00	29.80	
203282615001	Invoice	10/07/2021	GF-NOTEBOOKS-ENG		0.00	65.97	
000928	PUSH-PEDAL-PULL		10/26/2021	Regular	0.00	130.00	70432
320624	Invoice	10/11/2021	REC-TREADMILL CONSOLE		0.00	130.00	
000931	R & L TIRES		10/26/2021	Regular	0.00	72.00	70433
41466	Invoice	10/13/2021	GF-TIRE MOUNTING-PARKS		0.00	72.00	
001075	THE CONSOLIDATED MUTUAL		10/26/2021	Regular	0.00	156.87	70434
101521	Invoice	10/15/2021	UF-SEP21 ELECTRICAL PERRY PIT-WELL B		0.00	32.04	
101521-1	Invoice	10/15/2021	UF-SEP21 ECTRICAL PERRY PIT-WELL C		0.00	31.92	
101521-2	Invoice	10/15/2021	UF-SEP21 ELECTRICAL PERRY PIT-DISCHARGE...		0.00	92.91	
001105	TOSHIBA FINANCIAL SERVICES		10/26/2021	Regular	0.00	1,880.34	70435
455281451	Invoice	10/08/2021	Copier Lease		0.00	1,880.34	
001894	UMB BANK, N.A.		10/26/2021	Regular	0.00	400.00	70436
893078	Invoice	10/13/2021	UF-2017 WATER BOND PAYING AGENT FEE-...		0.00	400.00	
002262	WELD COUNTY EXTENSION OFFICE		10/26/2021	Regular	0.00	50.00	70437
100821	Invoice	10/08/2021	CPR-MASTER GARDNERS DONATION-MUSE...		0.00	50.00	
000031	ADAMSON POLICE PRODUCTS		11/02/2021	Regular	0.00	853.00	70438
INV363855	Invoice	10/11/2021	GF-UNIFORMS-CODE		0.00	853.00	
000039	AFFORDABLE FUNERAL SUPPLY LLC		11/02/2021	Regular	0.00	53.89	70439
INV63969	Invoice	10/01/2021	CEM-LOWERING DEVICE STRAPS		0.00	53.89	
001820	BADGER METER		11/02/2021	Regular	0.00	65,255.00	70440
1465996	Invoice	10/22/2021	UF-METERS AND ACCESSORIES		0.00	65,340.00	
40624	Credit Memo	10/25/2021	UF-METER TESTING-W LINES		0.00	-85.00	
000167	BRIGHTON FORD INC		11/02/2021	Regular	0.00	20.95	70441
324512	Invoice	10/11/2021	GF-VEHICLE REPAIRS-PD		0.00	20.95	
000182	CEM SALES & SERVICE INC		11/02/2021	Regular	0.00	1,460.00	70442
155495	Invoice	10/15/2021	REC-POOL/SPA CHEMICALS		0.00	1,460.00	
000208	CESARE INC		11/02/2021	Regular	0.00	2,360.50	70443
21.3071.1	Invoice	10/27/2021	GF-GEOTECH STUDY-ENGINEERING		0.00	2,360.50	
000267	COLONIAL LIFE		11/02/2021	Regular	0.00	105.96	70444
78168201101681	Invoice	10/22/2021	GF-SUPPLEMENTAL INSURANCE OCT21		0.00	105.96	
002266	COLORADO PAVING INC		11/02/2021	Regular	0.00	76,063.91	70445
2021-04-1	Invoice	10/06/2021	SSTX- KAHIL PAVING CHANGE ORDER #3		0.00	76,063.91	
000306	COMCAST BUSINESS		11/02/2021	Regular	0.00	2,085.82	70446
132434053	Invoice	10/15/2021	Comcast Phones		0.00	2,085.82	
000307	COMCAST CABLE COMM, LLC		11/02/2021	Regular	0.00	220.03	70447
0164533 NOV21	Invoice	10/14/2021	GF-CABLE/INTERNET 10/23-11/22/21-PW S...		0.00	220.03	
001517	CORE&MAIN LP		11/02/2021	Regular	0.00	2,058.02	70448
P522277	Invoice	10/13/2021	UF-REPAIR PARTS-W LINES		0.00	778.02	
P755474	Invoice	10/12/2021	UF-METER PARTS-W LINES		0.00	1,280.00	
000489	FORT LUPTON RECREATION CTR		11/02/2021	Regular	0.00	1,540.00	70449

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102621	Invoice	10/26/2021	CPR-REFEREE FEES-ATHL		0.00	1,540.00	
001930	HUMANA HEALTH PLAN INC		11/02/2021	Regular	0.00	82,292.03	70450
379450838	Invoice	11/01/2021	GF-HEALTH,DENTAL,VISION NOV21		0.00	82,292.03	
002894	KATHLEEN RAPIER		11/02/2021	Regular	0.00	40.00	70451
2006753	Invoice	10/16/2021	REC-SWIM LESSON REFUND		0.00	40.00	
000745	LOUIS A GRESH		11/02/2021	Regular	0.00	1,500.00	70452
OCT21	Invoice	10/25/2021	GF-ARRAIGNMENTS-COURT		0.00	1,500.00	
002755	MAXINE BROOKS		11/02/2021	Regular	0.00	266.00	70453
102621	Invoice	10/26/2021	GF-RESTITUTION		0.00	266.00	
002027	MURRAYSMITH INC		11/02/2021	Regular	0.00	538.50	70454
20-2746.00-17	Invoice	10/25/2021	WST- Non-Pot Pumphouse Engineering- WTP		0.00	538.50	
000897	PETTY CASH-REC CTR		11/02/2021	Regular	0.00	176.86	70455
102521	Invoice	10/25/2021	REC-PETTY CASH REIMBURSEMENT		0.00	176.86	
000931	R & L TIRES		11/02/2021	Regular	0.00	2,881.16	70456
41486	Invoice	10/14/2021	UF-TIRE REPAIR-S LINES		0.00	15.00	
41509	Invoice	10/15/2021	UF-TIRE REPLACEMENT-S LINES		0.00	846.24	
41525	Invoice	10/18/2021	UF-TIRE REPLACEMENT-W LINES		0.00	1,095.80	
41526	Invoice	10/18/2021	GF-TIRE REPLACEMENT-STREETS		0.00	924.12	
000935	RAQUEL FERSZT		11/02/2021	Regular	0.00	390.00	70457
082483	Invoice	10/18/2021	GF-TRANSLATOR SERVICES-COURT		0.00	390.00	
001008	SHRED-IT USA LLC		11/02/2021	Regular	0.00	30.00	70458
8000152405	Invoice	10/01/2021	GF-SHREDDING SERVICES-CITY CL		0.00	30.00	
002694	SYMMETRY ENERGY SOLUTIONS LLC		11/02/2021	Regular	0.00	1,787.75	70459
12023224	Invoice	10/25/2021	REC-SEP21 NATURAL GAS		0.00	1,787.75	
001079	THE EMPLOYMENT FIRM		11/02/2021	Regular	0.00	4,554.15	70460
34198	Invoice	10/20/2021	GF-OCT 11-15 TEMP EMPLOYEE-FINANCE		0.00	1,154.15	
34242	Invoice	10/27/2021	GF-TEMP EMPLOYEE BUYOUT-FINANCE		0.00	3,400.00	
001101	TODD HODGES DESIGN LLC		11/02/2021	Regular	0.00	11,175.00	70461
3365	Invoice	10/25/2021	GF-PLANNING SRVC 10/11-10/24/21-PLANN...		0.00	11,175.00	
002446	TRENCH PLATE RENTAL CO		11/02/2021	Regular	0.00	4,288.00	70462
360553	Invoice	10/13/2021	Trench Box		0.00	4,288.00	
001128	ULINE INC		11/02/2021	Regular	0.00	118.66	70463
137230586	Invoice	10/01/2021	GF-BAGS FOR DONOR APPRECIATION-COM ...		0.00	118.66	
001963	WASTE CONNECTIONS OF COLO, INC		11/02/2021	Regular	0.00	225.98	70464
5675518	Invoice	10/18/2021	GF-NOV21 TRASH SERVICES-PARKS		0.00	122.54	
5676024	Invoice	10/18/2021	CEM-NOV 21 TRASH SERVICES		0.00	103.44	
001196	WELD COUNTY OFFICE OF THE BOARD		11/02/2021	Regular	0.00	34.00	70465
102521	Invoice	10/25/2021	GF-TOWN AND COUNTY DINNER-CITY ADMIN		0.00	34.00	
001200	WELD COUNTY PUBLIC WORKS		11/02/2021	Regular	0.00	860.50	70466
0001	Invoice	10/20/2021	SSTX-WEED TREATMENT-STREETS		0.00	860.50	
001224	XCEL ENERGY-GAS		11/02/2021	Regular	0.00	128.39	70467
753015776	Invoice	10/21/2021	GF-CITY HALL & GENERATOR GAS 9/16-10/1...		0.00	128.39	
000119	BANK OF COLORADO		10/22/2021	Bank Draft	0.00	5,930.58	DFT0001820
INV0001058	Invoice	10/22/2021	HSA DISTRIBUTION		0.00	5,930.58	
000119	BANK OF COLORADO		10/22/2021	Bank Draft	0.00	515.83	DFT0001821
INV0001059	Invoice	10/22/2021	HSA DISTRIBUTION		0.00	515.83	

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Vendor Number / Payable #	Vendor Name / Payable Type	Post Date	Payment Date / Payable Description	Payment Type	Discount Amount / Discount Amount	Payment Amount / Payable Amount	Number
001416	VALIC_1		10/22/2021	Bank Draft	0.00	30,296.42	DFT0001822
INV0001060	Invoice	10/22/2021	VALIC - 457(b) $ Contributions		0.00	30,296.42	
001265	IRS		10/22/2021	Bank Draft	0.00	52,507.36	DFT0001823
INV0001061	Invoice	10/22/2021	Federal Withholding		0.00	52,507.36	
001418	CO DEPARTMENT OF REVENUE		10/22/2021	Bank Draft	0.00	8,859.27	DFT0001824
INV0001062	Invoice	10/22/2021	CO Withholding		0.00	8,859.27	
000465	FIRE & POLICE PENSION ASC		10/22/2021	Bank Draft	0.00	1,770.60	DFT0001827
102221	Invoice	10/22/2021	FPPA PAYMENT FOR PAYROLL 9/24/21		0.00	1,770.60	
000309	COMDATA BUSINESSLINK		10/22/2021	Bank Draft	0.00	16,500.00	DFT0001828
10/22/21	Invoice	10/22/2021	GF-PD CC CHARGES PARKS,REC,GOLF EARLY L..		0.00	16,500.00	

Bank Code Pooled Cash Summary

Payment Type	Payable Count	Payment Count	Discount	Payment
Regular Checks	75	58	0.00	320,262.55
Manual Checks	0	0	0.00	0.00
Voided Checks	0	0	0.00	0.00
Bank Drafts	7	7	0.00	116,380.06
EFT's	0	0	0.00	0.00
	82	**65**	**0.00**	**436,642.61**

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All Bank Codes Check Summary

Payment Type	Payable Count	Payment Count	Discount	Payment
Regular Checks	112	82	0.00	410,200.96
Manual Checks	0	0	0.00	0.00
Voided Checks	0	0	0.00	0.00
Bank Drafts	7	7	0.00	116,380.06
EFT's	0	0	0.00	0.00
	119	**89**	**0.00**	**526,581.02**

Fund Summary

Fund	Name	Period	Amount
600	GOLF ENTERPRISE FUND	10/2021	52,925.54
600	GOLF ENTERPRISE FUND	11/2021	37,012.87
999	POOLED CASH/CONSOLIDATED CASH	10/2021	173,278.55
999	POOLED CASH/CONSOLIDATED CASH	11/2021	263,364.06
			526,581.02

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RECORD OF PROCEEDINGS
FORT LUPTON CITY COUNCIL/ENTERPRISE BOARDS
October 16, 2021

The City Council of the City of Fort Lupton met in special session at City Hall, 130 South McKinley, on Saturday, October 16, 2021. Mayor Zo Stieber called the meeting to order at 9:06 a.m.

ROLL CALL

City Clerk, Mari Peña, called the roll. Those present were Mayor Zo Stieber, Councilmembers Bruce Fitzgerald, David Crespin, Michael Sanchez and Tommy Holton. Chris Ceretto joined the meeting at 9:40 a.m.

Also present were City Administrator, Chris Cross, City Clerk, Mari Peña, Chief of Police, John Fryar, Finance Director, Leann Perino, Accountant Kris Kindle Planning Director, Todd Hodges, Public Works Director Roy Vestal, Recreation Center Director, Monty Schuman Human, and Resources Director, Laura Howe.

The following staff participated remotely, through GoToMeeting: IT Director, Travis Aksamitowski, and GIS Specialist, Jake Freier,

PRESENTATION OF THE 2021 PRELIMINARY BUDGET

Leann Perino, Finance Director, led the discussion regarding the proposed 2022 Preliminary Budget. Each department: IT Department, Police Department, Recreation Center, Building and Grounds, and Human Resources presented their 2022 budget requests. The Council then made recommendation to either accept the request, amend the request or deny the request.

ADJOURNMENT

It was the consensus of Council to adjourn the Special Meeting at 2:40 p.m.

Motion carried on voice vote.

Respectfully submitted.

_____
Maricela Peña, City Clerk

Approved by City Council

_____
Zo Stieber, Mayor

DRAFT

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RECORD OF PROCEEDINGS
FORT LUPTON CITY COUNCIL/ENTERPRISE BOARDS
October 19, 2021

The City Council of the City of Fort Lupton met in a regular session at the City Complex, 130 South McKinley Avenue, the regular meeting place of the City Council, on Tuesday, October 19, 2021. Due to the COVID-19 virus, the meeting was held with remote access provided through GoToWebinar. Mayor Zo Stieber called the meeting to order at 7:00 p.m. and invited everyone to join her in the Pledge of Allegiance.

ROLL CALL

Mari Peña, City Clerk, called the roll. Those present were Mayor Zo Stieber and Councilmembers Chris Ceretto, Tommy Holton, and Bruce Fitzgerald. Councilmembers Shannon Rhoda and David Crespin participated remotely through GoToWebinar.

Also present were City Administrator, Chris Cross, City Clerk, Mari Peña, City Attorney, Andy Ausmus, Police Chief, John Fryar, Planning Director, Todd Hodges, Finance Director, Leann Perino and Public Works Director Roy Vestal.

PERSONS TO ADDRESS COUNCIL

Police chief, John Fryar, spoke regarding Police Officer, Brittany English's experience through the training period and presented her with a new badge to signify her transition.

PROCLAMATION

Mayor Zo Stieber read and signed the Salud Family Health Centers Proclamation, making October 24-30, 2021 as Salud Family Health Centers week in the City of Fort Lupton.

APPROVAL OF AGENDA

It was moved by Tommy Holton and seconded by Chris Ceretto to approve the Agenda as presented. Motion passed unanimously on roll call vote.

REVIEW OF ACCOUNTS PAYABLES

Council reviewed the October 19, 2021, payables; there were no questions or comments from the Mayor or Council.

CONSENT AGENDA

It was moved by Bruce Fitzgerald and seconded by Tommy Holton to approve the Agenda as presented with the following items: October 5, 2021 City Council Meeting Minutes, Approving Resolution 2021R059 A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON TO ALLOW THE PLANNING DIRECTOR TO SCHEDULE A PLANNING COMMISSION MEETING FOR A DATE THAT IS NOT THE SECOND OR FOURTH THURSDAY OF THE MONTH IF A REGULAR PLANNING COMMISSION MEETING FALLS ON A NATIONAL AND/OR STATE HOLIDAY, Ratification of Finance Director's Signature on Purchase Order for

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Purchase of 2021 HV513 SFA (HV513) International Dump Truck for Public Works Streets From McCandless Truck Center LLC for not to Exceed $250,000.00 From the Public Works Streets General Fund. Motion passed unanimously on roll call vote.

PUBLIC HEARING

AM 2021-161 Adopt an Ordinance Rezoning Land Legally Described in Exhibit A to the Proposed Ordinance, and Known as the Pearson Park Change of Zone, to the 'P' Parks & Open Space Zone District

Mayor Stieber opened the public hearing at 7:12 p.m. Alyssa Knutson, the City Planner, provided a presentation on the Pearson Park Change of Zone. This change of zone complies with zoning and the comprehensive plan. All public notification requirements have been met. Staff recommends the approval of this change of zone.

Mayor Stieber asked if anyone from the public wished to speak for or against the proposal. Hearing none, Mayor Stieber closed the public hearing at 7:15 p.m.

It was moved by Tommy Holton and seconded by Bruce Fitzgerald to adopt Ordinance 2021-1131 INITIALLY ZONING LAND KNOWN AS THE PEARSON PARK CHANGE OF ZONE, LEGALLY DESCRIBED IN EXHIBIT A, TO THE 'P' PARKS & OPEN SPACE ZONE DISTRICT. Motion passed unanimously on roll call vote.

AM 2021-162 Adopt an Ordinance Rezoning Land Legally Described in Exhibit A to the Proposed Ordinance, and Known as the WWTP Change of Zone, to the 'A' Agricultural Zone District

Mayor Stieber opened the public hearing at 7:16 p.m. Alyssa Knutson, the City Planner, provided a presentation on the WWTP Change of Zone. This change of zone complies with zoning and the comprehensive plan. All public notification requirements have been met.

Mayor Stieber asked if anyone from the public wished to speak for or against the proposal. Hearing none, Mayor Stieber closed the public hearing at 7:18 p.m.

It was moved by Bruce Fitzgerald and seconded by Chris Ceretto to adopt Ordinance 2021-1132 INITIALLY ZONING LAND KNOWN AS THE WWTP CHANGE OF ZONE, LEGALLY DESCRIBED IN XHIBIT A, TO THE 'A' AGRICULTURAL ZONE DISTRICT. Motion passed unanimously on roll call vote.

AM 2021-163 Approving a Resolution for the Inouye Gravel Mine Amended Special Use Permit to Include the WWTP Site Within Existing Sand and Gravel Operations

Mayor Stieber opened the public hearing at 7:21 p.m. Alyssa Knutson, the City Planner, introduced the Inouye Gravel Mine Amended Special Use Permit. Andy Rodriguez, representing Bestway, provided a presentation on the Inouye Gravel Mine Amended Special Use Permit.

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Mayor Stieber asked if the Inouye houses and buildings have been demolished. Mr. Rodriguez stated that they were not.

Council asked questions regarding truck impact, intended tuck routes, and road impact fees. Mr. Rodriguez stated that the truck impact will be internal and the truck routes will be east to Highway 85 then north or south depending on the market. Roy Vestal, Public Works Director, stated that road impact fees have already been established on County Road 14 ½.

Mayor Stieber asked if anyone from the public wished to speak for or against the proposal. Hearing none, Mayor Stieber closed the public hearing at 7:33 p.m.

It was moved by Tommy Holton and seconded by Chris Ceretto to approve Resolution 2021R056 A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE INOUYE GRAVEL MINE AMENDED SPECIAL USE PERMIT TO INCLUDE THE WWTP SITE WITHIN THE SAND AND GRAVEL OPERATIONS. Motion passed unanimously on roll call vote.

AM 2021-164 Approve a Resolution Accepting the Lupton Village Townhomes Lot 2 Block 7 Preliminary Plat

Mayor Stieber opened the public hearing at 7:35 p.m. Maria Lancto, the City Planner, introduced the application of the Lupton Village Townhomes Lot 2 Block 7 Preliminary Plat. Zach Cesar and Andy Gerk, representing Baessler, provided a presentation on the Lupton Village Townhomes Lot 2 Block 7 Preliminary Plat.

Council asked questions regarding landscaping, garage placement, pricing, and the number of bedrooms.

Mr. Cesar stated that there will be a dog park area, garages will be at the rear of the buildings, pricing will be around market value, and bedrooms will vary between two or three.

Mayor Stieber asked if anyone from the public wished to speak for or against the proposal. Hearing none, Mayor Stieber closed the public hearing at 7:43 p.m.

It was moved by Tommy Holton and seconded by Bruce Fitzgerald to approve Resolution 2021R057 A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE LUPTON VILLAGE TOWNHOMES LOT 2 BLOCK 7 PRELIMINARY PLAT FOR A SINGLE-FAMILY ATTACHED RESIDENTIAL SUBDIVISION. Motion passed with 5 ‘yes’ votes and 1 ‘no’ vote by Shannon Rhoda.

ACTION MEMORANDUM

AM 2021-165 Approve a Resolution Accepting the Final Plat of the Lupton Village PUD Third Filing

The applicant, Baessler Development, LLC, has applied for approval of a Final Plat, known as the

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Lupton Village PUD Third Filing. The proposed Final Plat is for a single-family attached residential subdivision to include 61 townhomes. The Property that is the subject of the Final Plat is located approximately at the northwest corner of S. Rollie Avenue and County Road 12 (the Property).

The applicant submitted a concurrent request for the Lupton Village Townhomes Lot 2 Block 7 Preliminary Plat for this property that was reviewed by City Council at a separate public hearing. The PUD Plan was approved by City Council on January 5, 2021.

It was moved by Bruce Fitzgerald and seconded by Tommy Holton to approve Resolution 2021R058 A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE FINAL PLAT OF THE LUPTON VILLAGE PUD THIRD FILING FOR A SINGLE-FAMILY ATTACHED RESIDENTIAL SUBDIVISION. Motion passed with 5 ‘yes’ votes and 1 ‘no’ vote by Shannon Rhoda.

AM 2021-168 Approving Resolution 2021Rxxx Establishing the Fee Schedule Collected by the Municipal Court

Establish a Resolution to set the fees collected by the Fort Lupton Municipal Court in accordance to Section 2-155 of the Fort Lupton Municipal Code.

Fort Lupton Municipal Code, Section 2-155, authorizes the Fort Lupton Municipal Court to collects fees from each Defendant that is found guilty, pleads guilty or pleads no contendere (no contest).

At the beginning of 2011, Council reviewed the fees and set them as follows:

Victim’s Compensation Fund	$5.00 per Defendant
Police Equipment & Training	$10.00 per Defendant
Court Programs & Enhancements	$5.00 per Defendant

In 2015, Municipal Code, Section 2-155, was revised to remove the fee amounts listed in the Ordinance and set them by Resolution. This Resolution establishes the fees as approved by City Council in 2011.

It was moved by Tommy Holton and seconded by Chris Ceretto to approve Resolution 2021R060 A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE FEES CHARGED BY THE MUNICIPAL COURT. Motion passed unanimously on roll call vote.

AM 2021-169 Approve Continuation of Intergovernmental Agreement with CDOT for State Highway Maintenance

Approve continuation of current terms of Intergovernmental Agreement with CDOT for maintenance services on Hwy 52 and US 85B.

AM 2021-146 approved on September 7, 2021 approved ratifying the Mayor’s signature on the

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IGA with CDOT for maintenance services on Highway 52 and Denver Avenue with the intent that the area of responsibility would be changed to the current City limits (CR 21 to CR 35). Further conversation s with CDOT staff have concluded that CDOT does not intend to extend the City's responsibility to existing City limits, rather wants to leave the current extents (Pearson Park to CR 31) for the agreement

The annual payment by the state to the city will remain $9,439.50 ($725.00 / lane mile).

Executing the agreement is not required. The City is responsible for back of curb maintenance (mowing) if the agreement is not executed.

City public works is capable of performing these maintenance activities and has done so in the past. The contract agreement period is for 4.75-years.

It was moved by Chris Ceretto and seconded by Bruce Fitzgerald to approve Resolution 2021R061A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING AN INTERGVERNMENTAL AGREEMENT (IGA) BETWEE NTHE CITY OF FORT LUPTON AND THE COLORADO DEPARTENT OF TRANSPORTATION. Motion carries with 4 'yes' votes and 2 'no' votes by Mayor Stieber and Shannon Rhoda.

AM 2021-170 Authorize the Mayor to Execute an Agreement to Lease 100 Acre Feet Equivalet Colorado Big Thompson Water Units to Platte River Power Authority

PRPA is in need of the C-BT water to collateralize their Windy Gap water use in case the Windy Gap water does not yield in 2022. The Parties anticipate that with an initial assumption of a 50% quota, it would require a minimum of 200 C-BT units to yield 100 acre feet in Water Year 2022. Once Northern sets the 2022 C-BT quota (in April 2022) a true up would occur to the 100 acre feet and excess C-BT units would transferred back. The City does have the additional C-BT at this point to lease out. PRPA will pay $100 per acre foot for an amount totaling $10,000.

It was moved by Tommy Holton and seconded by Bruce Fitzgerald to authorize the Mayor to Execute an Agreement to Lease 100 Acre Feet Equivalent Colorado Big Thompson Water Units to Platte River Power Authority. The motion passed unanimously on a voice vote.

STAFF

Jeanelle Andersen, Court Administrator, discussed the additional purchase to the court software that will allow defendants to online search court dockets and the increase in court credit card processing fees.

Alyssa Knutson, Planner, updated the Council on the Development Code and announced that there will be an open house Wednesday, October 20, 2021 at City Hall at 6:00 p.m. for the Downtown Zone District proposal.

Leann Perino, Finance Director, informed Council that the department hired a Utility Billing Clerk.

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MAYOR/COUNCIL REPORTS

There were no reports from the Mayor or Council.

FUTURE CITY EVENTS

October 1-31, 2021	Scarecrow Contest
October 26, 2021	Town Hall Meeting, 130 S. McKinley Ave. 6:30 p.m.
October 30, 2021	Pumpkin Fest & Haunted Hay Ride
October 31, 2021	Trick or Treat Street, Downtown Fort Lupton, 4-6:00 p.m.
November 2, 2021	City Council Meeting, 130 S. McKinley Ave. 7:00 p.m.
November 9, 2021	Town Hall Meeting, 130 S. McKinley Ave. 6:30 p.m.
November 16, 2021	City Council Meeting, 130 S. McKinley Ave. 7:00 p.m.
November 5-19, 2021	Art Show at the Library

ADJOURNMENT

The meeting adjourned at 8:05 p.m.

Submitted by,

_____

Maricela Peña, City Clerk

Approved by City Council

_____

Zo Stieber, Mayor

DRAFT

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-172

AUTHORIZE THE CITY ADMINISTRATOR TO EXECUTE AN AGREEMENT WITH SMARTNET TO HOST A LEICA GEOSYSTEMS GLOBAL NAVIGATION SATELLITE SYSTEM ON CITY PROPERTY

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:
a. SmartNet Host Agreement.
b. SmartNet Hosting Overview

III. Summary Statement:

LEICA Geosystems Inc. wish to contract with the City to participate in the SmartNet GNSS Reference Network. This would be a set location on the Recreation Center for the network they provide. The City would receive $1000 dollars a year on the lease space.

IV. Submitted by: _____ City Administrator

V. Finance Reviewed _____ Finance Director

VI. Approved for Presentation: _____ City Administrator

VII. Attorney Reviewed Approved Pending Approval

VIII. Certification of Council Approval: _____ City Clerk _____ Date

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IX. Detail of Issue/Request:

LEICA Geosystems Inc. wish to contract with the City to participate in the SmartNet GNSS Reference Network. This would be a set location on the Recreation Center for the network they provide. The City would receive $1000 dollars a year on the lease space. This City can choose to utilize the Enterprise License instead of the $1000 dollars. This can happen at the annual payment time. At this time the cash payment would be preferred to start.

Leica Geosystems, Inc. launched SmartNet North America on March 1, 2010. SmartNet is a subscription-based service offering GNSS Network RTK corrections throughout North America with Leica Geosystems directly operating, managing, and maintaining all segments of the network. From the reference stations in the field to the server and IT infrastructure, SmartNet offers a turnkey solution. SmartNet provides GNSS Network RTK coverage in 50 US States and 8 Canadian Provinces, to anyone in need of Precision GNSS corrections. This includes the precision ag, construction, engineering, surveying, autonomous vehicle, and mapping markets.

X. Legal/Political Considerations:

Not Applicable.

XI. Alternatives/Options:

- Approve at a different location
- Do not approve

XII. Financial Considerations:

The recreation center fund would receive $1,000 in miscellaneous revenue annually.

XIII. Staff Recommendation:

Staff recommends authorization by the City Administrator to execute the agreement with SmartNet for the $1,000 annual lease payment.

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SMARTNET NORTH AMERICA REFERENCE NETWORK
REFERENCE STATION HOST AGREEMENT

LEICA Geosystems Inc. and Host wish to contract for Host to participate in the SmartNet GNSS Reference Network on the terms and conditions set forth in the Agreement (all as defined below).

Accordingly, in consideration of the mutual agreements contained herein, each of Leica Geosystems, Inc. and Host acknowledges that it has received and reviewed this Agreement and agrees to be bound by the same.

Host	Fort Lupton Recreation Center
Station Name:	Fort Lupton, Colorado
Effective Date:	October 13, 2021

1. **Definitions**. Certain terms used and not otherwise defined in this Agreement have the following definitions or meanings:

"GNSS" means global navigation satellite system

"Agreement" means this agreement together with the standard SmartNet Terms & Conditions and any agreed upon Appendices

"Leica" means Leica Geosystems, Inc., a Delaware corporation.

"Network" means the Reference Network marketed under the brand SmartNet, a real-time GNSS network anticipated to provide spatial information to a diverse user community in proximity to the Site.

"Reference Station" means the Leica GNSS reference station and associated or ancillary equipment located at the Site.

"Site" means the real property and improvements of the Host where the Reference Station is located.

"Term" means the period commencing with the Effective Date identified on the first page of this Agreement and continuing thereafter, unless terminated in accordance with the provisions of Section 4.

2. **Host Obligations**. Host hereby grants to Leica and its employees, agents, designees and/or contractors (hereinafter "Licensee") right of ingress and egress to the Site to install, maintain, repair and/or operate the Reference Station during regular business hours, if the Site is an

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occupied edifice, and at any reasonable time if unoccupied. No ownership, leasehold or other rights to the Site shall vest in Licensee by virtue of this Agreement. Host agrees and licenses Licensee to permanently erect the Reference Station in a place on the Site and to a standard consistent with the standards for the Network as established by Leica from time to time. Host also agrees to (i) provide access to and maintain an internet connection for the Reference Station and (ii) provide power.

3. **Payment**. As full and valid consideration for the obligations to Host set forth herein, Leica grants Host an annual payment of $ 1,000.00. This payment will remain in effect during the term of this Agreement.

4. **Termination.**

a. Either Party may terminate this Agreement immediately by delivery of notice to the other Party at any time if the other Party materially breaches this Agreement.

b. Either Party may terminate this Agreement for any reason or no reason upon 60 days' written notice.

5. **Notices.** All notices, authorizations, directions, consents, and other communications to, upon, and between the parties shall be in writing and shall be deemed to have been duly made, delivered and received when delivered personally or by nationally recognized courier service or when mailed by certified mail, postage prepaid and return receipt requested, or when transmitted, and receipt confirmed, by facsimile or electronic transmission to each Party at the address, facsimile number or electronic address set forth under the name of that Party on the first page of this Agreement or to either Party at such other post office address, facsimile number or electronic address as that Party may specify by notice to the other Parties.

6. **Governing Law & Venue.** Each Party agrees to file and resolve any dispute in Weld County District Court, Colorado.

7. **No Joint Venture or Partnership**. This Agreement shall not be deemed nor construed to create a joint venture or partnership between Host and Leica, nor shall this Agreement be deemed or construed as making either Party the agent or representative of the other Party. Neither Party shall have the authority to bind the other Party in any respect.

8. **Modifications**. This Agreement may not be modified, waived, amended, discharged, terminated or supplemented, or otherwise changed, except by a document executed by an authorized representative of each Party.

9. **Non-Waiver of Rights and Breaches**. Except as provided in Paragraph 11, no failure or delay of any Party in the exercise of any right given to such Party hereunder shall constitute a waiver thereof, nor shall any single or partial exercise of any such right preclude other or further exercise thereof or of any other right. The waiver by a party of any default of any other Party

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hereunder shall not be deemed to be a waiver of any such subsequent default or other default of any party. No action or forbearance by any Party contrary to the provisions of this Agreement shall be construed to constitute a waiver of any of the express provisions hereof.

10. **Successors and Assigns**. Either Party may assign this Agreement (a) to one or more affiliates in connection with an internal corporate reorganization or restructuring (in which case the Party shall remain liable for its obligations hereunder notwithstanding such assignment) or (b) to a third party in connection with the sale of substantially all of a Party's assets to, or the merger of the Party into, a third party.

11. **Limitation of Remedies.** Neither Party shall seek, and each hereby irrevocably waives, monetary damages, whether direct, consequential, indirect, or punitive, as a consequence, or arising from, this Agreement or its breach. This Paragraph does not waive or affect either Party's remedies in cases of fraud or intentional torts. IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR CONSEQUENTIAL OR INDIRECT DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFIT OR LOST OPPORTUNITY.

12. **Construction**. Each Party acknowledges that it has participated in the negotiation of this Agreement, had the opportunity to consult with legal counsel prior to executing the Agreement, and that no provision of this Agreement shall be construed against or be interpreted to the disadvantage of any Party hereto by any court or other governmental or judicial authority by reason of such Party having or deemed to have structured, dictated or drafted such provision.

13. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be deemed an original, with such counterparts together constituting one and the same instrument. Alternatively, the Parties acknowledge and agree that this Agreement may be, for convenience, executed in duplicate originals, each of which is intended to be and is as valid as its counterpart original.

14. **Invalidity.** If any term, provision, covenant or condition of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of this Agreement will remain in full force and effect and will in no way be affected, impaired or invalidity.

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LEICA GEOSYSTEMS, INC.		HOST	
Signature:		Signature:	
Printed Name:	Wendy Watson	Printed Name:	Chris Cross
Title:	Director of SmartNet NA	Title:	City Administrator
Date:		Date:	
Address:		Address:	
5051 Peachtree Corners Circle		130 S McKinley Ave.	
Suite 250		Fort Lupton, CO 80621	
Norcross, GA 30092			
Attention:	Wendy Watson	Attention:	Chris Cross
Fax Number:	470-745-0669	Fax Number:	
Email Address:	contracts@smartnetna.com	Email Address:	ccross@fortluptonco.gov

SITE LOCATION

Station Name	Fort Lupton, CO
Site Address	203 S Harrison Ave
Site City	Fort Lupton
Site State/Province	Colorado
Site Zip/Postal Code	80621
Site Phone Number	720-466-6103

For general questions or issues, you may also contact us at support@smartnetna.com

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- when it has to be right

Leica Geosystems

SUPPLIER SIZE AND CLASSIFICATION CERTIFICATION / RECERTIFICATION

To: All suppliers of Leica Geosystems Inc

In order to enter your company into our supplier database, we need to verify your business size and classification. We ask your cooperation by completing and returning this form to the sender. Your prompt response will avoid unnecessary delays in future business transactions. Please see reverse side for business "type" definitions.

NAME: Fort Lupton Recreation Center
STREET: 203 S Harrison Ave
CITY: Fort Lupton STATE: Colorado ZIP: 80621
PHONE: 720-466-6103 FAX:

☐ **LARGE BUSINESS CONCERN**
(To check this category you must conform with definition No. 1)

☐ **SMALL BUSINESS CONCERN**
(To check this category you must conform with definition No. 2)

☐ **SMALL DISADVANTAGED BUSINESS CONCERN**
(To check this category you must conform with definition No. 4)

☐ **WOMAN-OWNED SMALL BUSINESS CONCERN**
(To check this category you must conform with definition No. 2 AND 3)

☐ **VETERAN-OWNED SMALL BUSINESS CONCERN**
(To check this category you must conform with definition No. 2 AND 8)

☐ **SERVICE DISABLED VETERAN-OWNED SMALL BUSINESS CONCERN**
(To check this category you must conform with definition No. 2 AND 9)

☐ **SMALL DISADVANTAGED WOMEN-OWNED BUSINESS CONCERN**
(To check this category you must conform with definition No. 3 and 4)

☐ **HISTORICALLY BLACK COLLEGE OR UNIVERSITY**
(To check this category you must conform with definition No. 7)

☐ **NON-PROFIT ORGANIZATION**
(To check this category you must conform with definition No. 5)

☐ **FOREIGN OWNED BUSINESS CONCERN**
(To check this category you must conform with definition No. 6)

☐ **HUBZONE SMALL BUSINESS CONCERNS**
(To check this category you must conform with definition No. 2 AND 10)

Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or woman-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall (I) Be punished by imposition of fine, imprisonment or both; (II) Be subject to administrative remedies, including suspension and debarment; and (III) Be ineligible for participation in programs conducted under the authority of the Act.

Certification by an authorized representative verifying the information contained in this form	**Return this form via FAX or E-Mail to:** **Leica Geosystems Inc**
Date:	**Attention: Wendy Watson**
Print Name: Chris Cross	**470-745-0669**
Authorized Signature:	**contracts@smartnetna.com**
Title: City Administrator	

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DEFINITIONS

1. Large Business Concern:
A concern that does not qualify as a small business concern under the criteria and size standards in 13 CFR, Part 121.

2. Small Business Concern (Reference FAR 19.001):
"Small business concern" means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on government contracts, and qualified as a small business under the criteria and size standards in 13 CFR part 121 (see 19.102). Such a concern is "not dominant in its field of operation" when it does not exercise a controlling or major influence on a national basis in a kind of business activity in which a number of business concerns are primarily engaged. In determining whether dominance exists, consideration shall be given to all appropriate factors, including volume of business, number of employees, financial resources, competitive status or position, ownership or control of materials, processes, patents, license agreements, facilities, sales territory, and nature of business activity.

3. Woman-Owned Small Business Concern (Reference FAR 19.001, 52.212-3, 52.219-1):
A business concern which is at least 51% owned by one or more women; or, in the case of any publicly owned business, at least 51% of the stock of which is owned by one or more women, and whose management and daily business operations are controlled by one or more women.

4. Small Disadvantaged Business Concern (Reference FAR 52.219-23, 13 CFR 124, subpart B):
A small business concern that is at least 51% unconditionally owned by one or more individuals who are both socially and economically disadvantaged, or a publically owned business that has at least 51% of its stock unconditionally owned by one or more socially and economically disadvantaged individuals and that has its management and daily business controlled by one or more such individuals. Named groups include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, and Subcontinent-Asian Americans. (1) "Subcontinent-Asian Americans" means U.S. citizens whose origins are in India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Island or Nepal. (2) "Asian-Pacific Americans" means U.S. citizens whose origins are in Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territory of the Pacific Islands (Republic of Palau), the Northern Maiana Islands, Laos, Kampuchea (formerly Cambodia), Taiwan, Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Republic of the Marshall Islands, or the Federated States of Micronesia, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru (3) "Native Americans" means American Indians, Eskimos, Aleuts and Native Hawaiians. The small disadvantaged business concern must also appear on the List of Qualified SDBs maintained by the SBA.

5. Non-Profit Organization:
An organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26U.S.C.501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26U.S.C.501(a)), or any nonprofit scientific or educational organization qualified under a State nonprofit organization statute.

6. Foreign Owned Business Concern:
A business concern organized or existing under the laws of a country other than the United States, its territories, or possessions.

7. Historically Black College or University or Minority Institution (Reference FAR 26.301, 52.219-23):
An institution determined by the Secretary of Education to meet the requirements of 34 CFR 608.2 For DoD, NASA, and the Coast Guard; the term also includes any nonprofit research institution that was an integral part of such a college or university before November 14, 1986. Minority Institution means an Institution of higher education meeting the requirements of Section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3) which includes a Hispanic-serving Institution of higher education as defined in Section 316(b)(1) of Act (20 U.S.C. 1059c(b)(1).

8. Veteran-Owned Small Business Concern (Reference FAR 52.219-1):
A business concern that is at least 51% owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51% of the stock of which is owned by one or more veterans and whose management and daily business operations are controlled by one or more veterans.

9. Service-Disabled Veteran-Owned Small Business Small Business Concern (Reference FAR 52.219-1):
A business concern that is at least 51% owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51% of the stock of which is owned by one or more service-disabled veterans and whose management and daily business operations are controlled by one or more service-disabled veterans or, in the case of a veteran with a permanent and severe disability, the spouse or permanent caregiver of such veteran. Service-disabled veteran is as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

10. HUBZone Small Business Concern (Reference FAR 19.001, 52.219-3): A business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the SBA where HUBZone means a historically underutilized business zone, which is an area located within one or more qualified census tracts, qualified non-metropolitan counties, or lands within the external boundaries of an Indian reservation.

CFR – Code of Federal Regulations
FAR – Federal Acquisitions Regulations
USC – United States Code
SBA – Small Business Administration

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Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

▶ **Go to *www.irs.gov/FormW9* for instructions and the latest information.**

Give Form to the requester. Do not send to the IRS.

Print or type. See **Specific Instructions** on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN,* later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–			–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here **Signature of U.S. person** ▶ **Date** ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9.*

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

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Hosting Overview

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Background

SmartNet North America

Leica Geosystems, Inc. launched SmartNet North America on March 1, 2010. SmartNet is a subscription-based service offering GNSS Network RTK corrections throughout North America with Leica Geosystems directly operating, managing, and maintaining all segments of the network. From the reference stations in the field to the server and IT infrastructure, SmartNet offers a turnkey solution.

SmartNet provides GNSS Network RTK coverage in 50 US States and 8 Canadian Provinces, to anyone in need of Precision GNSS corrections. This includes the precision ag, construction, engineering, surveying, autonomous vehicle, and mapping markets.

Hosting Overview

SmartNet would propose to mount a SmartNet owned GNSS reference station at host organization's facility. The station(s) consists of the following:

- GNSS Antenna (Fig. 1)
- 80" Aluminum Mast (Fig. 2)
- LMR400 Antenna Cable
- GNSS Reference Station (Fig. 3)
- Power Supply

The needs for the station are minimal; we only require a suitable structure to attach the aluminum mast and GNSS antenna that provides a clear and unimpeded view of the sky. Once secured, the mast will support the GNSS antenna cable and provide the necessary horizontal stability to determine the antennas position to +/- 5 mm (Fig. 1). We then route the antenna cable from the antenna into the building to a mutually agreeable location. The GNSS receiver is then secured to a wall or provided enclosure (Fig. 3), and the antenna cable is terminated and connected to the receiver.

The receiver will require an electrical outlet, as well as a connection to the internet. This internet connection can be provided either by the host or SmartNet can arrange to have internet service brought to the site independently. All hardware, labor and installation costs would be covered by SmartNet.

Electrical Requirements

- 22 kW Per Year Consumption – Comparable to single LED Light Bulb
- Average Kilowatt Cost / Hour – $ 0.132 kW / Hour
- Total Electrical Cost - $ 2.904 / Year

Internet Requirements- Guest Network (outside firewall) or Cellular Card (Provided by SmartNet)

- Minimal Consumption – 4-8 kbps
- Access to single LAN Port
- Network connection in DMZ / Guest Network acceptable

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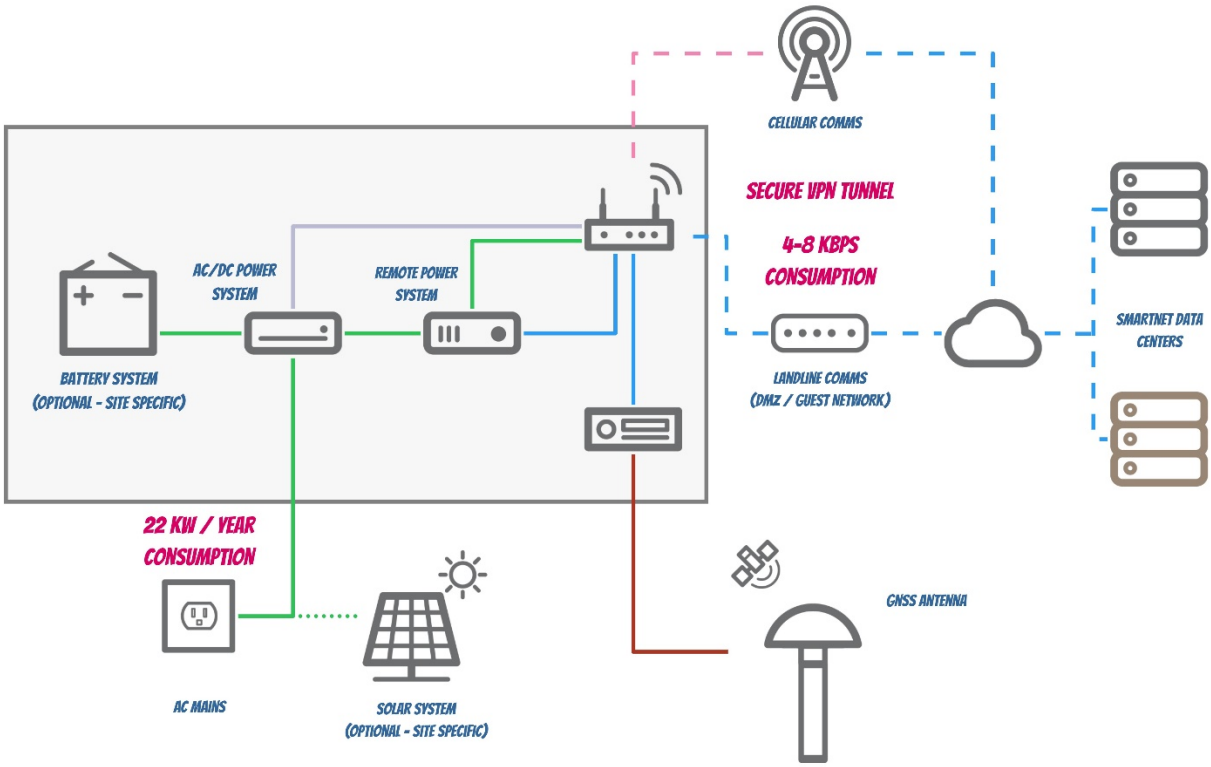

Hosting Compensation

In return for providing SmartNet with a host location, SmartNet would provide compensation to your organization in the form of either:

- **One (1) SmartNet Subscription- Enterprise License**
  Network License. As full and valid consideration for the obligations to Host set forth herein, Leica grants Host access for one GNSS RTK Rover to the Network pursuant to the terms and conditions set forth in the standard SmartNet Terms & Conditions, incorporated herein by reference. The access will remain in effect during the term of this Agreement
- **An Annual Payment / Stipend**
  SmartNet annually performs between 150 - 500 New Installations / Relocations
  Each host site offered provides an annual payment of $1,000.00. Adding a bottom line revenue stream between $150,000.00 - $500,000.00

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Example Photos

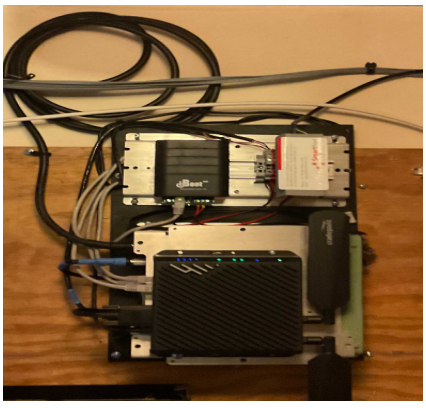
Fig.1 – GNSS Antenna

Fig.2 – 80” Aluminum Mast

Fig. 3 – GNSS Reference Station Receiver

Exterior Mount

Interior Mount



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LEICA BLK2GO - As-built scan offered to each store utilized as a host

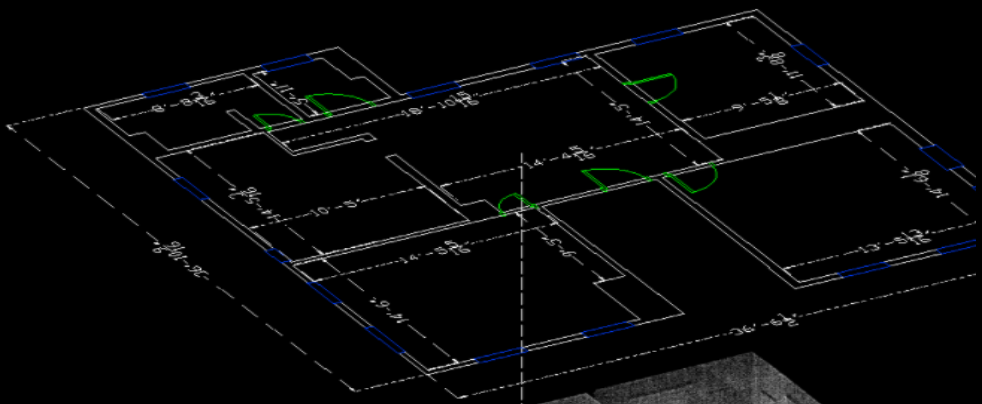
Make the most of your BLK360 and BLK2GO data with automatic registration, precise visual alignment, easy cleanup, and multiple visualization and export options.

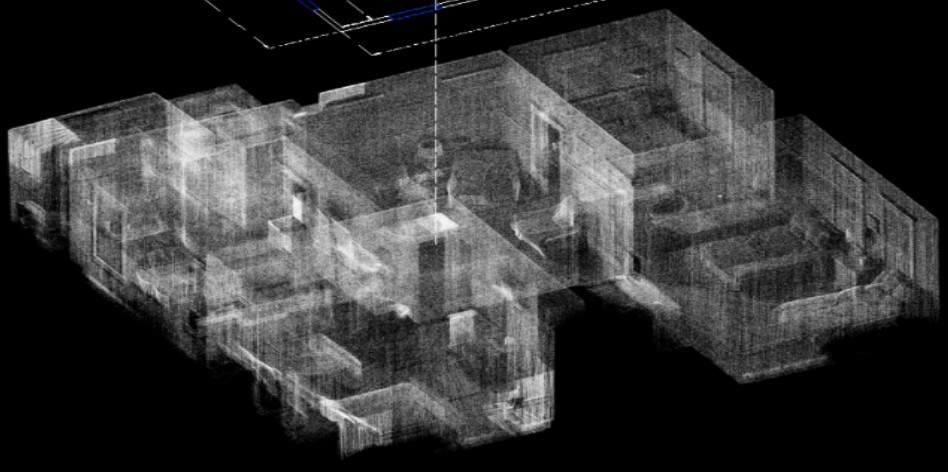
Move between point clouds and images with ease

View and adjust HDR photospheres and thermal imagery from your BLK360. Or view panoramic images from your BLK2GO.

CAD

Create highly accurate 2D floorplans quickly and easily with point cloud data.





Dimensions from Point Clouds

Every dimension you need, even the ones you didn't know you needed.

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-175

APPROVE MAYOR'S SIGNATURE FOR LETTER OF SUPPORT FOR THE HIGHWAY 52 PLANNING AND ENVIRONMENTAL LINKAGES STUDY (PEL) AND ACCESS CONTROL PLAN (ACP) STUDY.

I. **Agenda Date:** Council Meeting – November 2, 2021

II. **Attachments:** a. Letter of Support Highway 52 PEL/ACP Study

III. **Summary Statement:**

Approve Mayor's signature for letter of support for the Highway 52 Planning and Environmental Linkages Study (PEL) and Access Control Plan (ACP) study.

IV. **Submitted by:** _____ Public Works Director

V. **Finance Reviewed** _____ Finance Director

VI. **Approved for Presentation:** _____ City Administrator

VII. **Attorney Reviewed** _____ Approved _____ Pending Approval

VIII. **Certification of Council Approval:** _____ City Clerk _____ Date

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IX. Detail of Issue/Request:

Council approved a payment of $28,000 to Weld County as the City's portion of the cost of this study on October 2020 with AM 2020-167.

The City of Fort Lupton participated in the CO 52 Planning and Environmental Linkages Study (PEL) for the area along the travel corridor stretching from CO 119 north of Boulder to SH 79 east of the Town of Hudson. Final PEL recommendations will be complete by Winter 2021. As an integral participating agency in the study, CDOT is requesting a letter of support for the study recommendations.

Staff and the mayor have regularly attended State Highway 52 Coalition, Technical Team, public outreach, and agency specific meetings; and provided consistent feedback throughout progression of the study.

The study establishes planning criteria for accessing Highway 52 to ensure future considerations are taken during the planning process for new developments along the corridor.

A Resolution and Intergovernmental Agreement will be presented for approval following the completion and presentation of the study resuls.

X. Legal/Political Considerations:

None

XI. Alternatives/Options:

1. *Authorize the Mayor to signing the letter*
2. *Do not sign the letter of support*

XII. Financial Considerations:

None

XIII. Staff Recommendation:

Staff recommends Council approve the Mayor's signature on the letter of support for the PEL/ACP Study.

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CITY OF
Fort Lupton
EST 1836

Mayor Zo Stieber

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

Colorado Department of Transportation

November 2, 2021

Attention: Chad Hall
Colorado Department of Transportation
Region 4
10601 West 10th Street
Greeley, CO 80634

Subject: Support for the CO 52 PEL Study Recommendations

Dear Mr. Hall,

The City of Fort Lupton has participated in the CO 52 Planning and Environmental Linkages Study (PEL) for the area along the travel corridor stretching from CO 119 north of Boulder to SH 79 east of the Town of Hudson, with final PEL recommendations to be complete by Winter 2021. As an integral participating agency in the study, we are sending this letter of support for the study recommendations. We have regularly attended State Highway 52 Coalition, Technical Team, public outreach, and agency specific meetings; and provided consistent feedback throughout progression of the study. We are writing to endorse the following:

1. The study has been a collaborative effort between FHWA, CDOT and local agencies. The PEL was developed with the participation of our agency and information was made available to all interested parties.
2. The purpose and need for highway improvements on CO 52 are clearly defined.
3. The recommended alternatives were selected because they best meet the purpose and need and goals of the CO 52 corridor.
4. A well-planned transportation system is foundational to efficient economic development of communities along the corridor.
5. Corridor improvements will be phased and future projects will incorporate the identified supplemental elements such as bicycle and pedestrian facilities and technology.
6. Identifying funding and continuing to partner with all agencies involved in developing the PEL will be critical in realizing the corridor vision.

We look forward to continuing communication and collaboration with you and CDOT staff in order to implement improvements to benefit CO 52 users, and we commend the consistent professionalism exhibited throughout the project.

Sincerely,

Zo Stieber

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-177

AUTHORIZATION FOR MAYOR TO SIGN AN INDEMNIFICATION AGREEMENT BETWEEN PEERLESS TIRE CO., CITY OF FORT LUPTON AND THE FORT LUPTON HOUSING AUTHORITY

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: a. Indemnification Agreement.

III. Summary Statement:

Attached is an Indemnification Agreement that the City Attorney and Staff have been working on concerning the McDonald's project. This Indemnification agreement is specific to an Environmental Review required by HUD for the lease or transfer of the northern access across property currently owned by the Fort Lupton Housing Authority.

IV. Submitted by: _____ Planning Director

V. Finance Reviewed _____ Finance Director

VI. Approved for Presentation: _____ City Administrator

VII. Attorney Reviewed _____ Approved _____ Pending Approval

VIII. Certification of Council Approval: _____ City Clerk _____ Date

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IX. Detail of Issue/Request:

As indicated in the summary statement this is a request for authorization for the Mayor to sign an Indemnification agreement that would hold the City harmless pertaining to the execution of an Environmental Review on a portion of property currently owned by the Housing Authority. Peerless Tyre Co. has purchased the land that the new McDonald's have been approved for a site plan to redevelop the property. The northern access is currently owned by the Fort Lupton Housing Authority and would need to either be leased or sold/transferred for the use by McDonald's for their approved site plan. HUD has required that an Environmental Assessment be completed on the property prior to the final approval by HUD for the Fort Lupton Housing Authority to lease or sell the portion of property needed for the access. Attached is the Indemnification Agreement and exhibit for your reference.

X. Legal/Political Considerations:

The City Attorney has been diligently working with staff to obtain this indemnification agreement so that the project may move forward into construction.

XI. Alternatives/Options:

Sign the agreement
Don't sign agreement which may require a redesign of the site without the northern access.

XII. Financial Considerations:

NA

XIII. Staff Recommendation:

Staff recommends that Council give the Mayor Authorization to sign the Indemnification Agreement.

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INDEMNIFICATION AGREEMENT

This Indemnification Agreement ("Agreement") is entered into by and between PEERLESS TYRE CO., a Colorado corporation (hereinafter "Landowner"); and CITY OF FORT LUPTON (hereinafter "City") and the FORT LUPTON HOUSING AUTHORITY (hereinafter "the Authority").

RECITALS

Whereas, Landowner desires to sell real property known as 105 1st Street, Fort Lupton, Colorado (the "Property"), to a third party, which third party will then lease the Property for purposes of constructing and operating a McDonald's commercial restaurant thereon (the "Intended Use");

Whereas, Landowner previously operated a gas station on the Property, and the underground storage tanks used in connection with such gas station leaked, resulting in a petroleum release (the "Release");

Whereas, Landowner remediated the Release and obtained a "No Further Action" letter in connection therewith from the Colorado Division of Oil and Public Safety.

Whereas, the Intended Use requires access to the Property from the roadway located adjacent to the Property, which roadway is located on property owned by the Authority (the "Roadway"); the Roadway is depicted and identified on **Exhibit A** attached hereto as the "Area of Access Easement."

As consideration for the Authority's grant of an access easement over the Roadway (or alternatively, the sale of the Roadway property to an appropriate party) for purposes of the Intended Use, the parties' desire to codify in writing the settlement they have reached in connection therewith, the terms of which are as follows:

1. **INDEMNIFICATION.** In consideration for the City's execution of an Environmental Review for Activity/Project that is Exempt or Categorically Excluded form, in the form attached hereto as **Exhibit B**, Landowner agrees to indemnify and hold the City and the Authority, and their respective employees, elected officials, contractors, successors and assigns, harmless from any and all claims, counterclaims, crossclaims, causes of actions, property damage, personal injury damages, liabilities, expenses, attorney fees, remediation costs or obligations of any kind or nature, which may arise from or relate in any way to any environmental condition discovered on the Property or the Roadway property as a result of the Release. Landowner specifically agrees that it shall be responsible for any environmental remediation and any costs associated therewith deemed necessary by any state, local or federal governmental authority pertaining to the condition of the Property.

2. **AMENDMENT/NO ASSIGNMENT/SUCCESSORS.** No modification, amendment or assignment of this Agreement shall be valid unless in writing and signed by all parties to this Agreement. This Agreement shall be binding upon the successors and assigns of the parties and shall run with the land. Notwithstanding anything set forth herein to the contrary, the liability under this Agreement of the Landowner expressly named herein ("Current Landowner") shall continue regardless of Current Landowner's sale or other transfer of title to the Property, but the liability of Current Landowner's successors and assigns under this Agreement shall be limited to events occurring during their respective periods of ownership of the Property. Nothing set forth in

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this Agreement shall be deemed waive or limit Current Landowner's liability for the Release or any other environmental condition on the Property or the Roadway pursuant to any separate agreement.

3. **ELECTRONIC COUNTERPARTS.** This Agreement may be executed in one or more counterparts, and signatures on this Agreement may be communicated by electronic email transmission and shall be binding upon the parties transmitting the same.

4. **COMPLETE AGREEMENT.** This Agreement shall constitute the entire agreement between the parties. There are no agreements, representations or warranties of any kind, except as expressly set forth in this Agreement.

5. **GOVERNING LAW.** This Agreement shall be governed by, and construed in accordance with, the laws of the State of Colorado. All parties agree that any dispute regarding enforcement of this Agreement shall be filed in Weld County District Court.

6. **GOVERNMENTAL IMMUNITY.** Nothing herein shall operate as a waiver of the City's rights of governmental immunity under the Colorado Governmental Immunity Act, or applicable laws of the state of Colorado. Specifically, all such rights of governmental immunity are hereby reserved on behalf of the City or the Authority.

CITY OF FORT LUPTON

BY:_____ _____
NAME_____ Date
TITLE:_____

FORT LUPTON HOUSING AUTHORITY

BY:_____ _____
NAME_____ Date
TITLE:_____

PEERLESS TYRE CO.,
a Colorado corporation

BY: _____ 10/27/2021
NAME Jeffery E Forbes Date
TITLE: VICE PRESIDENT

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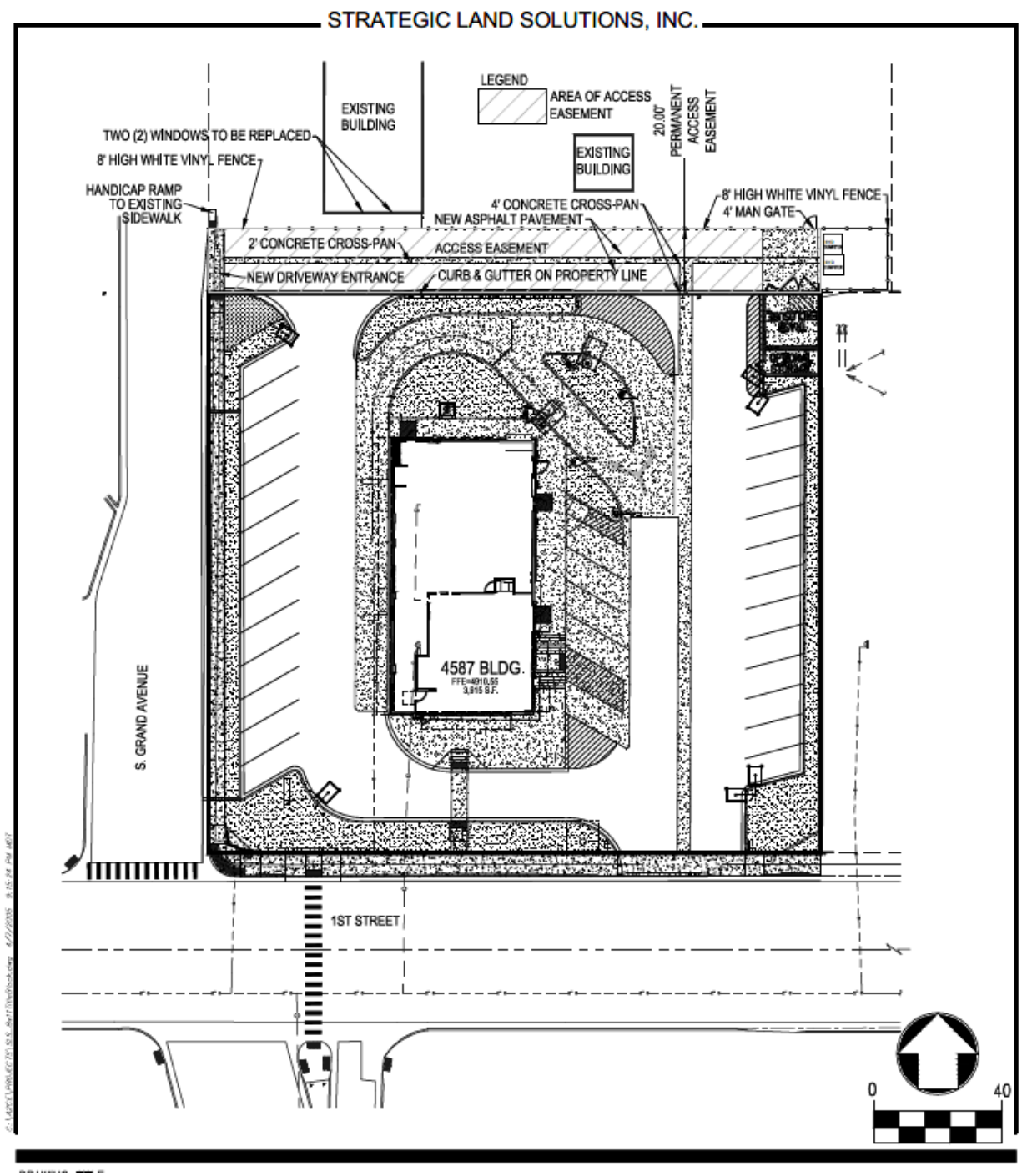
EXHIBIT A
ROADWAY



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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-178

AUTHORIZE THE MAYORS SIGNATURE TO THE JACOBS CONTRACT AMENDMENT 2

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: a. Jacobs Contract Amendment 2

III. Summary Statement:

The Jacobs contract Appendix F denotes the manner in which the Contract is amended for yearly inflation. The increase is based upon the June Consumer Price Index and the Consumer Cost Index for Civilian Workers for the previous year. A formula using those numbers for June 2021 were calculated. The result was a 4% increase which is the maximum allowed by the Contract. Jacobs discussed the increase with Staff and offered a 3.7% increase for 2022.

IV. Submitted by: _____
Jon Mays, Wastewater Plant Supervisor

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed Approved Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

The Consumer Price Index for June 2021 was 5.4%. The Consumer Cost Index was 2.9%. Jacobs operating costs have steadily increased over the past year. The increase is described and agreed upon in the Contract.

X. Legal/Political Considerations:

Discuss any legal or political issues that may be affected by this decision. If there are not any, put "Not Applicable". Examples might include "This issue is required to be addressed in this manner by the Taxpayer's Bill of Right's (TABOR)" or "Section V. of the City's 1996 Golf Revenue Bond covenants require this issue to be addressed in this manner".

Note: You should consult with the City Attorney when discussing legal issues to avoid creating "additional" liabilities. Be careful of unintended consequences.

XI. Alternatives/Options:

The increase is a cost of Jacobs doing business

XII. Financial Considerations:

This section is primarily for more complicated issues that involve grants, debt financing, etc., If the item is already budgeted and no additional funds are necessary, then the fiscal note on page one should suffice. If this section does not apply, put "Not Applicable".

XIII. Staff Recommendation:

Staff recommends accepting Amendment 2 to the Jacobs Contract and authorizing the Mayor's signature.

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AMENDMENT NO. 2
to the
AGREEMENT
for
OPERATIONS, MAINTENANCE AND MANAGEMENT SERVICES
for
FORT LUPTON, COLORADO

THIS AMENDMENT NO. 2 is made and entered into this ___ day of _____ 2021, by and between the Fort Lupton Utility Enterprise Board (hereinafter "Owner") and Operations Management International, Inc. (hereinafter "OMI").

NOW THEREFORE, the Owner and OMI hereby agree that the Agreement dated August 6, 2019 between Owner and OMI (the "Agreement") shall be and is hereby amended and modified in the following manner for the period from January 1, 2022 through December 31, 2022:

1. Article 4.1 is hereby deleted in its entirety and replace with the following:

   4.1 Owner shall pay to OMI as compensation for Services performed under this Agreement a base fee of One Million One Hundred Fifty Thousand Nine Hundred Sixty-Four Dollars ($1,150,964) for the period of January 1, 2022 through December 31, 2022 exclusive of rebateable budgets set forth in Article 4.4, 4.5, 4.6 and 4.7 (the "Rebateable Limits"). Subsequent years' base fee shall be determined as hereinafter specified.

All other terms and conditions remain in effect in accordance with the Agreement referenced in this Amendment. Both parties indicated their approval of this Agreement by their signatures below.

OPERATIONS MANAGEMENT INTERNATIONAL, INC.

Authorized Signature:

_____
Name: Andrew Appleton
Title: Vice President

Date: _____

FORT LUPTON UTILITY ENTERPRISE BOARD

Authorized Signature:

_____
Name: Zo Steiber
Title: Mayor

Date: _____

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-180

APPROVAL TO AUTHORIZE THE MAYOR TO SIGN A RESOLUTION ADOPTING THE WELD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:
a. Adoption Resolution
b. Weld County Multi-Jurisdictional Hazard Mitigation Plan

III. Summary Statement:

Authorize the mayor to sign the Weld County Multi-Jurisdictional Hazard Mitigation Plan.

IV. Submitted by: _____
City Administrator

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed Approved Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

The Weld County Multi-Jurisdictional Hazard Mitigation Plan ("the Plan") was developed in cooperation with several jurisdictions within Weld County outlining the duties and responsibilities of individual jurisdictions during emergency situations. The plan fulfills the FEMA requirements for C.F.R. 201.6 and has been approved by the Federal Emergency Management Administration.

X. Legal/Political Considerations:

Participation in this plan enables the city to better serve its citizens in emergency situation. It coordinates emergency responses to those situations, and enhances the federal response to local emergencies.

XI. Alternatives/Options:

1. *Direct the mayor to sign.*
2. *Direct the mayor not to sign.*

XII. Financial Considerations:

There is no financial contribution for this plan.

XIII. Staff Recommendation:

Staff recommends adopting the plan.

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RESOLUTION NO. 2021Rxxx

A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON ADOPTING THE WELD COUNTY MULTIJURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the City of Fort Lupton with the assistance from Weld County, has gathered information and prepared the Weld County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, the Weld County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in accordance with FEMA requirements at 44 C.F.R. 201.6; and,

WHEREAS, the City of Fort Lupton is a local unit of government that has afforded the citizens an opportunity to comment and provide input in the Plan and the actions in the Plan; and,

WHEREAS, the City of Fort Lupton has reviewed the Plan and affirms that the Plan will be updated no less than every five years;

NOW THEREFORE BE IT RESOLVED by that the Fort Lupton City Council adopts the Weld County Multi-Jurisdictional Hazard Mitigation Plan as this jurisdiction's and resolves to execute the actions in the Plan.

APPROVED AND PASSED BY A MAJORITY VOTE OF THOSE ELECTED TO THE CITY COUNCIL THIS 2nd DAY OF OCTOBER 2021.

City of Fort Lupton, Colorado

_____
Zo Stieber, Mayor

Attest:

_____
Maricela Peña, City Clerk

Approved as to form:

_____
Andy Ausmus, City Attorney

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The following link will direct you to the Hazard Mitigation Plan provided on Weld County's website:

https://www.weldgov.com/Government/Departments/Office-of-Emergency-Management/Hazard-Mitigation

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-181

APPROVING A RESOLUTION ACCEPTING THE CITY OF FORT LUPTON PARTICIPATE IN THE OPIOIDS SETTLEMENT

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:

a. Resolution 2021R0xx
b. Presentation from Colorado Department of Law
c. Memorandum of Understanding
d. The Subdivision Settlement Participation Form that releases subdivisions' legal claims against Johnson & Johnson
e. The Subdivision Settlement Participation Form that releases subdivisions' legal claims against AmerisourceBergen, Cardinal Health, and McKesson
f. Colorado Subdivision Escrow Agreement

III. Summary Statement:

On August 26, 2021, the Colorado Attorney General Phil Weiser signed the Colorado Opioids Settlement Memorandum of Understanding ("Colorado MOU"). The Colorado MOU provides a framework to settle Colorado legal claims on behalf of Colorado governments against the "Big 3" opioid distributors (AmerisourceBergen, Cardinal Health, and McKesson) and opioid manufacturer Johnson & Johnson. The Colorado MOU provides settlement funds for "Approved Purposes" broadly focused on abatement strategies to combat the opioid epidemic. The settlement funds amount to approximately $400 million with 20% of that total being distributed to participating local governments. In order to join the Colorado MOU, the City must execute the Colorado MOU, the Subdivision Settlement Participation Forms (Big 3 and Johnson & Johnson), and the Colorado Subdivision Escrow Agreement.

IV. Submitted by: _____
Andy Ausmus, City Attorney

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed _____ Approved _____ Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

The State of Colorado has participated in the national opioid litigation effort against private drug manufacturers since 2016. A settlement has been reached with many states, which includes the State of Colorado. The amount the State as a whole may receive from the settlement proceeds is dependent upon participation by local governments. Attached are documents that need to be approved and signed by the Mayor of Fort Lupton in order to participate in the national opioid settlement negotiated by the various states. Approval of the attached documents provides Fort Lupton options to directly receive funds over an 18 year period or redirect funds to a regional Weld County committee to be formed at a later date.

X. Legal/Political Considerations:

The Attached documents have been reviewed by the Colorado Attorney General's office, and the Weld County Attorney's office as well as the Fort Lupton City Attorney.

The documents attached hereto are approved and appear to be in the best interests of the City of Fort Lupton in order to allow for participation in the national opioid settlement.

XI. Alternatives/Options:

1. Join the settlement and participate in the distribution of settlement proceeds.
2. Don't join the settlement.

XII. Financial Considerations:

Payments will be made over an estimated 18 year period.
Fort Lupton can choose to accept the annual payments, or redirect its payments to a Weld County regional committee.

XIII. Staff Recommendation:

Staff seeks recommendation.

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RESOLUTION NO. 2021Rxxx

A RESOLUTION OF THE CITY OF FORT LUPTON COLORADO AUTHORIZING THE MAYOR TO EXECUTE ALL AGREEMENTS AND TO PERFORM ALL OTHER ACTIONS NECESSARY TO JOIN THE COLORADO OPIOIDS SETTLEMENT MEMORANDUM OF UNDERSTANDING

WHEREAS, the City of Fort Lupton ("City") is a statutory municipality organized under the laws of the State of Colorado; and

WHEREAS, opioid addiction and dependence caused by opioid manufacturers and distributors has ravaged Colorado communities; and

WHEREAS, on August 26, 2021, the Colorado Attorney General Phil Weiser signed the Colorado Opioids Settlement Memorandum of Understanding ("Colorado MOU"); and

WHEREAS, the Colorado MOU provides a framework to settle Colorado legal claims on behalf of Colorado governments against the "Big 3" opioid distributors (AmerisourceBergen, Cardinal Health, and McKesson) and opioid manufacturer Johnson & Johnson; and

WHEREAS, the Colorado MOU provides settlement funds for "Approved Purposes" broadly focused on abatement strategies to combat the opioid epidemic; and

WHEREAS, the settlement funds amount to approximately $400 million with 20% of that total being distributed to participating local governments; and

WHEREAS, settlement funds will only be made available to participating local governments when 95% participation by certain local governments has been reached; and

WHEREAS, execution of all settlement documents has been requested prior to November 5, 2021; and

WHEREAS, if the Colorado MOU is successful, settlement funds could be made available as soon as July 2022; and

WHEREAS, in order to join the Colorado MOU, the City must execute the Colorado MOU, the Subdivision Settlement Participation Forms (Big 3 and Johnson & Johnson), and the Colorado Subdivision Escrow Agreement; and

WHEREAS, the City of Fort Lupton City Council (the "Council") desires to join the Colorado MOU; and

WHEREAS, in order to join the Colorado MOU, the Council desires to authorizes the Mayor to execute the following documents on the Town's behalf:

1. The MOU that lays out the allocation of Opioid recoveries in the State of Colorado (**Exhibit 1**).
2. The Subdivision Settlement Participation Form that releases subdivisions' legal claims against Johnson & Johnson (**Exhibit 2**).
3. The Subdivision Settlement Participation Form that releases subdivisions' legal claims against AmerisourceBergen, Cardinal Health, and McKesson (**Exhibit 3**).

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4. The Colorado Subdivision Escrow Agreement that ensures subdivisions' legal claims are released only when 95% participation by certain local governments has been reached. (**Exhibit 4**).

NOW, THEREFORE, BE IT RESOLVED the Fort Lupton City Council authorizes the Mayor, in consultation with the City Attorney and Town Administrator, to take all other actions necessary to join the Colorado MOU hereby incorporated by reference.

1. The MOU that lays out the allocation of Opioid recoveries in the State of Colorado (**Exhibit 1**).

2. The Subdivision Settlement Participation Form that releases subdivisions' legal claims against Johnson & Johnson (**Exhibit 2**).

3. The Subdivision Settlement Participation Form that releases subdivisions' legal claims against AmerisourceBergen, Cardinal Health, and McKesson (**Exhibit 3**).

4. The Colorado Subdivision Escrow Agreement that ensures subdivisions' legal claims are released only when 95% participation by certain local governments has been reached. (**Exhibit 4**).

APPROVED AND PASSED BY A MAJORITY VOTE OF THOSE ELECTED TO THE CITY COUNCIL OF THE CITY OF FORT LUPTON, COLORADO THIS 2nd DAY OF NOVEMBER 2021.

City of Fort Lupton, Colorado

_____

Zo Stieber, Mayor

Attest:

_____

Maricela Peña, City Clerk

Approved as to form:

_____

Andy Ausmus, City Attorney

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COLORADO DEPARTMENT OF LAW

PHIL WEISER

Colorado Attorney General

HEIDI WILLIAMS

Director, Opioid Response

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The Problem

Colorado has lost over 7000 people to fatal opioid prescription, heroin and/or Fentanyl overdose

Roughly 70% of people who use heroin report they used opioid medications first

Our state has only around 15-20% of the total drug treatment capacity we need.

CDPHE. (n.d.). Counts of drug overdose deaths due to any opioid in Colorado, 2010-2019. Retrieved from https://cohealthviz.dphe.state.co.us/t/PSDVIP-MHPPUBLIC/views/DrugOverdoseDashboard/PoisoningDeathFrequencies?iframeSizedToWindow=true&:display_count=n&:showAppBanner=false&:origin=viz_share_link&:showVizHome=n&:isGuestRedirectFromVizportal=y&:embed=y

Colorado Prescription Drug Abuse Consortium. (n.d.). Heroin in Colorado (p. 3, Rep.). doi:http://www.corxconsortium.org/wp-content/uploads/Heroin-in-Colorado-FINAL-April-2017.pdf

Brown, J. (2020, June 28). Opioid crisis in Colorado could get worse amid pandemic. Retrieved August 6, 2020, from https://apnews.com/bf1c11ac45d63808ffeae945c750cd81

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Core Principles for All Colorado Plan

MAXIMIZE SETTLEMENT FUNDS

UTILIZE EXISTING INFRASTRUCTURE TO THE EXTENT POSSIBLE

ENSURE EQUITY FOR ALL LOCAL GOVERNMENTS

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ADDRESSING THE OPIOID EPIDEMIC

TREATMENT

Evidence-based treatment models

RECOVERY

Evidence-based recovery models

CRIMINAL JUSTICE

Innovative treatment, diversion strategies and wrap-around services

PREVENTION, EDUCATION

Widespread prevention and education efforts among communities

HARM REDUCTION

Strategies for reducing or mitigating the negative consequences associated with substance use

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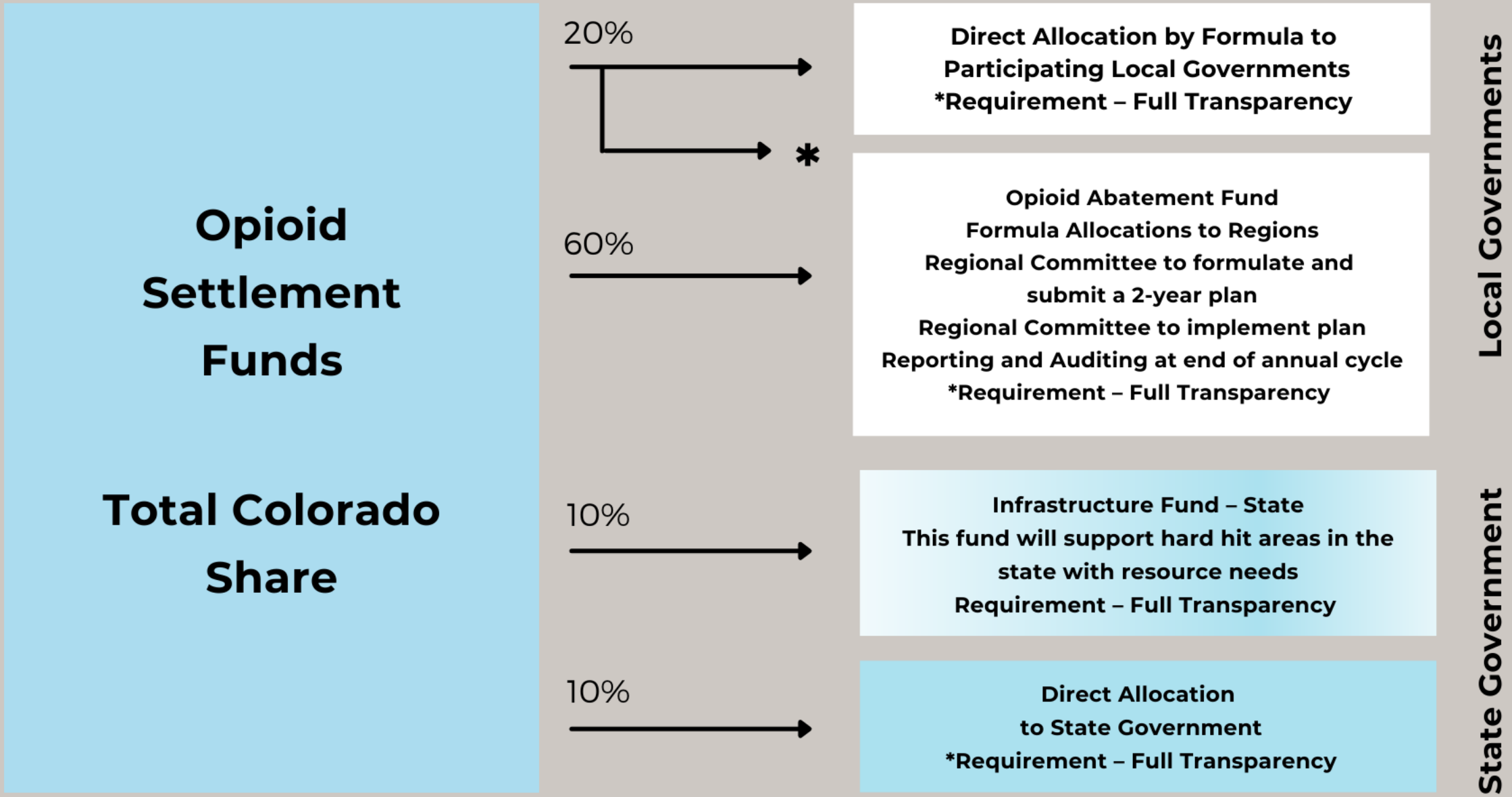

*Local government may direct its share to county or region

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Governance

Statewide Opioid Abatement Council

6

Local Government Appointees

6

Attorney General Appointees

1

Chair, non-voting, except in instance of a tie

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Regional Governance

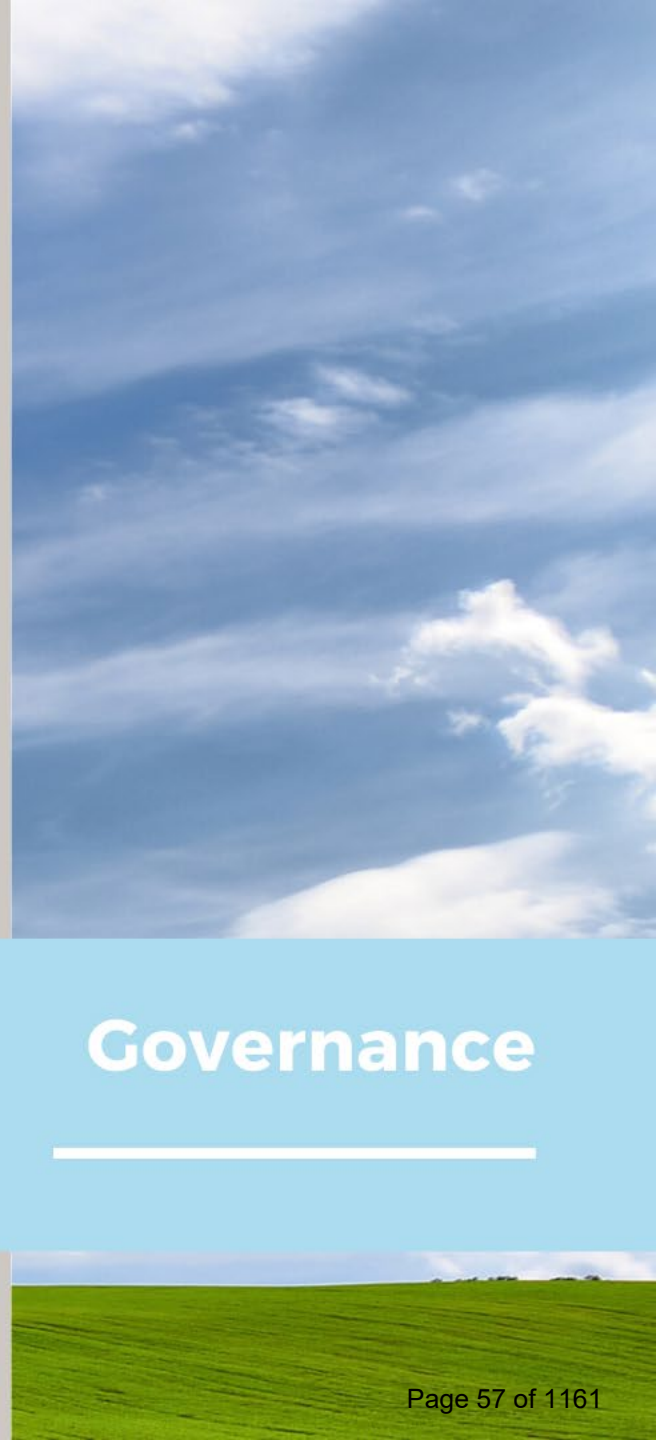
Voting Members (Recommended List: Participating Local Governments to Decide)

- 1 rep appointed by each county (can be commissioners)
- 1 rep appointed by the rotating city within each county (or other city agreed upon) (can be councilmembers and mayors)
- 1 rep from each public health department within the region
- 1 rep from a county human services department
- At least 1 rep appointed from law enforcement within region (sheriff, police, DA etc.)
- 1 rep from a municipal or county court system within region

*such other reps as participating counties/cities agree on (not to include providers who may be recipients of funds)

Non-Voting Members

- Reps from behavioral health providers
- Reps from health care providers
- Recovery/treatment experts
- Other county or city reps
- AG rep(s)
- Community rep(s)
- Affected persons



Governance

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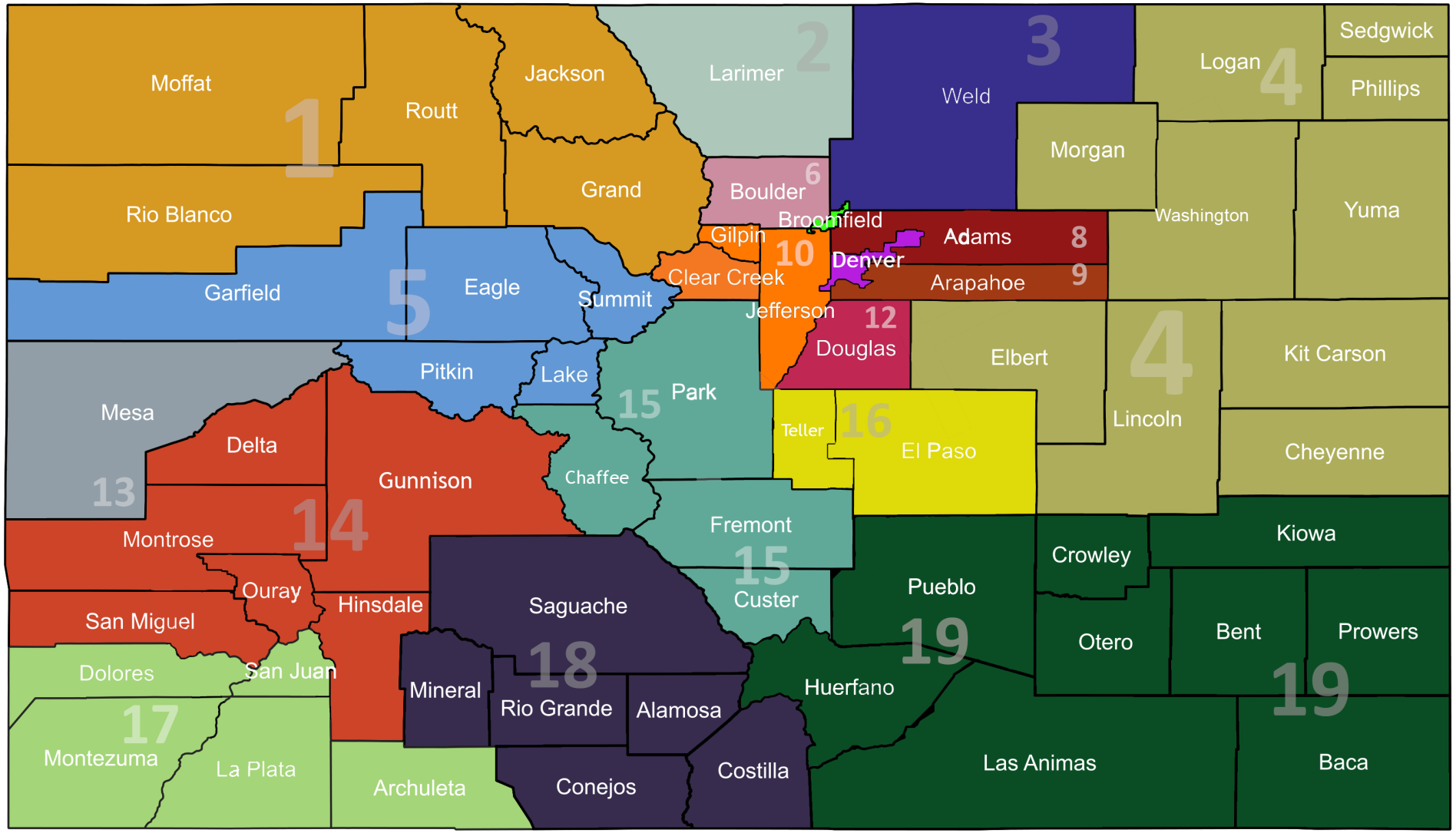
Regions for the distribution of opioid settlement funds



Region 1	Region 5	Region 9	Region 13	Region 17
Region 2	Region 6	Region 10	Region 14	Region 18
Region 3	Region 7 (Broomfield)	Region 11 (Denver)	Region 15	Region 19
Region 4	Region 8	Region 12	Region 16	

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We Want to Hear from You

Please tell us about any successes, challenges, and gaps related to opioids in your community.

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Contact Information:

Heidi Williams

Director of Opioid Response

Heidi.Williams@coag.gov

303-819-9722

THANK YOU

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COLORADO OPIOIDS SETTLEMENT MEMORANDUM OF UNDERSTANDING ("MOU")

Thursday, August 26, 2021

August 25, 2021 Attorney General version

A. Definitions

As used in this MOU:

1. "Approved Purpose(s)" shall mean forward-looking strategies, programming, and services to abate the opioid epidemic as identified by the terms of any Settlement. If a Settlement is silent on Approved Purpose(s), then Approved Purpose(s) shall mean those forward-looking strategies to abate the opioid epidemic identified in **Exhibit A** or any supplemental forward-looking abatement strategies added to **Exhibit A** by the Abatement Council. Consistent with the terms of any Settlement, "Approved Purposes" shall also include the reasonable administrative costs associated with overseeing and administering Opioid Funds from each of the four (4) Shares described in Section (B)(2). Reimbursement by the State or Local Governments for past expenses are not Approved Purpose(s). "Approved Purposes" shall include attorneys' fees and expenses incurred in the course of the opioid litigation that are paid through the process discussed below.

2. "County Area" shall mean a county in the State of Colorado plus the Local Governments, or portion of any Local Government, within that county.

3. "Effective Date" shall mean the date on which a court of competent jurisdiction, including any bankruptcy court, enters the first Settlement by order or consent decree. The Parties anticipate that more than one Settlement will be administered according to the terms of this MOU, but that the first entered Settlement will trigger the formation of the Abatement Council in Section (C) and the Regional Councils in Section (F)(5).[1]

4. "General Abatement Fund Council," or "Abatement Council," shall have the meaning described in Section (C), below.

[1] For the avoidance of doubt, the McKinsey Settlement and any other Settlement that precedes the finalization of drafting this MOU are not considered a trigger for purposes of the calculation of "Effective Date."

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5. "Local Government(s)" shall mean all counties in the State of Colorado and the municipalities, towns, and county and city municipal corporations that are listed in **Exhibit B**.

6. "National Opioid Settlement Administrative Fund" shall mean any fund identified by a Settlement for the national distribution of Opioid Funds.

7. "Opioid Funds" shall mean damage awards obtained through a Settlement.

8. "Opioid Settling Defendant" shall mean any person or entity, or its affiliates, that engages in or has engaged in the manufacture, marketing, promotion, distribution, or dispensing of licit opioids.

9. "Participating Local Government(s)" shall mean all Local Governments that sign this MOU, and if required under terms of a particular Settlement, who have executed a release of claims with the Opioid Settlement Defendant(s). For the avoidance of doubt, a Local Government must sign this MOU to become a "Participating Local Government." Local Governments may designate the appropriate individual from their entity to sign the MOU.

10. "Party" or "Parties" shall mean the State and/or Participating Local Government(s).

11. "Qualified Settlement Fund Account," or "QSF Account," shall mean an account set up as a qualified settlement fund, 468b fund, as authorized by Treasury Regulations 1.468B-1(c) (26 CFR §1.468B-1).

12. "Regional Council" shall have the meaning described in Section (F)(5), below.

13. "Settlement" shall mean the negotiated resolution of legal or equitable claims against an Opioid Settling Defendant when that resolution has been jointly entered into by the State and the Participating Local Governments, or by any individual Party or collection of Parties that opt to subject their Settlement to this MOU. Unless otherwise directed by an order from a United States Bankruptcy Court, "Settlement" shall also include distributions from any liquidation under Chapter 7 of the United States Bankruptcy Code or confirmed plan under Chapter 11 of the United States Bankruptcy Code that treats the claims of the State and Local Governments against an Opioid Settling Defendant.

14. "The State" shall mean the State of Colorado acting through its Attorney General and the Colorado Department of Law.

B. Allocation of Settlement Proceeds

1. All Opioid Funds shall be held in accordance with the terms of any Settlement. If a Settlement allows Opioid Funds to be held in a National Opioid Settlement Administrative Fund, then Opioid Funds shall be held in such National Opioid Settlement Administrative Fund. If a Settlement does not allow for Opioid Funds

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to be held in a National Opioid Settlement Administrative Fund, Opioid Funds shall be held in a Colorado-specific QSF Account or, under the following limited circumstances, in the State's Custodial Account: 1) if at the time of a Settlement, a Colorado-specific QSF Account is not yet established, although in such case, the Opioid Funds shall be transferred to the Colorado-specific QSF Account once it is established or 2) where the Abatement Fund Council determines Opioids Funds cannot be legally held in a Colorado-specific QSF Account. Regardless of whether Opioid Funds are held in a National Administrative Fund, a Colorado-specific QSF Account, or in the State's Custodial Account, the Abatement Council shall appoint one of its members to serve as the point of contact in accordance Section (C)(4)(b)(i), below.

2. All Opioid Funds, at the time of a Settlement or at the time designated in the Settlement documents, shall be divided and distributed as follows:[2]

   a. **10%** directly to the State ("State Share") for Approved Purposes in accordance with Section (D), below;

   b. **20%** directly to Participating Local Governments ("LG Share") for Approved Purposes in accordance with Section (E), below;

   c. **60%** directly to Regions ("Regional Share") for Approved Purposes in accordance with Section (F), below; and

   d. **10%** to specific abatement infrastructure projects ("Statewide Infrastructure Share") for Approved Purposes in accordance with Section (G), below.

3. Distribution of the Shares in Section B(2)(a) – (d) shall be direct, meaning that funds held in accordance with Section B(1) shall be disbursed directly to the State, Participating Local Governments, Regions, and the Statewide Infrastructure Share according to the terms of this MOU.

4. All Opioid Funds, regardless of allocation, shall be used for Approved Purposes.

5. Participating Local Governments may elect to share, pool, or collaborate with their respective allocation of the LG or Regional Shares in any manner they choose, so long as such sharing, pooling, or collaboration is used for Approved Purposes and complies with the terms of this MOU and any Settlement.

C. General Abatement Fund Council

1. A General Abatement Fund Council (the "Abatement Council"), consisting of representatives appointed by the State and Participating Local Governments, shall

[2] This MOU treats multi-county health departments as county health departments for purposes of allocation and distribution of abatement proceeds and therefore multi-county health departments shall not receive any Opioid Funds directly. Third-Party Payors ("TPPs") are not Parties to this MOU.

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be created to ensure the distribution of Opioid Funds complies with the terms of any Settlement and to provide oversight of the Opioid Funds in accordance with the terms of this MOU.

2. **Membership:** The Abatement Council shall consist of the following thirteen (13) members, who shall serve in their official capacity only.

a. **State Members:** Seven (7) members shall be appointed by the State, as authorized volunteers of the State, as follows:

(i) A Chair to serve as a non-voting member, except in the event of a tie;

(ii) Two (2) members who are licensed professionals with significant experience in substance use disorders;

(iii) Three (3) members who are professionals with significant experience in prevention, education, recovery, treatment, criminal justice, rural public health issues, or government administration related to substance use disorders; and

(iv) One (1) member or family member affected directly by the opioid crisis.

b. **Local Government Members:** Six (6) members shall be appointed by the Participating Local Governments. Local Government Members shall be a County Commissioner, Mayor, City or Town Council Member, or a professional with significant experience in prevention, education, recovery, treatment, criminal justice, rural public health issues, or governmental administration related to substance use disorders. A Participating Local Government may determine which Local Government Members are eligible (or ineligible) to serve on the General Abatement Fund Council. County Commissioners, City or Town Council Members, and/or Mayors from the Regions identified in **Exhibit C** shall collaborate to appoint Local Government Members as follows:

(i) Two (2) Members from Regions 1, 5, 13, 14, 15, 17, 18;

(ii) Two (2) Members from Regions 2, 6, 7, 8, 9, 10, 11, 12, 16; and

(iii) Two (2) Members from Regions 3, 4, 19.

c. **Terms:** The Abatement Council shall be established within ninety (90) days of the Effective Date. In order to do so, within sixty (60) days of the Effective Date, the State shall appoint the State Members in accordance with Section (C)(2)(a), and after conferral with the Local Governments, CCI and CML shall jointly appoint six (6) Local Government Members for an initial term not to exceed one year. Thereafter, Members shall be

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appointed in accordance with this Section and Sections (C)(2)(a) and (b) and may serve no more than two (2) consecutive two-year terms, for a total of four (4) consecutive years. Except that, beginning in the second year only, two (2) State Members and two (2) Local Government members shall be appointed for a three-year term and may serve one consecutive two-year term thereafter. The Chair shall have no term but may be replaced at the State's discretion.

(i) If a State or Local Government Member resigns or is otherwise removed from the Abatement Council prior to the expiration of their term, a replacement Member shall be appointed within sixty (60) days in accordance with Sections (C)(2)(a) and (b).

(ii) If a Local Government Member vacancy exists for more than sixty (60) days, the State shall appoint a replacement Local Government Member to serve until the vacancy is filled in accordance with Section (C)(2)(b).

3. **Duties:** The Abatement Council is primarily responsible for ensuring that the distribution of Opioid Funds complies with the terms of this MOU. The Abatement Council is also responsible for oversight of Opioid Funds from the Regional Share in accordance with Section (F), below, and for developing processes and procedures for the distribution and oversight of Opioid Funds from the Statewide Infrastructure Share in accordance with Section (G) below.

4. **Governance:** The Abatement Council shall draft its own bylaws or other governing documents, which must include appropriate conflict of interest and dispute resolution provisions, in accordance with the terms of this MOU and the following principles:

a. **Authority:** The Abatement Council does not have rulemaking authority. The terms of this MOU and any Settlement, as entered by any court of competent jurisdiction, including any bankruptcy court, control the authority of the Abatement Council and the Abatement Council shall not stray outside the bounds of the authority and power vested by this MOU and any Settlement.

b. **Administration:** The Abatement Council shall be responsible for an accounting of all Opioid Funds. The Abatement Council shall be responsible for releasing Opioid Funds in accordance with Section (B)(1) for the Regional and Statewide Infrastructure Shares in Sections (B)(2)(c) and (d) and shall develop policies and procedures for the release and oversight of such funds in accordance with Sections (F) and (G). Should the Abatement Council require assistance with providing an accounting of Opioid Funds, it may seek assistance from the State.

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(i) The Abatement Council shall appoint one of its members to serve as a point of contact for the purpose of communicating with the entity holding Opioid Funds in accordance with Section (B)(1) and in that role shall only act as directed by the Abatement Council.

c. **Transparency:** The Abatement Council shall operate with all reasonable transparency and operate in a manner consistent with all Colorado laws relating to open records and meetings regardless of whether the Abatement Council is otherwise obligated to comply with them.

(i) The Abatement Council shall develop a centralized public dashboard or other repository for the publication of expenditure data from any Party or Regional Council that receives Opioid Funds in accordance with Sections (D)-(G).

(ii) The Abatement Council may also require outcome related data from any Party or Regional Council that receives Opioid Funds in accordance with Sections (D)-(G) and may publish such outcome related data in the centralized public dashboard or other repository described above. In determining which outcome related data may be required, the Abatement Council shall work with all Parties and Regional Councils to identify appropriate data sets and develop reasonable procedures for collecting such data sets so that the administrative burden does not outweigh the benefit of producing such outcome related data.

(iii) For purposes of funding the centralized public dashboard or other repository described above, the Abatement Council shall make good faith efforts to seek funding from outside sources first, otherwise the State shall provide such funding.

d. **Collaboration:** The Abatement Council shall facilitate collaboration between the State, Participating Local Governments, Regional Councils, and other stakeholders for the purposes of sharing data, outcomes, strategies, and other relevant information related to abating the opioid crisis in Colorado.

e. **Decision Making:** The Abatement Council shall seek to make all decisions by consensus. In the event consensus cannot be achieved, unless otherwise required in this MOU, the Abatement Council shall make decisions by a majority vote of its Members. The Chair shall only vote in the event of a tie.

f. **Due Process:** The Abatement Council shall develop the due process procedures required by Section (G)(3)(d) for Parties to dispute or challenge remedial actions taken by the Abatement Council for Opioid Funds from the Statewide Infrastructure Share. The Abatement Council

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shall also abide by the due process principles required by Section (F)(12)-(13) for Regions to dispute or challenge remedial actions taken by the Abatement Council for Opioid Funds from the Regional Share.

g. **Legal Status:** The Abatement Council shall not constitute a separate legal entity.

h. **Legal Representation:** To the extent permitted by law, the State shall provide legal counsel to State Members for all legal issues arising from those State Members' work on the Abatement Council. At all times, Local Government Members of the Abatement Council are entitled to receive legal representation from their respective governmental entities. In the event of a conflict, the Abatement Council and its members may retain the services of other legal counsel.

i. **Compensation:** No member of the Abatement Council shall be compensated for their work related to the Abatement Council.

D. State Share

1. In accordance with Sections (B)(1) and (B)(2)(a), and the terms of any Settlement, the State Share shall be paid directly to the State in accordance with the terms of this Section (D).

2. The State maintains full discretion over distribution of the State Share anywhere within the State of Colorado, however, the State Share shall be used for Approved Purposes only. The State will work to reduce administrative costs as much as practicable.

3. On an annual basis, as determined by the Abatement Council, the State shall provide all expenditure data, including administrative costs, from the State Share to the Abatement Council for purposes of maintaining transparency in accordance with Section (C)(4)(c)(i). The Abatement Council may require the State to provide additional outcome-related data in accordance with Section (C)(4)(c)(ii) and the State shall comply with such requirements.

4. If the State disputes the amount of Opioid Funds it receives from the State Share, the State shall alert the Abatement Council within sixty (60) days of discovering the information underlying the dispute. Failure to alert the Abatement Council within this time frame shall not constitute a waiver of the State's right to seek recoupment of any deficiency in its State Share.

E. LG Share

1. In accordance with Sections (B)(1) and (B)(2)(b), and the terms of any Settlement, the LG Share shall be paid directly to Participating Local Governments in accordance with the terms of this Section (E).

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2. Allocations to Participating Local Governments from the LG Share shall first be determined using the percentages shown in **Exhibit D**.

3. The LG Share for each County Area shall then be allocated among the county and the other Participating Local Governments within it. **Exhibit E** reflects the default allocation that will apply unless the Participating Local Governments within a County Area enter into a written agreement providing for a different allocation. The Participating Local Governments may elect to modify the allocation for a County Area in **Exhibit E**, but such modification to the allocation in **Exhibit E** shall not change a County Area's total allocation under Section (E)(2).

4. A Local Government that chooses not to become a Participating Local Government will not receive a direct allocation from the LG Share. The portion of the LG Share that would have been allocated to a Local Government that is not a Participating Local Government will instead be re-allocated to the Regional Share for the Region where the Local Government is located, in accordance with Section (F), below.

5. In the event a Participating Local Government dissolves or ceases to exist during the term of any Settlement, the allocation for that Participating Local Government from the LG Share shall be re-allocated as directed by any Settlement, and if not specified, be re-allocated to the Regional Share for the Region in which the Participating Local Government was located, in accordance with Section (F). If a Participating Local Government merges with another Participating Local Government, the allocation for that Participating Local Government from the LG Share shall be re-allocated as directed by any Settlement, and if not specified, shall be re-allocated to the successor Participating Local Government's allocation of the LG Share. If a Participating Local Government merges with a Local Government that is not a Participating Local Government, the allocation for that Participating Local Government from the LG Share shall be re-allocated as directed by any Settlement, and if not specified, be re-allocated to the Region in which the merging Participating Local Government was located, in accordance with Section (F), below.

6. A Participating Local Government may forego its allocation of the LG Share and direct its allocation to the Regional Share for the Region where the Participating Local Government is located, in accordance with Section (F) below, by affirmatively notifying the Abatement Council on an annual basis of its decision to forego its allocation of the LG Share. A Participating Local Government's election to forego its allocation of the LG Share shall carry over to the following year unless the Participating Local Government notifies the Abatement Council otherwise. If a Participating Local Government elects to forego its allocation of the LG Share, the Participating Local Government shall be excused from the reporting requirements required by Section (E)(8).

7. Participating Local Governments maintain full discretion over the distribution of their allocation of the LG Share anywhere within the State of Colorado, however,

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all Participating Local Governments shall use their allocation from the LG Share for Approved Purposes only. Reasonable administrative costs for a Participating Local Government to administer its allocation of the LG Share shall not exceed actual costs or 10% of the Participating Local Government's allocation of the LG Share, whichever is less.

8. On an annual basis, as determined by the Abatement Council, all Participating Local Governments shall provide all expenditure data, including administrative costs, from their allocation of the LG Share to the Abatement Council for purposes of maintaining transparency in accordance with Section (C)(4)(c)(i). The Abatement Council may require Participating Local Governments to provide additional outcome related data in accordance with Section (C)(4)(c)(ii) and all Participating Local Governments shall comply with such requirements.

9. If any Participating Local Government disputes the amount of Opioid Funds it receives from its allocation of the LG Share, the Participating Local Government shall alert the Abatement Council within sixty (60) days of discovering the information underlying the dispute. Failure to alert the Abatement Council within this time frame shall not constitute a waiver of the Participating Local Government's right to seek recoupment of any deficiency in its LG Share.

F. Regional Share

1. In accordance with Sections (B)(1) and (B)(2)(c), and the terms of any Settlement, the Regional Share shall be paid to the Regions in accordance with the terms of this Section (F).

2. Participating Local Governments shall organize themselves into the Regions depicted in **Exhibit C**. Municipalities located in multiple Regions may join all or some of the Regions in which they are located according to **Exhibit C**.

3. Allocations to Regions will be distributed according to **Exhibit F**. For multi-county Regions, each Region's share listed in **Exhibit F** is calculated by summing the individual percentage shares listed in **Exhibit D** for the counties within that Region. The percentages in **Exhibit F** are based on the assumption that every Local Government in each Region becomes a Participating Local Government.

4. In the event a city, town, or other municipality that is a Participating Local Government merges, dissolves, or ceases to exist during the term of any Settlement, the allocation of the Regional Share owed to the Region in which that Participating Local Government existed shall be re-allocated as directed by any Settlement, and if not specified, shall not be modified from **Exhibit F**. If a county that is a Participating Local Government merges with another county within its Region, the allocation of the Regional Share owed to the Region in which that county existed shall be re-allocated as directed by any Settlement, and if not specified, shall not be modified from **Exhibit F**. If a county that is a Participating Local Government merges with a county in a different Region during the term of

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any Settlement, the allocation of the Regional Share owed to the Region in which that county existed shall be re-allocated as directed by any Settlement, and if not specified, shall be re-allocated to the Region in which that Participating Local Government merged in accordance with **Exhibit F**.

5. Each Region must create its own Regional Council while giving consideration to the regional governance models illustrated in **Exhibit G**. The Regional Council must be formed by the Participating Local Governments within the Region and each Regional Council shall designate a fiscal agent for the Region. Regional fiscal agents shall be county or municipal governments only. All funds from the Regional Share shall be distributed to the Regional Council's identified fiscal agent for the benefit of the entire Region.

   a. Subject to this Section F(5), each Region may draft its own intra-regional agreements, bylaws, or other governing documents to determine how the Regional Council will operate. However, each voting member of a Regional Council shall be an employee or elected official of a Participating Local Government within the applicable Region. In the case of Denver, the voting members of its Regional Council shall be appointed by the Mayor. In the case of Broomfield, the voting members of its Regional Council shall be appointed by the Broomfield City and County Manager.

   b. The Region shall not receive any Opioid Funds from the Regional Share until the Region certifies to the Abatement Council that its Regional Council has been formed and a fiscal agent has been designated. Such certification shall be in a simple form adopted by the Region and may be made via email, so long as it includes the names and affiliations of the Regional Council's members and the designated fiscal agent.

   c. If a Region does not form and certify its Regional Council and designate its fiscal agent within one-hundred and eighty (180) days of the Effective Date, the Abatement Council shall appoint members to the Region's Regional Council. Regional Council members appointed by the Abatement Council shall serve until the Region certifies the formation of its Regional Council to the Abatement Council.

   d. A Region shall submit a renewed certification required by Section (F)(5)(b), above, when its membership changes.

   e. If a membership vacancy exists on a Regional Council for more than ninety (90) days and the Regional Council is unable to fill the vacancy by its regular procedures during that time, the Abatement Council shall appoint a replacement member to serve until the Region fills the vacancy.

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6. A Local Government that chooses not to become a Participating Local Government shall not receive any Opioid Funds from the Regional Share or participate in the Regional Councils described in Section (F)(5) above.

7. Each Regional Council shall make requests to the Abatement Council for Opioid Funds from their allocation of the Regional Share. Each Regional Council's request for Opioid Funds from the Regional Share shall be accompanied by a 2-year plan identifying the Approved Purposes for which the requested funds will be used by the Region anywhere within the State of Colorado. A Regional Council's 2-year plan may be amended so long as such amendments comply with the terms of this MOU and any Settlement. Any Regional Council may seek assistance from the Abatement Council for purposes of developing its 2-year plan.

8. Reasonable administrative costs for a Regional Council to administer its Region's allocation of the Regional Share shall not exceed actual costs or 10% of the Region's allocation of the Regional Share, whichever is less.

9. The Abatement Council shall release funds requested by a Regional Council in accordance with Section (B)(1) if the Regional Council's 2-year plan complies with the Approved Purposes, the terms of this MOU, and the terms of any Settlement. The Abatement Council shall not deny any funding request from a Regional Council on the basis that the Abatement Council does not approve or agree with the Approved Purposes for which a Regional Council requests Opioid Funds from the Regional Share. Nor may the Abatement Council hold up, delay, or make unreasonable requests for additional or supporting information of the Regional Council prior to releasing the requested Opioid Funds. The purpose of this MOU is to facilitate Opioid Funds to their intended recipients quickly and efficiently with minimal administrative procedure.

10. On an annual basis, as determined by the Abatement Council, each Regional Council's fiscal agent shall provide to the Abatement Council the Regional Council's expenditure data, including administrative costs, from their allocation of the Regional Share and certify to the Abatement Council that the Regional Council's expenditures were for Approved Purposes and complied with its 2-year plan. The Regional Council shall subject itself to an accounting at the Abatement Council's discretion.

    a. The Abatement Council shall review a Regional Council's expenditure data and certification to ensure compliance with the Regional Council's 2-year plan, the Approved Purposes, and the terms of this MOU and any Settlement.

    b. The Abatement Council shall publish the Regional Council's expenditure data, including administrative costs, from the Regional Share in accordance with Section (C)(4)(c)(i). The Abatement Council may require Regional Councils to provide additional outcome related data in

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accordance with Section (C)(4)(c)(ii) and all Regional Councils shall comply with such requirements.

11. If any Regional Council disputes the amount of Opioid Funds it receives from its allocation of the Regional Share, the Regional Council shall alert the Abatement Council within sixty (60) days of discovering the information underlying the dispute. Failure to alert the Abatement Council within this time frame shall not constitute a waiver of the Regional Council's right to seek recoupment of any deficiency in its Regional Share.

12. If the Abatement Council has reason to believe a Region's expenditure of its allocation of the Regional Share did not comply with the Region's 2-year Plan, the Approved Purposes, the terms of this MOU or any Settlement, as described in this Section (F), or that the Region otherwise misused its allocation of the Regional Share, the Abatement Council may take remedial action against the alleged offending Region. Such remedial action is left to the discretion of the Abatement Council and may include but not be limited to, withholding future Opioids Funds owed to the offending Region or requiring the offending Region to reimburse improperly expended Opioid Funds to the Regional Share.

13. Within one hundred and twenty (120) days of the Abatement Council being formed, in accordance with Section (C)(2)(c) above, the Abatement Council shall develop and publish due process procedures for allowing a Region to challenge or dispute any remedial action taken by the Abatement Council, including timelines during which the Region may engage in such a challenge or dispute. Such due process procedures shall reflect, at a minimum, the following principles:

    a. Upon learning of any conduct that may warrant remedial action against a Region, the Abatement Council shall first provide notice to the Region of the conduct at issue, provide the Region an opportunity to respond, and, if appropriate, cure the alleged offending conduct. If after providing the Region such notice and opportunities to respond and cure, the Abatement Council continues to believe remedial action is warranted, the Abatement Council may take such remedial action.

    b. If the Abatement Council decides to take remedial action against an alleged offending Region, such action may only occur by a two-thirds supermajority vote of the Abatement Council. Thus, an Abatement Council made up of twelve (12) voting members requires a vote of eight (8) Members prior to taking remedial action against an alleged offending Region.

    c. Prior to taking any remedial action against an alleged offending Region, the Abatement Council shall first provide notice to the alleged offending Region of the remedial action to be taken and the facts underlying such remedial action. The Abatement Council shall then provide the alleged

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offending Region an opportunity to challenge or dispute the remedial action in accordance with, at a minimum, the principles below:

i. The alleged offending Region may request revisions or modifications to the proposed remedial action;

ii. The alleged offending Region may submit a written response to and/or request a hearing before the Abatement Council, or a third-party hearing officer,[3] regarding the alleged offending conduct and proposed remedial action; and

iii. After such written responses are submitted and reviewed and/or a hearing is conducted, the alleged offending Region may submit an appeal to the Abatement Council of the decision to take remedial action.

d. Remedial actions taken by the Abatement Council, in accordance with the due process principles detailed above, shall be considered final non-appealable orders and offending Regions may not seek judicial relief from remedial action taken by the Abatement Council, except as provided in Section (H), below.

e. Subject to Section (H)(2), below, if any Party(ies) believes the Abatement Council violated the terms of this MOU, such Party(ies) may seek to enforce the terms of this MOU.

14. If the Abatement Council has reason to believe a Region's conduct, or the conduct of any Participating Local Government or individual in that Region, amounts to a violation of any criminal law, the Abatement Council shall refer such matters to the appropriate authorities and may consider such conduct in its determination of any remedial action to be taken.

15. If the Abatement Council has reason to believe that an individual involved in the receipt or administration of Opioid Funds from the Regional Share has violated any applicable ethics rules or codes, the Abatement Council shall not attempt to adjudicate such a violation. In such instances, the Abatement Council shall lodge a complaint with the appropriate forum for handling such ethical matters, such as a local home rule municipality's ethics board.

16. Costs associated with the Abatement Council's distribution and oversight of the Regional Share, as described above in this Section (F), including costs associated with any remedial action by the Abatement Council, shall be paid from the Statewide

[3] Only an alleged offending Region may request the appointment of a third-party hearing officer to review any written responses and conduct any requested hearings. If an alleged offending Region makes such a request, the Abatement Council has sole discretion to appoint the third-party hearing officer and the alleged offending Region shall bear the cost of such review and/or hearing by the third-party hearing officer.

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Infrastructure Share. The Abatement Council shall make all good faith efforts to limit such costs to the greatest extent possible.

G. Statewide Infrastructure Share

1. In accordance with Sections B(1) and (B)(2)(d), and the terms of any Settlement, the Statewide Infrastructure Share shall be paid to any Party or Regional Council in accordance with this Section (G).

2. The purpose of the Statewide Infrastructure Share is to promote capital improvements and provide operational assistance for developing or improving the infrastructure necessary to abate the opioid crisis anywhere within the State of Colorado. The Statewide Infrastructure Share is intended to supplement Opioid Funds received by any Party or Region.

3. Prior to distributing any Opioid Funds from the Statewide Infrastructure Share, the Abatement Council shall establish and publish policies and procedures for the distribution and oversight of the Statewide Infrastructure Share, including processes for Parties or Regions to apply for Opioid Funds from the Statewide Infrastructure Share. The Abatement Council's policies and procedures shall, at a minimum, reflect the following principles:

    a. Opioid Funds from the Statewide Infrastructure Share shall be used for Approved Purposes only;

    b. Opioid Funds from the Statewide Infrastructure Share shall be paid directly to the appropriate state agencies (including but not limited to the Colorado Department of Law), Regional fiscal agents, or Participating Local Governments only;

    c. Distribution and oversight of the Statewide Infrastructure Share shall comply with the terms of this MOU and any Settlement;

    d. Appropriate processes for remedial action will be taken against Parties or Regions that misuse Opioid Funds from the Statewide Infrastructure Share. Such processes shall include procedures for alleged offending Parties or Regions to challenge or dispute such remedial action; and

    e. Limitations on administrative costs to be expended by recipients for administering Opioid Funds received from the Statewide Infrastructure Fund, not to exceed actual costs expended by the recipient or 10% of the amount received, whichever is less.

4. The distribution and oversight policies and procedures developed by the Abatement Council, in accordance with Section (G)(3), shall be non-appealable orders and no Party or Region may seek judicial relief related to the distribution and oversight of the Statewide Infrastructure Share.

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5. On an annual basis, as determined by the Abatement Council, any Party or Regional Council that receives funds from the Statewide Infrastructure Share shall provide all expenditure data, including administrative costs, related to any Opioid Funds it received from the Statewide Infrastructure Share and subject itself to an accounting as required by the Abatement Council. The Abatement Council shall publish all expenditure data from the Statewide Infrastructure Share in accordance with Section (C)(4)(c)(i). The Abatement Council may require the Parties or Regional Councils that receive funds from the Statewide Infrastructure Share to provide additional outcome related data in accordance with Section (C)(4)(c)(ii) and the Parties or Regional Councils shall comply with such requirements.

6. Costs associated with the Abatement Council's distribution and oversight of the Statewide Infrastructure Share, as described in this Section (G), shall be paid for from the Statewide Infrastructure Share. The Abatement Council shall make all good faith efforts to limit such costs to the greatest extent possible.

H. General Terms

1. All Parties and Regional Councils shall maintain all records related to the receipt and expenditure of Opioid Funds for no less than five (5) years and shall make such records available for review by the Abatement Council, any other Party or Regional Council, or the public. Records requested by the public shall be produced in accordance with Colorado's open records laws. Records requested by the Abatement Council or another Party or a Regional Council shall be produced within twenty-one (21) days of the date the record request was received. This requirement does not supplant any Party or Regional Council's obligations under Colorado's open records laws.

2. If any Party(ies) believes the Abatement Council has violated the terms of this MOU, the alleging Party(ies) may seek to enforce the terms of this MOU, provided the alleging Party(ies) first provides notice to the Abatement Council of the alleged violation and a reasonable opportunity to cure the alleged violation. In such an enforcement action, the alleging Party(ies) may only seek to enforce the terms of the MOU against the State and the Participating Local Governments from which the Local Government Members of the Abatement Council were appointed and may only seek declaratory and/or injunctive relief. In defense of such an enforcement action, the State's Members of the Abatement Council shall be represented by the State and the Local Government Members shall be represented by the Participating Local Governments from which the Local Government Members were appointed. In the event of a conflict, the Abatement Council and its Members may seek outside representation to defend itself against such an enforcement action.

3. If any Party(ies) believes another Party(ies), not including the Abatement Council, violated the terms of this MOU, the alleging Party(ies) may seek to enforce the terms of this MOU in the court in which any applicable Settlement(s) was entered, provided the alleging Party(ies) first provide the alleged offending Party(ies)

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notice of the alleged violation(s) and a reasonable opportunity to cure the alleged violation(s). In such an enforcement action, any alleging Party or alleged offending Party(ies) may be represented by their respective public entity in accordance with Colorado law.

4. Nothing in this MOU shall be interpreted to waive the right of any Party to seek judicial relief for conduct occurring outside the scope of this MOU that violates any Colorado law. In such an action, the alleged offending Party(ies), including the Abatement Council, may be represented by their respective public entities in accordance with Colorado law. In the event of a conflict, any Party, including the Abatement Council and its Members, may seek outside representation to defend itself against such an action.

5. If any Party(ies) believes another Party(ies), Region(s), or individual(s) involved in the receipt, distribution, or administration of Opioids Funds has violated any applicable ethics codes or rules, a complaint shall be lodged with the appropriate forum for handling such matters, such as a local home rule municipality's ethics board.

6. If any Party(ies) believes another Party(ies), Region(s), or individual(s) involved in the receipt, distribution, or administration of Opioid Funds violated any Colorado criminal law, such conduct shall be reported to the appropriate criminal authorities.

7. Venue for any legal action related to this MOU shall be in a court of competent jurisdiction where any applicable Settlement(s) is entered.

8. Because recovery under the terms of different Settlement(s) may vary depending on the number of Parties required to effectuate a Settlement, the Parties may conditionally agree to sign on to the MOU through a letter of intent, resolution or similar written statement, declaration or pronouncement declaring their intent to sign on to the MOU if the threshold for Party participation in a specific Settlement is achieved.[4]

9. This MOU may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same instrument. The Parties approve the use of electronic signatures for execution of this MOU. All use of electronic signatures shall be governed by the Uniform Electronic Transactions Act, C.R.S. §§ 24-71.3-101, *et seq.* The Parties agree not to deny the legal effect or enforceability of the MOU solely because it is in electronic form or

[4] For instance, the July 21, 2021 "Distributor Settlement Agreement" includes a "Subdivision Settlement Agreement Form" that, once filled out and executed, is meant to indicate that Local Government's (or Subdivision's) election to participate in that Distributor Settlement and also, to require that Local Government to take steps to formally release any claim it may have against the Settling Distributors. With regard to the Distributor Settlement Agreement or any other Settlements that include a form similar to the Subdivision Settlement Agreement Form, the Parties may still conditionally agree to sign on to the MOU if, for instance, the threshold for Party participation in a specific Settlement is achieved.

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because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the MOU in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

10. Each party represents that all procedures necessary to authorize such Party's execution of this MOU have been performed and that the person signing for such Party has been authorized to execute the MOU.

I. Payment of Counsel and Litigation Expenses Through a Back-Stop Fund

1. Some Settlements, including the McKesson Corporation, Cardinal Health, Inc., and AmerisourceBergen Corporation ("Distributor") and Johnson & Johnson/Janssen ("J&J") settlements, may provide for the payment of all or a portion of the fees and litigation expenses owed by Participating Local Governments to counsel specifically retained to file suit in the opioid litigation. If any Settlement is insufficient to cover the fee obligations of the Participating Local Governments (as discussed and modified by Judge Polster's Order of August 6 regarding fees for the Distributor and J&J settlements), the deficiencies will be covered as set forth in further detail below.

2. The Parties also recognize that, as in the Distributor and J&J settlements, certain Opioid Settling Defendants may offer premiums benefiting the entire state of Colorado when Participating Local Governments agree to the Settlement(s), thereby settling their claims in their on-going lawsuits. For example, below is the chart illustrating how Incentive Payment B (a 25% premium to the entire state) works in the Distributor Settlement at Section IV.F.2.b (p. 20):

Percentage of Litigating Subdivision Population that is Incentive B Eligible Subdivision Population[5]	**Incentive Payment B Eligibility Percentage**
Up to 85%	0%
85%+	30%
86+	40%
91+	50%
95+	60%
99%+	95%
100%	100%

3. If the court in *In Re: National Prescription Opiate Litigation*, MDL No. 2804 (N.D. Ohio), or if a Settlement establishes a common benefit fund or similar device to compensate attorneys for services rendered and expenses incurred that have benefited plaintiffs generally in the litigation (the "Common Benefit Fund"),

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and/or requires certain governmental plaintiffs to pay a share of their recoveries from defendants into the Common Benefit Fund ("Court-Ordered Common Benefit Fund Assessment"), then the Participating Local Governments shall be required to first seek to have their attorneys' fees and expenses paid through the Common Benefit Fund.

4. For the Distributor and J&J settlements only, counsel for Participating Local Governments shall have their expenses otherwise recoverable from Colorado Participating Local Governments compensated only through the Common Benefit Fund(s) established in those settlement(s). For the avoidance of doubt, counsel for Participating Local Governments may recover their attorneys' fees through the Distributor and J&J settlements and through the other applicable provisions of this Section (I).

5. In addition, as a means of covering any deficiencies in paying counsel for Participating Local Governments, a supplemental Colorado Attorney Fee Back-Stop Fund shall be established. The Colorado Attorney Fee Back-Stop Fund is to be used to compensate counsel for Participating Local Governments that filed an initial complaint in the opioid litigation by September 1, 2020 ("Litigating Participating Local Governments").

6. Payments out of the Colorado Attorney Fee Back-Stop Fund shall be determined by a committee (the "Opioid Fee and Expense Committee"). The Opioid Fee and Expense Committee shall consist of the following five (5) members:

   a. One (1) member appointed by CCI from a litigating county or from a litigating county and city municipal corporation;

   b. One (1) member appointed by CML from a litigating city;

   c. One (1) member appointed jointly by CCI and CML from a non-litigating county or city;

   d. One (1) member appointed by the Attorney General's Office; and

   e. One (1) neutral member jointly appointed by all of the other members listed above.

7. The Colorado Attorney Fee Back-Stop Fund shall be funded as follows from any Settlement, excluding settlements involving McKinsey and payments resulting from the Purdue or Mallinckrodt bankruptcy. For purposes only of calculating the funding of the Colorado Attorney Fee Back-Stop Fund, the Parties deem 58% of the total LG Share and Regional Share to be attributable to the Litigating Local Governments. The Colorado Attorney Fee Back-Stop Fund shall be funded by 8.7% of the total LG Share and 4.35% of the total Regional Share at the time such funds are actually received. No funds deposited into the Colorado Attorney Fee Back-Stop Fund will be taken from the Statewide Infrastructure Share or State Share.

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8. Counsel for Litigating Participating Local Governments may apply to the Colorado Attorney Fee Back-Stop Fund only after applying to the Common Benefit Fund.

9. Counsel for Litigating Participating Local Governments may apply to the Colorado Attorney Fee Back-Stop Fund for only a shortfall – that is, the difference between what their fee agreements would entitle them to (as limited by this Section (I)) minus what they have already collected from the Common Benefit Fund (including both the "common benefit" and "contingency fee" calculations, if any). If they receive fees/costs for common benefit work in the national fee fund, these fees/costs will be allocated proportionately across all their local government opioid clients based on the allocation model used in the Negotiation Class website to allocate the appropriate portion to Colorado clients.

10. Counsel for Litigating Participating Local Governments are limited to being paid, at most, and assuming adequate funds are available in any Common Benefit Fund and Colorado Attorney Fee Back-Stop Fund, fees in an amount equal to 15% of the LG Share and 7.5% of the Regional Share attributable to their Colorado clients.

11. Any funds remaining in the Colorado Attorney Fee Back-Stop Fund in excess of the amounts needed to cover the fees and litigation expenses owed by Litigating Participating Local Governments to their respective counsel shall revert to the Participating Local Governments according to the allocations described in Sections (E) and (F). Every two years, the Opioid Fee and Expense Committee shall assess the amount remaining in the Colorado Attorney Fee Back-Stop Fund to determine if it is overfunded.

12. Despite the fact that a litigating entity bonus benefits the entire state, no portion of the State Share shall be used to fund the Colorado Attorney Fee Back-Stop Fund or in any other way to fund any Participating Local Government's attorneys' fees and expenses. Because the state did not hire outside counsel, any funds for attorneys fees that the state receives from the J&J and Distributor settlement will be deposited into the State Share.

13. To participate in the Colorado Attorney Fee Back-Stop Fund, counsel must follow the requirements of C.R.S. § 13-17-304.

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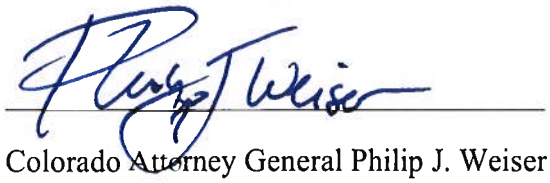
This **Colorado Opioids Settlement Memorandum of Understanding** is signed this 26 day of August, 2021 by:



Colorado Attorney General Philip J. Weiser

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This **Colorado Opioids Settlement Memorandum of Understanding** is signed this ___ day of _____, _____ by:

_____

Name & Title_____

On behalf of _____

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Exhibit A

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POTENTIAL OPIOID ABATEMENT APPROVED PURPOSES

I. TREATMENT

A. TREATMENT OF OPIOID USE DISORDER AND ITS EFFECTS

1. Expand availability of treatment, including Medication-Assisted Treatment (MAT), for Opioid Use Disorder (OUD) and any co-occurring substance use or mental health issues.

2. Supportive housing, all forms of FDA-approved MAT, counseling, peer-support, recovery case management and residential treatment with access to medications for those who need it.

3. Treatment of mental health trauma issues that resulted from the traumatic experiences of the opioid user (e.g., violence, sexual assault, human trafficking) and for family members (e.g., surviving family members after an overdose or overdose fatality).

4. Expand telehealth to increase access to OUD treatment, including MAT, as well as counseling, psychiatric support, and other treatment and recovery support services.

5. Fellowships for addiction medicine specialists for direct patient care, instructors, and clinical research for treatments.

6. Scholarships for certified addiction counselors.

7. Clinicians to obtain training and a waiver under the federal Drug Addiction Treatment Act to prescribe MAT for OUD.

8. Training for health care providers, students, and other supporting professionals, such as peer recovery coaches/recovery outreach specialists, including but not limited to training relating to MAT and harm reduction.

9. Dissemination of accredited web-based training curricula, such as the American Academy of Addiction Psychiatry's Provider Clinical Support Service-Opioids web-based training curriculum and motivational interviewing.

10. Development and dissemination of new accredited curricula, such as the American Academy of Addiction Psychiatry's Provider Clinical Support Service Medication-Assisted Treatment.

11. Development of a multistate/nationally accessible database whereby health care providers can list currently available in-patient and out-patient OUD treatment services that are accessible on a real-time basis.

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12. Support and reimburse services that include the full American Society of Addiction Medicine (ASAM) continuum of care for OUD.

13. Improve oversight of Opioid Treatment Programs (OTPs) to assure evidence-informed practices such as adequate methadone dosing.

B. INTERVENTION

1. Ensure that health care providers are screening for OUD and other risk factors and know how to appropriately counsel and treat (or refer, if necessary) a patient for OUD treatment.

2. Fund Screening, Brief Intervention and Referral to Treatment (SBIRT) programs to reduce the transition from use to disorder.

3. Training and long-term implementation of SBIRT in key systems (health, schools, colleges, criminal justice, and probation), with a focus on the late adolescence and young adulthood when transition from misuse to opioid disorder is most common.

4. Purchase automated versions of SBIRT and support ongoing costs of the technology.

5. Training for emergency room personnel treating opioid overdose patients on post-discharge planning, including community referrals for MAT, recovery case management and/or support services.

6. Support work of Emergency Medical Systems, including peer support specialists, to connect individuals to treatment or other appropriate services following an opioid overdose or other opioid-related adverse event.

7. Create school-based contacts whom parents can engage to seek immediate treatment services for their child.

8. Develop best practices on addressing OUD in the workplace.

9. Support assistance programs for health care providers with OUD.

10. Engage non-profits and faith community as a system to support outreach for treatment.

C. CRIMINAL-JUSTICE-INVOLVED PERSONS

1. Address the needs of persons involved in the criminal justice system who have OUD and any co-occurring substance use disorders or mental health (SUD/MH) issues.

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2. Support pre-arrest diversion and deflection strategies for persons with OUD and any co-occurring SUD/MH issues, including established strategies such as:

   a. Self-referral strategies such as Angel Programs or the Police Assisted Addiction Recovery Initiative (PAARI);

   b. Active outreach strategies such as the Drug Abuse Response Team (DART) model;

   c. "Naloxone Plus" strategies, which work to ensure that individuals who have received Naloxone to reverse the effects of an overdose are then linked to treatment programs;

   d. Officer prevention strategies, such as the Law Enforcement Assisted Diversion (LEAD) model; or

   e. Officer intervention strategies such as the Leon County, Florida Adult Civil Citation Network.

3. Support pre-trial services that connect individuals with OUD and any co-occurring SUD/MH issues to evidence-informed treatment, including MAT, and related services.

4. Support treatment and recovery courts for persons with OUD and any co-occurring SUD/MH issues, but only if they provide referrals to evidence-informed treatment, including MAT.

5. Provide evidence-informed treatment, including MAT, recovery support, harm reduction, or other appropriate services to individuals with OUD and any co-occurring SUD/MH issues who are incarcerated, on probation, or on parole.

6. Provide evidence-informed treatment, including MAT, recovery support, harm reduction, or other appropriate re-entry services to individuals with OUD and any co-occurring SUD/MH issues who are leaving jail or prison or who have recently left jail or prison.

7. Support critical time interventions (CTI), particularly for individuals living with dual-diagnosis OUD/serious mental illness, and services for individuals who face immediate risks and service needs and risks upon release from correctional settings.

D. WOMEN WHO ARE OR MAY BECOME PREGNANT

1. Evidence-informed treatment, including MAT, recovery, and prevention services for pregnant women or women who could become pregnant and have OUD.

2. Training for obstetricians and other healthcare personnel that work with pregnant women and their families regarding OUD treatment.

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3. Other measures to address Neonatal Abstinence Syndrome, including prevention, care for addiction and education programs.

4. Child and family supports for parenting women with OUD.

5. Enhanced family supports and child care services for parents receiving treatment for OUD.

E. PEOPLE IN TREATMENT AND RECOVERY

1. The full continuum of care of recovery services for OUD and any co-occurring substance use or mental health issues, including supportive housing, residential treatment, medical detox services, peer support services and counseling, community navigators, case management, and connections to community-based services.

2. Identifying successful recovery programs such as physician, pilot, and college recovery programs, and providing support and technical assistance to increase the number and capacity of high-quality programs to help those in recovery.

3. Training and development of procedures for government staff to appropriately interact and provide social and other services to current and recovering opioid users, including reducing stigma.

4. Community-wide stigma reduction regarding treatment and support for persons with OUD, including reducing the stigma on effective treatment.

5. Engaging non-profits and faith community as a system to support family members in their efforts to help the opioid user in the family.

II. PREVENTION

F. PRESCRIBING PRACTICES

1. Training for health care providers regarding safe and responsible opioid prescribing, dosing, and tapering patients off opioids.

2. Academic counter-detailing.

3. Continuing Medical Education (CME) on prescribing of opioids.

4. Support for non-opioid pain treatment alternatives, including training providers to offer or refer to multi-modal, evidence-informed treatment of pain.

5. Fund development of a multistate/national prescription drug monitoring program (PDMP) that permits information sharing while providing appropriate safeguards on sharing of private information, including but not limited to:

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a. Integration of PDMP data with electronic health records, overdose episodes, and decision support tools for health care providers relating to OUD.

b. Ensuring PDMPs incorporate available overdose/naloxone deployment data, including the United States Department of Transportation's Emergency Medical Technician overdose database.

6. Educating dispensers on appropriate opioid dispensing.

G. MISUSE OF OPIOIDS

1. Corrective advertising/affirmative public education campaigns.

2. Public education relating to drug disposal.

3. Drug take-back disposal or destruction programs.

4. Fund community anti-drug coalitions that engage in drug-abuse prevention efforts.

5. School-based programs that have demonstrated effectiveness in preventing drug misuse and seem likely to be effective in preventing the uptake and use of opioids.

6. Support community coalitions in implementing evidence-informed prevention, such as reduced social access and physical access, stigma reduction – including staffing, educational campaigns, or training of coalitions in evidence-informed implementation.

7. School and community education programs and campaigns for students, families, school employees, school athletic programs, parent-teacher and student associations, and others.

8. Engaging non-profits and faith community as a system to support prevention.

H. OVERDOSE DEATHS AND OTHER HARMS

1. Increasing availability and distribution of naloxone and other drugs that treat overdoses to first responders, overdose patients, opioid users, families and friends of opioid users, schools, community navigators and outreach workers, drug offenders upon release from jail/prison, and other members of the general public.

2. Training and education regarding naloxone and other drugs that treat overdoses for first responders, overdose patients, patients taking opioids, families, schools, and other members of the general public.

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3. Developing data tracking software and applications for overdoses/naloxone revivals.

4. Public education relating to emergency responses to overdoses.

5. Free naloxone for anyone in the community.

6. Public education relating to immunity and Good Samaritan laws.

7. Educating first responders regarding the existence and operation of immunity and Good Samaritan laws.

8. Syringe service programs, including supplies, staffing, space, peer support services, and the full range of harm reduction and treatment services provided by these programs.

9. Expand access to testing and treatment for infectious diseases such as HIV and Hepatitis C resulting from intravenous opioid use.

III. ADDITIONAL AREAS

I. SERVICES FOR CHILDREN

1. Support for children's services: Fund additional positions and services, including supportive housing and other residential services, relating to children being removed from the home and/or placed in foster care due to custodial opioid use.

J. FIRST RESPONDERS

1. Law enforcement expenditures relating to the opioid epidemic.

2. Educating first responders regarding appropriate practices and precautions when dealing with fentanyl or other drugs.

3. Increase electronic prescribing to prevent diversion and forgery.

K. COMMUNITY LEADERSHIP

1. Regional planning to identify goals for opioid reduction and support efforts or to identify areas and populations with the greatest needs for treatment intervention services.

2. Government dashboard to track key opioid-related indicators and supports as identified through collaborative community processes.

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L. STAFFING AND TRAINING

1. Funding for programs and services regarding staff training and networking to improve staff capability to abate the opioid crisis.

2. Support infrastructure and staffing for collaborative cross-systems coordination to prevent opioid misuse, prevent overdoses, and treat those with OUD (e.g., health care, primary care, pharmacies, PDMPs, etc.).

M. RESEARCH

1. Funding opioid abatement research.

2. Research improved service delivery for modalities such as SBIRT that demonstrate promising but mixed results in populations vulnerable to OUD.

3. Support research for novel harm reduction and prevention efforts such as the provision of fentanyl test strips.

4. Support for innovative supply-side enforcement efforts such as improved detection of mail-based delivery of synthetic opioids.

5. Expanded research for swift/certain/fair models to reduce and deter opioid misuse within criminal justice populations that build upon promising approaches used to address other substances (e.g. Hawaii HOPE and Dakota 24/7).

6. Research expanded modalities such as prescription methadone that can expand access to MAT.

N. OTHER

1. Administrative costs for any of the approved purposes on this list.

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Exhibit B

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Adams County	**Adams**	**County**	
Arvada	Adams	City	2 counties
Aurora	Adams	City	3 counties
Bennett	Adams	City	2 counties
Brighton	Adams	City	2 counties
Commerce City	Adams	City	
Federal Heights	Adams	City	
Lochbuie	Adams	City	2 counties
Northglenn	Adams	City	2 counties
Thornton	Adams	City	2 counties
Westminster	Adams	City	2 counties
Alamosa County	**Alamosa**	**County**	
Alamosa	Alamosa	City	
Hooper	Alamosa	City	
Arapahoe County	**Arapahoe**	**County**	
Aurora	Arapahoe	City	3 counties
Bennett	Arapahoe	City	2 counties
Bow Mar	Arapahoe	City	2 counties
Centennial	Arapahoe	City	
Cherry Hills Village	Arapahoe	City	
Columbine Valley	Arapahoe	City	
Deer Trail	Arapahoe	City	
Englewood	Arapahoe	City	
Foxfield	Arapahoe	City	
Glendale	Arapahoe	City	
Greenwood Village	Arapahoe	City	
Littleton	Arapahoe	City	3 counties
Sheridan	Arapahoe	City	
Archuleta County	**Archuleta**	**County**	
Pagosa Springs	Archuleta	City	
Baca County	**Baca**	**County**	
Campo	Baca	City	
Pritchett	Baca	City	
Springfield	Baca	City	
Two Buttes	Baca	City	
Vilas	Baca	City	
Walsh	Baca	City	
Bent County	**Bent**	**County**	
Las Animas	Bent	City	
Boulder County	**Boulder**	**County**	
Boulder	Boulder	City	
Erie	Boulder	City	2 counties
Jamestown	Boulder	City	
Lafayette	Boulder	City	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Longmont	Boulder	City	2 counties
Louisville	Boulder	City	
Lyons	Boulder	City	
Nederland	Boulder	City	
Superior	Boulder	City	2 counties
Ward	Boulder	City	
Broomfield	**Broomfield**	**City/County**	
Chaffee County	**Chaffee**	**County**	
Buena Vista	Chaffee	City	
Poncha Springs	Chaffee	City	
Salida	Chaffee	City	
Cheyenne County	**Cheyenne**	**County**	
Cheyenne Wells	Cheyenne	City	
Kit Carson	Cheyenne	City	
Clear Creek County	**Clear Creek**	**County**	
Central City	Clear Creek	City	2 counties
Empire	Clear Creek	City	
Georgetown	Clear Creek	City	
Idaho Springs	Clear Creek	City	
Silver Plume	Clear Creek	City	
Conejos County	**Conejos**	**County**	
Antonito	Conejos	City	
La Jara	Conejos	City	
Manassa	Conejos	City	
Romeo	Conejos	City	
Sanford	Conejos	City	
Costilla County	**Costilla**	**County**	
Blanca	Costilla	City	
San Luis	Costilla	City	
Crowley County	**Crowley**	**County**	
Crowley	Crowley	City	
Olney Springs	Crowley	City	
Ordway	Crowley	City	
Sugar City	Crowley	City	
Custer County	**Custer**	**County**	
Silver Cliff	Custer	City	
Westcliffe	Custer	City	
Delta County	**Delta**	**County**	
Cedaredge	Delta	City	
Crawford	Delta	City	
Delta	Delta	City	
Hotchkiss	Delta	City	
Orchard City	Delta	City	
Paonia	Delta	City	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Denver	**Denver**	**City/County**	
Dolores County	**Dolores**	**County**	
Dove Creek	Dolores	City	
Rico	Dolores	City	
Douglas County	**Douglas**	**County**	
Aurora	Douglas	City	3 counties
Castle Pines	Douglas	City	
Castle Rock	Douglas	City	
Larkspur	Douglas	City	
Littleton	Douglas	City	3 counties
Lone Tree	Douglas	City	
Parker	Douglas	City	
Eagle County	**Eagle**	**County**	
Avon	Eagle	City	
Basalt	Eagle	City	2 counties
Eagle	Eagle	City	
Gypsum	Eagle	City	
Minturn	Eagle	City	
Red Cliff	Eagle	City	
Vail	Eagle	City	
El Paso County	**El Paso**	**County**	
Calhan	El Paso	City	
Colorado Springs	El Paso	City	
Fountain	El Paso	City	
Green Mountain Falls	El Paso	City	2 counties
Manitou Springs	El Paso	City	
Monument	El Paso	City	
Palmer Lake	El Paso	City	
Ramah	El Paso	City	
Elbert County	**Elbert**	**County**	
Elizabeth	Elbert	City	
Kiowa	Elbert	City	
Simla	Elbert	City	
Fremont County	**Fremont**	**County**	
Brookside	Fremont	City	
Cañon City	Fremont	City	
Coal Creek	Fremont	City	
Florence	Fremont	City	
Rockvale	Fremont	City	
Williamsburg	Fremont	City	
Garfield County	**Garfield**	**County**	
Carbondale	Garfield	City	
Glenwood Springs	Garfield	City	
New Castle	Garfield	City	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Parachute	Garfield	City	
Rifle	Garfield	City	
Silt	Garfield	City	
Gilpin County	**Gilpin**	**County**	
Black Hawk	Gilpin	City	
Central City	Gilpin	City	2 counties
Grand County	**Grand**	**County**	
Fraser	Grand	City	
Granby	Grand	City	
Grand Lake	Grand	City	
Hot Sulphur Springs	Grand	City	
Kremmling	Grand	City	
Winter Park	Grand	City	
Gunnison County	**Gunnison**	**County**	
Crested Butte	Gunnison	City	
Gunnison	Gunnison	City	
Marble	Gunnison	City	
Mount Crested Butte	Gunnison	City	
Pitkin	Gunnison	City	
Hinsdale County	**Hinsdale**	**County**	
Lake City	Hinsdale	City	
Huerfano County	**Huerfano**	**County**	
La Veta	Huerfano	City	
Walsenburg	Huerfano	City	
Jackson County	**Jackson**	**County**	
Walden	Jackson	City	
Jefferson County	**Jefferson**	**County**	
Arvada	Jefferson	City	2 counties
Bow Mar	Jefferson	City	2 counties
Edgewater	Jefferson	City	
Golden	Jefferson	City	
Lakeside	Jefferson	City	
Lakewood	Jefferson	City	
Littleton	Jefferson	City	3 counties
Morrison	Jefferson	City	
Mountain View	Jefferson	City	
Superior	Jefferson	City	2 counties
Westminster	Jefferson	City	2 counties
Wheat Ridge	Jefferson	City	
Kiowa County	**Kiowa**	**County**	
Eads	Kiowa	City	
Haswell	Kiowa	City	
Sheridan Lake	Kiowa	City	
Kit Carson County	**Kit Carson**	**County**	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Bethune	Kit Carson	City	
Burlington	Kit Carson	City	
Flagler	Kit Carson	City	
Seibert	Kit Carson	City	
Stratton	Kit Carson	City	
Vona	Kit Carson	City	
La Plata County	**La Plata**	**County**	
Bayfield	La Plata	City	
Durango	La Plata	City	
Ignacio	La Plata	City	
Lake County	**Lake**	**County**	
Leadville	Lake	City	
Larimer County	**Larimer**	**County**	
Berthoud	Larimer	City	2 counties
Estes Park	Larimer	City	
Fort Collins	Larimer	City	
Johnstown	Larimer	City	2 counties
Loveland	Larimer	City	
Timnath	Larimer	City	2 counties
Wellington	Larimer	City	
Windsor	Larimer	City	2 counties
Las Animas County	**Las Animas**	**County**	
Aguilar	Las Animas	City	
Branson	Las Animas	City	
Cokedale	Las Animas	City	
Kim	Las Animas	City	
Starkville	Las Animas	City	
Trinidad	Las Animas	City	
Lincoln County	**Lincoln**	**County**	
Arriba	Lincoln	City	
Genoa	Lincoln	City	
Hugo	Lincoln	City	
Limon	Lincoln	City	
Logan County	**Logan**	**County**	
Crook	Logan	City	
Fleming	Logan	City	
Iliff	Logan	City	
Merino	Logan	City	
Peetz	Logan	City	
Sterling	Logan	City	
Mesa County	**Mesa**	**County**	
Collbran	Mesa	City	
De Beque	Mesa	City	
Fruita	Mesa	City	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Grand Junction	Mesa	City	
Palisade	Mesa	City	
Mineral County	**Mineral**	**County**	
City of Creede	Mineral	City	
Moffat County	**Moffat**	**County**	
Craig	Moffat	City	
Dinosaur	Moffat	City	
Montezuma County	**Montezuma**	**County**	
Cortez	Montezuma	City	
Dolores	Montezuma	City	
Mancos	Montezuma	City	
Montrose County	**Montrose**	**County**	
Montrose	Montrose	City	
Naturita	Montrose	City	
Nucla	Montrose	City	
Olathe	Montrose	City	
Morgan County	**Morgan**	**County**	
Brush	Morgan	City	
Fort Morgan	Morgan	City	
Hillrose	Morgan	City	
Log Lane Village	Morgan	City	
Wiggins	Morgan	City	
Otero County	**Otero**	**County**	
Cheraw	Otero	City	
Fowler	Otero	City	
La Junta	Otero	City	
Manzanola	Otero	City	
Rocky Ford	Otero	City	
Swink	Otero	City	
Ouray County	**Ouray**	**County**	
Ouray	Ouray	City	
Ridgway	Ouray	City	
Park County	**Park**	**County**	
Alma	Park	City	
Fairplay	Park	City	
Phillips County	**Phillips**	**County**	
Haxtun	Phillips	City	
Holyoke	Phillips	City	
Paoli	Phillips	City	
Pitkin County	**Pitkin**	**County**	
Aspen	Pitkin	City	
Basalt	Pitkin	City	2 counties
Snowmass Village	Pitkin	City	
Prowers County	**Prowers**	**County**	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Granada	Prowers	City	
Hartman	Prowers	City	
Holly	Prowers	City	
Lamar	Prowers	City	
Wiley	Prowers	City	
Pueblo County	**Pueblo**	**County**	
Boone	Pueblo	City	
Pueblo	Pueblo	City	
Rye	Pueblo	City	
Rio Blanco County	**Rio Blanco**	**County**	
Meeker	Rio Blanco	City	
Rangely	Rio Blanco	City	
Rio Grande County	**Rio Grande**	**County**	
Center	Rio Grande	City	2 counties
Del Norte	Rio Grande	City	
Monte Vista	Rio Grande	City	
South Fork	Rio Grande	City	
Routt County	**Routt**	**County**	
Hayden	Routt	City	
Oak Creek	Routt	City	
Steamboat Springs	Routt	City	
Yampa	Routt	City	
Saguache County	**Saguache**	**County**	
Bonanza	Saguache	City	
Center	Saguache	City	2 counties
Crestone	Saguache	City	
Moffat	Saguache	City	
Saguache	Saguache	City	
San Juan County	**San Juan**	**County**	
Silverton	San Juan	City	
San Miguel County	**San Miguel**	**County**	
Mountain Village	San Miguel	City	
Norwood	San Miguel	City	
Ophir	San Miguel	City	
Sawpit	San Miguel	City	
Telluride	San Miguel	City	
Sedgwick County	**Sedgwick**	**County**	
Julesburg	Sedgwick	City	
Ovid	Sedgwick	City	
Sedgwick	Sedgwick	City	
Summit County	**Summit**	**County**	
Blue River	Summit	City	
Breckenridge	Summit	City	
Dillon	Summit	City	

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Frisco	Summit	City	
Montezuma	Summit	City	
Silverthorne	Summit	City	
Teller County	**Teller**	**County**	
Cripple Creek	Teller	City	
Green Mountain Falls	Teller	City	2 counties
Victor	Teller	City	
Woodland Park	Teller	City	
Washington County	**Washington**	**County**	
Akron	Washington	City	
Otis	Washington	City	
Weld County	**Weld**	**County**	
Ault	Weld	City	
Berthoud	Weld	City	2 counties
Brighton	Weld	City	2 counties
Dacono	Weld	City	
Eaton	Weld	City	
Erie	Weld	City	2 counties
Evans	Weld	City	
Firestone	Weld	City	
Fort Lupton	Weld	City	
Frederick	Weld	City	
Garden City	Weld	City	
Gilcrest	Weld	City	
Greeley	Weld	City	
Grover	Weld	City	
Hudson	Weld	City	
Johnstown	Weld	City	2 counties
Keenesburg	Weld	City	
Kersey	Weld	City	
La Salle	Weld	City	
Lochbuie	Weld	City	2 counties
Longmont	Weld	City	2 counties
Mead	Weld	City	
Milliken	Weld	City	
Northglenn	Weld	City	2 counties
Nunn	Weld	City	
Pierce	Weld	City	
Platteville	Weld	City	
Raymer (New Raymer)	Weld	City	
Severance	Weld	City	
Thornton	Weld	City	2 counties
Timnath	Weld	City	2 counties
Windsor	Weld	City	2 counties

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Colorado Local Governments*

Government Name	County	Gov't Type	Multi-County
Yuma County	**Yuma**	**County**	
Eckley	Yuma	City	
Wray	Yuma	City	
Yuma	Yuma	City	

*This list includes all 64 Colorado counties and all 271 municipalities listed in the 2019 Census. Cities located in multiple counties are listed under each corresponding county subheading. City and County of Denver and City and County of Broomfield are counted in both the city and county totals. The City of Carbonate is not included in this list, as there was no population in the 2019 Census data.

This list will be reconciled as necessary to be consistent with the terms of Settlement(s) with Opioid Settling Defendant(s)

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Exhibit C

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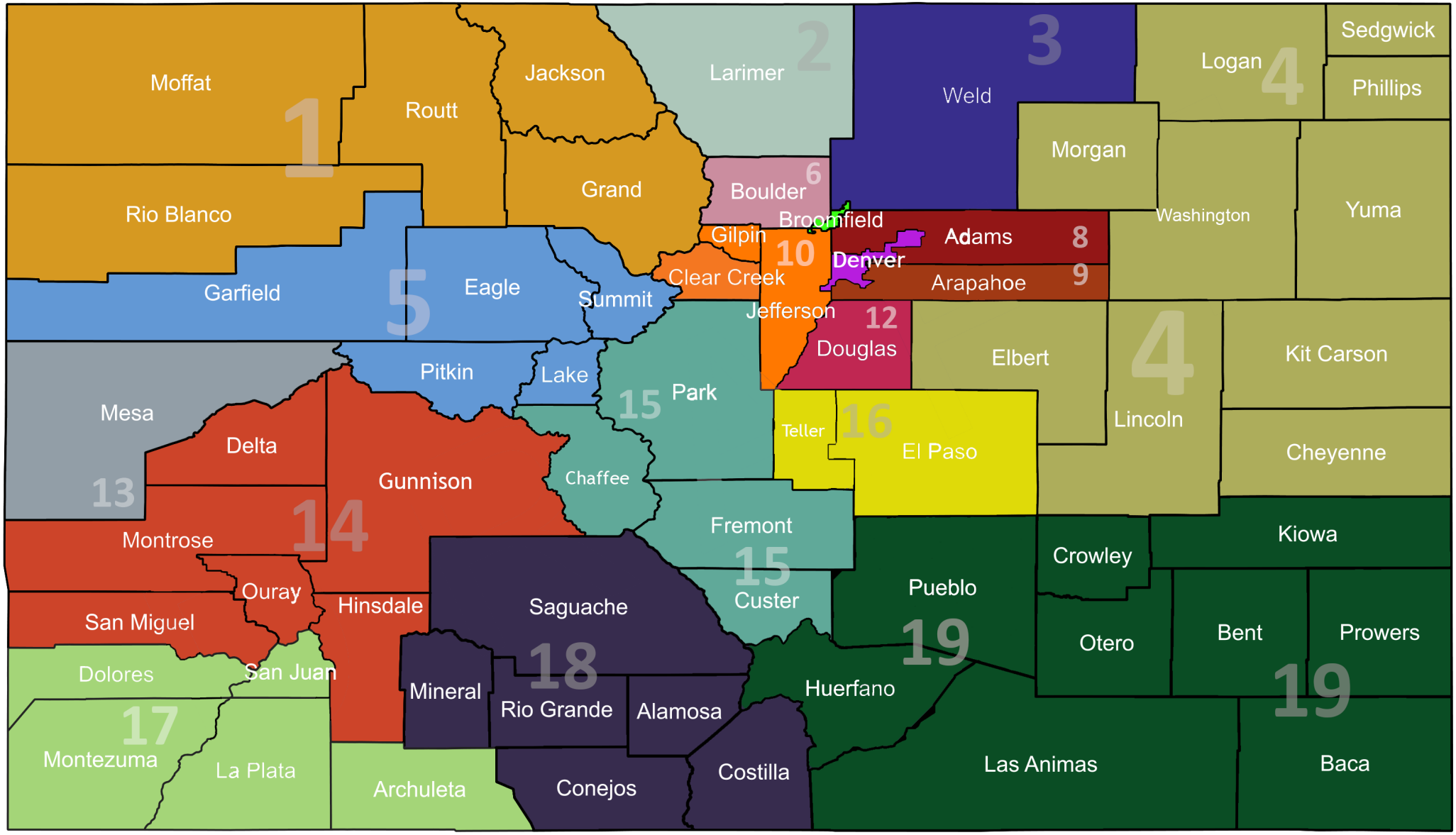
Regions for the distribution of opioid settlement funds



Region 1	Region 5	Region 9	Region 13	Region 17
Region 2	Region 6	Region 10	Region 14	Region 18
Region 3	Region 7 (Broomfield)	Region 11 (Denver)	Region 15	Region 19
Region 4	Region 8	Region 12	Region 16	

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Exhibit D

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Exhibit D - Allocations to Colorado County Areas

County	Percentage of LG Share
Adams	9.4247%
Alamosa	0.5081%
Arapahoe	10.8071%
Archuleta	0.1370%
Baca	0.0592%
Bent	0.1133%
Boulder	5.7936%
Broomfield	1.0014%
Chaffee	0.3604%
Cheyenne	0.0159%
Clear Creek	0.1380%
Conejos	0.2108%
Costilla	0.0552%
Crowley	0.0934%
Custer	0.0412%
Delta	0.5440%
Denver	15.0042%
Dolores	0.0352%
Douglas	3.6696%
Eagle	0.6187%
El Paso	11.9897%
Elbert	0.2804%
Fremont	0.9937%
Garfield	0.8376%
Gilpin	0.0561%
Grand	0.2037%
Gunnison	0.1913%
Hinsdale	0.0112%
Huerfano	0.2505%
Jackson	0.0310%
Jefferson	10.5173%
Kiowa	0.0142%
Kit Carson	0.0940%
La Plata	0.8127%
Lake	0.0990%
Larimer	6.5211%
Las Animas	0.6304%
Lincoln	0.0819%
Logan	0.3815%
Mesa	2.8911%
Mineral	0.0039%
Moffat	0.2326%
Montezuma	0.4429%

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Montrose	0.5695%
Morgan	0.4677%
Otero	0.4486%
Ouray	0.0535%
Park	0.1674%
Phillips	0.0714%
Pitkin	0.1747%
Prowers	0.1727%
Pueblo	5.6757%
Rio Blanco	0.1013%
Rio Grande	0.2526%
Routt	0.3837%
Saguache	0.0666%
San Juan	0.0097%
San Miguel	0.1005%
Sedgwick	0.0618%
Summit	0.3761%
Teller	0.6219%
Washington	0.0357%
Weld	3.8908%
Yuma	0.0992%
TOTAL	**100.0000%**

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Exhibit E

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Exhibit E - Intracounty Allocations[1,2]

The below chart depicts the default percentage that each Local Government will receive from the LG Share amount attributed to its County Area, as described in Section (E)(3) of the MOU. The chart assumes full participation by all Local Governments

Government Name	Intracounty Share
Adams County	68.3372%
Arvada (2 Counties)	0.2632%
Aurora (3 Counties)	4.6336%
Bennett (2 Counties)	0.1670%
Brighton (2 Counties)	1.4527%
Commerce City	4.7314%
Federal Heights	1.1457%
Lochbuie (2 Counties)	0.0001%
Northglenn (2 Counties)	2.0913%
Thornton (2 Counties)	10.6435%
Westminster (2 Counties)	6.5342%
Alamosa County	85.3075%
Alamosa	14.6818%
Hooper	0.0108%
Arapahoe County	42.7003%
Aurora (3 Counties)	35.5997%
Bennett (2 Counties)	0.0324%
Bow Mar (2 Counties)	0.0159%
Centennial	0.4411%
Cherry Hills Village	0.6685%
Columbine Valley	0.1601%
Deer Trail	0.0003%
Englewood	5.5850%
Foxfield	0.0372%
Glendale	1.2289%
Greenwood Village	2.8305%
Littleton (3 Counties)	8.5654%
Sheridan	2.1347%
Archuleta County	90.0864%
Pagosa Springs	9.9136%
Baca County	85.9800%
Campo	2.4443%
Pritchett	1.5680%
Springfield	7.0100%

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Government Name	Intracounty Share
Two Buttes	0.4766%
Vilas	0.9070%
Walsh	1.6141%
Bent County	80.9608%
Las Animas	19.0392%
Boulder County	47.6311%
Boulder	31.7629%
Erie (2 Counties)	0.3634%
Jamestown	0.0086%
Lafayette	3.3203%
Longmont (2 Counties)	14.6833%
Louisville	1.4455%
Lyons	0.5916%
Nederland	0.1646%
Superior (2 Counties)	0.0258%
Ward	0.0030%
Broomfield County/City	100.0000%
Chaffee County	74.8440%
Buena Vista	5.8841%
Poncha Springs	4.2369%
Salida	15.0350%
Cheyenne County	66.8002%
Cheyenne Wells	0.8586%
Kit Carson	32.3412%
Clear Creek County	92.2164%
Central City (2 Counties)	0.0000%
Empire	0.3364%
Georgetown	1.9063%
Idaho Springs	4.7625%
Silver Plume	0.7784%
Conejos County	77.1204%
Antonito	4.6338%
La Jara	2.4313%
Manassa	1.0062%
Romeo	2.4270%
Sanford	12.3812%

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Government Name	Intracounty Share
Costilla County	97.3454%
Blanca	1.2036%
San Luis	1.4509%
Crowley County	80.7081%
Crowley	4.3597%
Olney Springs	8.3683%
Ordway	0.1853%
Sugar City	6.3786%
Custer County	96.6858%
Silver Cliff	0.7954%
Westcliffe	2.5188%
Delta County	76.3512%
Cedaredge	3.6221%
Crawford	0.4938%
Delta	16.2658%
Hotchkiss	1.0963%
Orchard City	0.1473%
Paonia	2.0236%
Denver County/City	100.0000%
Dolores County	76.3307%
Dove Creek	17.3127%
Rico	6.3566%
Douglas County	71.8404%
Aurora (3 Counties)	0.2099%
Castle Pines	0.2007%
Castle Rock	13.5204%
Larkspur	0.0856%
Littleton (3 Counties)	0.0156%
Lone Tree	5.2786%
Parker	8.8487%
Eagle County	60.8236%
Avon	7.6631%
Basalt (2 Counties)	2.2311%
Eagle	3.1376%
Gypsum	1.7469%
Minturn	0.7771%

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Government Name	Intracounty Share
Red Cliff	0.0957%
Vail	23.5250%
El Paso County	18.4181%
Calhan	0.0228%
Colorado Springs	80.1161%
Fountain	0.9892%
Green Mountain Falls (2 Counties)	0.0149%
Manitou Springs	0.2411%
Monument	0.1492%
Palmer Lake	0.0455%
Ramah	0.0033%
Elbert County	86.5840%
Elizabeth	10.2633%
Kiowa	1.5455%
Simla	1.6072%
Fremont County	60.7882%
Brookside	0.0348%
Cañon City	30.9017%
Coal Creek	0.0476%
Florence	8.0681%
Rockvale	0.0687%
Williamsburg	0.0907%
Garfield County	76.3371%
Carbondale	2.4698%
Glenwood Springs	11.8141%
New Castle	1.4295%
Parachute	1.0653%
Rifle	5.2733%
Silt	1.6110%
Gilpin County	46.8613%
Black Hawk	46.3909%
Central City (2 Counties)	6.7478%
Grand County	80.1046%
Fraser	2.4903%
Granby	5.4008%
Grand Lake	0.3174%
Hot Sulphur Springs	0.1431%
Kremmling	2.9284%

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Government Name	Intracounty Share
Winter Park	8.6154%
Gunnison County	88.9185%
Crested Butte	2.3562%
Gunnison	5.9501%
Marble	0.1714%
Mount Crested Butte	2.5657%
Pitkin	0.0381%
Hinsdale County	76.0940%
Lake City	23.9060%
Huerfano County	68.2709%
La Veta	11.0719%
Walsenburg	20.6572%
Jackson County	61.5339%
Walden	38.4661%
Jefferson County	58.2140%
Arvada (2 Counties)	11.9733%
Bow Mar (2 Counties)	0.0087%
Edgewater	0.6604%
Golden	3.4815%
Lakeside	0.0030%
Lakewood	15.9399%
Littleton (3 Counties)	0.6176%
Morrison	0.2205%
Mountain View	0.1344%
Superior (2 Counties)	0.0000%
Westminster (2 Counties)	5.4779%
Wheat Ridge	3.2689%
Kiowa County	93.2138%
Eads	5.3777%
Haswell	0.6402%
Sheridan Lake	0.7682%
Kit Carson County	86.3178%
Bethune	0.1841%
Burlington	12.0640%
Flagler	0.4264%
Seibert	0.0291%
Stratton	0.9012%

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Government Name	Intracounty Share
Vona	0.0775%
La Plata County	66.8874%
Bayfield	1.6292%
Durango	29.2985%
Ignacio	2.1849%
Lake County	73.4523%
Leadville	26.5477%
Larimer County	56.0589%
Berthoud (2 Counties)	0.4139%
Estes Park	0.3502%
Fort Collins	18.5702%
Johnstown (2 Counties)	0.0711%
Loveland	23.4493%
Timnath (2 Counties)	0.2964%
Wellington	0.3653%
Windsor (2 Counties)	0.4248%
Las Animas County	77.8076%
Aguilar	0.0751%
Branson	0.0101%
Cokedale	0.0188%
Kim	0.0101%
Starkville	0.0087%
Trinidad	22.0696%
Lincoln County	91.3222%
Arriba	0.3444%
Genoa	0.2222%
Hugo	1.4778%
Limon	6.6333%
Logan County	72.7982%
Crook	0.0931%
Fleming	0.3413%
Iliff	0.0095%
Merino	0.4702%
Peetz	0.2029%
Sterling	26.0848%
Mesa County	60.8549%
Collbran	0.0920%

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Government Name	Intracounty Share
De Beque	0.0123%
Fruita	1.6696%
Grand Junction	37.1505%
Palisade	0.2208%
Mineral County	87.6744%
City of Creede	12.3256%
Moffat County	91.7981%
Craig	8.1862%
Dinosaur	0.0157%
Montezuma County	79.6682%
Cortez	18.6459%
Dolores	0.6106%
Mancos	1.0753%
Montrose County	92.8648%
Montrose	6.5980%
Naturita	0.1551%
Nucla	0.0703%
Olathe	0.3118%
Morgan County	61.6991%
Brush	8.5522%
Fort Morgan	27.8214%
Hillrose	0.1986%
Log Lane Village	0.6424%
Wiggins	1.0863%
Otero County	60.8168%
Cheraw	0.1888%
Fowler	1.0413%
La Junta	25.9225%
Manzanola	0.6983%
Rocky Ford	8.8215%
Swink	2.5109%
Ouray County	76.0810%
Ouray	17.6541%
Ridgway	6.2649%
Park County	96.3983%
Alma	0.7780%

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Government Name	Intracounty Share
Fairplay	2.8237%
Phillips County	52.3463%
Haxtun	13.9505%
Holyoke	33.1803%
Paoli	0.5228%
Pitkin County	47.1379%
Aspen	42.0707%
Basalt (2 Counties)	1.1156%
Snowmass Village	9.6757%
Prowers County	70.4524%
Granada	0.9965%
Hartman	0.3164%
Holly	4.9826%
Lamar	21.5860%
Wiley	1.6661%
Pueblo County	54.6622%
Boone	0.0019%
Pueblo	45.3350%
Rye	0.0008%
Rio Blanco County	78.2831%
Meeker	9.1326%
Rangely	12.5843%
Rio Grande County	68.0724%
Center (2 Counties)	0.7713%
Del Norte	6.7762%
Monte Vista	20.4513%
South Fork	3.9288%
Routt County	58.5353%
Hayden	1.0679%
Oak Creek	0.6360%
Steamboat Springs	39.4499%
Yampa	0.3109%
Saguache County	92.8796%
Bonanza	0.1367%
Center (2 Counties)	6.3687%
Crestone	0.0137%

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Government Name	Intracounty Share
Moffat	0.3553%
Saguache	0.2460%
San Juan County	87.0423%
Silverton	12.9577%
San Miguel County	48.7493%
Mountain Village	25.7930%
Norwood	0.4078%
Ophir	0.0816%
Sawpit	0.0272%
Telluride	24.9411%
Sedgwick County	98.7331%
Julesburg	0.3830%
Ovid	0.0295%
Sedgwick	0.8544%
Summit County	57.0567%
Blue River	0.5011%
Breckenridge	26.1112%
Dillon	4.1421%
Frisco	6.5096%
Montezuma	0.0169%
Silverthorne	5.6623%
Teller County	66.1557%
Cripple Creek	17.2992%
Green Mountain Falls (2 Counties)	0.0322%
Victor	3.1685%
Woodland Park	13.3445%
Washington County	99.1320%
Akron	0.7659%
Otis	0.1021%
Weld County	51.9387%
Ault	0.3202%
Berthoud (2 Counties)	0.0061%
Brighton (2 Counties)	0.0927%
Dacono	0.6104%
Eaton	0.4573%
Erie (2 Counties)	0.8591%
Evans	4.5121%

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Government Name	Intracounty Share
Firestone	1.4648%
Fort Lupton	0.8502%
Frederick	1.2228%
Garden City	0.1514%
Gilcrest	0.1580%
Greeley	30.6922%
Grover	0.0852%
Hudson	0.0066%
Johnstown (2 Counties)	1.5416%
Keenesburg	0.0215%
Kersey	0.1378%
La Salle	0.4128%
Lochbuie (2 Counties)	0.4004%
Longmont (2 Counties)	0.0154%
Mead	0.0941%
Milliken	1.5373%
Northglenn (2 Counties)	0.0030%
Nunn	0.2558%
Pierce	0.0948%
Platteville	0.3712%
Raymer (New Raymer)	0.0597%
Severance	0.0403%
Thornton (2 Counties)	0.0000%
Timnath (2 Counties)	0.0000%
Windsor (2 Counties)	1.5865%

Yuma County	75.5598%
Eckley	2.5422%
Wray	10.2148%
Yuma	11.6832%

[1] These allocations are based on the allocation model used in the Negotiation Class website. The allocation model is the product of prolonged and intensive research, analysis, and discussion by and among members of the court-appointed Plaintiffs' Executive Committee and Settlement Committee and their retained public health and health economics experts, as well as a series of meetings with scores of cities, counties and subdivisions. Additional information about the allocation model is available on the Negotiation Class website.

The allocations in the Negotiation Class website use two different methodologies:

County-Level Allocation

The allocation model uses three factors, based on reliable, detailed, and objective data collected and reported by the federal government, to determine the share of a settlement fund that each county will receive. The three factors are: (1) the amount of opioids shipped to the county, (2) the number of opioid deaths in that county, and (3) the number of people who suffer opioid use disorder in that county.

County/Municipal-Level Allocation

The county/municipal-level allocation is a default allocation to be used if another agreement is not reached between the county and its constituent cities. The formula uses U.S. Census Bureau data on local government spending. This data covers cities and counties for 98% of the U.S. population. If a jurisdiction lacked this data, it was extrapolated based on available data.

[2] The municipalities of Bow Mar, Johnstown, and Timnath were not reflected as being in multiple counties in the Negotiation Class website. The estimated allocations to those cities are based on the same methodology used in the website, in consultation with the expert. For cities in multiple counties, please see each county in which that city lies.

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Exhibit F

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Regional Allocations		
Region Number	Region Description	Total State Share
1	Northwest	0.9522%
2	Larimer	6.5211%
3	Weld	3.8908%
4	Logan	1.5896%
5	North Central	2.1061%
6	Boulder	5.7936%
7	Broomfield	1.0014%
8	Adams	9.4247%
9	Arapahoe	10.8071%
10	Jefferson	10.7114%
11	Denver	15.0042%
12	Douglas	3.6696%
13	Mesa	2.8911%
14	Southwest	1.4700%
15	Central	1.5627%
16	El Paso/Teller	12.6116%
17	Southwest Corner	1.4375%
18	South Central	1.0973%
19	Southeast	7.4580%
Total		100.0000%

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Exhibit G

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Regional Governance Models

A. Membership Structure

Single-County Regions

1. Voting Members (Recommended List: Participating Local Governments to Decide)
    - 1 or 2 representatives appointed by the county (can be commissioners)
    - 1 representative appointed from the public health department
    - 1 representative from the county human services department
    - 1 representative appointed from law enforcement within region (sheriff, police, local city or town district attorney, etc.)
    - 1 representative appointed from a municipal or county court system within region
    - 1-3 representatives (total) appointed by the cities within the county (or other city or cities agreed upon) (can be councilmembers and mayors)
    - Such other representatives as participating counties/cities agree on (not to include providers who may be recipients of funds)

2. Non-Voting Members (Optional but strongly encouraged)
    - Representatives from behavioral health providers
    - Representatives from health care providers
    - Recovery/treatment experts
    - Other county or city representatives
    - A representative from the Attorney General's Office
    - Community representative(s), preferably those with lived experience with the opioid crisis
    - Harm reduction experts

Multi-County Regions

1. Voting Members (Recommended List: Participating Local Governments to Decide)
    - 1 representative appointed by each county (can be commissioners)
    - 1 representative appointed by a rotating city within each county (or other city agreed upon) (can be councilmembers and mayors)
    - 1 representative from each public health department within the region
    - 1 representative from a county human services department
    - At least 1 representative appointed from law enforcement within region (sheriff, police, local city or town district attorney, etc.)
    - 1 representative from a municipal or county court system within region
    - Such other representatives as participating counties/cities agree on (not to include providers who may be recipients of funds)

2. Non-Voting Members (Optional)
    - Representatives from behavioral health providers

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- Representatives from health care providers
- Recovery/treatment experts
- Other county or city representatives
- A representative from the Attorney General's Office
- Community representative(s), preferably those with lived experience with the opioid crisis.
- Harm reduction experts

Single-County Single-City Regions (Denver & Broomfield)

1. Voting Members (Recommended List: Participating Local Government to Decide)[1]

    - 1 representative appointed by the city and county
    - 1 representative appointed from the public health department
    - 1 representative from the county human services department
    - 1 representative appointed from law enforcement within region (sheriff, police, district attorney, etc.)
    - 1 representative appointed from a municipal or county court system within region
    - Such other representatives as participating counties/cities agree on (not to include providers who may be recipients of funds)

2. Non-Voting Members (Optional)

    - Representatives from behavioral health providers
    - Representatives from health care providers
    - Recovery/treatment experts
    - Other county or city representatives
    - A representative from the Attorney General's Office
    - Community representative(s), preferably those with lived experience with the opioid crisis.
    - Harm reduction experts

B. Member Terms

- Regions may establish terms of appointment for members. Appointment terms may be staggered.

C. Procedures

- Regions will be governed by an intergovernmental agreement ("IGA") or memorandum of understanding ("MOU").
- Regions may adopt the Model Colorado Regional Opioid Intergovernmental Agreement, attached here as Exhibit G-1, in its entirety or alter or amend it as they deem appropriate.

[1] In Denver, the Mayor shall make voting member appointments to the Regional Council. In Broomfield, the City and County Manager shall make voting member appointments to the Regional Council.

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- Regions may establish their own procedures through adoption of bylaws (model bylaws to be made available).
- Meetings of regional board/committee shall be open to the public and comply with the Colorado Open Meetings Law (including requirement to keep minutes).

D. Financial Responsibility/Controls

- A local government entity shall nominate and designate a fiscal agent for the Region.
- A Regional fiscal agent must be appointed by the Regional Council on an annual basis. A Regional fiscal agent may serve as long as the Regional Council determines is appropriate, including the length of any Settlement that contemplates the distribution of Opioid Funds within Colorado. However, the Regional fiscal agent also can change over time.
- Regional fiscal agents must be a board of county commissioners or a city or town council or executive department, such as a department of finance.
- Yearly reporting by fiscal agent (using standard form) to the Abatement Council.
- All documents subject to CORA.

E. Conflicts of Interest

- Voting members shall abide by the conflict-of-interest rules applicable to local government officials under state law.

F. Ethics Laws

- Voting members shall abide by applicable state or local ethics laws, as appropriate.

G. Authority

- The Regional Council for each region shall have authority to decide how funds allocated to the region shall be distributed in accordance with the Colorado MOU and shall direct the fiscal agent accordingly.
- Any necessary contracts will be entered into by the fiscal agent, subject to approval by the Regional Council.

H. Legal Status

- The region shall not be considered a separate legal entity, unless the Participating Local Governments decide, through an IGA, to create a separate governmental entity.

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Exhibit G-1

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MODEL COLORADO REGIONAL OPIOID INTERGOVERNMENTAL AGREEMENT[2]

THIS MODEL COLORADO REGIONAL OPIOID INTERGOVERNMENTAL AGREEMENT (the "Regional Agreement") is made between _____, a Participating Local Government, as defined in the Colorado MOU, in the _____ Region ("_____") and _____, a Participating Local Government in the _____ Region, ("_____"), individually herein a "Regional PLG" and collectively the "Regional PLGs.""

RECITALS

WHEREAS, the State of Colorado and Participating Local Governments executed the Colorado Opioids Summary Memorandum of Understanding on _____ 2021 (the "Colorado MOU"), establishing the manner in which Opioid Funds shall be divided and distributed within the State of Colorado;

WHEREAS, the Regional Agreement assumes and incorporates the definitions and provisions contained in the Colorado MOU, and the Regional Agreement shall be construed in conformity with the Colorado MOU[3];

WHEREAS, all Opioid Funds, regardless of allocation, shall be used for Approved Purposes;

WHEREAS, Participating Local Governments shall organize themselves into Regions, as further depicted in **Exhibit E** to the Colorado MOU;

---

[2] This Model Regional Agreement is meant to serve as an example for the various Regions and to facilitate the flow of Opioid Funds to their intended purposes. Regions are free to adopt this Regional Agreement in its entirety or alter or amend it as they deem appropriate.

[3] When drafting agreements like this Regional Agreement, Regional PLGs should be conscious of the definitions used therein so as not to confuse such definitions with those used in the Colorado MOU. The Definitions in the Colorado MOU shall supersede any definitions used by Regional PLGs in a Regional Agreement.

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WHEREAS, Regions may consist of Single-County Regions, Multi-County Regions, or Single County-Single City Regions (Denver and Broomfield).

WHEREAS, there shall be a 60% direct allocation of Opioid Funds to Regions through a Regional Share;

WHEREAS, each Region shall be eligible to receive a Regional Share according to **Exhibit C** to the Colorado MOU;

WHEREAS, the Colorado MOU establishes the procedures by which each Region shall be entitled to Opioid Funds from the Abatement Council and administer its Regional Share allocation;

WHEREAS, the procedures established by the Colorado MOU include a requirement that each Region shall create its own Regional Council;

WHEREAS, all aspects of the creation, administration, and operation of the Regional Council shall proceed in accordance with the provisions of the Colorado MOU;

WHEREAS, each such Regional Council shall designate a fiscal agent from a county or municipal government within that Region;

WHEREAS, each such Regional Council shall submit a two-year plan to the Abatement Council that identifies the Approved Purposes for which the requested funds will be used, and the Regional Council's fiscal agent shall provide data and a certification to the Abatement Council regarding compliance with its two-year plan on an annual basis;

WHEREAS, the Regional Agreement pertains to the procedures for the Regional PLGs to establish a Regional Council, designate a fiscal agent, and request and administer Opioid Funds in a manner consistent with the Colorado MOU;

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NOW, THEREFORE, in consideration of the mutual covenants and agreements hereinafter set forth and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Regional PLGs incorporate the recitals set forth above and agree as follows:

1. **DEFINITIONS**. The defined terms used in this Regional Agreement shall have the same meanings as in the Colorado MOU[4]. Capitalized terms used herein and not otherwise defined within the Regional Agreement or in the Colorado MOU shall have the meanings ascribed to them in the body of the Regional Agreement.
2. **OBLIGATIONS OF THE REGIONAL PLGS**. The Regional PLGs shall perform their respective obligations as set forth in the Regional Agreement, the Colorado MOU and the accompanying exhibits to the Colorado MOU and incorporated herein by reference.
3. **REGIONAL COUNCIL**.

3.1. Purpose: In accordance with the Colorado MOU, a Regional Council, consisting of representatives appointed by the Regional PLGs, shall be created to oversee the procedures by which a Region may request Opioid Funds from the Abatement Council and the procedures by which the allocation of its Region's Share of Opioid Funds are administered.

3.2. Membership: The Regional Council of a Multi-County or Single County Region shall consist of the following:

a. **Multi-County Region:**

(i) **Voting Members.** Voting Members shall be appointed by the Regional PLGs. The Regional PLGs shall collaborate to appoint Regional Council members and to the extent practicable, Voting Members shall be selected from different counties and cities. No single county or city should dominate the make-up of the Regional Council. Voting Members shall be selected as follows:

(1) 1 representative appointed by each county (can be commissioners).

(2) 1 representative appointed from a rotating city within each county (or other city agreed upon) (can be councilmembers and mayors). A rotating city member shall be selected by majority vote of the cities within each county who do not have a Voting Member currently sitting on the Regional

[4] *See* FN 2, *supra*.

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Council.

(3) 1 representative from each public health department within the region.

(4) 1 representative from a county human services department.

(5) At least 1 representative appointed from law enforcement within the region (sheriff, police, local city or town district attorney, etc.).

(6) 1 representative from a municipal or county court system within the region.

b. **Single-County Region:**

(i) **Voting Members.** Voting Members shall be appointed by the Regional PLGs. The Regional PLGs shall collaborate to appoint Regional Council members and to the extent practicable, Voting Members shall be selected from different cities within the region. No single city should dominate the make-up of the Regional Council. Voting Members shall be selected as follows:

(1) 1 or 2 representatives appointed by the county (can be commissioners)

(2) 1 representative appointed from the public health department

(3) 1 representative from the county human services department

(4) 1 representative appointed from law enforcement within region (sheriff, police, local city or town district attorney, etc.)

(5) 1 representative appointed from a municipal or county court system within region

(6) 1-3 representatives (total) appointed by rotating cities within the county (or other city or cities agreed upon) (can be councilmembers and mayors). Rotating city members shall be selected by majority vote of the cities who do not have a Voting Member currently sitting on the Regional Council.

(7) Such other representatives as participating counties/cities agree on (not to include providers who may be recipients of

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funds)

c. **Non-Voting Members**. For both Multi-County and Single County Regions, Non-Voting Members are optional but are strongly encouraged. Non-voting members shall serve in an advisory capacity. Any Non-Voting Members shall be appointed by the Regional PLGs and may be comprised of all or some of the following, not to include potential recipients of funds:

(i) Representatives from behavioral health providers.

(ii) Representatives from health care providers.

(iii) Recovery/treatment experts.

(iv) Other county or city representatives.

(v) A representative from the Attorney General's Office.

(vi) Community representative(s), preferably those with lived experience with the opioid crisis.

(vii) Harm reduction experts.

d. **Acting Chair:** The Voting Members for both Multi-County and Single-County Regions shall appoint one member to serve as Acting Chair of the Regional Council. The Acting Chair's primary responsibilities shall be to schedule periodic meetings and votes of the Regional Council as needed and to serve as the point of contact for disputes within the Region. The Acting Chair must be either a Member from a county within a Region, such as a county commissioner or their designee, or a Member from a city or town within a Region, such as a mayor or city or town council member or their designee.

e. **Non-Participation:** A Local Government that chooses not to become a Participating Local Government in the Colorado MOU shall not receive any Opioid Funds from the Regional Share or participate in the Regional Council.

f. **Terms:** The Regional Council shall be established within ninety (90) days of the first Settlement being entered by a court of competent jurisdiction, including any bankruptcy court. In order to do so, within sixty (60) days of the first Settlement being entered, CCI and CML shall jointly recommend six (6) Voting Members, and so long as such recommendations comply with the terms of Section 3.2 (a) or (b), the Regional Council shall consist of CCI/CML's recommended Members for

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an initial term not to exceed one year.[5] Thereafter, Voting Members shall be appointed in accordance with Section 3.2 (a) or (b) and shall serve two-year terms. Following the expiration of that two-year term, the Regional PLGs, working in concert, shall reappoint that Voting Member, or appoint a new Voting Member according to Section 3.2 (a) or (b).

(i) If a Voting Member resigns or is otherwise removed from the Regional Council prior to the expiration of their term, a replacement Voting Member shall be appointed within sixty (60) days in accordance with Section 3.2 (a) or (b) to serve the remainder of the term. If the Regional PLGs are unable to fill a Voting Member vacancy within sixty (60) days, the existing Voting Members of the Regional Council at the time of the vacancy shall work collectively to appoint a replacement Voting Member in accordance with Section 3.2 (a) or (b). At the end of his or her term, the individual serving as that replacement Voting Member may be reappointed by the Regional PLGs to serve a full term consistent with this Section.

(ii) The purpose of the two-year term is to allow Regional PLGs an increased opportunity to serve on the Regional Council. However, Regional Council members who have already served on the Regional Council may be appointed more than once and may serve consecutive terms if appointed to do so by the Regional Council.

3.3. Duties: The Regional Council is primarily responsible for engaging with the Abatement Council on behalf of its Region and following the procedures outlined in the Colorado MOU for requesting Opioid Funds from the Regional Share, which shall include developing 2-year plans, amending those plans as appropriate, and providing the Abatement Council with data through its fiscal agent regarding Opioid Fund expenditures. Upon request from the Abatement Council, the Regional Council may also be subject to an accounting from the Abatement Council.

3.4. Governance: A Regional Council may establish its own procedures through adoption of bylaws if needed. Any governing documents must be consistent with the other provisions in this section and the Colorado MOU.

3.5. Authority: The terms of the Colorado MOU control the authority of a Regional Council and a Regional Council shall not stray outside the bounds of the authority and power vested by the Colorado MOU. Should a Regional Council require legal assistance in determining its authority,

[5] Local Governments within Multi-County or Single County Regions may decide to select initial Voting Members of the Regional Council between themselves and without CCI and CML involvement. However, the Regional Council must be established within ninety (90) days of the first Settlement being entered by a court of competent jurisdiction, including any bankruptcy court.

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it may seek guidance from the legal counsel of the county or municipal government of the Regional Council's fiscal agent at the time the issue arises.

3.6. Collaboration: The Regional Council shall facilitate collaboration between the State, Participating Local Governments within its Region, the Abatement Council, and other stakeholders within its Region for the purposes of sharing data, outcomes, strategies, and other relevant information related to abating the opioid crisis in Colorado.

3.7. Transparency: The Regional Council shall operate with all reasonable transparency and abide by all Colorado laws relating to open records and meetings. To the extent the Abatement Council requests outcome-related data from the Regional Council, the Regional Council shall provide such data in an effort to determine best methods for abating the opioid crisis in Colorado.

3.8. Conflicts of Interest: Voting Members shall abide by the conflict-of-interest rules applicable to local government officials under state law.

3.9. Ethics Laws: Voting Members shall abide by their local ethics laws or, if no such ethics laws exist, by applicable state ethics laws.

3.10. Decision Making: The Regional Council shall seek to make all decisions by consensus. In the event consensus cannot be achieved, the Regional Council shall make decisions by a majority vote of its Members.

4. REGIONAL FISCAL AGENT

4.1. Purpose: According to the Colorado MOU, the Regional Council must designate a fiscal agent for the Region prior to the Region receiving any Opioid funds from the Regional Share. All funds from the Regional Share shall be distributed to the Regional Council's fiscal agent for the benefit of the entire Region.

4.2. Designation: The Regional Council shall nominate and designate a fiscal agent for the Region by majority vote. Regional fiscal agents must be a board of county commissioners or a city or town council or executive department, such as a department of finance.

4.3. Term: A Regional fiscal agent must be appointed by the Regional Council on an annual basis. A Regional fiscal agent may serve as long as the Regional Council determines is appropriate, including the length of any Settlement that contemplates the distribution of Opioid Funds within Colorado.

4.4. Duties: The Regional fiscal agent shall receive, deposit, and make available Opioid Funds distributed from the Abatement Council and provide expenditure reporting data to the

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Abatement Council on an annual basis. In addition, the Regional fiscal agent shall perform certain recordkeeping duties outlined below.

a. **Opioid Funds:** The Regional fiscal agent shall receive all Opioid Funds as distributed by the Abatement Council. Upon direction by the Regional Council, the Regional fiscal agent shall make any such Opioid Funds available to the Regional Council.

b. **Reporting:** On an annual basis, as determined by the Abatement Council, the Regional fiscal agent shall provide to the Abatement Council the Regional Council's expenditure data from their allocation of the Regional Share and certify to the Abatement Council that the Regional Council's expenditures were for Approved Purposes and complied with its 2-year plan.

c. **Recordkeeping:** The Regional fiscal agent shall maintain necessary records with regard the Regional Council's meetings, decisions, plans, and expenditure data.

4.5. Authority: The fiscal agent serves at the direction of the Regional Council and in service to the entire Region. The terms of the Colorado MOU control the authority of a Regional Council, and by extension, the Regional fiscal agent. A Regional fiscal agent shall not stray outside the bounds of the authority and power vested by the Colorado MOU.

5. REGIONAL TWO-YEAR PLAN

5.1. Purpose: According to the Colorado MOU, as part of a Regional Council's request to the Abatement Council for Opioid Funds from its Regional Share, the Regional Council must submit a 2-year plan identifying the Approved Purposes for which the requested funds will be used.

5.2 Development of 2-Year Plan: In developing a 2-year plan, the Regional Council shall solicit recommendations and information from all Regional PLGs and other stakeholders within its Region for the purposes of sharing data, outcomes, strategies, and other relevant information related to abating the opioid crisis in Colorado. At its discretion, a Regional Council may seek assistance from the Abatement Council for purposes of developing a 2-year plan.

5.3 Amendment: At any point, a Regional Council's 2-year plan may be amended so long as such amendments comply with the terms of the Colorado MOU and any Settlement.

6. DISPUTES WITHIN REGION. In the event that any Regional PLG disagrees with a decision of the Regional Council, or there is a dispute regarding the appointment of Voting or Non-Voting Members to the Regional Council, that Regional PLG shall inform the Acting Chair of its dispute at the earliest

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possible opportunity. In Response, the Regional Council shall gather any information necessary to resolve the dispute. Within fourteen (14) days of the Regional PLG informing the Acting Chair of its dispute, the Regional Council shall issue a decision with respect to the dispute. In reaching its decision, the Regional Council may hold a vote of Voting Members, with the Acting Chair serving as the tie-breaker, or the Regional Council may devise its own dispute resolution process. However, in any disputes regarding the appointment of a Voting Member, that Voting Member will be recused from voting on the dispute. The decision of the Regional Council is a final decision.

7. **DISPUTES WITH ABATEMENT COUNCIL.** If the Regional Council disputes the amount of Opioid Funds it receives from its allocation of the Regional Share, the Regional Council shall alert the Abatement Council within sixty (60) days of discovering the information underlying the dispute. However, the failure to alert the Abatement Council within this time frame shall not constitute a waiver of the Regional Council's right to seek recoupment of any deficiency in its Regional Share.
8. **RECORDKEEPING**. The acting Regional fiscal agent shall be responsible for maintaining records consistent with the Regional Agreement.
9. **AUTHORIZED REPRESENTATIVES**. Each Regional PLGs' representative designated below shall be the point of contact to coordinate the obligations as provided herein. The Regional PLGs designate their authorized representatives under this Regional Agreement as follows:
    - **9.1.** _____ designates the ____ of the _____ or their designee(s).
    - **9.2.** _____ designates the ____ of the _____ or their designee(s).
10. **OBLIGATIONS OF THE REGIONAL PLGS**. The Regional PLGs shall perform their respective obligations as set forth in the Regional Agreement, the Colorado MOU and the accompanying exhibits to the Colorado MOU and incorporated herein by reference.
11. **TERM**. The Regional Agreement will commence on _____, and shall expire on the date the last action is taken by the Region, consistent with the terms of the Colorado MOU and any Settlement. (the "Term").
12. **INFORMATIONAL OBLIGATIONS**. Each Regional PLG hereto will meet its obligations as set forth in § 29-1-205, C.R.S., as amended, to include information about this Regional Agreement in a filing with the Colorado Division of Local Government; however, failure to do so shall in no way affect the validity of this Regional Agreement or any remedies available to the Regional PLGs hereunder.
13. **CONFIDENTIALITY**. The Regional PLGs, for themselves, their agents, employees and representatives, agree that they will not divulge any confidential or proprietary information they receive from another Regional PLG or otherwise have access to, except as may be required by law. Nothing in this Regional

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Agreement shall in any way limit the ability of the Regional PLGs to comply with any laws or legal process concerning disclosures by public entities. The Regional PLGs understand that all materials exchanged under this Regional Agreement, including confidential information or proprietary information, may be subject to the Colorado Open Records Act., § 24-72-201, *et seq*., C.R.S., (the "Act"). In the event of a request to a Regional PLG for disclosure of confidential materials, the Regional PLG shall advise the Regional PLGs of such request in order to give the Regional PLGs the opportunity to object to the disclosure of any of its materials which it marked as, or otherwise asserts is, proprietary or confidential. If a Regional PLG objects to disclosure of any of its material, the Regional PLG shall identify the legal basis under the Act for any right to withhold. In the event of any action or the filing of a lawsuit to compel disclosure, the Regional PLG agrees to intervene in such action or lawsuit to protect and assert its claims of privilege against disclosure of such material or waive the same. If the matter is not resolved, the Regional PLGs may tender all material to the court for judicial determination of the issue of disclosure.

14. **GOVERNING LAW; VENUE**. This Regional Agreement shall be governed by the laws of the State of Colorado. Venue for any legal action relating solely to this Regional Agreement will be in the applicable District Court of the State of Colorado for the county of the Region's fiscal agent. Venue for any legal action relating to the Colorado MOU shall be in a court of competent jurisdiction where a Settlement or consent decree was entered, as those terms are described or defined in the Colorado MOU. If a legal action relates to both a Regional Agreement and the Colorado MOU, venue shall also be in a court of competent jurisdiction where a Settlement or consent decree was entered.

15. **TERMINATION**. The Regional PLGs enter into this Regional Agreement to serve the public interest. If this Regional Agreement ceases to further the public interest, a Regional PLG, in its discretion, may terminate their participation in the Regional Agreement, in whole or in part, upon written notice to the other Regional PLGs. Each Regional PLG also has the right to terminate the Regional Agreement with cause upon written notice effective immediately, and without cause upon thirty (30) days prior written notice to the other Regional PLGs. A Regional PLG's decision to terminate this Regional Agreement, with or without cause, shall have no impact on the other Regional PLGs present or future administration of its Opioid Funds and the other procedures outlined in this Regional Agreement. Rather, a Regional PLG's decision to terminate this Regional Agreement shall have the same effect as non-participation, as outlined in Section 3.2 (e).

16. **NOTICES**. "Key Notices" under this Regional Agreement are notices regarding default, disputes, or termination of the Regional Agreement. Key Notices shall be given in writing and shall be deemed

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received if given by confirmed electronic transmission that creates a record that may be retained, retrieved and reviewed by a recipient thereof, and that may be directly reproduced in paper form by such a recipient through an automated process, but specifically excluding facsimile transmissions and texts when transmitted, if transmitted on a business day and during normal business hours of the recipient, and otherwise on the next business day following transmission; certified mail, return receipt requested, postage prepaid, three business days after being deposited in the United States mail; or overnight carrier service or personal delivery, when received. For Key Notices, the Regional PLGs will follow up any electronic transmission with a hard copy of the communication by the means described above. All other communications or notices between the Regional PLGs that are not Key Notices may be done via electronic transmission. The Regional PLGs agree that any notice or communication transmitted by electronic transmission shall be treated in all manner and respects as an original written document; any such notice or communication shall be considered to have the same binding and legal effect as an original document. All Key Notices shall include a reference to the Regional Agreement, and Key Notices shall be given to the Regional PLGs at the following addresses:

_____

_____

17. GENERAL TERMS AND CONDITIONS

17.1. **Independent Entities**. The Regional PLGs enter into this Regional Agreement as separate, independent governmental entities and shall maintain such status throughout.

17.2. **Assignment**. This Regional Agreement shall not be assigned by any Regional PLG without the prior written consent of all Regional PLGs. Any assignment or subcontracting without such consent will be ineffective and void and will be cause for termination of this Regional Agreement.

17.3. **Integration and Amendment**. This Regional Agreement represents the entire agreement between the Regional PLGs and terminates any oral or collateral agreement or understandings. This Regional Agreement may be amended only by a writing signed by the Regional PLGs. If any provision of this Regional Agreement is held invalid or unenforceable, no other provision shall be affected by such holding, and the remaining provision of this Regional Agreement shall continue in full force and effect.

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17.4. **No Construction Against Drafting Party**. The Regional PLGs and their respective counsel have had the opportunity to review the Regional Agreement, and the Regional Agreement will not be construed against any Regional PLG merely because any provisions of the Regional Agreement were prepared by a particular Regional PLG.

17.5. **Captions and References**. The captions and headings in this Regional Agreement are for convenience of reference only and shall not be used to interpret, define, or limit its provisions. All references in this Regional Agreement to sections (whether spelled out or using the § symbol), subsections, exhibits or other attachments, are references to sections, subsections, exhibits or other attachments contained herein or incorporated as a part hereof, unless otherwise noted.

17.6. **Statutes, Regulations, and Other Authority**. Any reference in this Regional Agreement to a statute, regulation, policy or other authority shall be interpreted to refer to such authority then current, as may have been changed or amended since the execution of this Regional Agreement.

17.7. **Conflict of Interest**. No Regional PLG shall knowingly perform any act that would conflict in any manner with said Regional PLG's obligations hereunder. Each Regional PLG certifies that it is not engaged in any current project or business transaction, directly or indirectly, nor has it any interest, direct or indirect, with any person or business that might result in a conflict of interest in the performance of its obligations hereunder. No elected or employed member of any Regional PLG shall be paid or receive, directly or indirectly, any share or part of this Regional Agreement or any benefit that may arise therefrom.

17.8. **Inurement**. The rights and obligations of the Regional PLGs to the Regional Agreement inure to the benefit of and shall be binding upon the Regional PLGs and their respective successors and assigns, provided assignments are consented to in accordance with the terms of the Regional Agreement.

17.9. **Survival**. Notwithstanding anything to the contrary, the Regional PLGs understand and agree that all terms and conditions of this Regional Agreement and any exhibits that require continued performance or compliance beyond the termination or expiration of this Regional Agreement shall survive such termination or expiration and shall be enforceable against a Regional PLG if such Regional PLG fails to perform or comply with such term or condition.

17.10. **Waiver of Rights and Remedies**. This Regional Agreement or any of its provisions may not be waived except in writing by a Regional PLG's authorized representative. The failure of a

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Regional PLG to enforce any right arising under this Regional Agreement on one or more occasions will not operate as a waiver of that or any other right on that or any other occasion.

17.11. **No Third-Party Beneficiaries**. Enforcement of the terms of the Regional Agreement and all rights of action relating to enforcement are strictly reserved to the Regional PLGs. Nothing contained in the Regional Agreement gives or allows any claim or right of action to any third person or entity. Any person or entity other than the Regional PLGs receiving services or benefits pursuant to the Regional Agreement is an incidental beneficiary only.

17.12. **Records Retention**. The Regional PLGs shall maintain all records, including working papers, notes, and financial records in accordance with their applicable record retention schedules and policies. Copies of such records shall be furnished to the Parties request.

17.13. **Execution by Counterparts; Electronic Signatures and Records**. This Regional Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same instrument. The Regional PLGs approve the use of electronic signatures for execution of this Regional Agreement. All use of electronic signatures shall be governed by the Uniform Electronic Transactions Act, C.R.S. §§ 24-71.3-101, *et seq*. The Regional PLGs agree not to deny the legal effect or enforceability of the Regional Agreement solely because it is in electronic form or because an electronic record was used in its formation. The Regional PLGs agree not to object to the admissibility of the Regional Agreement in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

17.14. **Authority to Execute**. Each Regional PLG represents that all procedures necessary to authorize such Regional PLG's execution of this Regional Agreement have been performed and that the person signing for such Regional PLG has been authorized to execute the Regional Agreement.

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EXHIBIT K

Settlement Participation Form

Governmental Entity:	State:
Authorized Official:	
Address 1:	
Address 2:	
City, State, Zip:	
Phone:	
Email:	

The governmental entity identified above ("Governmental Entity"), in order to obtain and in consideration for the benefits provided to the Governmental Entity pursuant to the Settlement Agreement dated July 21, 2021 ("Janssen Settlement"), and acting through the undersigned authorized official, hereby elects to participate in the Janssen Settlement, release all Released Claims against all Released Entities, and agrees as follows.

1. The Governmental Entity is aware of and has reviewed the Janssen Settlement, understands that all terms in this Election and Release have the meanings defined therein, and agrees that by this Election, the Governmental Entity elects to participate in the Janssen Settlement and become a Participating Subdivision as provided therein.

2. The Governmental Entity shall, within 14 days of the Reference Date and prior to the filing of the Consent Judgment, dismiss with prejudice any Released Claims that it has filed.

3. The Governmental Entity agrees to the terms of the Janssen Settlement pertaining to Subdivisions as defined therein.

4. By agreeing to the terms of the Janssen Settlement and becoming a Releasor, the Governmental Entity is entitled to the benefits provided therein, including, if applicable, monetary payments beginning after the Effective Date.

5. The Governmental Entity agrees to use any monies it receives through the Janssen Settlement solely for the purposes provided therein.

6. The Governmental Entity submits to the jurisdiction of the court in the Governmental Entity's state where the Consent Judgment is filed for purposes limited to that court's role as provided in, and for resolving disputes to the extent provided in, the Janssen Settlement.

7. The Governmental Entity has the right to enforce the Janssen Settlement as provided therein.

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8. The Governmental Entity, as a Participating Subdivision, hereby becomes a Releasor for all purposes in the Janssen Settlement, including but not limited to all provisions of Section IV (Release), and along with all departments, agencies, divisions, boards, commissions, districts, instrumentalities of any kind and attorneys, and any person in their official capacity elected or appointed to serve any of the foregoing and any agency, person, or other entity claiming by or through any of the foregoing, and any other entity identified in the definition of Releasor, provides for a release to the fullest extent of its authority. As a Releasor, the Governmental Entity hereby absolutely, unconditionally, and irrevocably covenants not to bring, file, or claim, or to cause, assist or permit to be brought, filed, or claimed, or to otherwise seek to establish liability for any Released Claims against any Released Entity in any forum whatsoever. The releases provided for in the Janssen Settlement are intended by the Parties to be broad and shall be interpreted so as to give the Released Entities the broadest possible bar against any liability relating in any way to Released Claims and extend to the full extent of the power of the Governmental Entity to release claims. The Janssen Settlement shall be a complete bar to any Released Claim.

9. In connection with the releases provided for in the Janssen Settlement, each Governmental Entity expressly waives, releases, and forever discharges any and all provisions, rights, and benefits conferred by any law of any state or territory of the United States or other jurisdiction, or principle of common law, which is similar, comparable, or equivalent to § 1542 of the California Civil Code, which reads:

> **General Release; extent.** A general release does not extend to claims that the creditor or releasing party does not know or suspect to exist in his or her favor at the time of executing the release that, if known by him or her, would have materially affected his or her settlement with the debtor or released party.

A Releasor may hereafter discover facts other than or different from those which it knows, believes, or assumes to be true with respect to the Released Claims, but each Governmental Entity hereby expressly waives and fully, finally, and forever settles, releases and discharges, upon the Effective Date, any and all Released Claims that may exist as of such date but which Releasors do not know or suspect to exist, whether through ignorance, oversight, error, negligence or through no fault whatsoever, and which, if known, would materially affect the Governmental Entities' decision to participate in the Janssen Settlement.

10. Nothing herein is intended to modify in any way the terms of the Janssen Settlement, to which Governmental Entity hereby agrees. To the extent this Election and Release is interpreted differently from the Janssen Settlement in any respect, the Janssen Settlement controls.

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I have all necessary power and authorization to execute this Election and Release on behalf of the Governmental Entity.

Signature: _____

Name: _____

Title: _____

Date: _____

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EXHIBIT K

Subdivision Settlement Participation Form

Governmental Entity:	State:
Authorized Official:	
Address 1:	
Address 2:	
City, State, Zip:	
Phone:	
Email:	

The governmental entity identified above ("*Governmental Entity*"), in order to obtain and in consideration for the benefits provided to the Governmental Entity pursuant to the Settlement Agreement dated July 21, 2021 ("*Distributor Settlement*"), and acting through the undersigned authorized official, hereby elects to participate in the Distributor Settlement, release all Released Claims against all Released Entities, and agrees as follows.

1. The Governmental Entity is aware of and has reviewed the Distributor Settlement, understands that all terms in this Participation Form have the meanings defined therein, and agrees that by signing this Participation Form, the Governmental Entity elects to participate in the Distributor Settlement and become a Participating Subdivision as provided therein.

2. The Governmental Entity shall, within 14 days of the Reference Date and prior to the filing of the Consent Judgment, secure the dismissal with prejudice of any Released Claims that it has filed.

3. The Governmental Entity agrees to the terms of the Distributor Settlement pertaining to Subdivisions as defined therein.

4. By agreeing to the terms of the Distributor Settlement and becoming a Releasor, the Governmental Entity is entitled to the benefits provided therein, including, if applicable, monetary payments beginning after the Effective Date.

5. The Governmental Entity agrees to use any monies it receives through the Distributor Settlement solely for the purposes provided therein.

6. The Governmental Entity submits to the jurisdiction of the court in the Governmental Entity's state where the Consent Judgment is filed for purposes limited to that court's role as provided in, and for resolving disputes to the extent provided in, the Distributor Settlement. The Governmental Entity likewise agrees to arbitrate before the National Arbitration Panel as provided in, and for resolving disputes to the extent otherwise provided in, the Distributor Settlement.

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7. The Governmental Entity has the right to enforce the Distributor Settlement as provided therein.

8. The Governmental Entity, as a Participating Subdivision, hereby becomes a Releasor for all purposes in the Distributor Settlement, including, but not limited to, all provisions of Part XI, and along with all departments, agencies, divisions, boards, commissions, districts, instrumentalities of any kind and attorneys, and any person in their official capacity elected or appointed to serve any of the foregoing and any agency, person, or other entity claiming by or through any of the foregoing, and any other entity identified in the definition of Releasor, provides for a release to the fullest extent of its authority. As a Releasor, the Governmental Entity hereby absolutely, unconditionally, and irrevocably covenants not to bring, file, or claim, or to cause, assist or permit to be brought, filed, or claimed, or to otherwise seek to establish liability for any Released Claims against any Released Entity in any forum whatsoever. The releases provided for in the Distributor Settlement are intended by the Parties to be broad and shall be interpreted so as to give the Released Entities the broadest possible bar against any liability relating in any way to Released Claims and extend to the full extent of the power of the Governmental Entity to release claims. The Distributor Settlement shall be a complete bar to any Released Claim.

9. The Governmental Entity hereby takes on all rights and obligations of a Participating Subdivision as set forth in the Distributor Settlement.

10. In connection with the releases provided for in the Distributor Settlement, each Governmental Entity expressly waives, releases, and forever discharges any and all provisions, rights, and benefits conferred by any law of any state or territory of the United States or other jurisdiction, or principle of common law, which is similar, comparable, or equivalent to § 1542 of the California Civil Code, which reads:

> **General Release; extent.** A general release does not extend to claims that the creditor or releasing party does not know or suspect to exist in his or her favor at the time of executing the release, and that if known by him or her would have materially affected his or her settlement with the debtor or released party.

A Releasor may hereafter discover facts other than or different from those which it knows, believes, or assumes to be true with respect to the Released Claims, but each Governmental Entity hereby expressly waives and fully, finally, and forever settles, releases and discharges, upon the Effective Date, any and all Released Claims that may exist as of such date but which Releasors do not know or suspect to exist, whether through ignorance, oversight, error, negligence or through no fault whatsoever, and which, if known, would materially affect the Governmental Entities' decision to participate in the Distributor Settlement.

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11. Nothing herein is intended to modify in any way the terms of the Distributor Settlement, to which Governmental Entity hereby agrees. To the extent this Participation Form is interpreted differently from the Distributor Settlement in any respect, the Distributor Settlement controls.

I have all necessary power and authorization to execute this Participation Form on behalf of the Governmental Entity.

Signature: _____

Name: _____

Title: _____

Date: _____

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Colorado Subdivision Escrow Agreement

Governmental Entity:	State: CO
Authorized Official:	
Address 1:	
Address 2:	
City, State, Zip:	
Phone:	
Email:	

The governmental entity identified above ("*Governmental Entity*") hereby provides Colorado Counties, Inc. (for counties) or the Colorado Municipal League (for municipalities) ("*Escrow Agent*") the enclosed copies of the Governmental Entity's endorsed Subdivision Settlement Participation Forms and the Colorado Opioids Settlement Memorandum of Understanding ("Colorado MOU"), to be held in escrow. The Subdivision Settlement Participation Forms apply respectively to (1) the National Settlement Agreement with McKesson Corporation, Cardinal Health, Inc., and AmerisourceBergen Corporation, dated July 21, 2021 ("*Distributor Settlement*"); and (2) the National Settlement Agreement with Janssen Pharmaceuticals, Inc., and its parent company Johnson & Johnson, dated July 21, 2021 ("*J&J Settlement*"). Pursuant to this Agreement, the Subdivision Settlement Participation Forms and the Colorado MOU will be released only if there is 95% participation by local governments in Colorado as further explained below.

Purpose of this Agreement

By endorsing a Subdivision Settlement Participation Form in the Distributor Settlement and the J&J Settlement, a governmental entity agrees to participate in those settlements and release any legal claims it has or may have against those settling pharmaceutical companies. This Colorado Subdivision Escrow Agreement is meant to ensure that the legal claims of governmental entities in Colorado will be released only when 95% participation by certain governmental entities has been reached. That 95% participation threshold is important because it signals to the settling pharmaceutical companies that the settlement has wide acceptance which will then secure significant incentive payments under these settlement agreements.

Escrow

The Escrow Agent shall promptly report the receipt of any Governmental Entity's endorsed Subdivision Settlement Participation Forms and Colorado MOUs to the Colorado Attorney General's Office and to the law firm of Keller Rohrback L.L.P. These documents shall be released by the Escrow Agent to the Colorado Attorney General's Office if and when the Escrow Agent is notified by the Attorney General's Office and Keller Rohrback that that the threshold 95% participation levels have been reached for both the Distributor Settlement and the J&J Settlement, as further described below. If by December 29, 2021, the Escrow Agent has not received notification that the threshold 95% levels have been reached for both the Distributor Settlement and the J&J Settlements, then the documents being escrowed shall be returned to the Governmental Entities and all copies shall be destroyed.

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Distributor Settlement

The Attorney General's Office and Keller Rohrback shall jointly submit a written notification to the Escrow Agent when it has been determined that the percentages of populations eligible for Incentives B and C, as described in Sections IV.F.2 and IV.F.3 of the Distributor Settlement, are each 95% or more. For purposes of this Escrow Agreement, the percentages of populations eligible for Incentives B and C under the Distributor Settlement will include governmental entities that sign a Subdivision Settlement Participation Form subject to an escrow agreement and governmental entities that sign a Subdivision Settlement Participation Form that is not subject to an escrow agreement.

J&J Settlement

The Attorney General's Office and Keller Rohrback shall jointly submit a written notification to the Escrow Agent when it has been determined that the Participation or Case-Specific Resolution Levels for Incentives B and C, as described in Sections V.E.5 and V.E.6 of the J&J Settlement, are each 95% or more. For purposes of this Escrow Agreement, the percentages or populations eligible for Incentives B and C under the J&J Settlement will include governmental entities that sign a Subdivision Settlement Participation Form subject to an escrow agreement and governmental entities that sign a Subdivision Settlement Participation Form that is not subject to an escrow agreement.

Colorado Subdivision Name _____

_____ _____

Authorized Signature Date

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-182

APPROVE A RESOLUTION ACCEPTING THE COTTONWOOD GREENS PUD PRELIMINARY PLAT & PRELIMINARY PUD PLAN FOR FILING NO. 4

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:

a. Proposed Resolution
b. Planning Commission Resolution & Minutes
c. Staff Report
d. Land Use Application & Project Description
e. Preliminary Plat Map & PUD Plan for Filing No. 4
f. Preliminary Plat Map & PUD Plan for Overall Cottonwood Greens PUD (for reference)
g. Construction Plans
h. Landscape Plans
i. Elevation Drawings & Renderings
j. Cost Estimate
k. Development Reports & Traffic Studies
l. Referral Responses
m. Legal Notifications & Mineral Notice Affidavit

III. Summary Statement:

The applicant, Arbor Capital Partners, LLC, has applied for approval of a preliminary and preliminary PUD plan, known as the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan. The site is located north and adjacent to 9th Street and approximately 0.29 miles west of County Road 31. The site is 16.22 acres, more or less, and a residential subdivision with 137 single-family attached (townhouse) residential units is proposed, and will include common areas and interconnecting trails.

IV. Submitted by: _____ City Planner

V. Finance Reviewed _____ Finance Director

VI. Approved for Presentation: _____ City Administrator

VII. Attorney Reviewed _____ Approved _____ Pending Approval

VIII. Certification of Council Approval: _____ City Clerk _____ Date

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IX. Detail of Issue/Request:

The applicant, Arbor Capital Partners, LLC, has applied for approval of a preliminary plat and preliminary PUD plan, known as the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan. The site is located north and adjacent to 9th Street and approximately 0.29 miles west of County Road 31. The site is 16.22 acres, more or less, and a residential subdivision with 137 single-family attached (townhouse) residential units is proposed, and will include common areas and interconnecting trails.

The subdivision is currently zoned PUD Planned Unit Development. The zoning permits residential uses within the R-1, R-1A, R-2 and R-3 portion of the Municipal Code. The Comprehensive Plan designates this area as Single Family Detached, however also states that this can consist of a variety of development types, including higher density homes within residential growth areas. The proposed use complies with the current zoning and comprehensive plan designation.

Additional information on this application can be found in the attached Staff Report and other supportive documents. Other submittal documents may not be included with this packet, but can be available for review upon request.

X. Legal/Political Considerations:

The preliminary plat and PUD plan is being reviewed under the preliminary plat provisions of the Subdivision Regulations of the Fort Lupton Municipal Code. This is the second step in the major subdivision process. The first step is approval of a sketch plat (reviewed and approved on May 6, 2019). The public hearing for the preliminary plat and PUD plan is the second step, and the final plat and PUD plan will be the final step, which will be reviewed at a separate public meeting if the preliminary plat and PUD plan is approved.

Under the Code, the Planning Commission shall consider the application, referral comments and any public testimony at a public hearing and make a recommendation to City Council to approve, approve with conditions or deny the preliminary plat. The Planning Commission reviewed the application on October 14, 2021 and recommended approval of this application, with conditions as shown on the Resolution included with the packet materials.

The City Council shall then conduct a public hearing and evaluate the preliminary plat and preliminary PUD plan, referral agency comments, Planning Commission recommendation and any public testimony. City Council shall approve, conditionally approve, continue for additional information or for further study or deny the application based on the evidence presented and compliance with the City's standards, regulations and policies and other guidelines.

References to the Preliminary PUD Plan establishes the unique regulations and standards for development on the Property. This includes, but is not limited to, any deviations from the City's Zoning Regulations, Residential Design Standards and Specification for Design and Construction of Public Improvements and Zoning Regulations.

The Subdivision Regulations require published notice of the hearings in a timely manner prior to the hearings. The Planning Commission and City Council hearings were published in the Fort Lupton press on September 29, 2021. Notice of the public hearings were posted on the Property on September 29, 2021, pursuant to the Subdivision Regulations, which require the Applicant post the Property with notice of the hearings at least fifteen (15) days prior to the hearings.

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Notice was mailed to neighbors within 500 feet of the Property, and owners and lessees of mineral interests on September 28, 2021.

XI. Alternatives/Options:

The City Council has the following options for each request:

a) Approve the proposed resolution.
b) Approve the proposed resolution with conditions.
c) Continue the hearing for additional information or further study.
d) Deny the proposed resolution.

XII. Financial Considerations:

All applicable land use application fees have been paid and a fee deposit has been submitted to cover costs related to the application.

XIII. Staff Recommendation:

Staff recommends conditional approval of the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan.

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RESOLUTION NO. 2021R0XX

A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE COTTONWOOD GREENS PUD PRELIMINARY PLAT AND PRELIMINARY PUD PLAN FOR FILING NO. 4 LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO.

WHEREAS, Arbor Capital Partners, LLC ("Applicant") has applied for approval of the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan for single family attached (townhome) residential units (the "Application"); and

WHEREAS, the Fort Lupton City Council held a public meeting on November 2, 2021 for the purpose of reviewing the Cottonwood Greens PUD Preliminary Plat and Preliminary PUD Plan for Filing No. 4; and

WHEREAS, after review of the Application and consideration of staff comments, Applicant's presentation and any public input, the City Council finds the request for the Cottonwood Greens PUD Preliminary Plat and Preliminary PUD Plan for Filing No. 4 conforms with City codes and requirements and policies therein; and

WHEREAS, all legal notification requirements have been met, including publishing the time and place of the public hearings in the Fort Lupton Press, posting notice at least fifteen (15) days before the hearings on the property, mailing notice to property owners within five-hundred (500) feet of the property and to oil and gas lessees on the property; and

NOW THEREFORE BE IT RESOLVED, the City Council has considered the application and has taken into consideration staff comments, the applicant presentation, all referral comments and any citizen testimony in response to this application. Based upon the review of applicable policies and goals in the Fort Lupton Comprehensive Plan, review of the Subdivision and Zoning Regulations, and the facts presented on this date, the City Council hereby approves the Cottonwood Greens PUD Preliminary Plat and Preliminary PUD Plan for Filing No. 4 located in the Southeast Quarter of Section 33, Township 2 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, County of Weld, State of Colorado, with the following conditions:

I. Prior to finalizing the Preliminary Plat:

   A. The title of the Preliminary Plat shall include the Project No.: LUP2021-0019 & Plan No.: PPL2021-0004.

   B. Update the Preliminary Plat and Preliminary PUD Plan with any redlined changes provided by staff.

II. As part of the Final Plat submittal:

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A. Finalize the Preliminary Plat and Preliminary PUD Plan with the comments provided by City staff noted under Section I (B) of this Resolution.

B. Written evidence shall be provided to show that the comments from United Power have been adequately addressed.

C. Written evidence shall be provided to show that the comments from Xcel Energy (Public Service Company) have been adequately addressed.

D. Written evidence shall be provided to show that any comments from the Public Works Director have been adequately addressed.

E. Written evidence shall be provided to show that the comments from the Fort Lupton Fire Protection District have been adequately addressed.

F. Applicant shall finalize a subdivision improvements agreement for review by City staff and approval by City Council.

G. Provide information concerning any existing surface use agreements and provide detail how the agreements have been addressed on the design of the development.

H. Provide information concerning any existing metro district and/or planned homeowners association.

APPROVED AND PASSED BY A MAJORITY VOTE OF THOSE ELECTED TO THE CITY COUNCIL OF THE CITY OF FORT LUPTON, COLORADO THIS 2nd DAY OF NOVEMBER, 2021.

City of Fort Lupton, Colorado

_____

Zo Stieber, Mayor

Attest:

_____

Maricela Peña, City Clerk

Approved as to form:

_____

Andy Ausmus, City Attorney

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RESOLUTION NO. P2021-025

A RESOLUTION OF THE PLANNING COMMISSION OF FORT LUPTON RECOMMENDING TO CITY COUNCIL APPROVAL OF THE COTTONWOOD GREENS PUD FILING NO. 4 PRELIMINARY PUD PLAT AND PRELIMINARY PUD PLAN LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO.

WHEREAS, Arbor Capital Partners, LLC ("Applicant") has applied for approval of the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan for single family attached (townhome) residential units (the "Application"); and

WHEREAS, pursuant to Section 16-45(c)(3) of the Fort Lupton Zoning Regulations, PUD development plan applications shall be processed in the same manner as set forth in the Fort Lupton Subdivision Regulations; and

WHEREAS, the Planning Commission held a public meeting on October 14, 2021 for the purpose of reviewing the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan; and

WHEREAS, after review of the Application and consideration of staff comments, Applicant's presentation and any public input, Planning Commission finds the request for the Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan conforms with City codes and requirements and policies therein; and

WHEREAS, all legal notification requirements have been met, including publishing the time and place of the public hearings in the Fort Lupton Press, posting notice at least fifteen (15) days before the hearings on the property, mailing notice to property owners within five-hundred (500) feet of the property and to oil and gas lessees on the property; and

NOW THEREFORE BE IT RESOLVED, the Planning Commission has considered the application and has taken into consideration staff comments, the applicant presentation, all referral comments and any citizen testimony in response to this application. Based upon the review of applicable policies and goals in the Fort Lupton Comprehensive Plan, review of the Subdivision and Zoning Regulations, and the facts presented on this date, the Planning Commission hereby recommends approval of Cottonwood Greens PUD Filing No. 4 Preliminary Plat and Preliminary PUD Plan for a planned unit development located in the Southeast Quarter of Section 33, Township 2 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, County of Weld, State of Colorado, with the following conditions:

I. Prior to finalizing the Preliminary Plat:

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A. The title of the Preliminary PUD Plat shall include the Project No.: LUP2021-0019 & Plan No.: PPL2021-0004.

B. Update the Preliminary Plat and Preliminary PUD Plan with any redlined changes provided by staff.

II. As part of the Final PUD Plat submittal:

A. Finalize the Preliminary PUD Plat with the comments provided by City staff noted under Section I(B) of this Resolution.

B. Written evidence shall be provided to show that the comments from United Power have been adequately addressed.

C. Written evidence shall be provided to show that the comments from Xcel Energy (Public Service Company) have been adequately addressed.

D. Written evidence shall be provided to show that any comments from the Public Works Director have been adequately addressed.

E. Applicant shall finalize a subdivision improvements agreement for review by City staff and approval by City Council.

F. Provide information concerning any existing surface use agreements and provide detail how the agreements have been addressed on the design of the development.

G. Provide information concerning any existing metro district and/or planned homeowners association.

DONE THIS 14th DAY OF OCTOBER, 2021, BY THE PLANNING COMMISSION FOR THE CITY OF FORT LUPTON, COLORADO.

Chairman

ATTEST:

Planning Director

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RECORD OF PROCEEDINGS
FORT LUPTON PLANNING COMMISSION
October 14, 2021

The Planning Commission of the City of Fort Lupton met in session at the City Complex, 130 South McKinley Avenue, the regular meeting place of the Planning Commission and virtually via GoToMeeting, on Thursday, October 14, 2021.

Chair Mike Simone called the meeting to order at 6:03 p.m.

ROLL CALL

Those present were Chair Mike Simone and Commission Members Carlos Barron, Kathy Kvasnicka, Thomas Holton and Paul Weber. Also in attendance were Planning Director Todd Hodges, Planner Alyssa Knutson, Planner Maria Lancto and Administrative Assistant Magaly Morales-Tejada.

APPROVAL OF AGENDA

Paul Weber moved to approve the agenda and Kathy Kvasnicka seconded.

CONSENT AGENDA

Carlos Barron moved to approve the consent agenda and Paul Weber seconded.

PUBLIC COMMENT

There was no public comment.

ACTION ITEMS

P2021-025 Cottonwood Greens Filing No.4 Preliminary Plat & PUD Plan

Planner Knutson presented this item. She stated that this is Filing No. 4 for this Cottonwood Greens PUD Plat & PUD Plan, and Filing Nos. 1-3 were approved by City Council on May 19, 2020. The property is located north and adjacent to 9th St and east and adjacent to College Ave. All notification requirements have been met.

Applicant representative, Kristin Turner, provided a brief presentation. She stated that 9th St. runs along the southern property boundary and College Ave. runs along the western boundary. Cottonwood Greens Filings 1-3 are located to the west of this property and are currently under construction. There will be two streets that will connect throughout the entire project. The townhomes will all be accessed through the rear and porches will be facing the streetscape, allowing for a more pedestrian oriented feel and look to the property. There will be several trail connecters throughout the project.

Jim Righeimer, applicant representative, added that they will be buying the adjacent parcel known as the Conner piece to achieve contiguity in the development up to the fire station. There are already accessible trails within the development and progress is being made on the public road.

Chair Simone opened up the public comment portion of the Hearing for the action item. Hearing none, he closed the public comment.

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Chair Simone opened up the hearing to Planning Commissioners' comments and questions.

Member Holton asked if there was a retention pond on the northern corner of this parcel, how many total units there will be, and the projected cost of these units.

Dan Rodriguez, engineer for this project, stated that there is a retention pond that will provide additional retention. There will be 137 units and the cost of these units is unknown to them as that comes from the developer.

Member Barron asked if there would be parking on the main frontages of 9th Street and College Avenue.

Rodriguez stated that there would not be. All on-street parking will be within the development. Each unit has four off street parking spaces.

Member Carlos Barron moved to approve P2021-025 and Paul Weber seconded. This motion passed unanimously.

DISCUSSION ITEMS

Review of Meeting Discussion

A review of meeting discussions took place.

Development Code Update

A discussion of the Development Code Update took place.

FUTURE BUSINESS

The next meeting of the Planning Commission will be on November 3, 2021 at 6:00pm

ADJOURNMENT

Chair Simone adjourned the meeting at 6:30 PM.

Submitted by

_____
Magaly Morales-Tejada, Administrative Assistant

Approved by Planning Commission

_____
Mike Simone, Chair

DRAFT

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CITY OF Fort Lupton EST 1836
COME PAINT YOUR FUTURE WITH US

COTTONWOOD GREENS PUD FILING NO. 4 PRELIMINARY PLAT & PRELIMINARY PUD PLAN
STAFF REPORT
LUP2021-0019 & PPL2021-0004

PROJECT DESCRIPTION

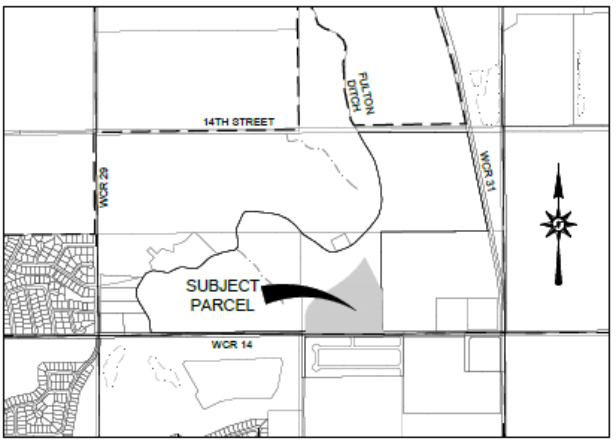
Project Nos.: LUP2021-0019 & PPL2021-0004

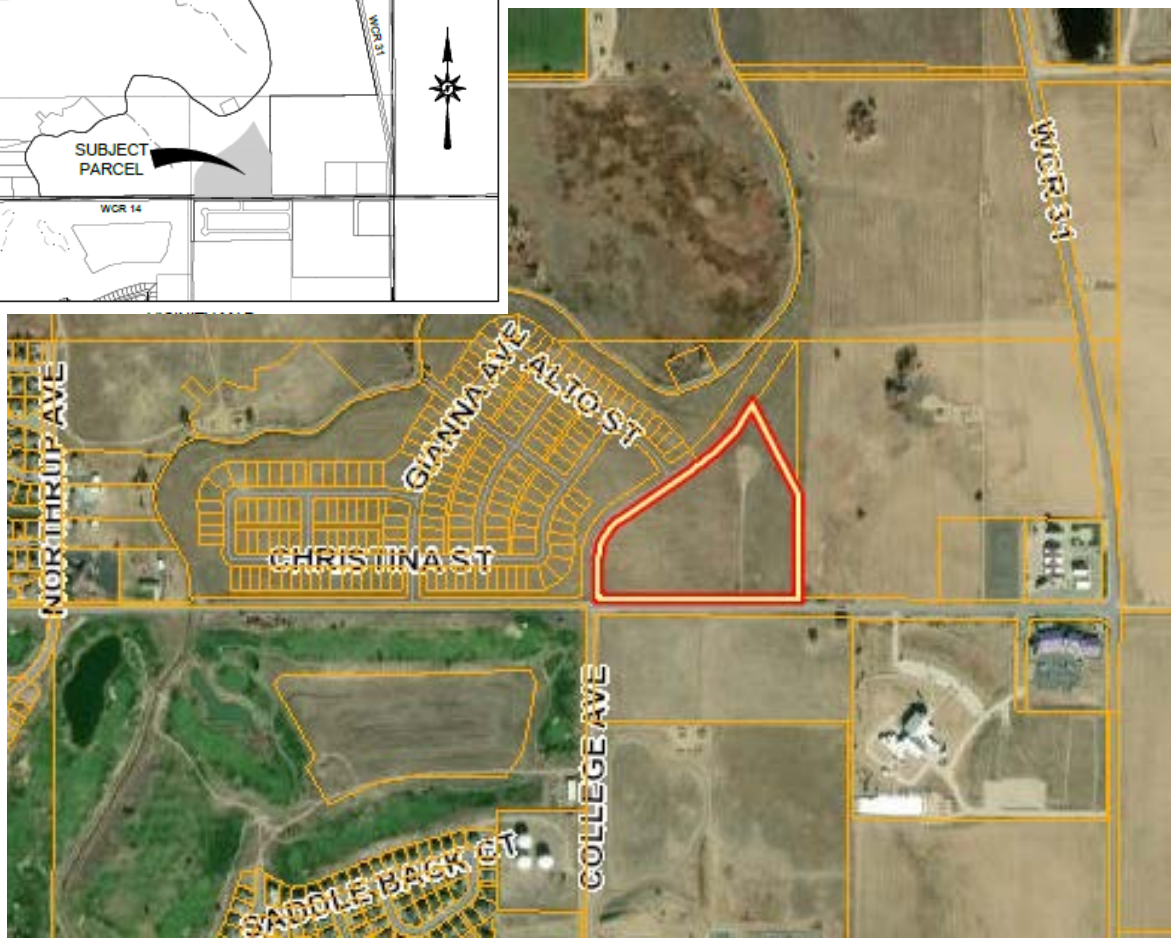
Project Name: Cottonwood Greens PUD Filing No. 4 Preliminary Plat & Preliminary PUD Plan

Applicant's Name: Arbor Capital Partners, LLC ("Applicant")

Location of Request:

The site consists of land located north and adjacent to 9th Street and west and adjacent to County Road 31 (the "Property"). The Property is located in the Southeast Quarter of Section 33, Township 2 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton., County of Weld, State of Colorado.





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Nature of Request:

The Applicant has submitted a request for a preliminary plat and preliminary PUD plan for 137 single family attached (townhouse) residential units, and will include common areas and interconnecting trails.

Site Size: 16.22 acres, more or less.

Zone District: PUD Planned Unit Development.

Proposed Use: Residential uses to include 137 single family attached (townhouse) residential units, including common areas and interconnecting trails.

Existing Use: Vacant.

Hearing Dates: Planning Commission – October 14, 2021 at 6:00 PM; and
City Council – November 2, 2021 at 7:00 PM.

Hearing Location: Fort Lupton City Hall – Council Chambers, 130 S. McKinley Ave., Fort Lupton, Colorado, with an option to attend virtually via GoToMeeting.

Staff Recommendation: Approval with conditions, as shown on the proposed resolution.

SUMMARY OF PREVIOUS APPLICATIONS

In 2006, the City Council approved a metropolitan district, final plat, subdivision improvement agreement, and PUD development plan for this property. However, the subdivision was never developed, and the property ownership became fragmented. The metropolitan district remains in effect, however each separate ownership parcel(s) will be required to start the development process over.

On May 6, 2019, the Fort Lupton City Council approved the Cottonwood Greens Sketch PUD Plat (Resolution No. 2019R034), and on December 16, 2019, the PUD Development Plan and Preliminary PUD Plat for the overall Cottonwood Greens Development was approved (Resolution No 2019R090).

On May 19, 2020, City Council approved the Final PUD Development Plan and Final Plats for Filing Nos. 1 – 3 (Resolution No. 2020R048). The Subdivision Improvements Agreement was approved on June 2, 2020 (Resolution No. 2020R050).

APPLICATION PROCESS

The Applicant is requesting approval of a preliminary plat and preliminary PUD plan for a residential subdivision that will include 137 single family attached homes, including common areas and interconnecting trails.

Under the Fort Lupton Municipal Code, after required public notice of the preliminary plat and PUD plan, the Planning Commission shall consider the application, referral comments and any public testimony at a public hearing and make a recommendation to City Council to approve, approve with conditions or deny the preliminary plat. The Planning Commission's comments shall be based on the evidence presented, conformance with the Comprehensive Plan and compliance with the City's standards, regulations and policies.

The City Council shall then conduct a public hearing and evaluate the preliminary plat and preliminary PUD plan, referral agency comments, Planning Commission recommendation and any public testimony.

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City Council shall approve, conditionally approve, continue for additional information or for further study or deny the application based on the evidence presented and compliance with the City's standards, regulations and policies and other guidelines.

References to the Preliminary PUD Plan establishes the unique regulations and standards for development on the Property. This includes, but is not limited to, any deviations from the City's Zoning Regulations, Residential Design Standards and Specification for Design and Construction of Public Improvements and Zoning Regulations.

NOTIFICATION REQUIREMENTS

The Subdivision Regulations require published notice of the hearings in a timely manner prior to the hearings. The Planning Commission and City Council hearings were published in the Fort Lupton press on September 29, 2021.

Notice of the public hearings were posted on the Property on September 29, 2021, pursuant to the Subdivision Regulations, which require the Applicant post the Property with notice of the hearings at least fifteen (15) days prior to the hearings.

Notice was mailed to neighbor within 500 feet of the Property, and owners and lessees of mineral interests on September 28, 2021.

CONFORMANCE WITH CITY STANDARDS, REGULATIONS AND POLICIES

The area is zoned PUD Planned Unit Development with residential uses. The objective of a PUD is to provide for the planning and development of substantial tracts of land, suitable in location and character for the uses proposed, as unified and integrated entities in accordance with detailed development plans.

The Preliminary Plat and Preliminary PUD Plan is for a residential subdivision to include 137 single family attached (townhouse) residential units, including common areas and interconnecting trails. The Applicant has submitted the required documents pursuant to the Code.

Approval of a PUD Plan is being reviewed concurrently with the Preliminary Plat. All development within a PUD zone district must be in accordance with a PUD plan. PUD plans shall contain unique district regulations that apply to the PUD zone district. All provisions of the City's Code and adopted standards and specifications shall apply within PUD zone districts, unless specifically modified in the PUD plan. Deviations from the City's standards are noted on the Preliminary Plat and Preliminary PUD Plan map.

CONFORMANCE WITH THE COMPREHENSIVE PLAN

The Future Land Use Map designates this area as Single-Family Detached land use. The Single-Family Detached designation allows for neighborhoods of predominantly singe family detached homes on individual lots. This can consist of a variety of development types, including higher density homes within the City's urban core and planned subdivisions within residential growth areas. In addition to single family units, these neighborhoods may include scattered single family attached and multi-family housing options, as well as public and semi-public uses. Given market demand, single family neighborhoods are likely to remain the primary residential designation within Fort Lupton and should see considerable growth in the future.

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The proposed development plans for single family attached homes within Filing No. 4. Filing Nos. 1 – 3 included singe family detached homes. The application complies with and meets the intent of the Comprehensive Plan by including a mix of residential types including townhomes, as well as single family detached homes.

The proposal also complies with the Parks and Trails Master Plan, which identifies the Fulton Ditch Trail along the College Avenue. A proposed 10-foot concrete sidewalk is proposed along this roadway. There is also a connection trail identified in the Plan along 9th Street, and a planned community trail is included in the plans. The proposal includes plans for other interconnecting trails and common areas for the residents of the subdivision.

REFERRALS

Referrals were provided to the list below. Any comments received are enclosed with the Planning Commission packet.

Buildings/Grounds Manager	City Attorney	Police Chief
Public Works Director	Building Inspector	Recreation Manager
Golf Course Manager	Wastewater Treatment Plant Manager	GIS Specialist
Finance Director	Fort Lupton Fire Protection District	CDOT
Colorado Parks & Wildlife	Division of Water Resources	United Power
Comcast	CenturyLink	Xcel Energy
Postmaster	Weld County Department of Planning	Weld County Public Works
Weld County School District RE-8	NCWCD	Fulton Ditch Company

For more information on this development, please refer to the Planning Commission packet provided. Additional documents are available for review at the Fort Lupton City Hall.

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Form PLAN002

CITY OF Fort Lupton EST 1836

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Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortlupton.org

Project No. _____

Land Use Application Form

A. CONTACT INFORMATION

1) Property Owner Name: Cottonwood Development Partners LLC.

Company: _____

Phone: (949) 230-1496 Email: tdharris@arborcapitalpartners.com

Address: 4040 MacArthur Blvd., Ste. 250 Newport Beach, CA 92660

Preferred method of contact? Email: ☑ Phone: ☐ Mail: ☐

2) Representative Name: Kristin Turner

Company: TB Group

Phone: 970.532.5891 Email: kristin@tbgroup.us

Address: 444 Mountain Avenue Berthoud, CO 80513

Preferred method of contact? Email: ☑ Phone: ☐ Mail: ☐

3) Billing Contact *(where invoices should be directed to)*: Attn: Gloria Morales

Billing Company: Cottonwood Development Partners LLC

Phone: (949)566-8163 Email: Gloria@rfcomsites.com

Address: 4040 MacArthur Blvd., Ste. 250 Newport Beach, CA 92660

B. SITE DESCRIPTION

Site Address: Vacant Land, County Road 14 Fort Lupton, CO 80621

Parcel Number: 130933416019

Existing Zone Classification: PUD Proposed Zone Classification: PUD

Water Type: Municipal Name: Fort Lupton

Sewage Type: Municipal District Name or Location Hauled to: _____

C. APPLICATION TYPE (CHECK ALL THAT APPLY)

☐ Sketch Plat	☐ Administrative Site Plan	☐ PUD Plan (Preliminary & Final)
☑ Preliminary Plat	☐ Special Use Permit	☐ Variance
☐ Final Plat	☐ Oil & Gas Permit	☐ Administrative Variance
☐ Minor Subdivision	☐ Annexation & Initial Zone	☐ Appeal
☐ Amended Plat	☐ Change of Zone	☐ Other: _____
☐ Site Plan	☐ Comp Plan Amendment	

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Project No. _____

D. PROJECT DESCRIPTION

Project Name: Cottonwood Greens

Please provide a short description of the proposed project in the space provided below:

This is a proposal for development of a future development tract (outlot A) within the Cottonwood Greens subdivision. The site has existing PUD zoning. Single family attached (townhomes) are proposed for this portion of the site.

E. REQUIRED DOCUMENTS

For an application to be considered complete, and for planning staff to begin review and schedule any applicable public hearings, this Land Use Application Form must be fully completed and all required attachments included. Planning staff will review the application for completeness and will provide notice to the representative and/or owner whether the application has been deemed complete.

F. CERTIFICATIONS

Representative Certification

By signing this application, I attest that I am acting with the knowledge and consent of all owners of the property that is the subject of this application, and that I have been designated to act as the representative for the project described in this land use application. I further certify that all information submitted with this application is true and accurate to the best of my knowledge.

Representative: _____ Date: 6/4/21

Owner Certification

I hereby certify that I am the legal owner of record of the property that is the subject of this application. I hereby authorize the representative listed on this application, if any, to communicate directly with City officials and to submit documentation and information regarding this application on my behalf.

Owner: _____ Date: 6/16/21

For Office Use Only

Received Date: _____

If the application is not complete, state reasons why it is incomplete:

_____

_____

_____

Deemed Complete Date: _____

Fees Submitted: _____ Escrow Submitted: _____

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Instructions for Submitting the Land Use Application Form

DEFINITIONS

Words in the singular include the plural and words in the plural include the singular.

Application refers to the official submittal to the City of Fort Lupton's Planning Department for review of the proposed land use development identified in the land use application form. The application includes the form, all materials submitted for review of the project, including those documents required under the Land Use Regulations of the Municipal Code, and any additional information provided.

Project refers to the land use development identified on the land use application form and application materials.

Property refers to the land that is being proposed for development as described in the land use application form and application materials.

A. CONTACT INFORMATION

1) Provide contact information for all owners of any property that is the subject of the application. If the contact information for all property owners will not fit on the space provided, submit a separate sheet for the additional owners.
2) Provide contact information for all persons, firms or businesses that are authorized by the owners identified in Section A(1) to work on the land use application, including, but not limited to, discussing the project, submitting application materials, and attending meeting and hearings. If the contact information for all representatives will not fit on the space provided, submit a separate sheet for the additional representatives.
3) Provide contact and mailing information for the person that should receive all invoices for the project. If this person changes at any time, contact the Planning Department immediately to update this information.

B. SITE DESCRIPTION

Provide all information requested. Parcel numbers and address information may be found at the Weld County Property Portal at https://www.co.weld.co.us/maps1/propertyportal/. Current zoning can be found at http://www.fortlupton.org/405/Zoning.

C. APPLICATION TYPE

Select the land use application that is applicable to the project. If there are multiple land use application types being submitted to run concurrently, select all that apply. The land use application types will be identified during the required pre-application meeting. If you have any questions about this, please contact the Planning Department at 303.857.6694 or planningdept@fortlupton.org.

D. PROJECT DESCRIPTION

Please select a project name that will be referenced throughout the project and a description of what the project entails. If you need more space for the project description, please attach a separate sheet.

E. REQUIRED DOCUMENTS

Required documents will be discussed during the pre-application meeting with the Planning Department. If any documents are missing, the acceptance of the application may be delayed until the submittal is complete.

F. CERTIFICATIONS

Representative Certification. Provide the signature of all authorized representatives in this section.
Owner Certification. Provide the signature of all owners of properties included in the application in this section.

For any other questions, please contact the Planning Department at 303.857.6694 or planningdept@fortlupton.org.

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TB GROUP
landscape architecture | planning | illustration

Cottonwood Greens PUD No. 4: Preliminary/Final Plat Narrative
June 21, 2021

General Description/Site Features and Proposed Land Uses

The property is located on the north side of 9th street and west of College Avenue. The property is approximately 16.22 acres with existing PUD zoning. Proposed uses will include 137 single family attached residential units. The overall project density is approximately 8.4 du/ac. The development will include common areas and interconnecting trails.

Compliance with the City of Fort Lupton Comprehensive Plan

The proposed development integrates the goals set out in the Town Comprehensive Plan in the following ways:

Growth and Development
The proposed development is designed to provide connections at pre-determined locations to existing and adjacent neighborhoods. In addition, the layout provides continuous, direct, convenient, and safe pedestrian pathways to adjacent subdivisions and proposed parks. The site is well situated for housing per the Comprehensive Plan. The plan also provides for diversity in housing types for the community.

Transportation and Mobility
This plan provides a safe and efficient transportation network that accommodates pedestrians, vehicles and bicycles. Two connections to College Avenue will extend through the site. Designated as a collector roadway, it will provide convenient access to local streets for vehicles, bicycles, and pedestrians. The project is planned as a pedestrian oriented and walkable community with sidewalks, street trees and connections throughout the community, to future and existing adjacent neighborhoods.

Parks, Open Space and Environmental Features
The open space and trails within the development will provide high quality recreational opportunities for neighborhood residents and create connections to future and existing neighborhoods and uses beyond our project boundaries. This project will construct the Connector Trail proposed along 9th Street. Trail connections will be provided throughout the site with extensions to all sides of the development tract. A neighborhood park was designed as part of Cottonwood Greens PUD No. 1, to serve the overall development. In addition, a trail head with access to multiple Town trails is located across the street from this development.

444 Mountain Ave.
Berthoud, CO 80513
TEL 970.532.5891
WEB TBGroup.us

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Public Facilities and Services

The proposed development is a logical extension of the City of Fort Lupton public services without placing additional burdens on existing residents and businesses. Infrastructure will be provided so as to meet the requirements of the Comprehensive Plan and/or the Land Use Code.

Water will be provided by the Town of Fort Lupton by connecting to an existing 16” water main in 9th Street and an existing 12” water main Weld County Road 31. There will also be a network of 8” mains throughout the site. Irrigation flows will be provided by a separate irrigation system.

Sewer will be provided by the Town of Fort Lupton through three connection points: one to the northwest in Northrop Avenue, one in the center of the site, and on in 14th Street. The existing mains have capacity for the proposed development.

Stormwater will be treated using appropriate water quality measures, with on-site detention being utilized throughout the site to maintain stormwater releases at or below historic rates from the site. The release will be to a single pipe to be constructed through the site to the west adjacent to the existing sanitary sewer. The project area is not located with any FEMA regulated floodplain.

Planned Phasing

The development is proposed in one phase.

Statement of Commercial Mineral Deposits

There are currently oil & gas facilities within the property but there are no known commercial mineral deposits on-site.

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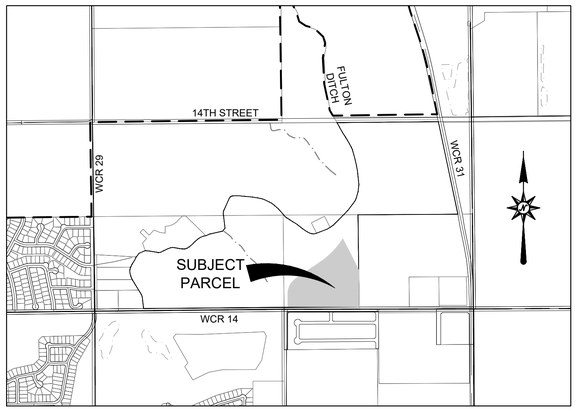
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-XXXX / PLAN NO. PPL2021-XXXX

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO



VICINITY MAP
SCALE: 1"=1000'

0' 1000' 2000' 3000'

SCALE: 1" = 1000'

LEGAL DESCRIPTION

TRACT D AND OUTLOT A, COTTONWOOD GREENS PUD FILING NO. 3
COUNTY OF WELD, STATE OF COLORADO

RECORDED AT RECEPTION NO. 4681486, WELD COUNTY RECORDS

SAID PARCEL OF LAND CONTAINS 706,426 SQUARE FEET, OR 16.22 ACRES, MORE OR LESS (±).

DEVELOPER/APPLICANT
COTTONWOOD DEVELOPMENT PARTNERS
JIM RIGHEIMER
4040 MACARTHUR BLVD., #250
NEWPORT BEACH, CA 92660 (303)-905-3496

SITE ENGINEER
ATWELL, LLC
DANIEL RODRIGUEZ, P.E.
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, COLORADO 80228 (303) 462-1100

SURVEYOR
ATWELL, LLC
MICHAEL LLOYD POOL, PLS
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, COLORADO 80228 (303) 462-1100

PUD ZONING REQUIREMENTS:

PARCEL	PUD ZONING	R3 ZONING
ALLOWABLE LAND USE	SFD, MFD	SFD, MFD
MINIMUM LOT SIZE (SF)	5,000 SF	5,000 SF
MINIMUM LOT WIDTH	30'	30'
MAXIMUM LOT COVERAGE	N/A	N/A
PRIMARY USES		
MAXIMUM HEIGHT	35'	35'
MINIMUM FRONT YARD SETBACK (PRINCIPLE STRUCTURE)	15' TO HOUSE/20' TO GARAGE	25'
MINIMUM SIDE YARD SETBACK	5'	5'
MINIMUM REAR YARD SETBACK	15'	20'
MINIMUM SIDE YARD (CORNER) SETBACK	15'	20'
MINIMUM DWELLING SIZE (SF)	750 SF (SFD)/ 500 SF (MFD)	750 SF (SFD)/500 SF (MFD)
ACCESSORY USE		
HEIGHT	35'	35'
FRONT SETBACK	N/A	N/A
SIDE SETBACK	5'	20'
REAR SETBACK	5'	N/A

NOTES:

1. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY ATWELL, LLC TO DETERMINE OWNERSHIP OR EASEMENTS OF RECORD. ATWELL, LLC RELIED UPON (TITLE COMPANY), COMMITMENT FILE NO: XX DATED XX IN THE PROCESS OF THIS SURVEY TO AID IN EASEMENT AND OWNERSHIP RESEARCH.
2. GROSS LAND AREA IS 619,698 SQUARE FEET, OR 14.23 ACRES, MORE OR LESS.
3. THE LINEAR UNIT OF MEASUREMENT FOR THIS SURVEY IS U.S. SURVEY FEET.
4. THE BASIS OF BEARINGS IS THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 33 AS BEARING NORTH 00° 09' 31" WEST, AND MONUMENTED AS SHOWN ON DRAWING.
5. CURRENT ZONING: PUD
6. UTILITY EASEMENTS ARE DEDICATED TO THE CITY FORT LUPTON FOR THE BENEFIT OF THE APPLICABLE UTILITY PROVIDERS FOR THE INSTALLATION, MAINTENANCE, AND REPLACEMENT OF ELECTRIC, GAS, TELEVISION, CABLE, AND TELECOMMUNICATIONS FACILITIES (DRY UTILITIES). UTILITY EASEMENTS SHALL ALSO BE GRANTED WITHIN ANY ACCESS EASEMENTS AND PRIVATE STREETS IN THE SUBDIVISION. PERMANENT STRUCTURES, IMPROVEMENTS, OBJECTS, BUILDINGS, WELLS, WATER METERS AND OTHER OBJECTS THAT MAY INTERFERE WITH THE UTILITY FACILITIES OR USE THEREOF (INTERFERING OBJECTS) SHALL NOT BE PERMITTED WITHIN SAID UTILITY EASEMENTS AND THE UTILITY PROVIDERS, AS GRANTEES, MAY REMOVE ANY INTERFERING OBJECTS AT NO COST TO SUCH GRANTEES, INCLUDING, WITHOUT LIMITATION, VEGETATION. PUBLIC SERVICE COMPANY OF COLORADO (PSCO) AND ITS SUCCESSORS RESERVE THE RIGHT TO REQUIRE ADDITIONAL EASEMENTS AND TO REQUIRE THE PROPERTY OWNER TO GRANT PSCO AN EASEMENT ON ITS STANDARD FORM.

SURVEY CERTIFICATION

I, MICHAEL LLOYD POOL, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THE SURVEY REPRESENTED BY THIS PLAT WAS MADE UNDER MY SUPERVISION, AND THE MONUMENTS SHOWN HEREIN ACTUALLY EXIST, AND THIS PLAT ACCURATELY REPRESENTS SAID SURVEY.

COLORADO LICENSED MICHAEL LLOYD POOL 38304 PROFESSIONAL LAND SURVEYOR

PRELIMINARY

MICHAEL LLOYD POOL, PLS
COLORADO REG. NO. 38304
FOR AND ON BEHALF OF ATWELL, LLC

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATE SHOWN HEREON.

RIGHT TO FARM STATEMENT:

WELD COUNTY IS ONE OF THE MOST PRODUCTIVE AGRICULTURAL COUNTIES IN THE UNITED STATES, TYPICALLY RANKING IN THE TOP TEN COUNTIES IN THE COUNTRY IN TOTAL MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD. THE RURAL AREAS OF WELD COUNTY MAY BE OPEN AND SPACIOUS, BUT THEY ARE INTENSIVELY USED FOR AGRICULTURE.
PERSONS MOVING INTO A RURAL AREA MUST RECOGNIZE AND ACCEPT THERE ARE DRAWBACKS, INCLUDING CONFLICTS WITH LONG-STANDING AGRICULTURAL PRACTICES AND A LOWER LEVEL OF SERVICES THAN IN TOWN. ALONG WITH THE DRAWBACKS COME THE INCENTIVES WHICH ATTRACT URBAN DWELLERS TO RELOCATE TO RURAL AREAS: OPEN VIEWS, SPACIOUSNESS, WILDLIFE, LACK OF CITY NOISE AND CONGESTION, AND THE RURAL ATMOSPHERE AND WAY OF LIFE. WITHOUT NEIGHBORING FARMS, THOSE FEATURES WHICH ATTRACT URBAN DWELLERS TO RURAL WELD COUNTY WOULD QUICKLY BE GONE FOREVER.

AGRICULTURAL USERS OF THE LAND SHOULD NOT BE EXPECTED TO CHANGE THEIR LONG-ESTABLISHED AGRICULTURAL PRACTICES TO ACCOMMODATE THE INTRUSIONS OF URBAN USERS INTO A RURAL AREA. WELL-RUN AGRICULTURAL ACTIVITIES WILL GENERATE OFF-SITE IMPACTS, INCLUDING NOISE FROM TRACTORS AND EQUIPMENT; SLOW-MOVING FARM VEHICLES ON RURAL ROADS; DUST FROM ANIMAL PENS, FIELD WORK, HARVEST AND GRAVEL ROADS; ODOR FROM ANIMAL CONFINEMENT, SILAGE AND MANURE; SMOKE FROM DITCH BURNING; FLIES AND MOSQUITOES; HUNTING AND TRAPPING ACTIVITIES; SHOOTING SPORTS, LEGAL HAZING OF NUISANCE WILDLIFE; AND THE USE OF PESTICIDES AND FERTILIZERS IN THE FIELDS, INCLUDING THE USE OF AERIAL SPRAYING. IT IS COMMON PRACTICE FOR AGRICULTURAL PRODUCERS TO UTILIZE AN ACCUMULATION OF AGRICULTURAL MACHINERY AND SUPPLIES TO ASSIST IN THEIR AGRICULTURAL OPERATIONS. A CONCENTRATION OF MISCELLANEOUS AGRICULTURAL MATERIALS OFTEN PRODUCES A VISUAL DISPARITY BETWEEN RURAL AND URBAN AREAS OF THE COUNTY. SECTION 35-3.5-102, C.R.S., PROVIDES THAT AN AGRICULTURAL OPERATION SHALL NOT BE FOUND TO BE A PUBLIC OR PRIVATE NUISANCE IF THE AGRICULTURAL OPERATION ALLEGED TO BE A NUISANCE EMPLOYS METHODS OR PRACTICES THAT ARE COMMONLY OR REASONABLY ASSOCIATED WITH AGRICULTURAL PRODUCTION.

WATER HAS BEEN, AND CONTINUES TO BE, THE LIFELINE FOR THE AGRICULTURAL COMMUNITY. IT IS UNREALISTIC TO ASSUME THAT DITCHES AND RESERVOIRS MAY SIMPLY BE MOVED "OUT OF THE WAY" OF RESIDENTIAL DEVELOPMENT. WHEN MOVING TO THE COUNTY, PROPERTY OWNERS AND RESIDENTS MUST REALIZE THEY CANNOT TAKE WATER FROM IRRIGATION DITCHES, LAKES OR OTHER STRUCTURES, UNLESS THEY HAVE AN ADJUDICATED RIGHT TO THE WATER.

WELD COUNTY COVERS A LAND AREA OF APPROXIMATELY FOUR THOUSAND (4,000) SQUARE MILES IN SIZE (TWICE THE SIZE OF THE STATE OF DELAWARE) WITH MORE THAN THREE THOUSAND SEVEN HUNDRED (3,700) MILES OF STATE AND COUNTY ROADS OUTSIDE OF MUNICIPALITIES. THE SHEER MAGNITUDE OF THE AREA TO BE SERVED STRETCHES AVAILABLE RESOURCES. LAW ENFORCEMENT IS BASED ON RESPONSES TO COMPLAINTS MORE THAN ON PATROLS OF THE COUNTY, AND THE DISTANCES WHICH MUST BE TRAVELED MAY DELAY ALL EMERGENCY RESPONSES, INCLUDING LAW ENFORCEMENT, AMBULANCE AND FIRE. FIRE PROTECTION IS USUALLY PROVIDED BY VOLUNTEERS WHO MUST LEAVE THEIR JOBS AND FAMILIES TO RESPOND TO EMERGENCIES. COUNTY GRAVEL ROADS, NO MATTER HOW OFTEN THEY ARE BLADED, WILL NOT PROVIDE THE SAME KIND OF SURFACE EXPECTED FROM A PAVED ROAD. SNOW REMOVAL PRIORITIES MEAN THAT ROADS FROM SUBDIVISIONS TO ARTERIALS MAY NOT BE CLEARED FOR SEVERAL DAYS AFTER A MAJOR SNOWSTORM. SERVICES IN RURAL AREAS, IN MANY CASES, WILL NOT BE EQUIVALENT TO MUNICIPAL SERVICES. RURAL DWELLERS MUST, BY NECESSITY, BE MORE SELF-SUFFICIENT THAN URBAN DWELLERS.

PEOPLE ARE EXPOSED TO DIFFERENT HAZARDS IN THE COUNTY THAN IN AN URBAN OR SUBURBAN SETTING. FARM EQUIPMENT AND OIL FIELD EQUIPMENT, PONDS AND IRRIGATION DITCHES, ELECTRICAL POWER FOR PUMPS AND CENTER PIVOT OPERATIONS, HIGH-SPEED TRAFFIC, SAND BURS, PUNCTURE VINES, TERRITORIAL FARM DOGS AND LIVESTOCK AND OPEN BURNING PRESENT REAL THREATS. CONTROLLING CHILDREN'S ACTIVITIES IS IMPORTANT, NOT ONLY FOR THEIR SAFETY, BUT ALSO FOR THE PROTECTION OF THE FARMER'S LIVELIHOOD. (WELD COUNTY CODE ORDINANCE 2002-6; WELD COUNTY CODE ORDINANCE 2008-13)

RECORDER'S CERTIFICATE

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK AND RECORDER OF WELD COUNTY, COLORADO

AT _____ _.M. ON THE DAY OF _____ , A.D. 20___

IN BOOK _____, PAGE _____, RECEPTION NO. _____

_____
COUNTY CLERK AND RECORDER

_____
DEPUTY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS

SHEET 1 OF 4

FILE NO. 20002948-PRELIM PLAT
DATE 06/15/2021
DRAWN BY TWK
CHECK BY MLP
JOB NO. 20002948

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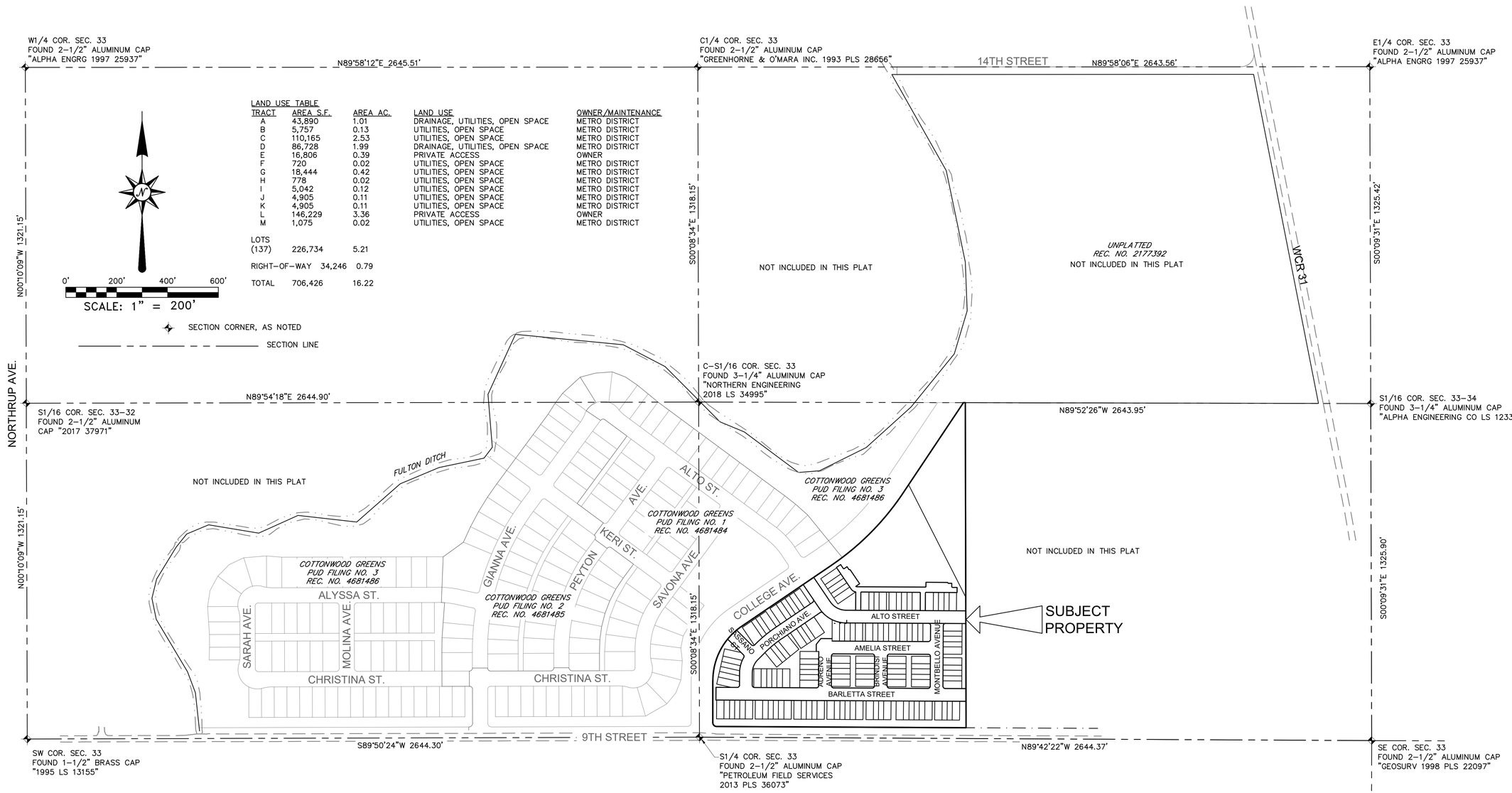
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-000X

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



LAND USE TABLE

TRACT	AREA S.F.	AREA AC.	LAND USE	OWNER/MAINTENANCE
A	43,890	1.01	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
B	5,757	0.13	UTILITIES, OPEN SPACE	METRO DISTRICT
C	110,165	2.53	UTILITIES, OPEN SPACE	METRO DISTRICT
D	86,728	1.99	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
E	16,806	0.39	PRIVATE ACCESS	OWNER
F	720	0.02	UTILITIES, OPEN SPACE	METRO DISTRICT
G	18,444	0.42	UTILITIES, OPEN SPACE	METRO DISTRICT
H	778	0.02	UTILITIES, OPEN SPACE	METRO DISTRICT
I	5,042	0.12	UTILITIES, OPEN SPACE	METRO DISTRICT
J	4,905	0.11	UTILITIES, OPEN SPACE	METRO DISTRICT
K	4,905	0.11	UTILITIES, OPEN SPACE	METRO DISTRICT
L	146,229	3.36	PRIVATE ACCESS	OWNER
M	1,075	0.02	UTILITIES, OPEN SPACE	METRO DISTRICT
LOTS				
(137)	226,734	5.21		
RIGHT-OF-WAY	34,246	0.79		
TOTAL	706,426	16.22		

COLORADO LICENSED
MICHAEL LLOYD KOL
36304
PROFESSIONAL LAND SURVEYOR
PRELIMINARY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS

SHEET 2 OF X

FILE NO. 19003254-PRELIM PLAT
DATE 06/15/2021
DRAWN BY TWK
CHECK BY BCR
JOB NO. 19003254

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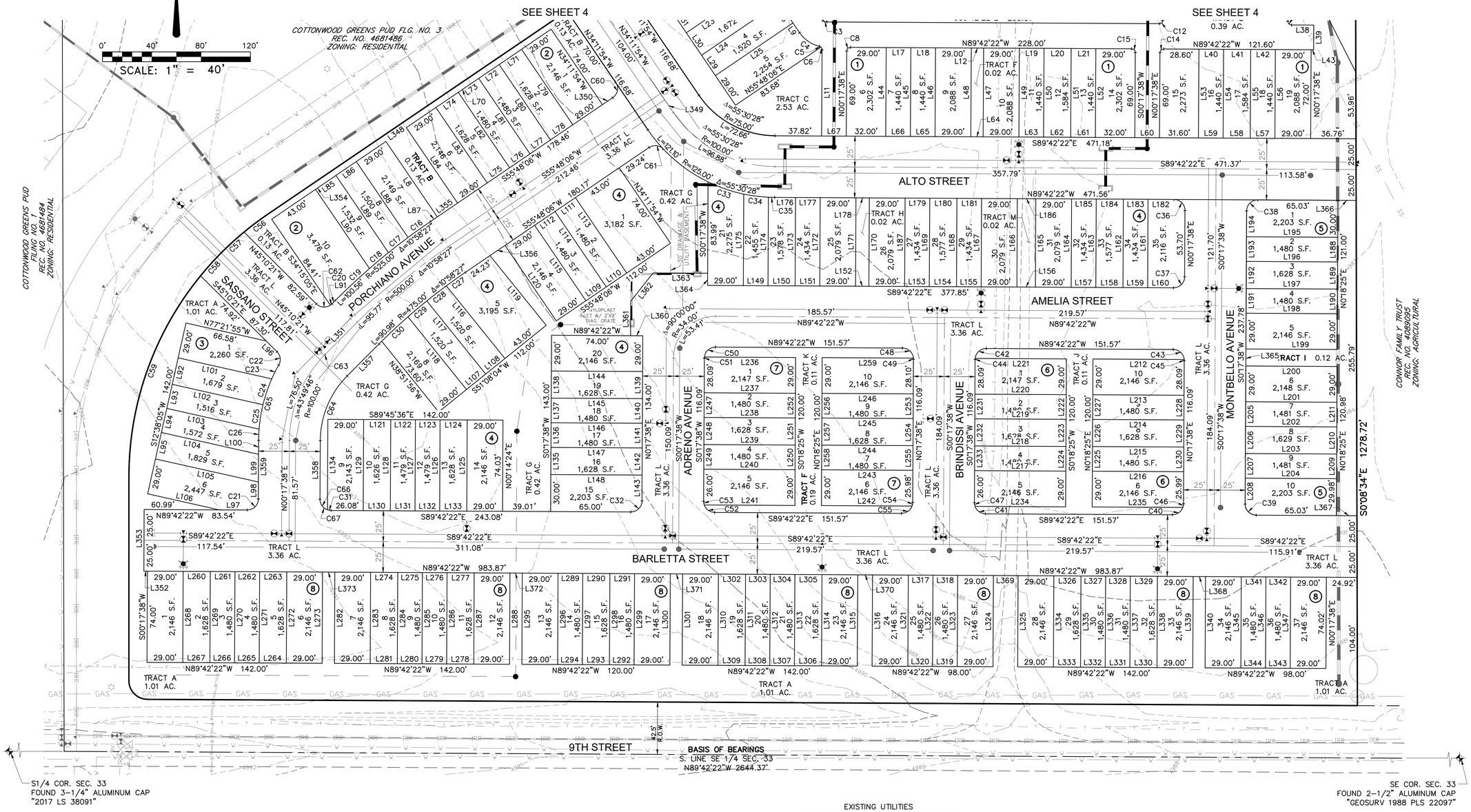
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-00XX

PRELIMINARY PUD PLAT
LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2
NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



LEGEND

- SECTION CORNER, AS NOTED
- OIL/GAS WELL
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP "LS 12330"
- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY	LOT LINE
SECTION LINE	R.O.W. CENTER LINE
MATCH LINE	R.O.W. LINE
UTILITY EASEMENT LINE	WETLAND SETBACK LINE
DRAINAGE EASEMENT LINE	WETLAND LINE

PROPOSED UTILITIES

- PROPOSED STORM SEWER
- PROPOSED WATER LINE
- PROPOSED IRRIGATION LINE
- PROPOSED SANITARY SEWER

EXISTING UTILITIES

GAS GAS GAS
W W W W
OHE OHE OHE
SS SS SS
FO FO FO FO FO

COLORADO LICENSED MICHAEL LLOYD POOL 38304 PROFESSIONAL LAND SURVEYOR

PRELIMINARY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS
REVISED 01/28/2020
REVISED 02/05/2020
REVISED 02/28/2020

SHEET 5 OF 9

FILE NO.	19003254-PRELIM PUD
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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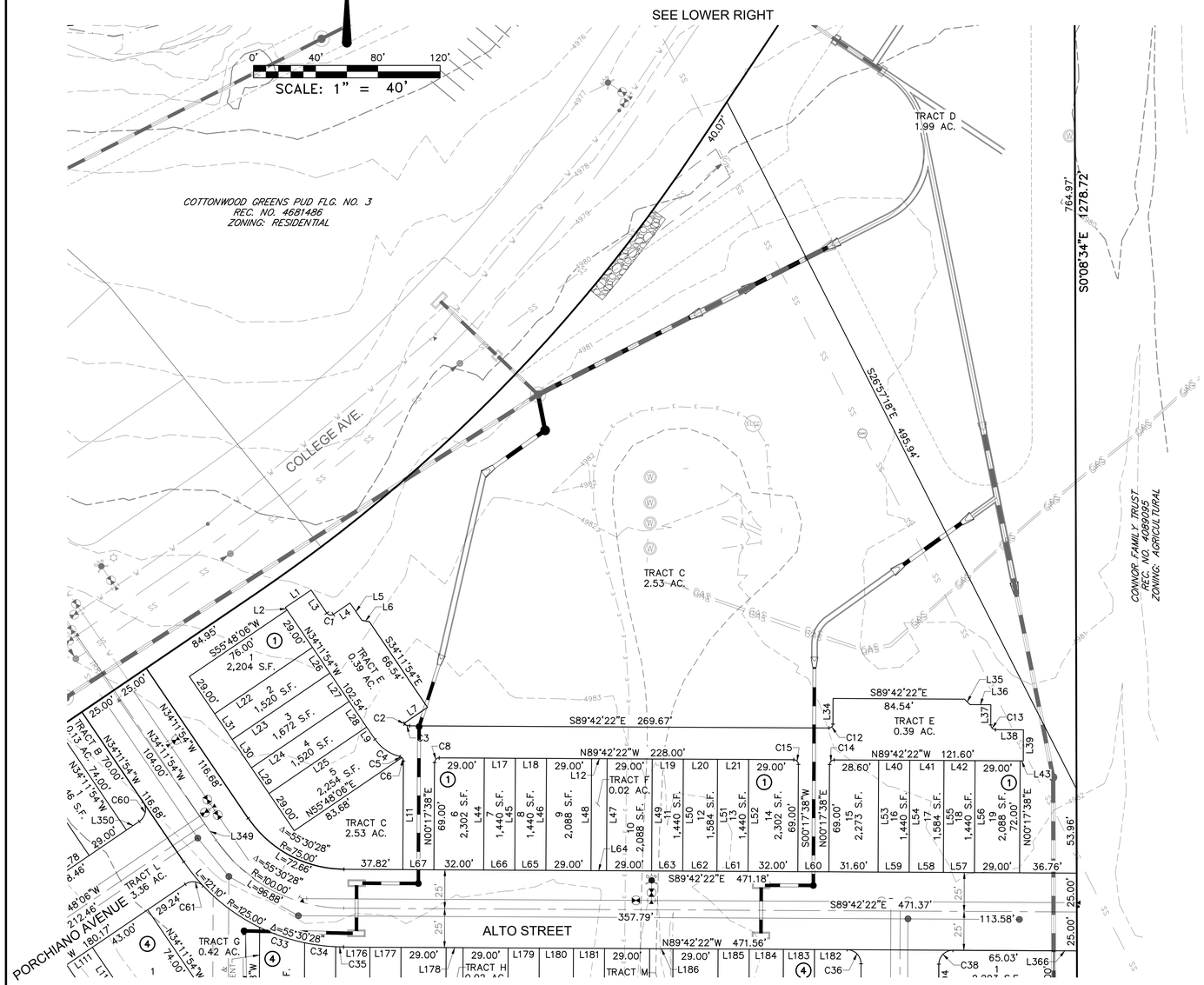
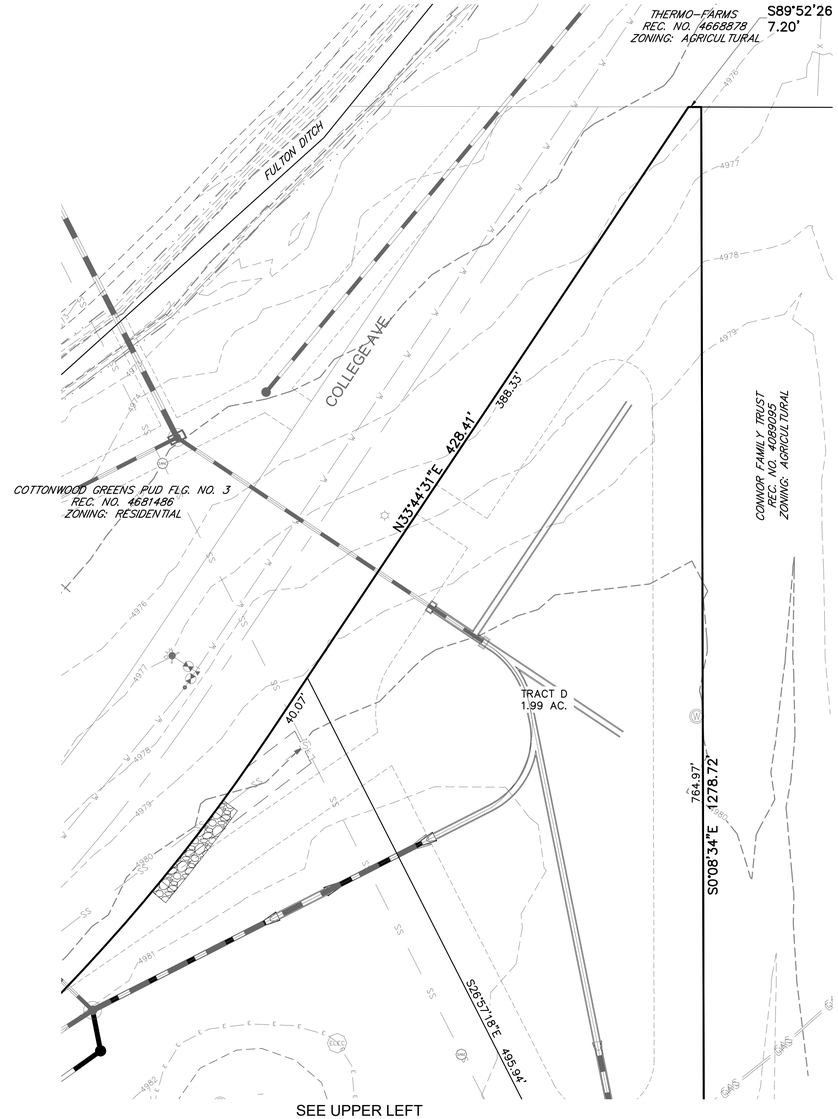
COTTONWOOD GREENS PUD FILING NO. 4

PRELIMINARY PUD PLAT
LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-00XX





LEGEND

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- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE

LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE

PROPOSED UTILITIES
PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

EXISTING UTILITIES
GAS GAS GAS
W W W W
OHE OHE OHE
SS SS SS
ro ro ro ro ro

COLORADO LICENSED
MICHAEL LICHTENTHALER
38504
PROFESSIONAL LAND SURVEYOR
PRELIMINARY

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866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS
REVISED 01/28/2020
REVISED 02/05/2020
REVISED 02/28/2020

SHEET 5 OF 9

FILE NO.	19003254-PRELIM PUD
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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COTTONWOOD GREENS

PROJECT NO. LUP2019-0033 / PLAN NO. PPL2019-0002

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO

LEGAL DESCRIPTION

MULTIPLE PARCELS OF LAND SITUATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF SAID SECTION 33, AS MONUMENTED BY A 2-1/2" ALUMINUM CAP STAMPED "GEOSURV 1998, PLS 22097", AND CONSIDERING THE EAST LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 33, AS MONUMENTED ON THE NORTH END BY A 2" ALUMINUM CAP STAMPED "ALPHA ENGRG 1997 25937" AS BEARING NORTH 00°09'31" WEST WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO;

THENCE NORTH 00°09'31" WEST ALONG THE EAST LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 33 1506.37 FEET TO THE SOUTH 1/16 CORNER BETWEEN SECTION 33 AND SECTION 34;

THENCE NORTH 89°52'26" WEST ALONG THE SOUTH LINE OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 33 205.84 FEET TO THE WESTERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 31 AS CONVEYED TO WELD COUNTY IN THAT WARRANTY DEED RECORDED MAY 23, 1980 AS RECEPTION NO. 1825641 OF THE RECORDS OF WELD COUNTY, AND THE **POINT OF BEGINNING;**

THENCE NORTH 89°52'26" WEST CONTINUING ALONG THE SOUTH LINE OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 33 1389.28 FEET TO THE EAST LINE OF THAT PARCEL OF LAND CONVEYED TO AIMS I IN A WARRANTY DEED RECORDED JANUARY 21, 1986 AS RECEPTION NO. 2039953 OF THE RECORDS OF WELD COUNTY;

THENCE SOUTH 00°08'34" EAST ALONG A LINE PARALLEL WITH THE NORTH-SOUTH CENTERLINE OF SAID SECTION 33 1291.22 FEET TO A LINE PARALLEL WITH AND 30.00 FEET NORTHERLY OF, AS MEASURED AT A RIGHT ANGLE, TO THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 33;

THENCE NORTH 89°42'22" WEST ALONG SAID PARALLEL LINE 1048.85 FEET TO THE NORTH-SOUTH CENTERLINE OF SAID SECTION 33;

THENCE SOUTH 89°50'24" WEST ALONG A LINE PARALLEL WITH AND 30.00 FEET NORTHERLY OF, AS MEASURED AT A RIGHT ANGLE, TO THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 33 1966.48 FEET TO THE CENTERLINE OF THE FULTON DITCH, BEING COINCIDENTAL WITH THE EASTERLY LINES OF THE EDELEN HEIGHTS MINOR SUBDIVISION NO. 1 RECORDED JUNE 6, 2018 AS RECEPTION NO. 4404851 OF THE RECORDS OF WELD COUNTY:;

THENCE ALONG SAID CENTERLINE THE FOLLOWING SIX (6) COURSES:

1. NORTH 06°12'34" WEST 151.28 FEET;
2. NORTH 20°43'56" WEST 88.12 FEET;
3. NORTH 30°47'46" WEST 240.23 FEET;
4. NORTH 11°35'19" WEST 84.39 FEET;
5. NORTH 13°59'13" EAST 78.29 FEET;
6. NORTH 31°25'15" EAST 147.40 FEET TO THE NORTHEAST CORNER OF SAID EDELEN HEIGHTS MINOR SUBDIVISION NO. 1;

THENCE CONTINUING ALONG SAID CENTERLINE OF FULTON DITCH THE FOLLOWING TEN (10) COURSES:

7. NORTH 38°52'08" EAST 65.88 FEET;
8. NORTH 67°22'47" EAST 93.12 FEET;
9. SOUTH 80°35'03" EAST 199.77 FEET;
10. NORTH 65°44'52" EAST 169.57 FEET;
11. SOUTH 83°34'28" EAST 232.47 FEET;
12. NORTH 48°40'18" EAST 227.84 FEET;
13. NORTH 67°11'05" EAST 165.39 FEET;
14. NORTH 78°11'40" EAST 180.87 FEET;
15. NORTH 37°22'05" EAST 53.66 FEET;
16. NORTH 04°39'12" WEST A DISTANCE OF 176.96 FEET (RECORD DISTANCE = 177.03 FEET) TO THE NORTH LINE OF THE SOUTH HALF OF THE SOUTHWEST QUARTER OF SAID SECTION 33;

THENCE CONTINUING ALONG SAID CENTERLINE OF FULTON DITCH AND THE WESTERLY AND NORTHERLY LINES OF PARCEL B AS DESCRIBED IN THAT DEED RECORDED DECEMBER 13, 1984 AS RECEPTION NO. 1991950 OF THE RECORDS OF WELD COUNTY THE FOLLOWING FIVE (5) COURSES:

17. NORTH 04°39'12" WEST 31.82 FEET (RECORD DISTANCE = 31.82 FEET);
18. NORTH 24°35'11" EAST 259.79 FEET (RECORD DISTANCE = 259.75 FEET);
19. SOUTH 84°27'39" EAST 426.41 FEET (RECORD DISTANCE = 426.35 FEET);
20. SOUTH 62°30'49" EAST 185.28 FEET (RECORD DISTANCE = 185.25 FEET);
21. SOUTH 44°49'06" EAST 187.12 FEET (RECORD DISTANCE = 187.09 FEET) TO THE NORTH-SOUTH CENTERLINE OF SAID SECTION 33;

THENCE CONTINUING ALONG SAID CENTERLINE OF FULTON DITCH THE FOLLOWING SEVEN (7) COURSES:

22. SOUTH 44°49'06" EAST 119.68 FEET;
23. SOUTH 67°19'06" EAST 102.80 FEET;
24. SOUTH 53°17'11" EAST 266.98 FEET;
25. NORTH 85°19'19" EAST 82.20 FEET;
26. NORTH 63°33'42" EAST 205.14 FEET;
27. NORTH 47°56'22" EAST 237.78 FEET;
28. NORTH 39°06'23" EAST 22.89 FEET TO THE NORTH LINE OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 33 AND THE SOUTHWEST CORNER OF PARCEL 1 AS DESCRIBED IN THAT WARRANTY DEED RECORDED APRIL 24, 1989 AS REC. NO. 2177392 OF THE RECORDS OF WELD COUNTY;

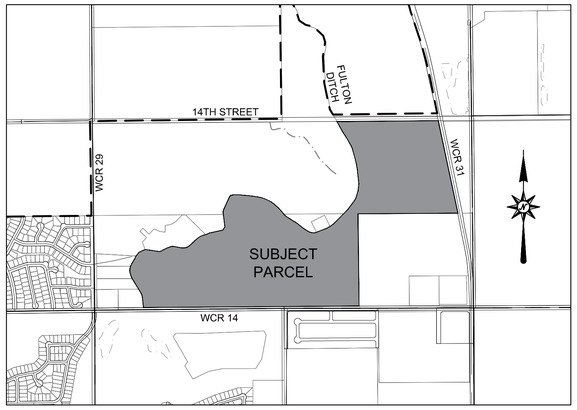
THENCE CONTINUING ALONG SAID CENTERLINE OF FULTON DITCH AND THE WESTERLY LINES OF SAID PARCEL 1 THE FOLLOWING FIVE (5) COURSES:

29. NORTH 39°06'23" EAST 246.83 FEET;
30. NORTH 16°42'35" EAST 177.01 FEET;
31. NORTH 02°13'20" WEST 191.53 FEET;
32. NORTH 11°45'35" WEST 367.88 FEET;
33. NORTH 29°31'20" WEST A DISTANCE OF 434.19 FEET TO A LINE PARALLEL WITH AND 30.00 FEET SOUTHERLY OF, AS MEASURED AT A RIGHT ANGLE, TO THE EAST-WEST CENTERLINE OF SAID SECTION 33;

THENCE NORTH 89°58'06" EAST ALONG THE EAST-WEST CENTERLINE OF SAID SECTION 33 1422.77 FEET TO THE WESTERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 31;

THENCE SOUTH 11°09'18" EAST ALONG THE WESTERLY RIGHT OF WAY LINE OF WELD COUNTY ROAD 31 1319.64 FEET TO THE **POINT OF BEGINNING;**

SAID DESCRIBED PARCELS OF LAND CONTAIN IN TOTAL 121.04 ACRES, MORE OR LESS (±).



VICINITY MAP

SCALE: 1"=1000'

0' 1000' 2000' 3000'

SCALE: 1" = 1000'

DEVELOPER/APPLICANT

ARBOR CAPITOL
MARC-ANDRE LEVESQUE
1002 RUE SHERBROOKE WEST, SUITE 1430
MONTREAL, QUEBEC, CANADA, H3A 3L6 (303)-918-7918

SITE ENGINEER

ATWELL, LLC
MICHAEL McGOLDRICK, P.E.
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, COLORADO 80228 (303) 462-1100

SURVEYOR

ATWELL, LLC
BRIAN C. RITZ, PLS
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, COLORADO 80228 (303) 462-1100

NOTES:

1. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY NORTHERN ENGINEERING TO DETERMINE OWNERSHIP OR EASEMENTS OF RECORD. NORTHERN ENGINEERING RELIED UPON FIDELITY NATIONAL TITLE GROUP, TITLE COMMITMENT FILE NO: 100-N0019440-030-TH DATED OCTOBER 2, 2018, TITLE COMMITMENT FILE NO: 100-N0019518-030-TH DATED OCTOBER 11, 2018 AND TITLE COMMITMENT FILE NO: 100-N10019515-030-TH DATED OCTOBER 12, 2018 WERE USED IN THE PROCESS OF THIS SURVEY TO AID IN EASEMENT AND OWNERSHIP RESEARCH.
2. GROSS LAND AREA IS 5,272,460 SQUARE FEET, OR 121.04 ACRES, MORE OR LESS.
3. THE LINEAL UNIT OF MEASUREMENT FOR THIS SURVEY IS U. S. SURVEY FEET.
4. THE BASIS OF BEARINGS IS THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 33 AS BEARING NORTH 00° 09' 31" WEST, AND MONUMENTED AS SHOWN ON DRAWING.
5. CURRENT ZONING: PUD
6. UTILITY EASEMENTS ARE DEDICATED TO THE CITY FORT LUPTON FOR THE BENEFIT OF THE APPLICABLE UTILITY PROVIDERS FOR THE INSTALLATION, MAINTENANCE, AND REPLACEMENT OF ELECTRIC, GAS, TELEVISION, CABLE, AND TELECOMMUNICATIONS FACILITIES (DRY UTILITIES). UTILITY EASEMENTS SHALL ALSO BE GRANTED WITHIN ANY ACCESS EASEMENTS AND PRIVATE STREETS IN THE SUBDIVISION. PERMANENT STRUCTURES, IMPROVEMENTS, OBJECTS, BUILDINGS, WELLS, WATER METERS AND OTHER OBJECTS THAT MAY INTERFERE WITH THE UTILITY FACILITIES OR USE THEREOF (INTERFERING OBJECTS) SHALL NOT BE PERMITTED WITHIN SAID UTILITY EASEMENTS AND THE UTILITY PROVIDERS, AS GRANTEES, MAY REMOVE ANY INTERFERING OBJECTS AT NO COST TO SUCH GRANTEES, INCLUDING, WITHOUT LIMITATION, VEGETATION. PUBLIC SERVICE COMPANY OF COLORADO (PSCO) AND ITS SUCCESSORS RESERVE THE RIGHT TO REQUIRE ADDITIONAL EASEMENTS AND TO REQUIRE THE PROPERTY OWNER TO GRANT PSCO AN EASEMENT ON ITS STANDARD FORM.

PUD ZONING REQUIREMENTS:

PARCEL	PUD ZONING	R3 ZONING
ALLOWABLE LAND USE	SFD, MFD	SFD, MFD
MINIMUM LOT SIZE (SF)	5,000 SF	5,000 SF
MINIMUM LOT WIDTH	30'	30'
MAXIMUM LOT COVERAGE	N/A	N/A
PRIMARY USES		
MAXIMUM HEIGHT	35'	35'
MINIMUM FRONT YARD SETBACK (PRINCIPLE STRUCTURE)	15' TO HOUSE/20' TO GARAGE	25'
MINIMUM SIDE YARD SETBACK	5'	5'
MINIMUM REAR YARD SETBACK	15'	20'
MINIMUM SIDE YARD (CORNER) SETBACK	15'	20'
MINIMUM DWELLING SIZE (SF)	750 SF (SFD)/ 500 SF (MFD)	750 SF (SFD)/500 SF (MFD)
ACCESSORY USE		
HEIGHT	35'	35'
FRONT SETBACK	N/A	N/A
SIDE SETBACK	5'	20'
REAR SETBACK	5'	N/A

SURVEY CERTIFICATION

I, BRIAN C. RITZ, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THE SURVEY REPRESENTED BY THIS PLAT WAS MADE UNDER MY SUPERVISION, AND THE MONUMENTS SHOWN HEREIN ACTUALLY EXIST, AND THIS PLAT ACCURATELY REPRESENTS SAID SURVEY.

COLORADO LICENSED BRIAN C. RITZ 38452 PROFESSIONAL LAND SURVEYOR

BRIAN C. RITZ, PLS
COLORADO REG. NO. 38452
FOR AND ON BEHALF OF ATWELL, LLC

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATE SHOWN HEREON.

RIGHT TO FARM STATEMENT:

WELD COUNTY IS ONE OF THE MOST PRODUCTIVE AGRICULTURAL COUNTIES IN THE UNITED STATES, TYPICALLY RANKING IN THE TOP TEN COUNTIES IN THE COUNTRY IN TOTAL MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD. THE RURAL AREAS OF WELD COUNTY MAY BE OPEN AND SPACIOUS, BUT THEY ARE INTENSIVELY USED FOR AGRICULTURE.
PERSONS MOVING INTO A RURAL AREA MUST RECOGNIZE AND ACCEPT THERE ARE DRAWBACKS, INCLUDING CONFLICTS WITH LONG-STANDING AGRICULTURAL PRACTICES AND A LOWER LEVEL OF SERVICES THAN IN TOWN. ALONG WITH THE DRAWBACKS COME THE INCENTIVES WHICH ATTRACT URBAN DWELLERS TO RELOCATE TO RURAL AREAS: OPEN VIEWS, SPACIOUSNESS, WILDLIFE, LACK OF CITY NOISE AND CONGESTION, AND THE RURAL ATMOSPHERE AND WAY OF LIFE. WITHOUT NEIGHBORING FARMS, THOSE FEATURES WHICH ATTRACT URBAN DWELLERS TO RURAL WELD COUNTY WOULD QUICKLY BE GONE FOREVER.

AGRICULTURAL USERS OF THE LAND SHOULD NOT BE EXPECTED TO CHANGE THEIR LONG-ESTABLISHED AGRICULTURAL PRACTICES TO ACCOMMODATE THE INTRUSIONS OF URBAN USERS INTO A RURAL AREA. WELL-RUN AGRICULTURAL ACTIVITIES WILL GENERATE OFF-SITE IMPACTS, INCLUDING NOISE FROM TRACTORS AND EQUIPMENT; SLOW-MOVING FARM VEHICLES ON RURAL ROADS; DUST FROM ANIMAL PENS, FIELD WORK, HARVEST AND GRAVEL ROADS; ODOR FROM ANIMAL CONFINEMENT, SILAGE AND MANURE; SMOKE FROM DITCH BURNING; FLIES AND MOSQUITOES; HUNTING AND TRAPPING ACTIVITIES; SHOOTING SPORTS, LEGAL HAZING OF NUISANCE WILDLIFE; AND THE USE OF PESTICIDES AND FERTILIZERS IN THE FIELDS, INCLUDING THE USE OF AERIAL SPRAYING. IT IS COMMON PRACTICE FOR AGRICULTURAL PRODUCERS TO UTILIZE AN ACCUMULATION OF AGRICULTURAL MACHINERY AND SUPPLIES TO ASSIST IN THEIR AGRICULTURAL OPERATIONS. A CONCENTRATION OF MISCELLANEOUS AGRICULTURAL MATERIALS OFTEN PRODUCES A VISUAL DISPARITY BETWEEN RURAL AND URBAN AREAS OF THE COUNTY. SECTION 35-3.5-102, C.R.S., PROVIDES THAT AN AGRICULTURAL OPERATION SHALL NOT BE FOUND TO BE A PUBLIC OR PRIVATE NUISANCE IF THE AGRICULTURAL OPERATION ALLEGED TO BE A NUISANCE EMPLOYS METHODS OR PRACTICES THAT ARE COMMONLY OR REASONABLY ASSOCIATED WITH AGRICULTURAL PRODUCTION.

WATER HAS BEEN, AND CONTINUES TO BE, THE LIFELINE FOR THE AGRICULTURAL COMMUNITY. IT IS UNREALISTIC TO ASSUME THAT DITCHES AND RESERVOIRS MAY SIMPLY BE MOVED "OUT OF THE WAY" OF RESIDENTIAL DEVELOPMENT. WHEN MOVING TO THE COUNTY, PROPERTY OWNERS AND RESIDENTS MUST REALIZE THEY CANNOT TAKE WATER FROM IRRIGATION DITCHES, LAKES OR OTHER STRUCTURES, UNLESS THEY HAVE AN ADJUDICATED RIGHT TO THE WATER.

WELD COUNTY COVERS A LAND AREA OF APPROXIMATELY FOUR THOUSAND (4,000) SQUARE MILES IN SIZE (TWICE THE SIZE OF THE STATE OF DELAWARE) WITH MORE THAN THREE THOUSAND SEVEN HUNDRED (3,700) MILES OF STATE AND COUNTY ROADS OUTSIDE OF MUNICIPALITIES. THE SHEER MAGNITUDE OF THE AREA TO BE SERVED STRETCHES AVAILABLE RESOURCES. LAW ENFORCEMENT IS BASED ON RESPONSES TO COMPLAINTS MORE THAN ON PATROLS OF THE COUNTY, AND THE DISTANCES WHICH MUST BE TRAVELED MAY DELAY ALL EMERGENCY RESPONSES, INCLUDING LAW ENFORCEMENT, AMBULANCE AND FIRE. FIRE PROTECTION IS USUALLY PROVIDED BY VOLUNTEERS WHO MUST LEAVE THEIR JOBS AND FAMILIES TO RESPOND TO EMERGENCIES. COUNTY GRAVEL ROADS, NO MATTER HOW OFTEN THEY ARE BLADED, WILL NOT PROVIDE THE SAME KIND OF SURFACE EXPECTED FROM A PAVED ROAD. SNOW REMOVAL PRIORITIES MEAN THAT ROADS FROM SUBDIVISIONS TO ARTERIALS MAY NOT BE CLEARED FOR SEVERAL DAYS AFTER A MAJOR SNOWSTORM. SERVICES IN RURAL AREAS, IN MANY CASES, WILL NOT BE EQUIVALENT TO MUNICIPAL SERVICES. RURAL DWELLERS MUST, BY NECESSITY, BE MORE SELF-SUFFICIENT THAN URBAN DWELLERS.

PEOPLE ARE EXPOSED TO DIFFERENT HAZARDS IN THE COUNTY THAN IN AN URBAN OR SUBURBAN SETTING. FARM EQUIPMENT AND OIL FIELD EQUIPMENT, PONDS AND IRRIGATION DITCHES, ELECTRICAL POWER FOR PUMPS AND CENTER PIVOT OPERATIONS, HIGH-SPEED TRAFFIC, SAND BURS, PUNCTURE VINES, TERRITORIAL FARM DOGS AND LIVESTOCK AND OPEN BURNING PRESENT REAL THREATS. CONTROLLING CHILDREN'S ACTIVITIES IS IMPORTANT, NOT ONLY FOR THEIR SAFETY, BUT ALSO FOR THE PROTECTION OF THE FARMER'S LIVELIHOOD. (WELD COUNTY CODE ORDINANCE 2002-6; WELD COUNTY CODE ORDINANCE 2008-13)

RECORDER'S CERTIFICATE

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK AND RECORDER OF WELD COUNTY, COLORADO

AT _____ _.M. ON THE DAY OF _____ , A.D. 20___

IN BOOK _____, PAGE _____, RECEPTION NO. _____

_____
COUNTY CLERK AND RECORDER

_____
DEPUTY

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303.462.1100

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REVISED 02/05/2020
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SHEET 1 OF 9

FILE NO.	19003254-PRELIM PUD
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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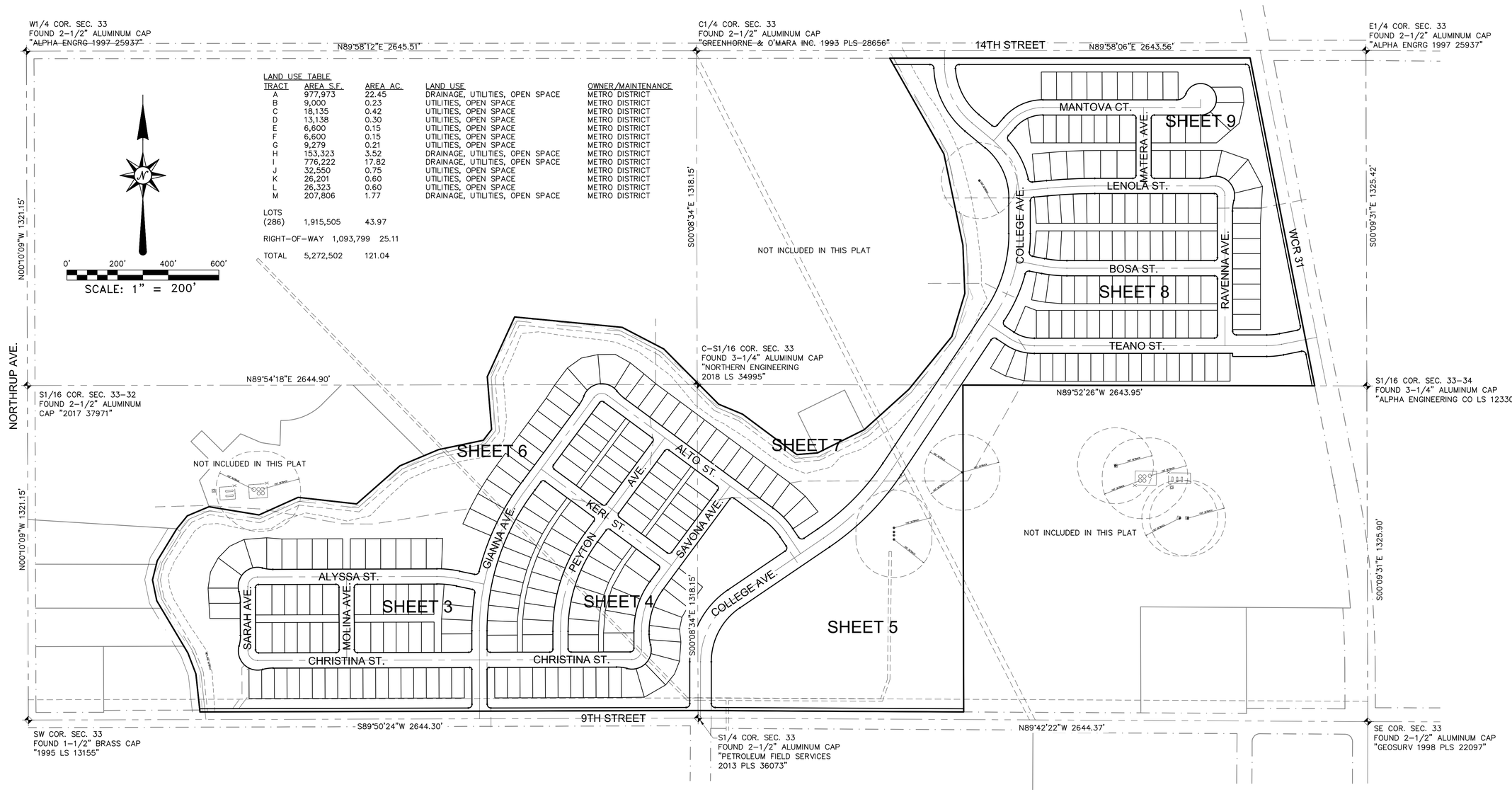
COTTONWOOD GREENS

PROJECT NO. LUP2019-0033 / PLAN NO. PPL2019-0002

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



LAND USE TABLE				
TRACT	AREA S.F.	AREA AC.	LAND USE	OWNER/MAINTENANCE
A	977,973	22.45	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
B	9,000	0.23	UTILITIES, OPEN SPACE	METRO DISTRICT
C	18,135	0.42	UTILITIES, OPEN SPACE	METRO DISTRICT
D	13,138	0.30	UTILITIES, OPEN SPACE	METRO DISTRICT
E	6,600	0.15	UTILITIES, OPEN SPACE	METRO DISTRICT
F	6,600	0.15	UTILITIES, OPEN SPACE	METRO DISTRICT
G	9,279	0.21	UTILITIES, OPEN SPACE	METRO DISTRICT
H	153,323	3.52	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
I	776,222	17.82	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
J	32,550	0.75	UTILITIES, OPEN SPACE	METRO DISTRICT
K	26,201	0.60	UTILITIES, OPEN SPACE	METRO DISTRICT
L	26,323	0.60	UTILITIES, OPEN SPACE	METRO DISTRICT
M	207,806	1.77	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
LOTS				
(286)	1,915,505	43.97		
RIGHT-OF-WAY	1,093,799	25.11		
TOTAL	5,272,502	121.04		

SECTION CORNER, AS NOTED

SECTION LINE

SHEET MATCH LINE

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SHEET 2 OF 9

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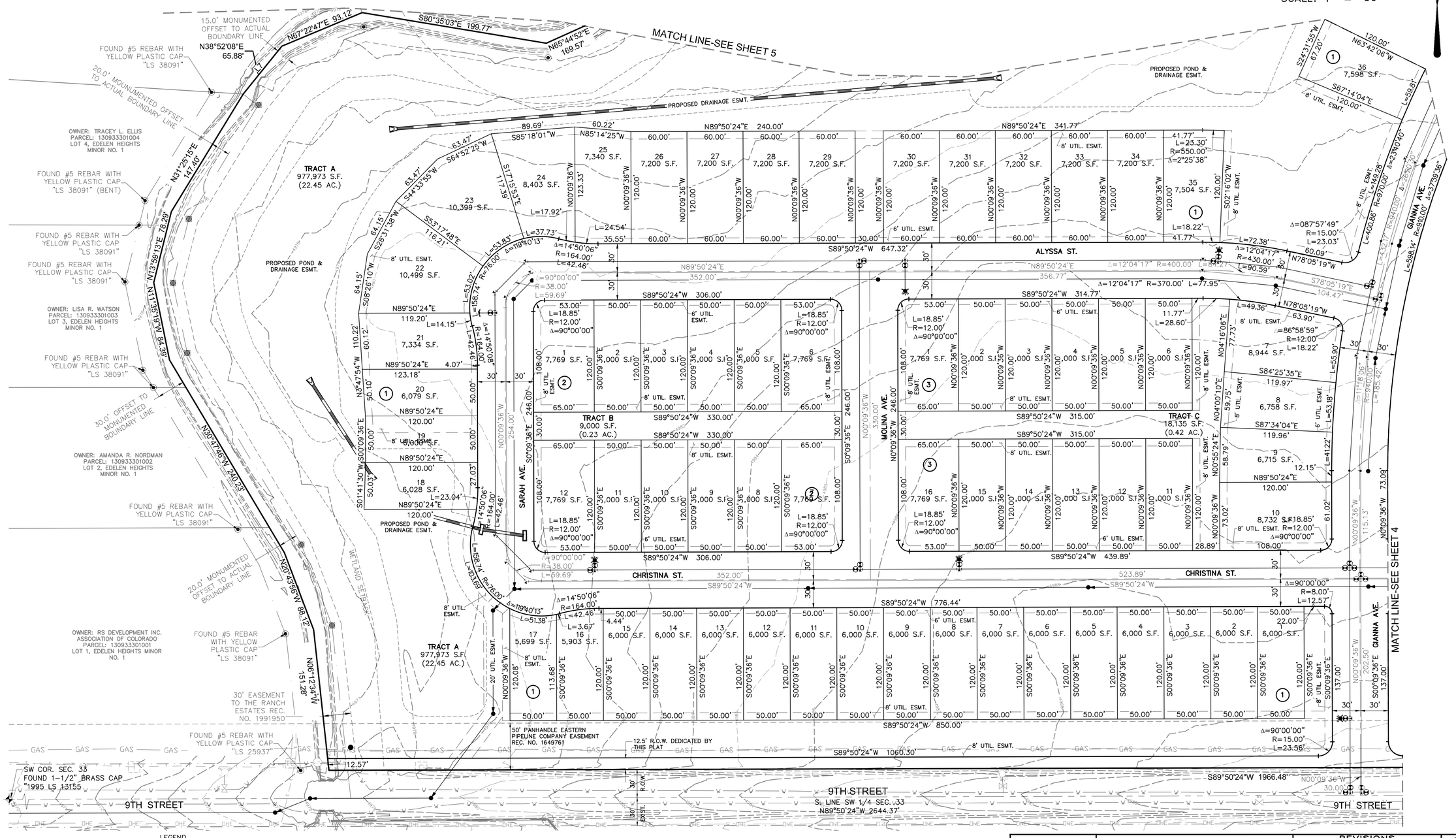
SCALE: 1" = 50'



LEGEND

- SECTION CORNER, AS NOTED
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP "LS 12330"
- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE

LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE

PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

EXISTING UTILITIES

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COUNTY OF WELD, STATE OF COLORADO

LEGEND

- SECTION CORNER, AS NOTED
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP "LS 12330"
- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE

LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE

EXISTING UTILITIES

PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

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COTTONWOOD GREENS

PRELIMINARY PUD PLAT

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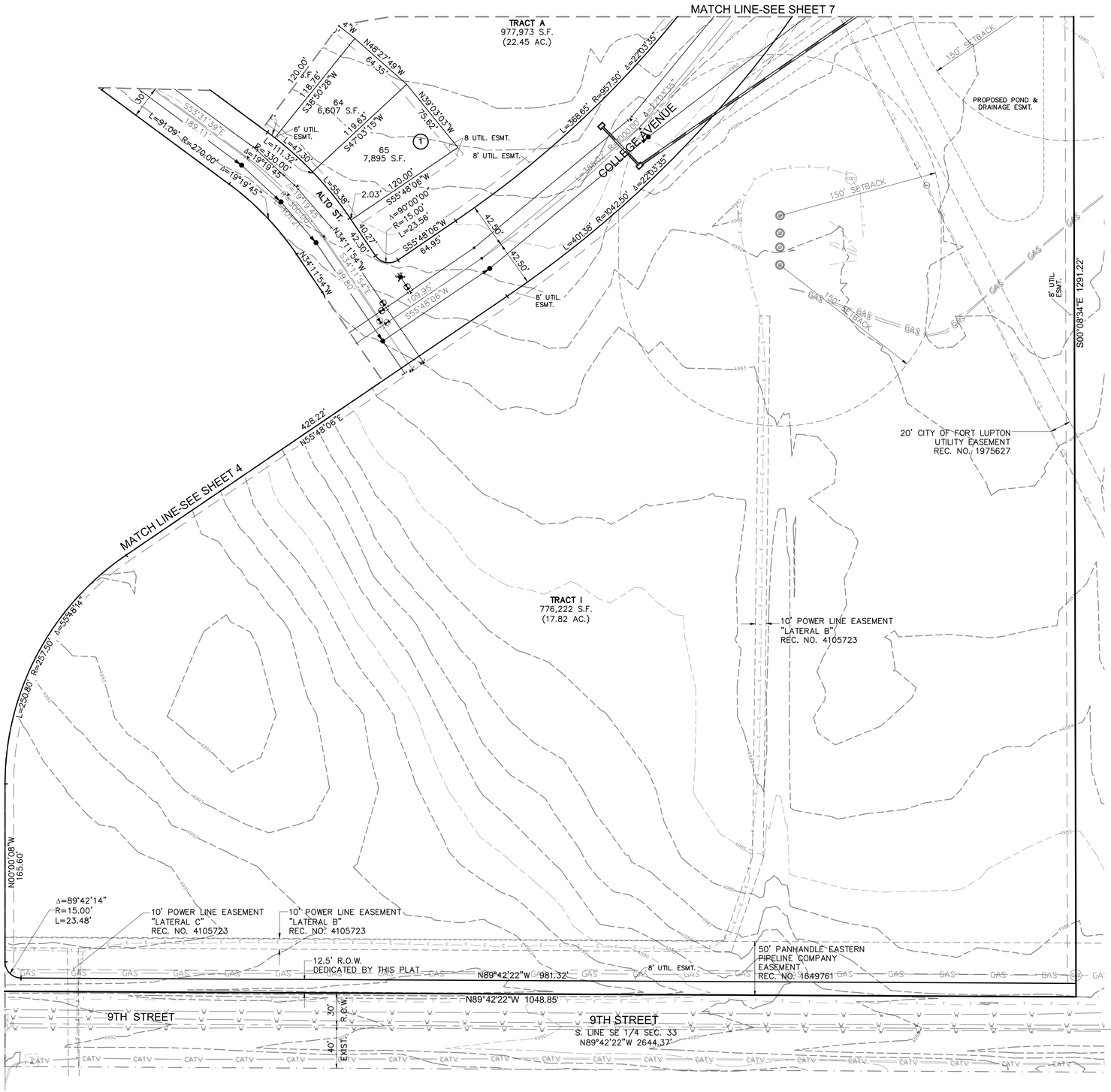
PROJECT NO. LUP2019-0033 / PLAN NO. PPL2019-0002



0' 50' 100' 150'

SCALE: 1" = 50'

LEGEND

- SECTION CORNER, AS NOTED
- OIL/GAS WELL
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP "LS 12330"
- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE

LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE

EXISTING UTILITIES

PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

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COTTONWOOD GREENS

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PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO

0' 50' 100' 150'

SCALE: 1" = 50'

lalf of the Southwest Quarter

1818.70'

N89°54'18"E 2644.90'

FOUND #5 REBAR WITH
2" ALUMINUM CAP "PLS 25378"
20' OFFSET FROM PROPERTY CORNER

N04°39'12"W
31.82'

FOUND #4 REBAR WITH
ORANGE PLASTIC CAP
"LS 12330"

N00°04'36"W 1,176.96'

CORNER

20' OFFSET FROM PROPERTY CORNER

S84°27'39"E 426.41'

S62°30'49"E 185.26'

N24°35'11"E 259.79'

15.0' MONUMENTED OFFSET TO ACTUAL BOUNDARY LINE

30' EASEMENT TO
THE RANCH ESTATES
REC. NO. 1991950

MATCH LINE-SEE SHEET 7

TRACT A
977,973 S.F.
(22.45 AC.)

PROPOSED POND &
DRAINAGE ESMT.

OWNER: RENNOC CORPORATION
PARCEL: 130933300002
REC NO 3803402

N37°22'05"E 53.66'

N78°11'40"E 180.87'

N67°11'05"E 165.39'

N48°40'18"E 227.84'

OWNER: RENNOC CORPORATION
PARCEL: 130933300001

15.0' MONUMENTED OFFSET TO ACTUAL BOUNDARY LINE

150' SETBACK

S83°34'28"E 232.47'

N65°44'52"E 169.57'

30' EASEMENT TO
THE RANCH ESTATES
REC. NO. 1991950

MATCH LINE-SEE SHEET 3

10' POWER LINE
EASEMENT
"LATERAL A"
REC. NO. 4105724

PROPOSED POND &
DRAINAGE ESMT.

TRACT A
977,973 S.F.
(22.45 AC.)

N75°18'38"E 63.86'
N86°02'13"E 64.53'
S69°00'32"E 55.66'
S55°37'53"E 57.09'
S50°17'25"E 54.53'
S50°18'58"E 50.08'

DRAINAGE ESMT.

8' UTIL. ESMT.

N47°34'20"E 93.61'
N31°56'48"W 118.29'
S06°27'48"W 120.60'

48
10,206 S.F.

49
9,587 S.F.

47
8,111 S.F.

46
6,035 S.F.

45
6,115 S.F.

44
6,014 S.F.

43
6,000 S.F.

42
6,000 S.F.

41
7,769 S.F.

40
7,767 S.F.

39
7,308 S.F.

38
7,569 S.F.

37
7,584 S.F.

50
6,715 S.F.

51
6,070 S.F.

12
8,049 S.F.

11
6,000 S.F.

10
6,000 S.F.

9
6,000 S.F.

8
6,000 S.F.

7
6,000 S.F.

6
7,769 S.F.

5
6,000 S.F.

4
6,000 S.F.

3
6,000 S.F.

2
6,000 S.F.

1
7,769 S.F.

TRACT E
6,600 S.F.
(0.15 AC.)

N53°31'39"W 116.10'
N35°48'53"E 50.00'
N32°31'16"E 50.12'
N36°45'23"E 50.00'
L=50.95'
L=6.84'
L=44.38'
R=76.00'
Δ=119°40'13"
L=50.74'
R=58.00'
Δ=90°00'00"
L=59.69'
L=12.67'
L=38.01'
L=4.45'
L=35.63'
R=164.00'
Δ=12°26'56"
L=42.46'
L=18.85'
R=12.00'
Δ=90°00'00"
L=16.17'
L=14.64'
L=39.58'
R=970.00'
Δ=2°19'40"
L=58.70'
L=400.86'
R=6040.00'
Δ=3°48'07"
L=398.94'
R=910.00'
Δ=25°07'36"

S53°31'39"E 108.00'
S53°31'39"E 236.00'
S53°31'39"E 282.00'
S53°31'39"E 330.00'
S53°31'39"E 378.00'
S53°31'39"E 426.00'
S53°31'39"E 474.00'
S53°31'39"E 522.00'
S53°31'39"E 570.00'
S53°31'39"E 618.00'
S53°31'39"E 666.00'
S53°31'39"E 714.00'
S53°31'39"E 762.00'
S53°31'39"E 810.00'
S53°31'39"E 858.00'
S53°31'39"E 906.00'
S53°31'39"E 954.00'
S53°31'39"E 1002.00'
S53°31'39"E 1050.00'
S53°31'39"E 1098.00'
S53°31'39"E 1146.00'
S53°31'39"E 1194.00'
S53°31'39"E

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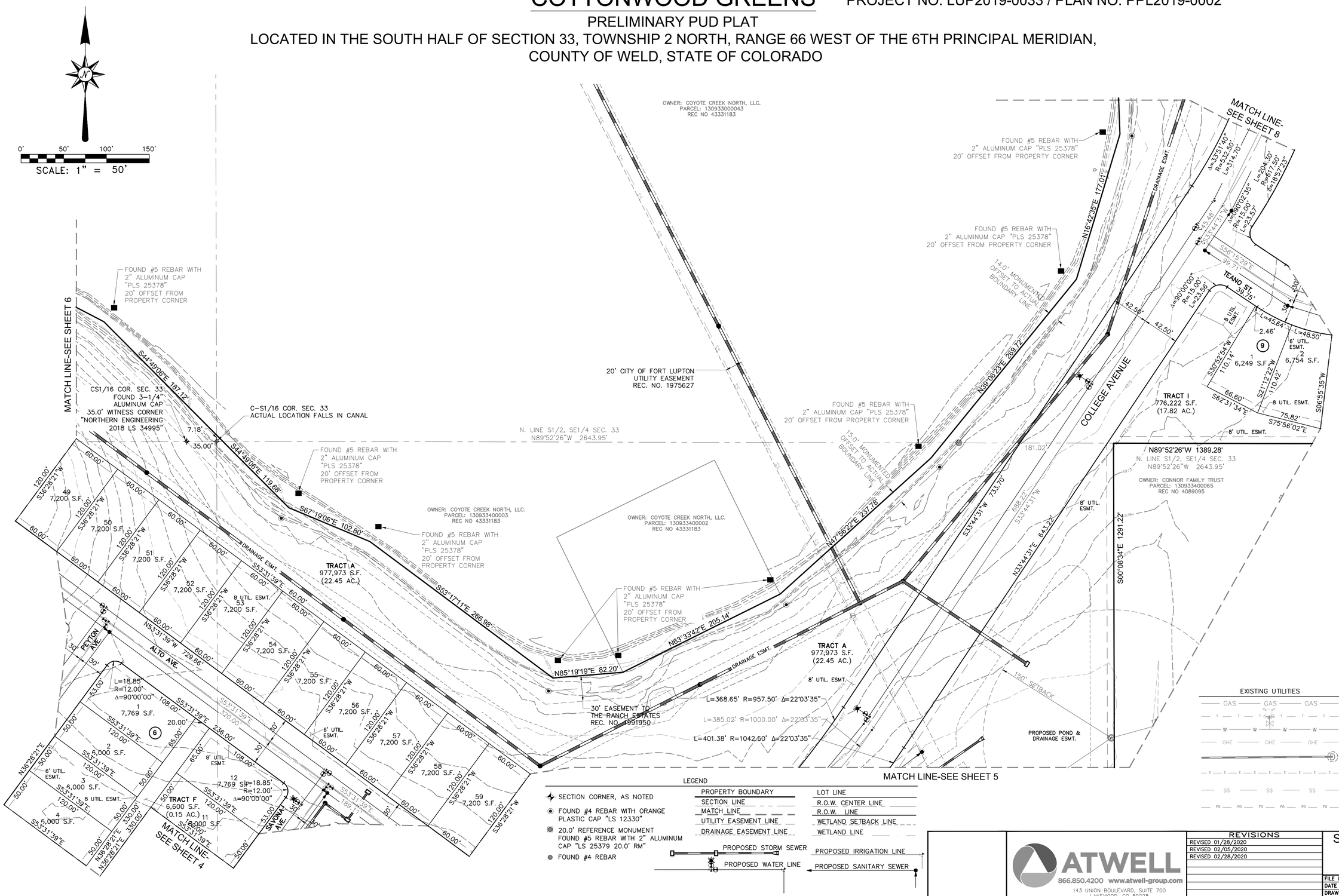
COTTONWOOD GREENS

PROJECT NO. LUP2019-0033 / PLAN NO. PPL2019-0002

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



LEGEND

- SECTION CORNER, AS NOTED
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP "LS 12330"
- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE
LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE
PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS
REVISED 01/28/2020
REVISED 02/05/2020
REVISED 02/28/2020

SHEET 7 OF 9

FILE NO.	19003254-PRELIM PLAT
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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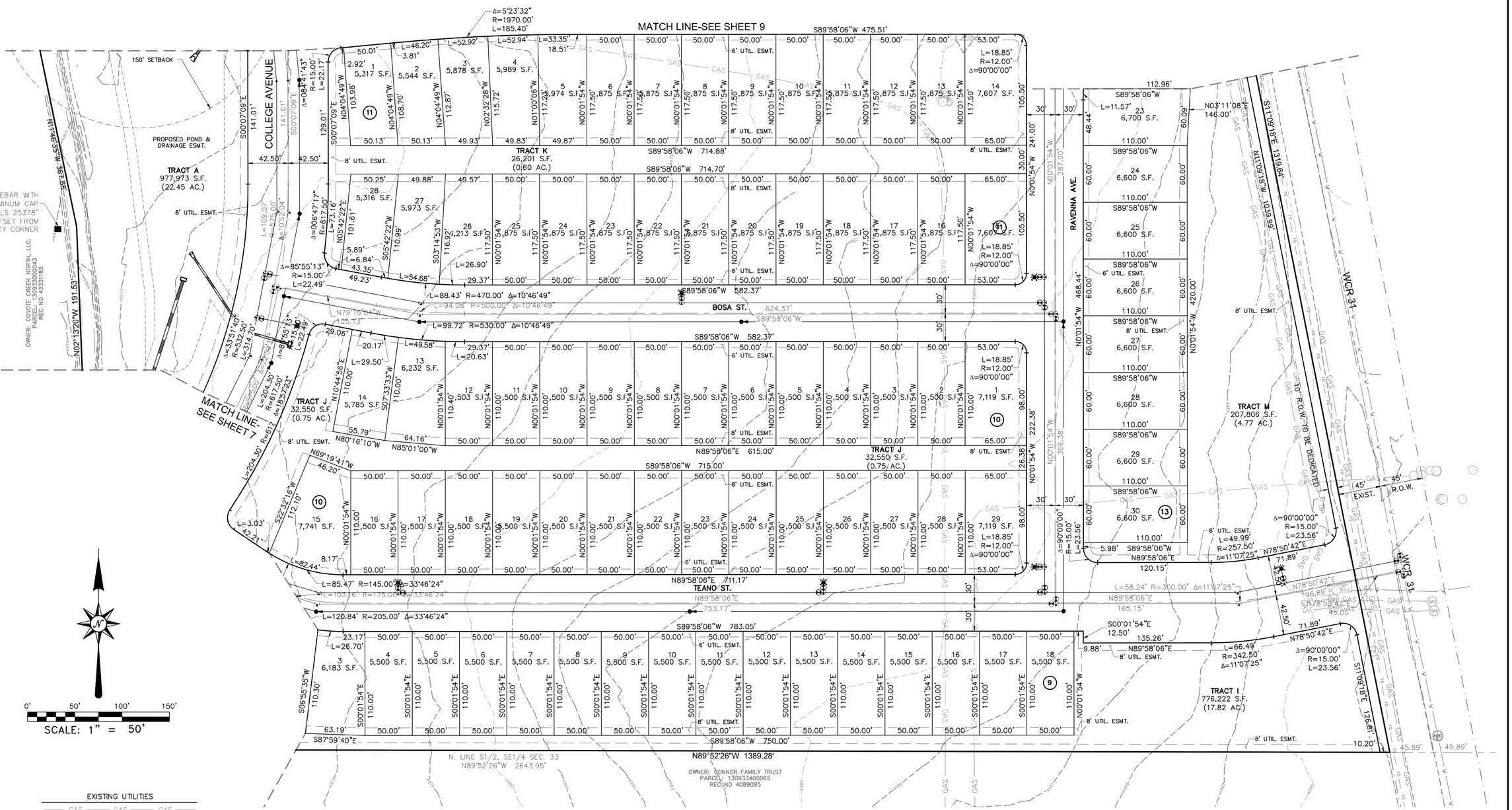
COTTONWOOD GREENS

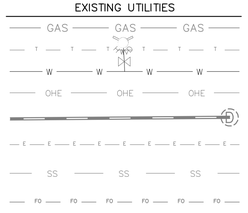
PROJECT NO. LUP2019-0033 / PLAN NO. PPL2019-0002

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



EXISTING UTILITIES



LEGEND

- PROPOSED STORM SEWER
- PROPOSED WATER LINE
- PROPOSED IRRIGATION LINE
- PROPOSED SANITARY SEWER
- SECTION CORNER, AS NOTED
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- DRAINAGE EASEMENT LINE
- LOT LINE
- R.O.W. CENTER LINE
- R.O.W. LINE
- WETLAND SETBACK LINE
- WETLAND LINE

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SHEET 8 OF 9

FILE NO.	19003254-PRELIM PLAT
DATE	10/01/19
DRAWN BY	TWK
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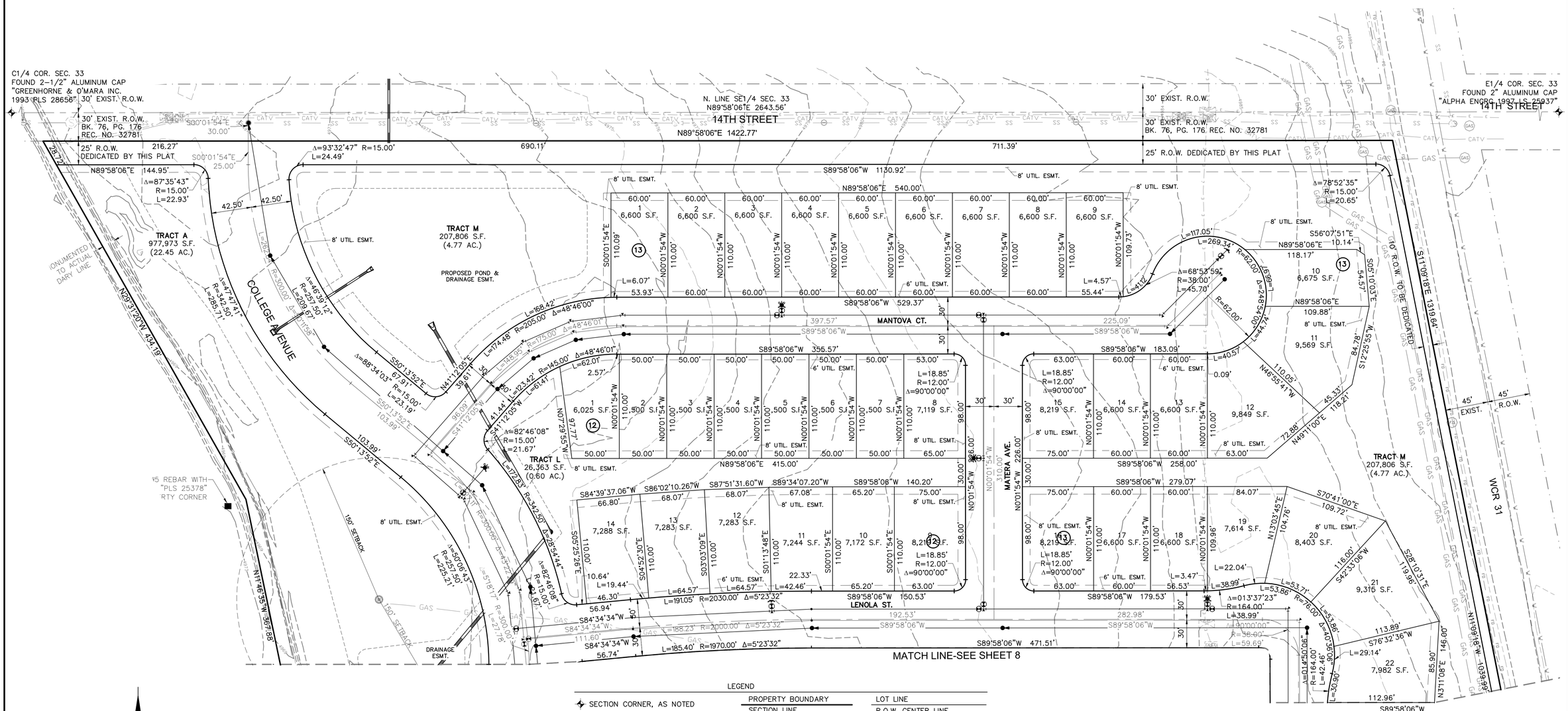
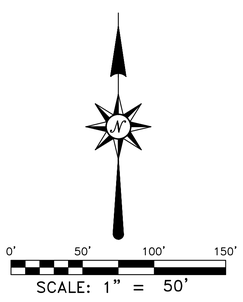
COTTONWOOD GREENS

PROJECT NO. LUP2019-0033 / PLAN NO. PPL2019-0002

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO





LEGEND

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PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE

LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE

EXISTING UTILITIES

GAS GAS GAS
T T T T T T T T
W W W W
OHE OHE OHE
E E E E E E E E E
SS SS SS
ro ro ro ro ro ro

PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

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SHEET 9 OF 9

FILE NO.	19003254-PRELIM PLAT
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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COTTONWOOD GREENS FILING NO. 4

A TRACT OF LAND LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO

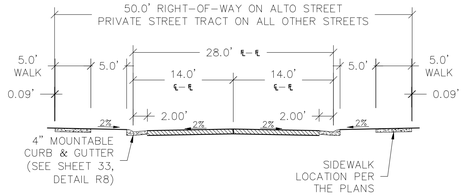
FILING NO. 4 CONSTRUCTION PLANS

LEGAL DESCRIPTION:

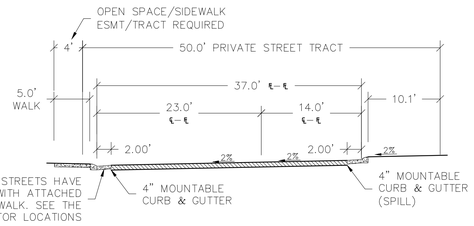
TRACT D AND OUTLOT A, COTTONWOOD GREENS PUD FILING NO. 3
COUNTY OF WELD, STATE OF COLORADO

RECORDED AT RECEPTION NO. 4681486, WELD COUNTY RECORDS

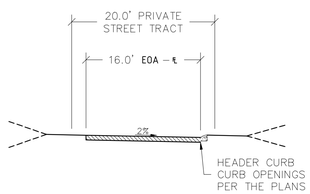
SAID PARCEL OF LAND CONTAINS 706,426 SQUARE FEET, OR 16.22 ACRES, MORE OR LESS (±).



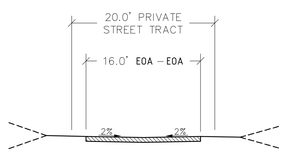
MODIFIED LOCAL STREET SECTION WITH 50' ROW / PRIVATE STREET TRACT
1:10 HOR.



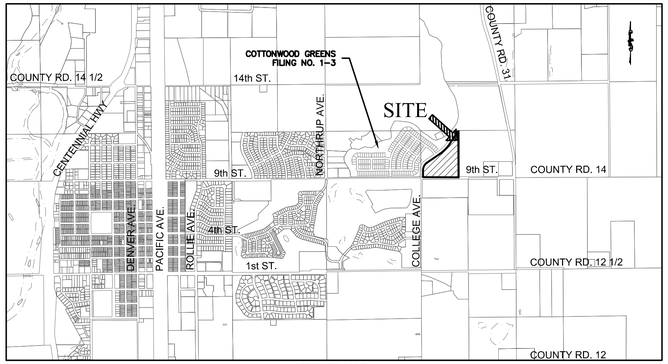
BARLETTA STREET SUPER ELEVATED WITH PARKING AND ATTACHED SIDEWALK
1:10 HOR.



PRIVATE ALLEY DRIVEWAY
1:10 HOR.



PRIVATE ALLEY DRIVEWAY
1:10 HOR.



VICINITY MAP
SCALE: 1"=2,000'

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04	GESC INTERIM PLAN
05	GESC FINAL PLAN
06	GESC DETAILS
07	GESC DETAILS
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08	DETAIL GRADING PLAN
09	DETAIL GRADING PLAN
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35	SANITARY DETAILS
SIGNAGE & STRIPING	
36	SIGNAGE & STRIPING

CITY ENGINEER'S APPROVAL:

APPROVED THIS ___ DAY OF _____, 2020.

_____
CITY ENGINEER

CITY WATER AND SEWER DEPARTMENT APPROVAL:

APPROVED THIS ___ DAY OF _____, 2020.

_____
DIRECTOR OF PUBLIC WORKS

CITY ADMINISTRATOR'S APPROVAL:

APPROVED THIS ___ DAY OF _____, 2020.

_____
CITY ADMINISTRATOR

PLANNING COMMISSION RECOMMENDATION:

RECOMMENDED THIS ___ DAY OF _____, 2020, BY RESOLUTION NO. _____,

_____
CHAIRPERSON, FORT LUPTON
PLANNING COMMISSION

MAYOR'S CERTIFICATE:
THIS IS TO CERTIFY THAT A PLAT OF THE ABOVE-DESCRIBED PROPERTY WAS APPROVED BY [ORDINANCE/RESOLUTION] NO. _____ OF THE CITY OF FORT LUPTON PASSED AND ADOPTED ON THE _____ DAY OF _____, A.D., 2020 AND THAT THE MAYOR OF THE CITY OF FORT LUPTON, AS AUTHORIZED BY SAID [ORDINANCE/RESOLUTION] ON BEHALF OF THE CITY OF FORT LUPTON, HEREBY ACKNOWLEDGES AND ADOPTS THE SAID PLAT UPON WHICH THIS CERTIFICATE IS ENDORSED FOR ALL PURPOSES INDICATED THEREON.

_____
MAYOR

ATTEST: _____

_____
CITY CLERK

(SEAL)

OWNER:
ARBOR CAPITAL PARTNERS, LLC.
4040 MACAURTHER BLVD.,
SUITE 250
NEWPORT BEACH, CA 92660
(303) 905-3496
CONTACT: JIM RIGHEIMER

CIVIL ENGINEER:
ATWELL, LLC.
143 UNION BLVD.,
SUITE 700
LAKEWOOD, CO 80228
(303) 462-1100
CONTACT: DANIEL RODRIGUEZ

SURVEYOR:
ATWELL, LLC.
143 UNION BLVD.,
SUITE 700
LAKEWOOD, CO 80228
(303) 462-1100
CONTACT: MICHAEL L. POOL

CITY OF FORT LUPTON:
130 S. McKINLEY AVE.
FORT LUPTON, CO 80621
(303) 857-6694
CONTACT: ROY VESTAL

XCEL ENERGY(GAS):
5460 W. 60TH AVE.
ARVADA, CO 80003
(800) 895-4999
CONTACT: DONNA SANDERS

UNITED POWER (ELEC):
P.O. BOX 929
BRIGHTON, CO 80601
(303) 659-0551
CONTACT: HECTOR AVENDANO

CENTURYLINK (FIBER OPTIC):
5324 WADSWORTH BYP.,
SUITE F
ARVADA, CO 80002
(303) 403-9980

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

ENGINEER'S STATEMENT

THE CONSTRUCTION PLANS INCLUDED HEREIN HAVE BEEN PREPARED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF FORT LUPTON ENGINEERING CONSTRUCTION STANDARDS AND SPECIFICATIONS MANUAL.

_____ _____
DANIEL J. RODRIGUEZ, P.E. DATE
COLORADO NO. 48683
FOR AND ON BEHALF OF ATWELL, LLC.

811 Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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ATWELL
866.850.4200 www.atwell-group.com
143 UNION BLVD. SUITE 700
LAKEWOOD, CO 80228
303.462.1100

DEVELOPER
ARBOR CAPITAL PARTNERS, LLC
4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496

CLIENT
ARBOR CAPITAL PARTNERS, LLC

COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
COVER SHEET

DATE 6/22/2021

REVISIONS

DR. NA CH. CJG
P.M. DJR

JOB 20002948
SHEET NO. 01

CAD FILE: 20002948-COVER SHEET.DWG

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GENERAL NOTES – WATER & SANITARY SEWER

1. ALL CONSTRUCTION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF FORT LUPTON STANDARD SPECIFICATIONS, LATEST EDITION OR PROJECT SPECIFICATIONS, WHICHEVER IS MORE STRINGENT.

2. ALL OVER LOT GRADING IN THE RIGHT–OF–WAY OR EASEMENT SHALL BE COMPLETED PRIOR TO INSTALLING WATER OR SANITARY SEWER LINES.

3. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CALL UTILITY NOTIFICATION CENTER OF COLORADO AT 811 OR 1–800–922–1987 BEFORE DIGGING, GRADING OR EXCAVATING.

4. MAINTAIN A MINIMUM OF 10 FOOT HORIZONTAL CLEAR DISTANCE SEPARATION BETWEEN WATER AND SANITARY SEWER MAINS AND SERVICES. WATER MAINS AND SERVICES ARE TO BE LOCATED 18 INCHES MINIMUM ABOVE THE SANITARY SEWER MAIN OR SERVICES. IF FIELD CONDITIONS VARY FROM THOSE SHOWN ON THESE PLANS AND THE SANITARY SEWER CANNOT BE LOCATED BELOW THE WATER MAIN OR SERVICE, A CLEAR VERTICAL DISTANCE OF 18 INCHES CANNOT BE MAINTAINED, OR A MINIMUM 10 FOOT HORIZONTAL SEPARATION CANNOT BE ACHIEVED, THE CITY OF FORT LUPTON INSPECTION SERVICES SHALL BE CONTACTED IMMEDIATELY TO REVIEW THE SITUATION. IF NO OTHER FEASIBLE SOLUTION CAN BE USED TO MAINTAIN THE REQUIRED CLEARANCES, THE SANITARY SEWER SHALL BE ENCASED PER CURRENT CONSTRUCTION STANDARDS.

5. WHERE WATER AND SANITARY SEWER LINES ARE LOCATED IN COMMON UTILITY EASEMENT AREAS, THERE SHALL BE NO OTHER UTILITIES LOCATED HORIZONTALLY WITHIN 10 FEET OF EITHER LINE EXCEPT AT APPROVED CROSSINGS.

6. CONTRACTOR SHALL NOTIFY THE CITY OF FORT LUPTON ONE WEEK PRIOR TO COMMENCING WORK AFTER DRAWING DISTRIBUTION AND PRECONSTRUCTION MEETING HELD WITH THE CITY.

7. CONTRACTOR TO OBTAIN ALL PERMITS, DO ALL EXCAVATION FOR OSHA SAFE TRENCH.

8. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES TO BE CROSSED BY WATER AND/OR SEWER LINES AT LEAST 24 HOURS PRIOR TO CROSSING TO ENSURE 18 INCH MINIMUM CLEARANCE IF OPEN CUT METHODS ARE USED AND 24 INCH MINIMUM CLEARANCE FOR BORED CROSSINGS. IF VERTICAL CLEARANCE CANNOT BE MET AS SHOWN ON THE DRAWINGS, CONTACT THE DESIGN ENGINEER IMMEDIATELY. HORIZONTAL AND VERTICAL LOCATION OF CROSSED EXISTING UTILITIES SHALL BE RECORDED ON THE AS–BUILT RECORD DRAWINGS.

9. SHOULD ANY VARIATIONS BEFORE OR DURING CONSTRUCTION TO THE WATER MAIN OR SANITARY SEWER COLLECTION SYSTEM DESIGN(S) BE CONSIDERED, NOTICE MUST FIRST BE GIVEN TO THE ENGINEER (BRAD EATON, 970–395–9880).

10. THE CONTRACTOR SHALL PROVIDE THE OWNER WITH AS–BUILT RECORD DRAWINGS UPON COMPLETION OF WORK.

11. ALL WATER MAINS, FIRE HYDRANTS, AND SERVICES SHALL HAVE A MINIMUM COVER OF 5.0 FEET AND A MAXIMUM COVER OF 6.0 FEET UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

12. ALL NEW WATER MAINS SHALL BE BULKHEADED AND TESTED AND APPROVED PRIOR TO CONNECTION TO THE EXISTING WATER SYSTEM. VALVES WHICH PASS TESTING FOR PRESSURE AND LEAKAGE AT THE TIME OF INSTALLATION AND THE TESTING WAS PERFORMED IN THE PRESENCE OF THE CITY MAY BE CONSIDERED AS A BULKHEAD.

13. ALL VALVES AT DEAD ENDS SHALL BE RESTRAINED WITH RESTRAINING GLANDS UPSTREAM OF THE VALVE. LENGTH OF RESTRAINT IS SHOWN ON THE DRAWINGS.

14. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE POLYWRAPPED IN ACCORDANCE WITH AWWA STANDARD C–105.

15. NO POLYVINYL CHLORIDE (PVC) PIPE STORED OUTSIDE AND EXPOSED TO SUNLIGHT SHALL EXCEED THE MANUFACTURER'S RECOMMENDATION EXPOSURE TIME. THIS TIME SHALL BEGIN FROM THE DATE OF MANUFACTURE. IF THE TIME WILL BE GREATER THAN THE MANUFACTURE'S RECOMMENDED TIME, THE PIPE SHALL BE COVERED WITH AN OPAQUE MATERIAL. AIR CIRCULATION SHALL BE PROVIDED UNDER THE COVERING.

16. COPPER TRACING WIRE SHALL BE INSTALLED PER SPECIFICATIONS FOR ALL WATER PIPE.

17. FOR TAPPING PVC C–900 PIPE, AN APPROVED TAPPING SADDLE SHALL BE USED. THE TAPPING MACHINE USED TO MAKE THE CONNECTION MUST OPERATE WITH A CUTTING/TAPPING TOOL WHICH IS CLASSIFIED AS A CORE CUTTING TOOL (EITHER WITH INTERNAL TEETH OR WITH DOUBLE SLOTS) OF THE SHELL DESIGN WHICH RETAINS THE COUPON WHILE PENETRATING THE WALL OF THE WATER MAIN. THE TAPPING MACHINE SHOULD PROVIDE THE STANDARD RATCHET HANDLE ON THE BORING BAR AND SHOULD BE OF THE DESIGN WHERE CUTTING AND TAPPING IS CONTROLLED AND ACCOMPLISHED WITH A FEED–NUT OR FEED–SCREW AND YOKE.

18. ALL BACKFLOW PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH THE COLORADO CROSS–CONNECTION CONTROL MANUAL, LATEST EDITION, AND AS REQUIRED NECESSARY BY THE CITY OF FORT LUPTON WATER AND SEWER DEPARTMENT. ALL BACKFLOW ASSEMBLIES MUST BE TESTED UPON INSTALLATION AND JUST PRIOR TO END OF WARRANTY PERIOD. OWNER SHALL BE RESPONSIBLE FOR TESTING EACH YEAR THEREAFTER.

19. ALL DUCTILE IRON PIPE (D.I.P.) WATER MAINS SHALL BE THICKNESS CL. 50 UNLESS OTHERWISE NOTED.

20. THERE SHALL BE NO PERMANENT STRUCTURES, FENCES, OR LANDSCAPING (PLANTINGS OR BERMS) PLACED WITHIN A 10.0 FOOT RADIUS OF FIRE HYDRANTS AS CONSTRUCTED.

21. BEDDING FOR DUCTILE IRON PIPE SHALL BE TYPE 3 AS PER AWWA C–151 STANDARD LAYING CONDITIONS UNLESS OTHERWISE SPECIFIED.

22. PVC POTABLE (DOMESTIC) WATER MAIN PIPE SHALL MEET THE FOLLOWING QUALITY STANDARDS: AWWA C–900; CLASS 200 – DR 14 ELASTOMERIC RING – ASTM D1869 & F477 RING TIGHT JOINT.

23. PVC WATER PIPE SHALL BE INSTALLED USING A CDOT CLASS B BEDDING 6 INCHES ABOVE AND 6 INCHES BELOW THE PIPE.

24. INSULATED 12 GAUGE TRACER WIRE SHALL BE AFFIXED TO THE PROPOSED WATER MAINS.
   A. PASS CURRENT THROUGH WIRE AND DEMONSTRATE THAT THE WIRE IS CAPABLE OF LOCATING THE WATER MAINS.
   B. IF WIRE WILL NOT PASS CURRENT, LOCATE BREAK IN CIRCUIT AND TEST UNTIL TRACER WIRE WORKS IN ACCORDANCE WITH ITS INTENDED USE.

25. ALL IRRIGATION WATER PIPE SHALL BE EITHER PVC OR HDPE, MANUFACTURED IN A PURPLE COLOR AND SHALL BE EMBOSSED OR INTEGRALLY STAMPED WITH A STATEMENT THAT CLEARLY INDICATES THAT THE PIPE DOES NOT CONTAIN POTABLE WATER.

26. ALL IRRIGATION SYSTEM VALVE BOX LIDS, METER PIT COVERS, MANHOLE COVERS AND VAULT COVERS SHALL BE FURNISHED WITH THE WORD "IRRIGATION" OR AN ACCEPTABLE ABBREVIATION, CLEARLY CAST ON THE SURFACE. IRRIGATION WATER MAIN VALVE BOX LIDS SHALL BE TRIANGULAR, AND IRRIGATION METER PIT COVERS SHALL BE CAP–TYPE COVERS TO DISTINGUISH THEM FROM THE RECESSED COVERS USED ON POTABLE WATER METER PITS.

27. ALL SANITARY SEWER LINES SHALL BE ASTM D–3034 (PVC SDR 35) UNLESS OTHERWISE NOTED.

28. ALL SANITARY SEWER LINES SHALL HAVE A MINIMUM OF 10.0' HORIZONTAL & 18" VERTICAL CLEARANCE FROM PROPOSED OR EXISTING WATER LINES & STORM DRAIN LINES.

29. ALL SANITARY SEWER SERVICES TO BE 4" DIAMETER PVC (SDR 35) & SHALL NOT HAVE A SLOPE LESS THAN 2% OR MORE THAN 8%.

PROJECT GENERAL NOTES:

1. THE FOLLOWING SHALL BE FURNISHED WITH EACH BITUMINOUS PAVER:
   - A SKID TYPE DEVICE AT LEAST 30 FEET IN LENGTH. THIS DEVICE SHALL BE USED ON ALL PASSES AND LIFTS OF BITUMINOUS PAVEMENT PLACED.
   - ANY LAYER OF BITUMINOUS PAVEMENT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE SUCCEEDING LAYER IS PLACED.

2. TYPE OF COMPACTION FOR THIS PROJECT SHALL BE AASHTO T–99 (ASTM D698) (STANDARD PROCTOR) FOR SUBGRADE SOILS AND AASHTO T–180 (ASTM D1557) (MODIFIED PROCTOR) FOR AGGREGATE BASE COURSE.

3. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL, AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE NECESSARY EQUIPMENT AND MATERIALS TO SATISFACTORILY CONTROL DUST AT ALL TIMES, AND AS DIRECTED BY THE CITY. WATER SHALL BE USED AS THE DUST PALLIATIVE WHERE REQUIRED. THE CONTRACTOR WILL FURNISH AND SPREAD WATER AT NO ADDITIONAL COST TO THE PROJECT.

4. DEPTH OF MOISTURE–CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
   - FULL DEPTH OF ALL EMBANKMENTS
   - BASE OF CUTS AND FILLS, 0.5 FT.
   - EXCAVATION AND DIGGING AS REQUIRED FOR THE COMPACTION OF BASES OF CUTS AND FILLS WILL BE CONSIDERED SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY.

5. WHEN EXISTING ASPHALT PAVEMENT IS TO BE REMOVED, IT SHALL BE CUT TO A NEAT WORK LINE WITH A CUTTING WHEEL ATTACHED TO A BLADE, SAW OR OTHER METHODS AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED AS SUBSIDIARY TO OTHER WORK.

6. ALL DEBRIS, RUBBISH AND OTHER MATERIALS RESULTING FROM DEMOLITION OPERATIONS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF OFF–SITE. LOCATION OF DUMP, LENGTH OF HAUL, AND DISPOSAL EXPENSES SHALL BE CONTRACTOR'S RESPONSIBILITY.

7. THE STREETS ADJACENT TO THE CONSTRUCTION AREA SHALL BE CLEARED OF DEBRIS GENERATED BY THE PROJECT BY THE CONTRACTOR AT THE EARLIEST OPPORTUNITY, BUT IN NO CASE SHALL THE ROADS BE LEFT UNCLEARED AFTER THE COMPLETION OF THE DAY'S WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE NECESSARY EQUIPMENT AND MATERIAL TO SATISFACTORILY CLEAN THE ROADWAYS AT NO ADDITIONAL COST TO THE PROJECT.

8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITE GRADING IN A MANNER CONSISTENT WITH THE PLANS.

9. THERE SHALL BE A MINIMUM 12" VERTICAL SEPARATION WHERE UTILITY SLEEVES ARE LOCATED IN THE SAME TRENCH.

10. CONTRACTOR SHALL SUBMIT AS–BUILT INFORMATION TO THE PROJECT ENGINEER TO REVIEW AND PREPARE FINAL AS–BUILT RECORD DRAWINGS.

11. ALL WORK WITHIN THE PUBLIC RIGHT–OF–WAY OR EASEMENT SHALL CONFORM TO THE CITY OF FORT LUPTON CONSTRUCTION SPECIFICATIONS AND DESIGN STANDARDS.

12. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF ANY WORK ON THE PROJECT. A PRE–CONSTRUCTION CONFERENCE SHALL BE HELD WITH CITY REPRESENTATIVES BEFORE A PERMIT WILL BE ISSUED.

13. THE CONTRACTOR SHALL NOTIFY CITY OF FORT LUPTON AT LEAST 24–HOURS PRIOR TO THE DESIRED INSPECTION.

14. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER OF ANY PROBLEMS IN CONFORMING TO THE ACCEPTED PLANS FOR ANY ELEMENT OF THE PROPOSED IMPROVEMENTS PRIOR TO ITS CONSTRUCTION.

15. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, DURING THE PERFORMANCE OF THE WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND SHALL NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTY OF THE ENGINEER OR CITY TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.

16. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, SIGNS, BARRICADES, FLAG PERSONS, OR OTHER DEVICES NECESSARY TO PROVIDE FOR PUBLIC SAFETY IN ACCORDANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

17. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL SURVEY MONUMENTS. ANY MONUMENT THAT MUST BE DESTROYED FOR CONSTRUCTION MUST BE REPLACED. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A LICENSE SURVEYOR PRIOR TO DISTURBING ANY MONUMENTS.

18. PRIOR TO FINAL PLACEMENT OF SURFACE PAVEMENT, ALL UNDERGROUND UTILITY MAINS SHALL BE INSTALLED.

UTILITY MAINTENANCE STATEMENT:

1. ALL PUBLIC WATER, STORM SEWER AND SANITARY SEWER MAINS AND APPURTENANCES LOCATED IN PUBLIC ROW SHALL BE MAINTAINED BY THE CITY OF FORT LUPTON PUBLIC WORKS DEPARTMENTS. ALL PUBLIC WATER, STORM SEWER, SANITARY SEWER MAINS AND APPURTENANCES UNDER PRIVATE DRIVES ARE LOCATED IN UTILITY EASEMENTS. CITY IS RESPONSIBLE FOR MAINTENANCE OF THESE WATER, STORM AND SANITARY SEWER FACILITIES. CITY IS NOT RESPONSIBLE FOR REPAIR OR REPLACEMENT OF PRIVATE DRIVE, CURB AND GUTTER OR LANDSCAPING DAMAGED DURING UTILITY REPAIR OR MAINTENANCE.

GENERAL NOTES – STORM DRAIN

1. SEE DETAIL SHEET NO. XXXXX DETAIL ST4, FOR STORM DRAIN BEDDING REQUIREMENTS.

2. RCP SHALL HAVE FLEXIBLE GASKET MATERIAL (WATER TIGHT RUBBER GASKETS) MEETING ASTM C443 AND TYPE 4–G BELL AND SPIGOT JOINTS.

3. ALL PVC STORM DRAINS SHALL BE SDR 35 PUSH–ON BELL & SPIGOT TYPE MEETING ASTM D1784, D3034 & D3212. ALL GASKETS SHALL BE OF AN O–RING TYPE IN ACCORDANCE WITH ASTM F477.

4. ALL STORM DRAINAGE CONSTRUCTION SHALL CONFORM TO THE CITY OF FORT LUPTON'S MOST RECENT STORM DRAINAGE DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS. A COPY OF THE SPECIFICATIONS MAY BE OBTAINED FROM THE CITY.

5. STORM DRAIN PIPE MATERIAL SPECIFICATIONS ARE AS FOLLOWS:

REINFORCED CONCRETE PIPE (RCP) – REINFORCED CONCRETE PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR REINFORCED CONCRETE CULVERT, STORM DRAIN AND SEWER PIPE," ASTM C–76, LATEST REVISION. SHOP DRAWINGS WILL BE REQUIRED WHEN STEEL PLACEMENT IS DIFFERENT THAN THAT SHOWN OR REQUIRED BY THE APPLICABLE ASTM SPECIFICATION. RCP SHALL BE CLASS III, UNLESS SPECIFIED OTHERWISE, AND OF THE SIZE INDICATED ON THE DRAWINGS. INTERNAL PIPE WALL SHALL BE REASONABLY SMOOTH AND FREE OF DEFECTS. PIPE THAT IS ROUGH OR UNEVEN SHALL BE REMOVED FROM THE JOB SITE.

6. THE CONTRACTOR SHALL VERIFY THE HORIZONTAL AND VERTICAL ALIGNMENT OF ALL POINTS OF CONNECTION AND UTILITY CROSSINGS PRIOR TO INSTALLING ANY STORM DRAIN PIPE. IF A DESIGN MODIFICATION IS REQUIRED IT SHALL BE COORDINATED WITH THE ENGINEER.

GEOTECHNICAL NOTES:

A GEOTECHNICAL REPORT "SUBSURFACE EXPLORATION PROGRAM GEOTECHNICAL AND PAVEMENT" RECOMMENDATIONS XXXXXX FORT LUPTON, COLORADO HAS BEEN PREPARED BY GROUND ENGINEERING CONSULTANTS, INC., PROJ. NO. 12–3636, DATE NOVEMBER 15, 2018. REFER TO GEOTECHNICAL REPORT FOR ANY REQUIREMENTS EXCEEDING CITY STANDARDS.

ALLOWABLE PAVEMENT SECTION THICKNESS (INCHES)

	ASPHALT CONCRETE SURFACE	AGGREGATE BASE COURSE	FULL DEPTH ASPHALT	PORTLAND CEMENT CONCRETE
PARKING LOT	6.5"			
DRIVE LANES HEAVY TRUCK TRAFFIC	7.5"	6"		
FULL DEPTH				

LEGEND

- PROPERTY BOUNDARY
- PROPOSED RIGHT–OF–WAY
- EXISTING RIGHT–OF–WAY
- PROPOSED LOT LINE
- EXISTING LOT LINE
- PROPOSED CATCH CURB & GUTTER
- PROPOSED SPILL CURB & GUTTER
- EXISTING CURB & GUTTER
- PROPOSED SIDEWALK
- EXISTING SIDEWALK
- EXISTING SECTION LINE
- PROPOSED EASEMENT
- EXISTING EASEMENT
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PROPOSED SANITARY
- SS EXISTING SANITARY
- S PROPOSED SANITARY SERVICE
- PROPOSED STORM
- EXISTING STORM
- PROPOSED WATER
- W EXISTING WATER
- W PROPOSED WATER SERVICE
- PROPOSED HYDRANT
- EXISTING HYDRANT
- PROPOSED WATER VALVE
- EXISTING WATER VALVE
- EXISTING POWER POLE
- IRR EXISTING IRRIGATION LINE
- GAS EXISTING GAS LINE
- EXISTING TELEPHONE LINE
- OHE EXISTING OVERHEAD ELECTRICAL
- E EXISTING ELECTRICAL
- CATV EXISTING CABLE TV
- FO EXISTING FIBER OPTIC CABLE
- X EXISTING FENCE

PROJECT NO.: LUP2019–0033 &
PLAN NO.: PPL2019–0002

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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LAKEWOOD, CO 80228
303.462.1100

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4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303–905–3496
ARBOR CAPITAL PARTNERS, LLC

CLIENT
ARBOR CAPITAL PARTNERS, LLC

COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS

NOTES & LEGEND

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. NA CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 02

CAD FILE: 20002948–COVER SHEET.DWG

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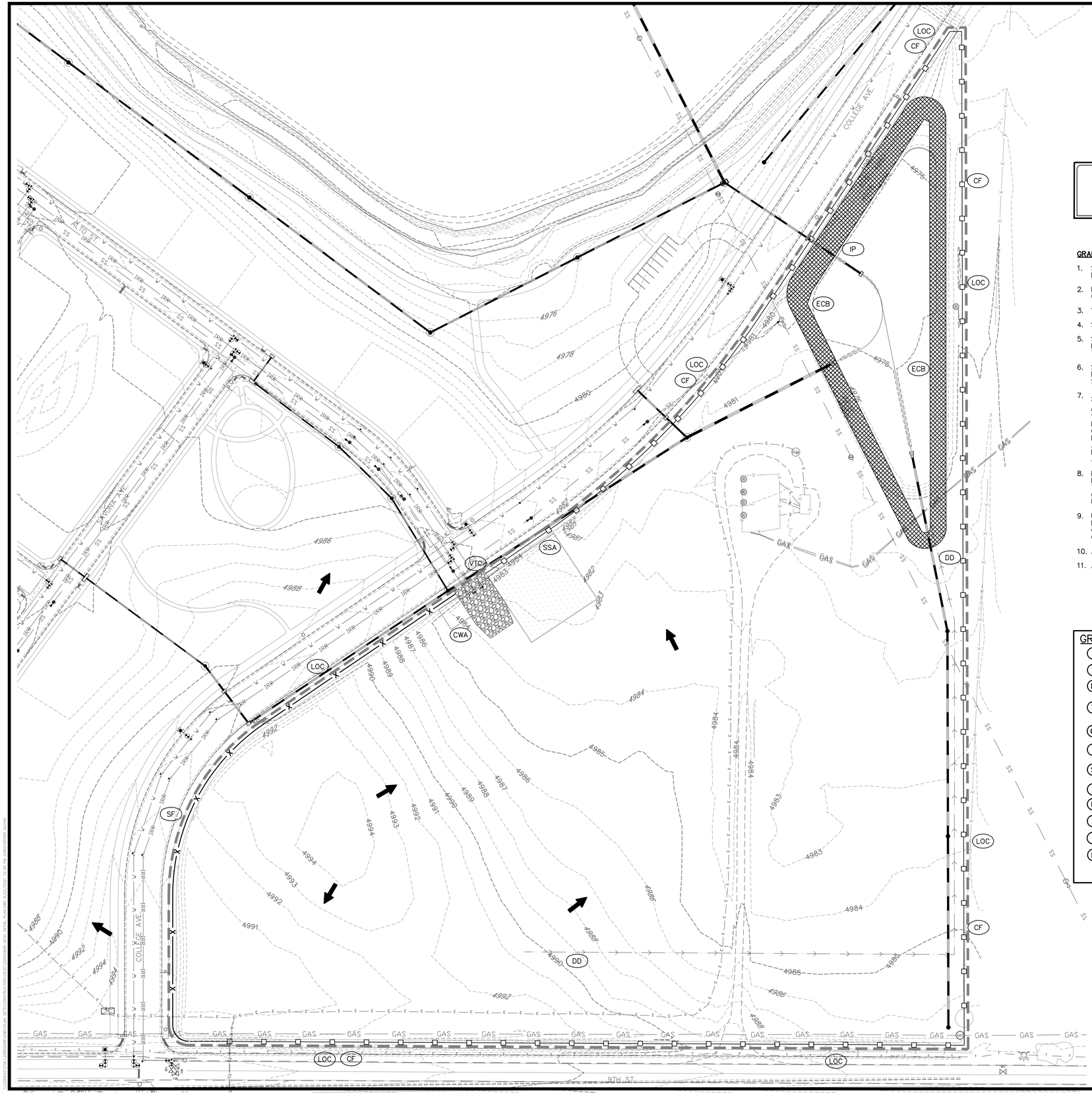
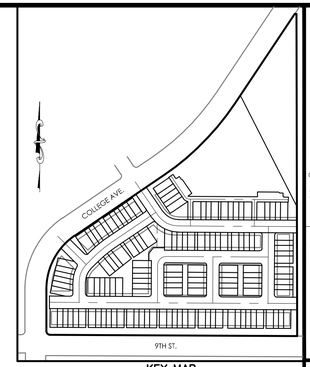


LEGEND

EXISTING GROUND CONTOURS



KEY MAP
N.T.S.

GRADING AND EROSION CONTROL NOTES:

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SF	SILT FENCE
IP	INLET PROTECTION
RRC	CULVERT PROTECTION
VTC	VEHICLE TRACKING CONTROL
CWA	CONCRETE WASHOUT AREA
RS	ROCK SOCK
SSA	STABILIZED STAGING AREA
SM	SEEDING AND MULCHING
LOC	LIMITS OF CONSTRUCTION
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
ECB	EROSION CONTROL BLANKET

PROJECT NO.:
PLAN NO.:

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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

GESC PLANS

GESC INITIAL PLAN

DATE 6/22/2021

REVISIONS

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DR. EP CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 03

CAD FILE: 20002948-GESC INITIAL PLAN.DWG

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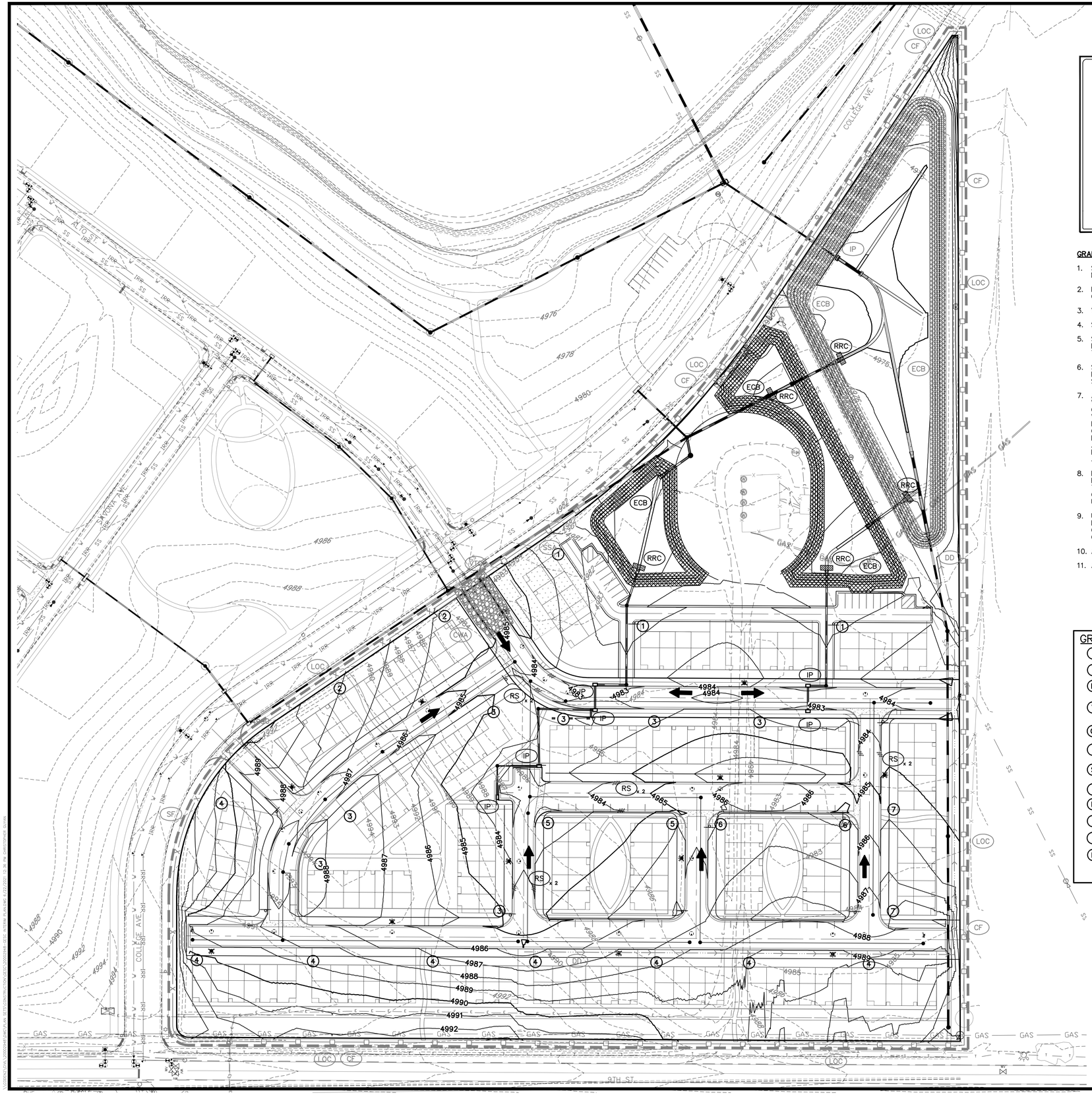


LEGEND

PROPERTY BOUNDARY LINE

×40.15 PROP. OVERLOT GRADE SPOT ELEV.

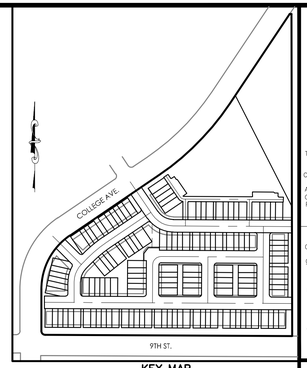
×40.15 EXIST. OVERLOT GRADE SPOT ELEV.

PROPOSED LOT LINE

EXISTING CONTOURS

PROPOSED CONTOURS

DRAINAGE FLOW ARROWS



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HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

DEVELOPER
ARBOR CAPITAL PARTNERS, LLC
4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496

CLIENT
ARBOR CAPITAL PARTNERS, LLC

COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

GESC PLANS

GESC INTERIM PLAN

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. EP	CH. CJG
P.M. DJR	
JOB 20002948	
SHEET NO. 04	

CAD FILE: 20002948-GESC INTERIM PLANDWG

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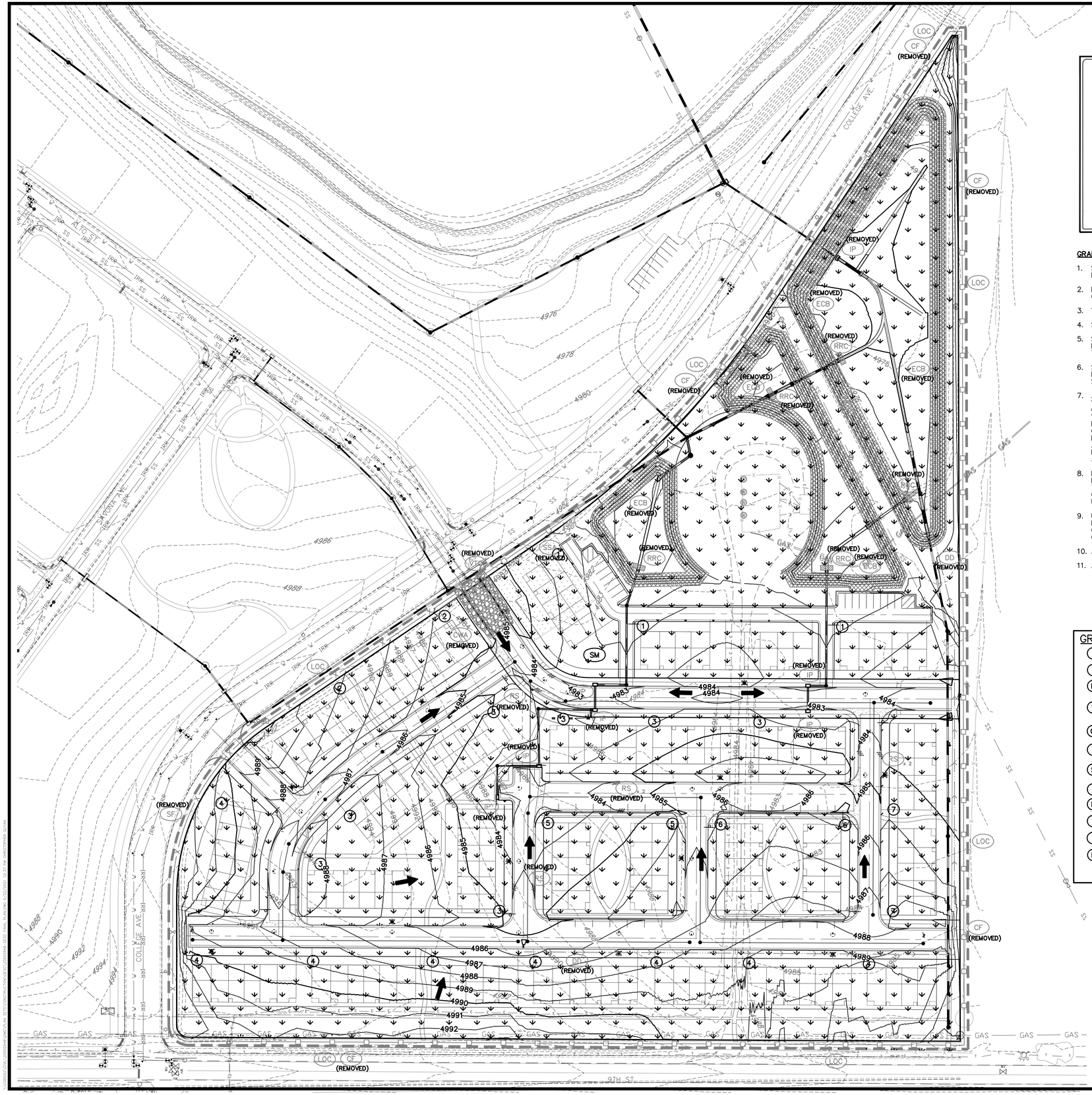


LEGEND

PROPERTY BOUNDARY LINE

×40.15 PROP. OVERLOT GRADE SPOT ELEV.

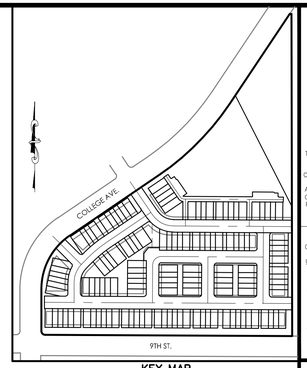
×40.15 EXIST. OVERLOT GRADE SPOT ELEV.

PROPOSED LOT LINE

EXISTING CONTOURS

PROPOSED CONTOURS

DRAINAGE FLOW ARROWS



KEY MAP
N.T.S.

811 Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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GRADING AND EROSION CONTROL NOTES:

1. SILT FENCE TO BE REMOVED AFTER PLACEMENT OF ECB OR SEEDING & MULCHING OF LOTS.
2. INLET PROTECTION TO BE REMOVED AFTER DEVELOPMENT AND STABILIZATION OF LOTS.
3. VTC TO BE REMOVED UPON COMPLETION OF PAVING OPERATIONS.
4. SEE COVER SHEET FOR COMMERCE CITY STANDARD GRADING NOTES.
5. SHADED BMP'S WERE INSTALLED IN INITIAL OR INTERIM STAGES AND SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE CITY.
6. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITIES, CULVERTS, STORM DRAINS, AND OUTLET PROTECTION.
7. A RELEASE OF ANY CHEMICAL, OIL, PETROLEUM PRODUCT, SEWAGE, ETC. WHICH MAY ENTER STATE WATERS (WHICH INCLUDE SURFACE WATER, GROUNDWATER AND DRY GULLIES OR STORM SEWERS LEADING TO SURFACE WATER) MUST BE REPORTED TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) IMMEDIATELY. WRITTEN NOTIFICATION TO CDPHE MUST FOLLOW WITHIN FIVE DAYS. THE CDPHE TOLL-FREE 24-HOUR ENVIRONMENTAL EMERGENCY SPILL REPORTING LINE IS 1-877-518-5608. ANY ACCIDENTAL DISCHARGE TO THE SANITARY SEWER SYSTEM MUST BE REPORTED TO SOUTH ADAMS COUNTY WATER AND SANITATION DISTRICT AT 303-288-2646.
8. E. 112TH AVENUE IMPROVEMENTS INCLUDING POND 7A HAVE BEEN DESIGNED BY JR ENGINEERING AND ARE CURRENTLY UNDER CONSTRUCTION. CONFIRM THAT THIS PROJECT AND GRADING IS COMPLETED PRIOR TO GRADING COMMENCEMENT OF REUNION FILING NO. 38. AS-BUILT STREET TIE-INS AND UTILITY INVERTS TO CONFIRM PROPER CONNECTIONS.
9. UTILITY IMPROVEMENTS ON CHAMBERS ROAD HAVE BEEN DESIGNED BY JR ENGINEERING AND SHOULD BE COMPLETED PRIOR TO GRADING COMMENCEMENT OF REUNION FILING NO. 38. AS-BUILT UTILITY INVERTS TO CONFIRM PROPER CONNECTIONS.
10. ALL TREE LAWNS SHALL BE SEEDED AND MULCHED.
11. ALL STREETS NEED TO BE CLEANED DAILY.

GRADING AND EROSION CONTROL LEGEND

SF	SILT FENCE
IP	INLET PROTECTION
RRC	CULVERT PROTECTION
VTC	VEHICLE TRACKING CONTROL
CWA	CONCRETE WASHOUT AREA
RS	ROCK SOCK
SSA	STABILIZED STAGING AREA
SM	SEEDING AND MULCHING
LOC	LIMITS OF CONSTRUCTION
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
ECB	EROSION CONTROL BLANKET

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL", LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
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ATWELL
866.850.4200 www.atwell-group.com
143 UNION BLVD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

DEVELOPER
ARBOR CAPITAL PARTNERS, LLC
4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496

CLIENT
ARBOR CAPITAL PARTNERS, LLC

COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

GESC PLANS

GESC FINAL PLAN

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. EP CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 05

CAD FILE: 20002948-GESC FINAL PLAN.DWG

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TITLE	KEY	SYMBOL
CHECK DAM	CD	
CONSTRUCTION ROAD STABILIZATION	CRS	CRS
CURB SOCK INLET PROTECTION	CS	
CONCRETE WASHOUT AREA	CWA	
DIVERSION DITCH AND DIKE, TEMPORARY	DD	DD
DIVERSION CHANNEL, TEMPORARY	DV	DV
DEWATERING	DW	
EROSION CONTROL BLANKET	ECB	
INLET FILTER	IF	
STORM DRAIN INLET PROTECTION	IP	
MULCHING	MU	MU

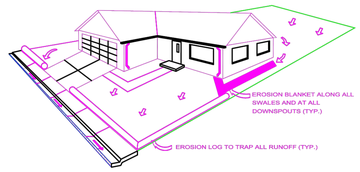
DESIGN STANDARDS	STANDARD DRAWING
MAP SYMBOLS	EC1
	DATE: 8/15/14

TITLE	KEY	SYMBOL
OUTLET PROTECTION	OP	
PAVED FLUME	PF	PF
PERMANENT SEEDING	PS	PS
REINFORCED CONCRETE DAM	RCD	
ROUGH CUT STREET CONTROL	RCS	
SEDIMENT BASIN	SB	
STRAW BALE BARRIER	SBB	
SILT FENCE	SF	
SURFACE ROUGHENING	SR	SR

DESIGN STANDARDS	STANDARD DRAWING
MAP SYMBOLS	EC2
	DATE: 8/15/14

TITLE	KEY	SYMBOL
STABILIZED STAGING AREA	SSA	
SEDIMENT TRAP	ST	
SEDIMENT LOG	SCL	
TERRACING	TER	
TEMPORARY SEEDING	TS	TS
TEMPORARY STREAM CROSSING CULVERT/BRIDGE TYPE	TSC C	
TEMPORARY STREAM CROSSING FORD TYPE	TSC F	
TEMPORARY SLOPE DRAIN	TSD	SD
VEHICLE TRACKING CONTROL	VTC	
VEHICLE TRACKING CONTROL WITH WASH RACK	WR	WR

DESIGN STANDARDS	STANDARD DRAWING
MAP SYMBOLS	EC3
	DATE: 8/15/14

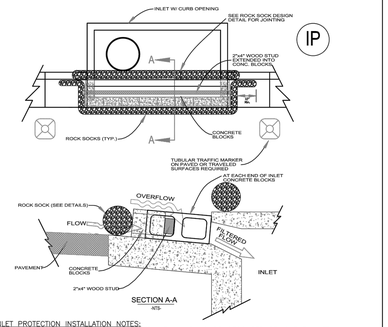


NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES AS DIRECTED BY THE CITY

EROSION LOG AND BLANKET BARRIER

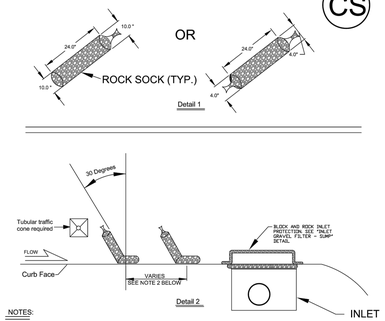
RESIDENTIAL INSTALLATION

DESIGN STANDARDS	STANDARD DRAWING
SINGLE FAMILY EROSION CONTROL PLAN	EC4
	DATE: 8/15/14



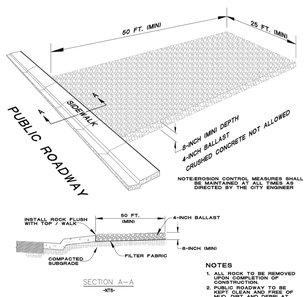
INLET PROTECTION INSTALLATION NOTES:
1. INLET PROTECTION SHALL BE INSTALLED WITHIN 48 HOURS OFCONSTRUCTING THE INLET.
2. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
3. CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW ABUTTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.
4. GRAVEL SOCKS SHALL BE PLACED AROUND THE CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINTED IN ACCORDANCE WITH THE ROCK SOCK DESIGN DETAIL.

DESIGN STANDARDS	STANDARD DRAWING
INLET GRAVEL FILTER - SUMP	EC5
	DATE: 8/15/14



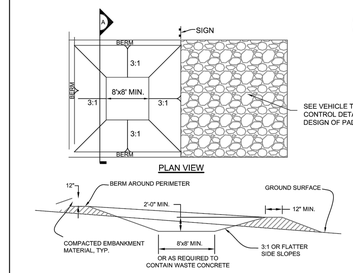
NOTES:
1) SOCKS WILL BE USED UPGRADIENT OF THE INLET AND FLUSH WITH THE CURB.
2) NO LESS THAN TWO 10 INCH DIAMETER SOCKS MUST BE USED IN SEQUENCE, SPACED NO MORE THAN FIVE FEET APART; NO LESS THAN SIX SOCKS SHALL BE USED IF THE 4 INCH SOCK IS USED, ALSO SPACED AT NO MORE THAN 5 FEET APART.
3) ALIGN AT 30 DEGREES FROM PERPENDICULAR, OPPOSITE THE DIRECTION OF FLOW (SEE DETAIL 2.
4) EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES AS DIRECTED BY THE CITY.

DESIGN STANDARDS	STANDARD DRAWING
ON GRADE INLET PROTECTION	EC 6
	DATE: 8/15/14



NOTES
1. ALL ROCK TO BE REMOVED UPON COMPLETION OF CONSTRUCTION.
2. PUBLIC ROADWAY TO BE KEPT CLEAN AND FREE OF MUD, SOIL AND DEBRI AT ALL TIMES.

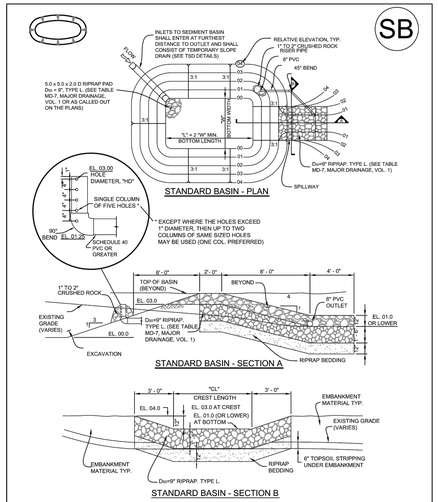
DESIGN STANDARDS	STANDARD DRAWING
VEHICLE TRACKING PAD	EC 8
	DATE: 8/15/14



CONCRETE WASHOUT AREA INSTALLATION NOTES
1. SEE PLAN VIEW FOR LOCATIONS OF CONCRETE WASHOUT AREA.
2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
3. VEHICLE TRACKING CONTROL IS REQUIRED AT THE ACCESS POINT.
4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT ARE TO OPERATORS OF CONCRETE TROUYKS AND PUMP RIGS.

CONCRETE WASHOUT AREA MAINTENANCE NOTES
1. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
2. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AND APPROVED WASTE SITE.
3. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, DRILL SEED AND CRIMP MULCH, OR OTHERWISE STABILIZE IN A MANNER APPROVED BY THE CITY.
4. INSPECT WEEKLY, DURING AND AFTER ANY STORM EVENT.
5. PORTABLE ROLLOFF TYPE OF CONCRETE WASHOUT FACILITIES WILL ALSO BE ALLOWED.

DESIGN STANDARDS	STANDARD DRAWING
CONCRETE WASHOUT AREA	EC 9
	DATE: 8/15/14


SB
INLETS TO SEDIMENT BASIN SHALL ENTER AT FURTHEST DISTANCE TO OUTLET AND SHALL CONSIST OF TEMPORARY SLOPE DRAIN (SEE TSD DETAIL 5)
FLOW ENTRY
RELATIVE ELEVATION, TYP. 6" (TYP.) COMPACTED ROCK INSIDE PIPE
6" PVC
45° BEND
5.0 x 5.0 x 2.0 D RIPRAP PAD Do = 9", TYPE L, (SEE TABLE MD-7, MAJOR DRAINAGE, VOL. 1, OR AS CALLED OUT ON THE PLANS)
3:1
TOP WIDTH
BOTTOM WIDTH
3:1
3:1
3:1

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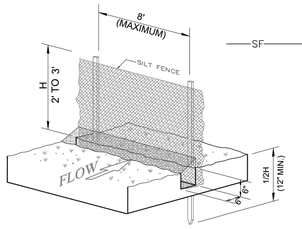
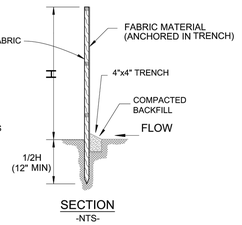


SILT FENCE INSTALLATION
-NTS-



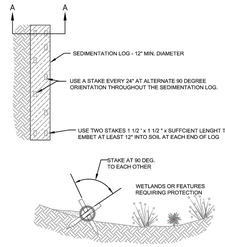
NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL LANDSCAPING IS COMPLETED, OR AS DIRECTED BY THE CITY

SECTION
-NTS-

CITY OF Fort Lupton EST. 1890 COME PAINT YOUR FUTURE WITH US

DESIGN STANDARDS	STANDARD DRAWING
SILT FENCE	EC 15
	DATE: 8/15/14

SCL



SECTION A - A

SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF SEDIMENT CONTROL LOG.
2. SEDIMENT CONTROL LOGS INDICATED ON INITIAL SWMP PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR, OR COCONUT FIBER.
4. NOT FOR USE IN CONCENTRATED FLOW AREAS.
5. THE SEDIMENT CONTROL LOG SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 2".

SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT SEDIMENT CONTROL LOGS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOGS SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE CREST OF LOG.
3. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE COVERED WITH TOP SOIL, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

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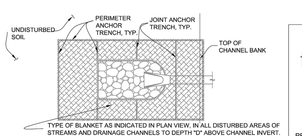
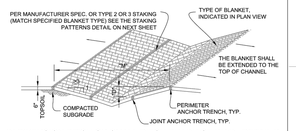
DESIGN STANDARDS	STANDARD DRAWING
SEDIMENT CONTROL LOGS	EC 16
	DATE: 8/15/14

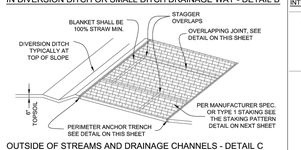
ECB



AT PIPE OUTLET AREAS OF STREAMS AND DRAINAGE CHANNELS - DETAIL A

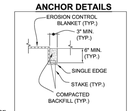


IN DIVERSION DITCH OR SMALL DITCH DRAINAGE WAY - DETAIL B

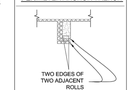


OUTSIDE OF STREAMS AND DRAINAGE CHANNELS - DETAIL C

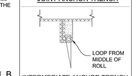
ANCHOR DETAILS



PERIMETER ANCHOR TRENCH



JOINT ANCHOR TRENCH



INTERMEDIATE ANCHOR TRENCH

OVERLAPPING JOINT

WOOD STAKE DETAIL
(WOOD WICKET OR USE 2x4 MATERIAL FOR STAKES

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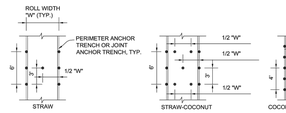
DESIGN STANDARDS	STANDARD DRAWING
EROSION BLANKET DETAILS	EC 17
	DATE: 8/15/14

ECB



STAKING PATTERNS

SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. IF NO MANUFACTURER'S SPECIFICATION IS AVAILABLE USE THE ACCEPTABLE STAKING PATTERN (AS SHOWN ABOVE)

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
   - TYPE OF BLANKET (STRAW, STRAW-COCONUT, COCONUT, OR EXCELSIOR).
   - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL; NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE DEVELOPER SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE. NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKETS EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.
9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEEDED AND MULCHED.
10. DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM ONES SHOWN HERE

TABLE 7.1 - EROSION CONTROL BLANKET TYPE

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	NETTING MIN.
STRAW*		100%	-	DOUBLE/NATURAL
STRAW-COCONUT*	30% MIN.	70% MAX.	-	DOUBLE/NATURAL
COCONUT*	100%		-	DOUBLE/NATURAL
EXCELSIOR			100%	DOUBLE/NATURAL

* FOR OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

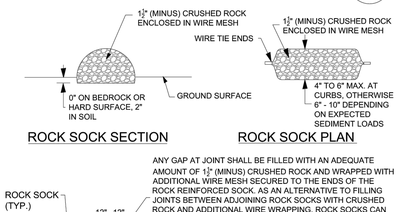
EROSION CONTROL BLANKET MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT EROSION CONTROL BLANKETS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS DIRECTED TO BE REMOVED BY THE CITY.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

CITY OF Fort Lupton EST. 1890 COME PAINT YOUR FUTURE WITH US

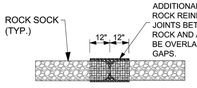
DESIGN STANDARDS	STANDARD DRAWING
EROSION BLANKET INSTALLATION AND MAINTENANCE NOTES	EC 18
	DATE: 8/15/14

RS



ROCK SOCK SECTION

ROCK SOCK PLAN



ANY GAP AT JOINT SHALL BE FILLED WITH AN ADEQUATE AMOUNT OF 1½" (MINUS) CRUSHED ROCK AND WRAPPED WITH ADDITIONAL WIRE MESH SECURED TO THE ENDS OF THE ROCK REINFORCED SOCK. AS AN ALTERNATIVE TO FILLING JOINTS BETWEEN ADJOINING ROCK SOCKS WITH CRUSHED ROCK AND ADDITIONAL WIRE WRAPPING, ROCK SOCKS CAN BE OVERLAPPED (TYPICALLY 12 - INCH OVERLAP) TO AVOID GAPS.

ROCK SOCK JOINTING

GRADATION TABLE	
SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	NO. 4
2"	100
11/2"	90 - 100
1"	20 - 55
3/4"	0 - 15
3/8"	0 - 5
MATCHES SPECIFICATIONS FOR NO. 4 COARSE AGGREGATE FOR CONCRETE PER AASHTO M43. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.	

ROCK SOCK INSTALLATION NOTES

1. SEE PLAN VIEW FORLOCATION OF ROCK SOCKS.
2. CRUSHED ROCK SHALL BE 11/2 " (MINUS) IN SIZE WITH A FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON THIS SHEET (11/2" MINUS).
3. WIRE MESH SHALL BE FABRICATED OD 10 GAGE POULTRY MESH OR EQUIVALENT WITH A MAXIMUM OPENING OF 1/2", RECOMMENDED MINIMUM ROLL WIDTH OF 48".
4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6" CENTERS ALONG ALL JOINTS AND AT 2" CENTERS ON ENDS OF SOCKS.

CITY OF Fort Lupton EST. 1890 COME PAINT YOUR FUTURE WITH US

DESIGN STANDARDS	STANDARD DRAWING
ROCK SOCK DETAIL	EC 19
	DATE: 8/15/14

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
GESC PLANS
GESC DETAILS

DATE 6/22/2021

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P.M. DJR
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SHEET NO. 07

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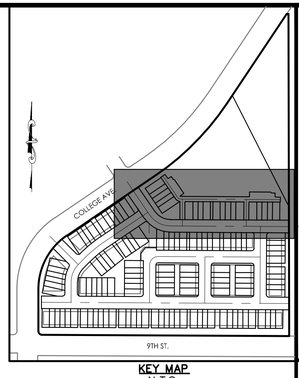

KEY MAP
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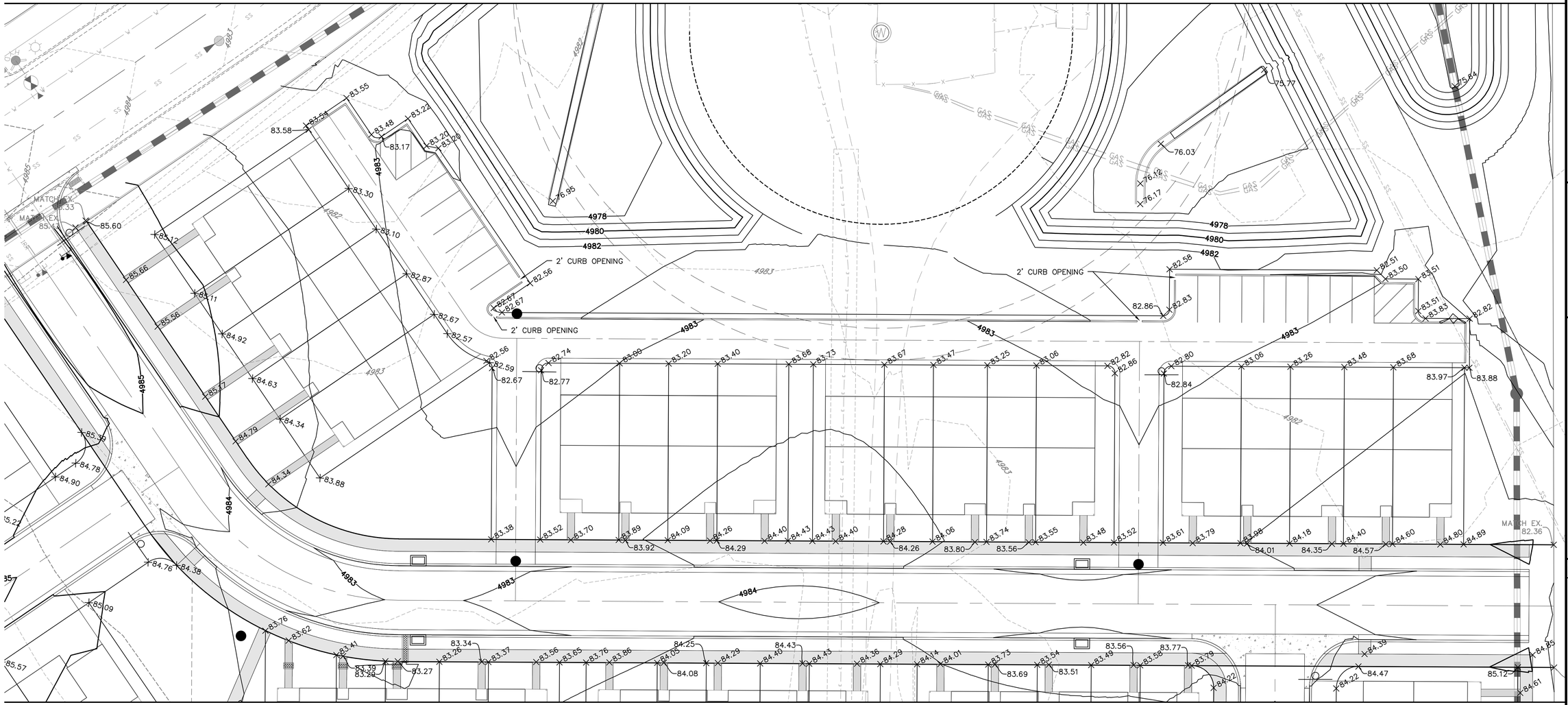
SEE SHEET 12



SEE SHEET 09

SEE SHEET 11

20 0 20 40
(IN FEET)
1 inch = 20 ft.

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PLAN NO.:

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DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

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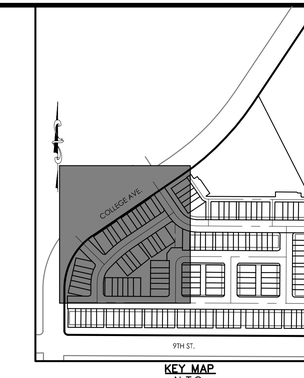

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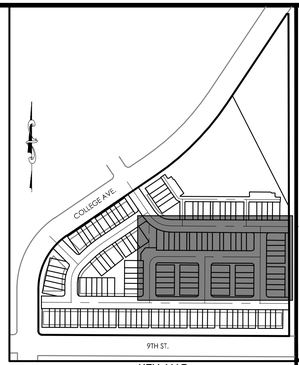

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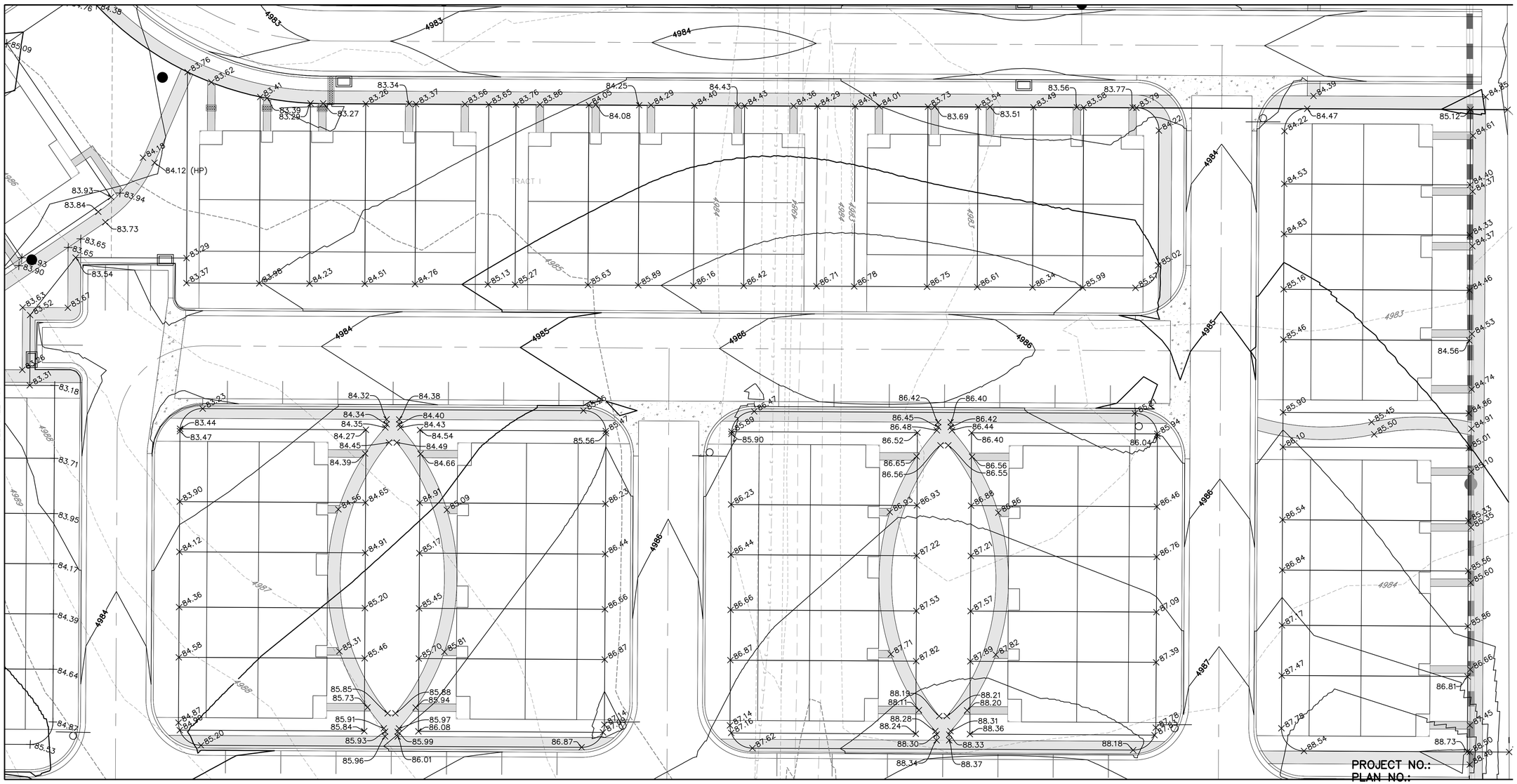

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(IN FEET)
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DETAIL GRADING PLAN

DATE 6/22/2021

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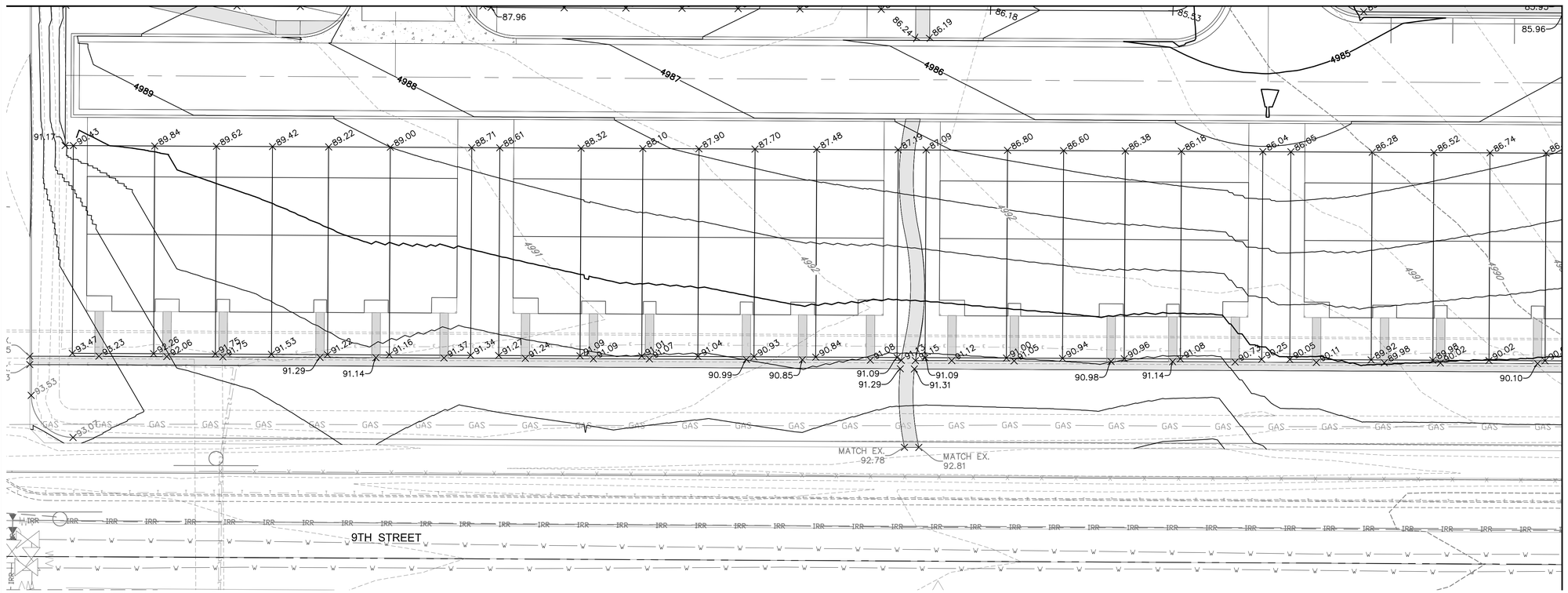

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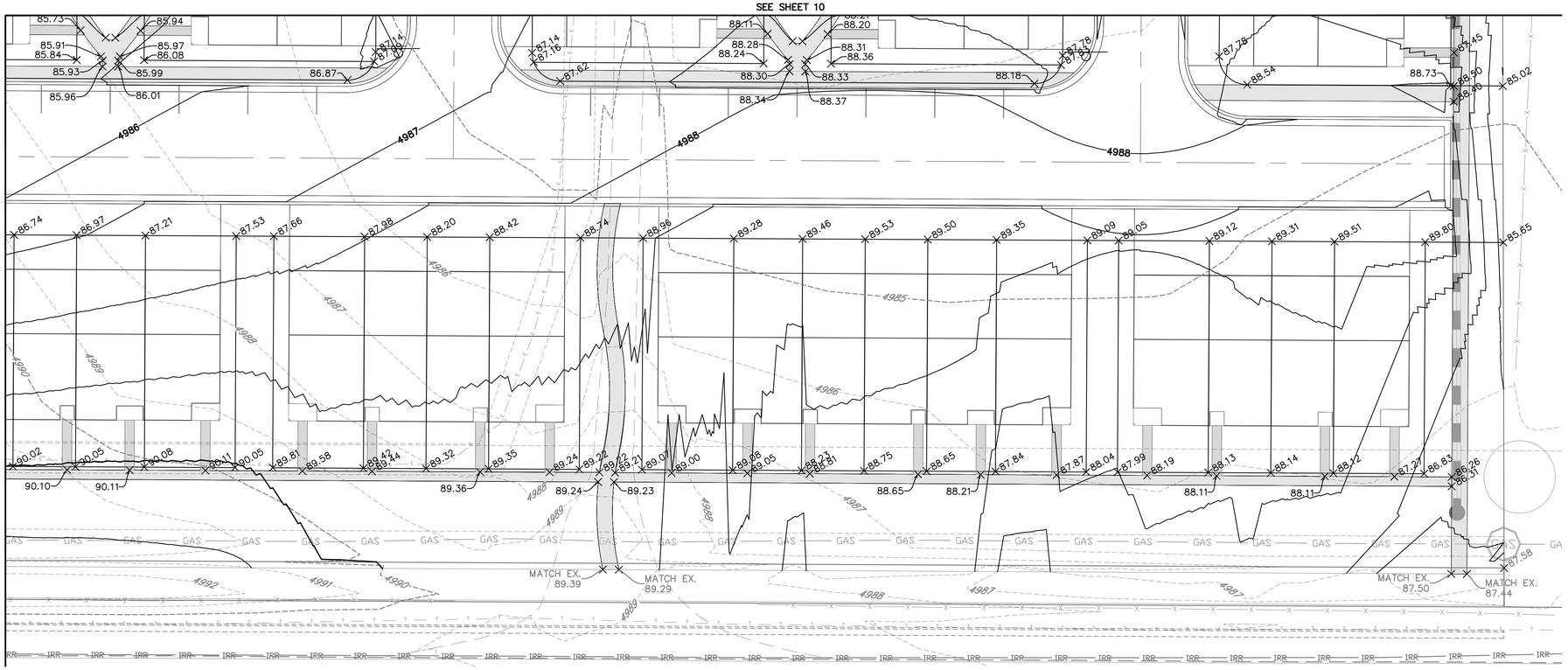

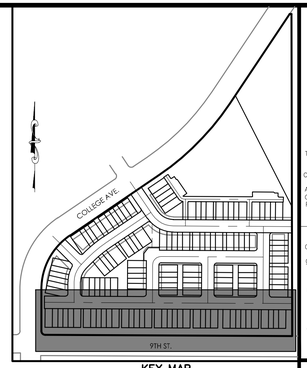

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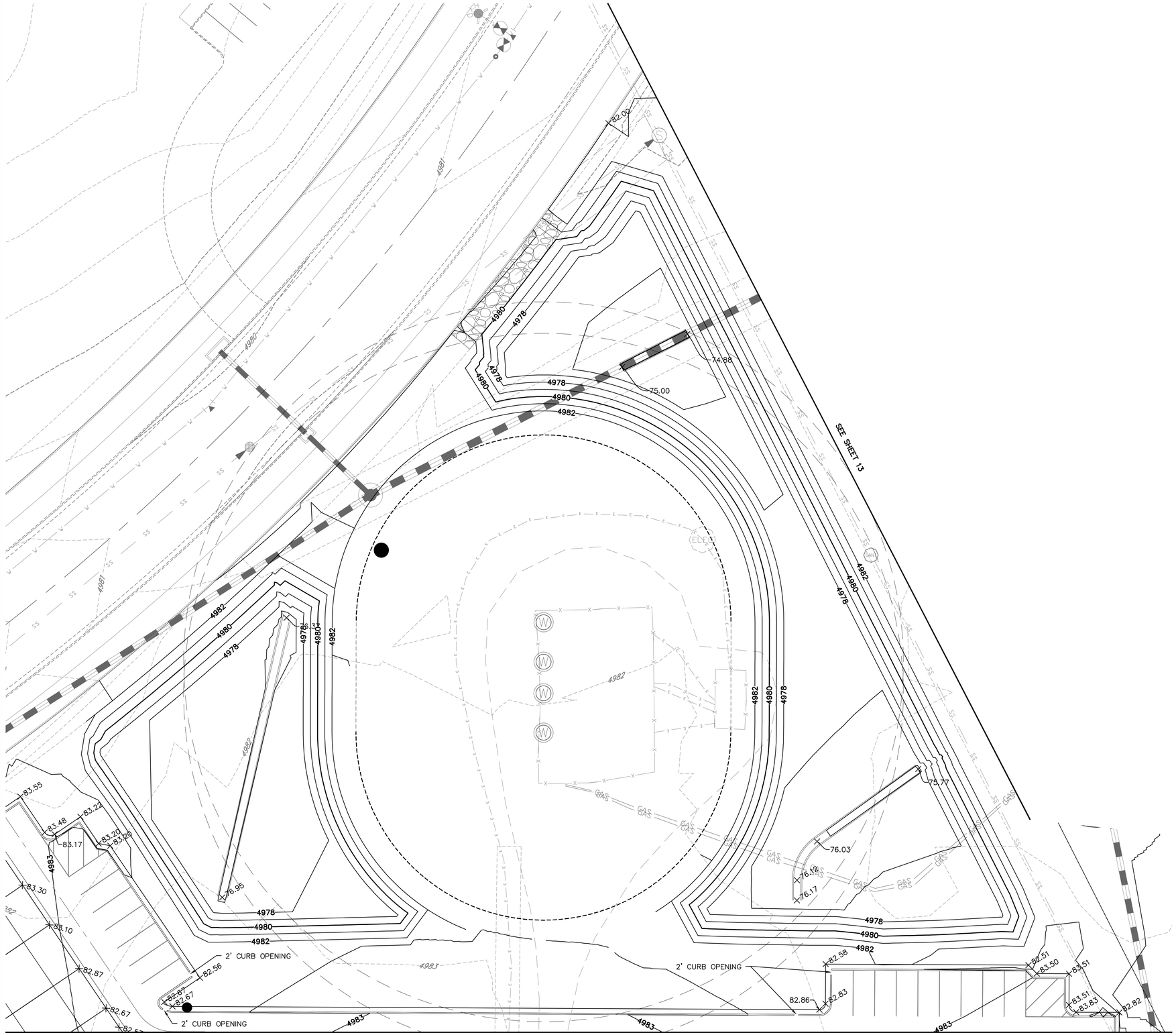

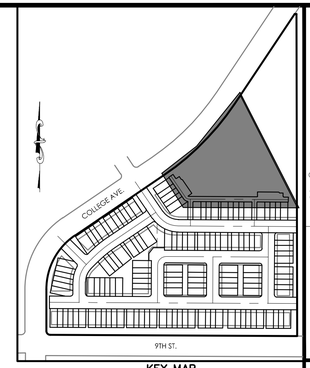

KEY MAP
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20 0 20 40
(IN FEET)
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DETAIL GRADING PLAN

DATE 6/22/2021

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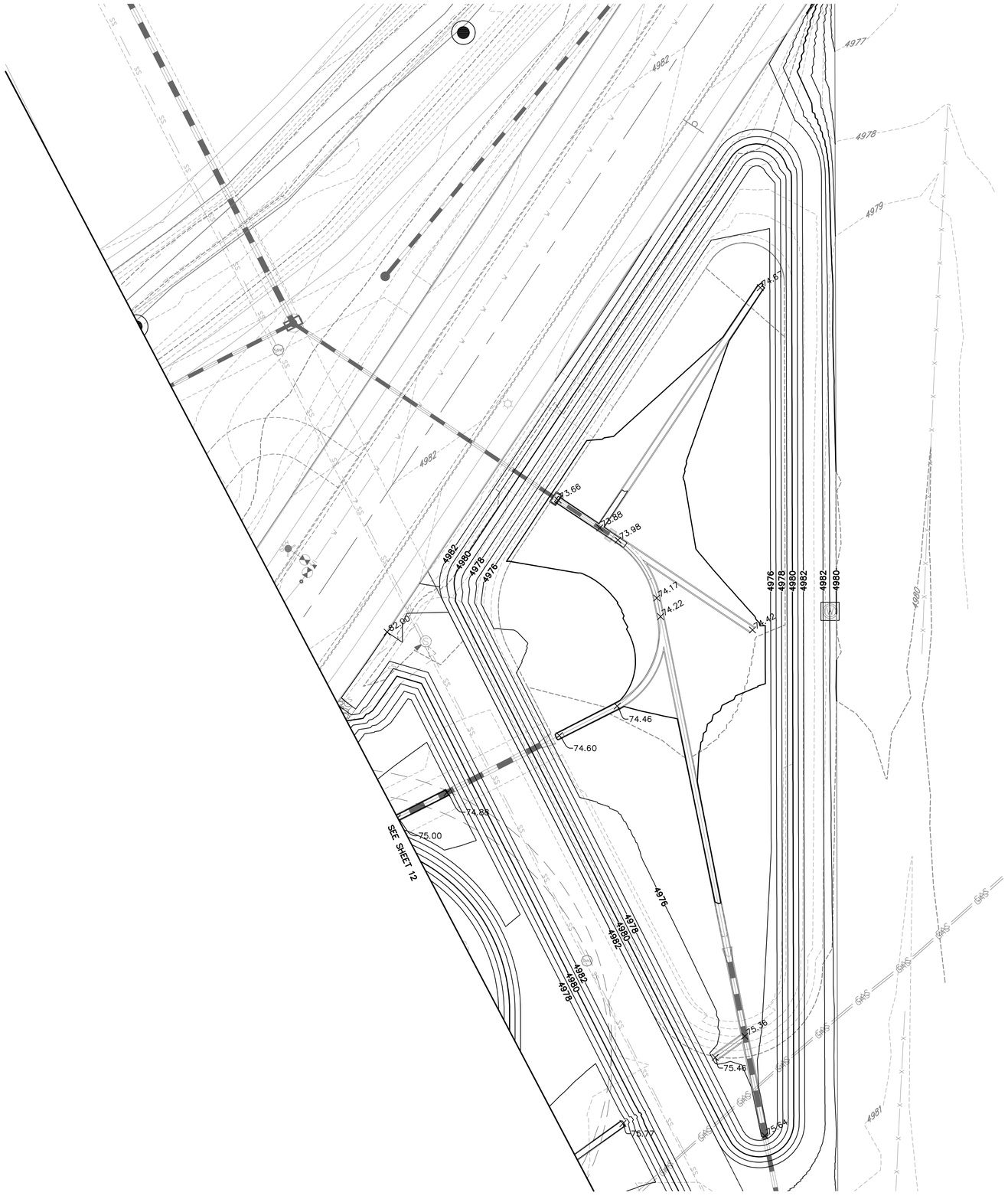

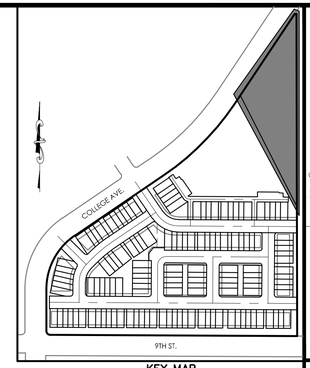

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30 0 30 60
(IN FEET)
1 inch = 30 ft.

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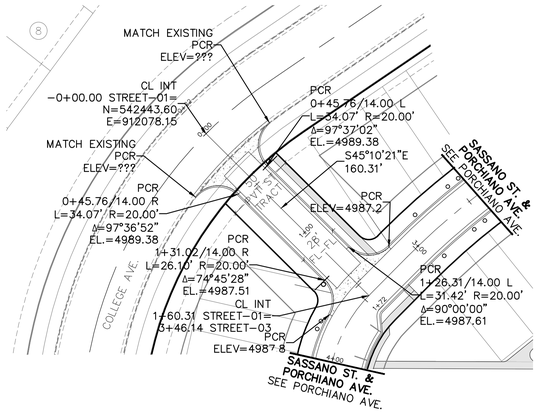

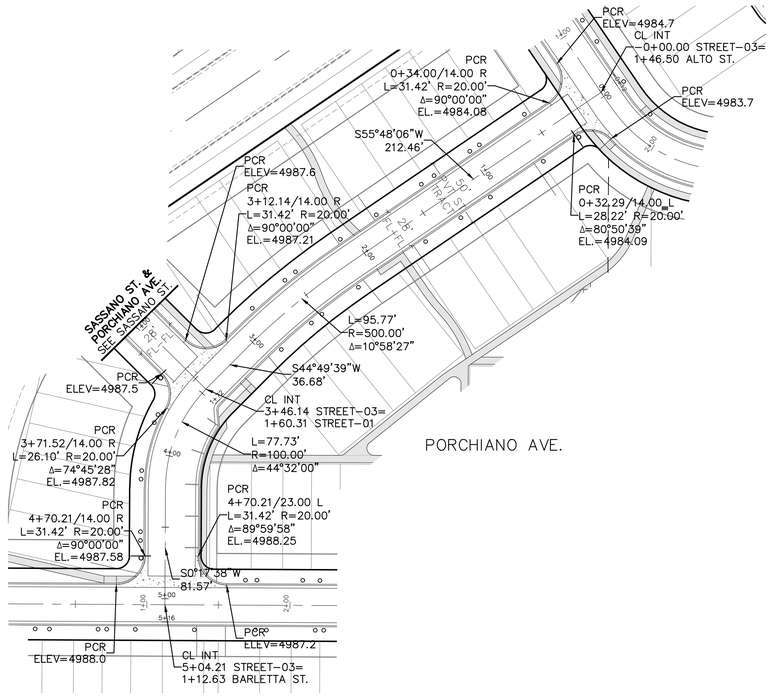

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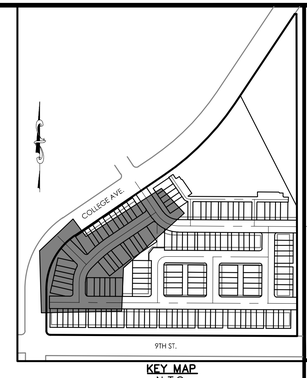

KEY MAP
N.T.S.

(IN FEET)
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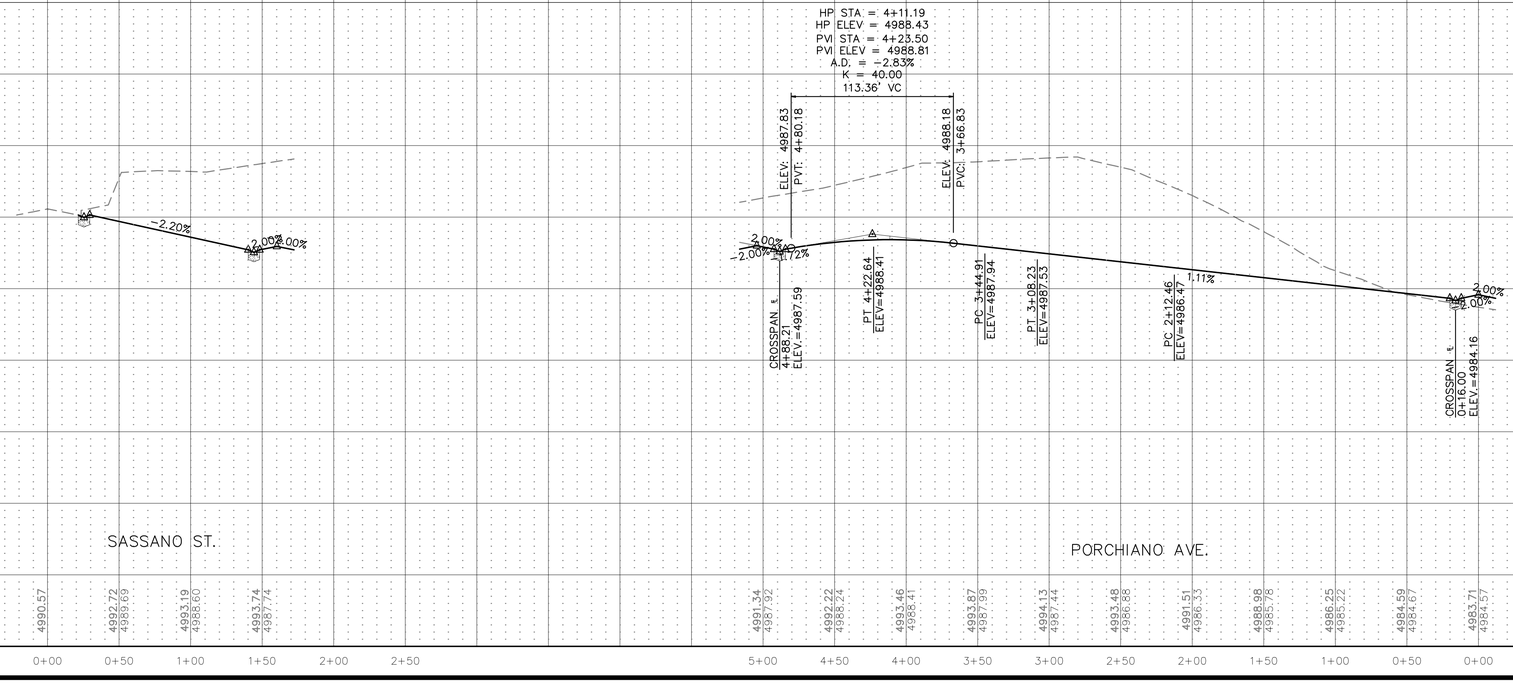
1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)



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STREET PLAN & PROFILE
SASSANO ST. & PORCHIANO AVE.

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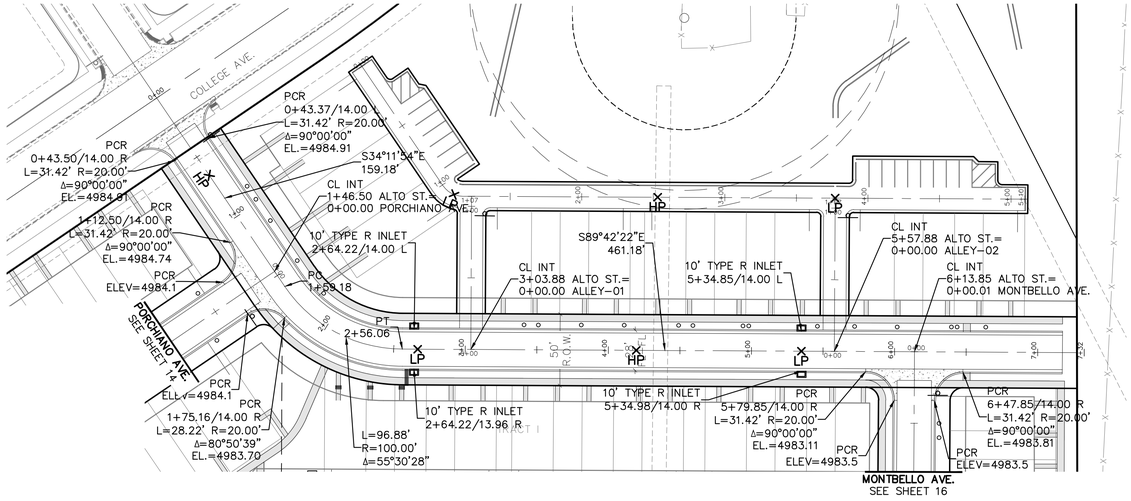

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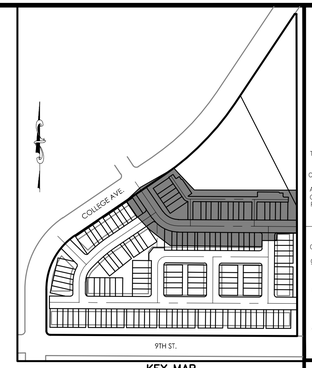

KEY MAP
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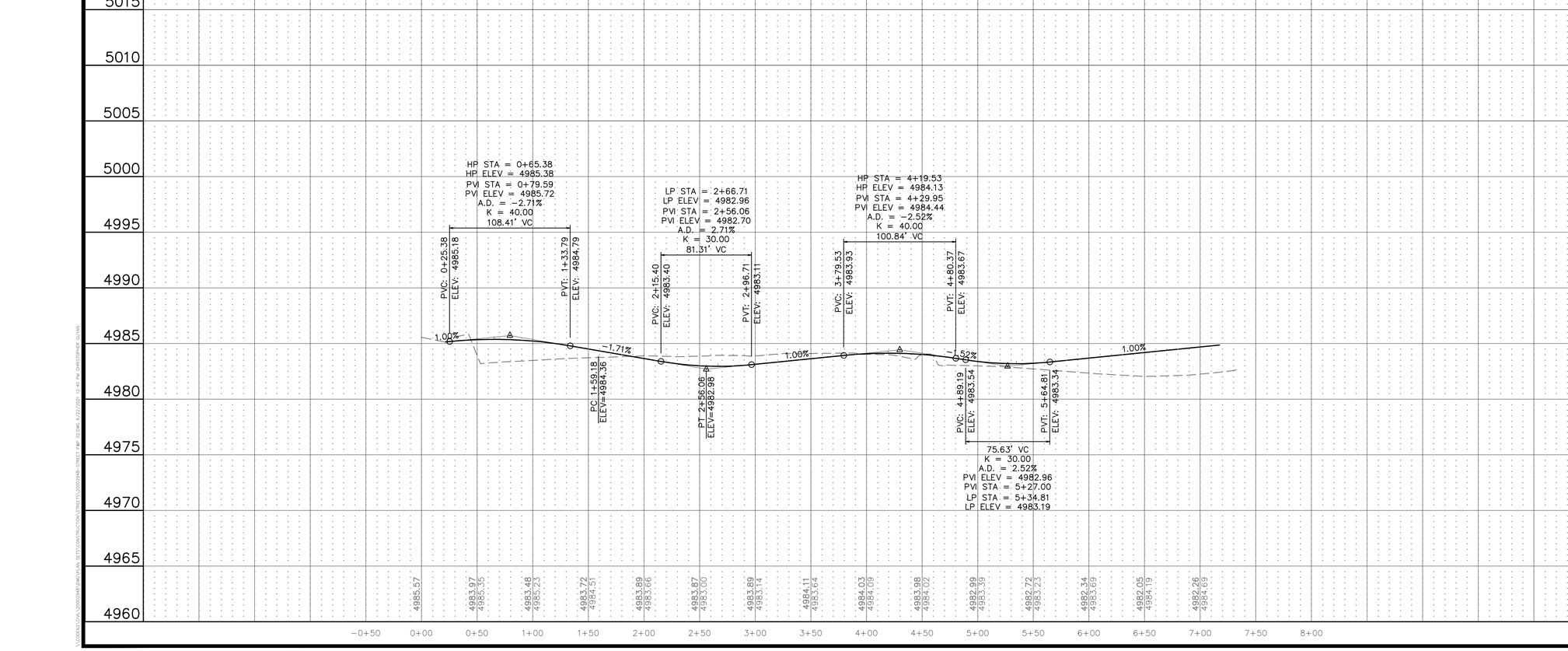

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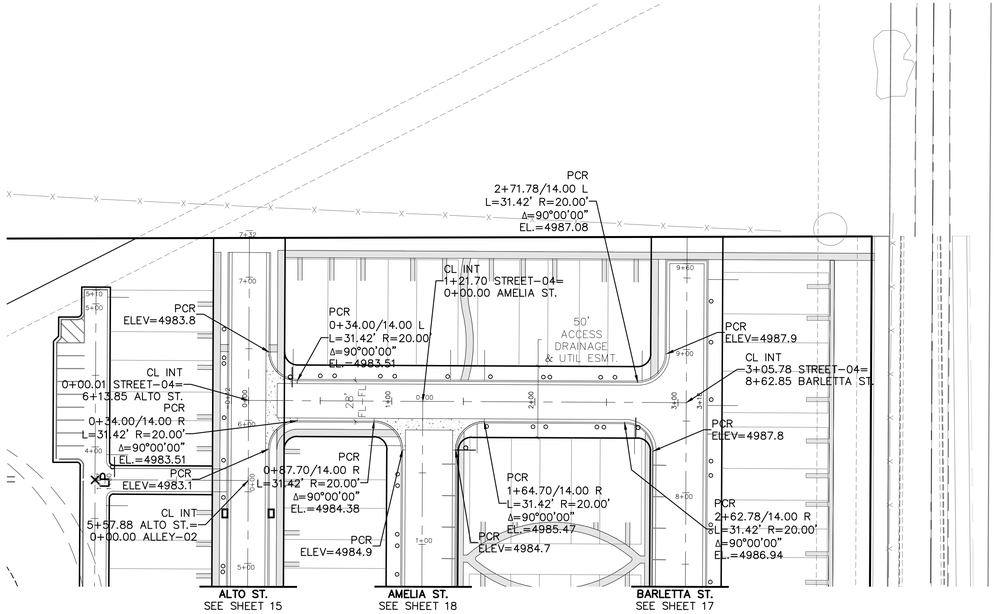

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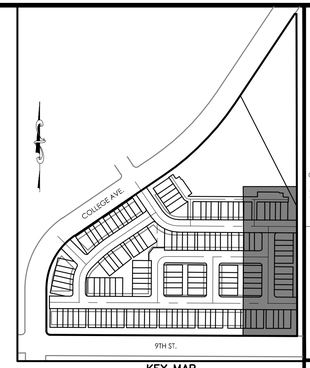

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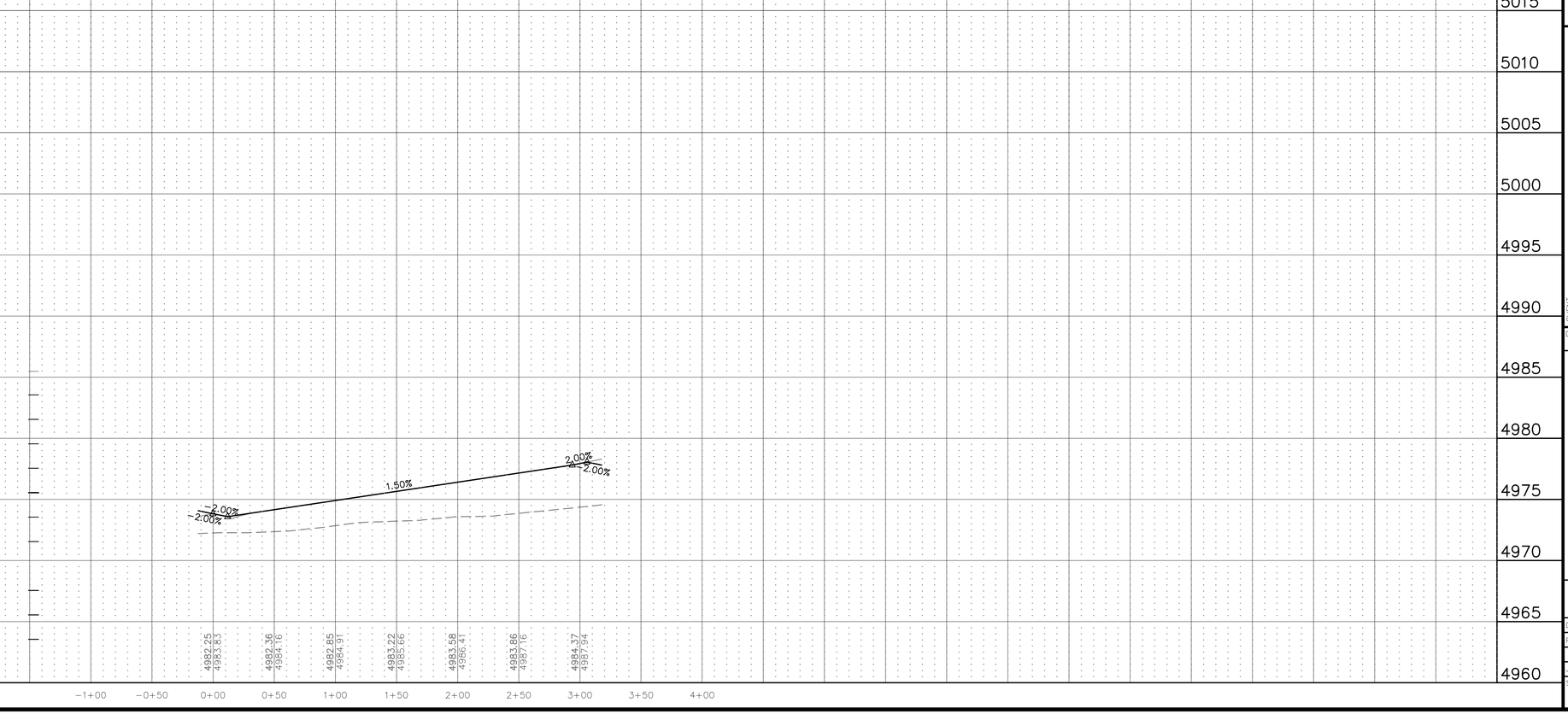

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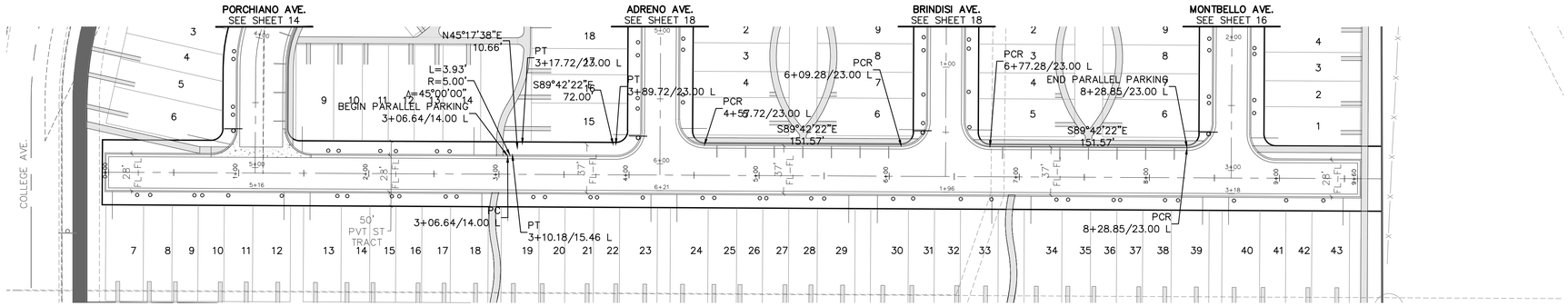

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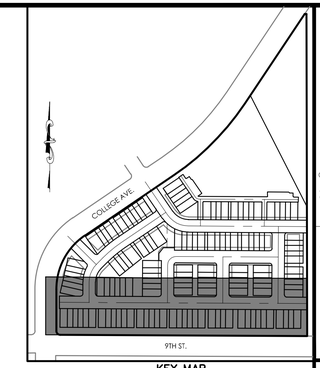

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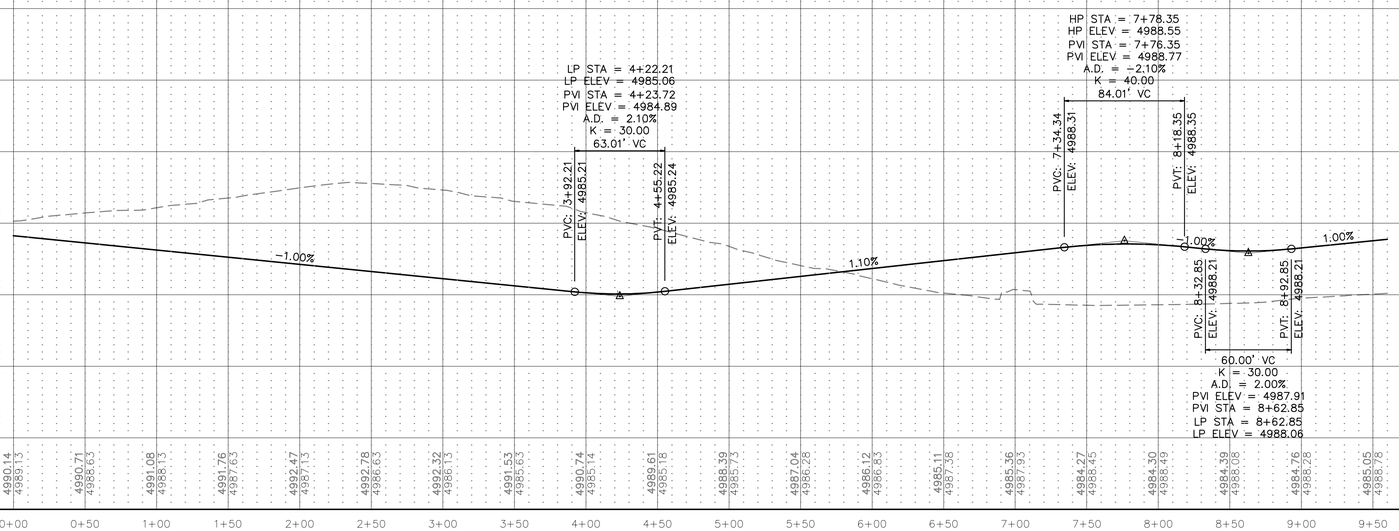

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STREET PLAN & PROFILE
BARLETTA ST.

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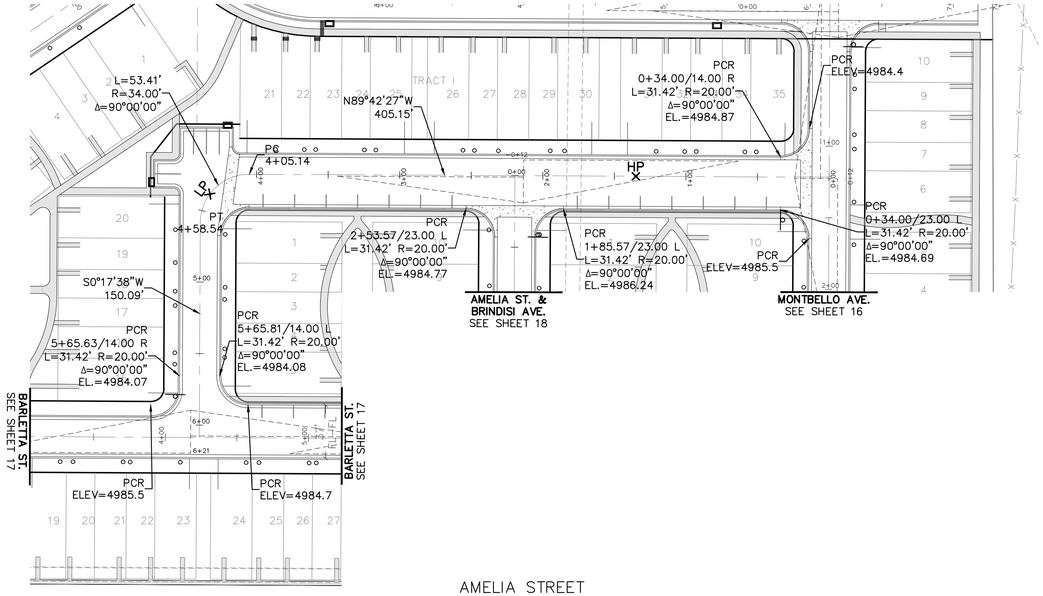
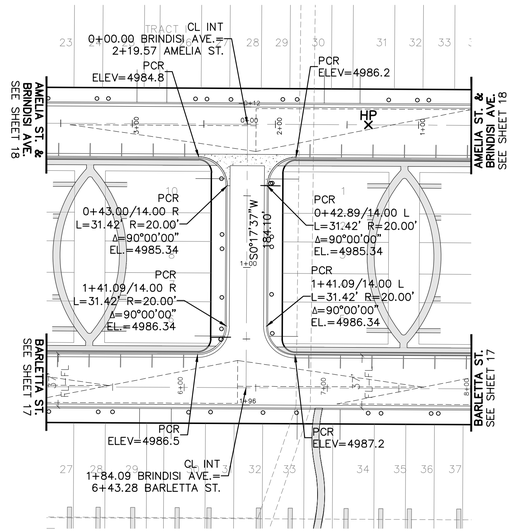
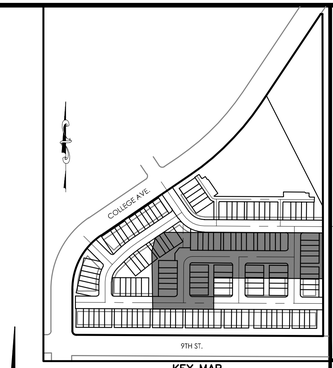


AMELIA STREET



BRINDISI AVENUE

AMELIA ST. & BRINDISI AVE.



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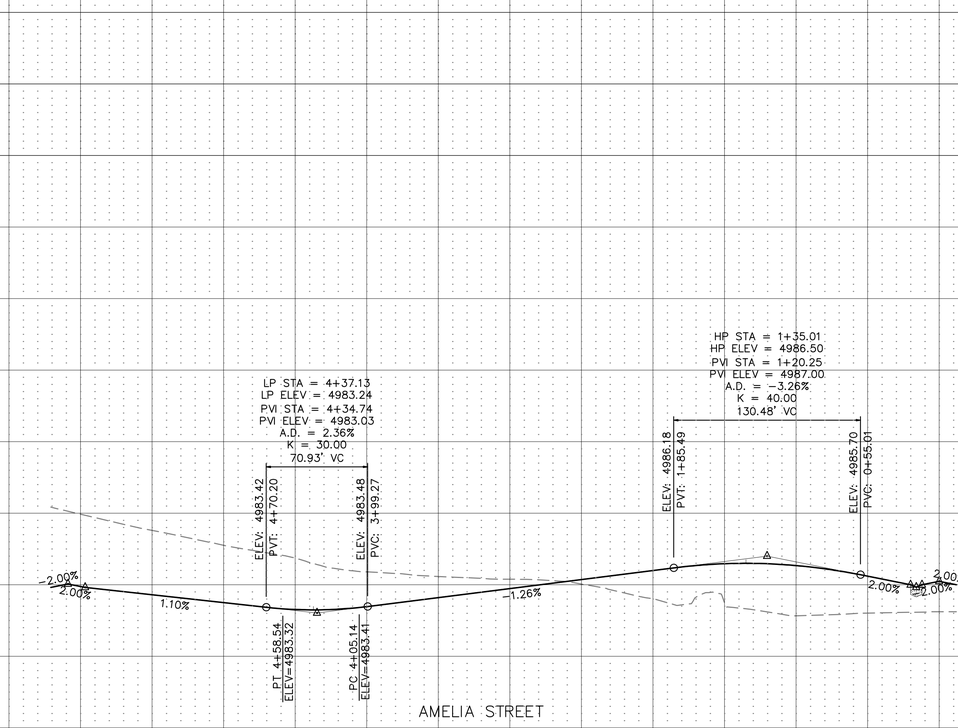

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AMELIA ST. & BRINDISI AVE.

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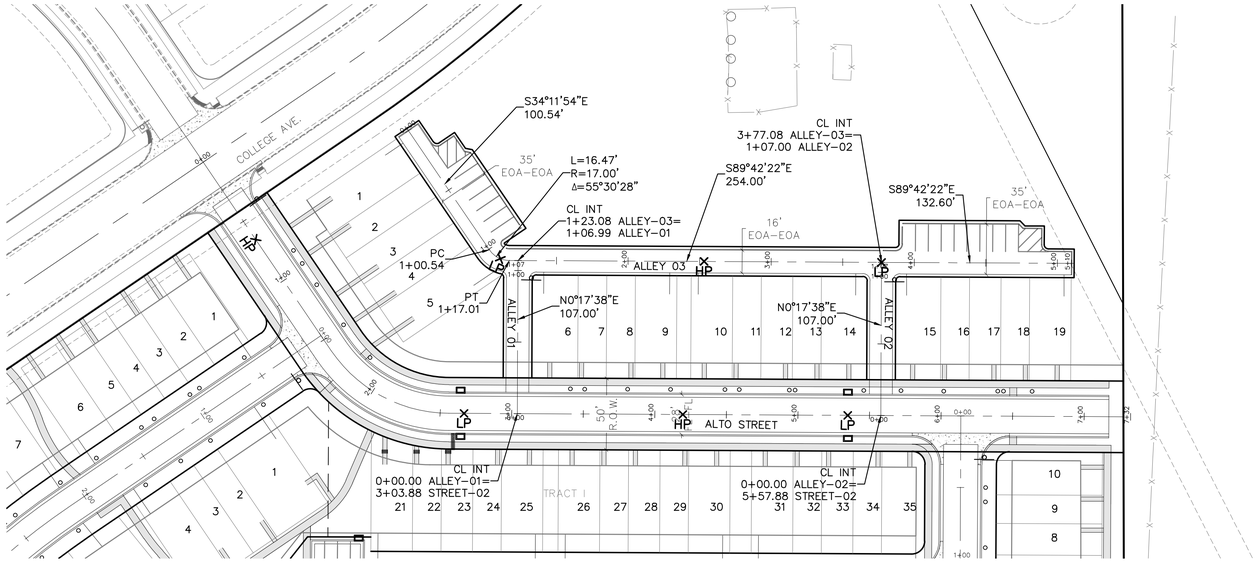

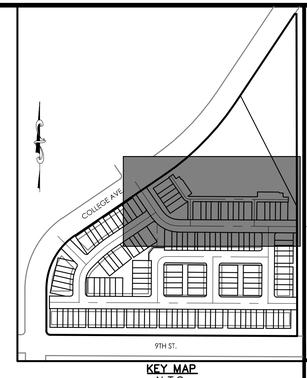

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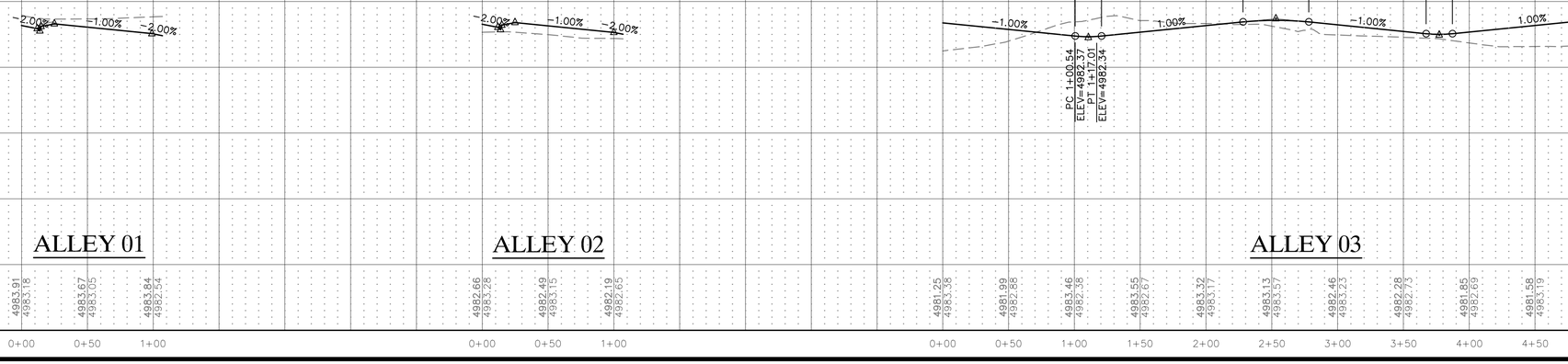

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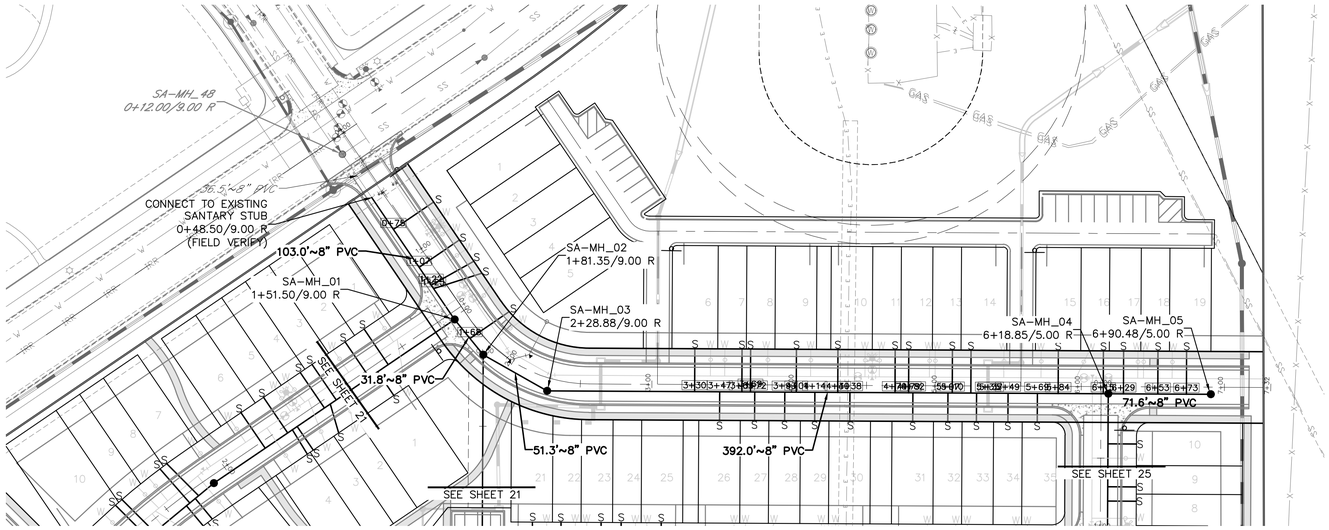

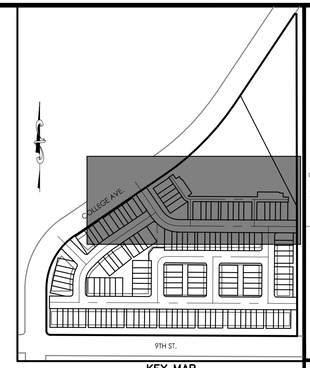

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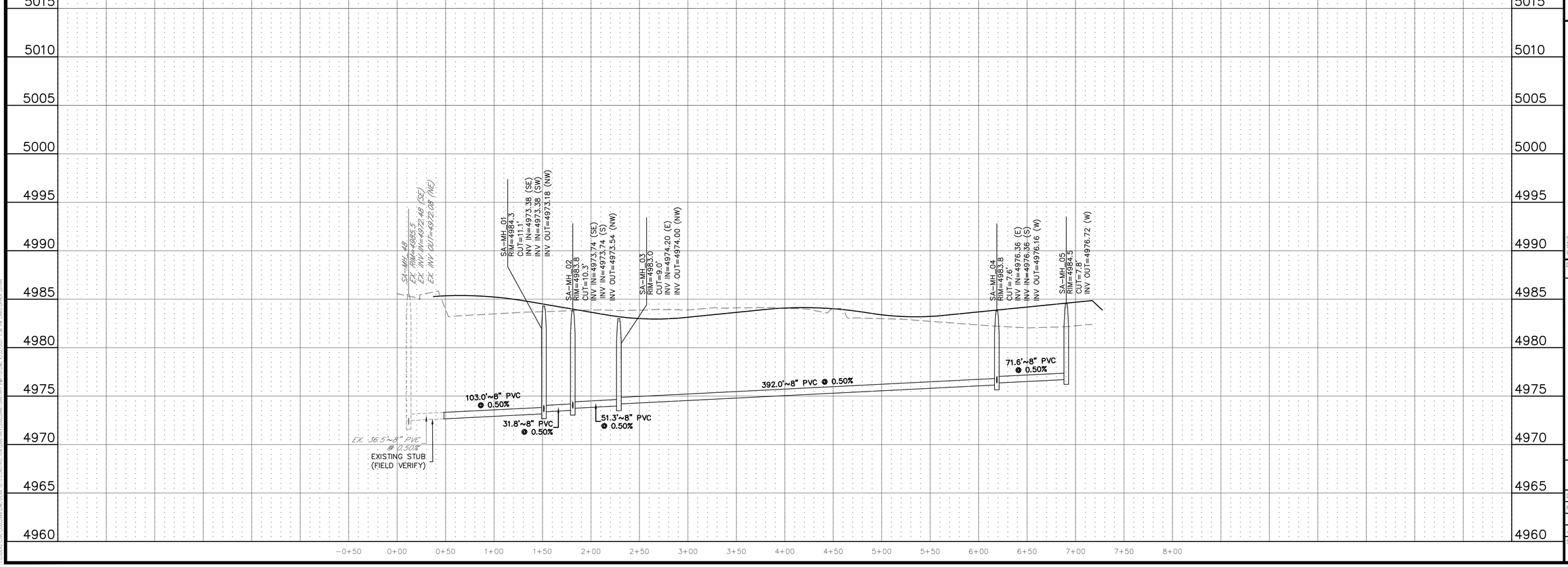

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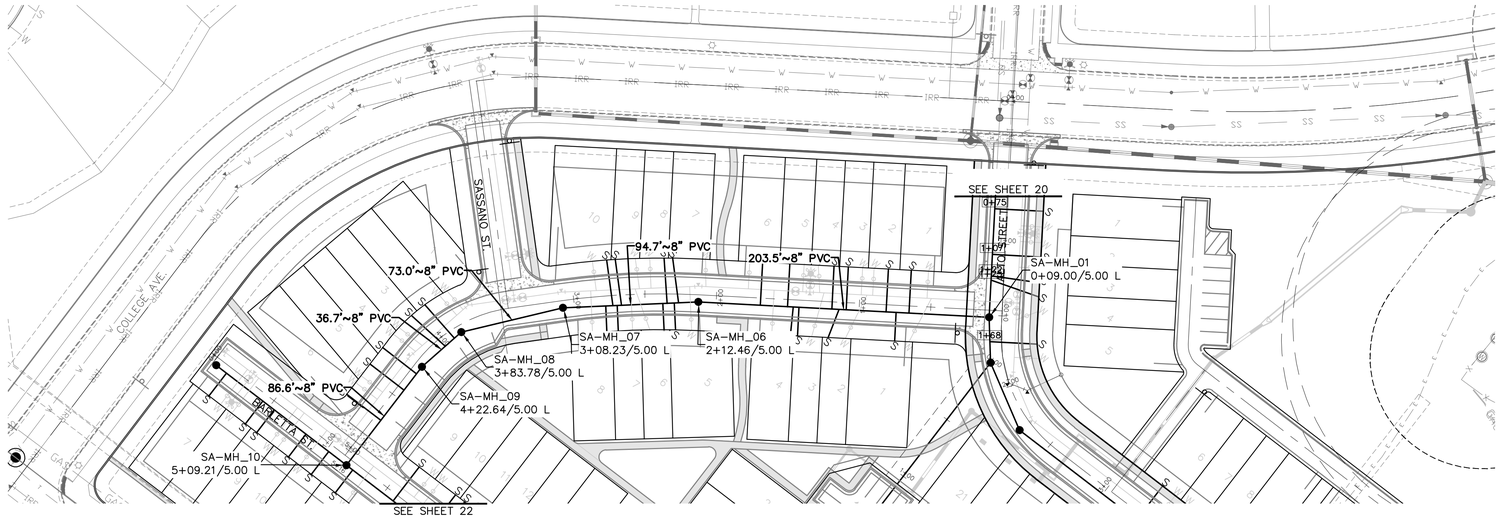

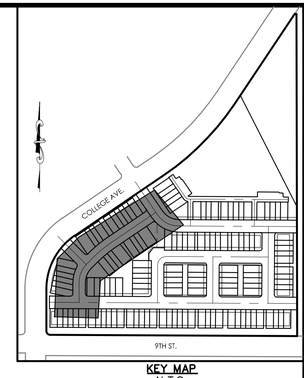

KEY MAP
N.T.S.

50 0 50 100
(IN FEET)
1 inch = 50 ft. (Horz)
1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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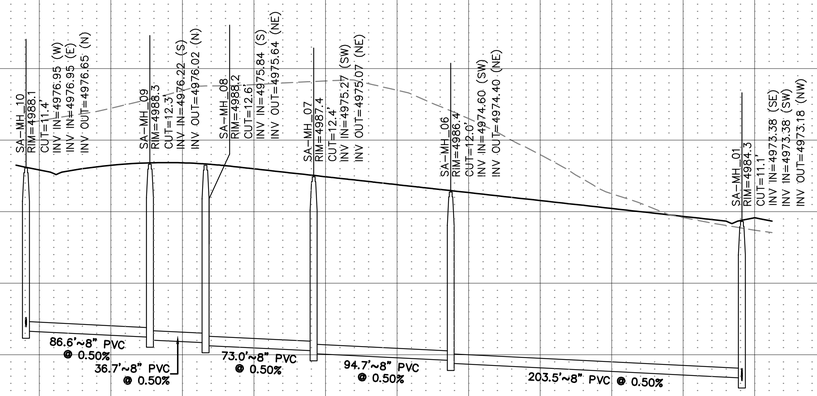
PORCHIANO AVE.



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6+00 5+50 5+00 4+50 4+00 3+50 3+00 2+50 2+00 1+50 1+00 0+50 0+00 -0+50 -1+00

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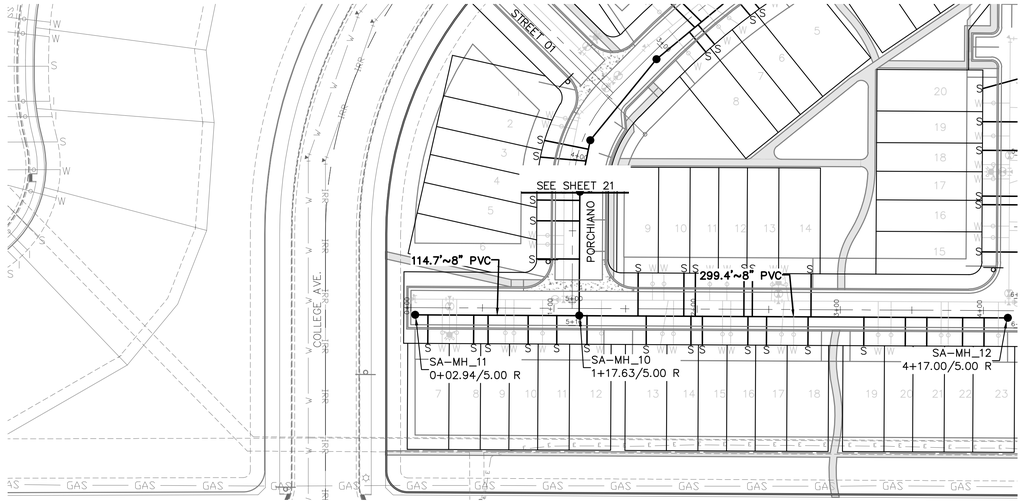
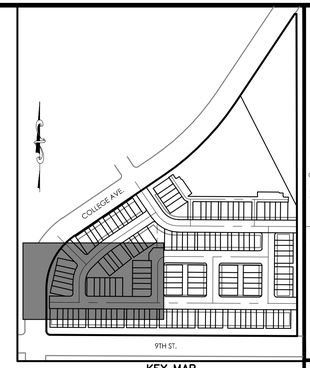


BARLETTA ST.



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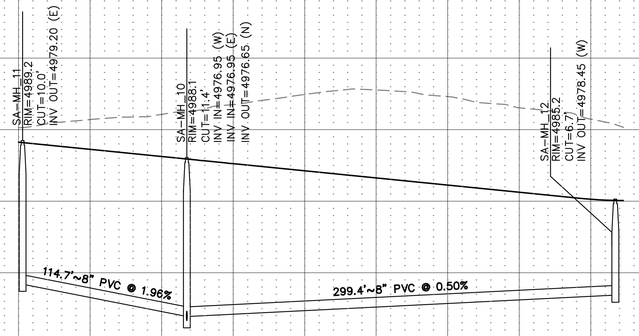

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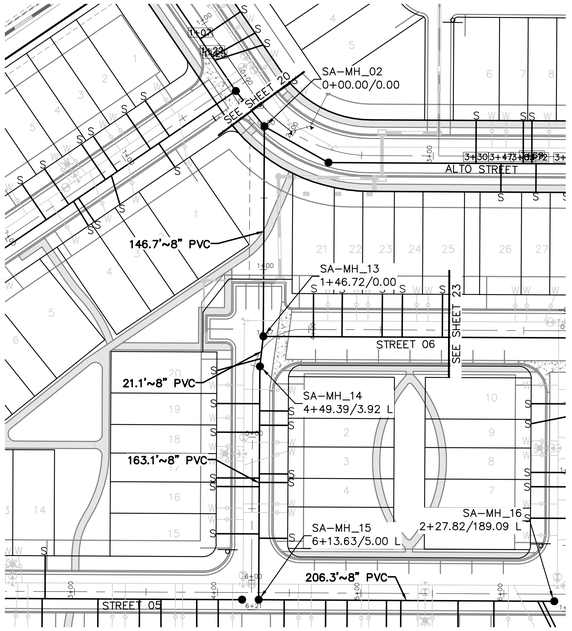
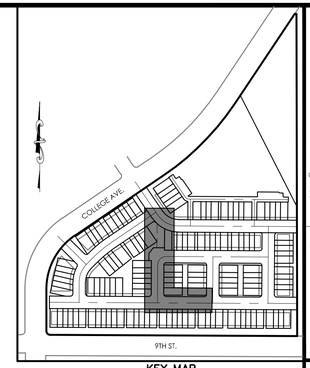


BARLETTA ST. & AMELIA ST.



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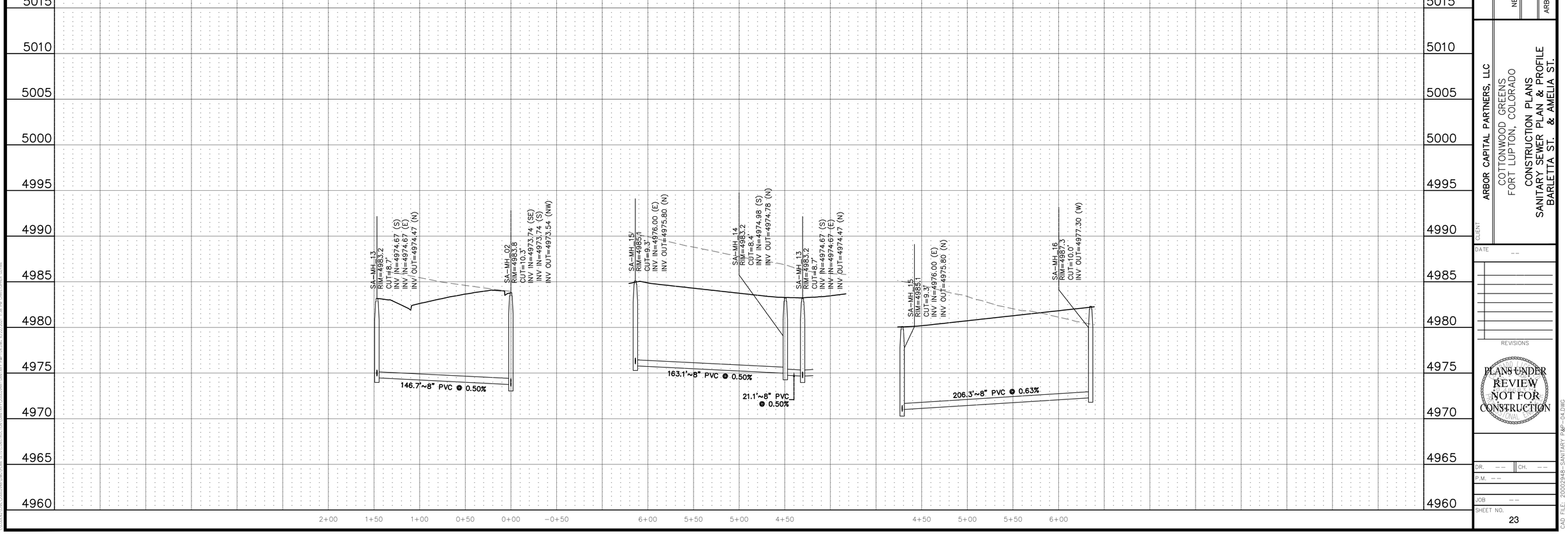

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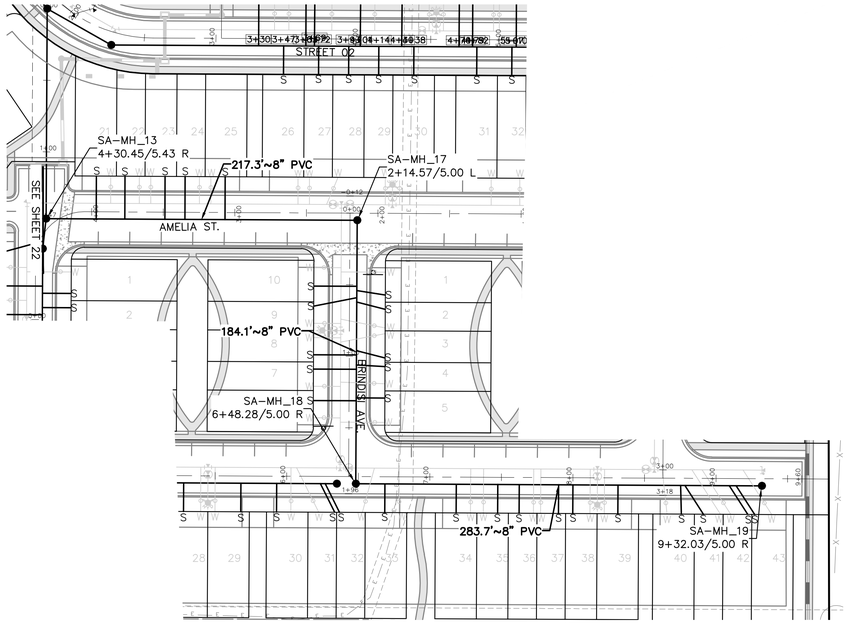
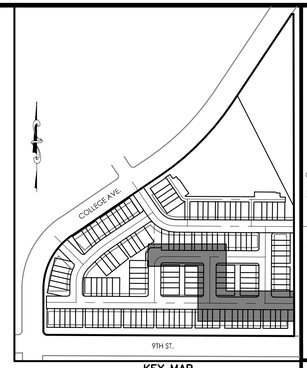


BARLETTA ST., AMELIA ST. & BRINDISI AVE.



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SANITARY SEWER PLAN & PROFILE
BARLETTA ST., AMELIA ST. & BRINDISI AVE.

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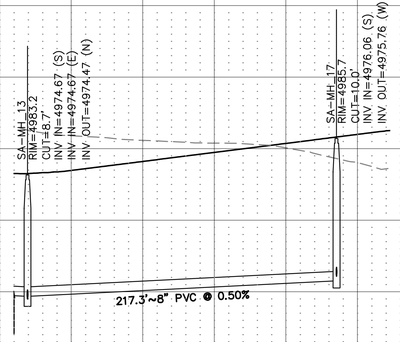

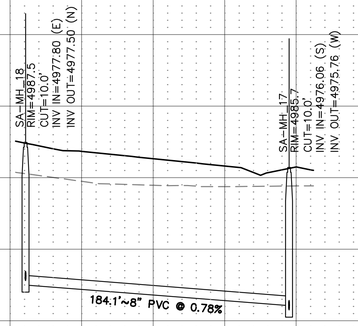

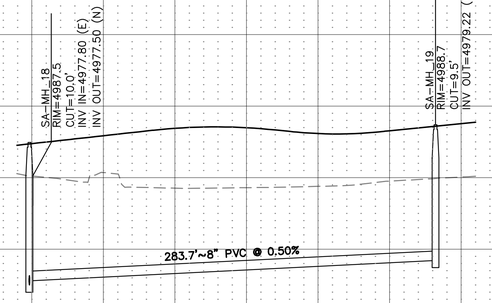

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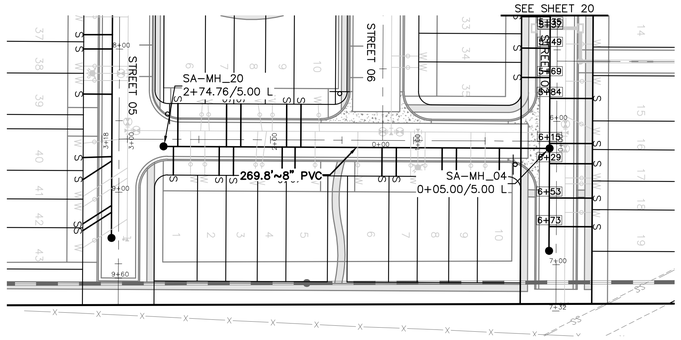
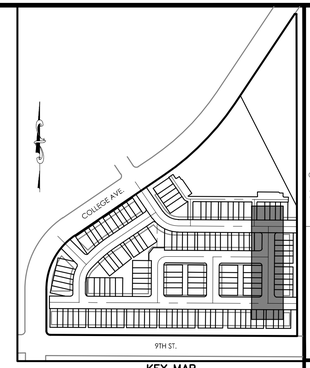


MONTBELLO AVE.



KEY MAP
N.T.S.

50 0 50 100
(IN FEET)
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1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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MONTBELLO AVE.

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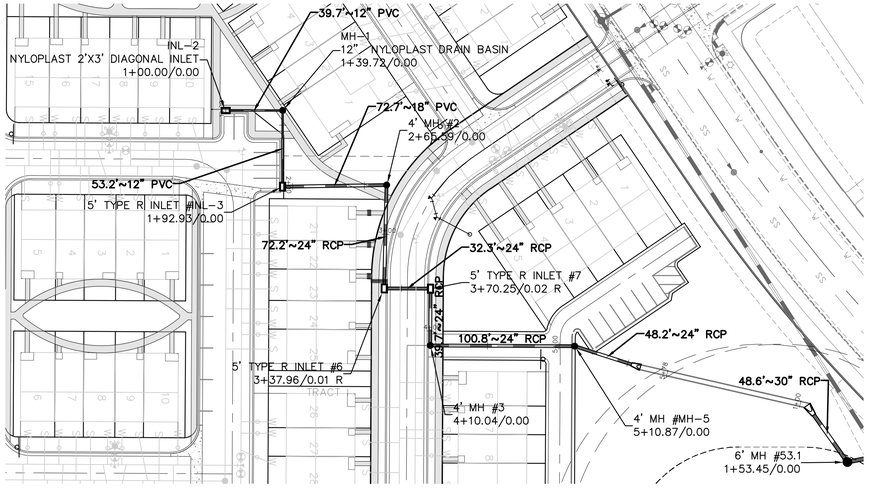

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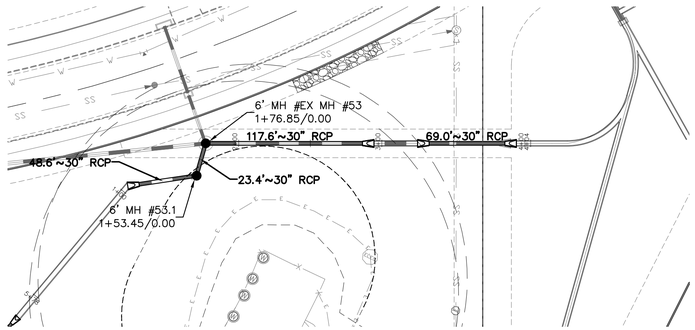

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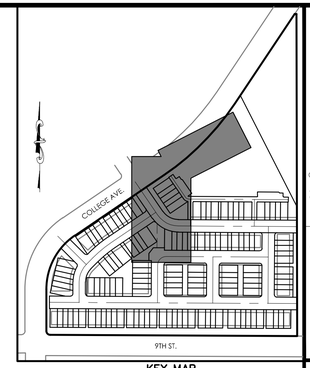

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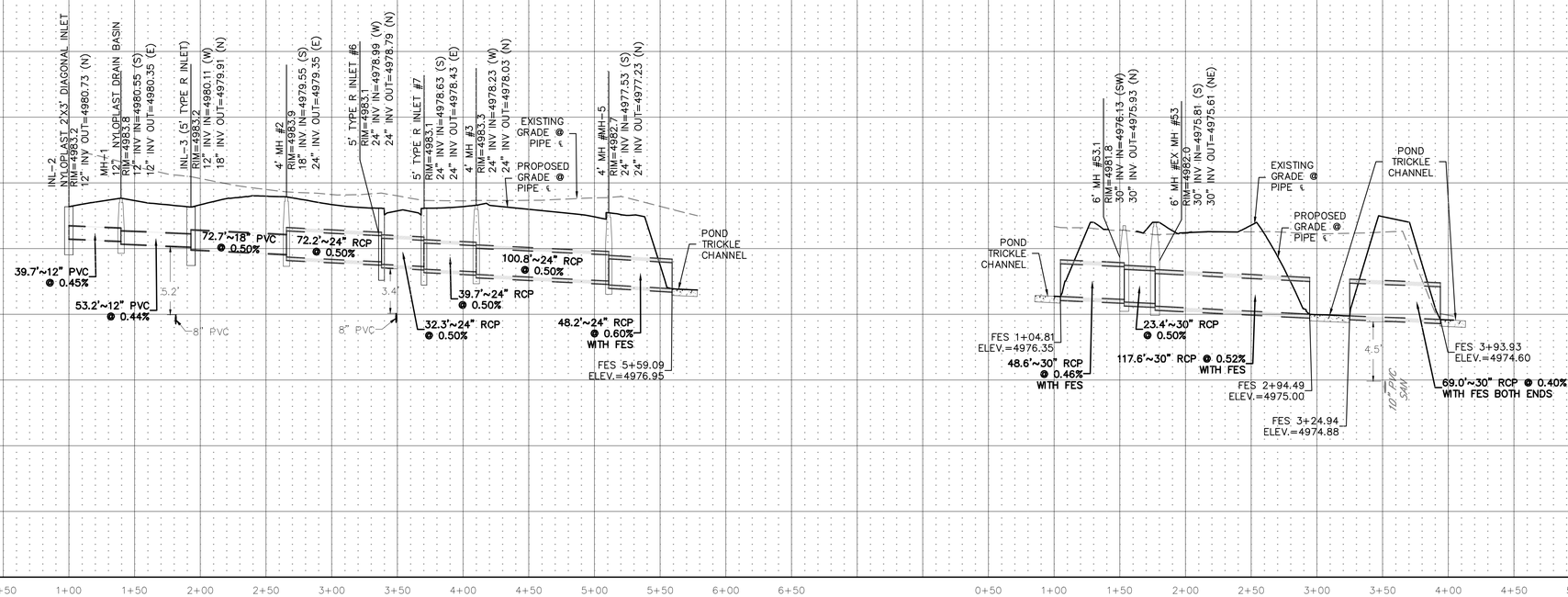

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STORM SEWER PLAN & PROFILE
STORM RUN 1 & 3

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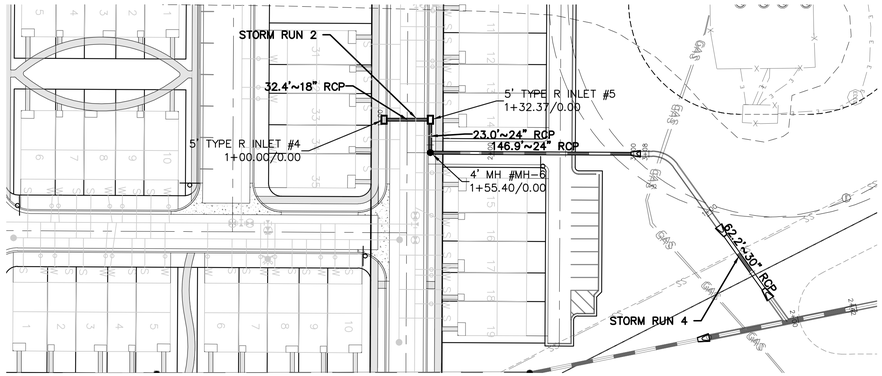
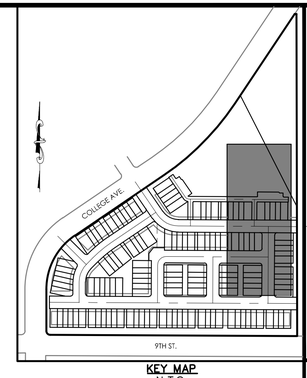


STORM RUN 2 & 4



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PLAN NO.:

BENCHMARK:

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NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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FORT LUPTON, COLORADO
CONSTRUCTION PLANS
STORM SEWER PLAN & PROFILE
STORM RUN 2 & 4

DATE --

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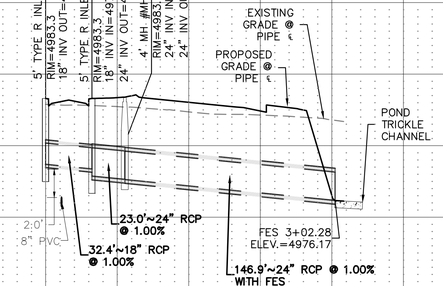
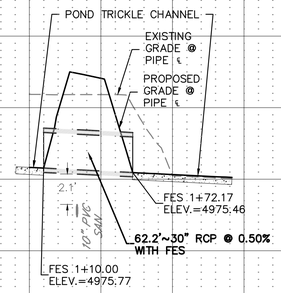
P.M. --
JOB --
SHEET NO. 27

CAD FILE: 20002948-STORM P&P_01.DWG





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0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00

0+50 1+00 1+50 2+00 2+50 3+00

DOCUMENT: \\atwellcloud.com\projects\20002948\Civil\Construction Plans\Storm Sewer\P&P_01.dwg LAYOUT: STORM RUN 2 & 4 PLOTTED: 2/25/2021 10:38 AM BY: Cooper Johnson

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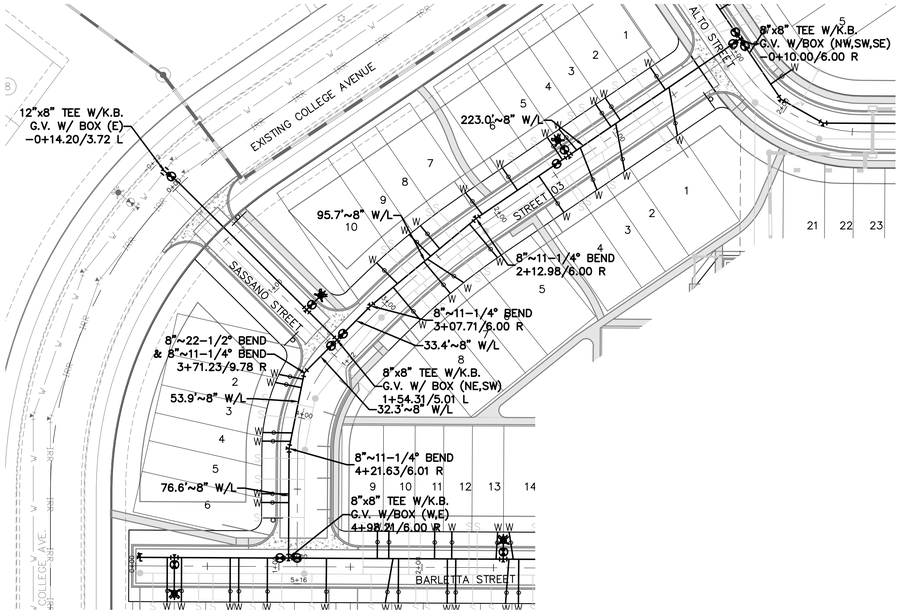

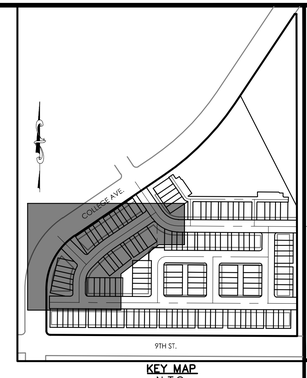

KEY MAP
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50 0 50 100
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1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

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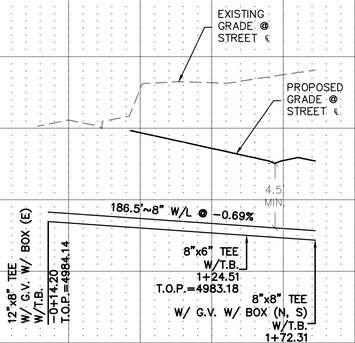

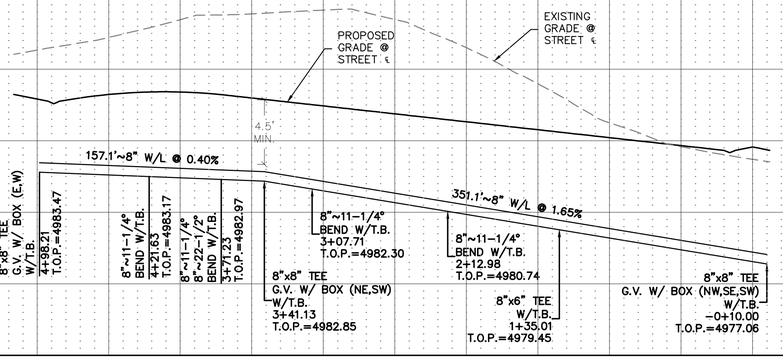

5025 5020 5015 5010 5005 5000 4995 4990 4985 4980 4975 4970

-1+00 -0+50 0+00 0+50 1+00 1+50 2+00 2+50 6+00 5+50 5+00 4+50 4+00 3+50 3+00 2+50 2+00 1+50 1+00 0+50 0+00 -0+50 -1+00

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WATER PLAN & PROFILE
SASSANO ST. & PORCHIANO AVE.

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CAD FILE: 20002948-WATER P&P_01.DWG

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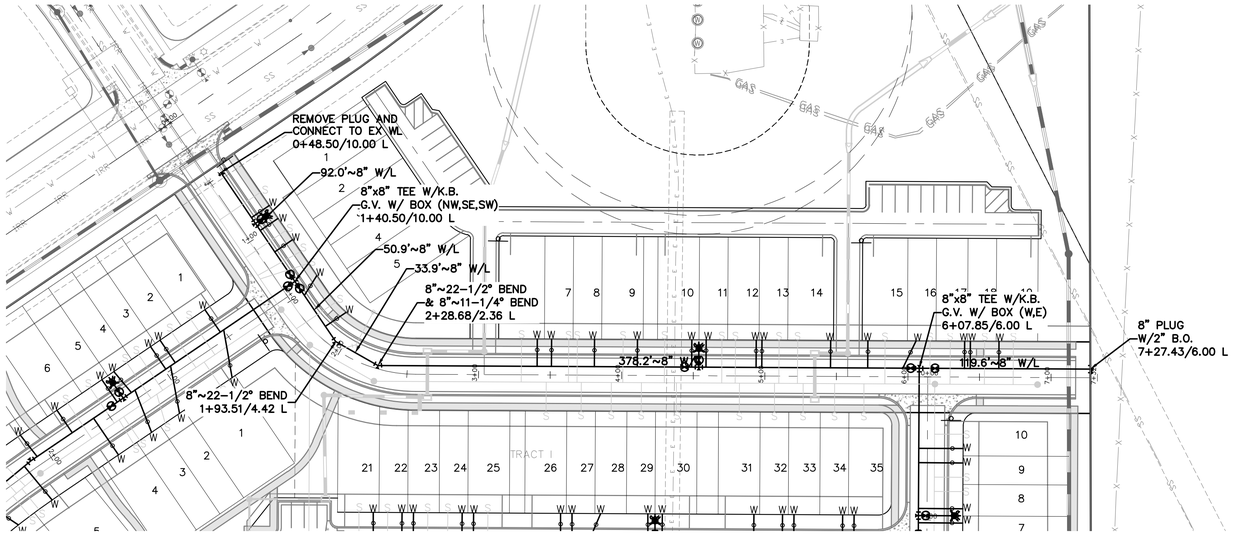

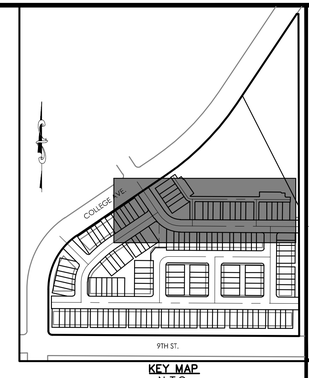

KEY MAP
N.T.S.

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1 inch = 5 ft. (Vert)

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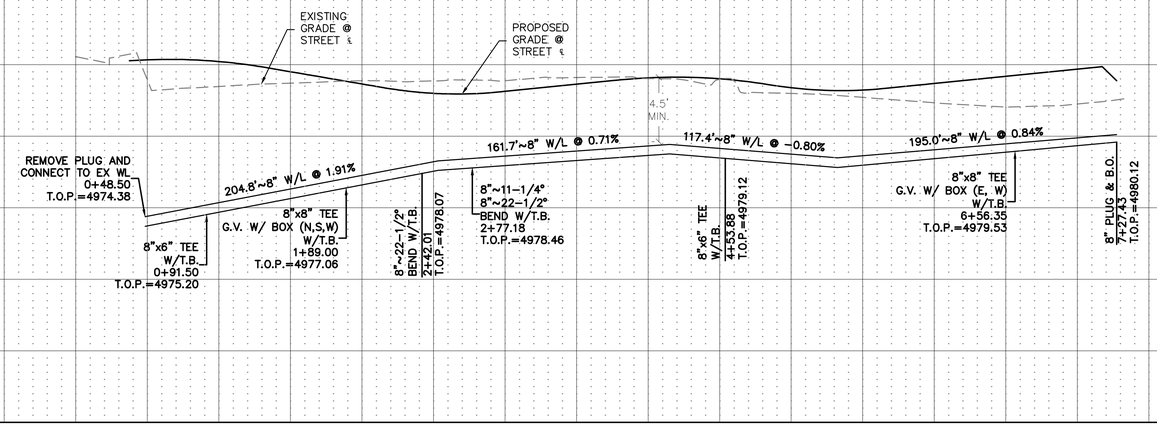

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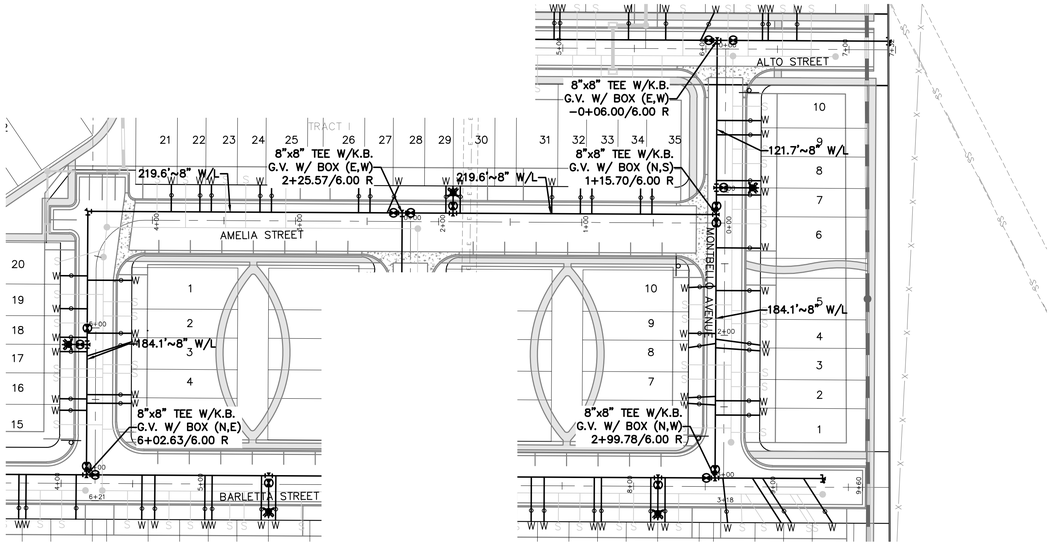

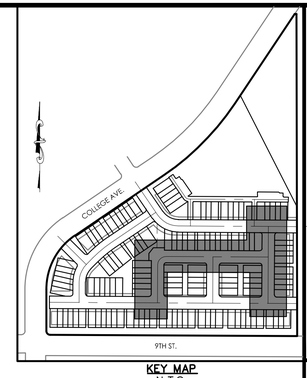

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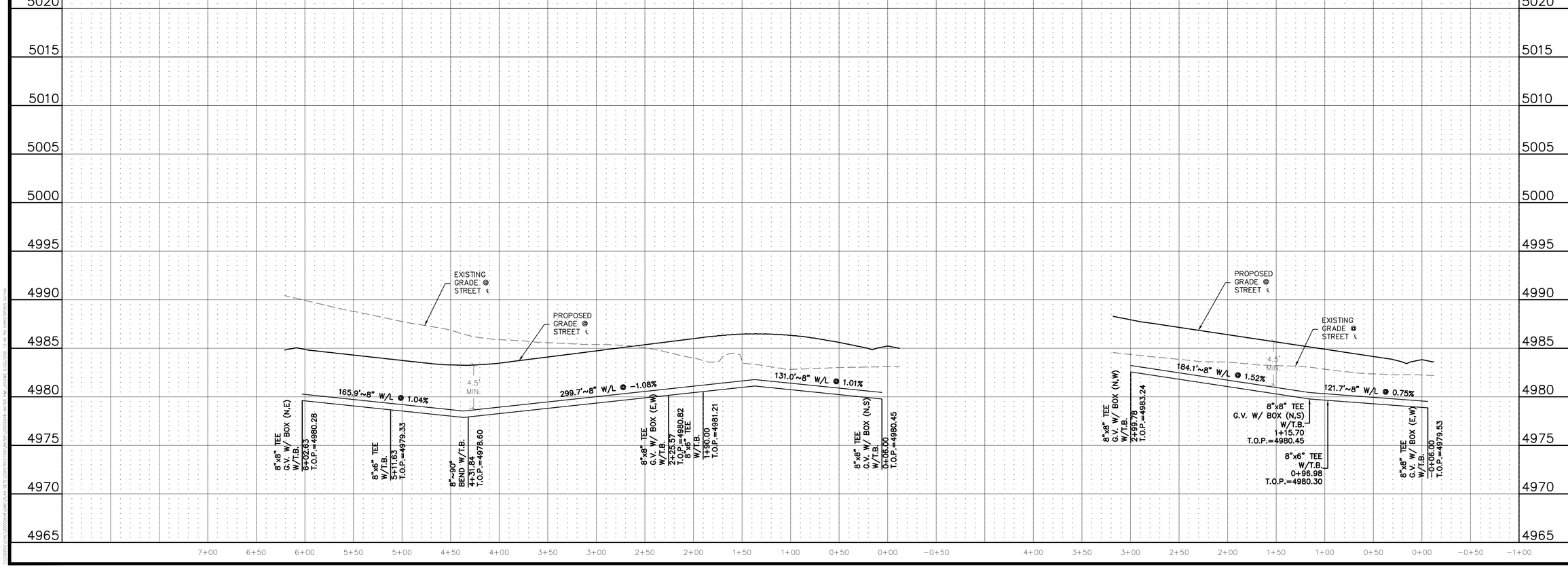

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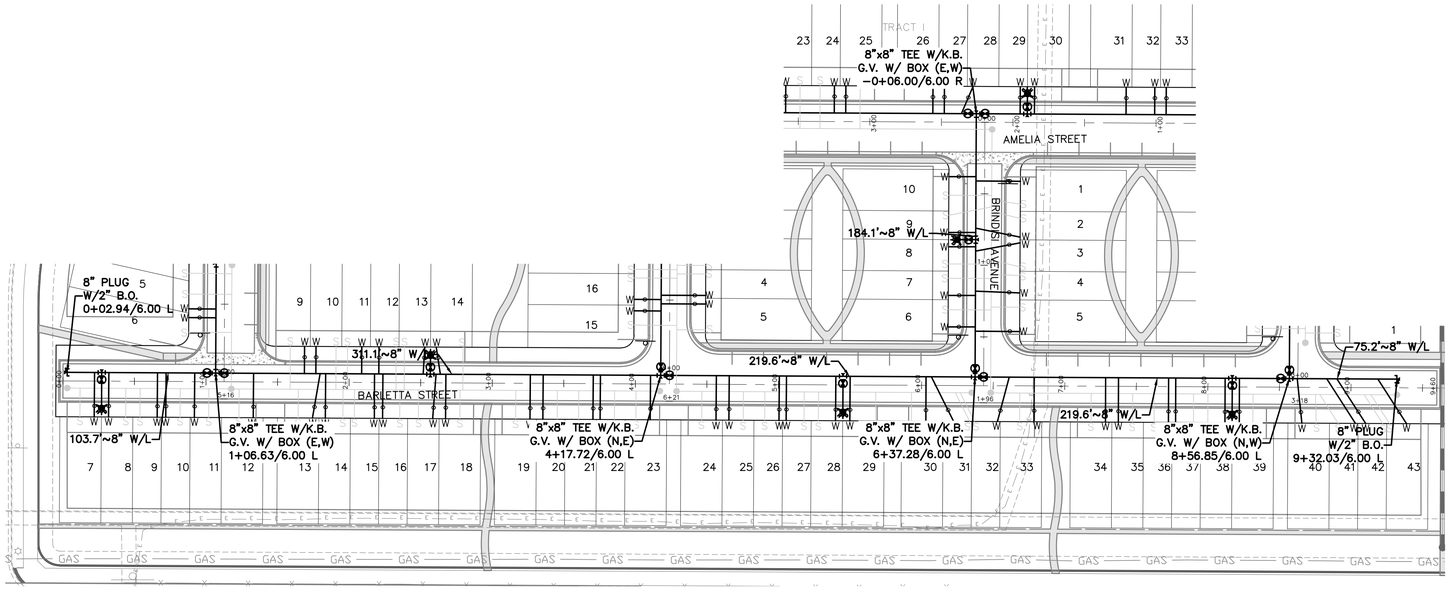

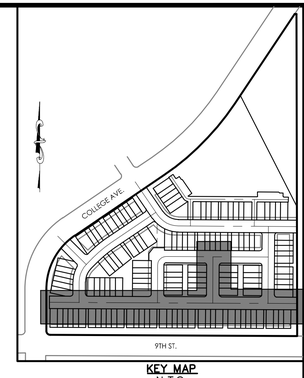

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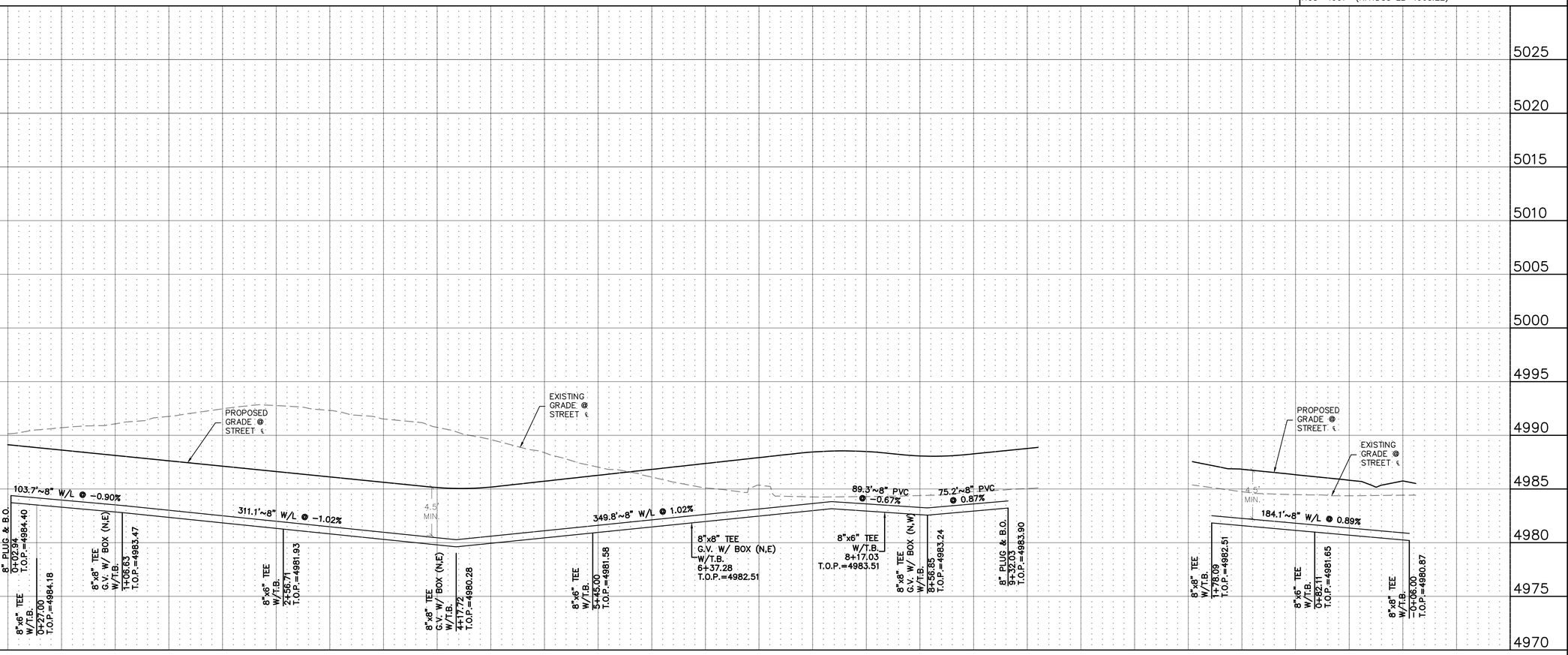

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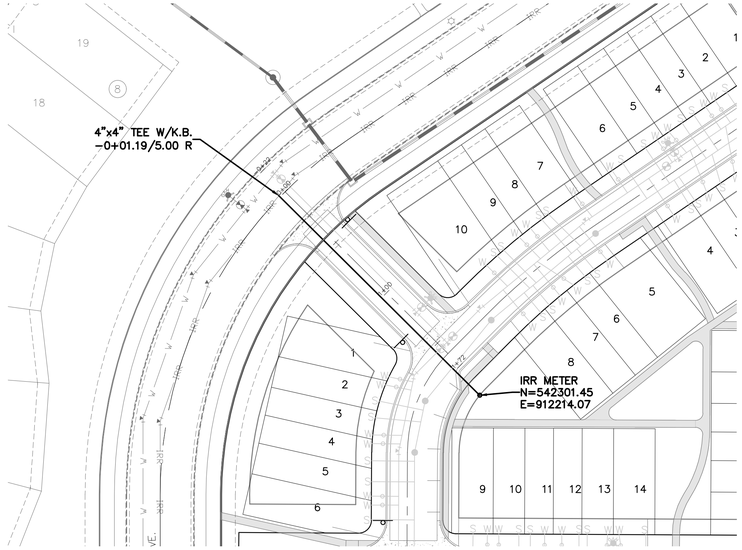

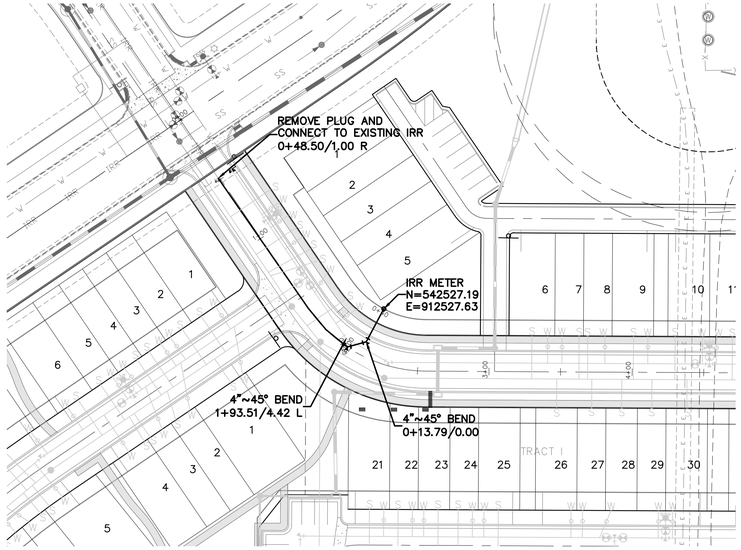

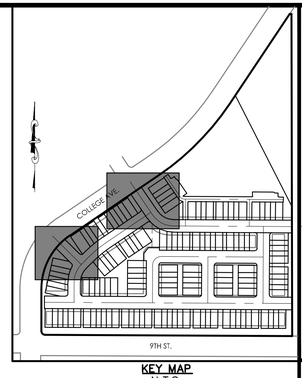

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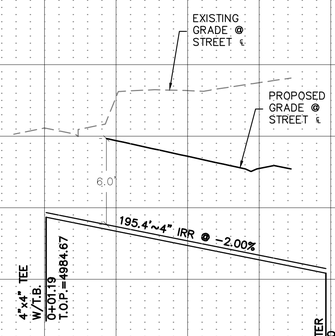

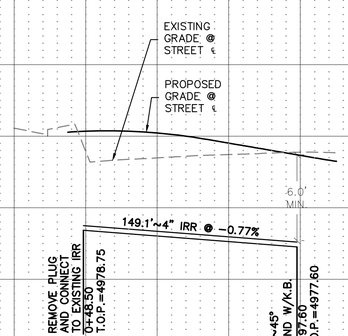

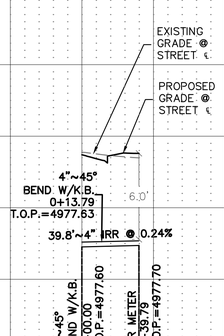

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FORT LUPTON, COLORADO

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IRRIGATION PLAN & PROFILE
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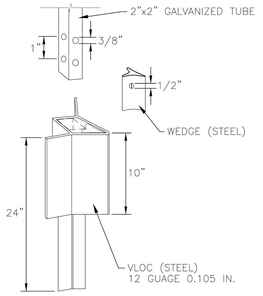
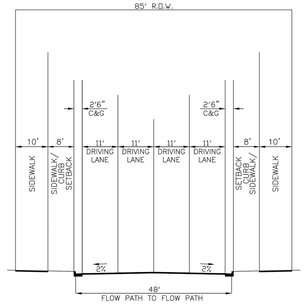


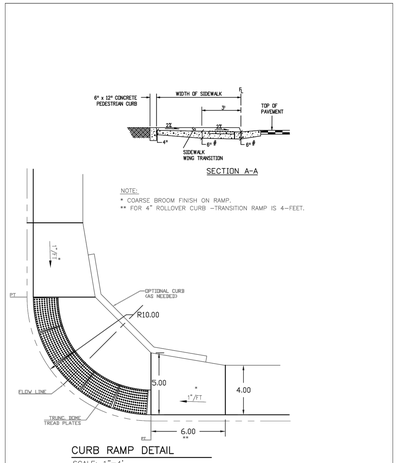
DESIGN STANDARDS	STANDARD DRAWING
TYPICAL SIGN POST ANCHOR DETAIL	T2
	DATE: 8/15/14



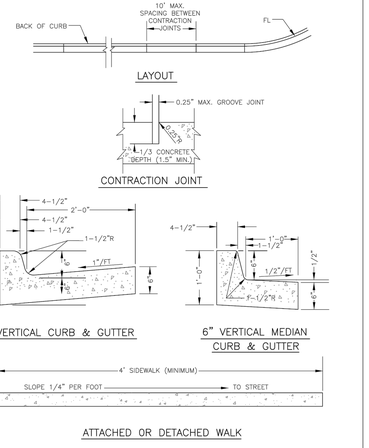
- PROVIDE WIDENING AT INTERSECTIONS FOR LEFT TURN LANES AND ACCEL/DECEL LANES RIGHT-OF-WAY WIDTH TO BE INCREASED TO 105' IN THESE AREAS.
- NO PARKING ALLOWED
- USED IN AREAS WHERE THERE IS LIMITED ACCESS AND PROJECTED TRAFFIC VOLUMES ARE GREATER THAN 10,000 VEHICLES PER DAY.

COLLECTOR PHASE III

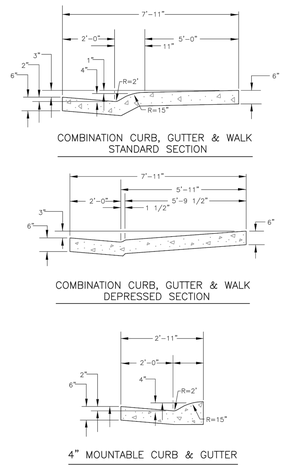
DESIGN STANDARDS	STANDARD DRAWING
COLLECTOR - PHASE 3 TYPICAL SECTION	R2-3
	DATE: 11/21/19



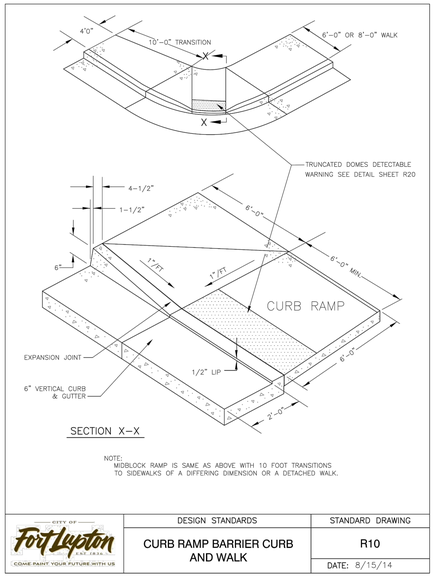
DESIGN STANDARDS	STANDARD DRAWING
CURB RAMP	R9
	DATE: 3/28/17



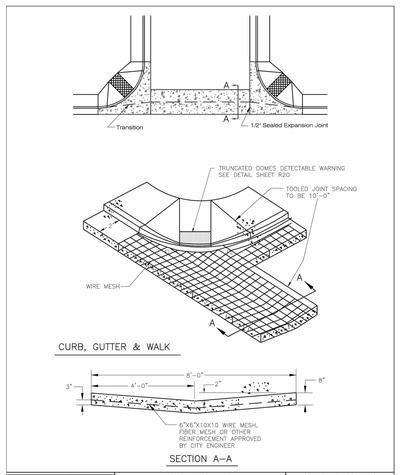
DESIGN STANDARDS	STANDARD DRAWING
VERTICAL CURB AND GUTTER	R7
	DATE: 8/15/14



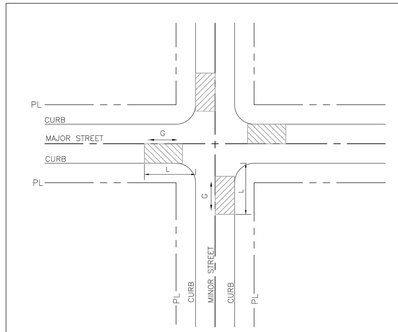
DESIGN STANDARDS	STANDARD DRAWING
COMBINATION CURB, GUTTER, AND WALK	R8
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
CURB RAMP BARRIER CURB AND WALK	R10
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
SIDEWALK RAMP WITH CROSS PAN	R11
	DATE: 3/15/17



MINOR STREET \ MAJOR STREET		LOCAL	MINOR COLLECTOR	MAJOR COLLECTOR	MINOR ARTERIAL	MAJOR ARTERIAL
LOCAL	L	95'	100'	100'	125'	125'
	G	4%	4%	4%	4%	4%
MINOR COLLECTOR	L	--	100'	120'	150'	150'
	G	--	4%	3%	3%	3%
MAJOR COLLECTOR	L	--	--	120'	150'	200'
	G	--	--	3%	3%	3%
MINOR ARTERIAL	L	--	--	--	200'	200'
	G	--	--	--	2%	2%
MAJOR ARTERIAL	L	--	--	--	--	200'
	G	--	--	--	--	2%

DESIGN STANDARDS	STANDARD DRAWING
MAXIMUM PERMISSIBLE INTERSECTION GRADE	R19
	DATE: 8/15/14

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAILS
STREET DETAILS

DATE 6/22/2021

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SHEET NO. 33

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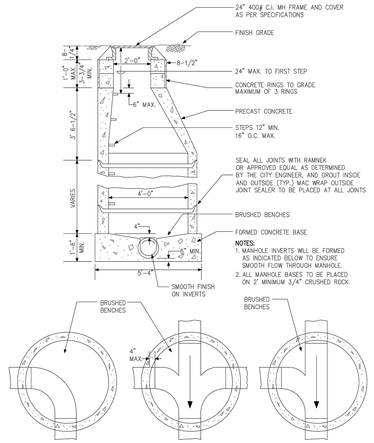
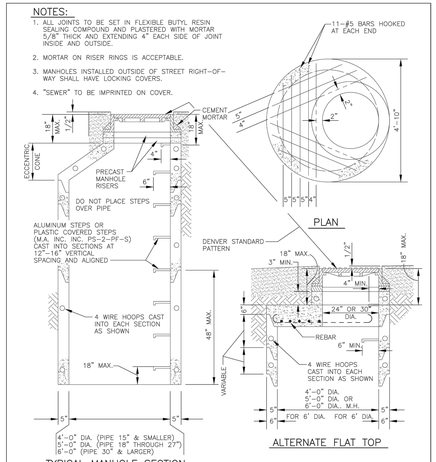
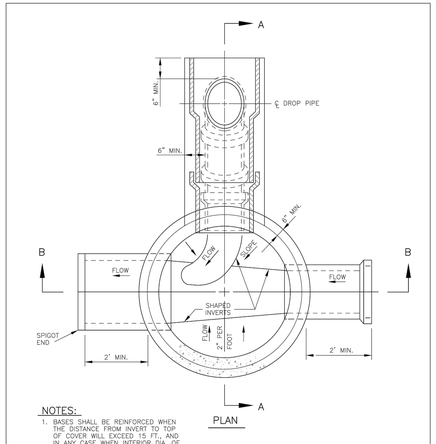


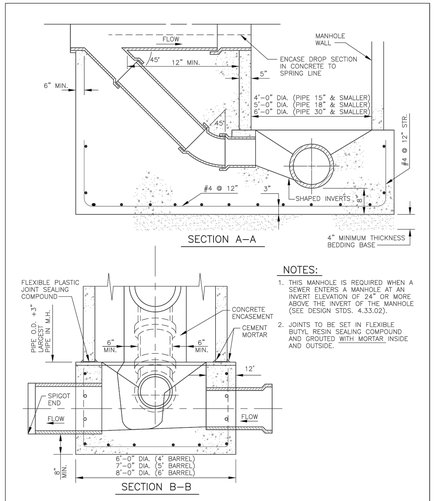
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	SANITARY SEWER STANDARD MANHOLE	SS1
		DATE: 8/15/14



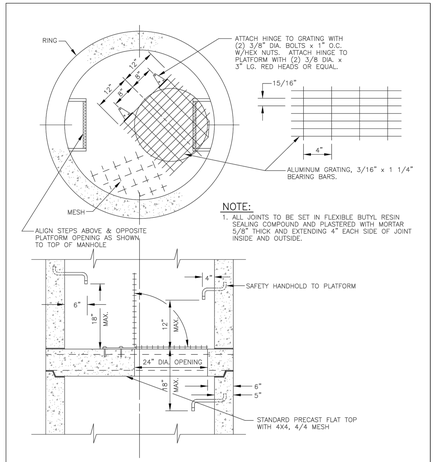
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	MANHOLE BARRELS AND ALTERNATE TOPS	SS2
		DATE: 8/15/14



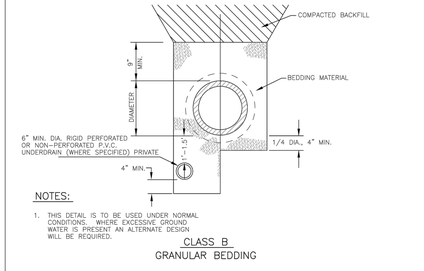
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	MONOLITHIC BASES FOR DROP MANHOLE	SS3
		DATE: 8/15/14



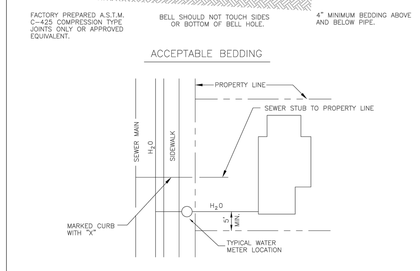
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	DROP MANHOLE DETAIL	SS4
		DATE: 8/15/14



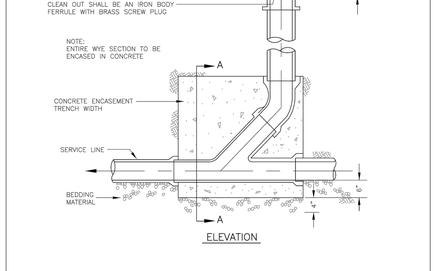
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	INTERMEDIATE PLATFORM FOR MANHOLES 17' IN DEPTH	SS5
		DATE: 8/15/14



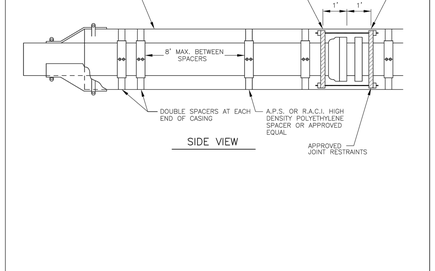
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	TYPICAL PIPE BEDDING	SS6
		DATE: 8/15/14



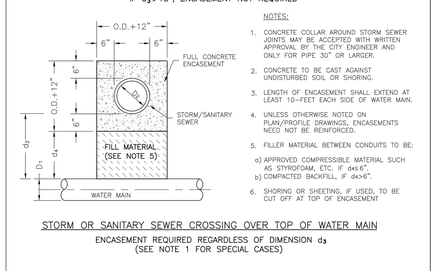
CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	TYPICAL HOUSE SERVICE LOCATION	SS7
		DATE: 8/15/14



CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	STANDARD CLEAN-OUT DETAIL	SS8
		DATE: 8/15/14



CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	JACKING DETAIL	SS9
		DATE: 8/15/14



CITY OF Fort Lupton	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	ENCASEMENT FOR CONDUIT CROSSING	SS11
		DATE: 8/15/14

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAILS
SANITARY DETAILS

DATE 6/22/2021

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SHEET NO. 34

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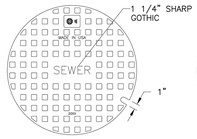
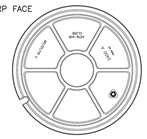
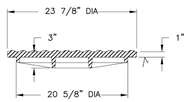
2400A Cover

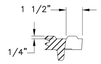




COVER BACK



SECTION



PICKSLOT DETAIL

Product Number
00340023
Design Features
-Materials
Gray Iron (CL30B)
-Design Load
Heavy Duty
-Coating
Undipped
-- - Designates Machined Surface

Certification
- ASTM A48
-Country of Origin USA

CITY OF Fort Lupton COLORADO COME PAINT YOUR FUTURE WITH US	DESIGN STANDARDS	STANDARD DRAWING
	SANITARY SEWER MANHOLE LID	SS12
		DATE: 5/04/2017

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAILS
SANITARY DETAILS

DATE 6/22/2021

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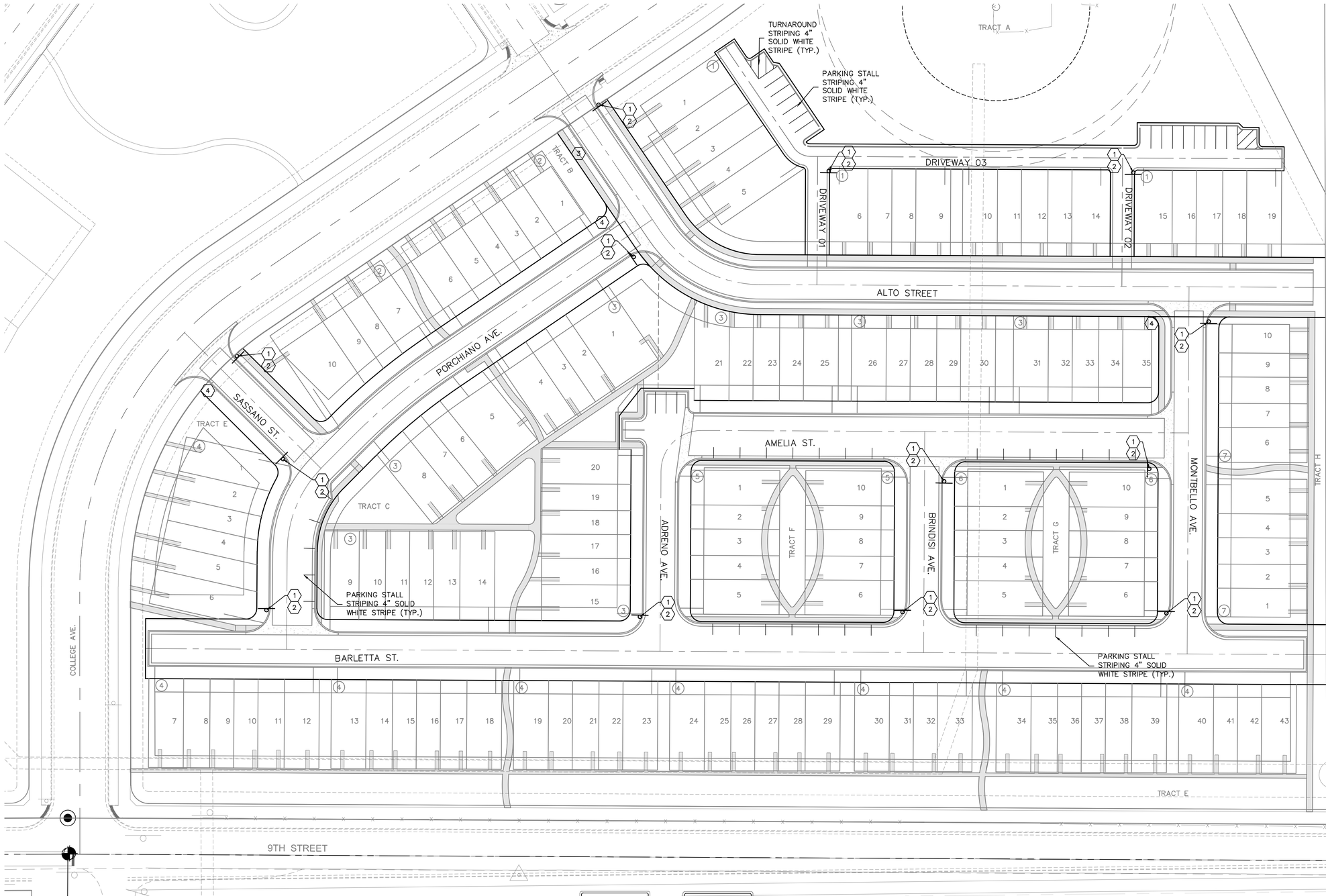

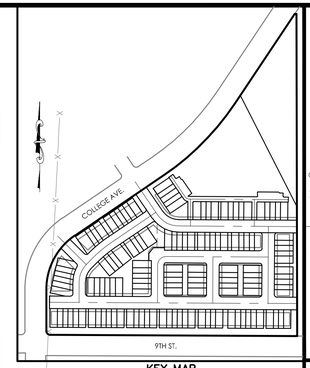

KEY MAP
N.T.S.

SPEED LIMIT 15
R2-1
24"x30"
NTS
(SPEED LIMIT AS NOTED ON PLAN)
4

SPEED LIMIT 25
R2-1
24"x30"
NTS
(SPEED LIMIT AS NOTED ON PLAN)
3

PORCHIANO AVE.
ALTO ST.
STREET SIGN (TYP.)
NTS
2

STOP
R1-1
30"x30"
NTS
1

40 0 40 80
(IN FEET)
1 inch = 40 ft.

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
SIGNAGE & STRIPING
SIGNAGE & STRIPING

DATE 6/22/2021

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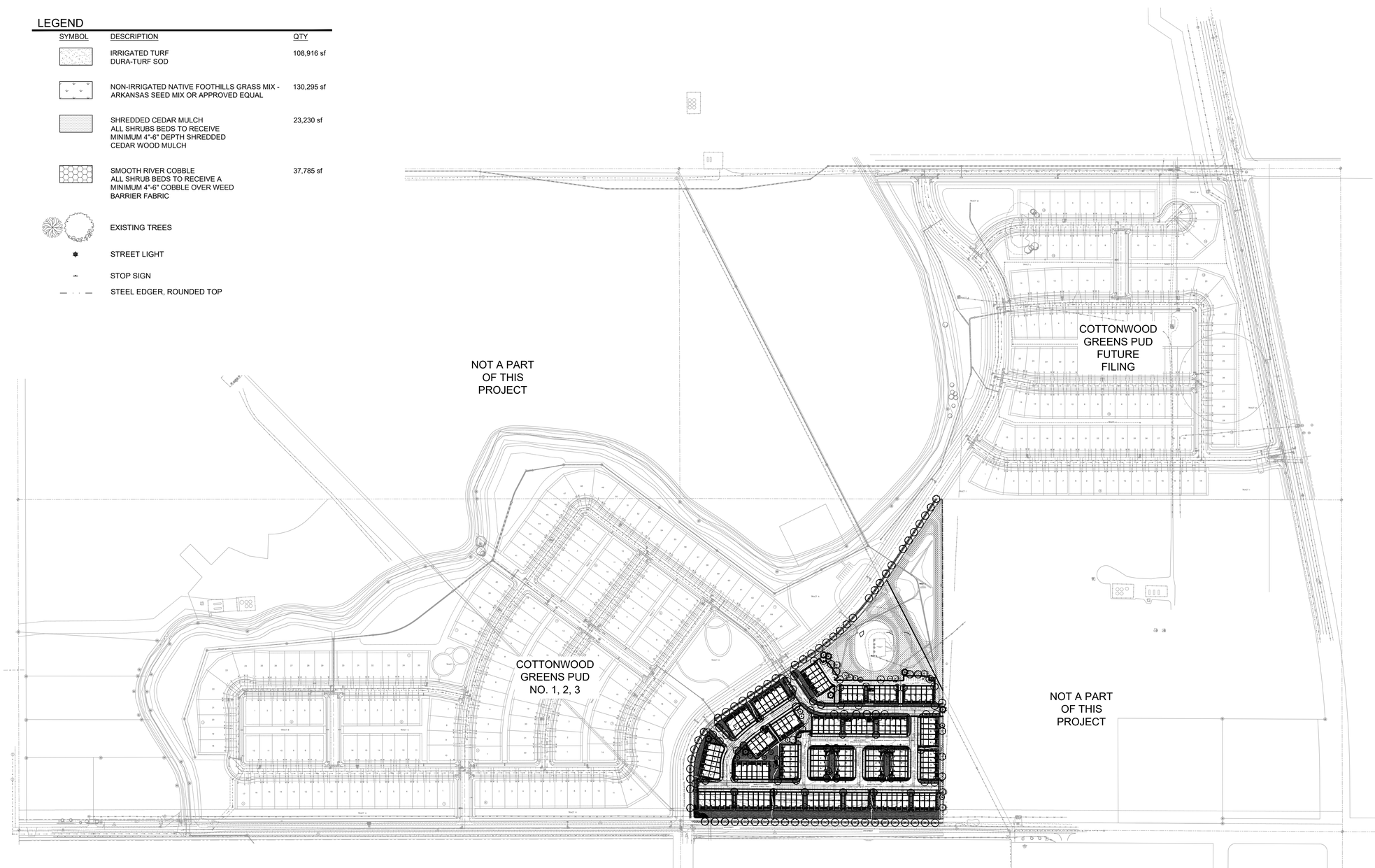
LEGEND

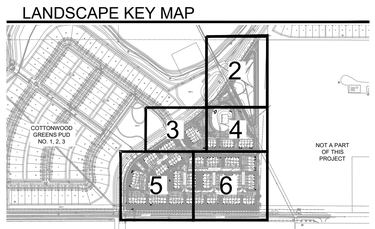
SYMBOL	DESCRIPTION	QTY
	IRRIGATED TURF DURA-TURF SOD	108,916 sf
	NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX - ARKANSAS SEED MIX OR APPROVED EQUAL	130,295 sf
	SHREDDED CEDAR MULCH ALL SHRUBS BEDS TO RECEIVE MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH	23,230 sf
	SMOOTH RIVER COBBLE ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" COBBLE OVER WEED BARRIER FABRIC	37,785 sf
	EXISTING TREES	
	STREET LIGHT	
	STOP SIGN	
	STEEL EDGER, ROUNDED TOP	



0 200' 300' 400'

SCALE 1" = 200'-0"

LANDSCAPE KEY MAP



Sheet Index:

OVERALL LANDSCAPE	1
LANDSCAPE PLAN	2
LANDSCAPE PLAN	3
LANDSCAPE PLAN	4
LANDSCAPE PLAN	5
LANDSCAPE PLAN	6
LANDSCAPE NOTES, DETAILS & SCHEDULES	7

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Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE:

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR:

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS DATE

DATE

JUNE 21, 2021

SHEET TITLE

Overall Landscape

SHEET INFORMATION

Sheet Number: 1

Of: 7

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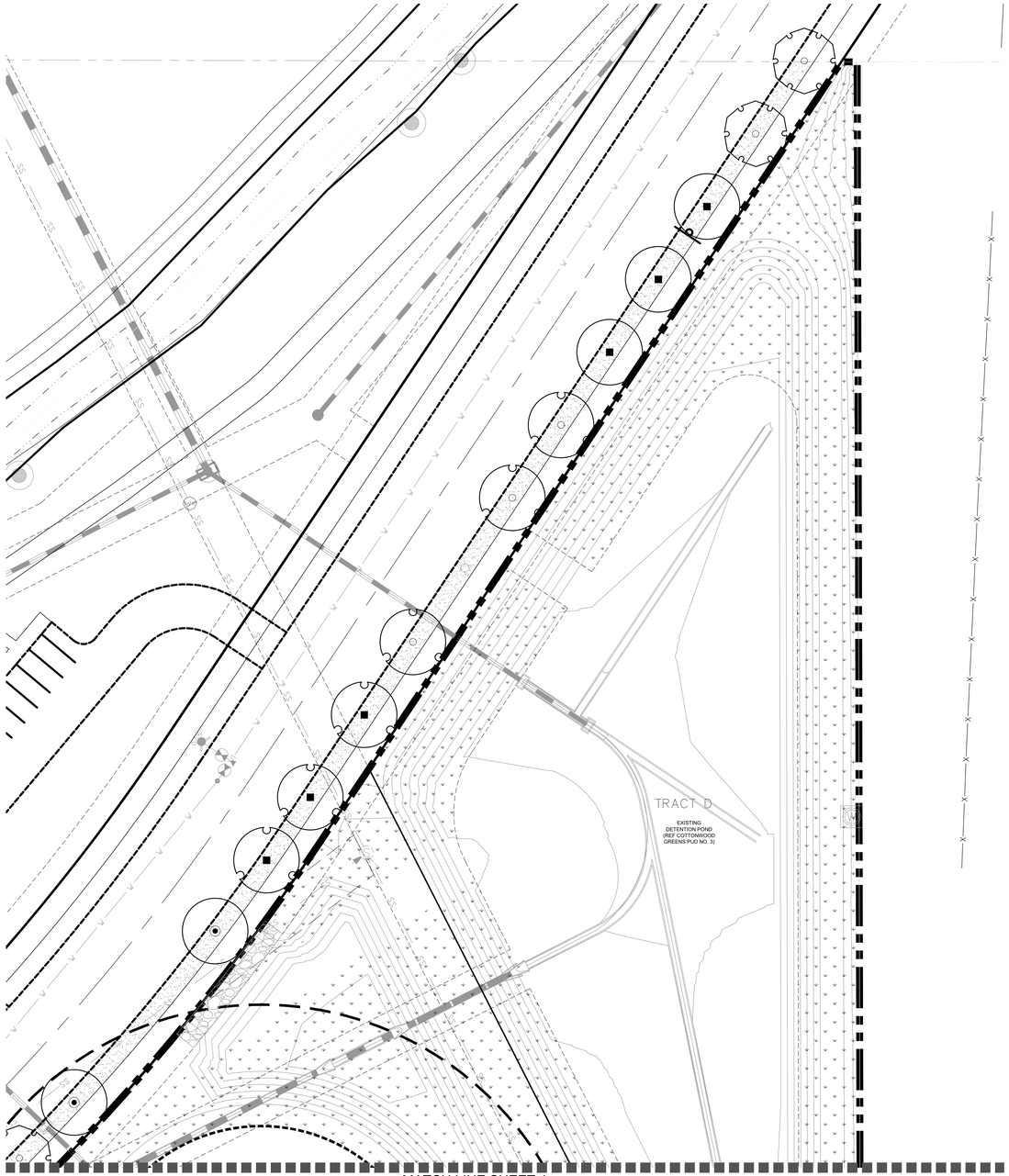


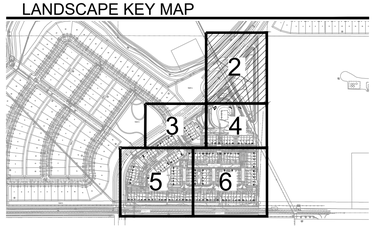
LANDSCAPE PLAN

0 30' 45' 60'

SCALE 1" = 30'-0"

NORTH

LANDSCAPE KEY MAP



PLANT LIST

DECIDUOUS TREES	QTY	BOTANICAL / COMMON NAME
	23	Celtis occidentalis Western Hackberry
	24	Gleditsia triacanthos `Skyline` Skyline Honey Locust
	26	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree
	22	Quercus buckleyi Texas Red Oak
	22	Quercus macrocarpa Burr Oak
	16	Tilia americana `Redmond` Redmond American Linden

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME
	15	Picea abies `Cupressina` Fastigiate Norway Spruce
	7	Picea pungens Colorado Spruce
	17	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine
	7	Pinus strobiformis Southwestern White Pine

ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME
	8	Acer glabrum Rocky Mountain Maple
	9	Acer tataricum `GarAnn` Hot Wings Tatarian Maple
	4	Malus x `Spring Snow` Spring Snow Crab Apple
	5	Pyrus calleryana `Chanticleer` Chanticleer Pear
	4	Syringa reticulata Japanese Tree Lilac

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME
	33	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry
	95	Buddleja davidii `Blue Chip` Dwarf Butterfly Bush
	52	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea
	65	Cornus sericea `Arctic Fire` Arctic Fire Dogwood
	59	Cornus sericea `Isanti` Isanti Dogwood
	64	Philadelphus x `Snowbell` Snowbell Mock Orange
	14	Physocarpus monogynus Mountain Ninebark
	64	Physocarpus opulifolius `Summer Wine` Summer Wine Ninebark
	47	Prunus besseyi `Pawnee Buttes` Creeping Western Sand Cherry
	51	Rhus trilobata Three-Leaf Sumac
	61	Ribes aureum Golden Currant
	27	Salix purpurea `Nana` Dwarf Arctic Willow
	63	Weigela florida Wine and Roses Wine and Roses Weigela

EVERGREEN SHRUBS	QTY	BOTANICAL / COMMON NAME
	42	Arctostaphylos uva-ursi Kinnikinnick
	29	Picea pungens `St. Mary`s Broom` St. Mary`s Broom Colorado Spruce
	49	Pinus mugo `Mops` Miniature Mugo Pine

GRASSES	QTY	BOTANICAL / COMMON NAME
	90	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass
	164	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass
	96	Helictotrichon sempervirens Blue Avena Grass
	125	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass
	31	Panicum virgatum `Shenandoah` Shenandoah Red Switch Grass

PERENNIALS	QTY	BOTANICAL / COMMON NAME
	30	Agastache rupestris `Sunset` Sunset Hyssop
	50	Echinacea purpurea Purple Coneflower
	38	Hemerocallis x `Red` Red Daylily
	45	Hemerocallis x `Stella de Oro` Stella de Oro Daylily
	53	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan

LEGEND

SYMBOL	DESCRIPTION	QTY
	IRRIGATED TURF DURA-TURF SOD	108,916 sf
	NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX - ARKANSAS SEED MIX OR APPROVED EQUAL	130,295 sf
	SHREDDED CEDAR MULCH ALL SHRUBS BEDS TO RECEIVE MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH	23,230 sf
	SMOOTH RIVER COBBLE ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" COBBLE OVER WEED BARRIER FABRIC	37,785 sf
	EXISTING TREES	
	STREET LIGHT	
	STOP SIGN	
	STEEL EDGER, ROUNDED TOP	

TB GROUP
landscape architecture | planning | illustration
444 Mountain Ave, Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS DATE

DATE

JUNE 21, 2021

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

Sheet Number: 2

Of: 7

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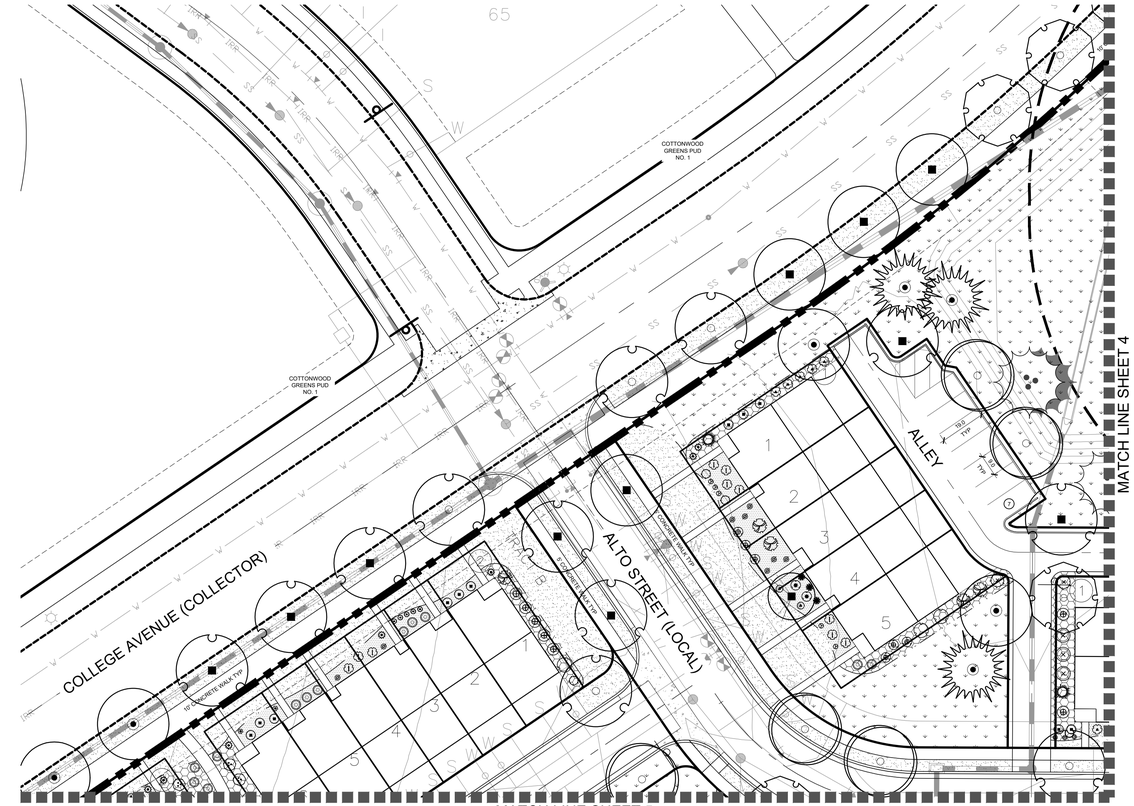

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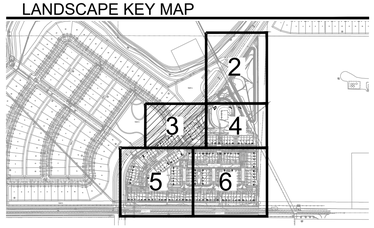

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REVISIONS DATE

DATE

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SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

Sheet Number: 3

Of: 7

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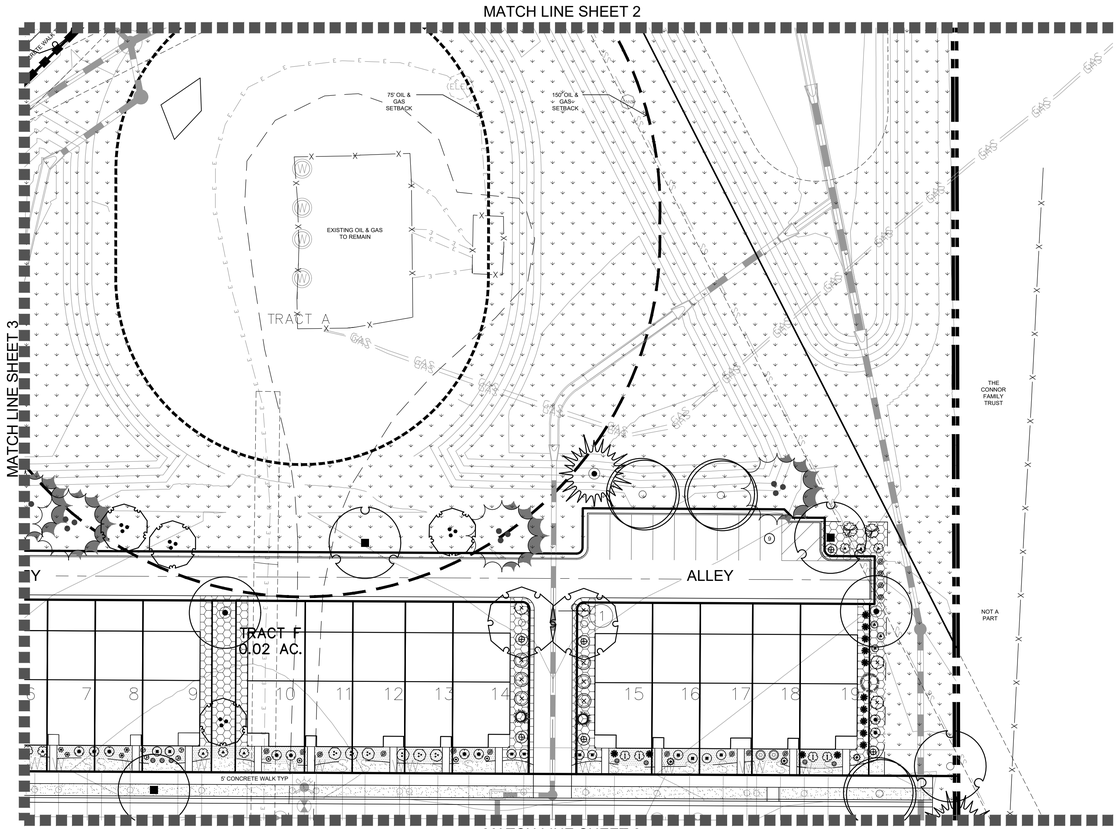

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0 30' 45' 60'

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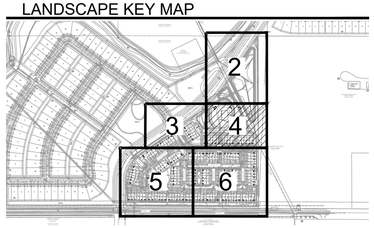

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SEAL

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PLAN NO:

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REVISIONS	DATE

DATE

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SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

Sheet Number: 4

Of: 7

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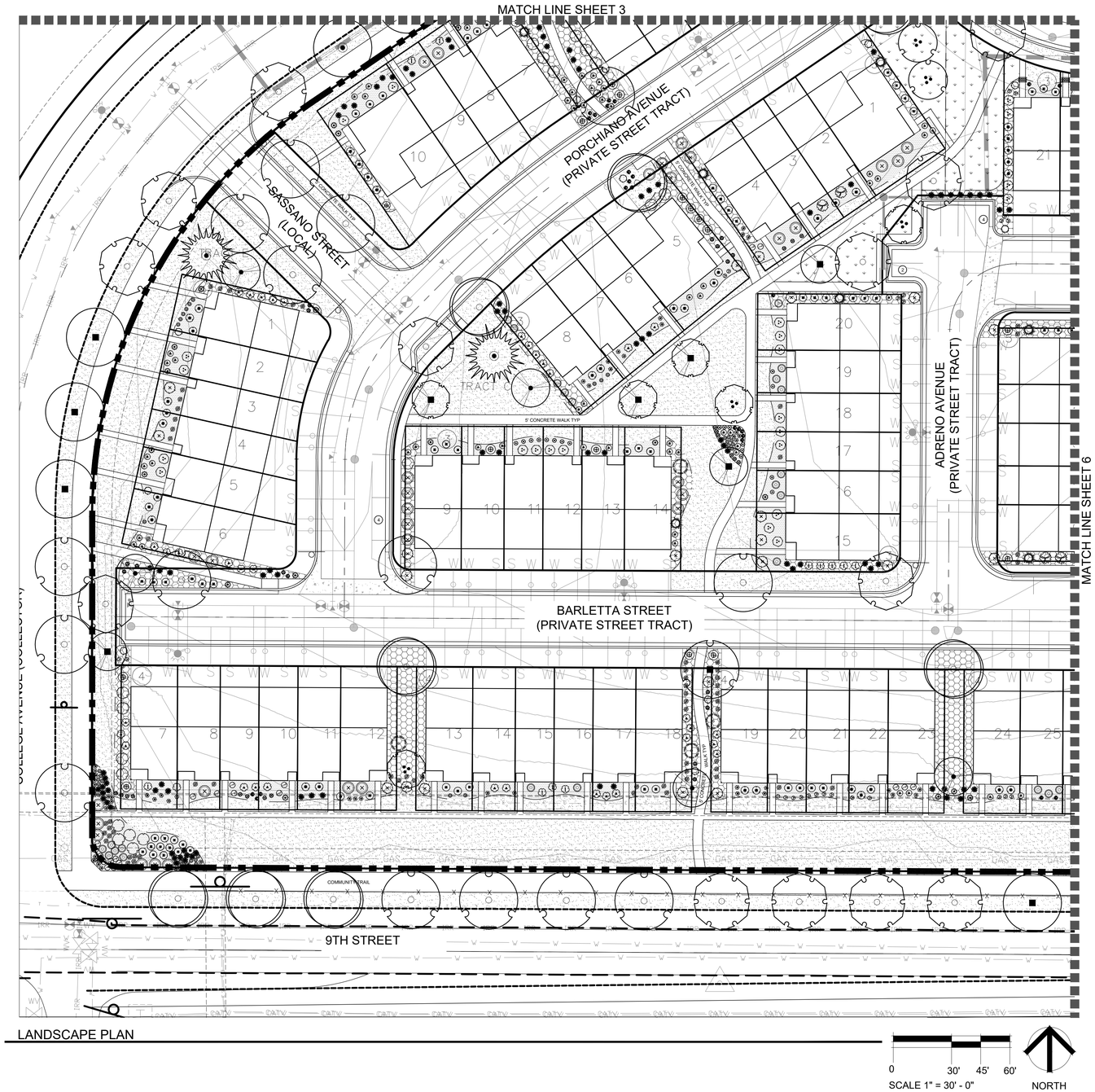

LANDSCAPE PLAN

0 30' 45' 60'

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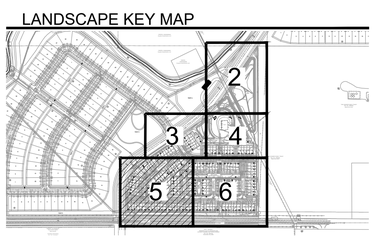
NORTH

LANDSCAPE KEY MAP



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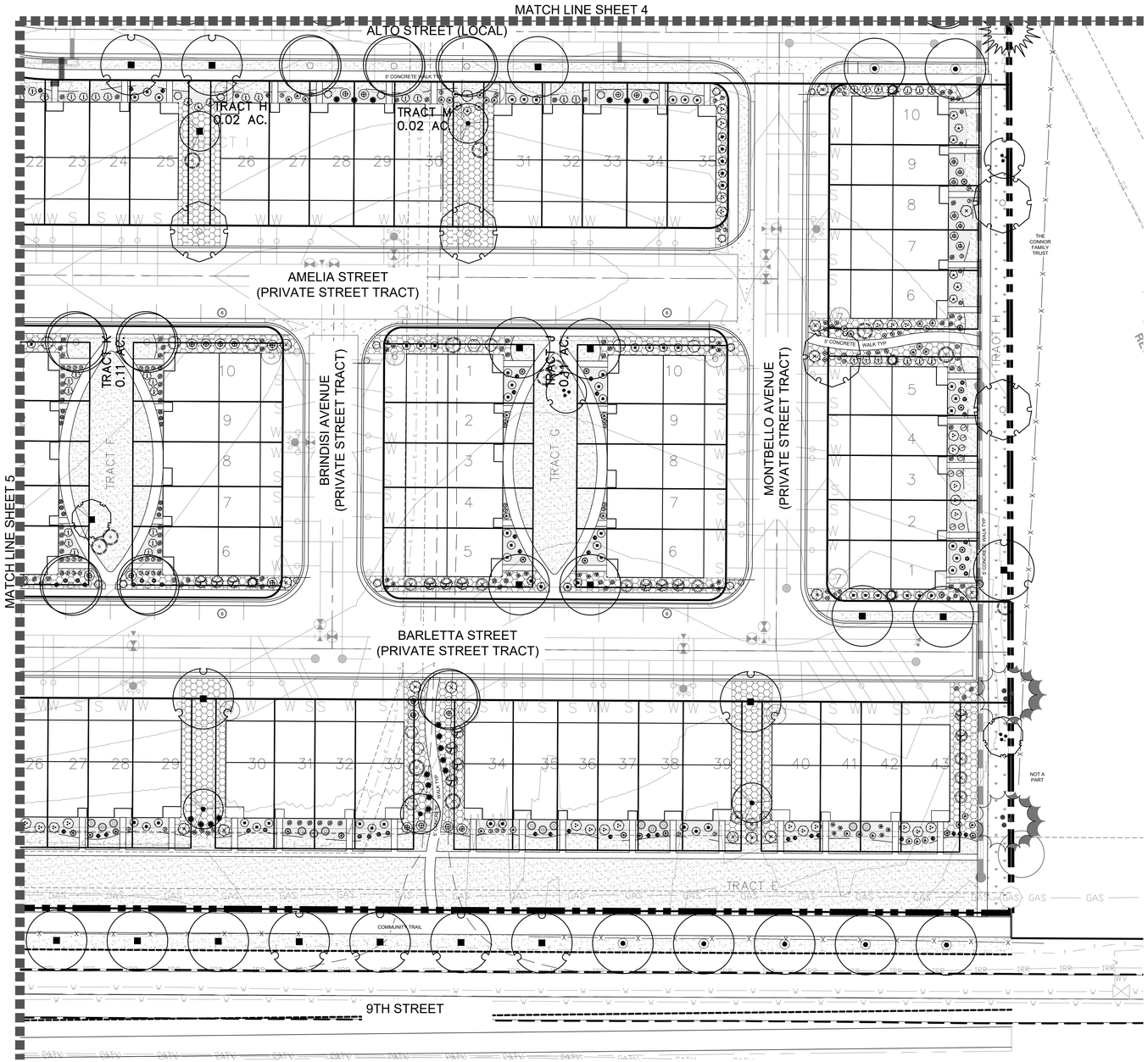

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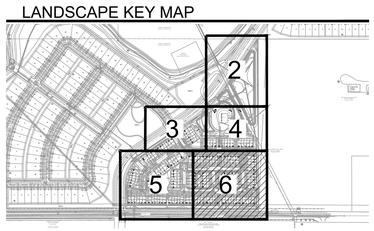

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	53	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan

LEGEND

SYMBOL	DESCRIPTION	QTY
	IRRIGATED TURF DURA-TURF SOD	108,916 sf
	NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX - ARKANSAS SEED MIX OR APPROVED EQUAL	130,295 sf
	SHREDDED CEDAR MULCH ALL SHRUBS BEDS TO RECEIVE MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH	23,230 sf
	SMOOTH RIVER COBBLE ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" COBBLE OVER WEED BARRIER FABRIC	37,785 sf
	EXISTING TREES	
	STREET LIGHT	
	STOP SIGN	
	STEEL EDGER, ROUNDED TOP	

TB GROUP
landscape architecture | planning | illustration
444 Mountain Ave.
Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS DATE

DATE

JUNE 21, 2021

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

Sheet Number: 6

Of: 7

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Landscape Notes

1. LANDSCAPE AREAS SHALL BE MAINTAINED, INCLUDING MOWING, WATERING AND FERTILIZING BY CONTRACTOR, UP TO FINAL ACCEPTANCE. AT SUCH TIME OWNER WILL BE RESPONSIBLE FOR ALL MAINTENANCE. LANDSCAPE AND IRRIGATION WILL BE WARRANTED FOR ONE (1) FULL YEAR AFTER FINAL ACCEPTANCE.
2. ANY DISCREPANCIES WITH THE DRAWINGS AND SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH CONSTRUCTION.
3. CONTRACTOR TO VERIFY ALL FIELD CONDITIONS, EASEMENTS, PROPERTY LINES, ETC. PRIOR TO STARTING WORK. SHOULD ANY DISCREPANCIES, OMISSIONS, OR ERRORS OCCUR, NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES 48 HRS. PRIOR TO ANY EXCAVATION OR PLANTING.
5. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH PLANTING OPERATIONS.1 - NO TREES OR SHRUBS SHALL BE PLANTED WITHIN 10' FROM WATER AND SEWER LINES, 4' FROM GAS, TELEPHONE AND ELECTRIC UTILITY LINES.
6. NO SHRUBS SHALL BE PLANTED WITHIN FIVE (5) FEET OR TREES WITHIN TEN (10) FEET OF POTABLE AND NON-POTABLE WATER METERS, FIRE HYDRANTS, SANITARY SEWER MANHOLES, POTABLE WATER, SANITARY SEWER, STORM SEWER, OR NON-POTABLE IRRIGATION MAINS.
7. MINIMUM CLEARANCE OF THREE (3) FEET ON EACH SIDE OF FIRE DEPARTMENT CONNECTION (FDC). NO VEGETATION OTHER THAN TURF OR GROUND COVERS PLANTED IN FRONT OF FDC.
8. TREES SHALL BE LIMBED TO A HEIGHT OF NOT LESS THAN EIGHT (8) FEET ABOVE ANY PUBLIC STREET OR SIDEWALK. SHRUBS AND OTHER PLANT MATERIALS SHALL BE MAINTAINED AT A HEIGHT OF NOT MORE THAN THIRTY (30) INCHES, AND SAID MAINTENANCE SHALL BE CONDUCTED IN PERPETUITY.
9. IF TREES OR SHRUBS ARE LOCATED ON TOP OF FIELD VERIFIED UTILITIES, CONTRACTOR SHALL NOTIFY OWNER BEFORE ANY DIGGING HAS COMMENCED. VERIFY WITH OWNER IF AND WHICH SHRUBS/TREES SHALL BE TAKEN OUT OF PROJECT/CONTRACT.
10. TO THE MAXIMUM EXTENT FEASIBLE, TOPSOIL THAT IS REMOVED DURING CONSTRUCTION ACTIVITY SHALL BE CONSERVED FOR LATER USE ON AREAS REQUIRING REVEGETATION AND LANDSCAPING.
11. EXCAVATED MATERIAL TO BE USED AS FILL WILL HAVE ALL ROCKS, DEBRIS, WASTE MATERIAL, FROZEN MATERIAL, AND VEGETATION LARGER THAN 3" IN ANY DIMENSION REMOVED BEFORE PLACEMENT AND COMPACTION OF SOIL.
12. PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING FOUNDATIONS AND A SMOOTH TRANSITION BETWEEN ALL ADJACENT EXISTING GRADES AND PROPOSED GRADES.
13. PRIOR TO FINE GRADING, SOD AREAS AND PLANTING BEDS SHALL BE THOROUGHLY LOOSENED AND TILLED TO A 6" DEPTH. REMOVE ALL UNSUITABLE TOPSOIL, INCLUDING ALL ROCKS OR OTHER MATERIAL LARGER THAN 1 INCHES IN ANY DIRECTION, ALL CONCRETE, TRASH, DEBRIS, WEEDS, ROOTS AND OTHER WASTE MATERIALS. AFTER THAT TIME ORGANIC AMENDMENTS SHALL THEN BE THOROUGHLY TILLED AND INCORPORATED TO A MINIMUM 6" DEPTH IN THESE AREAS AT THE MINIMUM OF RATE OF 3 CU. YDS. / 1,000 SQ.FT.
14. UNIFORMLY COMPACT AND FINE GRADE THESE SOD / GRASS AREAS AND PLANTING BEDS TO A SMOOTH SURFACE, FREE FROM IRREGULAR SURFACE CHANGES. CUT OUT SOFT SPOTS, FILL IN LOW SPOTS AND TRIM HIGH SPOTS TO COMPLY WITH REQUIRED GRADE TOLERANCES.
15. ONCE COMPACTED AND FINE GRADED, ALL ROCKS, DEBRIS, WASTE MATERIAL AND VEGETATION MATERIAL LARGER THAN 1/2" WILL BE RAKED FROM THE SURFACE AND REMOVED FROM SITE.
16. SOD TO BE 100% COLORADO GROWN DURA-TURF TALL FESCUE BLEND SPECIFICALLY GROWN FOR LOW WATER LAWN APPLICATIONS WITH MINIMUM THREE (3) IMPROVED VARIETIES, HAVING A HEALTHY VIGOROUS ROOT SYSTEM. ONCE TURF IS LAID IT SHALL BE PROPERLY ROLLED, COMPACTED AND PUSHED TOGETHER TO ELIMINATE ANY GAPS BETWEEN ROLL EDGES. APPLY FERTILIZER IN THESE AREAS PER SOD FARM'S RECOMMENDATIONS.
17. ALL PLANT MATERIALS ARE SIZED AND OUTLINED IN PLANT LIST. ALL PLANTS TO BE PLANTED IN AMENDED SOIL AND STAKED AS SHOWN IN DETAILS. ALL PLANT MATERIAL SHALL MEET OR EXCEED THE CODE OF STANDARDS CURRENTLY RECOMMENDED BY THE COLORADO NURSERY ACT FOR NUMBER ONE GRADE.
18. IF PLANTS ARE IN NEED OF REPLACEMENT DUE TO DECLINING HEALTH, DISEASE, OR DEATH, THE PLANTS MUST BE REPLACED WITH THE ORIGINAL SPECIES UNLESS APPROVED BY THE CITY.
19. CHANGES IN PLANT SPECIES OF PLANT LOCATIONS FROM WHAT IS LISTED ON THE LANDSCAPE PLAN WILL REQUIRE THE APPROVAL OF THE CITY PRIOR TO INSTALLATION OF REPLACEMENT. OVERALL QUANTITY AND QUALITY TO BE CONSISTENT WITH THE APPROVED PLANS. IN THE EVENT OF CONFLICT WITH THE QUANTITIES INCLUDED IN THE PLANT LIST, SPECIES AND QUANTITIES SHALL BE PROVIDED.
20. ALL TREES AND SHRUBS TO BE BALLED AND BURLAPPED, OR CONTAINERIZED.
21. ALL PLANT MATERIAL SHALL HAVE ALL WIRE, TWINE, BASKETS, BURLAP, AND ALL OTHER NON-BIODEGRADABLE CONTAINMENT MATERIAL REMOVED FROM THE TRUNK AND/OR ROOT BALL OF THE PLANT, PRIOR TO PLANTING.
22. ALL SHRUB BEDS SHALL HAVE MINIMUM 4" DEPTH SHREDDED CEDAR MULCH OR NATURAL COLOR AND/OR WASHED SMOOTH RIVER ROCK. A CONTINUOUS LAYER OF TYPAR LANDSCAPE FABRIC OR APPROVED EQUAL SHALL BE INSTALLED IN ALL SHRUB BEDS WITH 6" OVERLAP AT SEAMS WITH 4" STAPLES 4' O.C. IN ALL DIRECTIONS.
23. EDGING BETWEEN GRASS TYPES AND SHRUB BEDS / ROCK COBBLE AND CRUSHER FINES SHALL BE 14 GA HEAVY DUTY STEEL EDGER MIN. ¼" x 4" WITH ROLLED TOP AND SHALL BE SET LEVEL WITH THE TOP OF THE ADJACENT SOD.

General Notes:

1. ALL SIGNS SHALL BE REQUIRED TO APPLY FOR A SIGN PERMIT.
2. PROPOSED GRADES SHALL MATCH OR IMPROVE EXISTING GRADES TO PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING WHILE PROVIDING A SMOOTH TRANSITION BETWEEN ALL ADJACENT UNDISTURBED GRADES AND PROPOSED GRADES.
3. JOB SITE TO BE KEPT CLEAN AT ALL TIMES AND CONSTRUCTION AREAS ARE TO BE MAINTAINED FOR SAFETY.
4. SOILS DISTURBED ADJACENT TO WORK AREA, INCLUDING AREAS OUTSIDE OF CONSTRUCTION LIMITS, DUE TO NEW CONSTRUCTION ARE TO BE REGRADED AND SURFACE CONDITIONS REPAIRED EQUIVALENT TO THAT CONDITION PRIOR TO START OF WORK.
5. PROTECT EXISTING SURFACES AND SOILS, BOTH INSIDE AND OUTSIDE OF CONSTRUCTION LIMITS, DURING CONSTRUCTION. IF GRADES, CONCRETE OR ASPHALT ARE DAMAGED DUE TO CONSTRUCTION OPERATIONS OR WEATHER THE CONTRACTOR IS RESPONSIBLE FOR REPAIR TO THAT EQUIVALENT TO EXISTING CONDITIONS AT NO EXPENSE TO THE OWNER / CITY.
6. CONTRACTOR IS RESPONSIBLE FOR SETUP OF BARRICADES, WARNING SIGNAGE, OR OTHER PROTECTIVE DEVICES IF ANY EXCAVATIONS ARE LEFT EXPOSED AFTER ON-SITE WORK HOURS.
7. THE CONTRACTOR SHALL NOT PURPOSEFULLY PROCEED WITH ANY CONSTRUCTION PER PLANS PROVIDED WHEN OBSTRUCTIONS AND/OR GRADE DIFFERENCES EXIST THAT WERE NOT CONSIDERED OR CHANGED AFTER PLANS WERE SUBMITTED. CONTRACTOR SHALL NOTIFY OWNER OR OWNER'S REPRESENTATIVE AND THE CITY OF LOVELAND IF SITUATION ARISES AND REVISIONS ARE NECESSARY.
8. THE CONTRACTOR SHALL PREVENT SEDIMENT, DEBRIS AND OTHER POLLUTANTS FROM ENTERING ANY STORM WATER SEWER SYSTEM OR, ADJACENT WATER WAYS, ETC., DURING THE DEMOLITION OR CONSTRUCTION OPERATIONS THAT ARE PART OF THIS PROJECT. THE CONTRACTOR SHALL BE HELD RESPONSIBLE AND EXPENSE FOR THE CORRECTION OF ANY ADVERSE IMPACTS TO THE STORM WATER SEWER SYSTEM OR, ADJACENT WATER WAYS, WETLANDS ETC., RESULTING FROM THE WORK DONE AS PART OF THIS PROJECT/CONTRACT.
9. THE CONTRACTOR SHALL BE RESPONSIBLE PRIOR TO BIDDING AND CONSTRUCTION, OF BECOMING AWARE OF ALL EXISTING AND PROPOSED UTILITIES, PIPES, STRUCTURES, ETC. CALL UNCC THREE DAYS BEFORE SCHEDULED WORK AT 811 OR 1-800-922-1987.

Tree Protection Notes

1. HEAVY EQUIPMENT SHOULD NOT BE ALLOWED TO COMPACT OVER THE SOIL OVER THE ROOT ZONE OF PROTECTED EXISTING TREES.
2. AVOID CUTTING SURFACE ROOTS WHEREVER POSSIBLE. SIDEWALKS AND PAVING LEVELS SHOULD BE CONTOURED SUFFICIENTLY TO AVOID DAMAGE.
3. ROOT CUTS FROM EXCAVATION SHOULD BE DONE RAPIDLY. SMOOTH FLUSH CUTS SHOULD BE MADE. BACKFILL BEFORE THE ROOTS HAVE A CHANCE TO DRY OUT AND WATER THE TREE IMMEDIATELY.
4. PRIOR TO CONSTRUCTION, ALL PROTECTED TREES SHALL HAVE ORANGE PROTECTION BARRIER FENCING ERECTED, WHICH AS A MINIMUM ARE SUPPORTED BY 1" X 1" OR SIMILAR STURDY STOCK, FOR SHIELDING OF PROTECTED TREES, NO CLOSER THAN SIX (6) FEET FROM THE TRUNK OR ONE HALF (1/2) OF THE DRIP LINE, WHICH EVER IS GREATER. WITHIN THIS PROTECTION ZONE THERE SHALL BE NO MOVEMENT OF EQUIPMENT OR STORAGE OF EQUIPMENT, MATERIALS, DEBRIS, FILL OR CUT UNLESS APPROVED BY THE CITY FORESTER.
5. WITHIN THE DRIP LINE OF ANY PROTECTED EXISTING TREE, THERE SHALL BE NO CUT OR FILL OVER A FOUR INCH DEPTH UNLESS A QUALIFIED ARBORIST OR FORESTER HAS EVALUATED AND APPROVED THE DISTURBANCE.
6. DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE APPLICANT SHALL PREVENT THE CLEANING OF EQUIPMENT OR MATERIAL OR THE STORAGE OR DISPOSAL OF WASTE MATERIAL SUCH AS PAINTS, OILS, SOLVENTS, ASPHALT, CONCRETE, MOTOR OIL OR ANY OTHER MATERIAL HARMFUL TO THE LIFE OF A TREE, WITHIN THE DRIP LINE OF ANY PROTECTED TREE OR GROUP OF TREES.
7. NO DAMAGING ATTACHMENT, WIRES, SIGNS OR PERMITS MAY BE FASTENED TO ANY PROTECTED TREE.

Native Grass Seed Mix

NATIVE GRASS - NATIVE PRAIRIE MEADOW GRASS MIX:

1. SEED SHALL BE AS MANUFACTURED BY ARKANSAS VALLEY SEED SOLUTIONS, 4625 COLORADO BOULEVARD, DENVER, CO 80216, (877) 957-3337.
2. SEED SHALL BE A MIXTURE THAT MATCHES THE FOLLOWING:

NON-IRRIGATED FOOTHILLS MIX

COMMON NAME	%
ANNUAL RYEGRASS	20%
SLENDER WHEATGRASS	15%
CRESTED WHEATGRASS	12%
MOUNTAIN BROME	10%
HARD FESCUE	10%
CANADA BLUEGRASS	10%
SIDEOATS GRAMA	6%
BIG BLUESTEM	5%
BLUE GRAMA (COATED)	5%
SAND DROPSEED	1%

3. DRILLED APPLICATION RATE: 25.0 LBS (PLS) PER ACRE (0.57 LBS / 1000 SF
4. NATIVE SEED AREAS: ADEQUATE TEMPORARY IRRIGATION OR BY WATER TRUCK WILL BE PROVIDED FOR THE ESTABLISHMENT AND MAINTENANCE FOR THESE SEEDED AREAS, AND THAT NATIVE GRASSES SHALL BE MAINTAINED IN A CONDITION OF ACCEPTABLE HEIGHT, FREE OF WEEDS, TRASH AND DEBRIS, AND SHALL NOT REPRESENT A FIRE HAZARD NOR BECOME A NUISANCE SITE FOR WATER OR WIND EROSION.

MULCH IN ALL NATIVE SEED AREAS:

1. IMMEDIATELY FOLLOWING THE RAKING OPERATION, ADD STRAW MULCH TO THE SEEDED AREAS.
2. APPLY STRAW MULCH AT A MINIMUM OF 1.5 TONS PER ACRE OF AIR DRY MATERIAL. SPREAD STRAW MULCH UNIFORMLY OVER THE AREA WITH MECHANICAL MULCH SPREADER / CRIMPER. DO NOT MULCH WHEN WIND VELOCITY EXCEEDS 10 MPH.
3. WHEREVER THE USE OF CRIMPING EQUIPMENT IS PRACTICAL, PLACE MULCH IN THE MANNER NOTED ABOVE AND ANCHOR IT INTO THE SOIL. USE A DISC SUCH AS A MULCH TILLER, WITH A FLAT SERRATED DISC AT LEAS ½ INCH IN THICKNESS, HAVING DULL EDGES, AND SPACE NO MORE THAN 9 INCHES APART, WITH DISCS OF SUFFICIENT DIAMETER TO PREVENT THE FRAME OF THE EQUIPMENT FROM DRAGGING THE MULCH. ANCHOR MULCH A MINIMUM DEPTH OF 2 INCHES AND ACROSS THE SLOPE WHERE PRACTICAL WITH NO MORE THAN TWO PASSES OF THE ANCHORING EQUIPMENT.
4. IMMEDIATELY UPON COMPLETION OF THE MULCHING AND BINDING OPERATION, THE SEEDED AREAS SHALL BE IRRIGATED, KEEPING THE TOP 2 INCHES OF SOIL EVENLY MOIST UNTIL SEED HAS UNIFORMLY GERMINATED AND GROWN TO A HEIGHT OF 2-INCHES.
5. WATERING APPLICATION SHALL BE DONE IN A MANNER WHICH WILL PROVIDE UNIFORM COVERAGE BUT WHICH WILL NOT CAUSE EROSION, MOVEMENT, OR DAMAGE TO THE FINISHED SURFACE.

Irrigation Notes

1. IRRIGATION CONTRACTOR SHALL VERIFY AVAILABLE P.S.I. AND GPM. THIS SYSTEM SHALL THEN BE VERIFIED TO MEET THE AVAILABLE P.S.I. AND GPM AND THE PROPOSED IRRIGATION SYSTEM. IF NECESSARY CONTACT THE WATER DEPARTMENT PRIOR TO BEGINNING DESIGN TO OBTAIN AVAILABLE PRESSURES.
2. ALL INDICATED SOD GRASS AREAS ARE TO BE IRRIGATED BY A PERMANENT UNDERGROUND AUTOMATIC IRRIGATION SYSTEM. TURF AREAS LESS THAN 25 FEET IN WIDTH ARE TO BE IRRIGATED WITH POP-UP SPRAY HEADS, AND AREAS GREATER THAN 25 FEET SHALL USE A ROTOR POP-UP SPRAY SYSTEM. ALL IRRIGATION SYSTEMS SHALL BE DESIGNED TO MINIMIZE OVERSPRAY.
3. ALL TREES, SHRUBS AND PERENNIALS OUTSIDE OF IRRIGATED SOD AREAS ARE TO BE IRRIGATED WITH A PERMANENT DRIP IRRIGATION SYSTEM. IRRIGATION SYSTEMS SHALL BE DESIGNED TO AVOID OVERSPRAY ONTO NON-PLANTED AND IMPERVIOUS SURFACES. IRRIGATION SYSTEMS SHALL BE MAINTAINED IN GOOD WORKING ORDER AND CHECKED TO ENSURE THAT OVERSPRAY DOES NOT OCCUR.
4. FINAL LOCATION OF IRRIGATION HEADS MUST BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO PLANTING. HEAD LOCATION SHALL BE COORDINATED IN THE FIELD WITH EXISTING SITE CONDITIONS AND PLANT MATERIAL.
5. ALL IRRIGATION TRENCHES SHALL BE PROPERLY WATERED AND COMPACTED TO AVOID FUTURE SETTLING. ANY SETTLING DURING WARRANTY PERIOD WILL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE OWNER.
6. COORDINATE ALL IRRIGATION WORK WITH EXISTING UTILITIES AND RESPECTIVE TRADES.
7. ALL IRRIGATION SLEEVING SHALL BE PROVIDED AND INSTALLED BY GENERAL CONTRACTOR. IRRIGATION CONTRACTOR SHALL COORDINATE SLEEVING LOCATIONS WITH GENERAL CONTRACTOR. ALL IRRIGATION SLEEVING TO BE STAKED IN THE FIELD OR LOCATED ON DIMENSIONED "AS-BUILT" DRAWING BY THE GENERAL CONTRACTOR TO ALLOW FUTURE USE AND LOCATION.

Plant List

DECIDUOUS TREES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	23	Celtis occidentalis Western Hackberry	2.0" cal. BB	60`	40`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	24	Gleditsia triacanthos `Skyline` Skyline Honey Locust	2.0" cal. BB	50`	30`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	26	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree	2.0" cal. BB	60`	40`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	22	Quercus buckleyi Texas Red Oak	2.0" cal. BB	40`	30`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	22	Quercus macrocarpa Burr Oak	2.0" cal. BB	80`	70`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	16	Tilia americana `Redmond` Redmond American Linden	2.0" cal. BB	50`	40`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	15	Picea abies `Cupressina` Fastigiate Norway Spruce	6`, BB	20`	6`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	7	Picea pungens Colorado Spruce	6`, BB	50`	30`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	17	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine	6`, BB	15`	8`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	7	Pinus strobiformis Southwestern White Pine	6`, BB	50`	30`	FULL SPECIMEN, EVENLY AND WELL BRANCHED

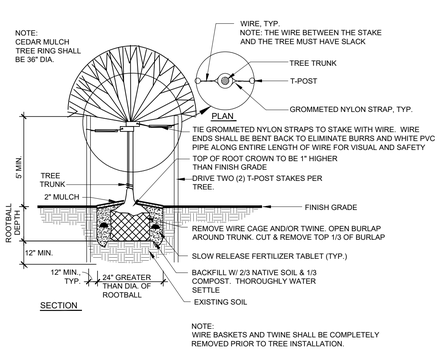
ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	8	Acer glabrum Rocky Mountain Maple	1.5" cal. BB	20`	15`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	9	Acer tataricum `GarAnn` Hot Wings Tatarian Maple	1.5" cal. BB	20`	15`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	4	Malus x `Spring Snow` Spring Snow Crab Apple	1.5" cal. BB	25`	20`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	5	Pyrus calleryana `Chanticleer` Chanticleer Pear	1.5" cal. BB	35`	25`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	4	Syringa reticulata Japanese Tree Lilac	1.5" cal. BB	25`	20`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	33	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry	5 gal.	8`	6`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	95	Buddleja davidii `Blue Chip` Dwarf Butterfly Bush	5 gal.	2`	3`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED
	52	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	65	Cornus sericea `Arctic Fire` Arctic Fire Dogwood	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	59	Cornus sericea `Isanti` Isanti Dogwood	5 gal.	5`	5`	24" (h) FULL SPECIMEN, EVENLY AN WELL BRANCHED
	64	Philadelphus x `Snowbell` Snowbell Mock Orange	5 gal.	3`	3`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	14	Physocarpus monogynus Mountain Ninebark	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	64	Physocarpus opulifolius `Summer Wine` Summer Wine Ninebark	5 gal.	4`	4`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED
	47	Prunus besseyi `Pawnee Buttes` Creeping Western Sand Cherry	5 gal.	2`	5`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED
	51	Rhus trilobata Three-Leaf Sumac	5 gal.	6`	6`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	61	Ribes aureum Golden Currant	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	27	Salix purpurea `Nana` Dwarf Arctic Willow	5 gal.	6`	6`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	63	Weigela florida Wine and Roses Wine and Roses Weigela	5 gal.	4`	4`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED

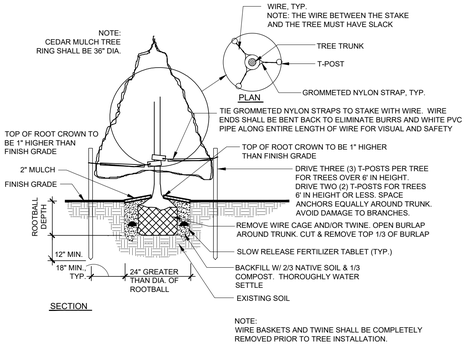
EVERGREEN SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	42	Arctostaphylos uva-ursi Kinnikinnick	5 gal.	6"	6`	12"(h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	29	Picea pungens `St. Mary`s Broom` St. Mary`s Broom Colorado Spruce	5 gal.	3`	4`	12" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	49	Pinus mugo `Mops` Miniature Mugo Pine	5 gal.	3`	3`	12"(h) FULL SPECIMEN, EVENLY AND WELL BRANCHED

GRASSES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	90	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED
	164	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass	1 gal.	5`	2.5`	WELL ROOTED AND ESTABLISHED
	96	Helictotrichon sempervirens Blue Avena Grass	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED
	125	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass	1 gal.	4`	2`	WELL ROOTED AND ESTABLISHED
	31	Panicum virgatum `Shenandoah` Shenandoah Red Switch Grass	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED

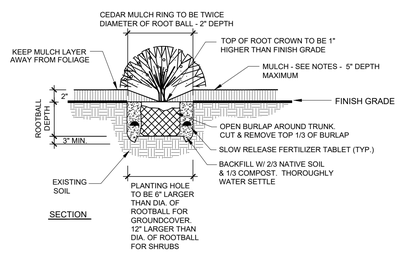
PERENNIALS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	30	Agastache rupestris `Sunset` Sunset Hyssop	1 gal.	3`	3`	WELL ROOTED AND ESTABLISHED
	50	Echinacea purpurea Purple Coneflower	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED
	38	Hemerocallis x `Red` Red Daylily	1 gal.	2`	2`	WELL ROOTED AND ESTABLISHED
	45	Hemerocallis x `Stella de Oro` Stella de Oro Daylily	1 gal.	2`	2`	WELL ROOTED AND ESTABLISHED
	53	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan	1 gal.	2`	2`	WELL ROOTED AND ESTABLISHED



DECIDUOUS TREE PLANTING DETAIL



CONIFER TREE PLANTING DETAIL



GROUND COVER & SHRUB PLANTING DETAIL

TB GROUP
landscape architecture | planning | illustration
444 Mountain Ave.
Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS | DATE

DATE

JUNE 21, 2021

SHEET TITLE

Landscape Notes, Details & Schedules

SHEET INFORMATION

Sheet Number: 7

Of: 7

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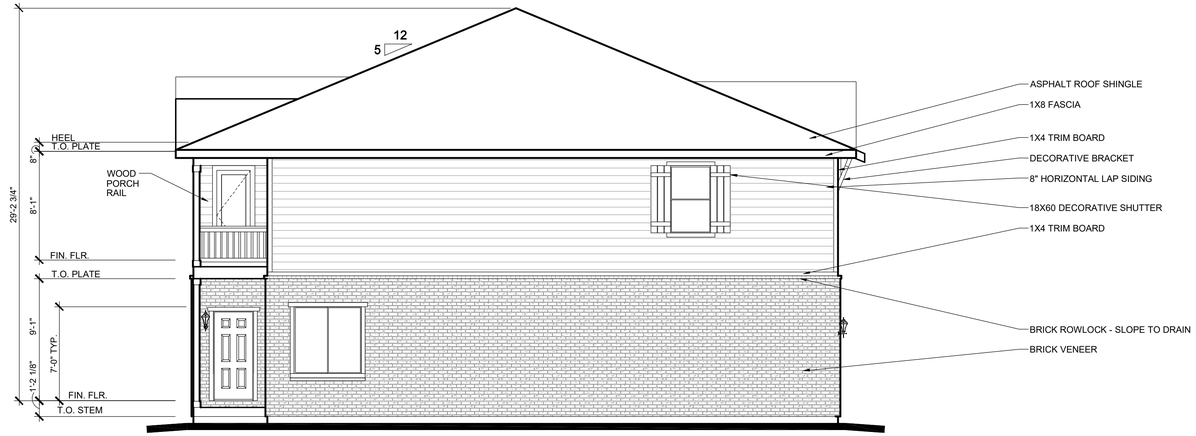

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1(LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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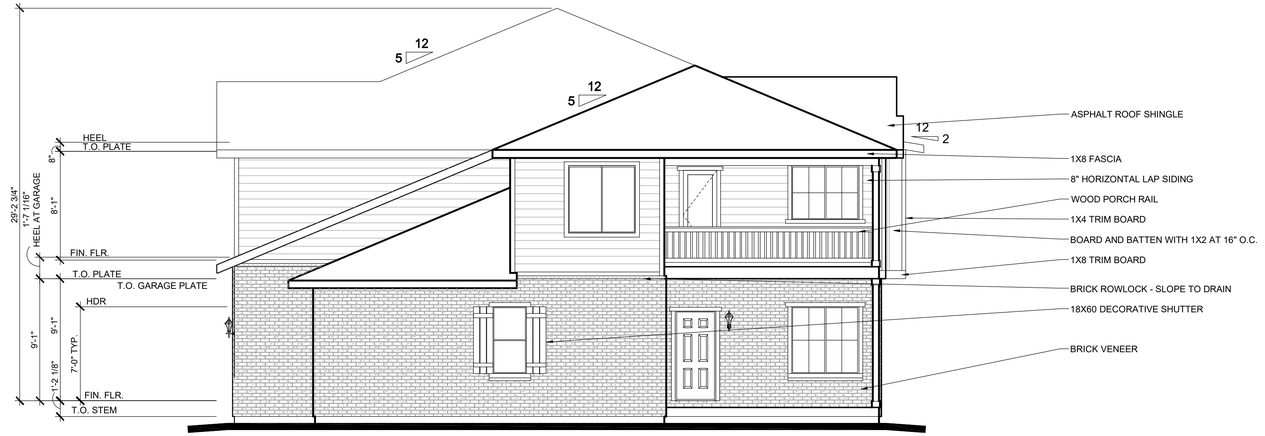
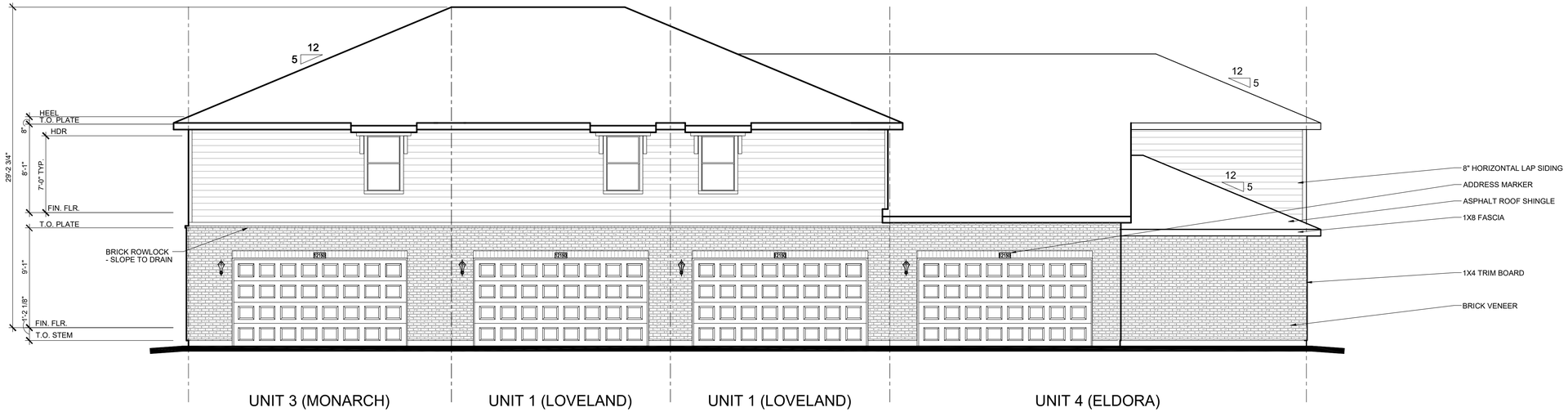


UNIT 4 (ELDORA)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 4 (ELDORA)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

FRONT ELEVATION

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4 PLEX - BLDG. 1 - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

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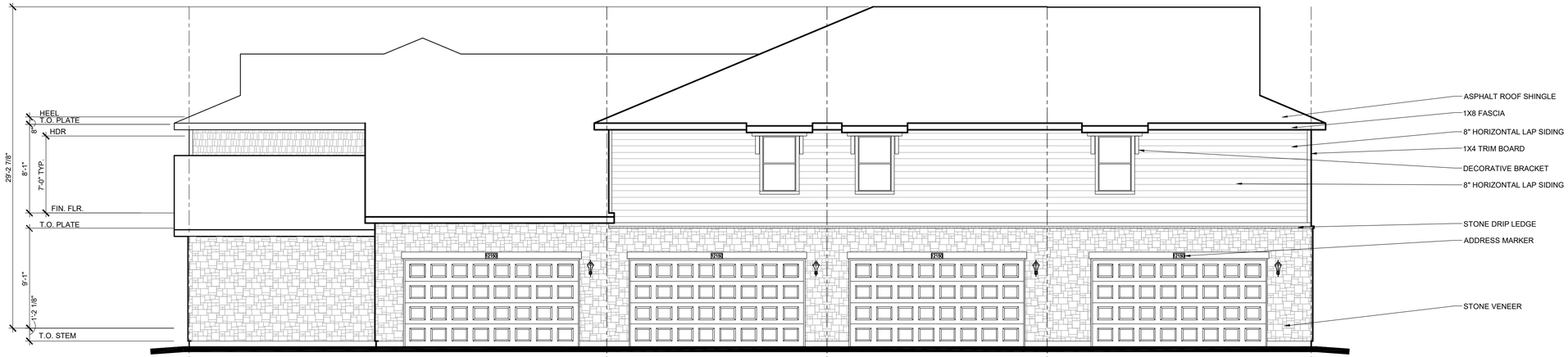

UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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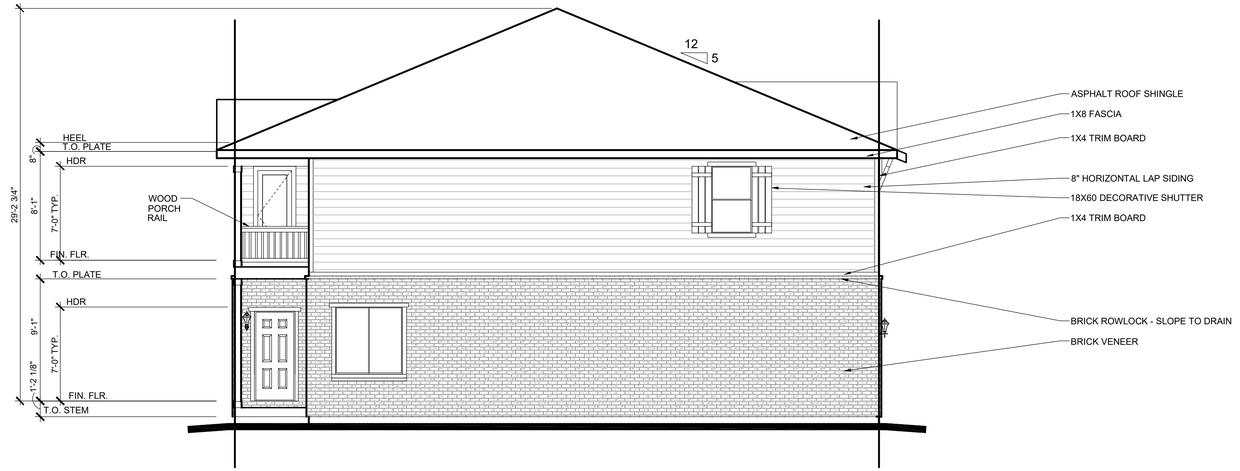

UNIT 3 (MONARCH)

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UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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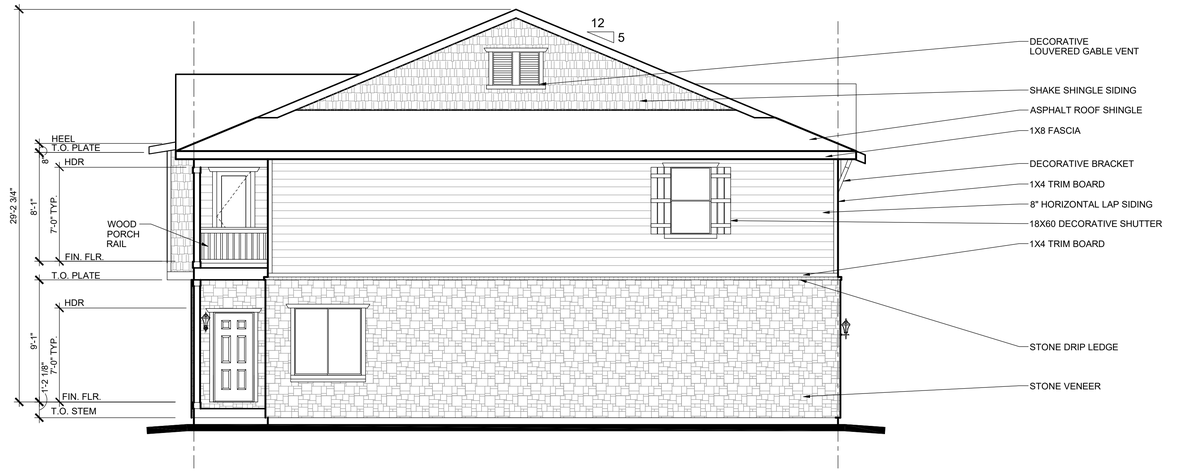

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UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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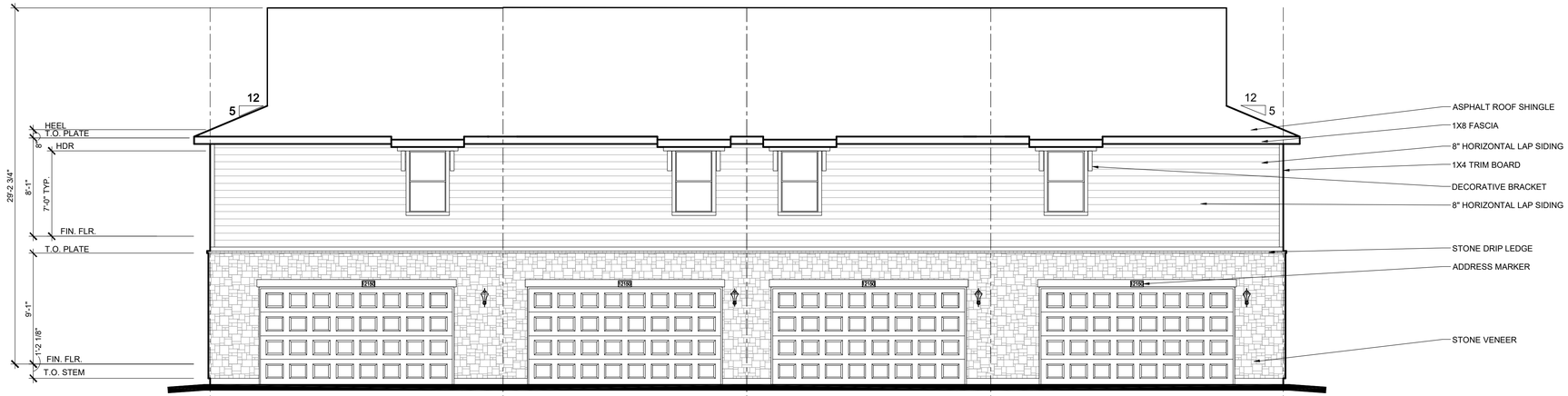

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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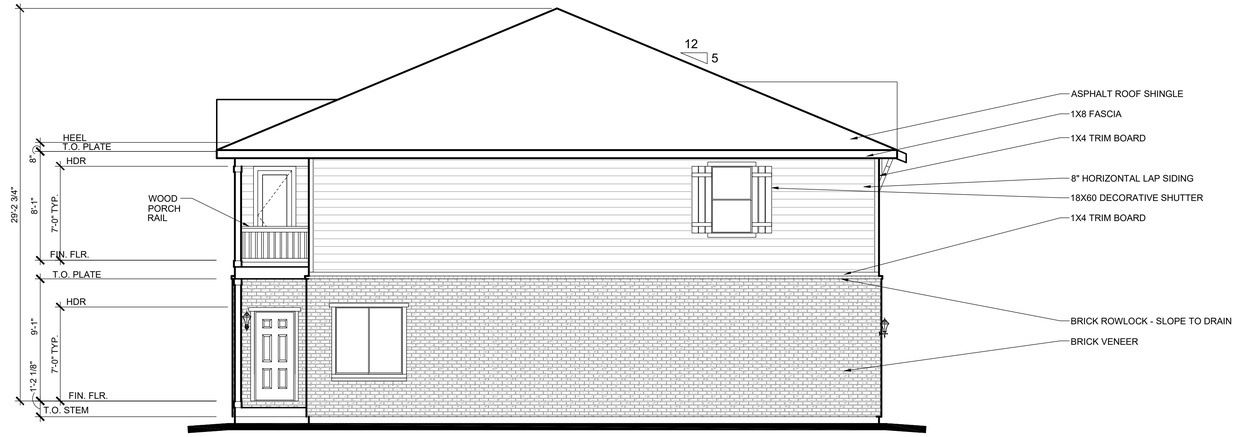

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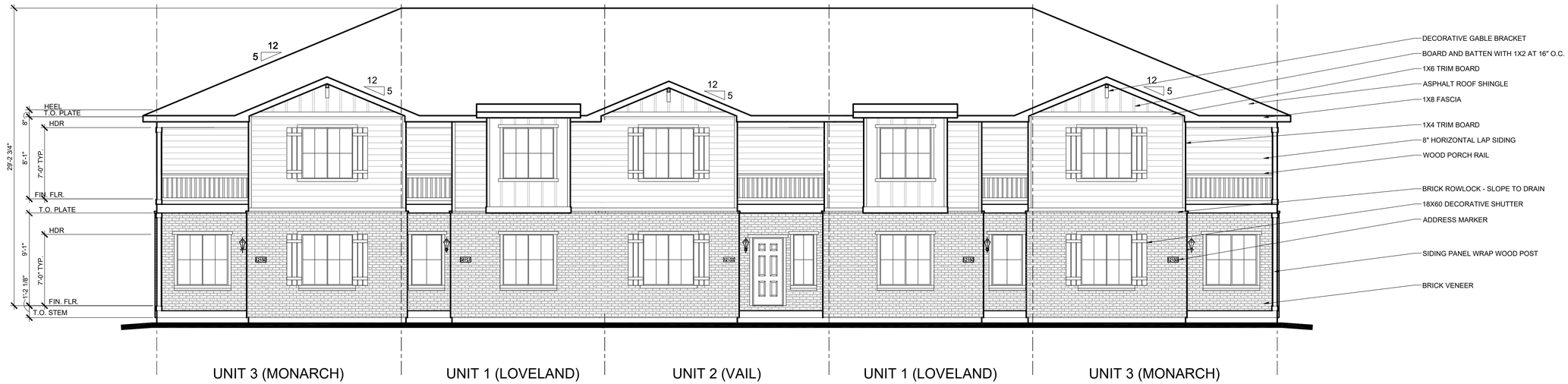

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

5 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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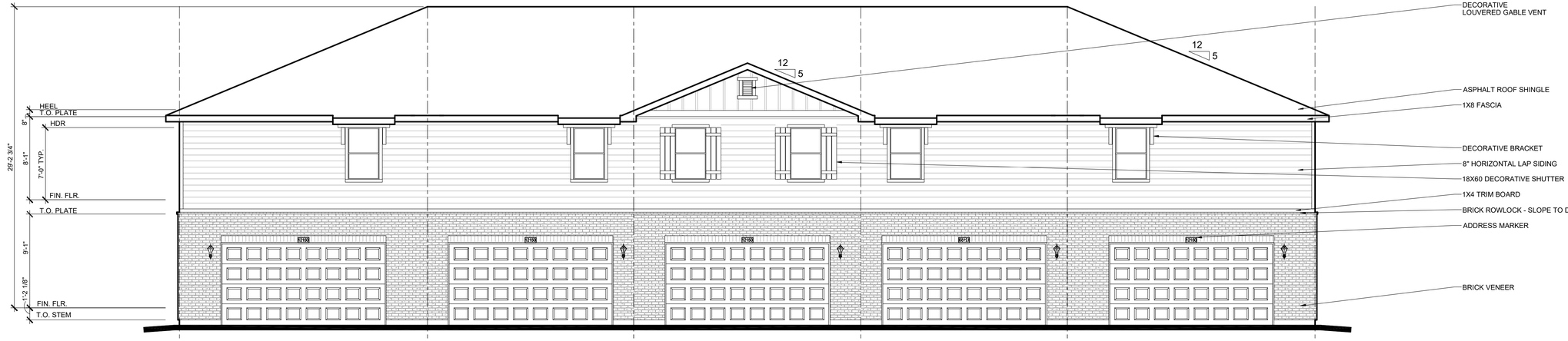

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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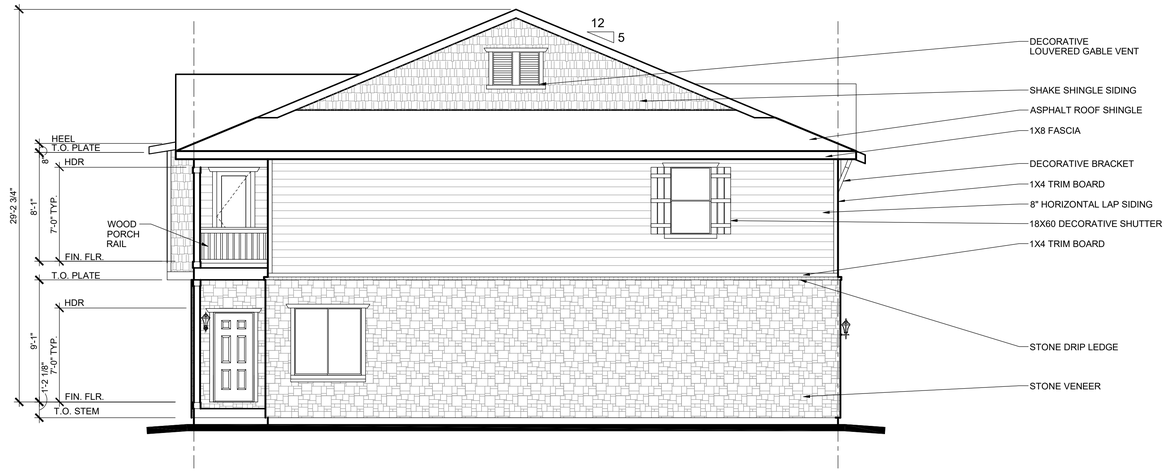

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

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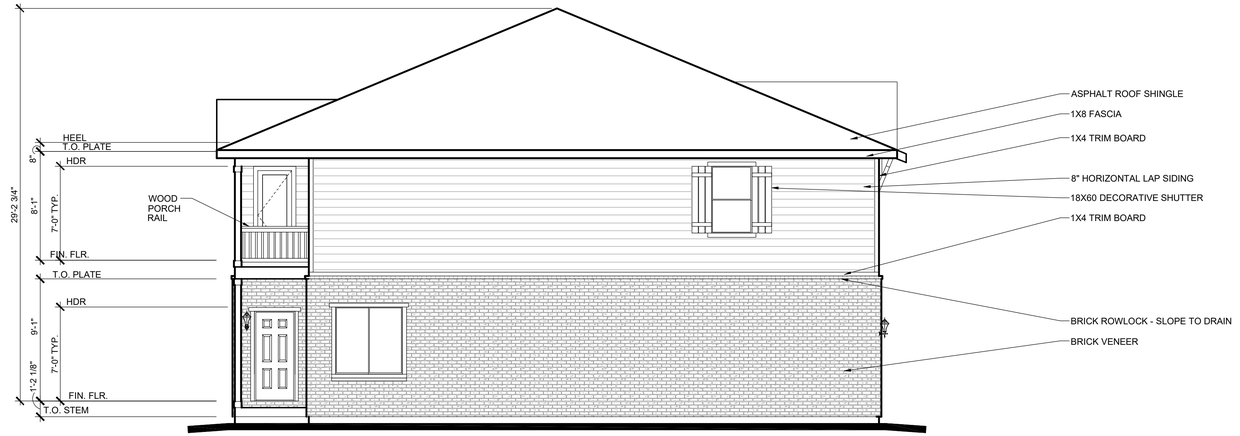

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

6 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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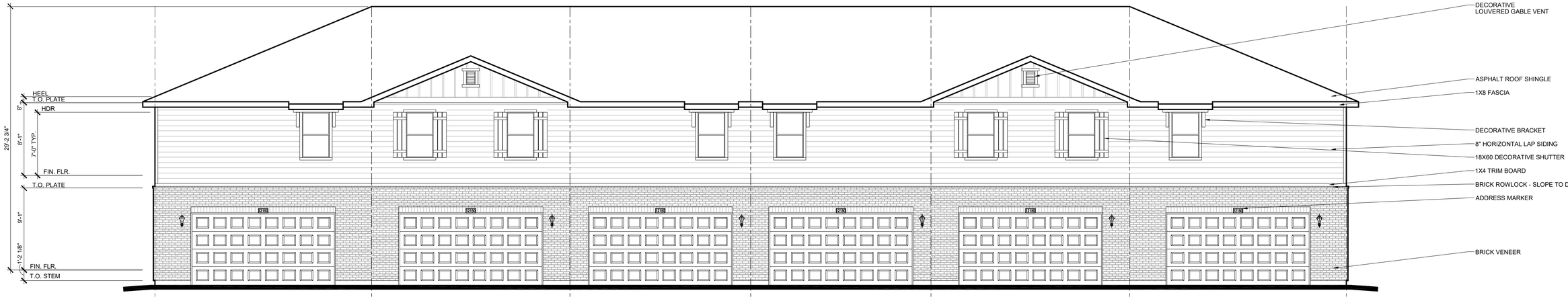

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

REAR ELEVATION

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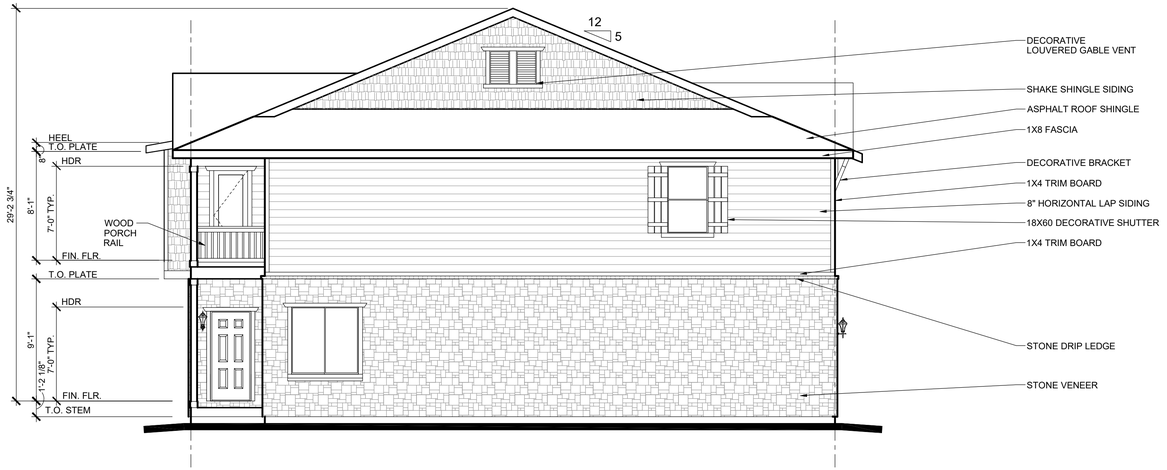

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

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6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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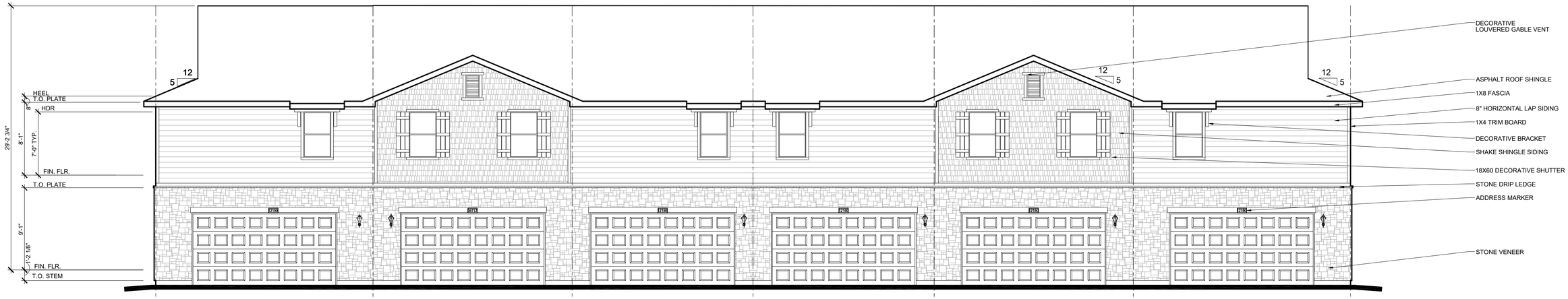

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

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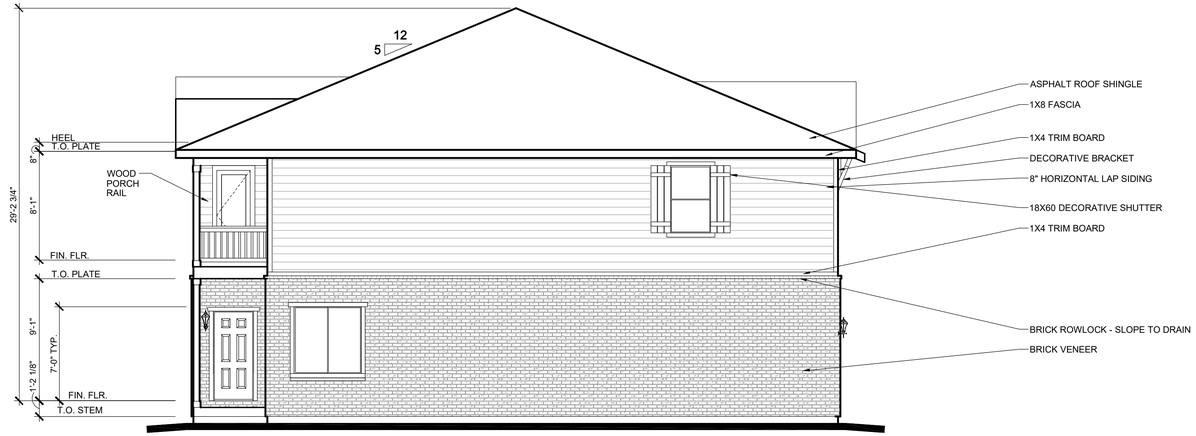

UNIT 3 (MONARCH)

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UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1(LOVELAND) UNIT 3 (MONARCH)

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4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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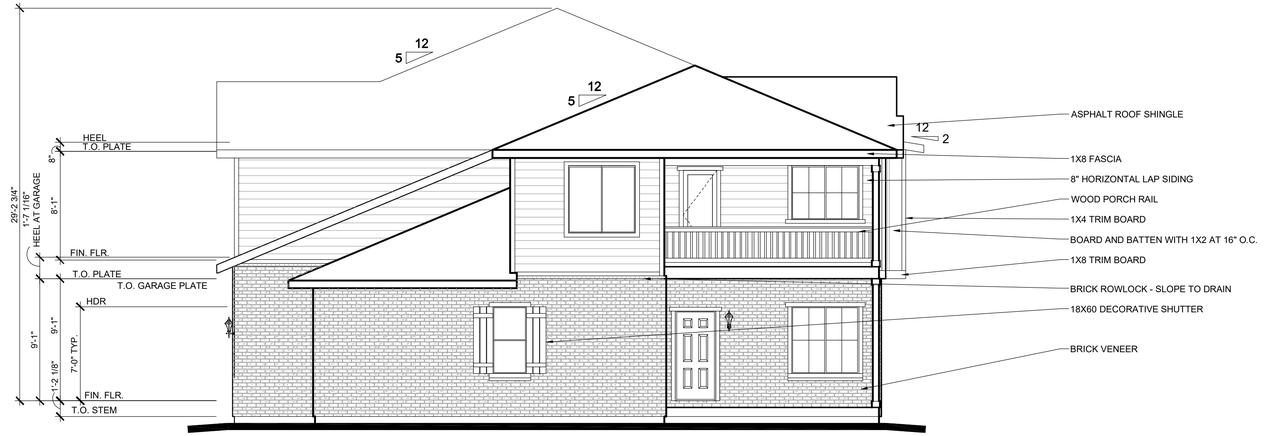

UNIT 4 (ELDORA)

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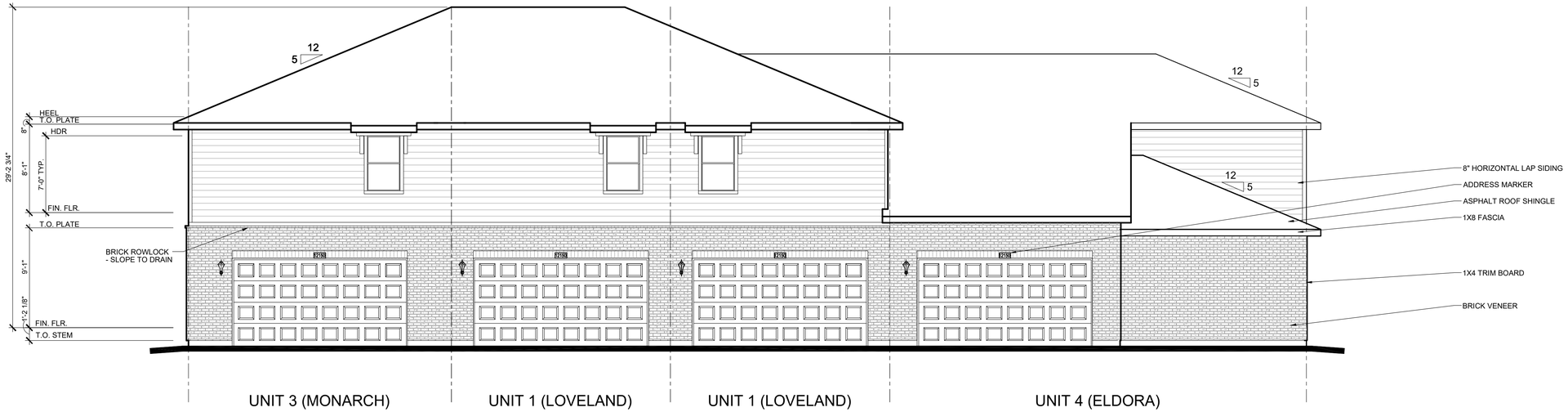

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

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UNIT 4 (ELDORA)

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UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

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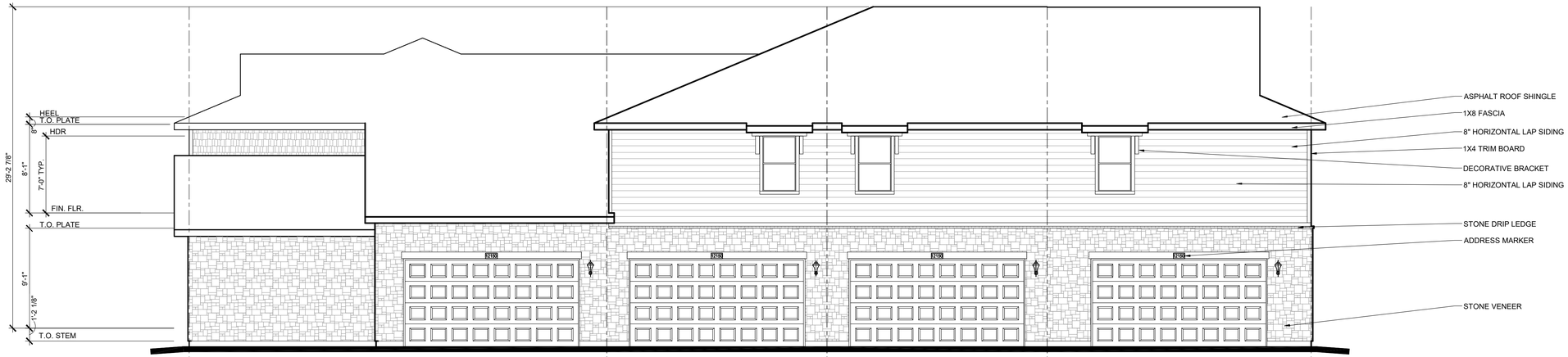

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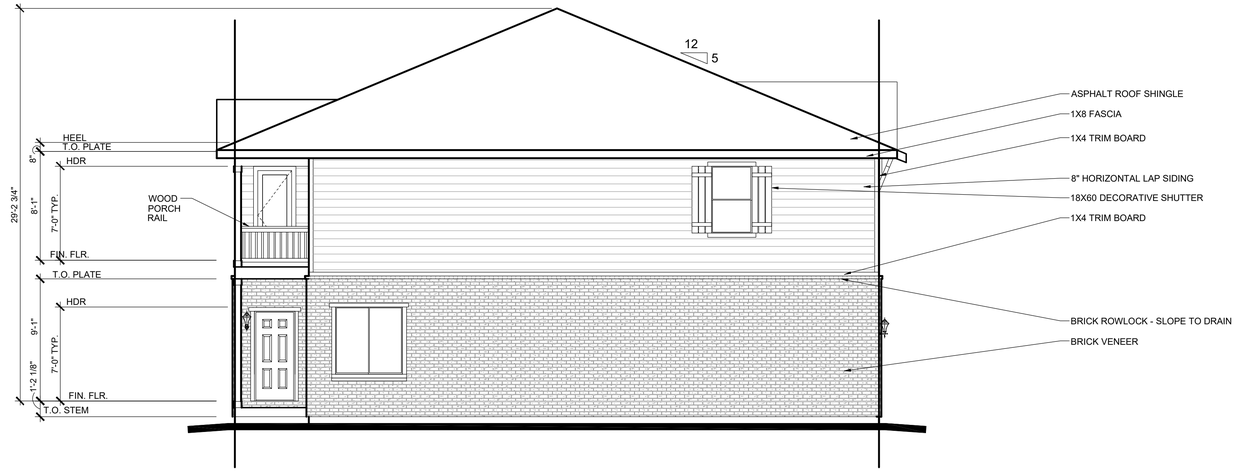

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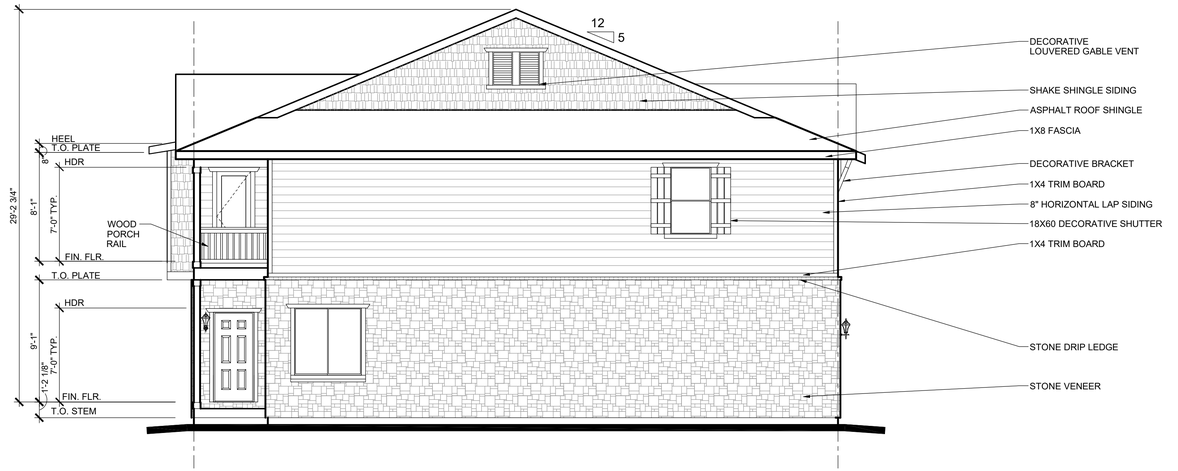

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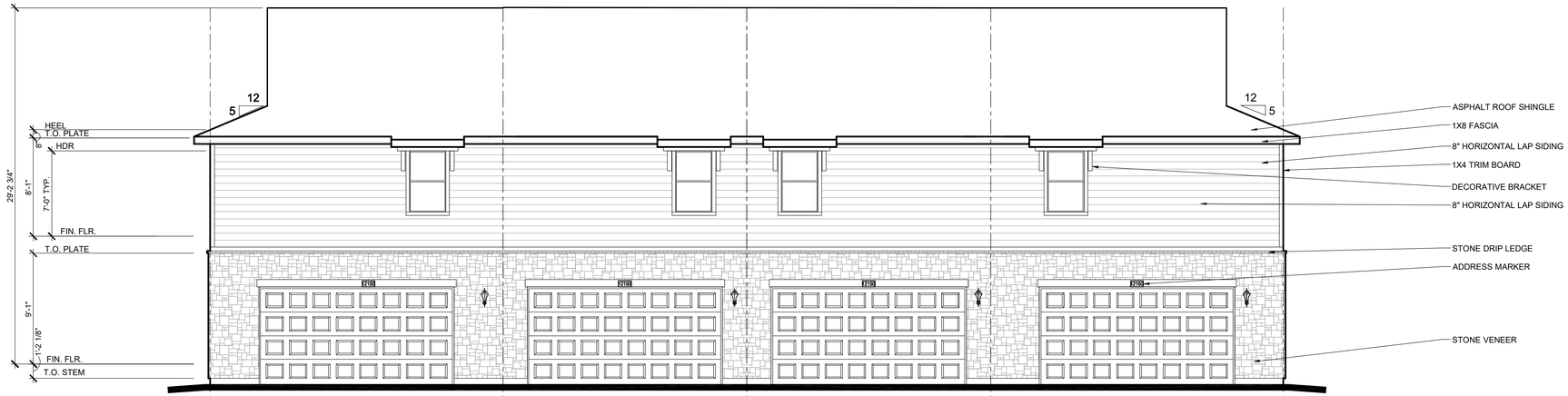

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION B 3/16" = 1'-0"

4 PLEX - BLDG. 2 - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

8-4-2021

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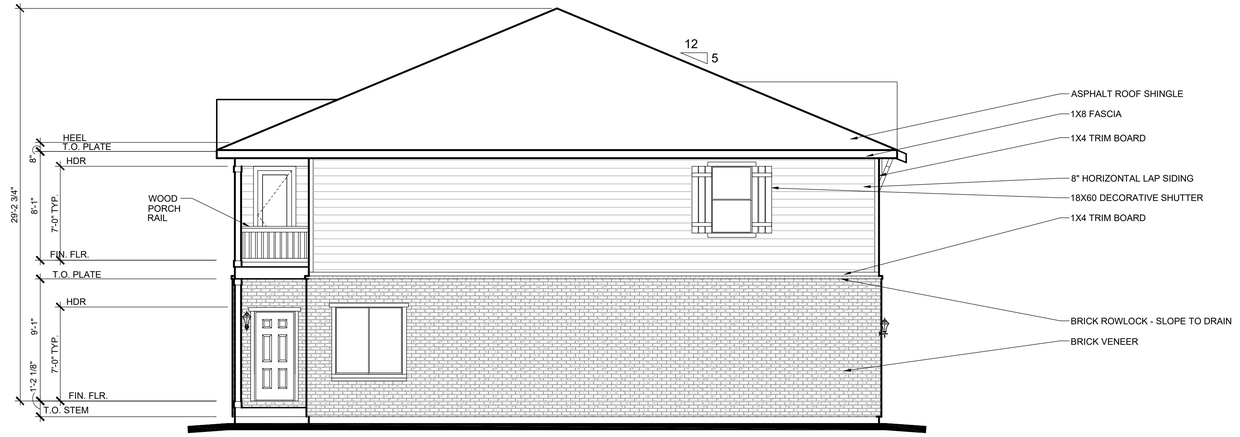
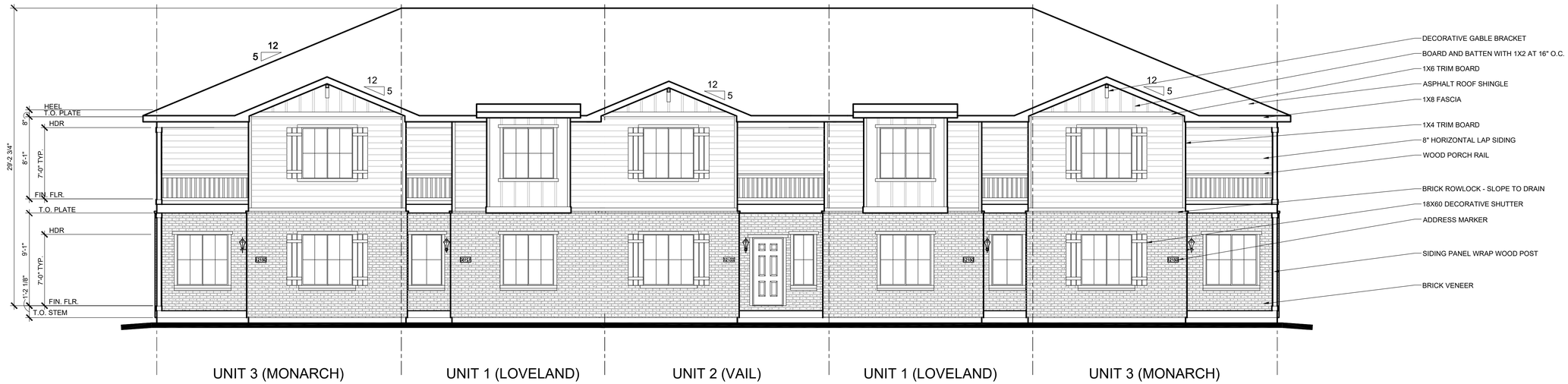


UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

5 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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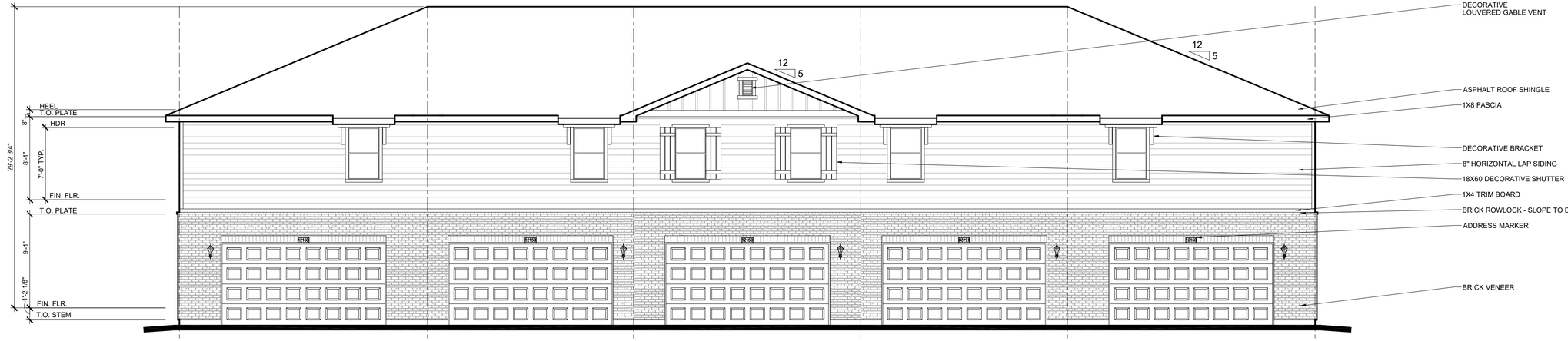
UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

5 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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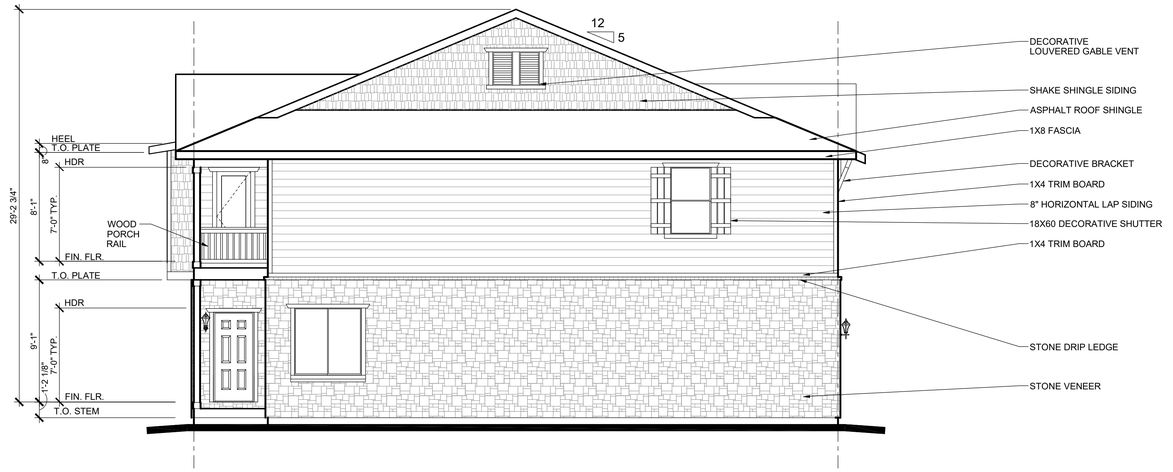

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

5 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION B 3/16" = 1'-0"

5 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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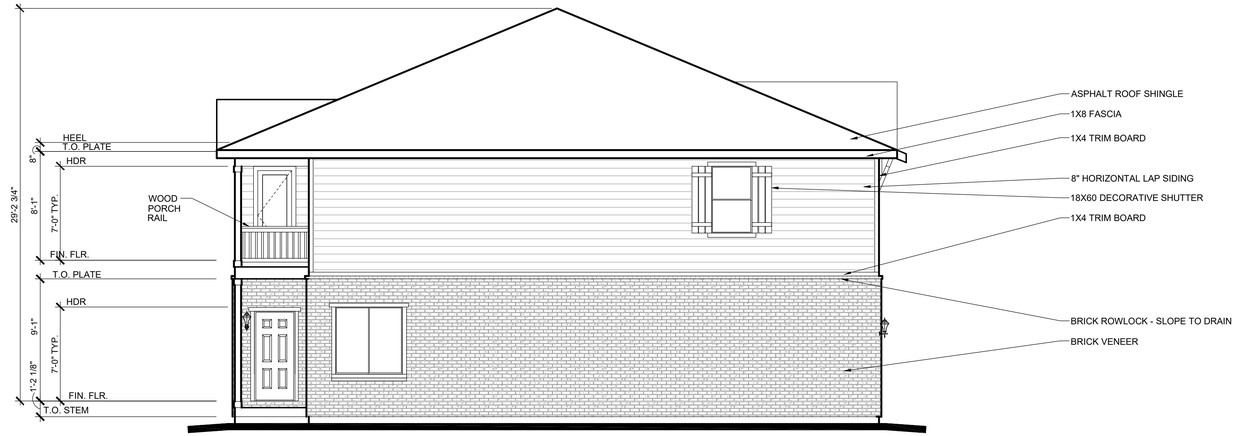

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

6 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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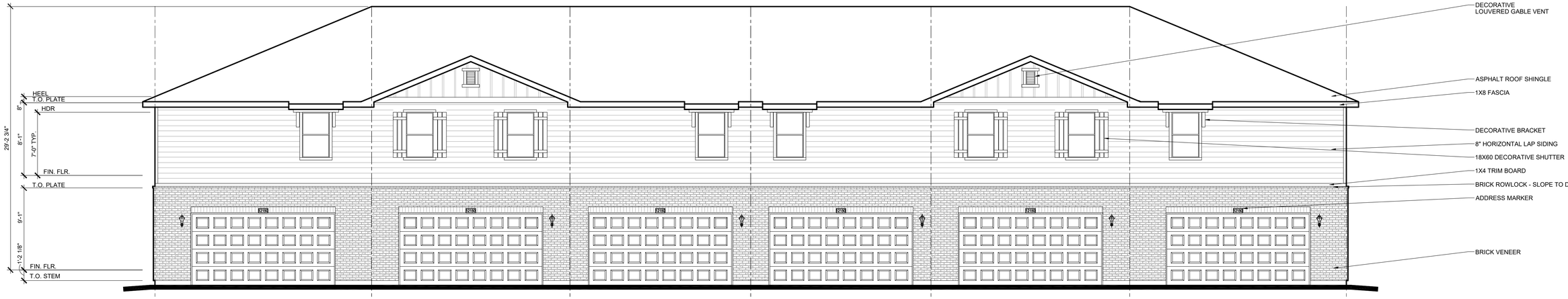
UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

6 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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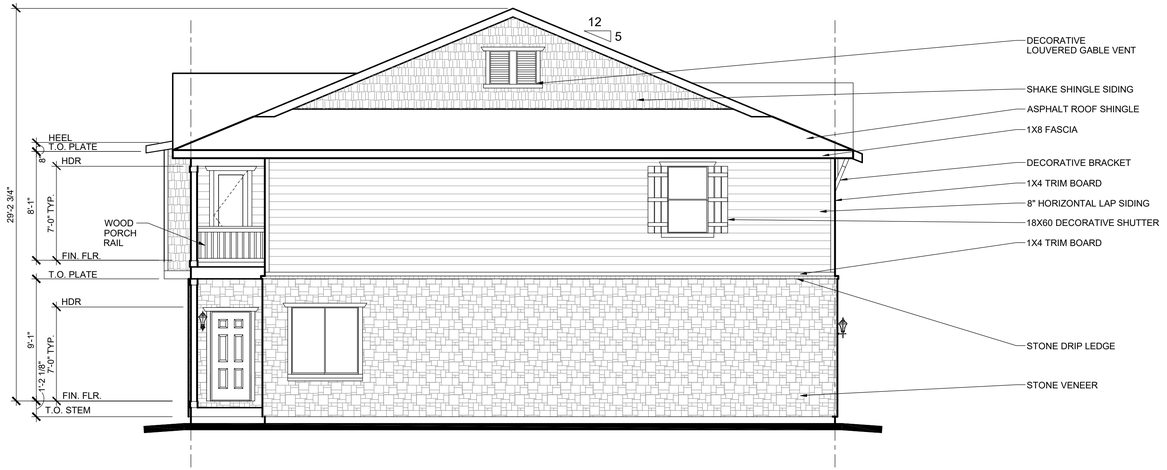

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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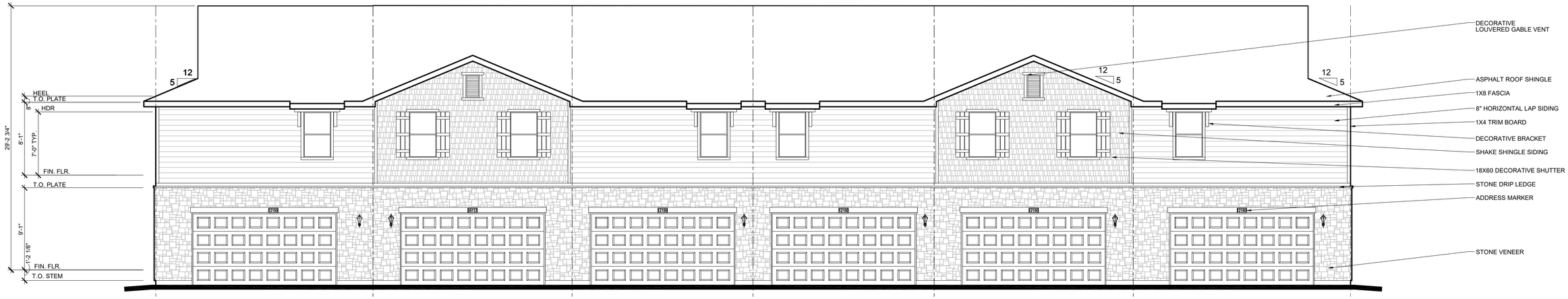

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

REAR ELEVATION

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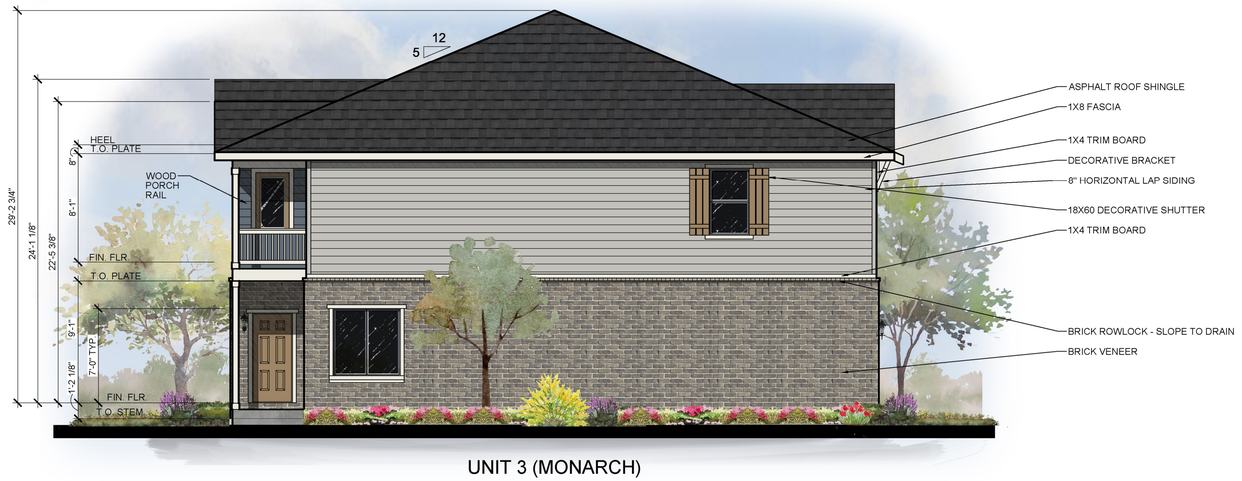

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 4 (ELDORA) | UNIT 1 (LOVELAND) | UNIT 1(LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 4 (ELDORA)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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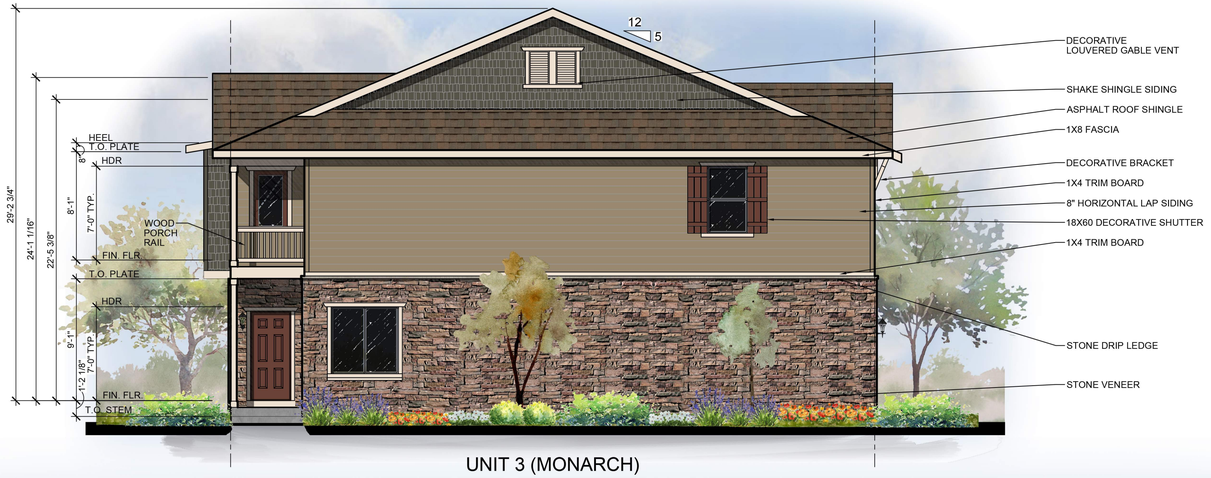

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

FRONT ELEVATION

ELEVATION B ELEVATION B 3/16" = 1'-0" 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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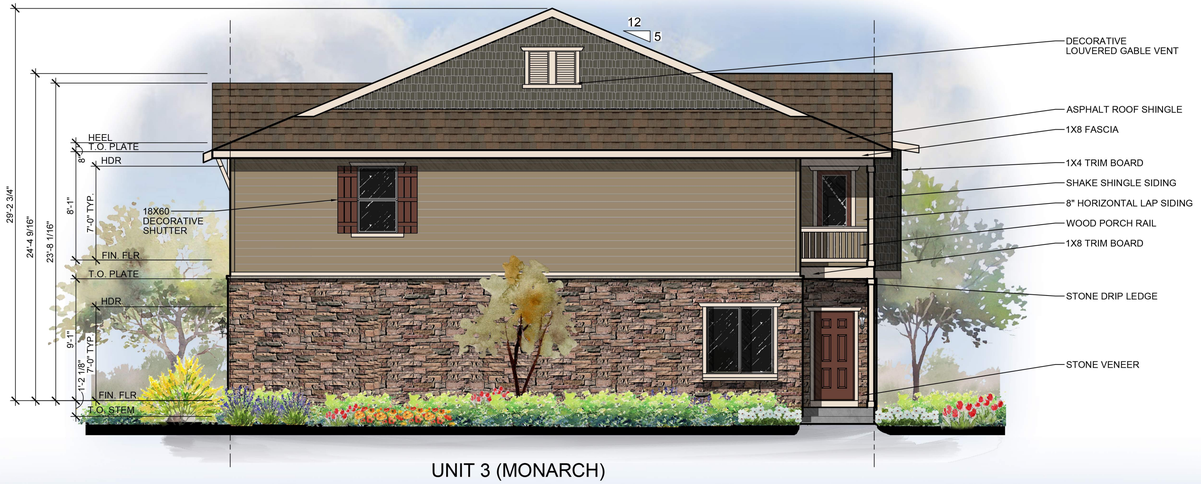

UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

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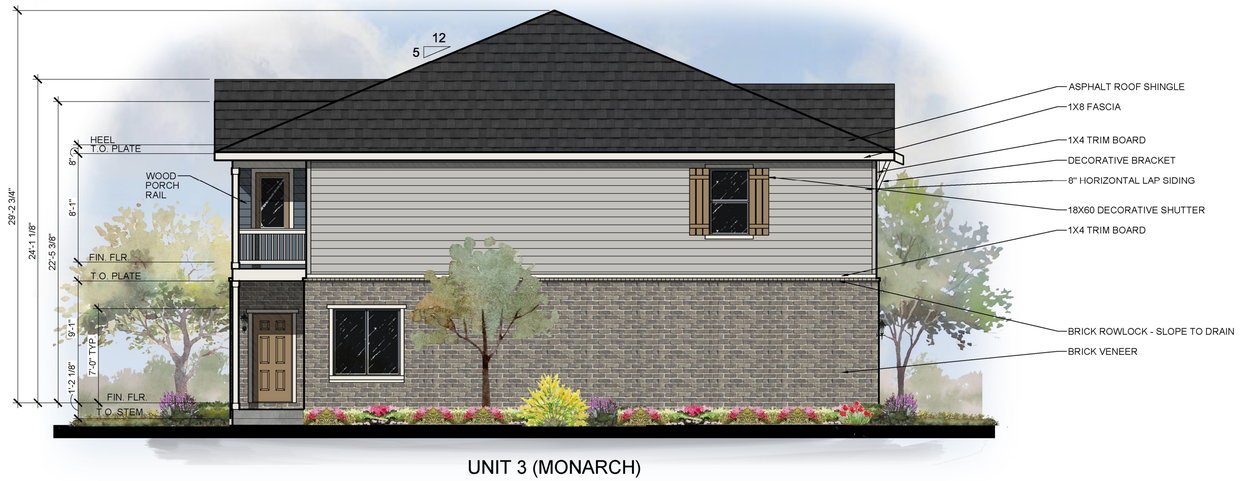

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UNIT 4 (ELDORA) | UNIT 1 (LOVELAND) | UNIT 1(LOVELAND) | UNIT 3 (MONARCH)

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4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 4 (ELDORA)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

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4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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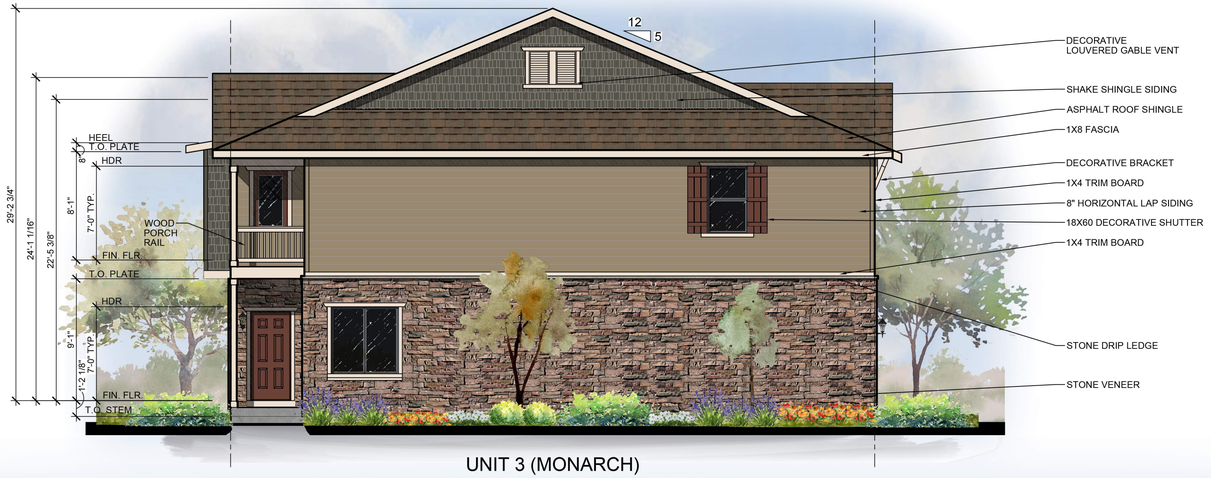

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B ELEVATION B 3/16" = 1'-0" 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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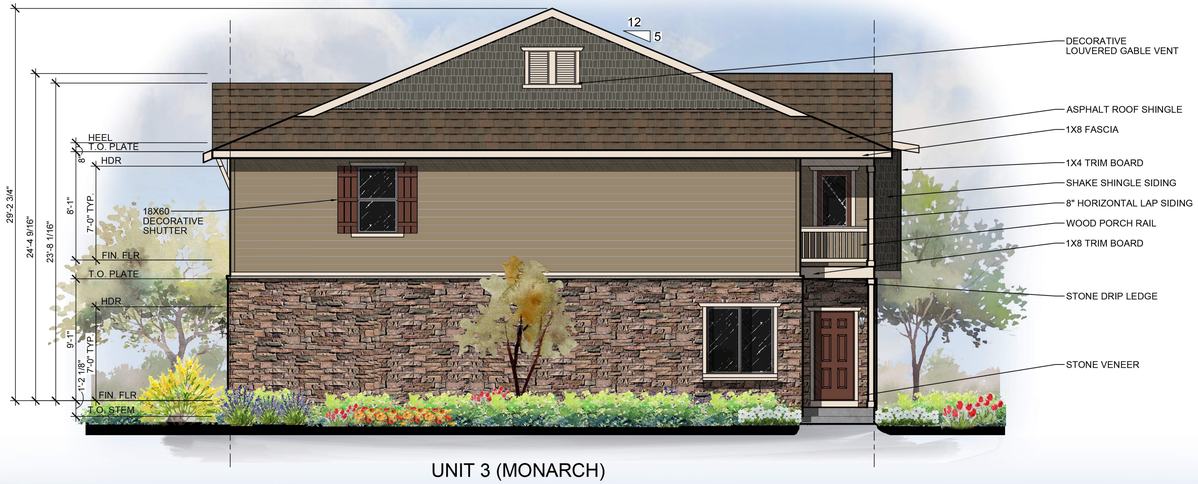

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UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

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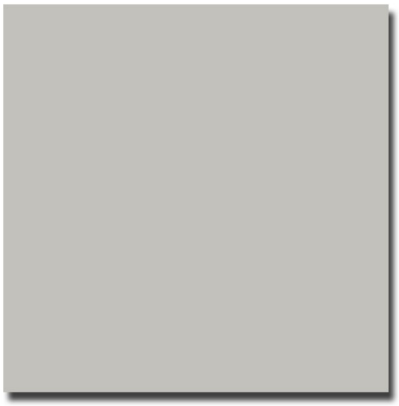
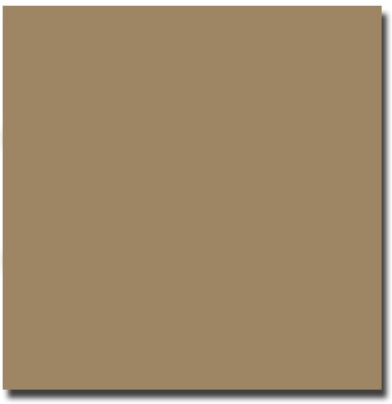
Color Scheme 1



Main Body
Light French Gray (SW 0055)
Mfg: Sherwin Williams

Accent Body
Granite Peak (SW 6250)
Mfg: Sherwin Williams

Trim
Alabaster (SW 7008)
Mfg: Sherwin Williams



Front Door
Hopsack (SW 6109)
Mfg: Sherwin Williams

Stone
TundraBrick - Ashland
Mfg: Eldorado Stone

Asphalt Shingles
Heritage Premium-Rustic Black
Mfg: Tamko

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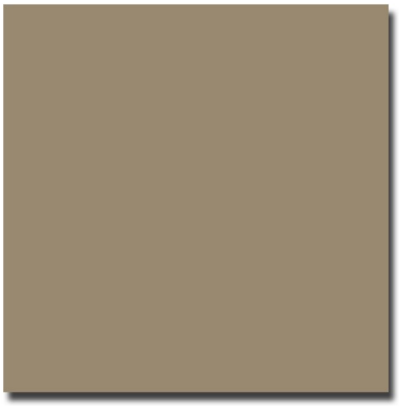
Color Scheme 2



Main Body -
Sawdust (SW 6158)
Mfg: Sherwin Williams

Accent Body -
Roycroft Bronze Green (SW 2846)
Mfg: Sherwin Williams

Trim -
Alluring White (SW 6343)
Mfg: Sherwin Williams

Front Door -
Aurora Brown (SW 2837)
Mfg: Sherwin Williams

Stone
Old Country Ledge - Chablis
Mfg: Coronado Stone

Asphalt Shingles
Heritage Premium - Mountain Slate
Mfg: Tamko

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Project: Cottonwood Townhomes (Filing 4)
Date: July 20, 2021
Client: Arbor Capital Partners

Prepared By: ARP
Job Number: 20002948

ATWELL

Cottonwood Greens
Overall: Phase 4

Storm Drainage

Item	Qty	Unit	Unit Cost	Item Cost	Description
12" Storm Sewer	93	LF	$ 40.00	$ 3,716.00	
18" Storm Sewer	105	LF	$ 50.00	$ 5,255.00	
24" Storm Sewer	463	LF	$ 60.00	$ 27,786.00	
30" Storm Sewer	321	LF	$ 75.00	$ 24,060.00	
Detention Pond	1	EA	$ 60,000.00	$ 60,000.00	Includes inlet/outlet structures, trickle channel, micropool, forebay, grading and seeding
5' Type R Inlet	6	EA	$ 5,500.00	$ 33,000.00	
Storm Sewer Manholes 4' Dia	5	EA	$ 4,500.00	$ 22,500.00	
Storm Sewer Manholes 6' Dia	2	EA	$ 7,000.00	$ 14,000.00	
Storm Total				**$ 190,317.00**	

Sanitary Sewer

Item	Qty	Unit	Unit Cost	Item Cost	Description
8" Sanitary Sewer	3,029	LF	$ 38.00	$ 115,113.40	
Sanitary Sewer Service	136	EA	$ 1,500.00	$ 204,000.00	
Sanitary Sewer Manholes 4' Dia.	20	EA	$ 4,500.00	$ 90,000.00	
Connection to Existing	1	EA	$ 5,000.00	$ 5,000.00	
Air Test	3,029	LF	$ 1.25	$ 3,786.25	
Sanitary Total				**$ 417,899.65**	

Water Distribution

Item	Qty	Unit	Unit Cost	Item Cost	Description
8" Water Line	3,900	LF	$ 38.00	$ 148,200.00	
4" Irrigation Line	384	LF	$ 3.00	$ 1,152.90	
Water Service	136	EA	$ 1,500.00	$ 204,000.00	Includes setting water meter
Connection to Existing	2	EA	$ 3,500.00	$ 7,000.00	
8" Gate Valves	34	EA	$ 1,950.00	$ 66,300.00	
Hyrdant Assemblies	11	EA	$ 4,800.00	$ 52,800.00	
Clear Water Testing	3,900	LF	$ 1.25	$ 4,875.00	
Water Total				**$ 484,327.90**	

Private Alleys

Item	Qty	Unit	Unit Cost	Item Cost	Description
Subgrade Preparation	1,575	SY	$ 2.50	$ 3,937.50	
Curb & Gutter	1,404	LF	$ 32.00	$ 44,928.00	
Asphalt	1,575	SY	$ 38.00	$ 59,850.00	
Signs	2	EA	$ 375.00	$ 750.00	
Roadway Total				**$ 109,465.50**	

Public Streets

Item	Qty	Unit	Unit Cost	Item Cost	Description
Subgrade Preparation	8,628	SY	$ 2.50	$ 21,570.00	
Curb & Gutter	5,417	LF	$ 32.00	$ 173,344.00	
Asphalt	8,093	SY	$ 38.00	$ 307,534.00	
Sidewalk	36,467	SF	$ 5.50	$ 200,568.50	
Pedestrian Ramps	26	EA	$ 3,000.00	$ 78,000.00	
Crosspan	9	EA	$ 8,000.00	$ 72,000.00	
Signs	11	EA	$ 375.00	$ 4,125.00	
Roadway Total				**$ 857,141.50**	

Soil Erosion Control

Item	Qty	Unit	Unit Cost	Item Cost	Description
Mobilization	1	EA	$ 25,000.00	$ 25,000.00	
Mulching	13	AC	$ 350.00	$ 4,647.65	
Temporary Seeding	13	AC	$ 350.00	$ 4,647.65	
Silt Fence	3,205	LF	$ 5.00	$ 16,025.00	
Permanent Seeding	13	AC	$ 600.00	$ 7,967.40	
Rock Sock	4	EA	$ 150.00	$ 600.00	
Erosion Control Blanket	5,877	SY	$ 3.25	$ 19,100.97	
Vehicle Tracking Control	1	EA	$ 3,000.00	$ 3,000.00	
Inlet/Outlet Protection	7	EA	$ 450.00	$ 3,150.00	
Concrete Washout Area	1	EA	$ 10,000.00	$ 10,000.00	
Soil Erosion Control Total				**$ 94,138.67**	

Earthwork

Item	Qty	Unit	Unit Cost	Item Cost	Description
Earthwork	69,738	CY	$ 3.00	$ 209,214.00	Includes earthwork shown on Borrow Area Plan dated 2021-04-30 (does not include soil import)
Earthwork Total				**$ 209,214.00**	

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Total

Sub-Total:	**$**	**1,505,362.72**
20% contingency:	$	301,072.54
TOTAL:	**$**	**1,806,435.27**

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Rollins Consult LLC

MEMORANDUM

To: Roy Vestal, City of Fort Lupton

From: Ruth Rollins, Rollins Consult LLC

Date: June 17, 2021

Subject: Transportation Memo Cottonwood Greens Townhomes

The following memorandum provides an evaluation of the proposed Townhomes within the Cottonwood Greens project in Fort Lupton. The original traffic study, prepared by Rollins Consult LLC for the Cottonwood Greens project is dated October 7, 2019. This study addressed the built out of 287 single family homes and 140 Townhomes. The townhomes are now being submitted for a preliminary and final development plan.

The townhomes will remain at the 140 dwellings analyzed in the October 7, 2019 study. The townhome site plan, which is shown on Figure 1, includes a roadway system that connects to the planned north/south collector street, College Avenue, within Cottonwood Greens. The internal roads within the townhome area can be designed as local streets to accommodate the townhome's projected 1,018 daily trips, as documented in the October 7, 2019 study and shown below in Table 1.

Table 1 – Estimated Trip Generation

ITE Land Use Code & Rates		Project	Project Trip Generation						
Land Use	Land Use Code	Dwelling Units	Daily	AM			PM		
				IN	Out	Total	IN	Out	Total
Single-Family Detached	210	287	2,709	53	159	212	179	105	284
Multi-Family Low Rise	220	140	1,018	15	51	66	50	29	80
TOTAL BUILDOUT			3,727	68	210	278	229	135	364

Based on ITE Trip Generation 10th Edition

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Figure 1 – Townhome Site Plan

The roadway system as proposed can accommodate the Cottonwood Greens Townhomes. Roy, let me know if you require any additional information.

Respectfully,

President, Rollins Consult LLC

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Traffic Impact Study
Cottonwood Greens

October 7, 2019

Prepared for:
Arbor Capital Partners LLC

Rollins Consult LLC

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1 INTRODUCTION

This report documents the results of a study to evaluate the potential traffic impacts of the proposed Cottonwood Greens project in the City of Fort Lupton, Colorado. Rollins Consult LLC conducted the study in support of the development application for the proposed project.

PROJECT DESCRIPTION

The Cottonwood Greens project is located in the City of Fort Lupton, west of Weld County Road (CR) 31 and north of 9th Street. The site is bounded by the Fulton Ditch and the future alignment of 14th Street. The project site is comprised of approximately 122 acres. The site is surrounded by undeveloped land to the north and east. South of the site is a golf course, and government facilities. West of the project site is a church, residential development and undeveloped land. Figure 1 illustrates the project location and study area.

The project site is depicted on Figure 2. The site was designed with numerous roadways which allow for distribution of pedestrians, bicycles and vehicles. The internal roadways were designed as a curvilinear grid. There is also a pedestrian and bicycle trail (the Man Fulton Ditch Trail) proposed that follows the alignment of the Fulton Ditch.

The project proposes the following land uses and transportation elements:

- There are 287 single family homes proposed.
- 140 townhomes would be located in the southern part of the project.
- Access to public roadways would be provided at four connections. Two access locations are proposed from 9th Street. One access is provided to CR 31. One access will be provided to 14th Street.
- The internal roadway system has been designed to accommodate the project traffic.
- The proposed pedestrian and bicycle trail along the Fulton Ditch will connect to both the planned Fort Lupton Trail and the Main Fulton Ditch Trail. The site also provides parking and access to future bike/ped trails.

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Figure 1 – Project Location

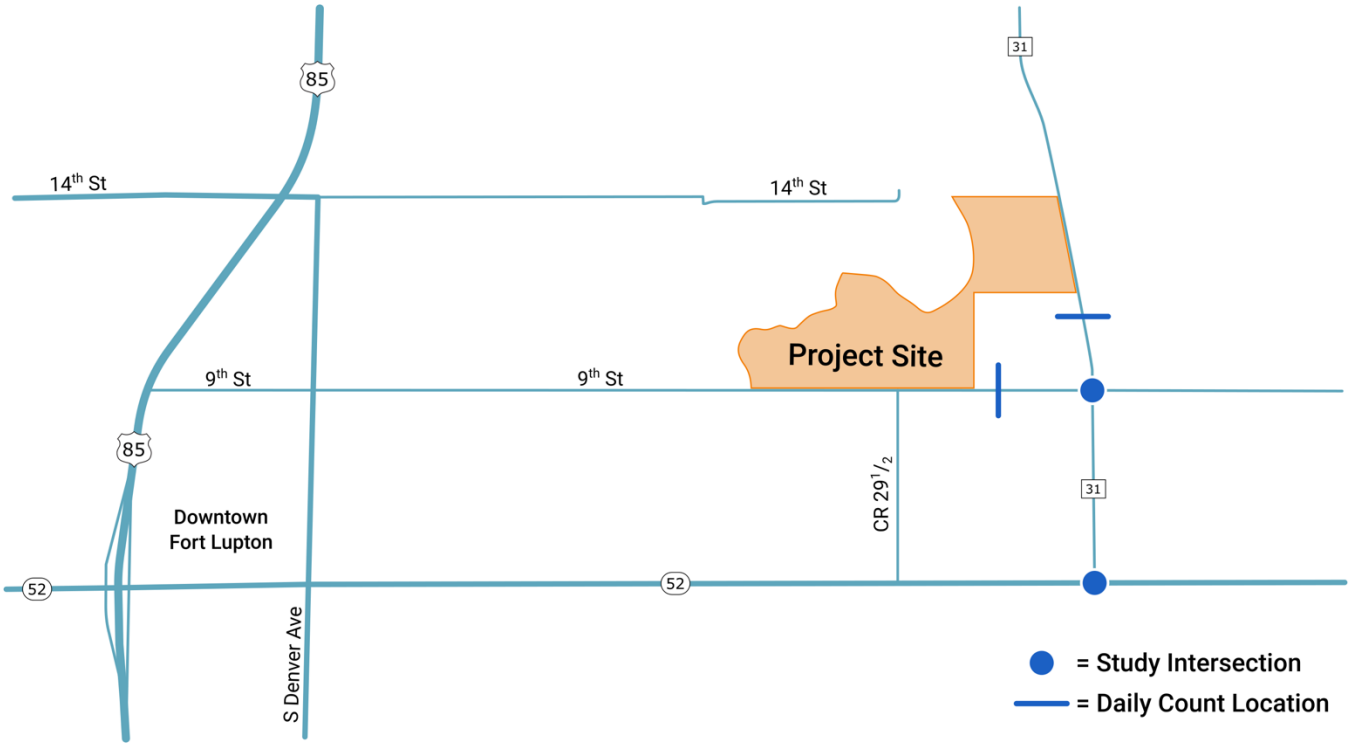

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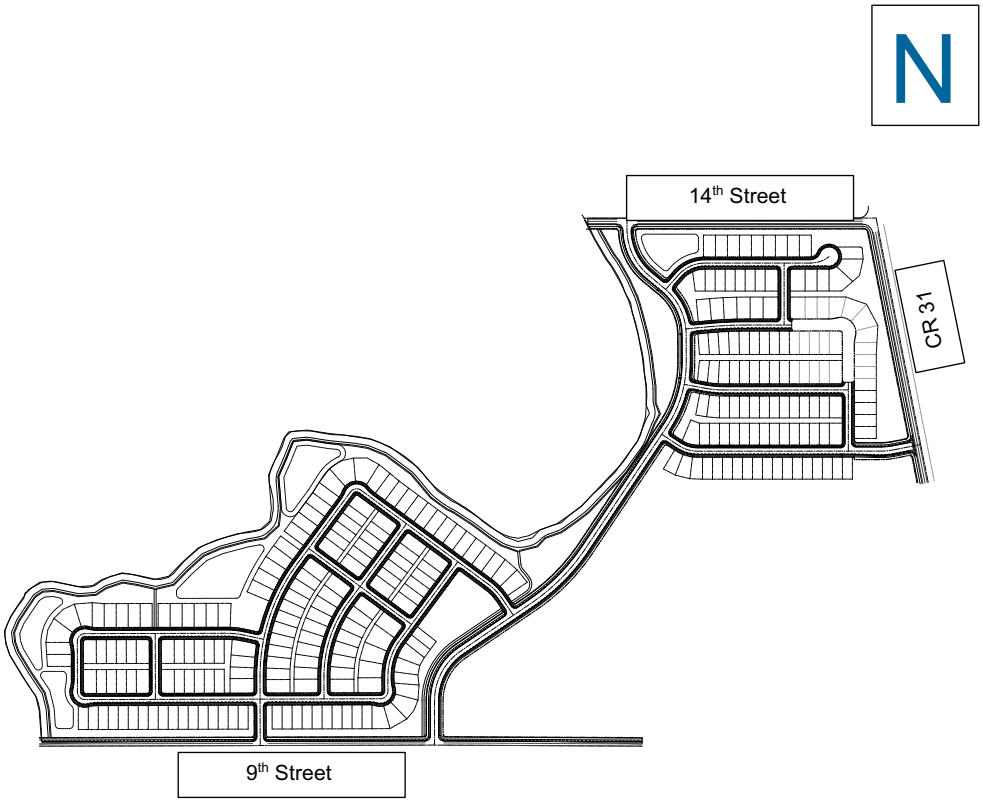
Figure 2 - Project Site Plan



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STUDY SCOPE

The scope of work for this study was developed in conjunction with the City of Fort Lupton's Public Works department. The base assumptions, technical methodologies, and geographic coverage of the study were all identified as part of the study approach. The study analyzes the potential project-generated traffic impacts on the adjacent street system.

The study evaluates the potential changes to the transportation system after completion of the proposed Cottonwood Greens residential project for two future horizon years. The analysis of future year traffic forecasts is based on projected conditions in year 2024 (short range conditions) and 2040 (long range future conditions) both with and without the addition of the project traffic. The following transportation scenarios were analyzed for the AM and PM peak hours:

- **Existing Conditions** – The analysis of existing traffic conditions provides a basis for the remainder of the study. The existing transportation system is described. Peak hour intersection operations are evaluated.
- **Project Travel Demand** – The traffic generated by the Project will be estimated, distributed, and assigned to the transportation network.
- **2024 and 2040 Background Conditions** – Future traffic conditions are projected without the proposed Project for the project buildout year 2024 and the long range future year 2040. The traffic volumes on the roadway system will be factored and analyzed to reflect conditions for 2024 and 2040. This analysis will include the addition of traffic from other potential projects.
- **Total Future Conditions** – The traffic associated with the project will be projected and added to the Background traffic. The intersection operations will be determined.

The study examined three intersections within the study area. These were identified by the City of Fort Lupton for inclusion in the study. The study intersections are shown on Figure 1 and listed below.

1. CR 31 & SH 52
2. CR 31 & 9th Street
3. Future CR 31 & 14th Street (to be connected to CR 31 by 2024)

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2 EXISTING CONDITIONS

The transportation system has numerous elements that are described in this chapter. The roadway network identified for this study is described and traffic volume information presented for the study intersections.

ADJACENT LANDUSE

The Project site is located west of CR 31 and north of 9th Street. The site is currently undeveloped land and is located to the east of downtown Fort Lupton. It is surrounded by undeveloped land, rural residential and industrial to the north and east. South of the site is a golf course, and government facilities. West of the project site is a church, residential development, and undeveloped land.

TRANSPORTATION NETWORK

The primary roadways that serve the Project site are described below. Roadway designations were provided in the *Fort Lupton Transportation Plan,* June 2018.

Roadway Network

State Highway (SH) 52 – This is a two-lane state highway that provides regional connections to Interstate 25 west of Fort Lupton, US 85 in Fort Lupton, and Interstate 76 to the east. In the study area, this is a two-lane east-west roadway with narrow paved shoulders. The speed limit is posted at 55 mph. At the intersection with CR 31 there are turn/auxiliary lanes provided.

CR 31 is a north-south two-lane roadway. The speed limit is posted at 45 mph in the study area. CR 31 has no improved shoulders. It is identified as a truck route by Fort Lupton. Currently CR 31 terminates at State Highway (SH) 52.

9th Street is a east-west two-lane roadway. Directly west of CR 31, 9th Street is a paved roadway with sidewalks. The intersection of 9th Street at CR 31 is improved for the eastbound direction. The speed limit is 40 mph. East of CR 31, 9th Street is an unpaved two-lane roadway.

CR 29 ½ is a north-south two-lane roadway that currently exists south of the Project site. Near 9th Street it is unpaved. Near SH 52 it is paved and provides access to Aims Community College. The City of Fort Lupton plans on improving CR 29 ½ by paving it from 9th Street south to its' current pavement.

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EXISTING TRAFFIC CONDITIONS

Existing intersection operations were evaluated for both the morning and evening peak hours. Intersection count data and daily counts were collected on Wednesday, April 24, 2019. **Appendix A** includes the intersection turning movement and daily count data. The resulting peak hour turning movement and daily volumes are provided on Figure 4. The current lane configurations of the study intersections are shown on Figure 5.

Intersection Level of Service Analysis Methodologies

Transportation professionals evaluate intersections to determine how they are currently operating and will operate in the future. The methods employed can be found in the Transportation Research Board's, 6th Edition, 2016 *Highway Capacity Manual* (HCM). Level of service (LOS) is based on a "graded" system from LOS A, very little to no delays, to LOS F which represents excessive delays and congestion.

The City of Fort Lupton has established a Level of Service criteria within their *Standards and Specifications for the Design and Construction of Public Improvements,* 2015. Chapter 8 – Traffic Control states: "Level of Service "C" shall be the design objective for all movements, and under no circumstances will less than level of Service "D" be accepted for site and non-site traffic, including existing traffic at Build-out of the study area." Definitions for level of service are provided for both unsignalized (existing operations) and signalized conditions.

Unsignalized Intersection

Peak hour levels of motor vehicle delay at unsignalized intersections were estimated using the method from Chapter 17 of the 2016 *Highway Capacity Manual*. The delays for the entire intersection and for each of the constrained movements are reported. Table 1 summarizes the relationship between average control delay per vehicle and LOS for unsignalized intersections.

Table 1 Unsignalized Intersection Level of Service Definitions

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	≤10.0	No delay for stop-controlled approaches.
B	10.0 and ≤15.0	Operations with minor delay.
C	>15.0 and ≤25.0	Operations with moderate delays.
D	>25.0 and ≤35.0	Operations with increasingly unacceptable delays.
E	>35.0 and ≤50.0	Operations with high delays, and long queues.
F	>50.0	Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers.

Source: Transportation Research Board, Highway Capacity Manual, 2016.

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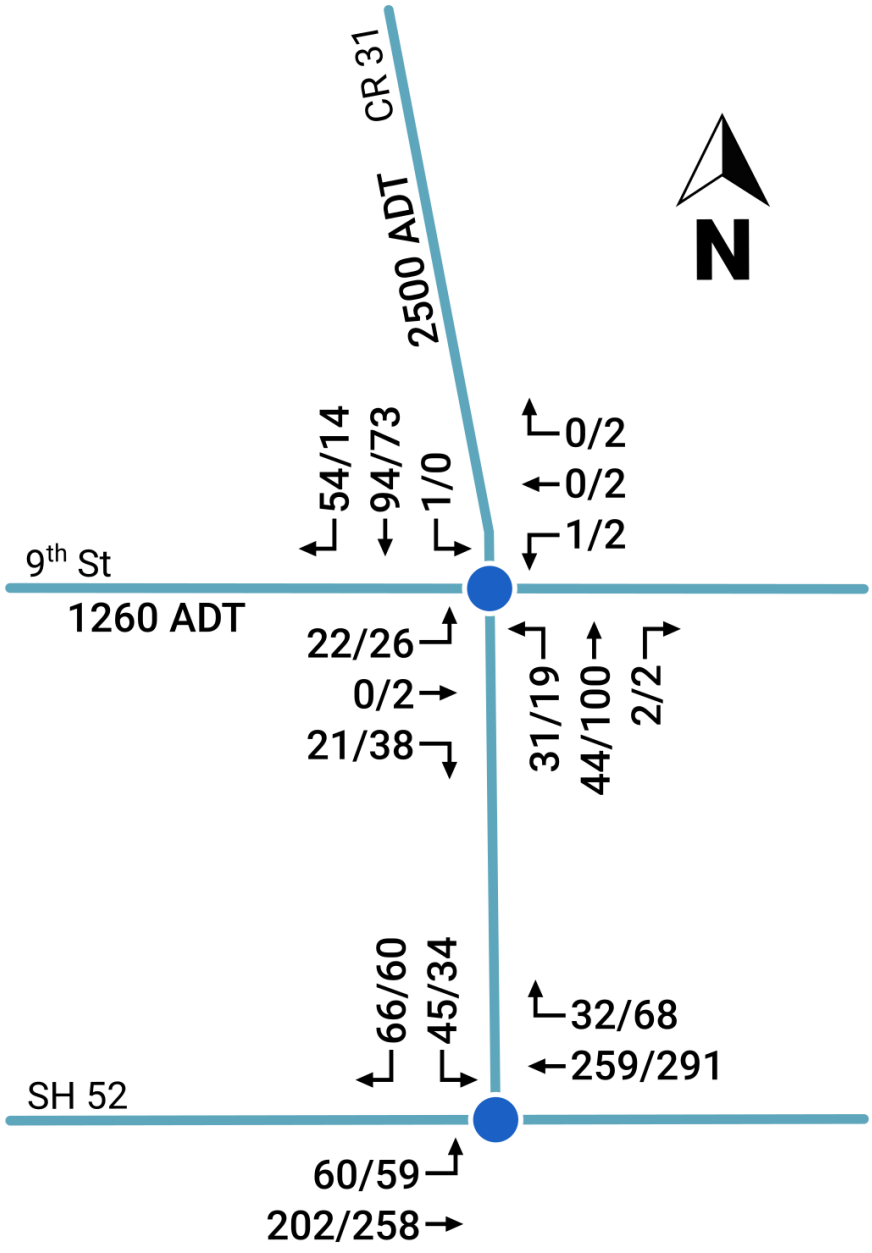
Figure 3 – Existing Peak Hour & Daily Volumes



AM/PM Peak Hour Turning Movements
ADT = Average Daily Traffic

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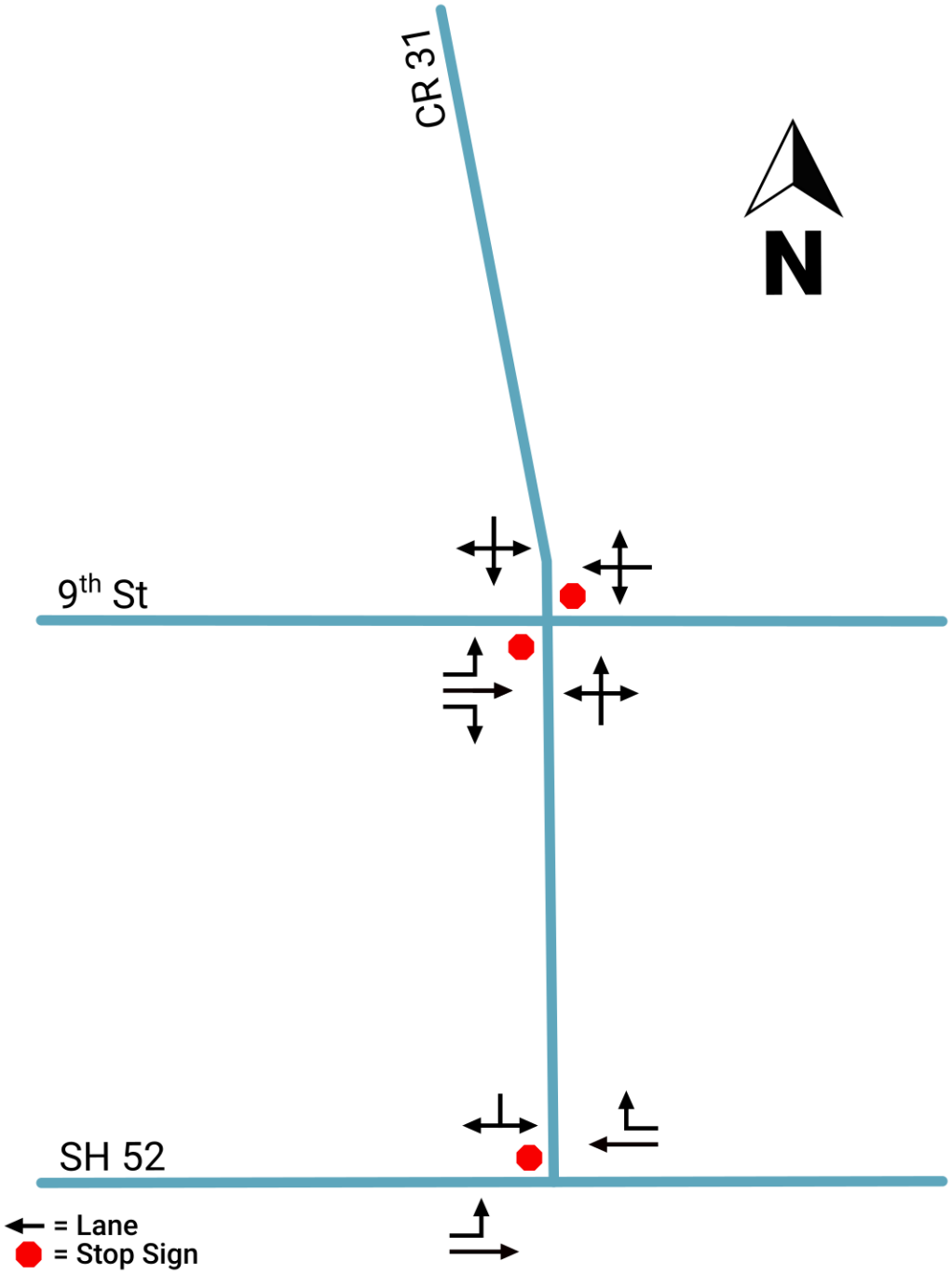
Figure 4 – Existing Lane Configurations



Signalized Intersections

Peak hour levels of motor vehicle delay at signalized intersections were estimated using methods provided in Transportation Research Board's 2010 Highway Capacity Manual. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay

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experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue Table 2 summarizes the relationship between average control delay per vehicle and LOS for signalized intersections.

Table 2 Signalized Intersection Level of Service Definitions

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	≤10.0	Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all.
B	>10.0 and ≤20.0	Stable Operation or Minimal Delays: Generally, occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized.
C	>20.0 and ≤35.0	Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted.
D	>35.0 and ≤55.0	Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays.
E	>55.0 and ≤80.0	Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
F	>80.0	Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections.

Source: Transportation Research Board, Highway Capacity Manual, 2016.

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Existing Intersection Conditions

Using the HCM methodology, the weekday AM and PM peak hour intersection operations were determined. The results are provided in Table 3. As indicated in the table, both of the study intersections are currently operating at acceptable levels of service. The detailed analysis worksheets are provided in Appendix B.

Table 3 Existing Weekday Peak-Hour Intersection Level of Service

#	Intersection	Overall Movement	AM Peak		PM Peak	
			Delay	LOS	Delay	LOS
1	CR 31 & SH 52 T Stop Control	Overall	2.9	A	2.2	A
		EB LT	8.1	A	8.3	A
		SB	13	B	13.2	B
2	CR 31 & 9th Street Two Way Stop Control	Overall	2.5	A	3	A
		NB LT	7.6	A	7.4	A
		EB LT	10.4	B	10.3	B
		EB T	0	A	10.5	B
		EB RT	9	A	8.9	A
		WB	10.5	B	10	B
		SB LT	7.3	A	0	A

Notes:
1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained /STOP-controlled movement or approach.

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3 PROJECT TRAVEL DEMAND

This chapter provides an overview of the project and a description of the travel demand methodology to estimate vehicle trip generation, distribution, and assignment of project-generated traffic along area roadways and intersections.

PROJECT CHARACTERISTICS

The proposed Cottonwood Greens project is a residential project located west of CR 31 and north of 9th Street. The project site plan was depicted on Figure 2. The project is planned on approximately 122 acres. As shown on the figure, vehicular access to the project will be from: CR 31 (one location), 9th Street (two locations) and a connection with the future 14th Street. The primary north-south project roadway will align with CR 29 ½ . The project will be developed with 287 single family and 140 townhomes. The transportation characteristics of the site includes a curvilinear grid roadway layout, a pedestrian/bicycle trail that allows for future connections to the Main Fulton Ditch Trail and the Fort Lupton Trail.

PROJECT TRIP GENERATION

The trip generation characteristics of the project were estimated using data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* 10th Edition. Table 4 provides the trip generation estimated for the project. As indicated in the table, the full buildout of the project is estimated to generate approximately 3,730 daily trips, 280 morning and 360 evening peak hour trips.

PROJECT TRIP DISTRIBUTION | ASSIGNMENT

The distribution of the project traffic onto the roadway system was based on: the existing peak hour traffic counts, the roadway network, the adjacent land use, the location of the project within the region and the City of Fort Lupton, traffic forecasts from the *Transportation Plan,* and input from the City engineer. The project trip distribution is depicted on Figure 5.

The project assigned peak hour traffic volumes for are shown on Figure 6. The City of Fort Lupton has within their *Transportation Plan* the extension of CR 31 south of SH 52 to CR 8. The projected traffic volumes on Figure 6 were modified at CR 31 and SH 52 to reflect this connection. The future year 2040 peak hour traffic volumes for this location are provided in Figure 7.

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Table 4 – Estimated Trip Generation

ITE Land Use Code & Rates		Project	Project Trip Generation						
Land Use	Land Use Code	Dwelling Units	Daily	AM			PM		
				IN	Out	Total	IN	Out	Total
Single-Family Detached	210	287	2,709	53	159	212	179	105	284
Multi-Family Low Rise	220	140	1,018	15	51	66	50	29	80
TOTAL BUILDOUT			3,727	68	210	278	229	135	364
Based on ITE Trip Generation 10th Edition									

Figure 5 – Trip Distribution

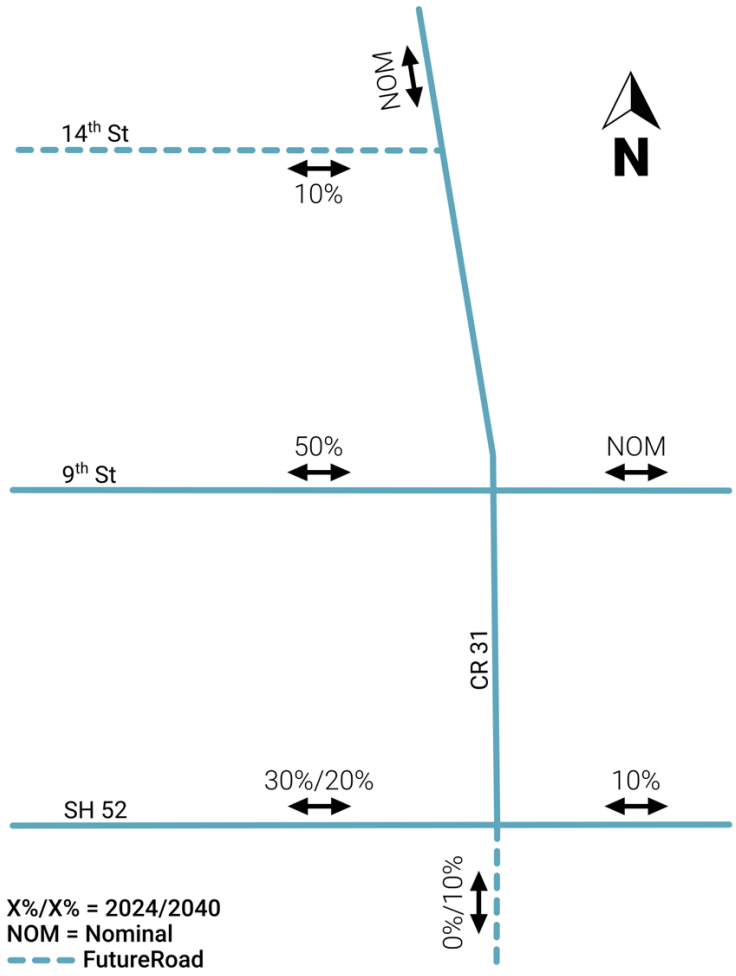

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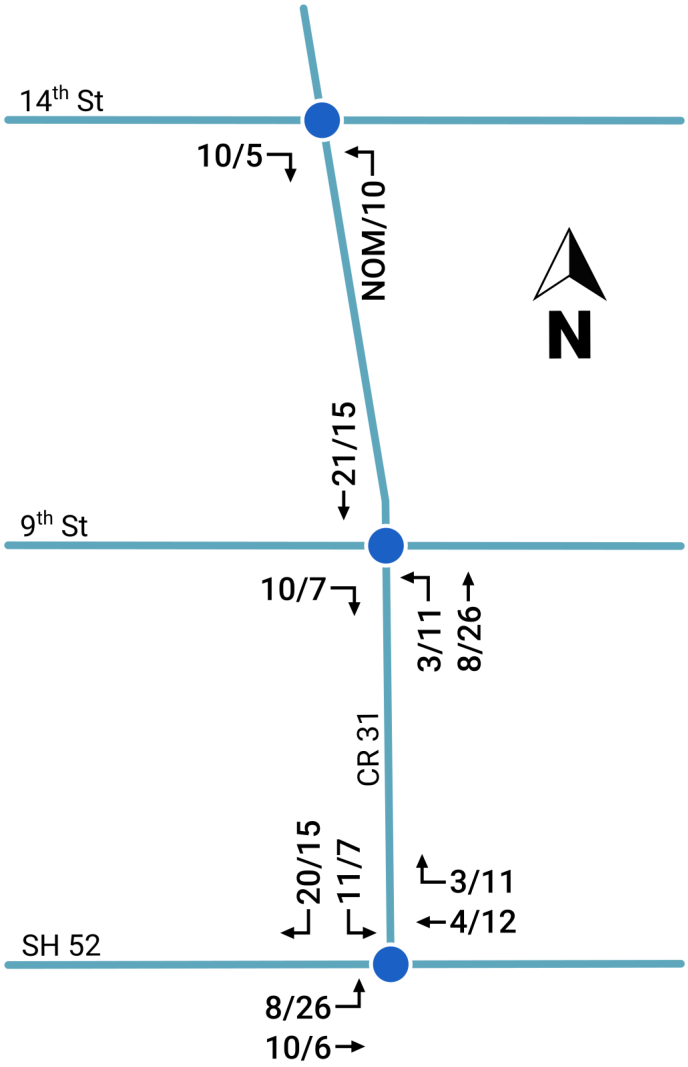
Figure 6 – Project Traffic - 2024



AM/PM Peak Hour Turning Movements

NOM = Nominal

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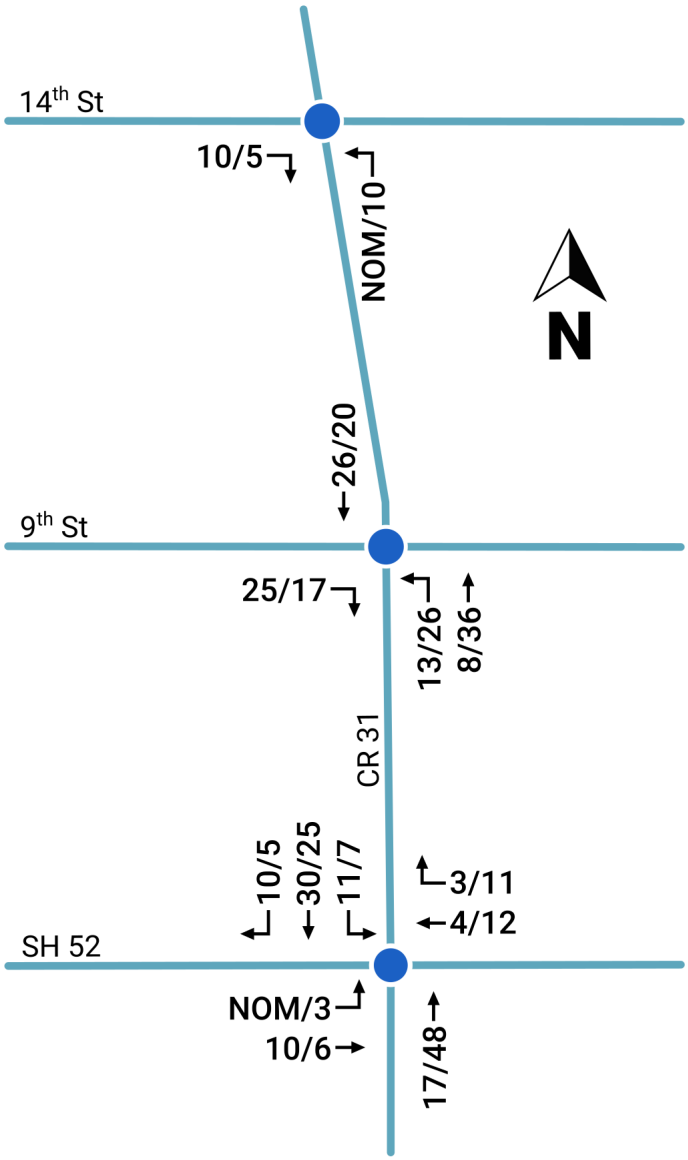
Figure 7 – Project Traffic - 2040



AM/PM Peak Hour Turning Movements

NOM = Nominal

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4 FUTURE TRAFFIC PROJECTIONS

Estimates of future traffic conditions both with and without the proposed Project were necessary to evaluate the potential impact of the Project on the local street system. The background base traffic scenario represents future traffic conditions without the addition of the Project, while the total scenario represents future traffic conditions with completion of the proposed Project. Two future years were analyzed, Year 2024 and Year 2040. The development of these future traffic scenarios is described in this chapter.

BACKGROUND 2024 TRAFFIC PROJECTIONS

The background traffic projections reflect growth in traffic from two primary sources: ambient growth in the existing traffic volumes due to regional growth both in and outside of the study area, and traffic generated by potential projects. The City requested that a project similar in size to the proposed Cottonwood Greens project be assumed for the land directly north of the project site. Additionally, the City anticipates two roadway improvements: 14th Street will be constructed to CR 31 by 2024 and CR 29 ½ will be paved and improved between 9th Street and SH 52. Each of these elements are described below.

- The **ambient growth** in traffic was determined with information from the *Fort Lupton Transportation Plan,* June 2018. Based on these projections an annual straight line growth rate of 1.7% per year was established for the short range for each roadway except SH 52. It should be noted that the future projections were adjusted to account for traffic from the proposed project. This eliminates double counting the Project traffic which is already included in the future projections in the *Transportation Plan*. The growth rate for SH 52 was 1% per year. This value will be applied to the existing counts to determine the Year 2024 volumes due to regional growth.
- It was assumed that a project similar in size and use would be built on the land north of the Cottonwood Greens project. Access to/from this future project would be from 14th Street. Traffic was estimated and assigned to the roadway system to account for this potential project.
- Based on conversations with City of Fort Lupton Public Works, 14th Street is expected to be built to CR 31 and CR 29 ½ will be paved and improved between 9th Street and SH 52..

The resulting Background 2024 traffic projections for the study intersections is provided on Figure 8.

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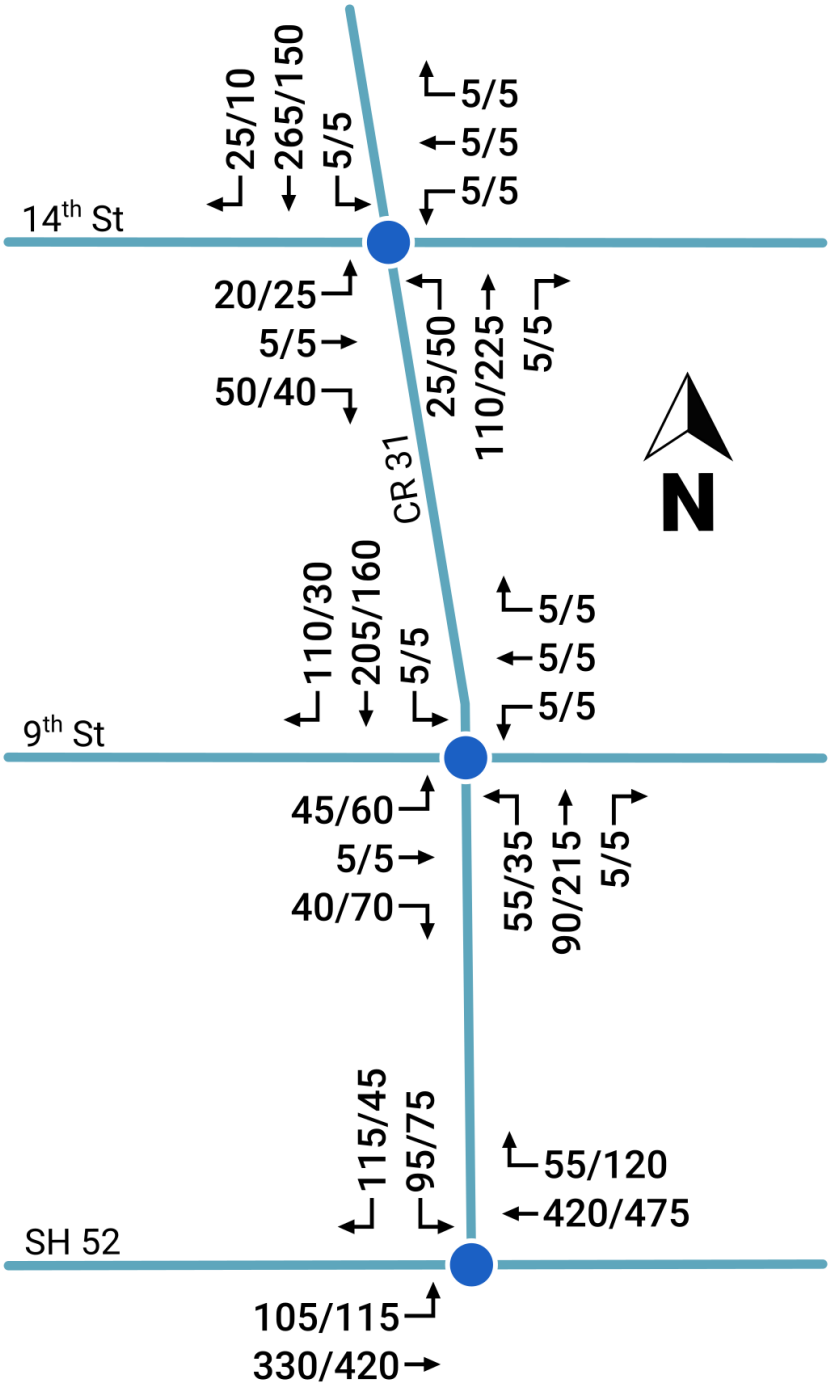
Figure 8 – Background Traffic 2024



AM/PM Peak Hour Turning Movements

Volumes Rounded to Nearest 5 Vehicles

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BACKGROUND 2040 TRAFFIC PROJECTIONS

The traffic projections for 2040 was estimated using a similar methodology as for 2024. The City of Fort Lupton has plans for roadway improvements by Year 2040. Each of these components to the 2040 projections are discussed below.

- The **ambient growth** in traffic was based on the values developed for 2024. An annual straight line growth of 1.7 % per year will be used for each roadway except for SH 52 which was 1% per year.
- Similar to 2024, it was assumed that a project similar in size and use would be built on the land north of the Cottonwood Greens project. Access to/from this future project would be from 14th Street. Traffic was estimated and assigned to the roadway system to account for this potential project.
- 14th Street was assumed to be built to CR 31 and CR 29 ½ will be paved between 9th Street and SH 52.
- The City of Fort Lupton, *Transportation Plan* plans for CR 31 is to be extended south of SH 52 to CR 8 by 2040.

The assumed intersection configurations for 2040 are illustrated on Figure 9. The resulting Background 2040 traffic projections for each of the study intersections are provided on Figure 10.

TOTAL TRAFFIC PROJECTIONS

The total traffic projections include both the background plus project traffic. Total traffic projections were developed for Year 2024 and 2040. The project-generated traffic volumes from Figure 7 were added to the Year 2024 background traffic volumes illustrated on Figure 9 to develop background plus project peak hour traffic volumes. The resulting Year 2024 total traffic is depicted on Figure 11.

The Year 2040 Total traffic projections were developed by adding the Project traffic from Figure 8, to the Year 2040 Background traffic from Figure 10. The resulting Year 2040 total traffic is illustrated on Figure 12.

INTERNAL SITE TRAFFIC

The Project site was designed to accommodate the traffic generated by the project. The City of Fort Lupton, within Chapter 6 of the *Standards and Specifications for the Design and Construction of Public Improvements,* has established that Local streets can accommodate up to 2,500 daily vehicular trips. It was estimated that the Local streets within Cottonwood Greens will accommodate between 700 and 1,500 daily trips at locations near their intersections with public roadways. The design of the internal streets as Locals is therefore appropriate.

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Figure 9 – Lane Configurations 2040

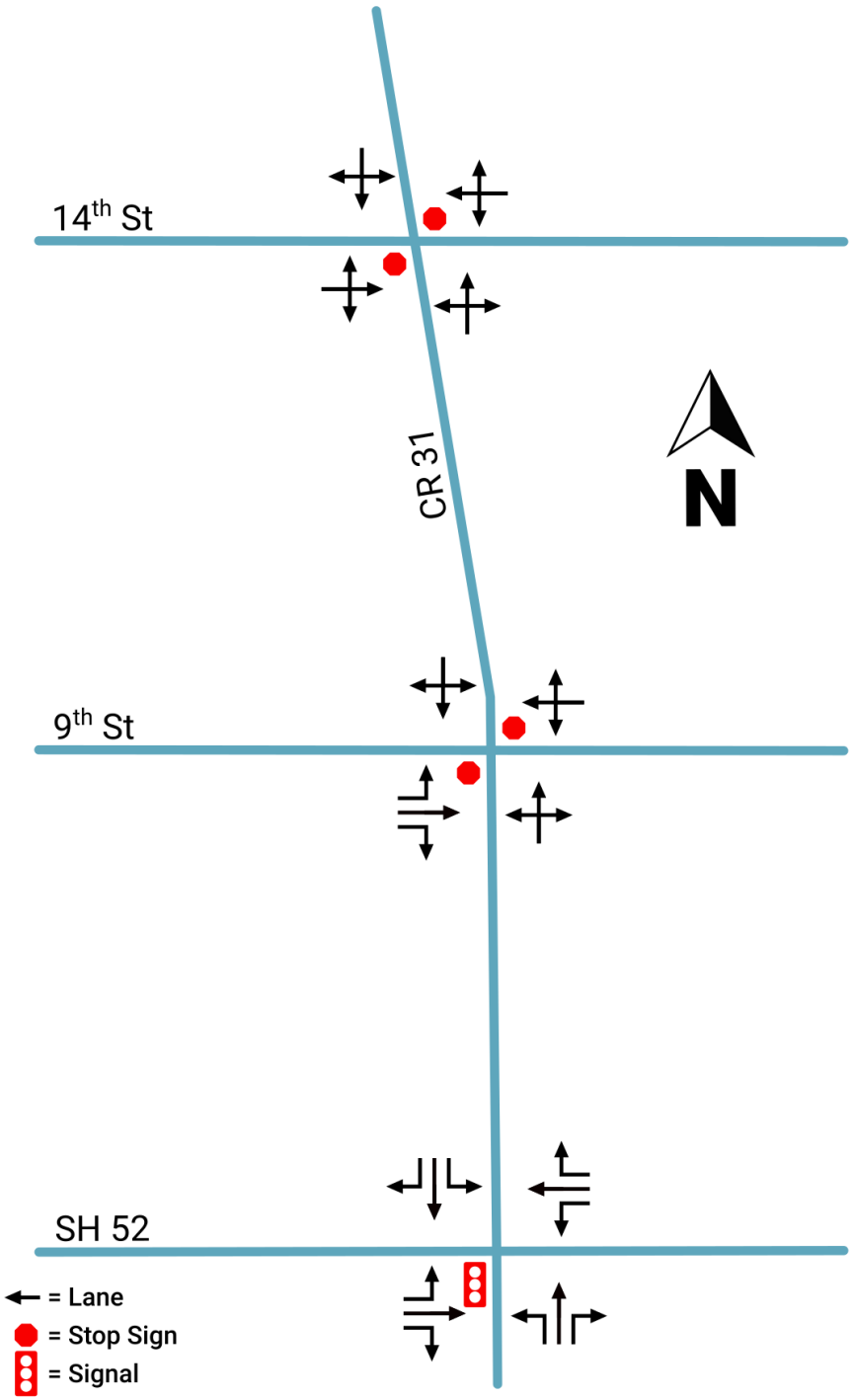

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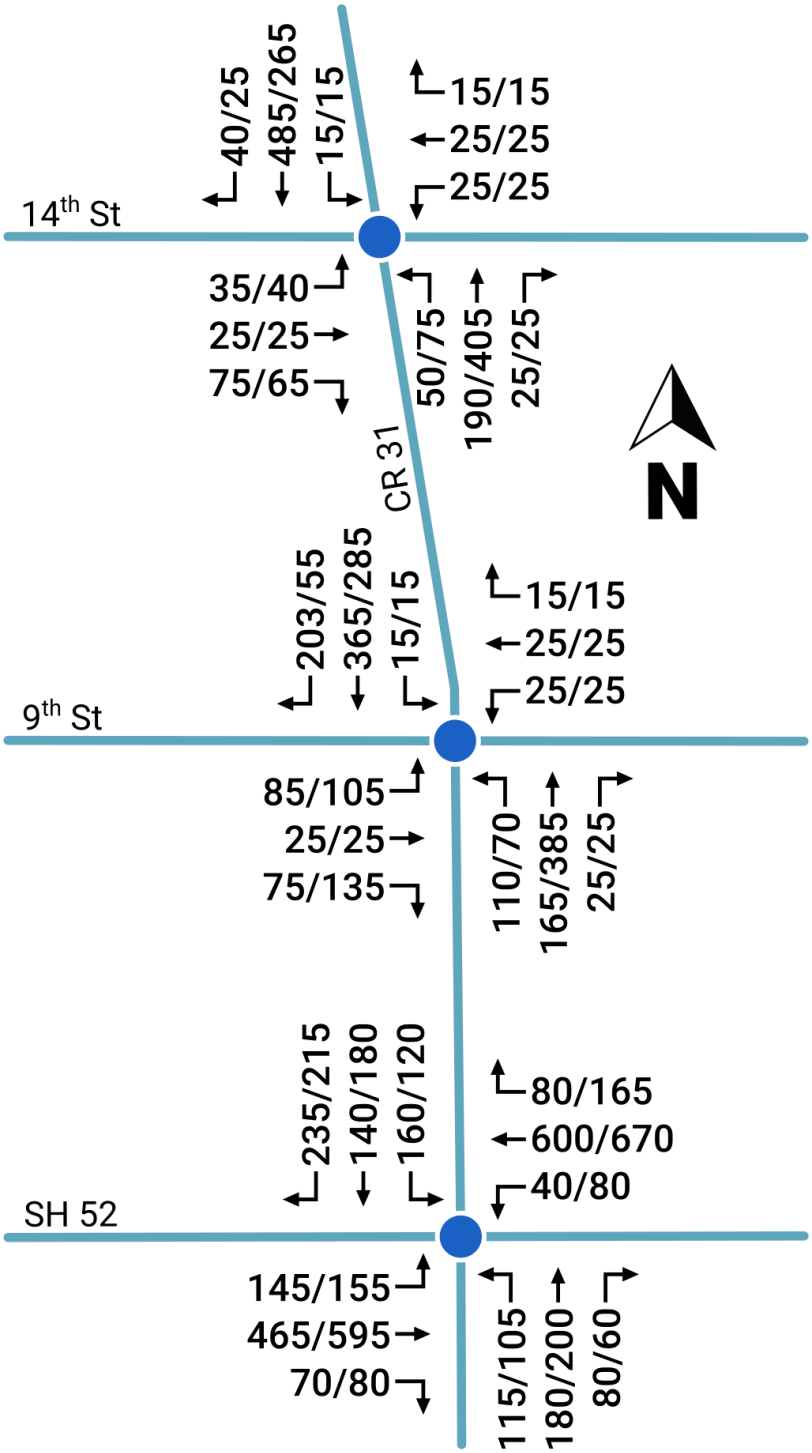
Figure 10 – Background Traffic 2040



AM/PM Peak Hour Turning Movements

Volumes Rounded to Nearest 5 Vehicles

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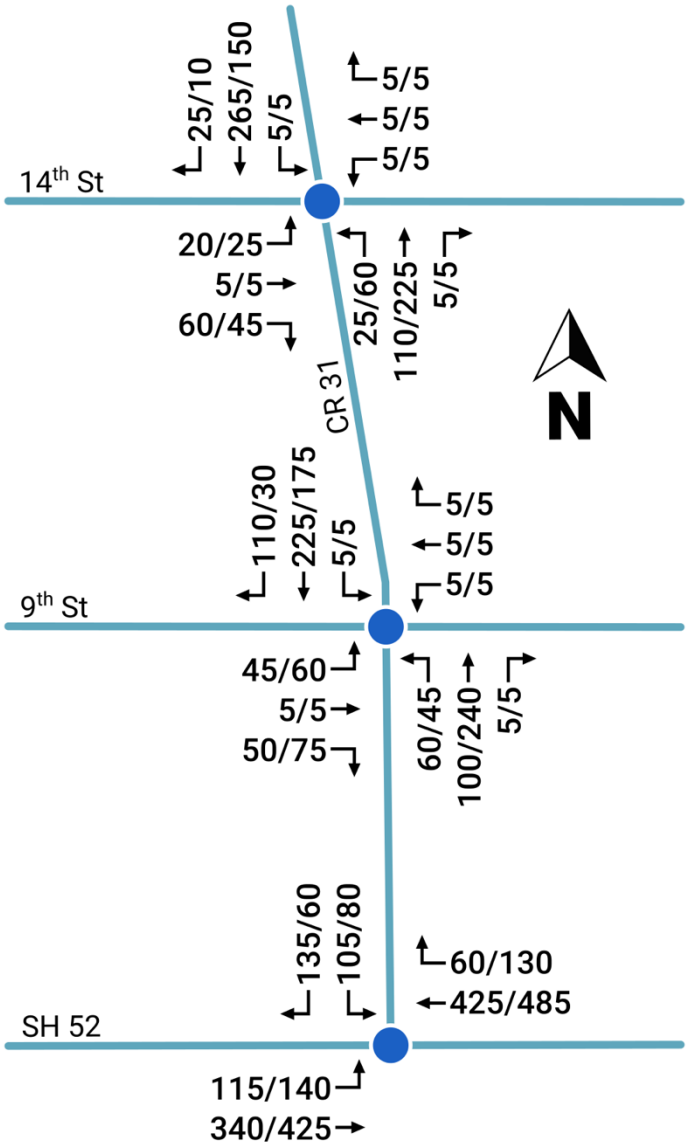
Figure 11 – Total Traffic 2024



AM/PM Peak Hour Turning Movements
Volumes Rounded to Nearest 5 Vehicles

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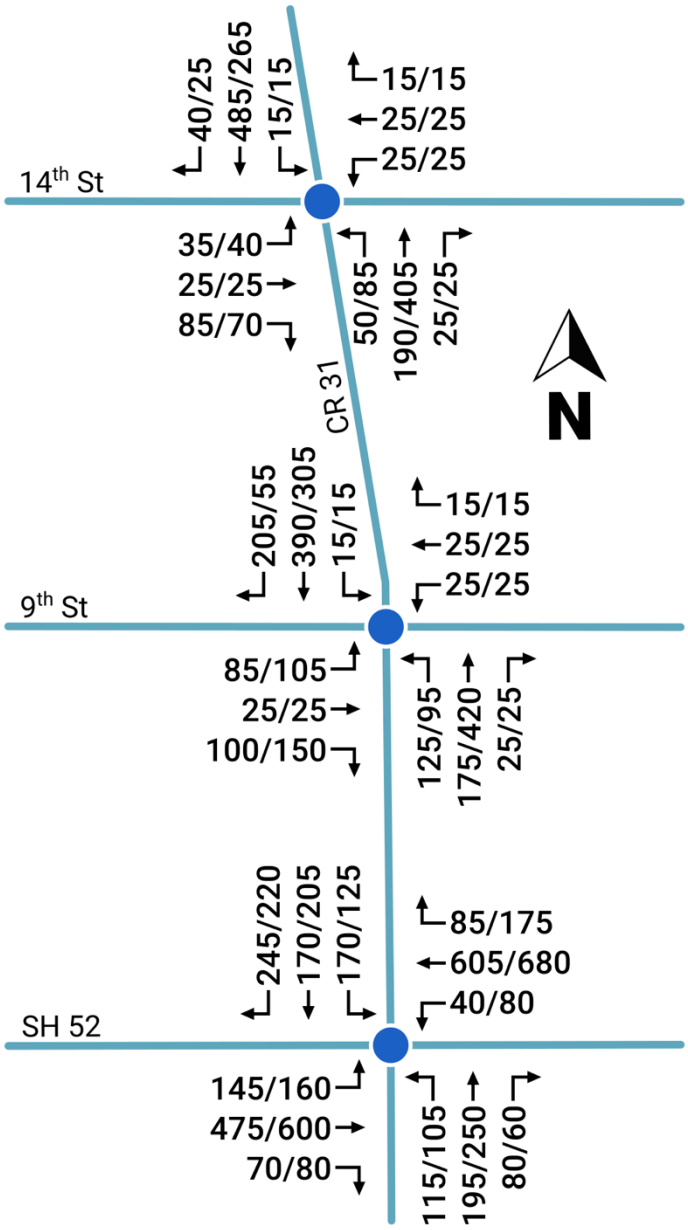
Figure 12 – Total Traffic 2040



AM/PM Peak Hour Turning Movements

Volumes Rounded to Nearest 5 Vehicles

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5 TRAFFIC IMPACT ANALYSIS

This chapter presents an analysis of the potential impacts of the traffic generated by the proposed Cottonwood Greens project on the local street system. The analysis compares the projected levels of service at each study intersection under future background and total conditions to estimate the incremental increase in the delay caused by the proposed project. This provides the information needed to assess the potential impact of the project using the significance criteria.

SIGNIFICANT TRAFFIC IMPACT CRITERIA

Threshold criteria were applied to determine if the growth in traffic due to regional growth/other projects and/or the proposed Project has a significant traffic impact at an intersection. If the future traffic projections for either Background (without Project) or Total (with Project) resulted in any portion of an intersection to exceed the LOS standards, this would be considered an impact.

As presented earlier, based on the City of Fort Lupton standards, LOS C is the design objective for all movements at an intersection. Level of service less than D is unacceptable.

FUTURE TRAFFIC CONDITIONS

The future traffic projections at the three study intersections were analyzed to determine their future operating conditions. The results for Year 2024 are provided in Table 5 for both the background and total traffic scenarios. The future operating conditions for Year 2040 are provided in Table 6.

It should be noted that under 2040 conditions, the intersection of CR 31 and SH 52 was projected to have peak hour volumes that would warrant signalization. The operational analysis for this location was performed assuming it was signalized. The need for a traffic signal is documented in the Federal Highways Administration, *Manual On Uniform Traffic Control Devices* (MUTCD), 2009. The Peak Hour - Warrant 3 is provided in Appendix C.

Note that the results provided in Tables 5 and 6 indicate both the overall delay/LOS for the intersection and the delay/LOS for the each constrained movement and/or leg. If an intersection, a movement, or leg is projected to operate at unacceptable levels it is highlighted in grey.

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Table 5 Future 2024 Intersection Level of Service

#	Intersection	Movement	AM Peak Hr				PM Peak Hr			
			Background		Total		Background		Total	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	CR 31 & SH 52 T Stop Control	Overall	7.2	A	10.2	B	4.6	A	6.6	A
		EB LT	8.8	A	8.9	A	9.4	A	9.7	A
		SB	33.9	D	45.7	E	38.8	E	52.6	F
2	CR 31 & 9th Street Two Way Stop Control	Overall	3.1	A	3.2	A	3.5	A	3.7	A
		NB LT	8.1	A	8.3	A	7.7	A	7.9	A
		EB LT	14.2	B	16.3	B	14.4	B	18.7	C
		EB T	13.3	B	14.8	B	13.2	B	15.8	C
		EB RT	10.1	B	10.8	B	9.6	A	10.1	B
		WB	12.4	B	13.9	B	12.6	B	15.1	C
		SB LT	7.4	A	7.5	A	7.7	A	7.9	A
3	CR 31 & 14th Street (To be Built) Two Way Stop Control	Overall	2.4	A	2.6	A	2.7	A	2.9	A
		NB	8	A	8	A	7.7	A	7.7	A
		EB	11.7	B	11.7	B	11.8	B	11.9	B
		WB	12	B	12	B	12.6	B	12.9	B
		SB	7.5	A	7.5	A	7.7	A	7.7	A

Notes:

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained STOP-controlled movement or approach.
3. Delays greater than 50 seconds are rounded to nearest second.
4. Grey highlighted indicates intersection operating at unacceptable LOS conditions.

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Table 6 Future 2040 Intersection Level of Service

			AM Peak Hr				PM Peak Hr			
			Background		Total		Background		Total	
#	Intersection	Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	CR 31 & SH 52 Signalized	Overall	22.7	C	23.3	C	22.5	C	23.7	C
		EB LT	16.9	B	17.1	B	18.3	B	19.0	B
		EB T	10.4	B	10.5	B	11.3	B	11.3	B
		EB RT	7.7	A	7.7	A	7.4	A	7.3	A
		WB LT	14.5	B	14.7	B	18.9	B	18.9	B
		WB T	36.5	D	37.3	C	31.7	C	32.8	C
		WB RT	13.3	B	13.3	B	13.7	B	13.8	B
		NB LT	25.2	C	27.0	C	32.2	C	34.8	D
		NB T	19.9	B	20.5	C	24.7	C	27.4	C
		NB RT	18.0	B	18.1	B	21.1	C	21.5	C
		SB LT	29.5	C	32.0	C	33.3	C	39.8	D
		SB T	18.9	B	19.8	B	24.0	C	25.4	B
		SB RT	24.1	C	24.9	C	27.8	C	28.7	C
2	CR 31 & 9th Street Two Way Stop Control	Overall	7.8	A	10	B	8.7	A	11.9	B
		NB LT	9.3	A	9.6	A	8.2	A	8.4	A
		EB LT	47.9	E	74	F	50	F	83.2	F
		EB T	24.8	C	29.5	D	22.9	C	27.5	D
		EB RT	12.4	B	13.8	B	11.5	B	11.9	B
		WB	32.7	D	46.3	E	31.7	D	46.4	E
		SB LT	7.7	A	7.7	A	8.3	A	8.4	A
3	CR 31 & 14th Street (To be Built) Two Way Stop Control	Overall	5.5	A	5.7	A	5.8	A	6.1	A
		NB	8.8	A	8.8	A	8.1	A	8.1	A
		EB	24.4	C	24.5	C	25.2	D	26.3	D
		WB	25.5	D	26.1	D	27.4	D	29.1	D
		SB	7.7	A	7.7	A	8.3	A	8.3	A

Notes:

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained STOP-controlled movement, lane group (signalized) or approach.
3. Delays greater than 50 seconds are rounded to nearest second.
4. Grey highlighted indicates intersection operating at unacceptable LOS conditions.

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The study results for 2024 indicate the following:

- At the intersection of CR 31 at SH 52 under both Background and Total conditions, the southbound approach is projected to operate at LOS E/F.
- The remaining two study intersections will operate at acceptable levels of service.

The study results for 2040 indicate the following:

- At CR 31 and 9th Street the eastbound left-turn will experience long delays under both Background and Total conditions. The westbound approach will experience long delays under Total conditions.
- The intersection of CR 31 at SH 52 and CR 31 at 14th Street are expected to operate acceptably.

FUTURE YEAR 2024 IMPROVEMENT MEASURES

The future 2024 traffic volume projections and operations were evaluated at CR 31 and SH 52 to determine effective improvements. Currently the southbound direction is a shared left/right-turn lane. The addition of an exclusive right-turn lane was analyzed. The resulting intersection operations with a southbound right-turn lane and a left-turn lane are provided in Table 7. The operations of the right-turn lane improved to acceptable levels however, the left-turn lane continued to operate with long delays. It should be noted that left-turns from streets that intersect higher volume roadways such as State Highways will typically experience delays in excess of LOS D. Therefore the addition of a separate right-turn lane should be considered as an improvement to this intersection.

Signalization of this location was also considered. Under Background conditions it was determined that peak hour signal warrants, as provided in the MUTCD, would not be satisfied. Under Total conditions, Warrant 3 the Peak Hour warrant is projected to be satisfied. It should be noted that the warrant is marginally satisfied. Meeting the threshold volumes for one warrant does not always justify the installation of a signal. The City of Fort Lupton and CDOT will need to determine this based on all of the traffic engineering factors that may include: daily volumes, pedestrian activity, location of nearby schools, crash history, and geometrics. The intersection operations with signalization are provided in Table 7. As shown the LOS is projected to operate at acceptable levels. This intersection should be monitored to determine if or when a signal should be installed.

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Table 7 - Improved 2024 Intersection Level of Service

#	Intersection	Movement	AM Peak Hr		PM Peak Hr	
			Total		Total	
			Delay	LOS	Delay	LOS
1	CR 31 & SH 52 **T Stop Control**	Overall	5.9	A	5.1	A
		EB LT	8.9	A	9.7	A
		SB LT	40.2	E	57.7	F
		SB RT	12.9	B	12.4	B
1	CR 31 & SH 52 **Signalized**	Overall	16.1	B	16.7	B
		EB LT	12.7	B	13.1	B
		EB T	9.9	A	9.7	A
		WB T	23.0	C	25.5	C
		WB RT	13.8	B	13.7	B
		SB RT/LT	14.7	B	14.1	B

The Total 2024 traffic volume projections (for the AM plus PM peak hours) were evaluated to determine the relative percentage of Project and Background volumes. These are shown on Table 8.

Table 8 - 2024 Percent Contribution

#	Intersection	Total Volumes (AM + PM)	Background		Project	
			Volume	Percent	Volume	Percent
1	CR 31 & SH 52 Signalized	2500	2369	95%	135	5%

FUTURE YEAR 2040 IMPROVEMENT MEASURES

The intersection of CR 31 at 9th Street is projected to experience long delays for the eastbound left-turn and westbound approach. It is challenging to improve these delays. Additional lanes in the westbound direction could reduce delays however, multiple lanes on 9th Street at a two-way stop begins to become challenging for motorists to determine whom has the right-of-way. An all-way stop would increase overall delays at the intersection by stopping CR 31. A roundabout is another intersection control design however, it is most effective where the volumes on both of the roadways (CR 31 and 9th Street) are approximately equal which is not anticipated. The projections do not indicate that any signal warrants would be satisfied.

If the intersection of CR 31 at SH 52 is signalized, this could create gaps in CR 31 traffic which will ease the projected delays on 9th Street. Additionally, as more of the roadway network in this area of Fort Lupton is built, vehicles will have options if their delays

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become perceived as unacceptable. Finally, some traffic may shift from 9th Street to 14th Street which was assumed to be completed by 2024.

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6 AUXILIARY LANE ANALYSIS

An analysis was conducted to determine the need for auxiliary right-turn and left-turn lanes on at the Project access locations. This analysis was performed for both 2024 and 2040. The projected peak hour traffic volumes at these locations are provided in Appendix D for both 2024 and 2040. The turning volumes were analyzed based on the guidelines set forth in the Transportation Research Board's *NCHRP Report 279*, 1985 provided in Appendix D.

Using the figures shown in Appendix D, it was determined that a left-turn lane on CR 31 will most likely be warranted at the northern Project access street (Access "C")under 2024 projections. For the year 2040, the two access locations on 9th Street (Access "A" and "B") would not require auxiliary lanes. It should be noted that this analysis was performed assuming both CR 31 and 9th Street were two-lane roadways.

Right-turn lanes were not determined to be required.

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7 CONCLUSIONS

This study was undertaken to analyze the potential traffic impacts of the proposed Cottonwood Greens project in the City of Fort Lupton. The following summarizes the results of this analysis:

- The full buildout proposed Project consists of 287 single family homes and 140 multi-family dwellings.
- The Project site is located north of 9th Street and west of CR 31 on land that is undeveloped.
- The Project is expected to generate approximately 3,275 daily trips, 280 trips during the AM peak hour and 365 trips during the PM peak hour.
- Currently the study intersections on CR 31 at both SH 52 and 9th Street are operating at acceptable levels.
- For 2024 is was assumed that 14th Street would connect from its' current terminus east to CR 31 and CR 29 ½ would be paved between 9th Street to SH 52.
- Under the future 2024 conditions, the intersection of CR 31 at SH 52 is projected to operate with long delays under both Background and Total traffic conditions. It is suggested that the City and CDOT consider improvements to the southbound approach with the addition of a right-turn lane. The southbound left-turn lane will continue to experience long delays. Signalization may also be considered at this location.
- Under the future 2040 conditions it was assumed that CR 31 would be extended south of SH 52 and be signalized.
- Under 2040 projected conditions, the traffic on 9th Street at CR 31 will experience long delays. Numerous improvements were explored to mitigate these delays however it is suggested that as this area of Fort Lupton grows and the roadway network is expanded, this location be monitored and improvements developed at that time.
- Under 2024 conditions a left-turn lane would be needed on CR 31 at: 9th Street.

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APPENDICIES

- Appendix A: Intersection Turning Movement Count Data (October 11, 2018)
- Appendix B: HCM LOS Calculation Outputs
- Appendix C: Figure and Table 4C-3 Manual on Uniform Traffic Control Devices
- Appendix D: Project Access 2024 and 2040 Volumes and NCHRP Report 279

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Appendix A

Intersection Turning Movement Count Data (April 24, 2019)

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Location: WCR 31 N/O 9TH ST
Date Range: 4/24/2019 - 4/30/2019
Site Code: 01

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	4/24/2019			4/25/2019			4/26/2019			4/27/2019			4/28/2019			4/29/2019			4/30/2019			Mid-Week Average		
Time	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	3	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	4
1:00 AM	4	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	8
2:00 AM	2	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	6
3:00 AM	1	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	4
4:00 AM	7	9	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	9	16
5:00 AM	35	39	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	39	74
6:00 AM	57	50	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57	50	107
7:00 AM	67	149	216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67	149	216
8:00 AM	52	75	127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	75	127
9:00 AM	40	59	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	59	99
10:00 AM	65	67	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	67	132
11:00 AM	81	74	155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81	74	155
12:00 PM	73	82	155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73	82	155
1:00 PM	72	54	126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	54	126
2:00 PM	88	93	181	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88	93	181
3:00 PM	118	67	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118	67	185
4:00 PM	129	86	215	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	129	86	215
5:00 PM	118	90	208	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118	90	208
6:00 PM	110	68	178	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110	68	178
7:00 PM	81	46	127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81	46	127
8:00 PM	53	43	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	43	96
9:00 PM	32	14	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	14	46
10:00 PM	21	6	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	6	27
11:00 PM	7	2	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	2	9
Total	**1,316**	**1,185**	**2,501**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1,316**	**1,185**	**2,501**
Percent	**53%**	**47%**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**53%**	**47%**	-

1. Mid-week average includes data between Tuesday and Thursday.

Mark Skaggs:425-250-0777
mark.skaggs@idaxdata.com

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Location: 9TH ST W/O WCR 31
Date Range: 4/24/2019 - 4/30/2019
Site Code: 02

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	4/24/2019			4/25/2019			4/26/2019			4/27/2019			4/28/2019			4/29/2019			4/30/2019			Mid-Week Average		
Time	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00 AM	1	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1
1:00 AM	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
2:00 AM	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
3:00 AM	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
4:00 AM	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3
5:00 AM	28	8	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	8	36
6:00 AM	37	18	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	18	55
7:00 AM	44	86	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44	86	130
8:00 AM	28	46	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	46	74
9:00 AM	37	46	83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	46	83
10:00 AM	45	41	86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	41	86
11:00 AM	52	35	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	35	87
12:00 PM	44	32	76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44	32	76
1:00 PM	32	41	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	41	73
2:00 PM	50	52	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	52	102
3:00 PM	66	41	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66	41	107
4:00 PM	67	34	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67	34	101
5:00 PM	40	41	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	41	81
6:00 PM	28	34	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	34	62
7:00 PM	19	19	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	19	38
8:00 PM	13	11	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	11	24
9:00 PM	6	8	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	14
10:00 PM	14	4	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	4	18
11:00 PM	3	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	5
Total	**659**	**603**	**1,262**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**659**	**603**	**1,262**
Percent	**52%**	**48%**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**52%**	**48%**	-

1. Mid-week average includes data between Tuesday and Thursday.

Mark Skaggs:425-250-0777
mark.skaggs@idaxdata.com

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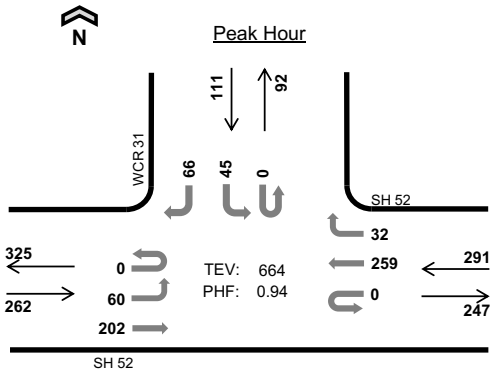
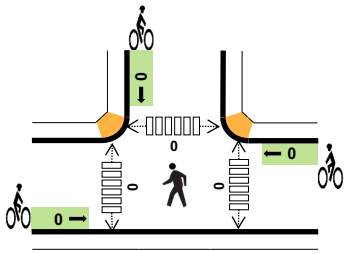
WCR 31
SH 52

Peak Hour



Date: Wed, Apr 24, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	11.1%	0.85
WB	15.8%	0.93
NB	-	-
SB	5.4%	0.79
TOTAL	12.2%	0.94

Two-Hour Count Summaries

Interval Start	SH 52 Eastbound				SH 52 Westbound				0 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	5	51	0	0	0	56	11	0	0	0	0	0	14	0	9	146	0
7:15 AM	**0**	**11**	**49**	**0**	**0**	**0**	**71**	**4**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**14**	**160**	0
7:30 AM	**0**	**6**	**49**	**0**	**0**	**0**	**66**	**12**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**23**	**168**	0
7:45 AM	**0**	**21**	**49**	**0**	**0**	**0**	**67**	**6**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**20**	**176**	650
8:00 AM	**0**	**22**	**55**	**0**	**0**	**0**	**55**	**10**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**9**	**160**	**664**
8:15 AM	0	11	31	0	0	0	59	5	0	0	0	0	0	9	0	14	129	633
8:30 AM	0	10	44	0	0	0	62	7	0	0	0	0	0	5	0	12	140	605
8:45 AM	0	10	50	0	0	0	49	7	0	0	0	0	0	5	0	13	134	563
Count Total	0	96	378	0	0	0	485	62	0	0	0	0	0	78	0	114	1,213	0
Peak Hour	**0**	**60**	**202**	**0**	**0**	**0**	**259**	**32**	**0**	**0**	**0**	**0**	**0**	**45**	**0**	**66**	**664**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	7	13	0	2	*22*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**8**	**7**	**0**	**0**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**4**	**12**	**0**	**1**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**11**	**10**	**0**	**4**	***25***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**6**	**17**	**0**	**1**	***24***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	5	9	0	1	*15*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	17	7	0	2	*26*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	10	8	0	1	*19*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	68	83	0	12	*163*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**29**	**46**	**0**	**6**	***81***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

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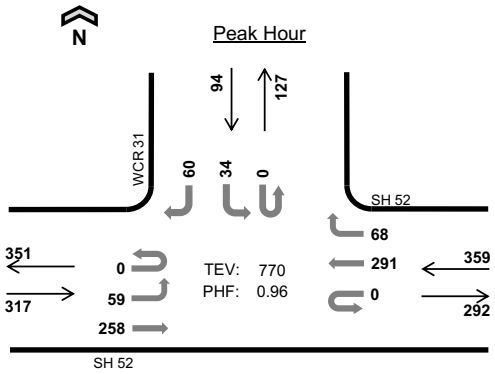
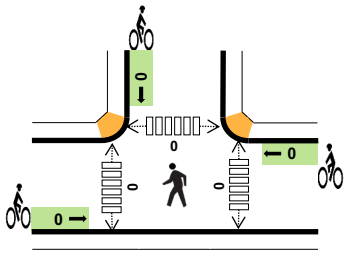
WCR 31
SH 52

Peak Hour



Date: Wed, Apr 24, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	7.6%	0.89
WB	7.0%	0.99
NB	-	-
SB	1.1%	0.78
TOTAL	6.5%	0.96

Two-Hour Count Summaries

Interval Start	SH 52 Eastbound				SH 52 Westbound				0 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	21	59	0	0	0	60	9	0	0	0	0	0	10	0	18	177	0
4:15 PM	0	12	72	0	0	0	49	13	0	0	0	0	0	7	0	17	170	0
4:30 PM	0	15	71	0	0	0	52	13	0	0	0	0	0	10	0	19	180	0
4:45 PM	0	23	64	0	0	0	57	11	0	0	0	0	0	10	0	22	187	714
5:00 PM	**0**	**18**	**71**	**0**	**0**	**0**	**79**	**12**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**10**	**200**	737
5:15 PM	**0**	**17**	**62**	**0**	**0**	**0**	**73**	**16**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**15**	**191**	758
5:30 PM	**0**	**10**	**60**	**0**	**0**	**0**	**71**	**19**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**21**	**190**	768
5:45 PM	**0**	**14**	**65**	**0**	**0**	**0**	**68**	**21**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**14**	**189**	**770**
Count Total	0	130	524	0	0	0	509	114	0	0	0	0	0	71	0	136	1,484	0
Peak Hour	**0**	**59**	**258**	**0**	**0**	**0**	**291**	**68**	**0**	**0**	**0**	**0**	**0**	**34**	**0**	**60**	**770**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	8	4	0	1	*13*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	11	5	0	2	*18*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	6	9	0	0	*15*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	3	5	0	2	*10*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**8**	**10**	**0**	**0**	***18***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**6**	**4**	**0**	**0**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**4**	**3**	**0**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**6**	**8**	**0**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	52	48	0	6	*106*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**24**	**25**	**0**	**1**	***50***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

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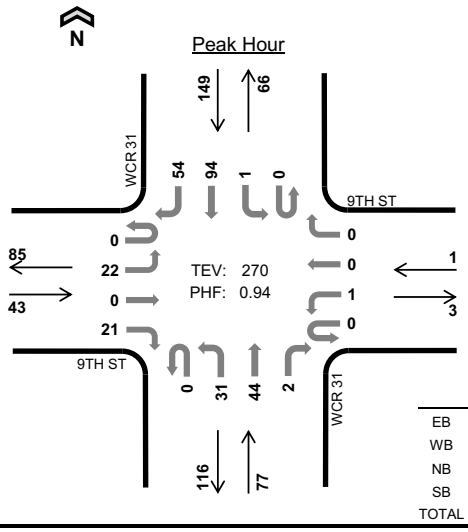
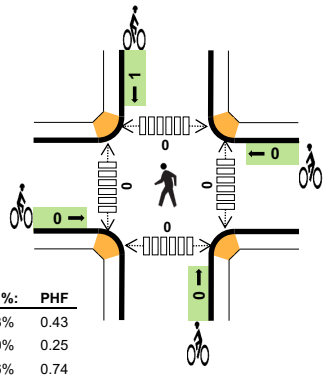
WCR 31
9TH ST



Date: Wed, Apr 24, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	2.3%	0.43
WB	0.0%	0.25
NB	2.6%	0.74
SB	7.4%	0.89
TOTAL	5.2%	0.94

Two-Hour Count Summaries

Interval Start	9TH ST Eastbound				9TH ST Westbound				WCR 31 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**2**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**7**	**8**	**1**	**0**	**0**	**19**	**18**	**58**	0
7:15 AM	**0**	**16**	**0**	**9**	**0**	**1**	**0**	**0**	**0**	**5**	**10**	**0**	**0**	**0**	**15**	**16**	**72**	0
7:30 AM	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**9**	**11**	**0**	**0**	**1**	**31**	**10**	**68**	0
7:45 AM	**0**	**2**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**10**	**15**	**1**	**0**	**0**	**29**	**10**	**72**	**270**
8:00 AM	0	1	1	1	0	1	0	0	0	11	19	0	0	0	16	2	52	264
8:15 AM	0	4	0	7	0	1	0	0	0	9	7	3	0	0	14	2	47	239
8:30 AM	0	2	1	3	0	0	0	2	0	4	9	0	0	2	15	6	44	215
8:45 AM	0	0	0	6	0	0	0	0	0	9	10	2	0	1	12	4	44	187
Count Total	0	29	2	38	0	3	0	2	0	64	89	7	0	4	151	68	457	0
Peak Hour	**0**	**22**	**0**	**21**	**0**	**1**	**0**	**0**	**0**	**31**	**44**	**2**	**0**	**1**	**94**	**54**	**270**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	**0**	**0**	**1**	**5**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:15 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**0**	**4**	***4***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***
8:00 AM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
8:15 AM	0	0	4	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	1	1	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	2	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	1	10	16	*28*	0	0	0	1	*1*	0	0	0	0	*0*
Peak Hour	**1**	**0**	**2**	**11**	***14***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***

Nathan Warren: (720) 646-1008 nathan.warren@idaxdata.com

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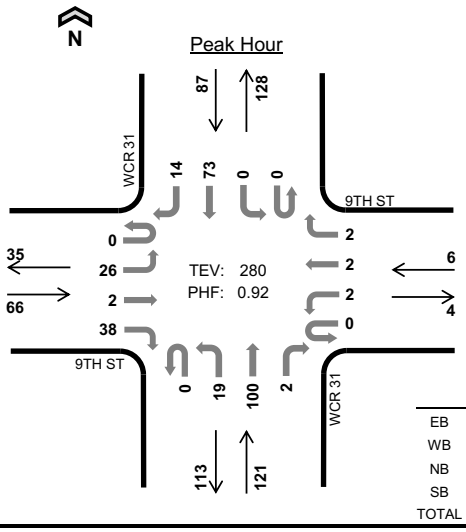
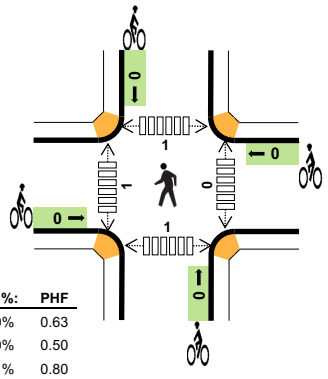
WCR 31
9TH ST



Date: Wed, Apr 24, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	3.0%	0.63
WB	0.0%	0.50
NB	4.1%	0.80
SB	6.9%	0.91
TOTAL	4.6%	0.92

Two-Hour Count Summaries

Interval Start	9TH ST Eastbound				9TH ST Westbound				WCR 31 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**5**	**1**	**7**	**0**	**0**	**0**	**0**	**0**	**5**	**26**	**0**	**0**	**0**	**19**	**5**	**68**	0
4:15 PM	**0**	**6**	**1**	**10**	**0**	**0**	**1**	**1**	**0**	**5**	**21**	**0**	**0**	**0**	**14**	**4**	**63**	0
4:30 PM	**0**	**13**	**0**	**13**	**0**	**1**	**1**	**1**	**0**	**5**	**19**	**2**	**0**	**0**	**16**	**5**	**76**	0
4:45 PM	**0**	**2**	**0**	**8**	**0**	**1**	**0**	**0**	**0**	**4**	**34**	**0**	**0**	**0**	**24**	**0**	**73**	**280**
5:00 PM	0	5	0	7	0	1	0	0	0	4	25	0	0	0	12	4	58	270
5:15 PM	0	3	0	5	0	1	0	0	0	5	26	0	0	0	19	7	66	273
5:30 PM	0	6	0	6	0	0	0	1	0	8	21	0	0	0	22	6	70	267
5:45 PM	0	2	2	2	0	0	0	0	0	7	30	0	0	0	19	1	63	257
Count Total	0	42	4	58	0	4	2	3	0	43	202	2	0	0	145	32	537	0
Peak Hour	**0**	**26**	**2**	**38**	**0**	**2**	**2**	**2**	**0**	**19**	**100**	**2**	**0**	**0**	**73**	**14**	**280**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**1**	**0**	**3**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**0**	*2*
4:45 PM	**1**	**0**	**2**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
5:00 PM	0	0	3	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	6	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	2	0	14	7	*23*	0	0	0	0	*0*	0	1	1	1	*3*
Peak Hour	**2**	**0**	**5**	**6**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**1**	***3***

Nathan Warren: (720) 646-1008 nathan.warren@idaxdata.com

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Appendix B
Level of Service Worksheets

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EXISTING

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Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	202	259	32	45	66
Future Vol, veh/h	60	202	259	32	45	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	220	282	35	49	72

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	317	0	-	0	632	282
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	350	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1243	-	-	-	444	757
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	713	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1243	-	-	-	421	757
Mov Cap-2 Maneuver	-	-	-	-	421	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	713	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1243	-	-	-	572
HCM Lane V/C Ratio	0.052	-	-	-	0.211
HCM Control Delay (s)	8.1	-	-	-	13
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8

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Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	258	291	68	34	60
Future Vol, veh/h	59	258	291	68	34	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	280	316	74	37	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	390	0	-	0	724	316
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	408	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1169	-	-	-	393	724
Stage 1	-	-	-	-	739	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1169	-	-	-	371	724
Mov Cap-2 Maneuver	-	-	-	-	371	-
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	671	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1169	-	-	-	539
HCM Lane V/C Ratio	0.055	-	-	-	0.19
HCM Control Delay (s)	8.3	-	-	-	13.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

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Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	0	21	1	0	0	31	44	2	1	94	54
Future Vol, veh/h	22	0	21	1	0	0	31	44	2	1	94	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	0	23	1	0	0	34	48	2	1	102	59

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	251	252	132	262	280	49	161	0	0	50	0	0
Stage 1	134	134	-	117	117	-	-	-	-	-	-	-
Stage 2	117	118	-	145	163	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	702	651	917	691	628	1020	1418	-	-	1557	-	-
Stage 1	869	785	-	888	799	-	-	-	-	-	-	-
Stage 2	888	798	-	858	763	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	688	634	917	661	612	1020	1418	-	-	1557	-	-
Mov Cap-2 Maneuver	688	634	-	661	612	-	-	-	-	-	-	-
Stage 1	847	784	-	866	779	-	-	-	-	-	-	-
Stage 2	866	778	-	836	762	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	10.5	3.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1418	-	-	688	-	917	661	1557	-	-
HCM Lane V/C Ratio	0.024	-	-	0.035	-	0.025	0.002	0.001	-	-
HCM Control Delay (s)	7.6	0	-	10.4	0	9	10.5	7.3	0	-
HCM Lane LOS	A	A	-	B	A	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	0.1	0	0	-	-

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Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	2	38	2	2	2	19	100	2	0	73	14
Future Vol, veh/h	26	2	38	2	2	2	19	100	2	0	73	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	2	41	2	2	2	21	109	2	0	79	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	241	240	87	260	246	110	94	0	0	111	0	0
Stage 1	87	87	-	152	152	-	-	-	-	-	-	-
Stage 2	154	153	-	108	94	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	713	661	971	693	656	943	1500	-	-	1479	-	-
Stage 1	921	823	-	850	772	-	-	-	-	-	-	-
Stage 2	848	771	-	897	817	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	702	651	971	654	646	943	1500	-	-	1479	-	-
Mov Cap-2 Maneuver	702	651	-	654	646	-	-	-	-	-	-	-
Stage 1	907	823	-	837	760	-	-	-	-	-	-	-
Stage 2	831	759	-	857	817	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10	1.2	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1500	-	-	702	651	971	725	1479	-	-
HCM Lane V/C Ratio	0.014	-	-	0.04	0.003	0.043	0.009	-	-	-
HCM Control Delay (s)	7.4	0	-	10.3	10.5	8.9	10	0	-	-
HCM Lane LOS	A	A	-	B	B	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.1	0	0	-	-

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BACKGROUND 2024

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Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	105	330	420	55	95	115
Future Vol, veh/h	105	330	420	55	95	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	114	359	457	60	103	125

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	517	0	-	0	1044	457
Stage 1	-	-	-	-	457	-
Stage 2	-	-	-	-	587	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1049	-	-	-	254	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1049	-	-	-	226	604
Mov Cap-2 Maneuver	-	-	-	-	226	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	556	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	33.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1049	-	-	-	344
HCM Lane V/C Ratio	0.109	-	-	-	0.664
HCM Control Delay (s)	8.8	-	-	-	33.9
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.4	-	-	-	4.5

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Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	420	475	120	75	45
Future Vol, veh/h	115	420	475	120	75	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	457	516	130	82	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	646	0	-	0	1223	516
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	707	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	939	-	-	-	198	559
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	489	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	939	-	-	-	172	559
Mov Cap-2 Maneuver	-	-	-	-	172	-
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	489	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	38.8
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	939	-	-	-	232
HCM Lane V/C Ratio	0.133	-	-	-	0.562
HCM Control Delay (s)	9.4	-	-	-	38.8
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0.5	-	-	-	3.1

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Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	5	40	5	5	5	55	90	5	5	205	110
Future Vol, veh/h	45	5	40	5	5	5	55	90	5	5	205	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	5	43	5	5	5	60	98	5	5	223	120

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	519	516	283	538	574	101	343	0	0	103	0	0
Stage 1	293	293	-	221	221	-	-	-	-	-	-	-
Stage 2	226	223	-	317	353	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	467	463	756	454	429	954	1216	-	-	1489	-	-
Stage 1	715	670	-	781	720	-	-	-	-	-	-	-
Stage 2	777	719	-	694	631	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	440	437	756	406	405	954	1216	-	-	1489	-	-
Mov Cap-2 Maneuver	440	437	-	406	405	-	-	-	-	-	-	-
Stage 1	678	667	-	740	683	-	-	-	-	-	-	-
Stage 2	727	682	-	646	628	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	12.4	3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1216	-	-	440	437	756	502	1489	-	-
HCM Lane V/C Ratio	0.049	-	-	0.111	0.012	0.058	0.032	0.004	-	-
HCM Control Delay (s)	8.1	0	-	14.2	13.3	10.1	12.4	7.4	0	-
HCM Lane LOS	A	A	-	B	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0	0.2	0.1	0	-	-

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Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	70	5	5	5	35	215	5	5	160	30
Future Vol, veh/h	60	5	70	5	5	5	35	215	5	5	160	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	5	76	5	5	5	38	234	5	5	174	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	519	516	191	554	530	237	207	0	0	239	0	0
Stage 1	201	201	-	313	313	-	-	-	-	-	-	-
Stage 2	318	315	-	241	217	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	467	463	851	443	455	802	1364	-	-	1328	-	-
Stage 1	801	735	-	698	657	-	-	-	-	-	-	-
Stage 2	693	656	-	762	723	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	447	446	851	389	439	802	1364	-	-	1328	-	-
Mov Cap-2 Maneuver	447	446	-	389	439	-	-	-	-	-	-	-
Stage 1	775	732	-	676	636	-	-	-	-	-	-	-
Stage 2	661	635	-	686	720	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	12.6	1.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1364	-	-	447	446	851	492	1328	-	-
HCM Lane V/C Ratio	0.028	-	-	0.146	0.012	0.089	0.033	0.004	-	-
HCM Control Delay (s)	7.7	0	-	14.4	13.2	9.6	12.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0	0.3	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	5	50	5	5	5	25	110	5	5	265	25
Future Vol, veh/h	20	5	50	5	5	5	25	110	5	5	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	54	5	5	5	27	120	5	5	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	494	491	302	518	502	123	315	0	0	125	0	0
Stage 1	312	312	-	177	177	-	-	-	-	-	-	-
Stage 2	182	179	-	341	325	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	486	478	738	468	471	928	1245	-	-	1462	-	-
Stage 1	699	658	-	825	753	-	-	-	-	-	-	-
Stage 2	820	751	-	674	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	469	465	738	421	458	928	1245	-	-	1462	-	-
Mov Cap-2 Maneuver	469	465	-	421	458	-	-	-	-	-	-	-
Stage 1	683	655	-	806	736	-	-	-	-	-	-	-
Stage 2	791	734	-	617	646	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	12	1.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	619	532	1462	-	-
HCM Lane V/C Ratio	0.022	-	-	0.132	0.031	0.004	-	-
HCM Control Delay (s)	8	0	-	11.7	12	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	5	40	5	5	5	50	225	5	5	150	10
Future Vol, veh/h	25	5	40	5	5	5	50	225	5	5	150	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	5	43	5	5	5	54	245	5	5	163	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	540	537	169	559	540	248	174	0	0	250	0	0
Stage 1	179	179	-	356	356	-	-	-	-	-	-	-
Stage 2	361	358	-	203	184	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	453	450	875	440	449	791	1403	-	-	1316	-	-
Stage 1	823	751	-	661	629	-	-	-	-	-	-	-
Stage 2	657	628	-	799	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	429	428	875	399	427	791	1403	-	-	1316	-	-
Mov Cap-2 Maneuver	429	428	-	399	427	-	-	-	-	-	-	-
Stage 1	786	748	-	631	601	-	-	-	-	-	-	-
Stage 2	617	600	-	751	744	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.6	1.4	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	605	491	1316	-	-
HCM Lane V/C Ratio	0.039	-	-	0.126	0.033	0.004	-	-
HCM Control Delay (s)	7.7	0	-	11.8	12.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-	-

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TOTAL 2024

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Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	340	425	60	105	135
Future Vol, veh/h	115	340	425	60	105	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	370	462	65	114	147

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1082	462
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1040	-	-	-	241	600
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1040	-	-	-	212	600
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	45.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1040	-	-	-	333
HCM Lane V/C Ratio	0.12	-	-	-	0.783
HCM Control Delay (s)	8.9	-	-	-	45.7
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0.4	-	-	-	6.4

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Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	140	425	485	130	80	60
Future Vol, veh/h	140	425	485	130	80	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	462	527	141	87	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	1293	527
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	766	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	922	-	-	-	180	551
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	922	-	-	-	150	551
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	459	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	52.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	922	-	-	-	218
HCM Lane V/C Ratio	0.165	-	-	-	0.698
HCM Control Delay (s)	9.7	-	-	-	52.6
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	4.5

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Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	5	50	5	5	5	60	100	5	5	225	110
Future Vol, veh/h	45	5	50	5	5	5	60	100	5	5	225	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	5	54	5	5	5	65	109	5	5	245	120

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	562	559	305	587	617	112	365	0	0	114	0	0
Stage 1	315	315	-	242	242	-	-	-	-	-	-	-
Stage 2	247	244	-	345	375	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	438	438	735	421	405	941	1194	-	-	1475	-	-
Stage 1	696	656	-	762	705	-	-	-	-	-	-	-
Stage 2	757	704	-	671	617	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	410	411	735	368	380	941	1194	-	-	1475	-	-
Mov Cap-2 Maneuver	410	411	-	368	380	-	-	-	-	-	-	-
Stage 1	656	653	-	718	664	-	-	-	-	-	-	-
Stage 2	703	663	-	614	615	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	13	3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	410	411	735	468	1475	-	-
HCM Lane V/C Ratio	0.055	-	-	0.119	0.013	0.074	0.035	0.004	-	-
HCM Control Delay (s)	8.2	0	-	15	13.9	10.3	13	7.5	0	-
HCM Lane LOS	A	A	-	C	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0	0.2	0.1	0	-	-

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Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	75	5	5	5	45	240	5	5	175	30
Future Vol, veh/h	60	5	75	5	5	5	45	240	5	5	175	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	5	82	5	5	5	49	261	5	5	190	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	584	581	207	622	595	264	223	0	0	266	0	0
Stage 1	217	217	-	362	362	-	-	-	-	-	-	-
Stage 2	367	364	-	260	233	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	423	425	833	399	417	775	1346	-	-	1298	-	-
Stage 1	785	723	-	657	625	-	-	-	-	-	-	-
Stage 2	653	624	-	745	712	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	401	405	833	344	397	775	1346	-	-	1298	-	-
Mov Cap-2 Maneuver	401	405	-	344	397	-	-	-	-	-	-	-
Stage 1	751	720	-	629	598	-	-	-	-	-	-	-
Stage 2	615	597	-	664	709	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	13.4	1.2	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	401	405	833	447	1298	-	-
HCM Lane V/C Ratio	0.036	-	-	0.163	0.013	0.098	0.036	0.004	-	-
HCM Control Delay (s)	7.8	0	-	15.7	14	9.8	13.4	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0	0.3	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	5	60	5	5	5	25	110	5	5	265	25
Future Vol, veh/h	20	5	60	5	5	5	25	110	5	5	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	65	5	5	5	27	120	5	5	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	494	491	302	524	502	123	315	0	0	125	0	0
Stage 1	312	312	-	177	177	-	-	-	-	-	-	-
Stage 2	182	179	-	347	325	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	486	478	738	464	471	928	1245	-	-	1462	-	-
Stage 1	699	658	-	825	753	-	-	-	-	-	-	-
Stage 2	820	751	-	669	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	469	465	738	411	458	928	1245	-	-	1462	-	-
Mov Cap-2 Maneuver	469	465	-	411	458	-	-	-	-	-	-	-
Stage 1	683	655	-	806	736	-	-	-	-	-	-	-
Stage 2	791	734	-	602	646	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	12	1.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	631	527	1462	-	-
HCM Lane V/C Ratio	0.022	-	-	0.146	0.031	0.004	-	-
HCM Control Delay (s)	8	0	-	11.7	12	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	5	45	5	5	5	60	225	5	5	150	10
Future Vol, veh/h	25	5	45	5	5	5	60	225	5	5	150	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	5	49	5	5	5	65	245	5	5	163	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	562	559	169	584	562	248	174	0	0	250	0	0
Stage 1	179	179	-	378	378	-	-	-	-	-	-	-
Stage 2	383	380	-	206	184	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	438	438	875	423	436	791	1403	-	-	1316	-	-
Stage 1	823	751	-	644	615	-	-	-	-	-	-	-
Stage 2	640	614	-	796	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	412	413	875	378	411	791	1403	-	-	1316	-	-
Mov Cap-2 Maneuver	412	413	-	378	411	-	-	-	-	-	-	-
Stage 1	779	748	-	609	582	-	-	-	-	-	-	-
Stage 2	596	581	-	743	744	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	12.9	1.6	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	604	473	1316	-	-
HCM Lane V/C Ratio	0.046	-	-	0.135	0.034	0.004	-	-
HCM Control Delay (s)	7.7	0	-	11.9	12.9	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

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2024 With Improvements

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Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	340	425	60	105	135
Future Vol, veh/h	115	340	425	60	105	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	370	462	65	114	147

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1082	462
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1040	-	-	-	241	600
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1040	-	-	-	212	600
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	24.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1040	-	-	-	212	600
HCM Lane V/C Ratio	0.12	-	-	-	0.538	0.245
HCM Control Delay (s)	8.9	-	-	-	40.2	12.9
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.4	-	-	-	2.8	1

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Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	140	425	485	130	80	60
Future Vol, veh/h	140	425	485	130	80	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	462	527	141	87	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	1293	527
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	766	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	922	-	-	-	180	551
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	922	-	-	-	150	551
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	459	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	38.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	922	-	-	-	150	551
HCM Lane V/C Ratio	0.165	-	-	-	0.58	0.118
HCM Control Delay (s)	9.7	-	-	-	57.7	12.4
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.6	-	-	-	3	0.4

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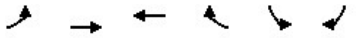
HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	340	425	60	105	135
Future Volume (veh/h)	115	340	425	60	105	135
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	125	370	462	65	114	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	336	864	557	472	267	344
Arrive On Green	0.08	0.46	0.30	0.30	0.37	0.37
Sat Flow, veh/h	1781	1870	1870	1585	725	935
Grp Volume(v), veh/h	125	370	462	65	262	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1666	0
Q Serve(g_s), s	2.3	7.0	12.2	1.6	6.2	0.0
Cycle Q Clear(g_c), s	2.3	7.0	12.2	1.6	6.2	0.0
Prop In Lane	1.00			1.00	0.44	0.56
Lane Grp Cap(c), veh/h	336	864	557	472	613	0
V/C Ratio(X)	0.37	0.43	0.83	0.14	0.43	0.00
Avail Cap(c_a), veh/h	380	1112	759	643	613	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.0	9.6	17.4	13.6	12.6	0.0
Incr Delay (d2), s/veh	0.7	0.3	5.7	0.1	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.9	4.8	0.4	2.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	9.9	23.0	13.8	14.7	0.0
LnGrp LOS	B	A	C	B	B	A
Approach Vol, veh/h		495	527		262	
Approach Delay, s/veh		10.6	21.9		14.7	
Approach LOS		B	C		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			29.0		24.0	8.7	20.3
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			31.5		19.5	5.5	21.5
Max Q Clear Time (g_c+I1), s			9.0		8.2	4.3	14.2
Green Ext Time (p_c), s			1.8		0.6	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

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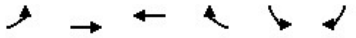
HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	140	425	485	130	80	60
Future Volume (veh/h)	140	425	485	130	80	60
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	152	462	527	141	87	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	330	925	615	521	327	245
Arrive On Green	0.08	0.49	0.33	0.33	0.34	0.34
Sat Flow, veh/h	1781	1870	1870	1585	963	719
Grp Volume(v), veh/h	152	462	527	141	153	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1693	0
Q Serve(g_s), s	2.8	9.0	14.3	3.6	3.6	0.0
Cycle Q Clear(g_c), s	2.8	9.0	14.3	3.6	3.6	0.0
Prop In Lane	1.00			1.00	0.57	0.42
Lane Grp Cap(c), veh/h	330	925	615	521	576	0
V/C Ratio(X)	0.46	0.50	0.86	0.27	0.27	0.00
Avail Cap(c_a), veh/h	396	1118	739	627	576	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.1	9.2	17.0	13.4	13.0	0.0
Incr Delay (d2), s/veh	1.0	0.4	8.5	0.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.3	5.9	1.0	1.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.1	9.7	25.5	13.7	14.1	0.0
LnGrp LOS	B	A	C	B	B	A
Approach Vol, veh/h		614	668		153	
Approach Delay, s/veh		10.5	23.0		14.1	
Approach LOS		B	C		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			31.4		23.0	9.0	22.4
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	6.5	21.5
Max Q Clear Time (g_c+I1), s			11.0		5.6	4.8	16.3
Green Ext Time (p_c), s			2.4		0.3	0.1	1.6

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

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BACKGROUND 2040

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 09/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	465	70	40	600	80	115	180	80	160	140	235
Future Volume (veh/h)	145	465	70	40	600	80	115	180	80	160	140	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	505	76	43	652	87	125	196	87	174	152	255
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	979	830	402	704	597	334	541	458	338	541	458
Arrive On Green	0.08	0.52	0.52	0.38	0.38	0.38	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	833	1870	1585	978	1870	1585	1096	1870	1585
Grp Volume(v), veh/h	158	505	76	43	652	87	125	196	87	174	152	255
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	833	1870	1585	978	1870	1585	1096	1870	1585
Q Serve(g_s), s	3.2	11.3	1.5	2.3	21.4	2.3	7.3	5.3	2.6	9.6	4.0	8.7
Cycle Q Clear(g_c), s	3.2	11.3	1.5	4.2	21.4	2.3	11.3	5.3	2.6	14.9	4.0	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	280	979	830	402	704	597	334	541	458	338	541	458
V/C Ratio(X)	0.56	0.52	0.09	0.11	0.93	0.15	0.37	0.36	0.19	0.51	0.28	0.56
Avail Cap(c_a), veh/h	283	1008	855	414	731	619	334	541	458	338	541	458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	10.0	7.6	14.4	19.1	13.2	22.0	18.1	17.1	24.0	17.6	19.3
Incr Delay (d2), s/veh	2.5	0.4	0.0	0.1	17.4	0.1	3.2	1.9	0.9	5.5	1.3	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.2	0.4	0.4	10.5	0.7	1.9	2.4	1.0	2.8	1.8	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	10.4	7.7	14.5	36.5	13.3	25.2	19.9	18.0	29.5	18.9	24.1
LnGrp LOS	B	B	A	B	D	B	C	B	B	C	B	C
Approach Vol, veh/h		739			782			408			581	
Approach Delay, s/veh		11.5			32.7			21.1			24.3	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	24.5	39.5	24.5	9.4	30.1
Change Period (Y+Rc), s	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	18.5	34.5	18.5	5.0	25.0
Max Q Clear Time (g_c+I1), s	13.3	13.3	16.9	5.2	23.4
Green Ext Time (p_c), s	0.9	2.9	0.5	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 09/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	595	80	80	670	165	105	200	60	120	180	215
Future Volume (veh/h)	155	595	80	80	670	165	105	200	60	120	180	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	647	87	87	728	179	114	217	65	130	196	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	1058	896	341	804	681	276	508	430	291	508	430
Arrive On Green	0.07	0.57	0.57	0.43	0.43	0.43	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	723	1870	1585	958	1870	1585	1097	1870	1585
Grp Volume(v), veh/h	168	647	87	87	728	179	114	217	65	130	196	234
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	723	1870	1585	958	1870	1585	1097	1870	1585
Q Serve(g_s), s	3.6	16.9	1.9	6.7	26.8	5.3	8.1	7.0	2.3	8.2	6.3	9.3
Cycle Q Clear(g_c), s	3.6	16.9	1.9	13.6	26.8	5.3	14.4	7.0	2.3	15.2	6.3	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	272	1058	896	341	804	681	276	508	430	291	508	430
V/C Ratio(X)	0.62	0.61	0.10	0.26	0.91	0.26	0.41	0.43	0.15	0.45	0.39	0.54
Avail Cap(c_a), veh/h	344	1219	1033	373	889	753	276	508	430	291	508	430
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	10.6	7.4	18.5	19.6	13.5	27.7	22.1	20.4	28.4	21.8	22.9
Incr Delay (d2), s/veh	2.3	0.7	0.0	0.4	12.0	0.2	4.5	2.6	0.7	4.9	2.2	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.0	0.5	1.0	11.8	1.6	2.1	3.3	0.9	2.5	2.9	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	11.3	7.4	18.9	31.7	13.7	32.2	24.7	21.1	33.3	24.0	27.8
LnGrp LOS	B	B	A	B	C	B	C	C	C	C	C	C
Approach Vol, veh/h		902			994			396			560	
Approach Delay, s/veh		12.3			27.3			26.3			27.8	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	26.0	47.7	26.0	10.0	37.6
Change Period (Y+Rc), s	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	20.0	48.0	20.0	8.5	35.0
Max Q Clear Time (g_c+I1), s	16.4	18.9	17.2	5.6	28.8
Green Ext Time (p_c), s	0.7	4.2	0.8	0.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

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Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	85	25	75	25	25	15	110	165	25	15	365	203
Future Vol, veh/h	85	25	75	25	25	15	110	165	25	15	365	203
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	92	27	82	27	27	16	120	179	27	16	397	221

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	994	986	508	1027	1083	193	618	0	0	206	0	0
Stage 1	540	540	-	433	433	-	-	-	-	-	-	-
Stage 2	454	446	-	594	650	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	224	248	565	213	217	849	962	-	-	1365	-	-
Stage 1	526	521	-	601	582	-	-	-	-	-	-	-
Stage 2	586	574	-	491	465	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	209	565	145	183	849	962	-	-	1365	-	-
Mov Cap-2 Maneuver	172	209	-	145	183	-	-	-	-	-	-	-
Stage 1	452	511	-	516	500	-	-	-	-	-	-	-
Stage 2	467	493	-	390	456	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.4	32.7	3.4	0.2
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	962	-	-	172	209	565	199	1365	-	-
HCM Lane V/C Ratio	0.124	-	-	0.537	0.13	0.144	0.355	0.012	-	-
HCM Control Delay (s)	9.3	0	-	47.9	24.8	12.4	32.7	7.7	0	-
HCM Lane LOS	A	A	-	E	C	B	D	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	2.7	0.4	0.5	1.5	0	-	-

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Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	25	135	25	25	15	70	385	25	15	285	55
Future Vol, veh/h	105	25	135	25	25	15	70	385	25	15	285	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	114	27	147	27	27	16	76	418	27	16	310	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	977	969	340	1043	986	432	370	0	0	445	0	0
Stage 1	372	372	-	584	584	-	-	-	-	-	-	-
Stage 2	605	597	-	459	402	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	230	254	702	207	248	624	1189	-	-	1115	-	-
Stage 1	648	619	-	498	498	-	-	-	-	-	-	-
Stage 2	485	491	-	582	600	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	188	228	702	137	223	624	1189	-	-	1115	-	-
Mov Cap-2 Maneuver	188	228	-	137	223	-	-	-	-	-	-	-
Stage 1	593	608	-	456	456	-	-	-	-	-	-	-
Stage 2	406	449	-	432	589	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.8	31.7	1.2	0.3
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1189	-	-	188	228	702	204	1115	-	-
HCM Lane V/C Ratio	0.064	-	-	0.607	0.119	0.209	0.346	0.015	-	-
HCM Control Delay (s)	8.2	0	-	50	22.9	11.5	31.7	8.3	0	-
HCM Lane LOS	A	A	-	F	C	B	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.4	0.4	0.8	1.5	0	-	-

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Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	25	75	25	25	15	50	190	25	15	485	40
Future Vol, veh/h	35	25	75	25	25	15	50	190	25	15	485	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	27	82	27	27	16	54	207	27	16	527	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	931	923	549	964	931	221	570	0	0	234	0	0
Stage 1	581	581	-	329	329	-	-	-	-	-	-	-
Stage 2	350	342	-	635	602	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	247	270	535	235	267	819	1002	-	-	1333	-	-
Stage 1	499	500	-	684	646	-	-	-	-	-	-	-
Stage 2	666	638	-	467	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	208	249	535	172	246	819	1002	-	-	1333	-	-
Mov Cap-2 Maneuver	208	249	-	172	246	-	-	-	-	-	-	-
Stage 1	468	491	-	642	606	-	-	-	-	-	-	-
Stage 2	585	598	-	367	480	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.4	25.5	1.7	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1002	-	-	330	245	1333	-	-
HCM Lane V/C Ratio	0.054	-	-	0.445	0.288	0.012	-	-
HCM Control Delay (s)	8.8	0	-	24.4	25.5	7.7	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.2	1.2	0	-	-

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Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	25	65	25	25	15	75	405	25	15	265	25
Future Vol, veh/h	40	25	65	25	25	15	75	405	25	15	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	27	71	27	27	16	82	440	27	16	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	973	965	302	1001	965	454	315	0	0	467	0	0
Stage 1	334	334	-	618	618	-	-	-	-	-	-	-
Stage 2	639	631	-	383	347	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	231	255	738	222	255	606	1245	-	-	1094	-	-
Stage 1	680	643	-	477	481	-	-	-	-	-	-	-
Stage 2	464	474	-	640	635	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	188	228	738	168	228	606	1245	-	-	1094	-	-
Mov Cap-2 Maneuver	188	228	-	168	228	-	-	-	-	-	-	-
Stage 1	619	631	-	435	438	-	-	-	-	-	-	-
Stage 2	386	432	-	544	624	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.2	27.4	1.2	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	317	230	1094	-	-
HCM Lane V/C Ratio	0.065	-	-	0.446	0.307	0.015	-	-
HCM Control Delay (s)	8.1	0	-	25.2	27.4	8.3	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.2	1.3	0	-	-

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TOTAL 2040

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31

10/03/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	475	70	40	605	85	115	195	80	170	170	245
Future Volume (veh/h)	145	475	70	40	605	85	115	195	80	170	170	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	516	76	43	658	92	125	212	87	185	185	266
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	982	832	396	708	600	310	539	457	325	539	457
Arrive On Green	0.08	0.52	0.52	0.38	0.38	0.38	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	825	1870	1585	940	1870	1585	1080	1870	1585
Grp Volume(v), veh/h	158	516	76	43	658	92	125	212	87	185	185	266
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	825	1870	1585	940	1870	1585	1080	1870	1585
Q Serve(g_s), s	3.2	11.6	1.5	2.3	21.7	2.5	7.8	5.8	2.7	10.6	5.0	9.2
Cycle Q Clear(g_c), s	3.2	11.6	1.5	4.5	21.7	2.5	12.8	5.8	2.7	16.5	5.0	9.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	982	832	396	708	600	310	539	457	325	539	457
V/C Ratio(X)	0.57	0.53	0.09	0.11	0.93	0.15	0.40	0.39	0.19	0.57	0.34	0.58
Avail Cap(c_a), veh/h	280	1005	852	405	729	617	310	539	457	325	539	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	10.0	7.6	14.6	19.1	13.2	23.1	18.3	17.2	25.0	18.0	19.5
Incr Delay (d2), s/veh	2.7	0.5	0.0	0.1	18.2	0.1	3.9	2.1	0.9	7.0	1.7	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.3	0.4	0.4	10.8	0.7	1.9	2.7	1.0	3.2	2.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	10.5	7.7	14.7	37.3	13.3	27.0	20.5	18.1	32.0	19.8	24.9
LnGrp LOS	B	B	A	B	D	B	C	C	B	C	B	C
Approach Vol, veh/h		750			793			424			636	
Approach Delay, s/veh		11.6			33.3			21.9			25.5	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		24.5		39.7		24.5	9.4	30.3				
Change Period (Y+Rc), s		6.0		6.0		6.0	4.5	6.0				
Max Green Setting (Gmax), s		18.5		34.5		18.5	5.0	25.0				
Max Q Clear Time (g_c+I1), s		14.8		13.6		18.5	5.2	23.7				
Green Ext Time (p_c), s		0.8		2.9		0.0	0.0	0.6				

Intersection Summary		
HCM 6th Ctrl Delay	23.3	
HCM 6th LOS	C	

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	600	80	80	680	175	105	250	60	125	205	220
Future Volume (veh/h)	160	600	80	80	680	175	105	250	60	125	205	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	652	87	87	739	190	114	272	65	136	223	239
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	1066	903	341	810	686	255	503	426	248	503	426
Arrive On Green	0.08	0.57	0.57	0.43	0.43	0.43	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	720	1870	1585	930	1870	1585	1043	1870	1585
Grp Volume(v), veh/h	174	652	87	87	739	190	114	272	65	136	223	239
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	720	1870	1585	930	1870	1585	1043	1870	1585
Q Serve(g_s), s	3.7	17.1	1.9	6.8	27.6	5.7	8.6	9.3	2.3	9.5	7.4	9.7
Cycle Q Clear(g_c), s	3.7	17.1	1.9	13.7	27.6	5.7	16.0	9.3	2.3	18.8	7.4	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	1066	903	341	810	686	255	503	426	248	503	426
V/C Ratio(X)	0.64	0.61	0.10	0.26	0.91	0.28	0.45	0.54	0.15	0.55	0.44	0.56
Avail Cap(c_a), veh/h	338	1207	1023	368	880	746	255	503	426	248	503	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	10.6	7.3	18.5	19.8	13.6	29.2	23.3	20.7	31.3	22.6	23.4
Incr Delay (d2), s/veh	2.8	0.7	0.0	0.4	13.1	0.2	5.6	4.1	0.8	8.5	2.8	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	5.1	0.5	1.0	12.3	1.7	2.2	4.5	0.9	2.9	3.5	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	11.3	7.3	18.8	32.8	13.8	34.8	27.4	21.5	39.8	25.4	28.7
LnGrp LOS	B	B	A	B	C	B	C	C	C	D	C	C
Approach Vol, veh/h		913			1016			451			598	
Approach Delay, s/veh		12.4			28.1			28.4			30.0	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.0		48.4		26.0	10.2	38.2				
Change Period (Y+Rc), s		6.0		6.0		6.0	4.5	6.0				
Max Green Setting (Gmax), s		20.0		48.0		20.0	8.5	35.0				
Max Q Clear Time (g_c+I1), s		18.0		19.1		20.8	5.7	29.6				
Green Ext Time (p_c), s		0.5		4.3		0.0	0.1	2.6				

Intersection Summary												
HCM 6th Ctrl Delay			23.7									
HCM 6th LOS			C									

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Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	85	25	100	25	25	15	125	175	25	15	390	205
Future Vol, veh/h	85	25	100	25	25	15	125	175	25	15	390	205
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	92	27	109	27	27	16	136	190	27	16	424	223

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1065	1057	536	1112	1155	204	647	0	0	217	0	0
Stage 1	568	568	-	476	476	-	-	-	-	-	-	-
Stage 2	497	489	-	636	679	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	200	225	545	186	197	837	939	-	-	1353	-	-
Stage 1	508	506	-	570	557	-	-	-	-	-	-	-
Stage 2	555	549	-	466	451	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	184	545	114	161	837	939	-	-	1353	-	-
Mov Cap-2 Maneuver	148	184	-	114	161	-	-	-	-	-	-	-
Stage 1	424	496	-	476	465	-	-	-	-	-	-	-
Stage 2	428	458	-	346	442	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.1	41.9	3.6	0.2
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	939	-	-	148	184	545	166	1353	-	-
HCM Lane V/C Ratio	0.145	-	-	0.624	0.148	0.199	0.426	0.012	-	-
HCM Control Delay (s)	9.5	0	-	63	27.9	13.2	41.9	7.7	0	-
HCM Lane LOS	A	A	-	F	D	B	E	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	3.4	0.5	0.7	1.9	0	-	-

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Intersection	
Int Delay, s/veh	11.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	25	150	25	25	15	95	420	25	15	305	55
Future Vol, veh/h	105	25	150	25	25	15	95	420	25	15	305	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	114	27	163	27	27	16	103	457	27	16	332	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1092	1084	362	1166	1101	471	392	0	0	484	0	0
Stage 1	394	394	-	677	677	-	-	-	-	-	-	-
Stage 2	698	690	-	489	424	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	192	217	683	171	212	593	1167	-	-	1079	-	-
Stage 1	631	605	-	443	452	-	-	-	-	-	-	-
Stage 2	431	446	-	561	587	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	187	683	104	183	593	1167	-	-	1079	-	-
Mov Cap-2 Maneuver	148	187	-	104	183	-	-	-	-	-	-	-
Stage 1	555	594	-	389	397	-	-	-	-	-	-	-
Stage 2	343	392	-	400	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	40	43.4	1.5	0.3
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	148	187	683	162	1079	-	-
HCM Lane V/C Ratio	0.088	-	-	0.771	0.145	0.239	0.436	0.015	-	-
HCM Control Delay (s)	8.4	0	-	83.2	27.5	11.9	43.4	8.4	0	-
HCM Lane LOS	A	A	-	F	D	B	E	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	4.8	0.5	0.9	2	0	-	-

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Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	25	85	25	25	15	50	190	25	15	485	40
Future Vol, veh/h	35	25	85	25	25	15	50	190	25	15	485	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	27	92	27	27	16	54	207	27	16	527	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	931	923	549	969	931	221	570	0	0	234	0	0
Stage 1	581	581	-	329	329	-	-	-	-	-	-	-
Stage 2	350	342	-	640	602	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	247	270	535	233	267	819	1002	-	-	1333	-	-
Stage 1	499	500	-	684	646	-	-	-	-	-	-	-
Stage 2	666	638	-	464	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	208	249	535	166	246	819	1002	-	-	1333	-	-
Mov Cap-2 Maneuver	208	249	-	166	246	-	-	-	-	-	-	-
Stage 1	468	491	-	642	606	-	-	-	-	-	-	-
Stage 2	585	598	-	356	480	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	26.1	1.7	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1002	-	-	339	240	1333	-	-
HCM Lane V/C Ratio	0.054	-	-	0.465	0.294	0.012	-	-
HCM Control Delay (s)	8.8	0	-	24.5	26.1	7.7	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.4	1.2	0	-	-

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Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	25	70	25	25	15	85	405	25	15	265	25
Future Vol, veh/h	40	25	70	25	25	15	85	405	25	15	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	27	76	27	27	16	92	440	27	16	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	993	985	302	1023	985	454	315	0	0	467	0	0
Stage 1	334	334	-	638	638	-	-	-	-	-	-	-
Stage 2	659	651	-	385	347	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	224	248	738	214	248	606	1245	-	-	1094	-	-
Stage 1	680	643	-	465	471	-	-	-	-	-	-	-
Stage 2	453	465	-	638	635	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	180	219	738	159	219	606	1245	-	-	1094	-	-
Mov Cap-2 Maneuver	180	219	-	159	219	-	-	-	-	-	-	-
Stage 1	612	631	-	419	424	-	-	-	-	-	-	-
Stage 2	371	419	-	538	624	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.3	29.1	1.3	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	313	219	1094	-	-
HCM Lane V/C Ratio	0.074	-	-	0.469	0.323	0.015	-	-
HCM Control Delay (s)	8.1	0	-	26.3	29.1	8.3	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.4	1.3	0	-	-

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Appendix C

Figure and Table 4C-3 Manual on Uniform Traffic Control Devices

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Excerpt from the Federal Highway Administration's, "Manual on Uniform Traffic Control Devices" (MUTCD), 2009

2009 EDITION PART 4 FIGURE 4C-3. WARRANT 3, PEAK HOUR

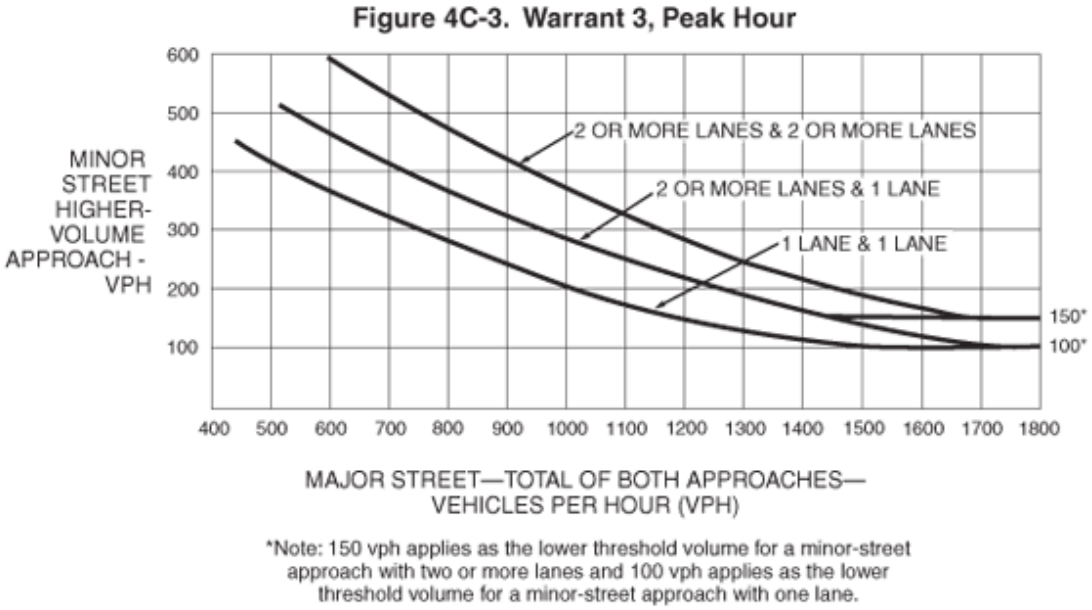

Figure 4C-3. Warrant 3, Peak Hour

This figure shows a graph depicting numerical values for Warrant 3, Peak Hour (see Section 4C.04 for further details). The figure displays three curves—one for each existing combination of approach lanes: one lane and one lane, two or more lanes and one lane, and two or more lanes and two or more lanes.

The table below shows the approximate VPH on the major street and corresponding VPH on the minor street for each combination of approach lanes.

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Table for Figure 4C-3					
One lane and one lane		Two or more lanes and one lane		Two or more lanes and two or more lanes	
VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)
1800	100	1800	100 or 150*	1800	150
1700	100	1700	100 or 150*	1700	150
1600	100	1600	120 or 150*	1600	170
1500	100	1500	145 or 150*	1500	180
1400	120	1400	155	1400	220
1300	130	1300	190	1300	250
1200	150	1200	220	1200	285
1100	175	1100	250	1100	340
1000	200	1000	285	1000	370
900	245	900	325	900	425
800	285	800	360	800	475
700	325	700	420	700	540
600	360	600	460	600	590
500	420	500	Not available	500	Not available

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: Federal Highway Administration’s on-line “Manual on Uniform Traffic Control Devices” (MUTCD) 2009

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Appendix D

Project Access 2024 and 2040 Volumes and NCHRP REPORT 279

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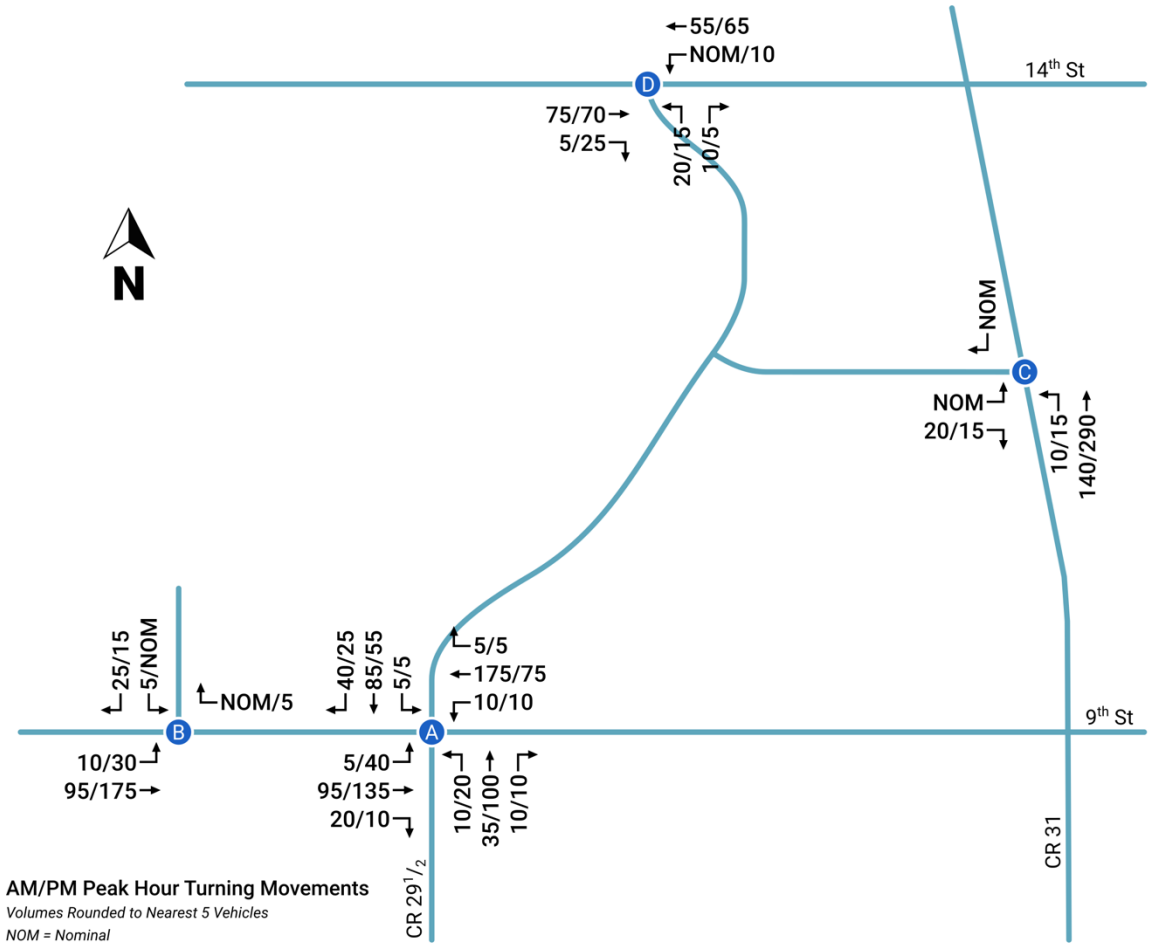
Project Access 2024 Peak Hour Volumes



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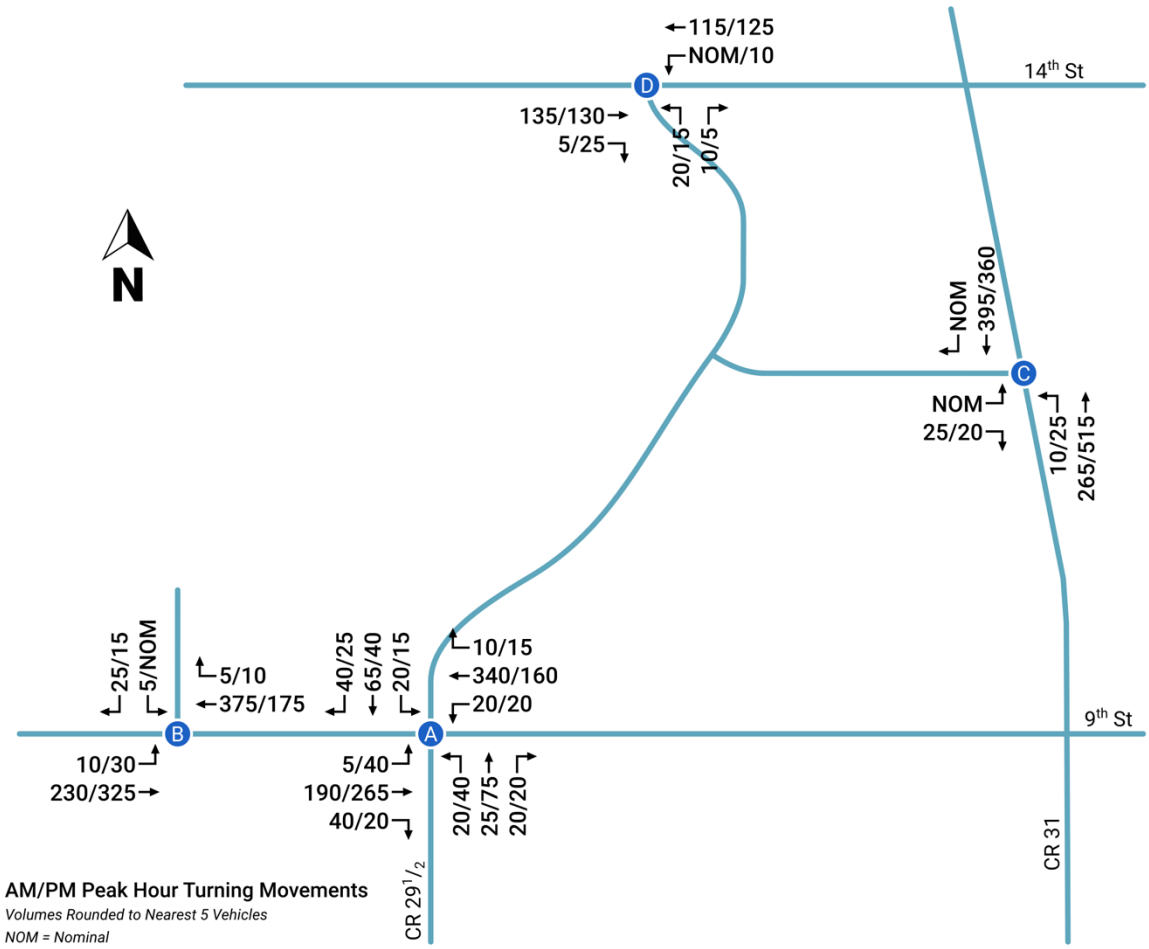
Project Access 2040 Peak Hour Volumes



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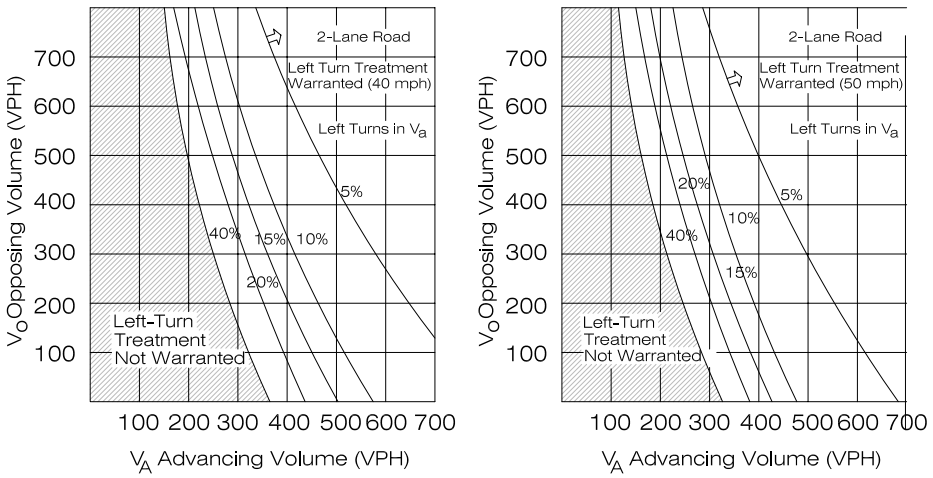
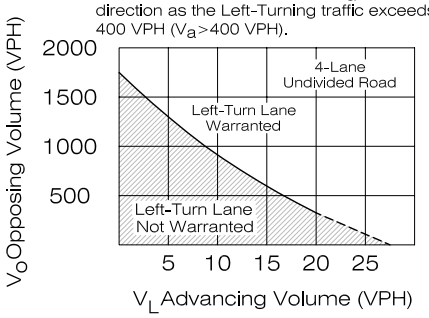
Based on Transportation Research Board's, *NCHRP – Report 279*, 1985



NOTE: When V_O < 400 VPH (dashed line). A Left-Turn Lane is not normally warranted unless the advancing volume (V_a) in the same direction as the Left-Turning traffic exceeds 400 VPH (V_a>400 VPH).



Notes: 1. Left turn lanes are required at all intersections and all-movement accesses on arterial roadways except where roundabouts are provided.

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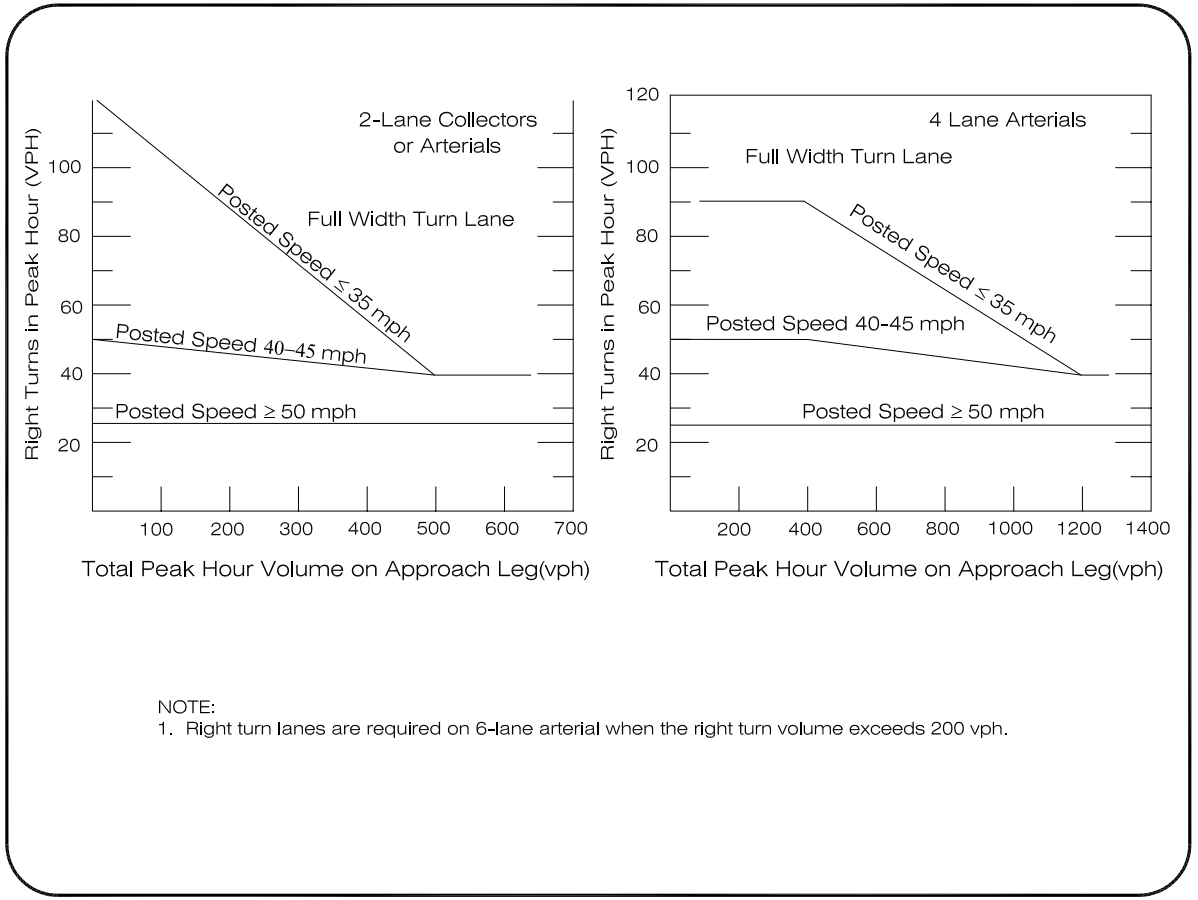
Based on Transportation Research Board's, *NCHRP – Report 279*, 1985



NOTE:
1. Right turn lanes are required on 6-lane arterial when the right turn volume exceeds 200 vph.

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Phase III Drainage Report

Cottonwood Greens Filing No. 4

A part of the Cottonwood Greens Subdivision

A Tract of land in the South Half of Section 33, Township 2 North, Range 66 West of the Sixth Principal Meridian, City of Fort Lupton, County of Weld, State of Colorado

Owner/Developer
Arbor Capital Partners, LLC
4040 MacArthur Drive, Suite 250
Newport Beach, California 92660
Contact: Mr. Jim Righeimer

Engineer
143 Union Boulevard
Suite 700
Lakewood, CO 80228
Tel: 303.462.1100
Contact: Daniel Rodriguez, PE

Atwell Project Number
20002948

City of Fort Lupton Project Number
T.B.D.

Submittal Date
June 2021

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ATWELL

Signature Page

Engineer's Statement:

"I hereby affirm that this report and plan for the Phase III drainage design of the development, Cottonwood Greens Filing No. 4, was prepared by me (or under my direct supervision) in accordance with the provisions of the City of Fort Lupton Storm Drainage Design and Technical Criteria for the owners thereof. I understand that the City of Fort Lupton does not and will not assume liability for facilities designed by others. I am also aware of the provisions of the City CODE as it pertains to the City's review."

SEAL & SIGNATURE: _____

Daniel Rodriguez, PE Date

Registered Professional Engineer State of Colorado No. 48683

Developer's Statement:

"Arbor Capital Partners, LLC hereby affirms that the drainage facilities for the development, Cottonwood Greens Filing No. 4, shall be constructed according to the design presented in this report. I understand that the City of Fort Lupton does not and will not assume liability for drainage facilities designed and/or certified by my engineer. I understand that the City of Fort Lupton reviews drainage plans but cannot, on behalf of Arbor Capital Partners, LLC and/or their successors and/or assigns assume future liability for improper design. I am also aware of the provisions of the City CODE as it pertains to the City's review."

_____

Authorized Signature Date

_____

Printed Name

_____

Title

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ATWELL

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APPENDIX B – Proposed Drainage Plans
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APPENDIX D – Inlet and Street Capacity Calculations
APPENDIX G – Referenced Material

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General Location and Description

Location

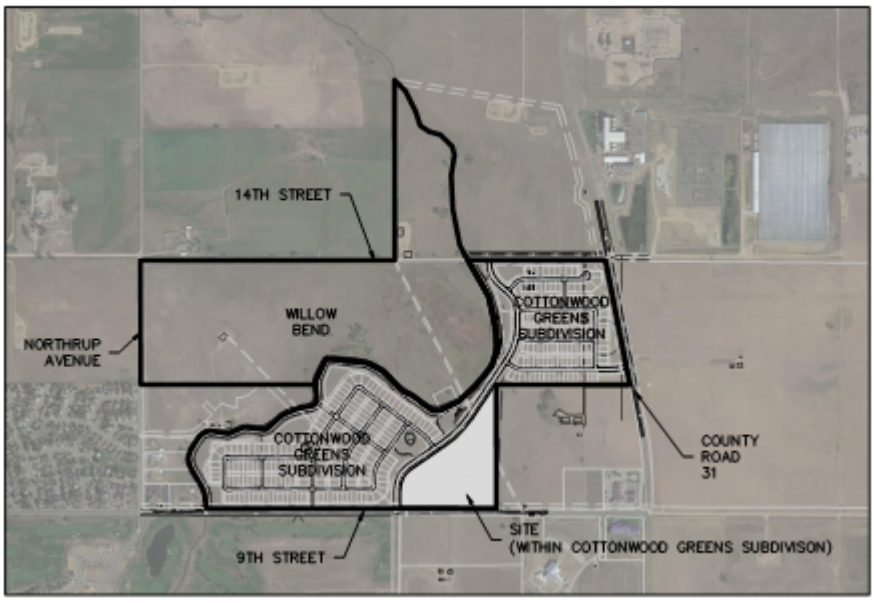

Figure 1 – Project Location

The Cottonwood Greens Filing No. 4 project site is a tract of land within the Cottonwood Greens Subdivision and is situated in the south half of Section 33, Township 2 North, Range 66 West of the Sixth Principal Meridian, City of Fort Lupton, County of Weld, State of Colorado. The site is bounded by Cottonwood Greens Filing No. 1-3 to the West, Fulton Ditch to the Northwest, Future Cottonwood Greens to the North, undeveloped land to the East, and 9th Street to the South. 9th Street is being improved with the College Ave/9th St Reconstruction Project by Wohnrade Civil Engineers for the City of Fort Lupton.

To the North, across the Fulton Ditch to 14th Street is the rest of the Cottonwood Greens P.U.D., soon to be developed as Willow Bend. To the South, across 9th Street, is Coyote Creek Golf Course, a Colorado Army National Guard Station, and a Weld County Facility. The Fort Lupton Fire Department is located at the Northwest corner of 9th Street and County Road 31. Further to the West is undeveloped land zoned R-1, and further to the East (across County Road 31) is also undeveloped land zoned R-1.

Description of Property

The proposed 16.2-acre Filing No. 4 development consists of 137 townhouse residential units in 27 buildings with on-site open spaces and detention. The site is part of the Cottonwood Greens PUD, recorded April 13th, 2006, and is currently undeveloped land used for farming, and houses gas facilities. An earlier Filing No. 1-3 of Cottonwood Greens proposed 291 single-family lots on 120 acres (including the Filing No. 4 property). The Filing No. 1-3 Cottonwood Greens Drainage Report assumed information

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for this area of the site within their report. This Filing No. 4 Drainage Report will re-analyze the initial Report with updated information and confirm assumptions made.

The site's topography generally slopes from the southeast to northwest with the slopes ranging between 3 percent and 9 percent. An onsite soil report for the site is illustrated in the Web Soil Survey from the National Resource Conservation Service (NRCS) website. The soil report indicates that 95% of the site is Valent Sand with the remainder being loamy sands and clay loam. The site consists of mainly Hydrologic Soil Group A soils. A soil report has been included in Appendix A.

Existing condition plans show all easements within and surrounding the subject property and can be found in the construction drawings.

Historic Drainage Basin

The existing topography shows sheet flow from southeast to northwest with flows entering Fulton Ditch for the entirety of the site. Improvements constructed with College Avenue/9th Street Reconstruction and the Cottonwood Greens Subdivision Filing No. 1-3 will reduce the tributary area draining to Fulton Ditch. Detention Pond 3 proposed with Cottonwood Greens Subdivision Filing No. 1-3 Construction Plans, will be the outfall point for the Filing No. 4 site. The downstream outfall for this pond is to the Willow Bend site and ultimately to the existing Golden Pond, located at the southeast corner of Pacific Court and 14th Street. The ultimate outfall for Golden Pond is the South Platte River. For more information on the Golden Pond and Cottonwood Greens Subdivision Detention Pond 3, please see the Drainage Report for the Cottonwood Greens Subdivision Filing No. 1-3.

The project area is not within a FEMA regulated floodplain as shown on FEMA Map No. 08123C2110E in Appendix C. As illustrated, the project site lies within Zone X - determined to be outside of the FEMA 100 and 500-year floodplains.

Proposed Drainage Basins

Drainage Basins

This Filing No. 4 site contains 11 onsite drainage basins plus drainage basins from Cottonwood Green Filing 1-3, 9th Street improvements by others, and offsite undeveloped land. All basins drain to Detention Pond 3 that will be constructed as part of Cottonwood Greens Subdivision Filing No. 1-3. The Filing No. 4 project proposes an expansion to this pond for additional volume. These small detention areas will be hydraulically connected to Detention Pond 3.

A Drainage Basin Map has been included in Appendix B of this Report to graphically depict the drainage basins for this Site.

Sub-basin A1 is 0.68 acres comprised of College Avenue and lot drainage from the Townhome site. Runoff flows down College Avenue to design point 1, where is collected by an on-grade inlet. Bypass from this inlet will continue northeast on College Avenue where it will combine with flows at design point 11. This inlet will be existing and is to be built with Filing No. 1-3.

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Sub-basin A2 is 3.85 acres comprised of residential lot areas and landscape areas. Runoff sheet flows from lots and into curb and gutter where it is conveyed to a sump inlet at design point 2.

Sub-basin A3 is 1.73 acres comprised of residential lots and landscaping. Runoff sheet flows to curb and gutter where it is conveyed to design point 3 where it enters a sump inlet.

Sub-basin A4 is 2.47 acres comprised of residential lots and landscaping. Runoff sheet flows to curb and gutter where it is conveyed to design point 4 and is collected in a sump inlet.

Sub-basin A5 is 0.42 acres comprised of residential lots. Runoff sheet flows to curb and gutter where it is conveyed to Design point 5 and is collected in a sump inlet.

Sub-basin A6 is 1.57 acres comprised of residential lots and landscaping. Runoff sheet flows to curb and gutter where it is conveyed to Design point 6 and is collected in a sump inlet.

Sub-basin A7 is 0.53 acres comprised of residential lots. Runoff sheets flows to curb and gutter where it collects at design point 7 and is collected in a sump inlet.

Sub-basin A8 is 1.10 acres comprised of residential lots and landscaping. This basin includes the pond expansion that is hydraulically linked to Detention Pond 3. An abandoned oil and gas well site makes up a part of this basin area. Runoff sheet flows to the Pond 3 expansion where it is conveyed to design point 8. A culvert connects this pond with the other portions of Pond 3.

Sub-basin A9 is 1.30 acres comprised of residential lots and landscaping. This basin includes the pond expansion that is hydraulically linked to Detention Pond 3. An abandoned oil and gas well site makes up a part of this basin area. Runoff sheet flows to the Pond 3 expansion where it is conveyed to design point 9. A culvert connects this pond with the other portions of Pond 3.

Sub-basin A10 is 0.70 acres comprised of landscaping. This basin includes the pond expansion that is hydraulically linked to Detention Pond 3. An abandoned oil and gas well site makes up a part of this basin area. Runoff sheet flows to the Pond 3 expansion where it is conveyed to design point 10. A culvert connects this pond with the other portions of Pond 3.

Sub-basin A11 is 1.40 acres comprised of pavement area from College Avenue and residential lot area. Runoff sheet flows overland to curb and gutter where it is conveyed to design point 11 and is collected in a sump inlet. This inlet will be existing and is to be built with Filing No. 1-3.

Drainage Design Criteria

The site drainage system has been designed per the City of Fort Lupton's criteria and discussions with the City of Fort Lupton. The storm system for this site has been designed to convey the 100-year event. Ponding area extensions have been proposed which are to be hydraulically linked to Detention Pond 3. This will provide additional capacity beyond what was provided with Filing No. 1-3. Please refer to the Cottonwood Greens Subdivision Filing No. 1-3 Construction Plans and Drainage Report for information pertaining to Detention Pond 3. Their Report included information that their ponds had been sized to

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over-detain, beyond the 100-year event, and release at less than the historic rate. The system had been intended to pass the historic flow through from off-site basins. Once these upstream basins are developed, on-site detention (likely over-detention) will be required of them as well.

Hydrological Criteria

Rational Method calculations were run using spreadsheets provided by the Mile High Flood Control District and can be found in Appendix C.

Hydraulic Criteria

In order to prevent flooding downstream, outlet structures will need to release detained storm water based on the agreed upon release rate. This was determined by Filing No. 1-3 and included within their Report. The Filing No. 1-3 Report also includes information on Ponds 1 and 2 that are offsite from Filing No. 4, but must be considered in relation to the release rates of Pond 3. Per this agreement, the entire Cottonwood Greens property cannot release more than 1 cfs in the Minor (5-year) Storm and 47.5 cfs in the Major (100-year) Storm. Using these release rates, downstream drainage facilities will not be impacted for storms up to and including the 100-year storm.

Using the Modified FAA Method, required storage volumes were determined for both the minor and major storm events. This method uses a runoff hydrograph calculated using basin characteristics and an outflow hydrograph based on a specified release rate. All calculations can be found in Appendix E.

Table 1 shows Pond Release Rates that was included within the Cottonwood Greens Filing No. 1-3 Drainage Report. The Filing No. 4 Report further studied the future ponds to determine the ultimate sizing of Pond 3 at full build-out. It was decided that Pond 3 would be allowed additional release rates to better size the volume for future development. See Table 2 below for the updated Pond Release Rates.

Pond	5-yr Release Rate (cfs)	100-yr Release Rate (cfs)	Minor Storage Volume Req'd (ac-ft)	Major Storage Volume Req'd (ac-ft)	Proposed Storage (ac-ft)
Pond 1+2	0.1	4.75	4.038	5.043	14.538
Pond 3	0.29	13.77	2.940	3.041	3.048
Total	0.39	18.52	6.978	8.084	17.586
Remaining for Future Phases	0.61	28.98	–	–	–

Table 1 – Pond Release Rates and Storage Volumes from Cottonwood Greens

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Pond	5-yr Release Rate (cfs)	100-yr Release Rate (cfs)	Minor Storage Volume Req'd (ac-ft)	Major Storage Volume Req'd (ac-ft)	Proposed Storage (ac-ft)
Pond 1+2	0.1	4.75	4.038	5.043	14.538
Updated Pond 3	0.73	33.00	3.615	11.279	Future
Future Pond 4+5	0.17	8.33	2.773	3.357	Future
Total	1.00	46.08	6.978	8.084	17.586
Remaining for Future Phases	0.00	1.42	–	–	–

Table 2 – Updated Pond Release Rates and Storage Volumes

For the calculation of the WQCV, the traditional UDFCD method was used, as follows:

WQCV Calculation:

$$WQCV = a(0.91I^3 - 1.19I^2 + 0.78I) \qquad Design\ Volume = 1.2\left(\frac{WQCV}{12}\right)A$$

Where:

a = 1.0 for a 40-hour release rate, per UDFDC Manual Volume 3

Using the calculations shown in above, the required volumes were calculated and shown below in Table 3:

Pond	Volume Required (Ac-Ft)		
	WQCV	5-year	100-year
1+2	0.79	4.038	5.043
3	0.69	2.940	3.041
4+5	Future	Future	Future

Table 3 – WQCV Pond Volume Requirements

All pond calculations, including outlet structure calculations, can be found in Appendix E of this report or within Filing No. 1-3 Drainage Report.

The natural drainage path leads to an irrigation ditch that cannot accept any additional runoff to prevent flooding of land downstream, so all pipes and inlets have been sized for the 100-Year Major Storm. This development will not increase runoff to the Fulton Ditch. Inlet and Street Capacity calculations can be found in Appendix D. Street Capacity is confirmed throughout the Site.

The final outfall for Pond 3 will combine the flows from Pond 1 and 2 outlets from Filing No. 1-3 and take them under Fulton Ditch, through an easement on the adjacent property (Willow Bend Development) to the Northwest. See Filing No. 1-3 for additional details on this outfall.

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Summary

As shown in this report, adequate detention has been provided, and the combined release rate for rainfall events up to and including the 100-Year storm will be released below the historic release rates for the Site. The outfall shown with Filing No. 1-3 will convey drainage through Willow Bend and eventually to Golden's Pond. Additional flow from potential upstream development, not mentioned as part of this analysis, may trigger regional upgrades.

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References

1) Storm Drainage Utility Plan, City of Fort Lupton; Adopted March 2015.
2) City of Fort Lupton Storm Drainage Design and Technical Criteria Manual; City of Fort Lupton
3) Drainage Criteria Manual, Volumes 1, 2, &3, Mile High Flood Control District; Volumes 1 & 2 – Originally Published September 1969, Updated January 2016; Volume 3 – Originally Published September 1992, Updated November 2010.
4) Construction Drawings for Cottonwood Greens Development, Atwell, LLC; November 2020.
5) Flood Insurance Rate Map of Weld County Colorado: Map No. 08123C2110E, Federal Emergency Management Agency; September 30, 2019.
6) USDA – NRCS – Web Soil Survey.

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APPENDIX A – Existing Conditions

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GOLDEN POND

Willow Bend

Future Cottonwood Greens

POND 3

FILING NO. 4 SITE

East Property, OS3

Cottonwood Greens Filing No. 1-3

Pond 3 Design Basin

9th Street and College Avenue Improvements (By Others)

South Property, OS4

Major Basin - 14th Street Basin

14TH STREET

9TH STREET

1ST STREET

WELD COUNTY RD 4 1/2

COUNTY RD 31

COUNTY RD 29 1/2

COLORADO STATE HIGHWAY 52

US HIGHWAY NO. 85

UNION PACIFIC RAILROAD

SHORTLINE DITCH

CEMETERY ROAD

WELD COUNTY RD 12

MATCHLINE SHEET 2

LEGEND
- STORM SEWER LINE
- STORM MANHOLE
- STORM INLET
- CITY LIMITS
- RAILROAD – UNION PACIFIC
- DRAINAGE BASIN

N

400 200 0 400 800 1200
SCALE IN FEET

J&T Consulting, Inc.
305 Denver Avenue • Suite D
Fort Lupton, CO 80621
Ph: 303.857.8704 • Fax: 303.857.0244
www.JConsultingInc.com

South Utility Extensions

Storm Sewer System Map

City of Ft. Lupton

No.	Date	By	Chk	Description
REVISIONS				

Job #	10106
Date	6/14/10
Drawn By	TPY/WSS
Designed By	TPY
Checked By	JCY
File	JT-storm
Scale	1" = 400'
Sheet:	Of:

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APPENDIX B – Proposed Drainage Plans

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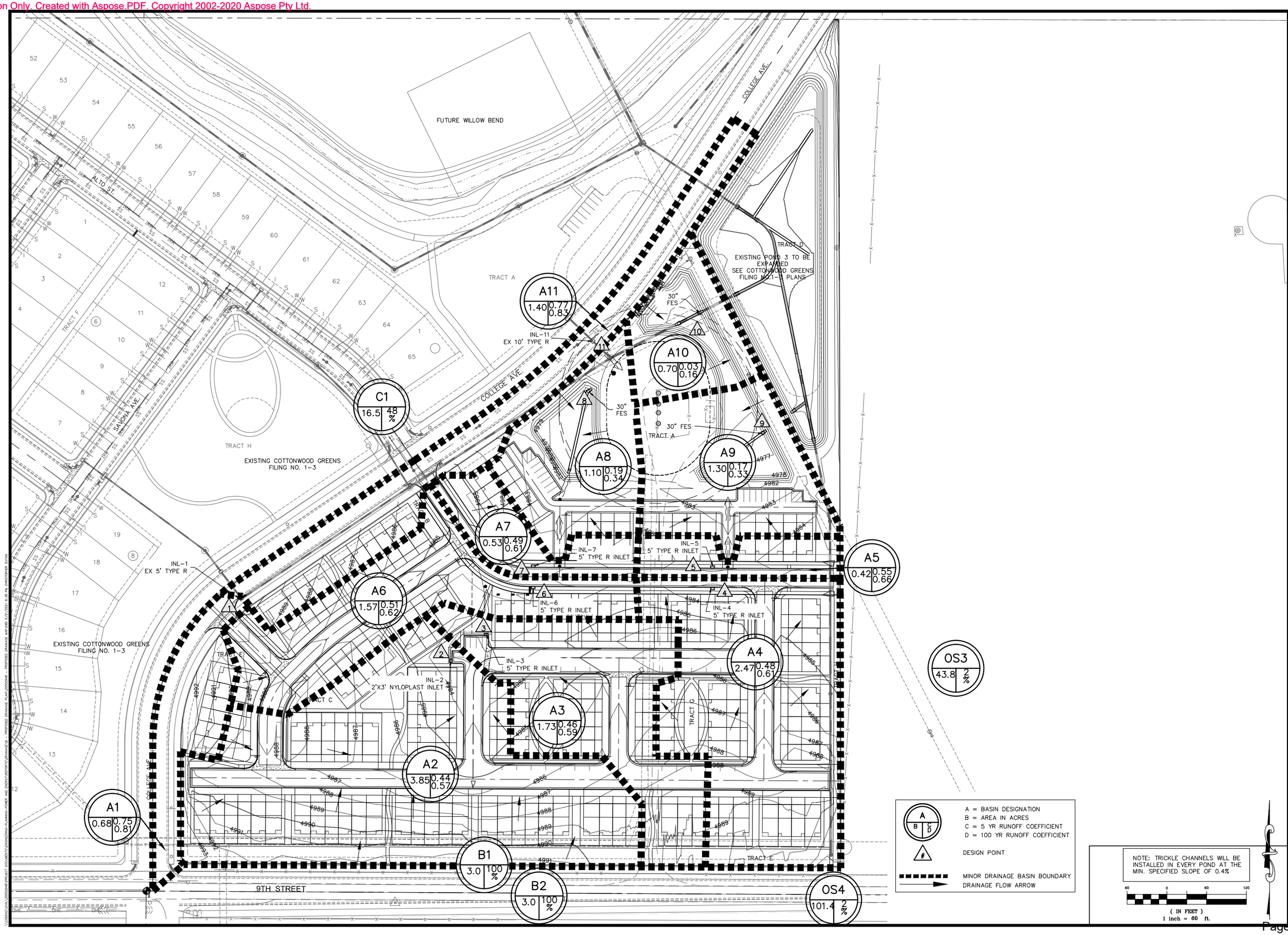

811 Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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ATWELL
888.850.4200 www.atwell-group.com
143 UNION BLVD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

DEVELOPER
4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496
ARBOR CAPITAL PARTNERS, LLC

CLIENT
ARBOR CAPITAL PARTNERS, LLC
COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
PROPOSED DRAINAGE BASIN MAP

DATE 6/21/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. NA | CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 1 OF 1

CAD FILE: 20002948 - PROPOSED DRAINAGE MAP.DWG

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APPENDIX C – Rational Method Calculations

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PERCENT IMPERVIOUS CALCULATION

PROJECT MANE: Cottonwood Greens Filing No. 4
PROJECT NO: 20002948
LOCATION: Fort Lupton, Colorado

*Calculations on this sheet come from Figure 603: Fort Lupton Drainage Manual

NRCS Hydrologic Soil Group: A

Single Family	45%	Impervious
Multi-Unit (attached)	70%	Impervious
Parks, cemeteries	7%	Impervious
Paved	100%	Impervious
Drive and walks	96%	Impervious
Lawns, clayey soil	7%	Impervious
Historic flow analysis	2%	Impervious

PROPOSED DRAINAGE AREA

BASIN ID	Notes	A_{total} (ft²)	Single Family (ft²)	Multi-Unit (attached) (ft²)	Parks, cemeteries (ft²)	Paved (ft²)	Drive and walks (ft²)	Lawns, clayey soil (ft²)	Historic flow analysis (ft²)	A_{total} (Ac)	Percent Impervious
A1		29772	0	10438	0	19334	0	0	0	0.68	89%
A2		167766	0	137594	30172	0	0	0	0	3.85	59%
A3		75285	0	65200	10085	0	0	0	0	1.73	62%
A4		107475	0	96584	10891	0	0	0	0	2.47	64%
A5		18212	0	18212	0	0	0	0	0	0.42	70%
A6		68252	0	63999	4253	0	0	0	0	1.57	66%
A7		22872	0	20733	2139	0	0	0	0	0.53	64%
A8		48078	0	17588	30490	0	0	0	0	1.10	30%
A9		56742	0	19187	37555	0	0	0	0	1.30	28%
A10		30696	0	0	30696	0	0	0	0	0.70	7%
A11		61039	0	16221	0	44818	0	0	0	1.40	92%
B1	from 9th Street	130680	0	0	0	130680	0	0	0	3.00	100%
B2	from 9th Street	130680	0	0	0	130680	0	0	0	3.00	100%
C1	from Cottonwood Greens F1-3	717832	245491	0	0	162602	59241	250498	0	16.48	48%
OS-3	East Property	1906345	0	0	0	0	0	0	1906345	43.76	2%
OS-4	South Property	4414806	0	0	0	0	0	0	4414806	101.35	2%
Subtotals:		7,986,532	245,491	465,756	156,281	488,114	59,241	250,498	6,321,151		14%

Drainage Area= 183.35

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Calculation of Peak Runoff using Rational Method

Designer:
Company: Atwell, LLC
Date: 6/21/2021
Project: Cottonwood Greens Filing No. 4
Location: Fort Lupton, Colorado

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum}$ = 5 (urban)
$t_{minimum}$ = 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.83	1.09	1.33	1.69	1.99	2.31	3.14
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A1	0.68	A	89.5	0.73	0.75	0.76	0.78	0.79	0.81	0.83	10.00			0.020	1.60	433.00			0.010	20	2.00	3.61	5.21	14.14	5.21	2.77	3.66	4.46	5.67	6.68	7.75	10.53	1.37	1.87	2.32	3.02	3.60	4.27	5.98
A2	3.85	A	58.7	0.42	0.44	0.45	0.49	0.53	0.57	0.63	121.00			0.020	10.49	510.00			0.015	20	2.45	3.47	13.96	20.06	13.96	1.94	2.56	3.12	3.97	4.67	5.42	7.37	3.13	4.30	5.44	7.42	9.46	11.84	17.95
A3	1.73	A	61.6	0.45	0.46	0.48	0.51	0.55	0.59	0.65	118.00			0.020	9.93	458.00			0.011	20	2.10	3.64	13.57	19.67	13.57	1.96	2.59	3.16	4.02	4.73	5.49	7.47	1.51	2.08	2.62	3.56	4.50	5.60	8.40
A4	2.47	A	63.6	0.47	0.48	0.50	0.53	0.57	0.61	0.66	117.00			0.020	9.58	403.00			0.015	20	2.45	2.74	12.32	18.25	12.32	2.05	2.71	3.30	4.19	4.94	5.73	7.79	2.35	3.23	4.07	5.50	6.92	8.57	12.77
A5	0.42	A	70.0	0.53	0.55	0.56	0.59	0.62	0.66	0.71	50.00			0.020	5.62	154.00			0.010	20	2.00	1.28	6.91	15.47	6.91	2.55	3.37	4.11	5.22	6.14	7.13	9.69	0.56	0.77	0.97	1.29	1.60	1.95	2.86
A6	1.57	A	66.1	0.49	0.51	0.52	0.55	0.59	0.62	0.68	45.00			0.020	5.71	490.00			0.020	20	2.83	2.89	8.60	17.93	8.60	2.36	3.12	3.81	4.84	5.70	6.62	8.99	1.81	2.48	3.13	4.21	5.26	6.48	9.59
A7	0.53	A	64.1	0.47	0.49	0.50	0.54	0.57	0.61	0.67	75.00			0.020	7.61	141.00			0.017	20	2.61	0.90	8.51	16.10	8.51	2.37	3.13	3.82	4.86	5.72	6.64	9.03	0.59	0.80	1.01	1.37	1.72	2.13	3.16
A8	1.10	A	30.0	0.18	0.19	0.20	0.23	0.28	0.34	0.45	35.00			0.010	9.77	190.00			0.070	7	1.85	1.71	11.48	21.80	11.48	2.11	2.79	3.40	4.32	5.09	5.91	8.03	0.41	0.57	0.75	1.09	1.58	2.24	3.97
A9	1.30	A	28.3	0.16	0.17	0.18	0.21	0.27	0.33	0.44	32.00			0.010	9.48	226.00			0.060	20	4.90	0.77	10.25	22.37	10.25	2.21	2.92	3.56	4.53	5.33	6.19	8.41	0.47	0.65	0.86	1.26	1.85	2.66	4.78
A10	0.70	A	7.0	0.03	0.03	0.03	0.04	0.08	0.16	0.30	121.00			0.070	11.19	1.00			0.010	7	0.70	0.02	11.22	24.83	11.22	2.13	2.82	3.44	4.36	5.14	5.97	8.11	0.04	0.06	0.08	0.14	0.31	0.69	1.71
A11	1.40	A	92.0	0.75	0.77	0.79	0.81	0.81	0.83	0.85	20.00			0.020	2.09	655.00			0.010	20	2.00	5.46	7.55	15.34	7.55	2.47	3.27	3.99	5.07	5.97	6.93	9.41	2.61	3.55	4.40	5.72	6.78	8.02	11.18

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APPENDIX D – Inlet and Street Capacity Calculations

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MHFD-Inlet, Version 5.01 (April 2021)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	INL-1	INL-2	INL-3
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.7	2.6	2.6
Major Q_{Known} (cfs)	7.7	5.4	5.5

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.7**	**2.6**	**2.6**
Major Total Design Peak Flow, Q (cfs)	**7.7**	**5.4**	**5.5**
Minor Flow Bypassed Downstream, Q_b (cfs)	1.2	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	4.3	N/A	N/A

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MHFD-Inlet, Version 5.01 (April 2021)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	INL-4	INL-5	INL-6
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	2.7	3.4	3.1
Major Q_{Known} (cfs)	5.7	7.1	6.6

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**2.7**	**3.4**	**3.1**
Major Total Design Peak Flow, Q (cfs)	**5.7**	**7.1**	**6.6**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A

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MHFD-Inlet, Version 5.01 (April 2021)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	INL-7	INL-11
Site Type (Urban or Rural)	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.1	3.3
Major Q_{Known} (cfs)	6.6	6.9

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	INL-1
Minor Bypass Flow Received, Q_b (cfs)	0.0	1.2
Major Bypass Flow Received, Q_b (cfs)	0.0	4.3

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

Overland Slope (ft/ft)		
Overland Length (ft)		
Channel Slope (ft/ft)		
Channel Length (ft)		

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.1**	**4.5**
Major Total Design Peak Flow, Q (cfs)	**6.6**	**11.3**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A

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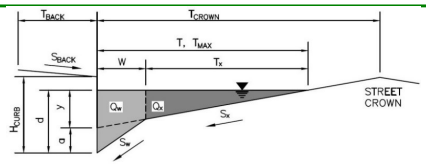
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-1**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	23.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	23.5	23.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	**13.8**	**124.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

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INLET ON A CONTINUOUS GRADE

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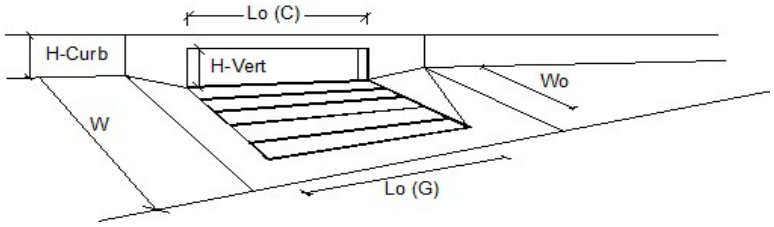

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.4**	**3.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.2**	**4.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**66**	**44**	**%**

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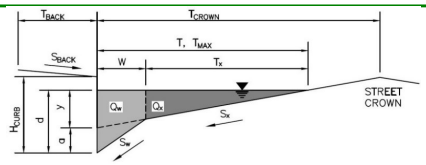
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-2**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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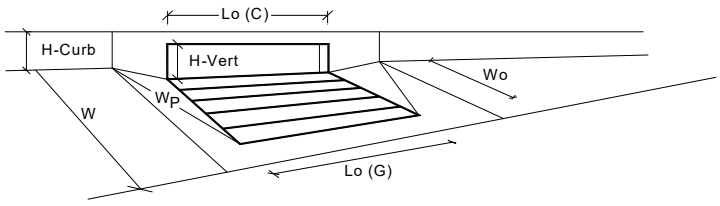

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.6	5.4	cfs

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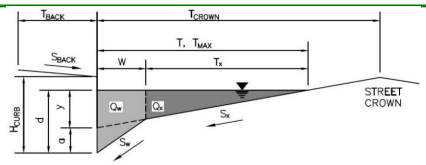
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
Q_{allow} =		**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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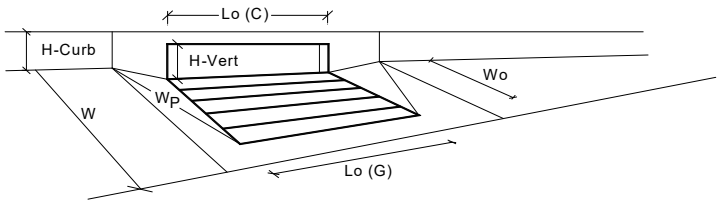

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.6	5.5	cfs

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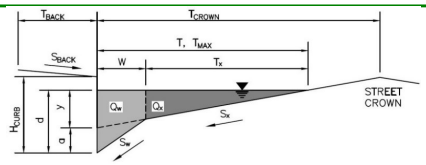
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-4**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
Q_{allow}	=	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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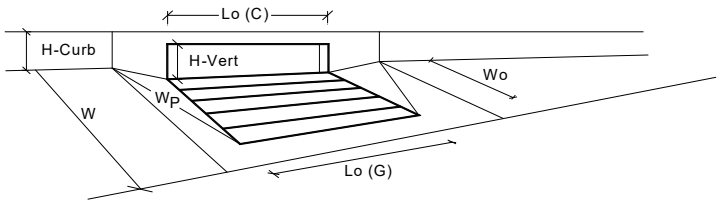

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.7	5.7	cfs

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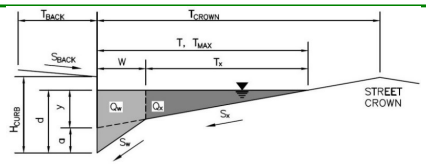
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-5**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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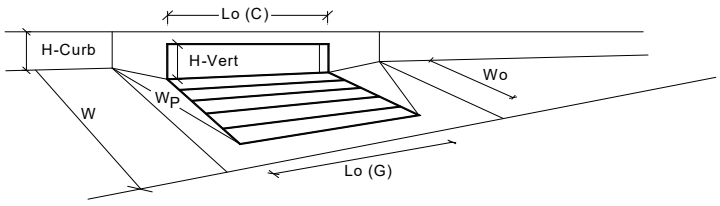

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.4	7.1	cfs

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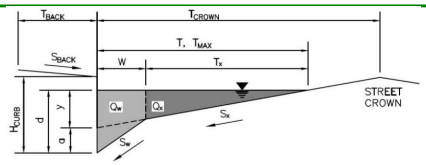
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-6**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
Q_{allow} =		**SUMP**	**SUMP**	**cfs**

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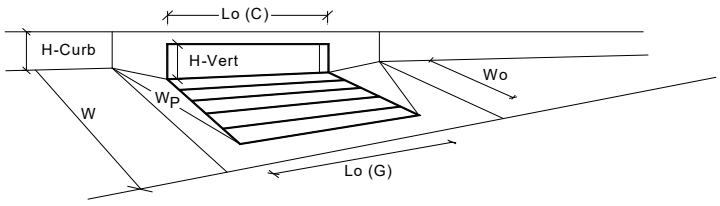
INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.1	6.6	cfs

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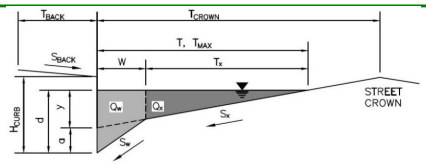
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-7**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
Q_{allow} =		**SUMP**	**SUMP**	**cfs**

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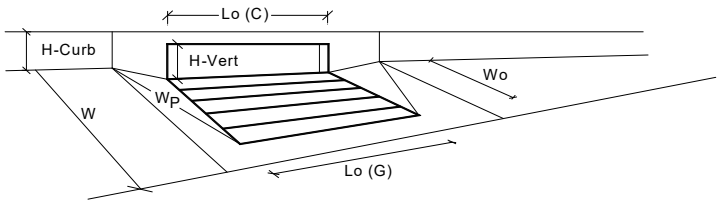
INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.1	6.6	cfs

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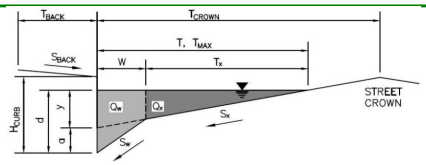
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-11**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	23.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	23.5	23.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

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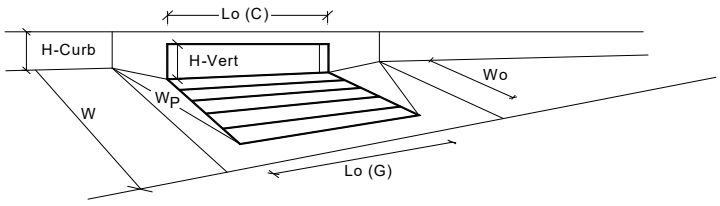
INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	7.2	inches
Grate Information		MINOR	MAJOR	Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.43	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	0.67	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	0.99	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.3**	**12.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.5	11.3	cfs

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Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	2'x3' Curb Inlet Diagonal
Head (ft)	0.5

Properties	
Orifice Flow Area (in)	**331.50**
Orifice Flow Area (ft)	**2.30**
Weir Flow Perimeter (in)	**124.20**
Weir Flow Perimeter (ft)	**10.35**

Solution	
Capacity (cfs)	**7.83**
Capacity (gpm)	**3516.18**

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33\ Weir\ Discharge\ Coefficient$

$L = Perimeter\ of\ Grate\ Opening\ (ft)$

$H = Flow\ Height\ of\ Water\ Surface\ Above\ Weir\ (ft)$

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60\ Orifice\ Discharge\ Coefficient$

$A = Area\ of\ the\ Orifice\ (ft^2)$

$g = Gravitational\ Constant\ \left(32.2\frac{ft}{s^2}\right)$

$H = Depth\ of\ Water\ Above\ Center\ of\ Orifice\ (ft)$

REV 2.1.21

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APPENDIX E – Pond Calculations

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Table 1401

DETENTION VOLUME BY THE MODIFIED FAA METHOD
(See USDCM Volume 2 Storage Chapter for description of method)

Project: Cottonwood Greens Filing No. 4

Basin ID: Pond 3

(For catchments less than 160 acres only. For larger catchments, use hydrograph routing method)

Warning: This worksheet is not intended for catchments larger than 160 acres.

Determination of MINOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	14.00	percent
Catchment Drainage Area WARNING->	A =	183.350	acres <-WARNING
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D
Return Period for Detention Control	T =	5	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	70	minutes
Allowable Unit Release Rate	q =	0.0040	cfs/acre
One-hour Precipitation	P_1 =	1.42	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.09	
Inflow Peak Runoff	Qp-in =	21.32	cfs
Allowable Peak Outflow Rate	Qp-out =	0.73	cfs
Mod. FAA Minor Storage Volume =		157,455	**cubic feet**
Mod. FAA Minor Storage Volume =		3.615	**acre-ft**

150 <- Enter Rainfall Duration Incremental Increase Value Here (e.g. 5 for 5-Minutes)

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	4.82	23,844	1.00	0.73	220	23,623
155	0.73	112,253	0.73	0.53	4,950	107,302
305	0.44	132,873	0.61	0.45	8,251	124,622
455	0.32	145,949	0.58	0.42	11,551	134,398
605	0.26	155,778	0.56	0.41	14,851	140,927
755	0.22	163,756	0.55	0.40	18,152	145,604
905	0.19	170,522	0.54	0.40	21,452	149,070
1055	0.17	176,426	0.53	0.39	24,752	151,674
1205	0.15	181,685	0.53	0.39	28,053	153,632
1355	0.14	186,437	0.53	0.39	31,353	155,084
1505	0.13	190,783	0.52	0.38	34,653	156,130
1655	0.12	194,793	0.52	0.38	37,953	156,840
1805	0.11	198,522	0.52	0.38	41,254	157,268
1955	0.10	202,009	0.52	0.38	44,554	157,455
2105	0.10	205,289	0.52	0.38	47,854	157,435
2255	0.09	208,387	0.52	0.38	51,155	157,232
2405	0.09	211,325	0.51	0.38	54,455	156,870
2555	0.08	214,119	0.51	0.38	57,755	156,364
2705	0.08	216,786	0.51	0.38	61,056	155,731
2855	0.08	219,338	0.51	0.38	64,356	154,982
3005	0.07	221,785	0.51	0.38	67,656	154,129
3155	0.07	224,137	0.51	0.37	70,956	153,181
3305	0.07	226,401	0.51	0.37	74,257	152,145
3455	0.07	228,586	0.51	0.37	77,557	151,029
3605	0.06	230,696	0.51	0.37	80,857	149,839
3755	0.06	232,738	0.51	0.37	84,158	148,580
3905	0.06	234,715	0.51	0.37	87,458	147,258
4055	0.06	236,634	0.51	0.37	90,758	145,876
4205	0.06	238,497	0.51	0.37	94,059	144,438
4355	0.06	240,308	0.51	0.37	97,359	142,949
4505	0.05	242,070	0.51	0.37	100,659	141,411
4655	0.05	243,787	0.51	0.37	103,959	139,827
4805	0.05	245,460	0.51	0.37	107,260	138,200
4955	0.05	247,092	0.51	0.37	110,560	136,532
5105	0.05	248,686	0.51	0.37	113,860	134,825
5255	0.05	250,243	0.51	0.37	117,161	133,082
5405	0.05	251,765	0.51	0.37	120,461	131,304
5555	0.05	253,254	0.51	0.37	123,761	129,493
5705	0.05	254,712	0.51	0.37	127,062	127,650
5855	0.04	256,139	0.51	0.37	130,362	125,777
6005	0.04	257,538	0.51	0.37	133,662	123,876
6155	0.04	258,910	0.51	0.37	136,962	121,947
6305	0.04	260,255	0.51	0.37	140,263	119,993
6455	0.04	261,576	0.51	0.37	143,563	118,013
6605	0.04	262,872	0.51	0.37	146,863	116,009
6755	0.04	264,145	0.51	0.37	150,164	113,982
6905	0.04	265,396	0.51	0.37	153,464	111,932
7055	0.04	266,626	0.50	0.37	156,764	109,862
7205	0.04	267,835	0.50	0.37	160,065	107,771
7355	0.04	269,025	0.50	0.37	163,365	105,660
7505	0.04	270,196	0.50	0.37	166,665	103,531
7655	0.04	271,348	0.50	0.37	169,965	101,382
7805	0.04	272,482	0.50	0.37	173,266	99,217
7955	0.03	273,600	0.50	0.37	176,566	97,034
8105	0.03	274,701	0.50	0.37	179,866	94,835
8255	0.03	275,786	0.50	0.37	183,167	92,619
8405	0.03	276,855	0.50	0.37	186,467	90,388
8555	0.03	277,910	0.50	0.37	189,767	88,143
8705	0.03	278,950	0.50	0.37	193,068	85,883
8855	0.03	279,976	0.50	0.37	196,368	83,608
9005	0.03	280,988	0.50	0.37	199,668	81,320

Mod. FAA Minor Storage Volume (cubic ft.) = 157,455

Mod. FAA Minor Storage Volume (acre-ft.) = 3.6147

Determination of MAJOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	14.00	percent
Catchment Drainage Area	A =	183.350	acres
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D
Return Period for Detention Control	T =	100	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	70	minutes
Allowable Unit Release Rate	q =	0.18	cfs/acre
One-hour Precipitation	P_1 =	2.71	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

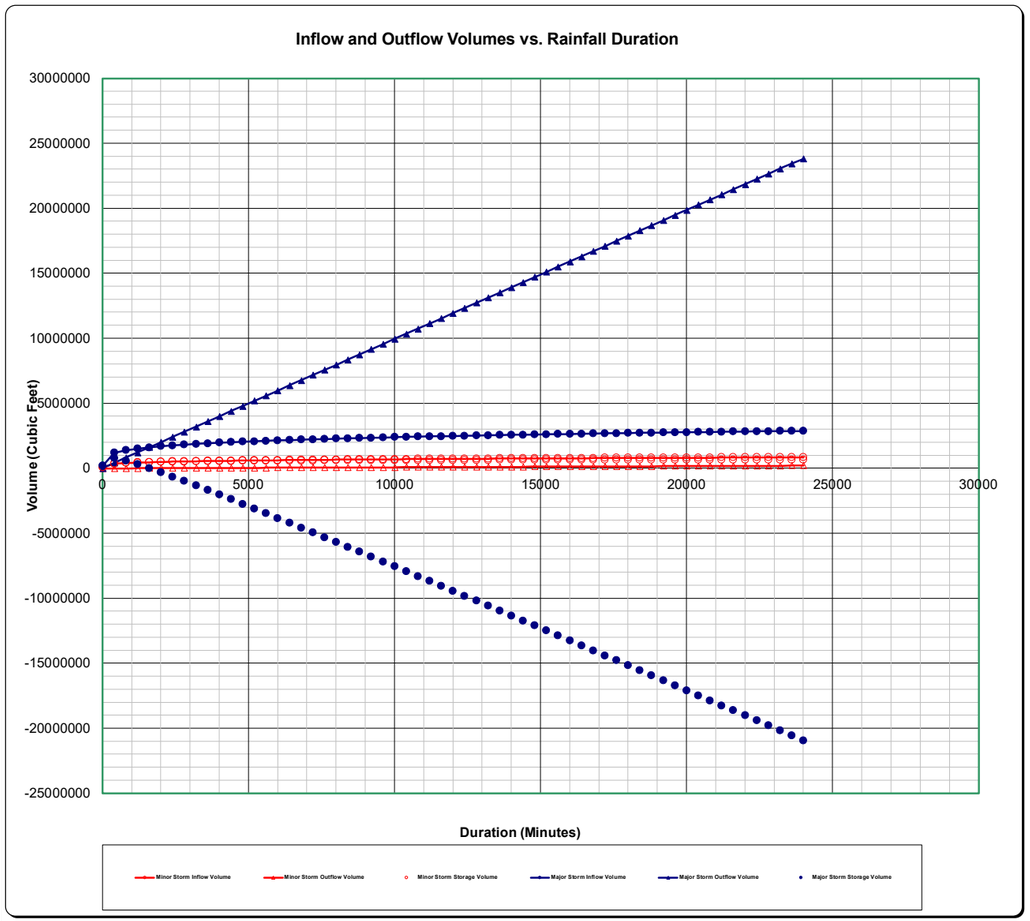
Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.30	
Inflow Peak Runoff	Qp-in =	135.64	cfs
Allowable Peak Outflow Rate	Qp-out =	33.00	cfs
Mod. FAA Major Storage Volume =		491,326	**cubic feet**
Mod. FAA Major Storage Volume =		11.279	**acre-ft**

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	9.19	151,681	1.00	33.00	9,901	141,780
155	1.40	714,096	0.73	23.95	222,770	491,326
305	0.84	845,270	0.61	20.29	371,284	473,986
455	0.62	928,455	0.58	19.04	519,797	408,658
605	0.50	990,985	0.56	18.41	668,311	322,674
755	0.42	1,041,734	0.55	18.03	816,824	224,909
905	0.36	1,084,774	0.54	17.78	965,338	119,436
1055	0.32	1,122,337	0.53	17.60	1,113,851	8,486
1205	0.29	1,155,787	0.53	17.46	1,262,365	-106,578
1355	0.27	1,186,022	0.53	17.35	1,410,878	-224,857
1505	0.24	1,213,668	0.52	17.27	1,559,392	-345,724
1655	0.23	1,239,179	0.52	17.20	1,707,905	-468,726
1805	0.21	1,262,896	0.52	17.14	1,856,419	-593,522
1955	0.20	1,285,084	0.52	17.09	2,004,932	-719,849
2105	0.19	1,305,947	0.52	17.05	2,153,446	-847,498
2255	0.18	1,325,655	0.52	17.01	2,301,959	-976,304
2405	0.17	1,344,342	0.51	16.98	2,450,473	-1,106,131
2555	0.16	1,362,121	0.51	16.95	2,598,986	-1,236,865
2705	0.15	1,379,087	0.51	16.93	2,747,500	-1,368,412
2855	0.15	1,395,320	0.51	16.91	2,896,013	-1,500,694
3005	0.14	1,410,887	0.51	16.89	3,044,527	-1,633,640
3155	0.14	1,425,848	0.51	16.87	3,193,040	-1,767,192
3305	0.13	1,440,254	0.51	16.85	3,341,554	-1,901,300
3455	0.13	1,454,149	0.51	16.84	3,490,067	-2,035,918
3605	0.12	1,467,573	0.51	16.82	3,638,581	-2,171,008
3755	0.12	1,480,561	0.51	16.81	3,787,094	-2,306,533
3905	0.12	1,493,143	0.51	16.80	3,935,608	-2,442,465
4055	0.11	1,505,348	0.51	16.79	4,084,121	-2,578,774
4205	0.11	1,517,199	0.51	16.78	4,232,635	-2,715,435
4355	0.11	1,528,721	0.51	16.77	4,381,148	-2,852,428
4505	0.10	1,539,931	0.51	16.76	4,529,662	-2,989,730
4655	0.10	1,550,850	0.51	16.75	4,678,175	-3,127,325
4805	0.10	1,561,494	0.51	16.74	4,826,689	-3,265,195
4955	0.10	1,571,877	0.51	16.73	4,975,202	-3,403,325
5105	0.09	1,582,015	0.51	16.73	5,123,716	-3,541,701
5255	0.09	1,591,920	0.51	16.72	5,272,229	-3,680,310
5405	0.09	1,601,603	0.51	16.72	5,420,743	-3,819,140
5555	0.09	1,611,076	0.51	16.71	5,569,256	-3,958,180
5705	0.09	1,620,349	0.51	16.70	5,717,770	-4,097,421
5855	0.08	1,629,430	0.51	16.70	5,866,283	-4,236,853
6005	0.08	1,638,330	0.51	16.69	6,014,797	-4,376,467
6155	0.08	1,647,055	0.51	16.69	6,163,310	-4,516,255
6305	0.08	1,655,614	0.51	16.68	6,311,824	-4,656,209
6455	0.08	1,664,014	0.51	16.68	6,460,337	-4,796,323
6605	0.08	1,672,260	0.51	16.68	6,608,851	-4,936,590
6755	0.08	1,680,360	0.51	16.67	6,757,364	-5,077,004
6905	0.07	1,688,319	0.51	16.67	6,905,878	-5,217,558
7055	0.07	1,696,143	0.50	16.67	7,054,391	-5,358,248
7205	0.07	1,703,836	0.50	16.66	7,202,905	-5,499,069
7355	0.07	1,711,404	0.50	16.66	7,351,418	-5,640,015
7505	0.07	1,718,850	0.50	16.66	7,499,932	-5,781,081
7655	0.07	1,726,181	0.50	16.65	7,648,445	-5,922,265
7805	0.07	1,733,398	0.50	16.65	7,796,959	-6,063,561
7955	0.07	1,740,507	0.50	16.65	7,945,472	-6,204,965
8105	0.07	1,747,511	0.50	16.64	8,093,986	-6,346,475
8255	0.06	1,754,413	0.50	16.64	8,242,499	-6,488,087
8405	0.06	1,761,217	0.50	16.64	8,391,013	-6,629,796
8555	0.06	1,767,925	0.50	16.64	8,539,526	-6,771,601
8705	0.06	1,774,542	0.50	16.63	8,688,040	-6,913,498
8855	0.06	1,781,069	0.50	16.63	8,836,553	-7,055,485
9005	0.06	1,787,509	0.50	16.63	8,985,067	-7,197,558

Mod. FAA Major Storage Volume (cubic ft.) = 491,326

Mod. FAA Major Storage Volume (acre-ft.) = 11.2793



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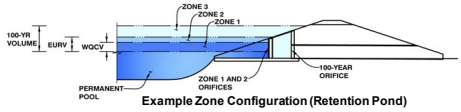
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: Cottonwood Greens Filing No. 4

Basin ID: Pond 3 ~ Stage 0=4973



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB		Note: L / W Ratio < 1
Watershed Area =	183.35	acres	L / W Ratio = 0.38
Watershed Length =	1,747	ft	
Watershed Length to Centroid =	874	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	14.00%	percent	
Percentage Hydrologic Soil Group A =	100.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	0.0%	percent	
Target WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.350	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	2.072	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1 in.) =		acre-feet	1.00	inches
5-yr Runoff Volume (P1 = 1.42 in.) =		acre-feet	1.42	inches
10-yr Runoff Volume (P1 = 1.68 in.) =		acre-feet	1.68	inches
25-yr Runoff Volume (P1 = 1.69 in.) =		acre-feet		inches
50-yr Runoff Volume (P1 = 1.99 in.) =		acre-feet		inches
100-yr Runoff Volume (P1 = 2.71 in.) =		acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.14 in.) =		acre-feet		inches
Approximate 2-yr Detention Volume =		acre-feet		
Approximate 5-yr Detention Volume =		acre-feet		
Approximate 10-yr Detention Volume =		acre-feet		
Approximate 25-yr Detention Volume =		acre-feet		
Approximate 50-yr Detention Volume =		acre-feet		
Approximate 100-yr Detention Volume =		acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
4974	--	1.00	--	--	--	223	0.005	112	0.003
4975	--	2.00	--	--	--	13,535	0.311	6,990	0.160
4976	--	3.00	--	--	--	43,090	0.989	35,302	0.810
4977	--	4.00	--	--	--	58,580	1.345	86,137	1.977
4978	--	5.00	--	--	--	74,540	1.711	152,697	3.505
4979	--	6.00	--	--	--	83,334	1.913	231,634	5.318
4980	--	7.00	--	--	--	91,496	2.100	319,049	7.324
4981	--	8.00	--	--	--	99,913	2.294	414,754	9.521
4982	--	9.00	--	--	--	108,878	2.499	519,149	11.918

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Table 1401

DETENTION VOLUME BY THE MODIFIED FAA METHOD
(See USDCM Volume 2 Storage Chapter for description of method)

Project: Cottonwood Greens Filing No. 4

Basin ID: Pond 4+5 (Future)

(For catchments less than 160 acres only. For larger catchments, use hydrograph routing method)
(NOTE: for catchments larger than 90 acres, CUHP hydrograph and routing are recommended)

Determination of MINOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	48.00	percent
Catchment Drainage Area	A =	33.320	acres
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D
Return Period for Detention Control	T =	5	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	22	minutes
Allowable Unit Release Rate	q =	0.0050	cfs/acre
One-hour Precipitation	P_1 =	1.42	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.29	
Inflow Peak Runoff	Qp-in =	25.98	cfs
Allowable Peak Outflow Rate	Qp-out =	0.17	cfs
Mod. FAA Minor Storage Volume =		120,811	**cubic feet**
Mod. FAA Minor Storage Volume =		2.773	**acre-ft**

150 <- Enter Rainfall Duration Incremental Increase Value Here (e.g. 5 for 5-Minutes)

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	4.82	13,962	1.00	0.17	50	13,912
155	0.73	65,732	0.57	0.09	882	64,850
305	0.44	77,806	0.54	0.09	1,632	76,175
455	0.32	85,464	0.52	0.09	2,382	83,082
605	0.26	91,219	0.52	0.09	3,131	88,088
755	0.22	95,891	0.51	0.09	3,881	92,010
905	0.19	99,853	0.51	0.09	4,631	95,222
1055	0.17	103,310	0.51	0.08	5,380	97,930
1205	0.15	106,389	0.51	0.08	6,130	100,259
1355	0.14	109,172	0.51	0.08	6,880	102,293
1505	0.13	111,717	0.51	0.08	7,629	104,088
1655	0.12	114,065	0.51	0.08	8,379	105,686
1805	0.11	116,249	0.51	0.08	9,129	107,120
1955	0.10	118,291	0.51	0.08	9,879	108,412
2105	0.10	120,211	0.51	0.08	10,628	109,583
2255	0.09	122,025	0.50	0.08	11,378	110,647
2405	0.09	123,746	0.50	0.08	12,128	111,618
2555	0.08	125,382	0.50	0.08	12,877	112,505
2705	0.08	126,944	0.50	0.08	13,627	113,317
2855	0.08	128,438	0.50	0.08	14,377	114,061
3005	0.07	129,871	0.50	0.08	15,126	114,745
3155	0.07	131,248	0.50	0.08	15,876	115,372
3305	0.07	132,574	0.50	0.08	16,626	115,948
3455	0.07	133,853	0.50	0.08	17,376	116,478
3605	0.06	135,089	0.50	0.08	18,125	116,964
3755	0.06	136,284	0.50	0.08	18,875	117,409
3905	0.06	137,443	0.50	0.08	19,625	117,818
4055	0.06	138,566	0.50	0.08	20,374	118,192
4205	0.06	139,657	0.50	0.08	21,124	118,533
4355	0.06	140,717	0.50	0.08	21,874	118,844
4505	0.05	141,749	0.50	0.08	22,623	119,126
4655	0.05	142,754	0.50	0.08	23,373	119,381
4805	0.05	143,734	0.50	0.08	24,123	119,611
4955	0.05	144,690	0.50	0.08	24,873	119,817
5105	0.05	145,623	0.50	0.08	25,622	120,001
5255	0.05	146,535	0.50	0.08	26,372	120,163
5405	0.05	147,426	0.50	0.08	27,122	120,305
5555	0.05	148,298	0.50	0.08	27,871	120,427
5705	0.05	149,152	0.50	0.08	28,621	120,531
5855	0.04	149,988	0.50	0.08	29,371	120,617
6005	0.04	150,807	0.50	0.08	30,120	120,686
6155	0.04	151,610	0.50	0.08	30,870	120,740
6305	0.04	152,398	0.50	0.08	31,620	120,778
6455	0.04	153,171	0.50	0.08	32,370	120,802
6605	0.04	153,930	0.50	0.08	33,119	120,811
6755	0.04	154,676	0.50	0.08	33,869	120,807
6905	0.04	155,408	0.50	0.08	34,619	120,790
7055	0.04	156,129	0.50	0.08	35,368	120,760
7205	0.04	156,837	0.50	0.08	36,118	120,719
7355	0.04	157,533	0.50	0.08	36,868	120,666
7505	0.04	158,219	0.50	0.08	37,617	120,601
7655	0.04	158,893	0.50	0.08	38,367	120,526
7805	0.04	159,558	0.50	0.08	39,117	120,441
7955	0.03	160,212	0.50	0.08	39,867	120,346
8105	0.03	160,857	0.50	0.08	40,616	120,241
8255	0.03	161,492	0.50	0.08	41,366	120,126
8405	0.03	162,119	0.50	0.08	42,116	120,003
8555	0.03	162,736	0.50	0.08	42,865	119,871
8705	0.03	163,345	0.50	0.08	43,615	119,730
8855	0.03	163,946	0.50	0.08	44,365	119,581
9005	0.03	164,539	0.50	0.08	45,114	119,424

Mod. FAA Minor Storage Volume (cubic ft.) = 120,811
Mod. FAA Minor Storage Volume (acre-ft.) = 2.7734

Determination of MAJOR Detention Volume Using Modified FAA Method

Design Information (Input):

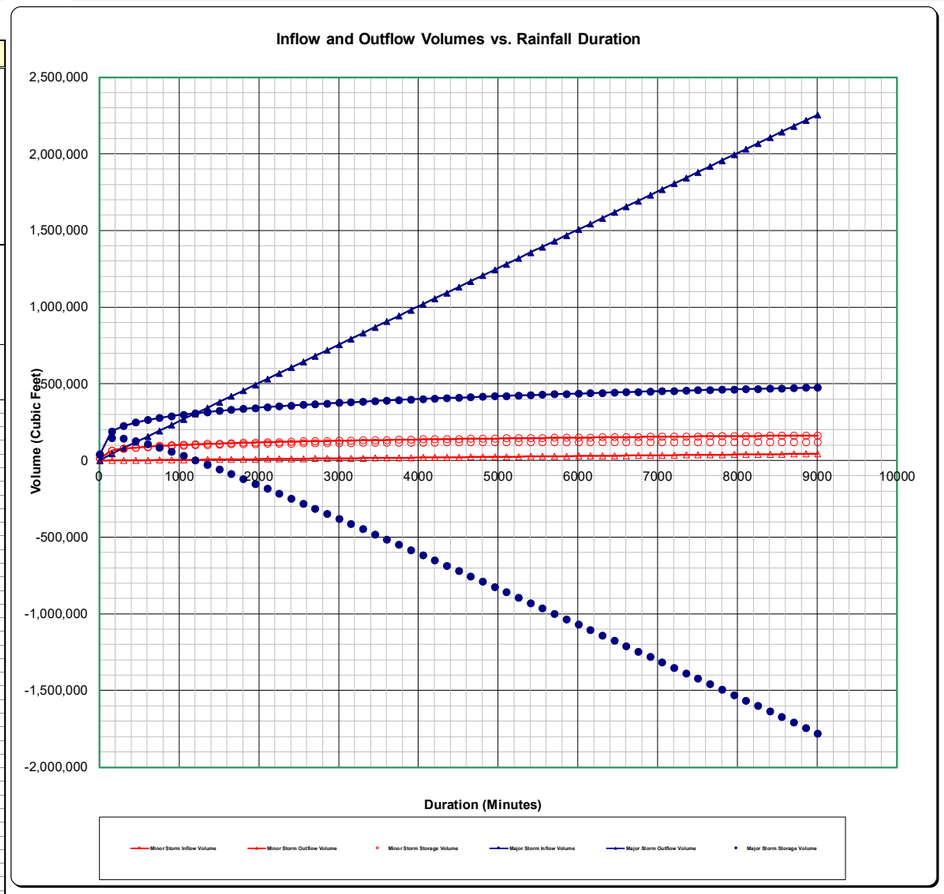
Catchment Drainage Imperviousness	I_a =	48.00	percent
Catchment Drainage Area	A =	33.320	acres
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D
Return Period for Detention Control	T =	100	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	22	minutes
Allowable Unit Release Rate	q =	0.25	cfs/acre
One-hour Precipitation	P_1 =	2.71	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.44	
Inflow Peak Runoff	Qp-in =	75.21	cfs
Allowable Peak Outflow Rate	Qp-out =	8.33	cfs
Mod. FAA Major Storage Volume =		146,225	**cubic feet**
Mod. FAA Major Storage Volume =		3.357	**acre-ft**

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	9.19	40,428	1.00	8.33	2,499	37,929
155	1.40	190,332	0.57	4.74	44,107	146,225
305	0.84	225,295	0.54	4.46	81,592	143,702
455	0.62	247,467	0.52	4.36	119,077	128,389
605	0.50	264,133	0.52	4.31	156,562	107,571
755	0.42	277,659	0.51	4.28	194,047	83,612
905	0.36	289,131	0.51	4.26	231,532	57,599
1055	0.32	299,143	0.51	4.25	269,017	30,126
1205	0.29	308,058	0.51	4.24	306,502	1,556
1355	0.27	316,117	0.51	4.23	343,987	-27,870
1505	0.24	323,486	0.51	4.22	381,472	-57,987
1655	0.23	330,285	0.51	4.22	418,957	-88,672
1805	0.21	336,607	0.51	4.21	456,442	-119,835
1955	0.20	342,521	0.51	4.21	493,927	-151,407
2105	0.19	348,082	0.51	4.21	531,412	-183,331
2255	0.18	353,334	0.50	4.20	568,897	-215,563
2405	0.17	358,315	0.50	4.20	606,382	-248,067
2555	0.16	363,054	0.50	4.20	643,867	-280,813
2705	0.15	367,576	0.50	4.20	681,352	-313,776
2855	0.15	371,903	0.50	4.20	718,837	-346,935
3005	0.14	376,052	0.50	4.19	756,322	-380,271
3155	0.14	380,039	0.50	4.19	793,807	-413,768
3305	0.13	383,879	0.50	4.19	831,292	-447,413
3455	0.13	387,583	0.50	4.19	868,777	-481,195
3605	0.12	391,161	0.50	4.19	906,262	-515,102
3755	0.12	394,622	0.50	4.19	943,747	-549,125
3905	0.12	397,976	0.50	4.19	981,232	-583,256
4055	0.11	401,229	0.50	4.19	1,018,717	-617,488
4205	0.11	404,388	0.50	4.19	1,056,202	-651,814
4355	0.11	407,459	0.50	4.19	1,093,687	-686,229
4505	0.10	410,447	0.50	4.18	1,131,172	-720,726
4655	0.10	413,357	0.50	4.18	1,168,657	-755,300
4805	0.10	416,194	0.50	4.18	1,206,142	-789,948
4955	0.10	418,962	0.50	4.18	1,243,627	-824,666
5105	0.09	421,664	0.50	4.18	1,281,112	-859,449
5255	0.09	424,304	0.50	4.18	1,318,597	-894,294
5405	0.09	426,884	0.50	4.18	1,356,082	-929,198
5555	0.09	429,409	0.50	4.18	1,393,567	-964,158
5705	0.09	431,881	0.50	4.18	1,431,052	-999,171
5855	0.08	434,301	0.50	4.18	1,468,537	-1,034,236
6005	0.08	436,674	0.50	4.18	1,506,022	-1,069,349
6155	0.08	438,999	0.50	4.18	1,543,507	-1,104,508
6305	0.08	441,280	0.50	4.18	1,580,992	-1,139,712
6455	0.08	443,519	0.50	4.18	1,618,477	-1,174,958
6605	0.08	445,717	0.50	4.18	1,655,962	-1,210,245
6755	0.08	447,876	0.50	4.18	1,693,447	-1,245,571
6905	0.07	449,997	0.50	4.18	1,730,932	-1,280,935
7055	0.07	452,083	0.50	4.18	1,768,417	-1,316,335
7205	0.07	454,133	0.50	4.18	1,805,902	-1,351,769
7355	0.07	456,150	0.50	4.18	1,843,387	-1,387,237
7505	0.07	458,135	0.50	4.18	1,880,872	-1,422,737
7655	0.07	460,089	0.50	4.18	1,918,357	-1,458,269
7805	0.07	462,013	0.50	4.18	1,955,842	-1,493,830
7955	0.07	463,907	0.50	4.18	1,993,327	-1,529,420
8105	0.07	465,774	0.50	4.18	2,030,812	-1,565,038
8255	0.06	467,614	0.50	4.18	2,068,297	-1,600,684
8405	0.06	469,427	0.50	4.18	2,105,782	-1,636,355
8555	0.06	471,215	0.50	4.18	2,143,267	-1,672,052
8705	0.06	472,979	0.50	4.18	2,180,752	-1,707,774
8855	0.06	474,718	0.50	4.18	2,218,237	-1,743,519
9005	0.06	476,435	0.50	4.17	2,255,722	-1,779,287

Mod. FAA Major Storage Volume (cubic ft.) = 146,225
Mod. FAA Major Storage Volume (acre-ft.) = 3.3569



UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.3, Released March 2012

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APPENDIX G – Referenced Material

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National Flood Hazard Layer FIRMette

FEMA

40°5'32.87"N

104°47'18.00"W

104°46'40.54"W

40°5'5.34"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/24/2019 at 2:38:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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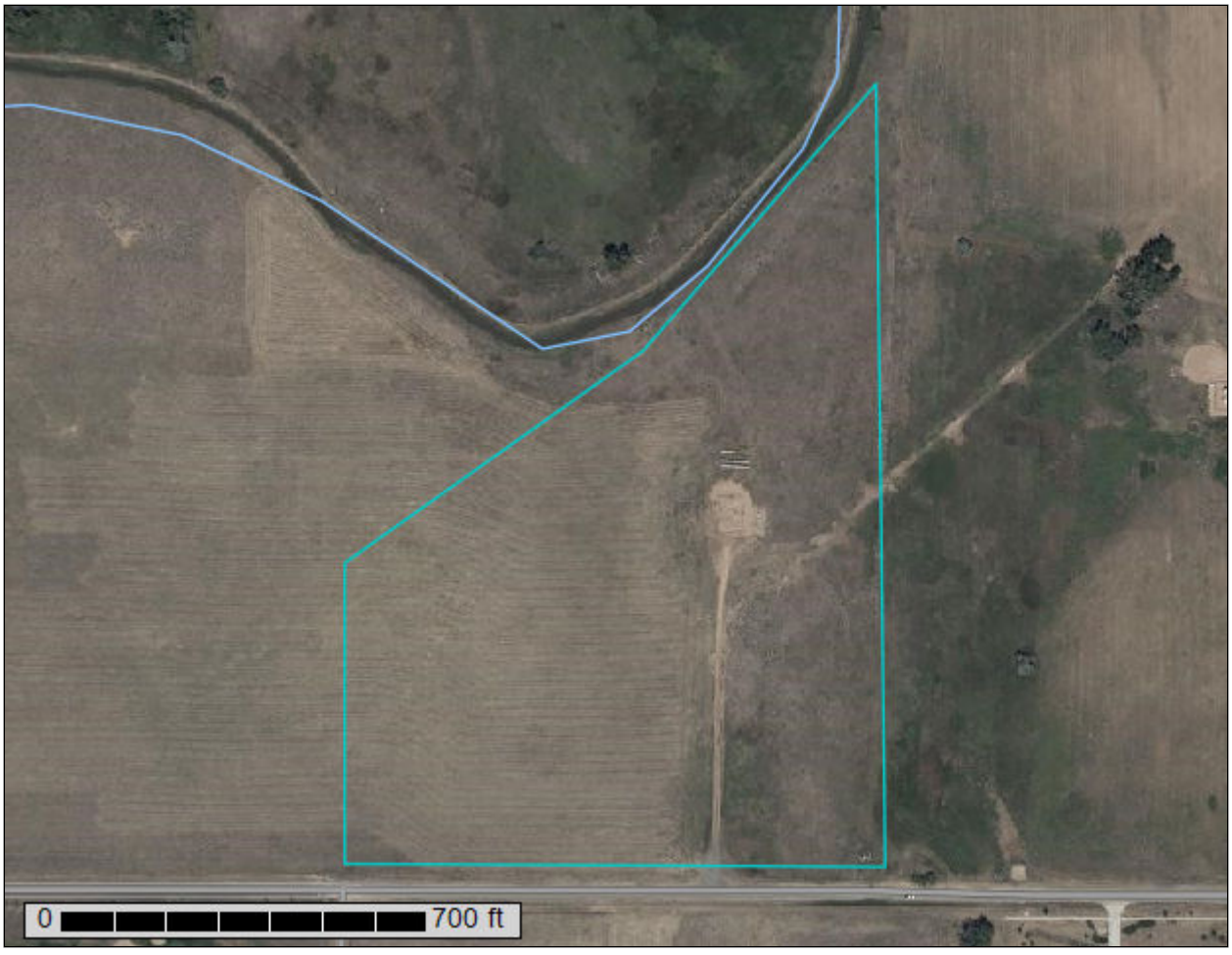
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Weld County, Colorado, Southern Part



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Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Custom Soil Resource Report
Soil Map

Map Scale: 1:2,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
35	Loup-Boel loamy sands, 0 to 3 percent slopes	0.4	1.8%
56	Renohill clay loam, 0 to 3 percent slopes	0.6	2.7%
69	Valent sand, 0 to 3 percent slopes	14.2	60.6%
70	Valent sand, 3 to 9 percent slopes	8.1	34.4%
72	Vona loamy sand, 0 to 3 percent slopes	0.1	0.5%
Totals for Area of Interest		**23.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

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Weld County, Colorado, Southern Part

35—Loup-Boel loamy sands, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 362f
Elevation: 4,550 to 4,750 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 130 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Loup and similar soils: 55 percent
Boel and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loup

Setting

Landform: Swales, drainageways, streams
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

H1 - 0 to 16 inches: loamy sand
H2 - 16 to 40 inches: loamy sand
H3 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: R067BY029CO - Sandy Meadow
Hydric soil rating: Yes

Description of Boel

Setting

Landform: Swales, drainageways, streams
Down-slope shape: Linear

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Across-slope shape: Linear
Parent material: Stratified sandy alluvium

Typical profile
H1 - 0 to 14 inches: loamy sand
H2 - 14 to 60 inches: loamy sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: R067BY029CO - Sandy Meadow
Hydric soil rating: No

Minor Components

Osgood
Percent of map unit: 5 percent
Hydric soil rating: No

Valent
Percent of map unit: 5 percent
Hydric soil rating: No

56—Renohill clay loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 3635
Elevation: 4,850 to 5,200 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Renohill and similar soils: 85 percent
Minor components: 15 percent

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Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Renohill

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 9 inches: clay loam
H2 - 9 to 32 inches: clay loam
H3 - 32 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Ulm

Percent of map unit: 10 percent
Hydric soil rating: No

Shingle

Percent of map unit: 5 percent
Hydric soil rating: No

69—Valent sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tczd
Elevation: 3,000 to 5,210 feet
Mean annual precipitation: 13 to 20 inches
Mean annual air temperature: 48 to 52 degrees F

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Frost-free period: 130 to 166 days
Farmland classification: Farmland of local importance

Map Unit Composition

Valent and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valent

Setting

Landform: Interdunes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Noncalcareous eolian sands

Typical profile

A - 0 to 5 inches: sand
AC - 5 to 12 inches: sand
C1 - 12 to 30 inches: sand
C2 - 30 to 80 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.9 mmhos/cm)
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R067BY015CO - Deep Sand, R072XA021KS - Sands (North) (PE 16-20)
Hydric soil rating: No

Minor Components

Julesburg

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)

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Hydric soil rating: No

Dailey

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY015CO - Deep Sand, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)
Hydric soil rating: No

70—Valent sand, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2tczf
Elevation: 3,050 to 5,150 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 130 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Valent and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valent

Setting

Landform: Hills, dunes
Landform position (two-dimensional): Backslope, shoulder, footslope, summit
Landform position (three-dimensional): Side slope, head slope, nose slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Noncalcareous eolian sands

Typical profile

A - 0 to 5 inches: sand

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AC - 5 to 12 inches: sand
C1 - 12 to 30 inches: sand
C2 - 30 to 80 inches: sand

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R067BY015CO - Deep Sand, R072XY109KS - Rolling Sands
Hydric soil rating: No

Minor Components

Dailey

Percent of map unit: 10 percent
Landform: Interdunes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY015CO - Deep Sand, R072XA021KS - Sands (North) (PE 16-20)
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope, backslope, shoulder
Landform position (three-dimensional): Side slope, head slope, nose slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)
Hydric soil rating: No

Haxtun

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave

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Ecological site: R067BY024CO - Sandy Plains, R072XY111KS - Sandy Plains
Hydric soil rating: No

72—Vona loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 363r
Elevation: 4,600 to 5,200 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Farmland of local importance

Map Unit Composition

Vona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vona

Setting

Landform: Plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 28 inches: fine sandy loam
H3 - 28 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

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Minor Components

Remmit

Percent of map unit: 10 percent
Hydric soil rating: No

Valent

Percent of map unit: 5 percent
Hydric soil rating: No

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Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

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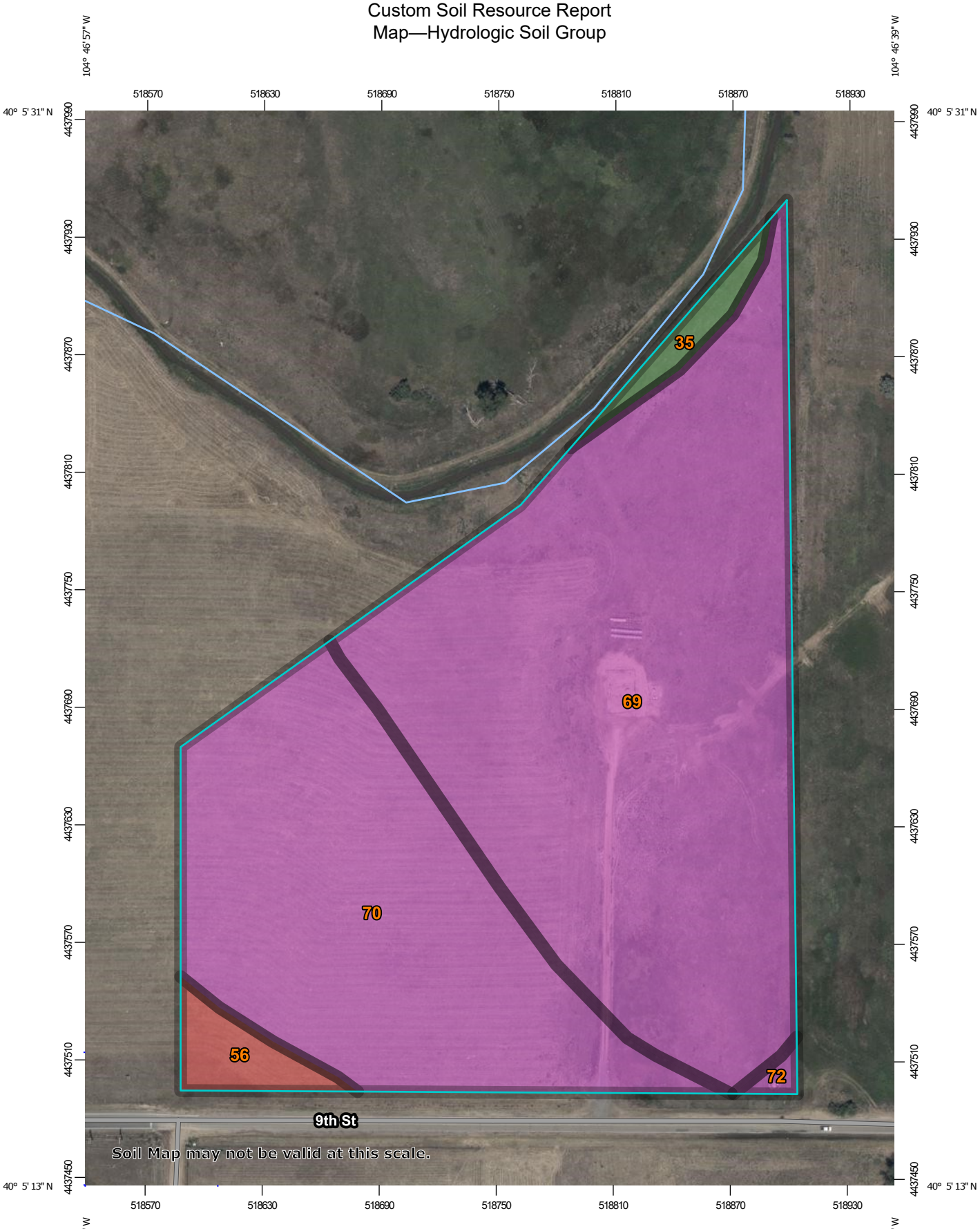
Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:2,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

20

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MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
35	Loup-Boel loamy sands, 0 to 3 percent slopes	A/D	0.4	1.8%
56	Renohill clay loam, 0 to 3 percent slopes	D	0.6	2.7%
69	Valent sand, 0 to 3 percent slopes	A	14.2	60.6%
70	Valent sand, 3 to 9 percent slopes	A	8.1	34.4%
72	Vona loamy sand, 0 to 3 percent slopes	A	0.1	0.5%
Totals for Area of Interest			**23.4**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Magaly Morales-Tejada

From: Kristen Thompson
Sent: Wednesday, October 13, 2021 10:04 AM
To: Magaly Morales-Tejada
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: RE: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

Magaly,

I am not sure if I responded to this referral. We do not have any comments.

Thank you
Kris

Kristen Thompson | Inclusion Specialist
220 Water Ave | Berthoud, CO 80513
Direct: (970) 622-2237
Main: 800-369-RAIN (7246)
www.northernwater.org
Facebook | Twitter | Instagram | LinkedIn
Disclaimer Notice: An allotment of Colorado-Big Thompson water is subject to the Water Conservancy Act, C.R.S 37-45-101 et seq, the authority of the Board of Directors of the Northern Colorado Water Conservancy District, and other relevant laws and regulations. The information provided in this email is not binding on Northern Water because the legal rights to Colorado-Big Thompson Project Allotments are subject to the continuing discretion of the Board of Directors of Northern Water and other legal limitations and requirements. Northern Water staff and counsel cannot provide you with legal advice, and you are advised to seek legal counsel with respect to the subject matter of this email. You also have an independent obligation to review and confirm the accuracy and completeness of any information provided to you by Northern Water, and to supplement or correct the records of Northern Water with respect to any errors or omissions.

From: Magaly Morales-Tejada
Sent: Monday, September 13, 2021 11:03 AM
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

External Message - Please be cautious when replying or opening links or attachments in this email

Good Morning,

The documentation located at the following link is submitted to you for review and recommendation for a preliminary and final plat being reviewed by the City of Fort Lupton. The application documents can be reviewed at the following link: https://www.fortlupton.org/DocumentCenter/Index/622.

Any comments you consider relevant to this request would be appreciated. Please reply by **October 4, 2021**, so that we may give full consideration to your recommendation. Any response not received before or on this date may be deemed to be a favorable response to the Planning & Building Department.

The Public Hearings for this matter are scheduled for:

- Planning Commission: Thursday, October 14, 2021 at 6:00 PM; and
- City Council: Tuesday, November 2, 2021 at 7:00 PM

Your time in this matter is greatly appreciated!

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CITY OF Fort Lupton EST 1836

Public Works

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

MEMO

To: Todd Hodges
Alyssa Knutson

From: Roy Vestal

Date: October 7, 2021

Subject: Cottonwood Greens Townhomes (LUP2021-0019)
Public Works Review

Public Works has reviewed the submitted documents for the above referenced development project with the following comments for inclusion with the Final Plat submittal. Be advised, review of construction drawings is for general compliance with city standards. There may be additional concerns as this design develops.

1. **PUD/Plat**
    a. Please coordinate with the Filing 1-3 revisions to the ROW of College Avenue. Changes were required from southern most curve to intersection of 9th Avenue.
    b. The lots along the eastern property line will require a drainage easement as shown. Option to relocate the storm sewer from 9th Street to be in the middle of the space of lots and property line.
    c. I think you want Alto Street to be designated as ROW.

2. **Drainage**
    a. Final Drainage Study as submitted is acceptable. Please convey one copy signed and sealed to Public Works.
    b. On-site storm sewer will be considered private.
    c. Coordination with 9th Street storm is required.
    d. Participation with current staff planning for this basin is required.
        i. Future storm line in 14th Street in coordination with Tri-State, Willow Bend and other basin properties from the east.

3. **Transportation**
    a. Traffic memorandum as submitted is acceptable. This development does comply with original Traffic Study.

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4. **Landscape / Grading** - *Chapter 2 Design Standards*
    a. A SWMP and Stormwater Discharge permit must be acquired from CDPH&E. Please submit proof of prior to receiving construction permits. Please provide copy of permit from CDPH&E.

5. **Utilities**
    a. Water - Chapter 3
        i. Section 3.21.00 Water service lines shall be located a minimum of 10 feet away from all sewer services and a minimum of 5 feet away from all fire protection service lines (measured horizontally). All service lines shall be constructed perpendicular to the front property line of the property they are going to serve and not less than 5 feet from the side of a front property line.
        ii. Include City standard detail W2. Specify "Red Mueller Super Centurion" hydrants in final construction drawings.

    b. Non Potable Irrigation
        i. Are all areas of landscape to be irrigated with the nonpotable system? I need to see intended irrigation scheme from the 2 meter locations.

    c. Sanitary Sewer - Chapter 4
        i. Section 4.18.00 Services. All service lines shall be constructed perpendicular to the property line of the property they are going to serve and not less than five feet from the side property line.

    d. Storm Sewer - Chapter 5
        i. The area on the eastern property line is not adequate for the storm sewer alignment. Easement requirements are the same as the sanitary sewer.
            4.16.00 EASEMENTS *All sanitary sewer mains shall be in an easement which has a width of at least two times the depth to the pipe invert. The minimum easement shall be 20 feet in width for one utility, 30 feet in width for two utilities and 40 feet in width for three utilities. Site specific circumstances may dictate the need for wider easements. The main shall be located a minimum of ten feet from and parallel to the edge of the easement.*

    e. Roadway - Chapter 6
        i. Designation of Private streets and Public is needed. I think we discussed City ownership and maintenance of Alto Street?
        ii. Preliminary Soils Report indicates presence of swelling soils, collapsible soils and shallow groundwater.

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iii. *Section 6.33.00* A Pavement Design Report is required prior to roadway paving. City preferred pavement section is a composite section of asphalt surface with Class VI base.
iv. *Section 6.18.02* At the intersection of two public streets or a private driveway and a public street, sight distance shall be evaluated across a "sight distance triangle" where obstructions are restricted according to the following criteria.
v. Do not use Standard detail R10. The ADA requirements will not be met. Detail R11 is good for the cross pan, but not the ramp. I do not think you have any ramps that match with our R9. You do not need the R2-3 detail
vi. Coordination on participation of 9th Street Improvements with City project will be required. Costs associated with the property frontage on 9th Street is $149,248.30.

6. **Public Improvement Agreement** – A Subdivision Improvements Agreement will be required for the construction of roadways, water, sewer and nonpotable water systems. See attached template.

7. A Geotechnical report for final pavement design will be required prior to paving public roads.

There may be additional concerns as this design develops.

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Magaly Morales-Tejada

From: John Fryar
Sent: Monday, September 13, 2021 11:27 AM
To: Magaly Morales-Tejada
Subject: RE: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

No LE issues.

Chief John Fryar

From: Magaly Morales-Tejada
Sent: Monday, September 13, 2021 11:03 AM
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

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- City Council: Tuesday, November 2, 2021 at 7:00 PM

Your time in this matter is greatly appreciated!

Magaly Morales-Tejada
Planning assistant
130 S. McKinley Ave.
Fort Lupton, CO 80621
Direct: 720-466-6111

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Magaly Morales-Tejada

From: Jonathan Gesick
Sent: Monday, September 13, 2021 4:50 PM
To: Magaly Morales-Tejada
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: RE: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

Good Afternoon.

Building has no concerns at this time.

Jonathan Gesick
Certified Building Official
(970) 305-3161
www.procodeinc.net

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From: Magaly Morales-Tejada
Sent: Monday, September 13, 2021 11:03 AM
Cc: Alyssa Knutson; Todd Hodges ; Maria Lancto
Subject: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

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Your time in this matter is greatly appreciated!

Magaly Morales-Tejada
Planning assistant
130 S. McKinley Ave.
Fort Lupton, CO 80621
Direct: 720-466-6111

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October 6, 2021

Fort Lupton Planning Department
130 S. McKinley Avenue
Fort Lupton, CO 80621
www.fortlupton.org

Re: Cottonwood Greens Preliminary and Final PUD Plat; Project No. LUP2021-0019; Plan No. PUD2021-0002; PPL2021-0004 FPL2020-0004

Dear Mr. Hodges and Ms. Knutson:

On behalf of United Power, Inc., thank you for inviting us to review and comment on the Cottonwood Greens Preliminary and Final PUD Plat. After review of the information, we have the following comments:

- **Front or Rear Lot Distribution** – United Power requires continuous dry utility easements for reliable electric facility installation. This allows us to install electric facilities in a continuous manner for our loop feed which provides reliability. We prefer the separation of gas and electric. Typically, with electric in the rear of the subdivision lots. We will need 8' to 10' wide dry utility easements in the rear of all lots. These utility easements will need to be on sides of lots abutting roads, and across tracts. If gas and electric will be sharing front lot distribution, we will need a 10' to 15' wide dry utility easements in the front of all lots. These utility easements will need to be on sides of lots abutting roads, and across tracts as well.

- Easements utilized by United Power cannot be encumbered by any hard surfaces such as streets or sidewalks. Although the roadways/tracts on the plat are dedicated to utilities, we have above ground equipment that cannot be placed within these areas. In addition, sidewalks take away from the use of the easement & reduces the area, limiting where our equipment can be placed.

- **Tracts/Open Space/Parks** – United Power prefers dedicated blanket utility easement use within tracts as this gives us the opportunity to set above ground equipment, coordinated with the developer, and limit the impact to home lots. If Blanket utility easement(s) cannot be given, we will need a 10' to 12' wide dry utility easements along the perimeter of all tracts, along perimeter of tracts abutting roads, and through tracts between lots.

- **Streetlights** – When streetlight locations are identified in a subdivision, we need a 5' wide dry utility easement along one side of the lot closest to the streetlight location. All streetlight locations must be approved and signed off by the city/town, etc. Please note, if we do not get these through the platting process, we will have to get individual ones during the design which will slow United Power's ability to start construction significantly.

Please have the property owner/developer/contractor submit an application for new electric service, any modification to existing facilities including relocation and/or removal along with CAD data via https://www.unitedpower.com/construction. United Power would like to work with these persons early in the construction process on getting an electric design prepared so that we can request any additional easements needed and hopefully have those easements dedicated on the plat rather than obtaining separate instrument. Obtaining easements via a separate instrument can be time consuming and could cause delays.

As a Reminder: No permanent structures are acceptable within the dry utility easement(s); such as, window wells, wing walls, retaining walls, basement walls, roof overhang, anything affixed to the house like decks, etc. United Power considers any structure that impedes the access, maintenance, and safety of our facilities a permanent structure. No exceptions will be allowed, and any encroachments could result in penalties.

Service will be provided according to the rules, regulations, and policies in effect by United Power at the time service is requested. We would like to remind the developer to call the Utility Notification Center by dialing 811 to have all utilities located prior to construction. We look forward to safely and efficiently providing reliable electric power and outstanding service.

Thank you,

Amber Mendoza

Amber Mendoza, RWA
ROW Agent
720.249.9315 | platreferral@unitedpower.com

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Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: **303.571.3306**
Facsimile: 303. 571.3284
donna.l.george@xcelenergy.com

September 29, 2021

City of Fort Lupton Planning Department
130 South McKinley Avenue
Fort Lupton, CO 80621

Attn: Alyssa Knutson and Todd Hodges

Re: Cottonwood Greens Townhomes PUD Filing No. 4, Case # LUP2021-0019

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has determined **there is a conflict** with **Cottonwood Greens Townhomes PUD F4** in that there are no utility easements dedicated for natural gas distribution facilities. Will the gas meters potentially be banked?

Please note that natural gas distribution utilities require minimum 6-foot wide utility easements *within each residential lot* on the side of the lot that is drivable pavement (minimum 8-feet wide, 6-inches thick) with space for service truck access and plowing in snowy conditions with a minimum 5-foot clearance from any structure.

PSCo also requests that Tracts E and L are dedicated for utility use, particularly for crossing and connectivity throughout the development.

The property owner/developer/contractor must complete the application process for any new natural gas service via xcelenergy.com/InstallAndConnect. It is then the responsibility of the developer to contact the Designer assigned to the project for approval of design details.

If additional easements need to be acquired by separate PSCo document, a Right-of-Way Agent will need to be contacted.

Donna George
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-571-3306 – Email: donna.l.george@xcelenergy.com

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Fort Lupton Fire Protection District
1121 Denver Avenue • Fort Lupton, Colorado 80621
Office: (303)857-4603 • Fax: (303)857-6619 • Website: www.fortluptonfire.org

Date: 10/22/2021
Project name: Cottonwood Greens PUD Filing #4
Project address: Parcel: 130933416019, Fort Lupton, CO 80621
FLFPD Project # R2021-0035
Plan reviewer: Taw Tamlin, Fire Marshal

The Fire District has reviewed the submittal for **Cottonwood Greens PUD Filing #4** located at **Parcel: 130933416019,** Fort Lupton, CO 80621. The submittal was reviewed for compliance with *2012 International Fire Code (IFC)* and National Fire Protection Association (*NFPA)* standards as adopted by the Fort Lupton Fire Protection District, the City Council of Fort Lupton and the Weld County Commissioners. The following specific requirements and conditions shall be met prior to operations.

Specific Requirements

1. Any property owner or authorized agent who intends to conduct an operation or business, or install or modify systems and equipment which is regulated by this code, or to cause any such work to be done, shall first make application to the fire code official and obtain the required permit. *2012 IFC, 105.1.1*

2. Application for a permit required by this code shall be made to the fire code official in such form and detail as prescribed by the fire code official. Applications for permits shall be accompanied by such plans as prescribed by the fire code official. *2012 IFC, 105.2*

    a. *The plan review, Fee Schedule, and Plan Review Application can be found at https://fortluptonfire.org/contractors/*

    b. *All documents shall be electronic and sent to ttamlin@ftluptonfire.com*

3. The following items shall be submitted for review prior to construction.
    a. Site Plan showing,
        i. Width of fire department access roads
        ii. Hydrant Locations & Distancing
        iii. Street lengths to dead end
        iv. Describe how Section D107.1 below has been met.

4. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103.1). 2012 IFC, D103.1

5. The minimum turning radius shall be determined by the fire code official. 2012 IFC, D103.3
    a. See attached document showing the minimum turning radius needed.

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6. The minimum fire-flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5m2) shall not be less than that specified in Table B105.1. 2012 IFC, B105.1

    a. Exception: A reduction in required fire-flow of 50 percent, as approved, is allowed when the building is equipped with an approved automatic sprinkler system.

7. The minimum number of fire hydrants available to a building shall not be less than that listed in Table C105.1. The number of fire hydrants available to a complex or subdivision shall not be less than that determined by spacing requirements listed in Table C105.1 when applied to fire apparatus access roads and perimeter public streets from which fire operations could be conducted. 2012 IFC, C103.1

8. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads and shall meet the requirements of Section D104.3. *2012 IFC, D107.1*

Exceptions:

    1. Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the International Fire Code, access from two directions shall not be required.

    2. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

9. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses. *2012 IFC, 104.3*

10. Where the vertical distance between the grade plane and the highest roof surface exceeds 30 feet (9144 mm), approved aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater. *2012 IFC, D105.1*

11. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Where required by the fire code official, address numbers shall be provided in additional approved locations to facilitate emergency response. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (101.6 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Where access is by means of a private road and the building

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cannot be viewed from the public way a monument, pole or other sign or means shall be used to identify the structure. Address numbers shall be maintained. *2021 IFC, 505.1*

Please contact Fire Marshal, Taw Tamlin at 303-857-4603 or ttamlin@ftluptonfire.com if you have questions or need further assistance.

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Colorado Community Media
750 W. Hampden Ave. Suite 225
Englewood, CO 80110

City of Fort Lupton ***
130 SOUTH MCKINLEY AVENUE
FT LUPTON CO 80621-0000

Description: FLP411 Notice of Hearing

AFFIDAVIT OF PUBLICATION

State of Colorado }
County of Weld } ss

This Affidavit of Publication for the Fort Lupton Press, a weekly newspaper, printed and published for the County of Weld, State of Colorado, hereby certifies that the attached legal notice was published in said newspaper once in each week, for 1 successive week(s), the last of which publication was made 9/29/2021, and that copies of each number of said paper in which said Public Notice was published were delivered by carriers or transmitted by mail to each of the subscribers of said paper, according to their accustomed mode of business in this office.

For the Fort Lupton Press

State of Colorado }
County of Weld } ss

The above Affidavit and Certificate of Publication was subscribed and sworn to before me by the above named Linda Shapley, publisher of said newspaper, who is personally known to me to be the identical person in the above certificate on 9/29/2021. Linda Shapley has verified to me that she has adopted an electronic signature to function as her signature on this document.

20004025550-990473

Carla Bethke
Notary Public
My commission ends April 11, 2022

CARLA BETHKE
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20004025550
MY COMMISSION EXPIRES APRIL 11, 2022

PUBLIC NOTICE

CITY OF FORT LUPTON
NOTICE OF PUBLIC HEARING

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The public hearings are to be held before the Planning Commission on Thursday, October 14, 2021, at 6:00 P.M., and before the City Council on Tuesday, November 2, 2021, at 7:00 P.M. or as soon as possible thereafter.

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Further information is available through the City Planning and Building Department at (303) 857-6694.

ALL INTERESTED PERSONS MAY ATTEND

LEGAL DESCRIPTION

A TRACT OF LAND BEING A PORTION OF THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO, ALSO BEING A PORTION OF THAT TRACT OF LAND DESCRIBED IN RECEPTION NO. 2039953, WELD COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

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COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 33:

THENCE NORTH 57°59'05" EAST 79.52 FEET TO THE BEGINNING OF A CURVE TO THE RIGHT HAVING A RADIUS OF 15.00 FEET AND A CENTER WHICH BEARS NORTH 00°17'38" EAST, ALSO BEING THE POINT OF BEGINNING;

THENCE 23.48 FEET ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 89°42'14";

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THENCE 401.38 FEET ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 22°03'35";

THENCE NORTH 33°44'31" EAST 40.07 FEET;

THENCE SOUTH 26°57'18" EAST 495.94 FEET TO THE EAST LINE OF SAID TRACT OF LAND;

THENCE ALONG SAID EAST LINE SOUTH 00°08'34" EAST 513.75 FEET TO THE NORTH RIGHT-OF-WAY LINE OF 9TH STREET;

THENCE ALONG SAID NORTH RIGHT-OF-WAY LINE NORTH 89°42'22" WEST 981.32 FEET TO THE POINT OF BEGINNING;

SAID TRACT OF LAND CONTAINS 619,698 SQUARE FEET, OR 14.23 ACRES, MORE OR LESS.

Legal Notice No. FLP411
First Publication: September 29, 2021
Last Publication: September 29, 2021
Publisher: Fort Lupton Press

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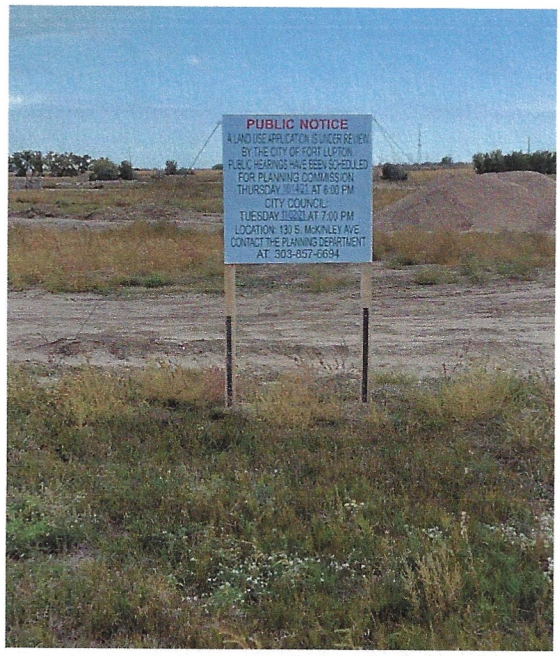
CITY OF
Fort Lupton
EST 1836

Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

Sign Posting Affidavit

Cottonwood Greens Townhomes PUD Preliminary and Final Plat
Project No. LUP2021-0019 / Plan Nos. PUD2021-0002; PPL2021-0004 & FPL2021-0004



Facing 9th St.

I, Don Guerra hereby acknowledge that the aforementioned property was posted in accordance with City Codes. Said public hearing notice was posted on this 29th day of September, 2021.

Signature of Owner or Owner's Representative

The foregoing instrument was acknowledged before me by Don Guerra, this 30th day of September, 2021. Witness my hand and seal.

My commission expires 12/04/21.

Notary Public

(SEAL)

CLAYTON CHESAREK
Notary Public – State of Colorado
Notary ID 20134072122
My Commission Expires Dec 4, 2021

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CERTIFICATE OF MAILING

I, the undersigned, hereby certify that on the 28th day of September 2021, a true and correct copy of the foregoing Notice of Public Hearings and Exhibit of Proposes Change for the Cottonwood Greens Townhomes Preliminary and Final PUD Plat was sent via U.S. Mail, postage pre-paid, to the following addresses:

COYOTE CREEK NORTH LLC
5300 DTC PKWY
STE 100
GREENWOOD VILLAGE, CO 80111

LGI HOMES COLORADO LLC
1450 LAKE ROBBINS DR
STE 430
THE WOODLANDS, TX 77380

THERMO - FARMS
5305 W 86TH AVE
ARVADA, CO 80003

CONNER FAMILY TRUST
1621 FAIR HOUSE RD
SPRING HILL, TN 77380

C/O NATIONAL GUARD
STATE OF COLORADO
6848 S REVERE PKWY
CENTENNIAL, CO 80112

ROWLEY DOWNS LAND COMPANY
260 KRAMERIA ST
DENVER, CO 80220

KP KAUFFMAN COMPANY, INC
1675 BROADWAY
STE 2800
DENVER, CO 80202

KERR-MCGEE OIL & GAS CORPORATION
1999 BROADWAY
STE 3700
DENVER, CO 80202

ANADARKO LAND CORPORATION
PO BOX 1330
HOUSTON, TX 77251

THE RANCH ESTATES
8791 CIRCLE DR
WESTMINSTER, CO 80031

RENNOC CORPORATION
2 OSPREY CIR
THORNTON, CO 80241

City Official

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CITY OF
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Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

CITY OF FORT LUPTON
NOTICE OF PUBLIC HEARING

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Further information is available through the City Planning and Building Department at (303) 857-6694.

ALL INTERESTED PERSONS MAY ATTEND.

ADDITIONAL INFORMATION AND DOCUMENTS ON THIS APPLICATION CAN BE FOUND AT BIT.LY/FLDEVELOPMENT AND SCROLLING DOWN TO THE ROW TITLED: COTTONWOOD GREENS TOWNHOMES PUD PRELIMINARY AND FINAL PUD PLAT

LEGAL DESCRIPTION

A TRACT OF LAND BEING A PORTION OF THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO, ALSO BEING A PORTION OF THAT TRACT OF LAND DESCRIBED IN RECEPTION NO. 2039953, WELD COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

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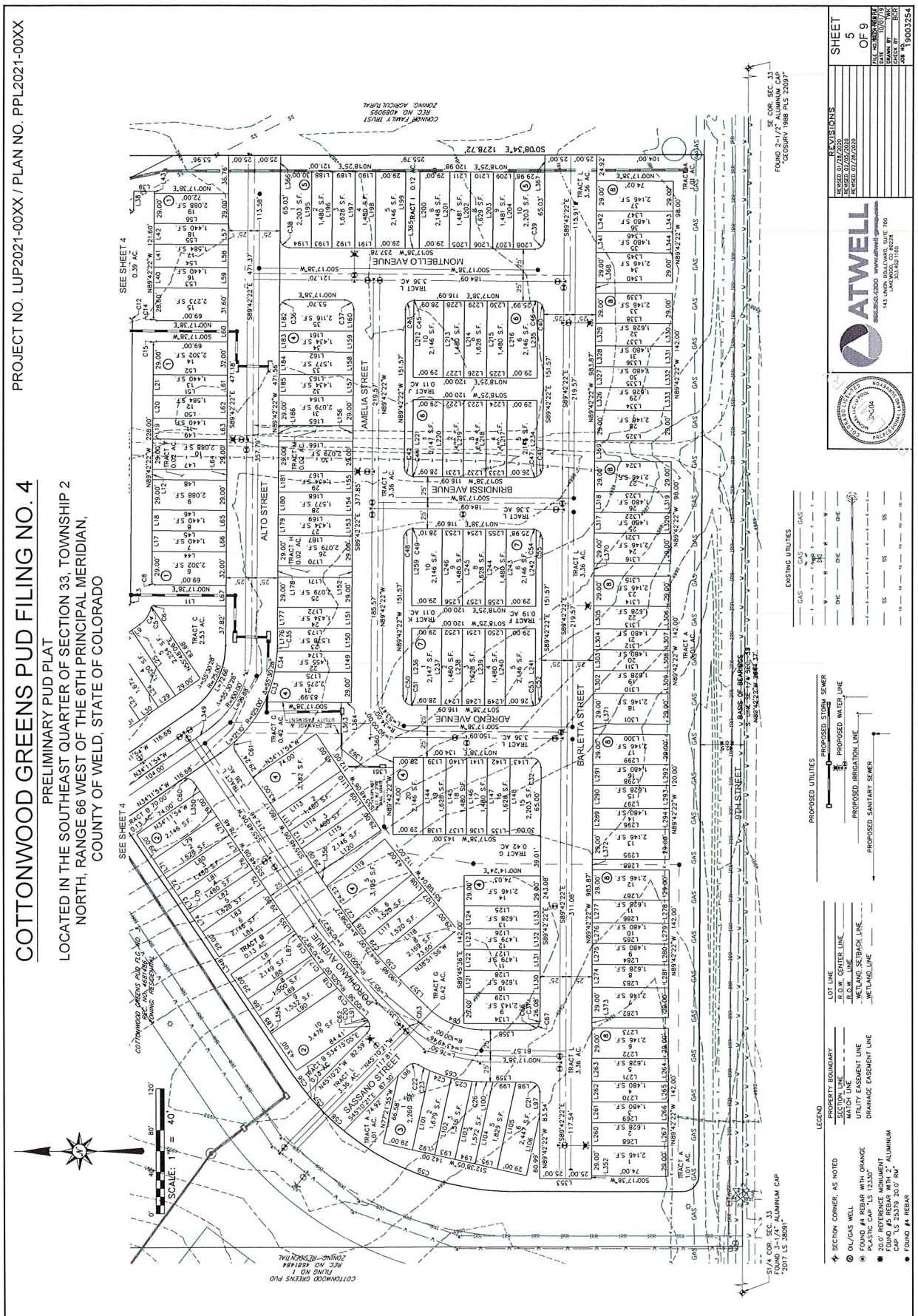
COTTONWOOD GREENS TOWNHOMES PUD PRELIMINARY AND FINAL PUD PLAT

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-00XX

COTTONWOOD GREENS PUD FILING NO. 4

PRELIMINARY PUD PLAT

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO



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Colorado Community Media
750 W. Hampden Ave. Suite 225
Englewood, CO 80110

City of Fort Lupton ***
130 SOUTH MCKINLEY AVENUE
FT LUPTON CO 80621-0000

Description: FLP411 Notice of Hearing

AFFIDAVIT OF PUBLICATION

State of Colorado }
County of Weld } ss

This Affidavit of Publication for the Fort Lupton Press, a weekly newspaper, printed and published for the County of Weld, State of Colorado, hereby certifies that the attached legal notice was published in said newspaper once in each week, for 1 successive week(s), the last of which publication was made 9/29/2021, and that copies of each number of said paper in which said Public Notice was published were delivered by carriers or transmitted by mail to each of the subscribers of said paper, according to their accustomed mode of business in this office.

For the Fort Lupton Press

State of Colorado }
County of Weld } ss

The above Affidavit and Certificate of Publication was subscribed and sworn to before me by the above named Linda Shapley, publisher of said newspaper, who is personally known to me to be the identical person in the above certificate on 9/29/2021. Linda Shapley has verified to me that she has adopted an electronic signature to function as her signature on this document.

20004025550-990473

Carla Bethke
Notary Public
My commission ends April 11, 2022

CARLA BETHKE
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20004025550
MY COMMISSION EXPIRES APRIL 11, 2022

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Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621
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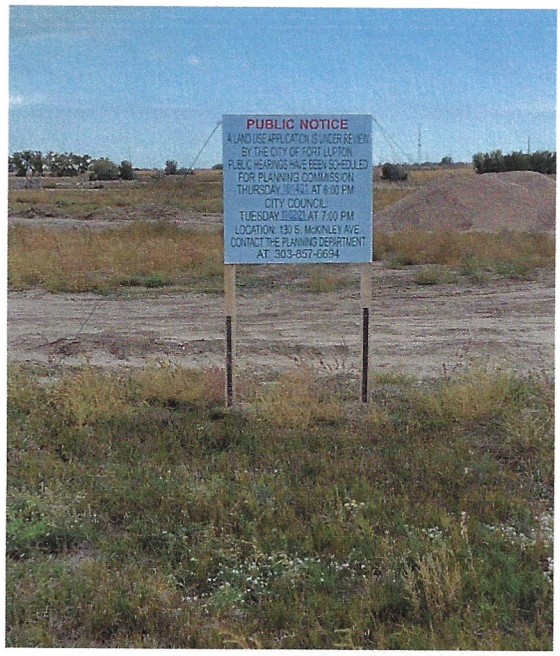
Sign Posting Affidavit

Cottonwood Greens Townhomes PUD Preliminary and Final Plat
Project No. LUP2021-0019 / Plan Nos. PUD2021-0002; PPL2021-0004 & FPL2021-0004



Facing 9th St.

I, Don Guerra hereby acknowledge that the aforementioned property was posted in accordance with City Codes. Said public hearing notice was posted on this 29th day of September, 2021.

Signature of Owner or Owner's Representative

The foregoing instrument was acknowledged before me by Don Guerra, this 30th day of September, 2021. Witness my hand and seal.

My commission expires 12/04/21.

Notary Public

(SEAL)

CLAYTON CHESAREK
Notary Public – State of Colorado
Notary ID 20134072122
My Commission Expires Dec 4, 2021

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CITY OF
Fort Lupton
EST 1836
COME PAINT YOUR FUTURE WITH US

Planning Department

130 S. McKinley Avenue
Fort Lupton, CO 80621

Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

Affidavit of Mineral Notice

CERTIFICATION OF NOTICE PURSUANT TO C.R.S. 24-65.5-103

Cottonwood Greens PUD Filing No. 4

The undersigned applicant, **Cottonwood Development Partners LLC**, hereby certifies:

(a) To the best of his or her knowledge, the attached list is a true and accurate list of the names and addresses of all mineral owners and lessees of mineral owners on or under the parcel of land being considered pursuant to C.R.S. 24-65.5-103(1)(a).

(b) Notice was sent to mineral estate owner(s) by certified mail, return receipt requested, or by a nationally recognized overnight courier not less than 30 days prior to the date scheduled for the initial public hearing by the City of Fort Lupton;

(c) Notice contained the time and place of the initial public hearing, the nature of the hearing, the location and legal description by section, township, and range of the property that is subject of the hearing, and the name of the applicant. A copy of the notice sent is attached hereto.

Signature of Owner or Owner's Representative

The foregoing instrument was acknowledged before me by JAMES M. RIGHEIMER this 16th day of JUNE, 2021. Witness my hand and seal.

My commission expires 8/9/21.

Notary Public

(SEAL)

JAMES KRETZSCHMAR
Notary Public - California
Orange County
Commission # 2204956
My Comm. Expires Aug 9, 2021

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-183

ADOPTING AN ORDINANCE AMENDING CHAPTER 18 BUILDING REGULATIONS OF THE FORT LUPTON MUNICIPAL CODE AND ADOPTING BY REFERENCE THE 2018 INTERNATIONAL BUILDING AND FIRE CODES AND ENACTING A NEW SECTION FOR THE INTERNATIONAL SWIMMING POOL AND SPA CODE

I. **Agenda Date:** Council Meeting – November 2, 2021

II. **Attachments:**
a. Ordinance
b. 2018 IBC Structural Changes
c. 2018-R2 IBC
d. IRC Code Comparison 2012 – 2018
e. Significant Changes Chapter 23
f. 4-up Handout

Commented [ML1]: Are these correct?

III. **Summary Statement:**

Staff is recommending adoption of the 2018 International Building and Fire Codes to replace the existing 2012 Codes. Specific codes to be adopted include:

- *International Building Code, 2018 Edition*
- *National Electrical Code, Current State Adopted Edition*
- *International Mechanical Code, 2018 Edition*
- *International Plumbing Code, 2018 Edition*
- *International Fire Code, 2018 Edition*
- *International Fuel Gas Code, 2018 Edition*
- *International Property Maintenance Code, 2018 Edition*
- *International Existing Building Code, 2018 Edition*
- *International Residential Code, 2018 Edition*
- *International Energy Conservation, 2018 Edition*
- *International Swimming Pool and Spa Code, 2018 Edition*

IV. **Submitted by:** _____ Planning Director

V. **Finance Reviewed** _____ Finance Director

VI. **Approved for Presentation:** _____ City Administrator

VII. **Attorney Reviewed** _____ Approved _____ Pending Approval

VIII. **Certification of Council Approval:** _____ City Clerk _____ Date

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IX. Detail of Issue/Request:

Staff is recommending adoption of the 2018 International Building and Fire Codes to replace the existing 2012 Codes. Specific codes to be adopted include:

- *International Building Code of the ICC, 2018 Edition*
- *National Electrical Code of the NFPA, Current State Adopted Edition*
- *International Mechanical Code of the ICC, 2018 Edition*
- *International Plumbing Code of the ICC, 2018 Edition*
- *International Fire Code of the ICC, 2018 Edition*
- *International Fuel Gas Code of the ICC, 2018 Edition*
- *International Property Maintenance Code of the ICC, 2018 Edition*
- *International Existing Building Code of the ICC, 2018 Edition*
- *International Residential Code of the ICC, 2018 Edition*
- *International Energy Conservation Code of the ICC, 2018 Edition*
- *International Swimming Pool and Spa Code, 2018 Edition*

Please see the attached documents for a comparison of the 2012 codes and the 2018 codes.

X. Legal/Political Considerations:

C.R.S. 31-16-201 – 31-16-208 describes the process by which ordinance codes are adopted by reference. City Council approved Ordinance 2021-1130 which introduced this proposed ordinance and set the public hearing for November 2, 2021. Notice of the public hearing was published in the Fort Lupton Press once at least fifteen days preceding the hearing and once at least eight days preceding it.

XI. Alternatives/Options:

The City Council has the following three options:

a) *Adopt the 2018 International Codes*
b) *Do not adopt the 2018 International Codes*
c) *Postpone the adoption of the International Codes and direct staff to gather more information.*

XII. Financial Considerations:

There are no financial considerations.

XIII. Staff Recommendation:

Staff recommends adopting the 2018 International Building and Fire Codes.

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ORDINANCE NO. 2021-11xx

INTRODUCED BY: xxx

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF FORT LUPTON, COLORADO AMENDING CHAPTER 18 BUILDING REGULATIONS OF THE FORT LUPTON MUNICIPAL CODE AND ADOPTING BY REFERENCE THE INTERNATIONAL BUILDING CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; THE NATIONAL ELECTRICAL CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), CURRENT STATE ADOPTED EDITION; INTERNATIONAL MECHANICAL CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL PLUMBING CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL FIRE CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL FUEL GAS CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL PROPERTY MAINTENANCE CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL EXISTING BUILDING CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL RESIDENTIAL CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION; INTERNATIONAL ENERGY CONSERVATION CODE OF THE INTERNATIONAL CODE COUNCIL, 2018 EDITION, AND ENACTING A NEW SECTION CHAPTER 18 ARTICLE XVI KNOWN AS THE INTERNATIONAL SWIMMING POOL AND SPA CODE, 2018 EDITION

WHEREAS, the City desires to adopt the 2018 Building Codes and the current state adopted edition of the National Electric Code; and

WHEREAS, all codes shall be adopted by reference; and

WHEREAS, a new section shall be enacted and be known as the International Swimming Pool and Spa Code; and

WHEREAS, notice of the public hearing was published in a newspaper of general circulation once at least fifteen days preceding the hearing and once at least eight days preceding it.

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF FORT LUPTON, WELD COUNTY, COLORADO:

Section 1. Chapter 18, Article III, Section 18-51 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-51. Adoption.

Pursuant to Title 31, Article 16, Parts 1 and 2, C.R.S., there is adopted by reference the 2018 International Building Code (IBC) promulgated and published as such by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795. This code includes comprehensive provisions covering building regulations, including regulations

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concerning erection, construction, enlargement, alterations, repair, moving, removal, conversion, demolition, occupancy, equipment, use, height, area and maintenance of buildings or structures in the City; providing for the issuance of permits and collection of fees therefor; and providing penalties for the violation thereof and for the enforcement of this Chapter and the building codes by the Building Official. This code presents in a compact and concise manner national test, material and special design standards. It deals with tests of combustibility of various materials in buildings, grading of lumber, cement, aggregates, steel, material specification, roof and foundation standards, sprinkler systems and doors, bonding agents, soil testing methods and other building standards.

Section 2. Chapter 18, Article IV, Section 18-57 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-57. Amendments to the International Building Code.

The following sections of the International Building Code are hereby revised:

"**101.1 Title**. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"101.4.3 Plumbing. Is amended by the deletion of the last sentence.

"101.4.5 Fire prevention. Is amended by replacing "International Fire Code" with "adopted fire code".

"101.4.6 Energy. Is amended by replacing the words "International Energy Conservation Code" with "2018 International Energy Conservation Code".

"105.1 Required. Is amended by replacing the words "building official" with 'City".

"105.2 Work exempt from permit. Is amended by: Building Exemption #1 is deleted in its entirety and replaced with "One-Story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet and the roof height does not exceed 10 feet above grade measured from a point directly outside the exterior walls of the structure." Building Exemption # 2 is deleted in its entirety. Building Exemption #14 is added to read "Shingle repair or replacement work not exceeding one square (100 square feet in area) of covering per building.

"105.5 Expiration. is amended by the deletion of this section in its entirety and replaced with the following: "Every permit issued by the building official under the provisions of this code shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within 180 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 180 days. Before such work can be recommenced, a new permit shall be first obtained to do so, and the fee therefor shall be one half the amount of the original permit fee, exclusive of any taxes or other fees already accessed, provided no changes have been made or will be made in the original plans and specifications for such work, and provided further that

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such suspension or abandonment has not exceeded one year. In order to renew action on a permit after expiration, the permittee shall pay a new full permit fee."

"109.4 Work commencing before permit issuance. Is amended by the deletion of this section in its entirety and replaced with the following: "Any person who commences any work on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits may be subject to an investigation fee established by the City. The amount of the investigation fee may be in the amount up to the amount of the permit fee that would normally be accessed for the specific type of construction activity, with any such investigation fee being in addition to all other required permit fees. The investigation fee shall be collected whether or not a permit is then subsequently issued.

"109.6 Refunds. Is amended by the deletion of this section in its entirety and replaced with the following: "The City may authorize refunding of any fee paid hereunder which was erroneously paid or collected. The City may authorize refunding of not more than 80 percent (80%) of the permit fee paid when no work has been done under a permit issued in accordance with this code. The City may authorize refunding of not more than 80 percent (80%) of the plan review fee paid when an application for a permit for which a plan review fee has been paid is withdrawn or cancelled before any plan reviewing is done. The City shall not authorize refunding of any fee paid except on written application filed by the original permittee not later than 180 days after the date of fee payment."

"111.3 Temporary occupancy. Is amended by deleting the words "building official" in the first and second sentence and replacing it with 'City".

"113.1 General. Is amended by the deletion of the last two sentences and replaced with the following: "The members of the Board of Appeals shall be comprised of the members of the Board of Adjustment."

"113.3 Qualifications. Is amended by the deletion of this section in its entirety.

"114.2 Notice of Violation. Is amended by the addition of 'Notice of Violations shall be delivered in accordance with section 107 of the IPMC" after the last paragraph.

"202 Definitions. Is amended by addition of the following: "Sleeping Room" (Bedroom) is any enclosed habitable space within a dwelling unit, which complies with the minimum room dimension requirements of IBC Section 1208 and contains a closet, an area that is useable as a closet, or an area that is readily convertible for use as a closet. Living rooms, family rooms and other similar habitable areas that are so situated and designed so as to clearly indicate these intended uses, shall not be interpreted as sleeping rooms.

"915.2.1 Dwelling units. Is amended by the deletion of the first sentence and replaced with the following: "Carbon monoxide detection shall be installed in dwelling units within 15 feet of each separate sleeping area and on every level."

"1015.2 Where required. Is amended by the addition of a second paragraph inserted before the exceptions as follows: "All area wells, stair wells, window wells and light wells attached to any building that are located less than 36 inches (914.4 mm) from the nearest

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intended walking surface and deeper than 30 inches (762 mm) below the surrounding ground level, creating an opening greater than 24 inches (610 mm) measured perpendicular from the building, shall be protected with guardrails conforming to this section around the entire opening, or be provided with an equivalent barrier.

"1020.1 Table 1020.1 Corridor Fire-Resistance Rating. Is amended to replace the corridor rating for R Occupancies with a sprinkler system from 0.5 to 1- Hour fire rating.

"1030.2 Minimum size. Is amended by the deletion of the exception.

"1301.1.1 Criteria. Is amended by replacing "International Energy Conservation Code" with the "2012 International Energy Conservation Code".

"IBM Section 1612.3 Establishment of flood hazard areas. Is amended by the insertion of "City of Fort Lupton" where indicated in [Name of Jurisdiction] and the date of the latest flood insurance study for the City of Fort Lupton, where indicated in [Date of Issuance].

Section 3. Chapter 18, Article IV, Section 18-71 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-71. Adoption.

The National Fire Protection Association standard number 70, hereafter known as the *National Electrical Code,* published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts, 02169-7471, is hereby adopted by reference as the City of Fort Lupton Electrical Code as if fully set out in the ordinance codified herein with the additions, deletions, insertions and changes as follows, and such adoption is to have the same force and effect as if set forth herein in every particular.

The effective edition of such *National Electrical Code* shall be the edition currently adopted by the State Electrical Board, Division of Professions and Occupations, Department of Regulatory Agencies as updated every 3 years. The effective date of the enforcement of the electrical code shall be 1 year after the State has adopted the latest edition.

The purpose and subject matter of the *National Electrical Code* includes minimum regulations for the practical safeguarding of persons and property from the hazards arising from the use of electricity and minimum standards relating to the installation of electrical conductors and equipment within or on public and private buildings and other structures, including mobile homes, recreational vehicles and floating dwelling units, and other premises such as yards, carnivals, parking and other lots, and industrial substations.

The *National Electrical Code* provides for the issuance of permits, inspections and the collection of fees therefor. Except as otherwise provided herein, the *National Electrical Code* is adopted in full, including the outline of contents, index and all appendices thereto.

A copy of the provisions of the *National Electrical Code,* currently adopted by the State Electrical Board, is available for public inspection during regular business hours at the State Electrical Board office at the Division of Professions and Occupations, Department of Regulatory Agencies, 1560 Broadway, Suite 1350, Denver, Colorado, 80202. In addition, at least one copy of the edition of the

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National Electrical Code, currently adopted by the State Electrical Board, has been and is now on file in the City building department and may be inspected during regular business hours.

National Electrical Code — Amendments - The National Electrical Code as adopted by the City is hereby amended as follows: The electrical permit fees for each permit shall be as established from time to time by resolution of the board of trustees and set forth in the City fee schedule maintained by the building officials for such purposes.
Violations and penalties - It shall be unlawful for any person, firm, building superintendent, building manager, contractor, contractor's superintendent, corporation or other entity to violate any of the provisions of this chapter or the terms of the code adopted and incorporated herein. Any person, firm or corporation convicted of a violation of any provision of this chapter or of the provisions of the code adopted and incorporated herein shall be subject to the penalty provided in Section 11.14-1.

Section 4. Chapter 18, Article V, Section 18-91 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-91. Adopted.

Pursuant to Title 31, Article 16, C.R.S., there is hereby adopted the 2018 International Mechanical Code, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795.

Section 5. Chapter 18, Article V, Section 18-94 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-94. Amendments to the International Mechanical Code.

The following sections of the International Mechanical Code are hereby revised:

"101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

Section 6. Chapter 18, Article VI, Section 18-111 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-111. Adoption.

Pursuant to Title 31, Article 16, C.R.S., there is adopted the 2018 International Plumbing Code, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795.

Section 7. Chapter 18, Article VI, Section 18-116 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-116. Amendments to the International Plumbing Code.

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The following sections of the International Plumbing Code is hereby revised:

"101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"305.4.1 Sewer depth. Is amended by filling in both areas where indicated to read "12 inches (305 mm)".

"312.3 Drainage and vent air test. Is amended by the deletion of the first sentence.

"903.1 Roof extension. Is amended by inserting the number "12" (152.4 mm) where indicated in the second sentence.

Section 8. Chapter 18, Article VII, Section 18-131 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-131. Adoption.

A certain document, one (1) copy of which is on file in the office of the City Clerk, being marked and designated as the International Fire Code, 2018 edition, including all Appendix Chapters (see International Fire Code Section 101.2.1, 2018 edition), as published by the International Code Council, is hereby adopted as the Fire Code of the City, regulating and governing the safeguarding of life and property from fire and explosion hazards arising from the storage, handling and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the occupancy of building and premises as herein provided; providing for issuance of permits and collection of fees therefor; and each and all of the regulations, provisions, penalties, conditions and terms of said Fire Code on file in the office at the City are hereby referred to, adopted and made a part hereof, as if fully set out herein, with the additions, insertions, deletions and changes, if any, prescribed in Section 18-137 below.

Section 9. Chapter 18, Article VII, Section 18-134 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-134. Geographic limits.

The geographic limits referred to in certain sections of the 2018 International Fire Code are hereby established as follows:

"**Section 5704.2.9.6.1**. **Locations where above-ground tanks are prohibited**. Storage of class I and II liquids in above-ground tanks outside of buildings is prohibited within the City limits of the City of Fort Lupton, except for previously existing storage facilities which shall be subject to the exemption provided herein. New storage facilities shall be allowed only upon completion of a plan review and approval of the Fort Lupton Fire Protection District..

"**Section 5706.2.4.4**. **Locations where above-ground tanks are prohibited**. Storage of class I and II liquids in above-ground tanks outside of buildings is prohibited within the

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City limits of the City of Fort Lupton, except for previously existing storage facilities which shall be subject to the exemption provided herein. New storage facilities shall be allowed only upon completion of a plan review and approval of the Fort Lupton Fire Protection District.

"**Section 5806.2**. **Limitations**. Storage of flammable cryogenic fluids in stationary containers outside of buildings is prohibited within the boundaries of the Fort Lupton Fire Protection District, including all areas within the City of Fort Lupton except that such storage may be allowed only upon completion of a plan review and approval of the Fort Lupton Fire Protection District.

"**Section 6104.2**. **Maximum capacity within established limits**. The storage of liquefied petroleum gas within the City of Fort Lupton is prohibited except for previously existing storage facilities and except for residential barbeque tank or outdoor barbeque grills and except for propane tanks of 1000 gallons or less which are located within the City, but outside the city limits of the City of Fort Lupton , all of which shall be exempt. New storage facilities involving tanks which exceed 1000 gallons shall require approval of the Fort Lupton Fire Protection District after plan review."

The following section A101.2 of Appendix A shall be repealed and replaced, and to be known as Section A101.2:

"**A101.2 Board of appeals established**. In order to hear and decide appeals of orders, decisions or determinations made by the fire code official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be the Board of Directors of the Fort Lupton Fire Protection District. The fire code official shall be an ex officio member of said board but shall have no vote on any matter before the board. The board shall render all decisions and findings in writing to the appellant with a duplicate copy to the fire code official."

Section 10. Chapter 18, Article VII, Section 18-137 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-137. Amendments to the International Fire Code.

"Section 101.1 Title. These regulations shall be known as the Fire Code of the City of Fort Lupton, hereinafter referred to as "this code"

"Section 110.4 Violation Penalties. Persons who shall violate a provision of this code or who shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the approved construction documents or directive of the fire code official, or of a permit or certificate used under provisions of this code, shall be guilty of a misdemeanor, punishable by a fine of not more than five hundred dollars ($500.00) or imprisonment. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

"Section 112.4 Failure to Comply. Any person who shall continue any work after having been served with a Stop Work Order, except such work as that person is directed to perform to

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remove a violation or unsafe condition, shall be liable for a fine of not less than five hundred dollars ($500.00) or more than one-thousand dollars ($1000.00).

"Chapter 9. Fire Protection Systems shall be modified to include the following provisions: DEVELOPMENTS NOT SERVED BY PUBLIC WATER SYSTEM-REQUIREMENT FOR FIRE EXTINGUISHING SYSTEMS. The extension or enlargement of a platted subdivision, or the development of any platted but underdeveloped subdivision, which is not served by a public water system, shall require that each dwelling unit in such extension, enlargement, or development in a previously undeveloped subdivision shall have an automatic fire extinguishing system, which has been approved by the local fire code official."

Section 11. Chapter 18, Article VIII, Section 18-161 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-161. Adoption.

Pursuant to Title 31, Article 16, C.R.S., there is hereby adopted the 2018 International Fuel Gas Code, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795.

Section 12. Chapter 18, Article VIII, Section 18-164 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-164. Amendments to International Fuel Gas Code.

The following sections of the International Fuel Gas Code are hereby revised:

"101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"404.12 Minimum burial depth. Is amended by the addition of the following: All plastic fuel gas piping shall be installed a minimum of 18 inches (457 mm) below grade.

"404.12.1 Individual outside appliances. Is amended by the deletion of this section in its entirety.

"406.4.1 Test pressure. Is amended by replacing 3 psig with 10 psig.

Section 13. Chapter 18, Article IX, Section 18-181 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-181. Adoption.

Pursuant to Title 31, Article 16, C.R.S., there is hereby adopted the 2018 International Property Maintenance Code, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795. This code contains requirements for existing residential and commercial buildings.

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Section 14. Chapter 18, Article IX, Section 18-185 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-185. Amendments to International Property Maintenance Code.

The following sections of the International Property Maintenance Code are hereby revised:

"101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"102.3 Application of Other Codes. Is amended by the deletion of the section and is replaced with the following: "Repairs, additions or alterations to a structure, or changes of occupancy, shall be done in accordance with the procedures and provisions of the current adopted building and zoning codes."

"103.5 Fees. Is amended by the deletion of the section and is replaced with the following: "Costs incurred in the performance of work shall be paid by the jurisdiction. The legal counsel of the jurisdiction shall institute appropriate action against the owner of the premises or owner's authorized agent where the unsafe structure is or was located for the recovery of such costs."

"111.2 Membership of board. Is amended by the deletion this section in its entirety and replaced with the following: "The members of the Board of Appeals shall be comprised of the members of the Board of Adjustment."

"111.2.1 Alternate Members. Is amended by the deletion of this section in its entirety.

"111.2.2 Chairman. Is amended by the deletion of this section in its entirety.

"111.2.3 Disqualification of member. Is amended by the deletion of this section in its entirety.

"111.2.4 Secretary. Is amended by the deletion of this section in its entirety.

"111.2.5 Compensation of members. Is amended by the deletion of this section in its entirety.

"111.3 Notice of Meeting. Is amended by the deletion of this section in its entirety.

"111.4 Open Hearing. Is amended by the deletion of this section in its entirety.

"302.3 Sidewalks and Driveways. Is amended by the deletion of this section in its entirety.

"302.4 Weeds. Is amended by the deletion of this section in its entirety.

"302.8 Motor Vehicles. Is amended by the deletion of this section in its entirety.

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"304.14 Insect Screens. Is amended by the deletion of this section in its entirety.

"308 Rubbish and Garbage. Is amended by the deletion of this section in its entirety.

"309 Pest Elimination. Is amended by the deletion of this section in its entirety.

"604.2 Service. Is amended by replacing "NFPA 70" with "Electrical Code adopted by the State of Colorado."

Section 15. Chapter 18, Article X, Section 18-201 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-201. Adoption.

Pursuant to Title 31, Article 16, C.R.S., there is hereby adopted the 2018 International Existing Building Code, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795. This code covers remodel and addition projects for existing buildings.

Section 16. Chapter 18, Article X, Section 18-205 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-205. Amendments to International Existing Building Code.

The following sections of the International Existing Building Code of hereby revised:

"International Existing Building Code is amended by replacing all references to "International Fire Code" with "Adopted Fire Code".

"101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"1401.2 Conformance. Is amended by the deletion of this section in its entirety and replaced with the following: "Structures moved into or within the jurisdiction shall comply with the provision of this code for new structures."

Section 17. Chapter 18, Article XI, Section 18-221 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-221. Adoption.

Pursuant to Title 31, Article 16, Part 2, C.R.S., The International Residential Code, 2018 Edition as published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, IL 60478, Chapters 1 through 43 inclusive and Appendix Chapters G and H, is hereby adopted by reference as the City of Fort Lupton Residential Building Code as if fully set out in this Article with additions, deletions, insertions and changes as provided.

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Section 18. Chapter 18, Article XI, Section 18-225 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-225. Amendments to the International Residential Code.

The following sections of the International Residential Code are hereby revised:

"R101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"R105.1 Required. Is amended by replacing the words "building official" with 'City".

"R105.2 Work Exempt from Permit. Is amended by:
Building Exemption #1 is deleted in its entirety and replaced with "One-Story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet and the roof height does not exceed 10 feet above grade measured from a point directly outside the exterior walls of the structure." Building Exemption #2 is deleted in its entirety. Building Exemption #10 is deleted in its entirety and replaced with: "Shingle repair or replacement work not exceeding one square (100 square feet in area) of covering per building.

"105.5 Expiration. Is amended by the deletion of this section in its entirety and replaced with the following: "Every permit issued by the building official under the provisions of this code shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within 180 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 180 days. Before such work can be recommenced, a new permit shall be first obtained to do so, and the fee therefor shall be one half the amount required for a new permit for such work, provided no changes have been made or will be made in the original plans and specifications for such work, and provided further that such suspension or abandonment has not exceeded one year. In order to renew action on a permit after expiration, the permittee shall pay a new full permit fee."

"Rl08.5 Refunds. Is amended by the deletion of this section in its entirety and replaced with the following: "The City may authorize refunding of any fee paid hereunder which was erroneously paid or collected. The City may authorize refunding of not more than 80 percent (80%) of the permit fee paid when no work has been done under a permit issued in accordance with this code. The City may authorize refunding of not more than 80 percent (80%) of the plan review fee paid when an application for a permit for which a plan review fee has been paid is withdrawn or cancelled before any plan reviewing is done. The City shall not authorize refunding of any fee paid except on written application filed by the original permittee not later than 180 days after the date of fee payment."

"Rl08.6 Work commencing before permit issuance. Is amended by the deletion of this section in its entirety and replaced with the following: "Any person who commences any work on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits may be subject to an investigation fee established by the City. The amount of the investigation fee may be in the amount up to the amount of the permit fee that would

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normally be accessed for the specific type of construction activity, with any such investigation fee being in addition to all other required permit fees. The investigation fee shall be collected whether or not a permit is then subsequently issued.

"R109.1.5 IRC Other inspections. Is amended by the addition of a new subsection as follows: R109.1.5.2 Insulation Inspection of the structure shall be made following installation of the wall, ceiling and floor insulation and exterior windows and before wall coverings are installed.

"R110.4 Temporary occupancy. Is amended by the deletion of the words "building official" in the first and second sentence and replaced with 'City".

"R112.1 General. Is amended by the deletion of the last three sentences and replaced with the following: "The members of the Board of Appeals shall be comprised of the members of the Board of Adjustment."

"R112.3 Qualifications. Is amended by the deletion of this section in its entirety.

"R1l3.2 Notice of Violation. Is amended by the addition of "Notice of Violations shall be delivered in accordance with section 107 of the IPMC" after the last paragraph.

"R202 Definitions. Is amended by addition of the following: "Sleeping Room" (Bedroom) is any enclosed habitable space within a dwelling unit, which complies with the minimum room dimension requirements of IRC Sections R304 and R305 and contains a closet, an area that is useable as a closet, or an area that is readily convertible for use as a closet. Living rooms, family rooms and other similar habitable areas that are so situated and designed so as to clearly indicate these intended uses, shall not be interpreted as sleeping rooms.

"Table R301.2 (1) is filled to provide the following:

Table R301.2 (1)
Climatic and Geographic Design Criteria

Ground Snow Load	Wind Design		Seismic Design Category	Subject to Damage From			Winter Design Temp Deg. F	Ice barrier Underlayment Required	Flood Hazard	Air Freezing Index	Mean Annual Temp
	Speed (V)	Topographic effects		Weathering	Frost Line	Termite					
30psf	115	No	B	Severe	30 in.	Slight to Moderate	1	YES	26713	1000	43F

"R302.1 Exterior walls. Is amended by the deletion of the wording; "or dwellings equipped throughout with an automatic sprinkler system installed in accordance with section P2904 shall comply with table R302.1(2)."

"R302.1 (2). Is amended by deleting the section in its entirety.

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"R302.3 Two-family dwelling. Is amended by replacing "1- Hour fire-resistance rating" with "2-Hour fire-resistance rating" and by deleting exception 1.

"R302.13 Fire Protection of Floors. Is amended by the addition of exceptions 5, 6, and 7 as follows: Exception #5- For floor assemblies located over a basement or crawlspace, mechanical equipment rooms not larger than 80 square feet constructed per sections R302.13 with minimum 5/8 inch Type X gypsum wallboard on the enclosing walls and a self-closing weather-stripped solid door. Exception #6- Floor assemblies located over a basement or crawlspace, with mechanical equipment rooms not larger than 80 square feet may be constructed per Exception #4, using fire treated I joists only above furnace closet area with minimum 5/8 inch Type X gypsum wallboard on the enclosing walls and a self-closing weather stripped solid core 20 minute rated door and frame. Exception #7- For floor assemblies located over a basement or crawl space with a mechanical equipment room not larger than 80 square feet may be unprotected if a fire sprinkler head is installed in accordance with section P2904 or the International Building Code sections 903.3.1.2 or 903.3.1.3, installed within the equipment room on a domestic water loop.

"R303.4 Mechanical Ventilation. Is amended by replacing "5 air changes per hour" with "7 air changes per hour" and replacing the words "in accordance with section N1102.4.1.2" with "in accordance with section 402.4.1.2 of the International Energy Conservation Code 2012 Edition.

"R309.5 Fire sprinklers. Is amended by the deletion of this section in its entirety.

"R310.1 Emergency escape and rescue opening required. Is amended by adding the following after the first paragraph: "All windows located in basements, habitable attics and sleeping rooms shall meet all the requirements of section R310.1 through R310.2.5."
Exception #2 is amended by the deletion of the exception and its conditions.

"R310.2.1 Minimum opening area. Is amended by the deletion of the exception.

"R310.2.3 Window wells. Is amended by the addition of the following: "For all building permits issued after the effective date of the Ordinance, all escape and rescue windows requiring a window well pursuant to the International Residential Code shall comply with the dimension requirements set forth in this section, when rescue window is located in a sleeping room.

"R310.2.3.1 Ladder and steps. Is amended by the addition of the following exception to read as follows: "Exception: Only one window well ladder shall be required in an unfinished basement."

"R312.1 Guards required. Is amended by the addition of a third paragraph as follows: "All area wells, stair wells, window wells and light wells attached to any building that are located less than 36 inches (914 mm) from the nearest intended walking surface and deeper than 30 inches (762 mm) below the surrounding ground level, creating an opening greater than 24 inches (610 mm) measured perpendicular from the building, shall be protected with guardrails conforming to this section around the entire opening, or be provided with an equivalent barrier.

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Exceptions: The access side of stairways need not be protected. Area and window wells provided for emergency escape and rescue windows may be protected with approved grates or covers that comply with Section R310.4 of this code. Covers and grates may be used over stairways and other openings used exclusively for service access or for admitting light or ventilation."

"R313.1 Automatic Fire Sprinkler Systems. Is amended by the deletion of this section and is replaced with. R313.1 Townhouse automatic fire sprinkler systems. An automatic residential fire sprinkler system *may* be installed in Townhouses.

"R313.2 Automatic Fire Sprinkler Systems. Is amended by the deletion of this section and is replaced with. R313.2 One- and two-family dwellings automatic fire sprinkler systems. An automatic residential fire sprinkler system *may* be installed in one- and two-family dwellings.

"315.3 Location. Is amended by deleting the first sentence and replacing it with the following: "Carbon monoxide detection shall be installed in dwelling units within 15 feet of each separate sleeping area and on each level."

"R401.2 Requirements. Is amended by the addition of the following after the first paragraph: "Foundations shall be designed, and the construction drawings stamped by a Colorado registered design professional. The foundation design must be based on an engineer's soils report. The drawings must be noted with the engineering firm name, specific location for design and soils report number. A site certification prepared by State of Colorado registered design professional is required for setback verification on all new Group R Division 3 occupancies."

"R405.1 Concrete or masonry foundations. Is amended with the addition of the following after the first sentence: All foundation drains shall be designed and inspected by a State of Colorado registered design professional.

"Chapter 11 Energy Efficiency. Is amended by the deletion of this chapter in its entirety and replaced with the 2018 International Energy Conservation Code.

"G2415.12 Minimum burial depth. Is amended by the addition of the following: All plastic fuel gas piping shall be installed a minimum of 18 inches (457 mm) below grade.

"G2415.12.1 Individual outdoor appliances. Is amended by the deletion of this section in its entirety.

"G2417.4.1 Test pressure. Is amended by replacing 3 psig with 10 psig.

"P2503.5.1 Rough plumbing. Is amended by the deletion of the first sentence and replaced with "DWV systems shall be tested on completion of the rough piping installation by water or air without evidence of leakage."

"P2603.5.1 Sewer depth. Is amended by filling in both areas where indicated to read "12 inches (305 mm)".

"P3103.1.1 Roof extension. Is amended by replacing "6 inches" with "12 inches".

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Section 19. A new section Chapter 18, Article XII, Section 18-241 of the Fort Lupton Municipal Code is enacted as follows:

Sec. 18-241. Adoption.

Pursuant to Title 31, Article 16, C.R.S., there is hereby adopted the 2018 International Swimming Pool and Spa Code, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795. This code contains requirements for swimming pools and spas.

Section 20. Chapter 18, Article XVI, Section 18-321 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-321. - Adoption.

Pursuant to Title 31, Article 16, C.R.S., there is hereby adopted the 2018 International Energy Conservation Code, as published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, IL 60478, Chapters l through 5 inclusive, are hereby adopted by reference as the City of Fort Lupton Energy Conservation Code as if fully set out in this ordinance with the additions, deletions, insertions, and changes as follows.

Section 21. Chapter 18, Article XVI, Section 18-325 of the Fort Lupton Municipal Code is revised to read as follows:

Sec. 18-325. – Amendments to International Energy Conservation Code.

The following sections of the International Energy Conservation Code are hereby revised:

"C101.1 Title. Is amended by the addition of the term "City of Fort Lupton" where indicated.

"101.5.2 IECC Section 101.5.1 Low energy buildings. Is amended by adding Section 101.5.2 that reads as follows; Commercial structures that lack one or more of the basic amenities or utilities required for year-round occupancy or use such as a permanent heating system, insulation, and/or year-round usable plumbing.

"109.1 General. Is amended by the deletion of the last three sentences and replaced with the following: "The members of the Board of Appeals shall be comprised of the members of the Board of Adjustment."

"109.3 Qualifications. Is amended by the deletion of this section in its entirety.

"R402.4.1.2 Testing. Is amended by the deletion of this section and replacing it with the following: "The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 7 air changes per hour in Climate Zones 1 and 2, and 5 air changes per hour in Climate Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an

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approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope."

INTRODUCED, READ, AND PASSED ON FIRST READING, AND ORDERED PUBLISHED this 2nd day of November 2021.

PUBLISHED in the Fort Lupton Press the 10th day of November 2021.

FINALLY READ BY TITLE ONLY, PASSED AND ORDERED PUBLISHED BY TITLE ONLY this __ day of __ 2021.

PUBLISHED BY TITLE ONLY the _____ day of _____ 2021.

EFFECTIVE (after publication) the _ day of _ 2021

City of Fort Lupton, Colorado

_____

Zo Stieber, Mayor

Attest:

_____

Maricela Peña, City Clerk

Approved as to form:

_____

Andy Ausmus, City Attorney

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1. Adoption of ASCE 7-16

- The update includes more current IBC wind speed maps and seismic design maps.
- Chapter 16 now includes a new section dealing with tsunami loads.
- The revision in Table 1607.1 is a change in the deck and balcony Live Loads to 1.5 times that of the occupancy served.

2. New and Updated Reference Standards

- Specification for Masonry requirement 2015 IBC Standard ACI 530/ASCE 5/TMS 402-13 shall be updated to MS402-16.
- The ACI 530.1/ASCE 6/TMS 602-13 is updated to TMS 602-16.
- AISC 341-10 and 360-10 will be revised to 2016 editions.
- AISI S100-12 has already been updated to the 2016 edition.
- AISI S220-11 and S230-07 were updated to the 2015 edition.
- AISI S200, S210, S211, S212 and S214 have all been merged to a single new standard, AISI S240-15.
- AISI S213 was fragmented into the new S240 and AISI S400-15.
- And ASCE 41-13 has been revised to the 2017 edition.
- The ICC 300 and ICC 400 have been updated to 2017 editions.
- Both ANSI/NC1.0-10 and ANSI/RD1.0-10 were updated to 2017 editions.

3. Section 1607.14.2 has been included for Structural Stability of Fire Walls

This new section provides guidance to designers on designing fire walls with structural stability and includes information from 5 psf from NFPA 221.

4. Modifications of the IBC Special Inspections Approved

There are many updates to the Special Inspections that have been approved in this guideline.
The section on special inspection of fabricated items, that is, Section 1704.2.5 is now more concise and explicit.
Special inspections are no longer needed when the stated spacing of fasteners at panel edges is more than 4 inches on center – this exception to 1705.11 clarifies the point.
The special inspection requirements for structural steel seismic force-resisting systems and structural steel elements in seismic force-resisting systems were further elucidated by allowing exceptions so that systems or elements not designed in accordance with AISC 341 will be exempt from inspection using the requirements of that standard.

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5. Changes Pertaining to Storm Shelters

- 1604.11 is a new section that specifies that “Loads and load combinations on storm shelters shall be determined in accordance with ICC 500.”
- The exception has been further included which says that when a storm shelter is added to a building, “the risk category for the normal occupancy of the building shall apply unless the storm shelter is a designated emergency shelter in accordance with Table 1604.5.”
- Table 1604.5 further clarifies the type of shelters that are designated as risk category IV: “Designated emergency shelters including earthquake or community storm shelters for use during and immediately after an event.”

6. Chapter 23 Changes to the IBC Conventional Construction Requirements

Chapter 23 includes a section on anchorage of foundation plates and sills to concrete or masonry foundations. This section has reorganized the requirements by Seismic Design Category (SDC) and added a new section on anchoring: SDC E.
One significant change is that it says now that the anchor bolt must be in the middle third of the width of the plate and adds further info to the sections on higher SDCs to specify the usage of alternate anchor straps.
If these are used they should be spaced to give equivalent anchorage to the specified 1/2″- or 5/8″-diameter bolts. The second change permits single-member 2-by headers, to allow more space for insulation in a wall.

7. Modification to the Requirements for Nails and Staples in the IBC

ASTM F1667 Supplement One has been adopted. This specifies the ideal procedure for testing nails for bending-yield strength and outlines the required minimum average bending moment for staples used for framing and sheathing connections.
The new RSRS-01 nail has been included to TABLE 2304.10.1, the Fastening Schedule. To achieve the new higher component and cladding uplift forces of ASCE 7-16, the RSRS nail (a new roof sheathing ring shank nail) was developed to gain higher withdrawal resistances.
Stainless-steel nails need to comply with ASTM F1667 and use Type 302, 304, 305 or 316 stainless steel, necessarily to achieve the corrosion resistance assumed in the code.
Staples used with preservative-treated wood or fire-retardant-treated wood need to be of stainless steel.

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8. Truss-Related Code Change

Since not all trusses use metal connector plates, the information needed on the truss design drawings has been updated from “Metal connector plate type” to “Joint connection type”.

9. Code Change to Section 2304.12.2.2

This code change clarifies the cases or exceptions where posts or columns don’t have to consist of naturally durable or preservative-treated wood.
It permits the use of posts or columns that are not naturally durable or preservative-treated if they are adequately supported by concrete piers or metal pedestals projecting at least 1″ above the slab or deck, such as Simpson Strong-Tie post bases that have a one-inch standoff.

10. Code Change to IBC Appendix M

Owing to a code change from FEMA, IBC Appendix M is now specific to refuge structures for vertical evacuation from tsunami.Thus in this scenario, the tsunami hazard mapping and structural design guidelines of ASCE 7-16 will be used instead of those in FEMA P-646.

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Important Changes to the 2018 IBC for R-2 (Apartments)

	Green - Favorable Action for Multifamily Construction
	Red - Unfavorable Action for Multifamily Construction
	Yellow - Item of interest to Multifamily Construction
	Orange - Fires In Apartments Issue

Approved Items 1-53

Item No.	Proposal #	Section(s) & Issue(s)	Type of Change	Cost Implication	Comment
		IBC-Means of Egress			
1	**E25-15**	IBC 1006.3 Egress from stories or occupied roofs. & 1006.3.1 Egress based on occupant load.	Revision	No Change	**Means of Egress from Story or Roof.** Clarifies that when determining the means of egress design requirements from a story or occupied roof, each story or roof will be provided with the minimum number of exits for that specific level. The revised language clarifies that an exit access stairway cannot serve as the exits for both floors and ensures that each level is provided with the proper number of exits.
2	**E27-15**	IBC 1006.3.1 Adjacent story.	Major Change	Decrease	**Means of Egress Exception.** New exceptions have been provided to the provision which only permits the exit path of travel to pass through one adjacent story. These include exit access stairways and ramps in : - Group R-1, R-2 or R-3. - Congregate residence (R-3) and group R-4 facilities. - Parking garages. -Open-air assemblies -Exit components between press boxes, galleries or balconies and the main level of occupancies like auditoriums, sport facilities and places of religious worship.
3	**E32-15**	IBC 1008.2.2 Exit discharge & 1008.3.5 Illumination level under emergency power.	Clarification	No change	**Means of Egress Lighting.** Clarifies that the required illumination within the means of egress illumination shall not be designed such that the failure of an individual lamp in the emergency lighting fixture shall produce less than 1 foot candle level of illumination on the landing.
4	**E40-15**	IBC 1009.7.2 Separation.	New Exception	Decrease	**Reduction in Fire Rating.** New exception allows for the reduction of the 1 hour fire-resistance rating of the exterior wall assembly between the building and the exterior area of assisted rescue, provided the building is equipped throughout with either a NFPA 13 or 13R automatic sprinkler system.
5	**E82-15**	IBC 1011.6 Stairway landings.	Clarification	No Change	**Stairway Landing.** Clarification regarding the minimum requirement for 48 inches of landing in the direction of travel, when a stairway has a straight run towards the landing.
6	**E145-15**	IBC 1030.1 Emergency Escape and Rescue Openings	New Exception	Decrease	**Exception for Means of Egress.** Provides new exception for emergency escape and rescue in sprinklered R-2 and R-3 dwelling units. In sprinkler buildings the code will now permit one means of egress and one emergency escape and rescue opening or two means of egress.
7		***IBC-Fire Safety***			
8	**FS7-15**	IBC 704.2 Column protection.	New Exception	Decrease	**Light Frame Fire Protection.** In light frame construction, contractors will no longer have to provide additional protection of the framing members (individual encasement of two or more vertical studs), provided the framing members are enclosed within a fire-resistance rated wall assembly and are located between the top and bottom plates, or tracks.
9	**FS29-15**	IBC 706.2 Structural Stability	Major change	Decrease	**Fire Wall Framing.** Light frame construction practices have required fire walls to be designed to avoid damage to or structural failure of the fire wall, in the event that the structure on wither side of the fire wall should collapse. Fire walls have been required to be anchored to wall framing on either side with break away fasteners and be independent of the structure framing. This new exception allows for double framed firewalls with limited continuous sheathing from one structure to the other, provided the framing complies with NFPA 221 and the sheathing does not exceed 3/4 inch in thickness.
		IBC General			
10	**G9-15**	IBC Sleeping Unit	Revised Definition	Decrease	**Definition of Unit/Sleeping Unit.** The significance of the change in defining sleeping unit, is the use of the term unit versus room. In previous editions of the IBC, a sleeping unit was defined by the room in which the occupant had the provisions for living, eating and either sanitation or cooking. By defining the space as a unit, the code will now classify the entire unit where these features are present opening up suites found in dormitories, hotels and assisted living as sleeping units.

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11	**G24-15**	503.1.4 Occupied roofs	Major Change	Decrease	**Occupied Roof.** This is a major change for defining and classifying the appropriate use of an occupied roofs. These provisions outline the occupant loads, acceptable use groups for occupying roofs or portions thereof, establish the allowable height limitations, provide specific language and guidelines for when the occupied roof qualifies as a story. This change will create a uniform understanding for designers and code officials across the country for occupied roofs and provide the needed guidance for the determining the appropriate level of life safety for allowing the use of the roof as an occupied space.
12	**G97-15**	IBC 406.3 Private garages and carports.	Major Change	Decrease	**Private Garage.** Previously, the code required a 1,000 square foot limitation on all private garages and for each garage to be separated by 1 hour rated assemblies. Under this new provision, private garages can be built using the same provisions allowed for open parking garages when the garage is used for the private use of a tenant or occupant.
13	**G102-15**	IBC 406.6.2 Ventilation.	Clarification	No Change	**Garage Ventilation.** Clarification that enclosed parking garages must be provided with a ventilation and exhaust system in accordance with the International Mechanical Code.
14	**G118-15**	IBC 420.2 Separation walls in sleeping units.	New Exception	Decrease	**Dormitory Sleeping Unit.** The new exceptions are intended to treat sleeping rooms in dormitories, suites and assisted living spaces as one combined unit. Previously, the code required sleeping rooms to be separated from other components such as bathrooms and living spaces by a fire partition. The exceptions intend to treat these areas similar to that of an apartment and maintain separation from other units and the corridors.
15	**G121-15**	IBC 420.7 Dormitory cooking faculties.	Major Change	Decrease	**Dormitory Cooking.** This s a new requirement addressing the use of cooking facilities in dormitives in R-2 occupancies. The specifically limits to the use of domestic appliances and does not allow any cooking appliances in sleeping rooms.
16	**G130-15**	IBC 503.1, 706.1 Fire wall separation of buildings	Major Change	Decrease	**Building Separation.** Previously, the code required all buildings to be considered independent and separate from other portions of the structure when a fire wall was present. This often required the buildings on either side of the fire wall to be provided with independent means of egress, separate utilities, individual addresses, and self contained life safety systems. This change now clarifies that the fire wall is only provided to ensure that the portions of the building separated by the fire wall is to solely limit the height and area of the building into individual compartments that do not exceed the limitations established by the code.
17	**G138-15**	IBC 505.2.1 Mezzanines in residential	Revision	No Change	**Mezzanine Area Increase.** The change increases the allowable area for mezzanines from 1/3 to 1/2 of the area of the floor below.
18	**G160-15**	IBC 510.2 Horizontal building separation allowance.	New Option	No Change	**Vertical Offset in Pedestal Buildings.** Change revises the option for pedestal buildings allowing a vertical offsets in pedestal buildings if the fire-resistance rating of the vertical offset is not less than 3 hours.
19	**G175-15**	IBC 602.3, 602.4.1 Fire-retardant-treated wood in exterior walls.	Clarification	No Change	**Fire-Retardant Treat Wood.** Previous editions of the building code allowed fire-retardant-treated wood within 2-hour fire-rated exterior walls assemblies, yet was silent on wood sheathing. Language was added to clarify that wood sheathing must also be treated with fire-retardant chemicals in order to be used as part of the 2-hour fire rated assembly.
20	**G185-15**	IBC 603.1 Allowable combustible materials for balconies, porches and decks.	New Option	No Change	**Use of Fire-Retardant Treat Wood.** This change adds a new option that allows fire-retardant-treated wood to be used on balconies, porches, decks and exterior stairways that are not used as required exits on buildings three stores or less above grade plane.
21	**G195-15**	IBC 3001.2 (New) Emergency communication for the deaf, hard of hearing and speech impaired	Major Change	Increase	**Two-way Communications.** This significant change in the building code addresses a gap in the emergency two-way communication that is currently provided in elevators for individuals who are deaf, hard of hearing or speech impaired. Under the 2018 IBC, all new elevators will be required to provide emergency communication devices capable of visual and text-based communication and video-based interactive capability to assist those individuals unable to use the current emergency communication systems provided. Based on the limited information provided for the devices in the code and no reference to a performance standards, building owners, designers and elevator provider should first seek the approval by the authority having jurisdiction for any devices or systems prior to installation.
22	**G201-15**	IBC 3006.2.1 Elevator hoist way opening into Rated corridors	Clarification	No Change	**Elevator Lobbies.** In previous editions of the code, there was a lack of clarity on whether the elevator hoist way opening was considered protected by the enclosed lobby, when the hoist way opened into a fire resistant rated corridor. The new language clarifies that it is the intent of the code to require opening protection to the hoist way, even when the elevator opens into an enclosed elevator lobby.

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23	**G202-15**	IBC 405.4.3, 708.1, 716.5.9.3, [F] 907.5.2.1 (IFC 907.5.2.1), 3006.4, 3007.6, 3007.6.1, 3007.6.3, 3007.9, 3007.9.1, 3008.6 Enclosed elevator lobby.	Clarification	No Change	**Elevator Lobby When Required.** This is a multi-sectional clarification throughout the IBC to clarify when an enclosed elevator lobby is required.
24	**G203-15**	IBC 3007.1 Fire service access elevator	Major Change	Decrease	**Fire Service Access Elevators.** The change consists of two parts, with the first reducing the number of floors served by the Fire Service Access Elevators (FSAE) to those floors above and including the lowest level of the building that provides fire department vehicle access. The second part of the change, is elevators that only serve an open or enclosed parking garage with access limited to the building lobby are no longer required to be constructed as a FSAE.
25	**G204-15**	IBC 3007.3 Water protection of hoist way	Clarification	No Change	**Water Protection of Hostway.** Clarification that the intent of this section is preventing water from outside the enclosed lobby from entering the elevator hoist way.
26	**G207-15**	IBC 3008.1, 3008.1.1 & 3008.8 Occupant evacuation elevators	Major Change	Decrease	**Occupant Evacuation Elevators.** This change significantly affects the required number, use and design of occupant evacuation elevators in three ways. First, it clarifies that only the elevators to be used for occupant evacuation need to comply with this section of the code, where as the code previously required all passenger elevators in the building had to comply. Second, it adds two option for determining the proper number of occupant evacuation elevators to be installed (1-hour total building evacuation or 5 consecutive floors in 15 minutes). Lastly, the code clarifies that only those elevators classified and used as occupant evacuation elevators shall be provided with stand by power.
27	**G208-15**	IBC 3008.1, 3008.6.1 Occupant evacuation elevators	New Exception	Decrease	**Occupant Evacuation Elevator in Parking Garages.** This exception exempts elevators that serve open and enclosed parking garages from be designed to the requirements for occupant evacuation elevators.
28	**G229-15**	IBC 3310.1 Stairways during construction	Clarification	Increase	**Stairways During Construction.** Previously, the code required that when a building reached 50 feet, either a temporary or permanent stair must be provided. Moving forward, all buildings under construction must provide the temporary or permanent stairway when the building reaches 40 feet and the required standpipe must be located in this stairway.
		Existing Building			
29	**EB13-15**	IEBC Section New Section 301.1.5 Accessibility	Major Change	Decrease	**Accessibility Exemption for Existing Buildings.** This significant change addresses the various changes that have been approved for the 2015 edition of the ANSI A117.1 Accessible & Useable Building & Facilities standard. These changes include increased clear floor space for wheeled mobility devices from 30"x 48" to 30" x 52". The increase affects corridor widths at turns, turns around objects, navigating bathroom stalls and increasing the turn around space from 60" to 67" diameter. While these changes require additional space and can more easily be incorporated into new construction, the affect that these changes would have had on existing buildings would have been detrimental. This new section clarifies that for existing buildings are required to maintain the accessible features within the building and that the accessible requirements must meet the 2009 edition of the A117.1 standard.
30	**EB16-15**	IEBC Section 401.2.4	Major Clarification	Decrease	**Decrease of Fire Resistance Rating.** Previously, the IEBC allowed under the work area method that the fire resistance rating of building elements could be decreased in buildings that were protected throughout with an automatic suppression system in accordance with NFPA 13 or NFPA 13R, when approved by the Authority Having Jurisdiction. The 2018 edition of the IEBC will allow this same reduction, when building owners or designers elects to use the Prescriptive method.
31	**EB21-15**	IEBC Section 402.6 Carbon monoxide detection existing buildings	Major Change	Increase	**Carbon Monoxide Alarms.** The change essentially places a cross reference in the IEBC to the existing requirements in the IFC for installation of carbon monoxide alarms. Any addition to an I-1, I-2, I-4 or R occupancy will require the installation of carbon monoxide detectors in the entire structure.
32	**EB28-15**	IEBC Section 405.5 Exception for opening protection	New Exception	Decrease	**Opening Protection.** In previous editions of the IEBC, only when the building owner or designer elected to use the work area method were they allowed to omit opening protection along the fire escape when the building was equipped with an automatic suppression system throughout. This new exception provides the same exception when the prescriptive method is used.
33	**EB39-15**	IEBC Sections 410.6 Type B unit exception	Major Revision	Increase	**Type B Dwelling and Work Area.** In the previous editions of the code Type B dwelling units were not required to comply with the accessibility requirements when a building had a change of occupancy. The exception will now only be permitted with the work area is 50 percent or less of the aggregate area of the building.

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34	**EB40-15**	IEBC Section 410.8.1, 705.1.1 Accessible entrance	Minor Clarification	No Change	**Accessible Entrance.** Under both the prescriptive and the work area method, the new language has been revised to clarify that were an inaccessible entrance is being altered, it shall not have to meet the accessible features, provided there is another accessible entrance into the building.
35	**EB49-15**	IEBC Sections 410.8.11 (New), 806.3 (New)	Major Change	Increase	**Accessible Bathroom.** In the 2018 edition of the IEBC, both mercantile and assembly occupancies and recreational facilities will have to provide an accessible family/unisex bathroom in addition to any other required toilet and bathing facilities, when an existing building undergoing an addition or alteration includes the addition of any number of toilet fixtures.
36	**EB61-15**	IEBC Section 904.2 Automatic sprinkler requirement Level III alterations	Major Change	Increase/Decrease	**Sprinkler Requirements Level III Alterations.** Beginning in the 2018 IEBC, all level III alterations in buildings which include a work area that has more than 30 occupants sharing an exit or corridor shall be require to install an automatic suppression system where there is sufficient water to the site and where a sprinkler system would be required under the IBC. At the same time, section 804.2 which contained similar requirements for level II alterations was deleted.
37	**EB65-15**	IBCC Section 906.2	Major Change	No Change	**Specific Date for Type B Dwelling Unit Compliance.** Clarifies and ties alterations of Type B units to only being required to comply with A117.1 to the HUD Fair Housing Accessible Guidelines to buildings that were constructed after March 14, 1991.
		Administrative Changes			
38	**ADM82 -16 Part I**	Part I: IBC: [A] 110.1; IEBC: [A] 109.1; IFC: [A] 106.3; IFGC: [A] 107.1; IMC: [A] 107.1; IPC: [A] 107.1; IPSDC: [A] 107.1.1; ISPSC: [A] 106.1; IWUIC: [A] 109.1.1 Part II: IECC-CE: C104.1 Part III: IECC-RE: R104.1	Clarification	No Change	**Inspection Exposure.** Revise language regarding inspections and the need for certain phases of construction to be left exposed prior to concealment. The code currently uses the term accessible in two ways, the first is in reference to individuals with disabilities and the other is in a way to allow easy or immediate access to equipment or systems
39	**ADM94**	Reference Standards	Update	Increase/Decrease	**Standards Update.** ADM94 updated the reference to latest editions of the standards referenced in the ICC codes. Cost increase or decrease will depend on the changes made to the individual standard.
40	**ADM94**	ASTM 7-16	Update	Increase	**Structural Loading.** Update of ASCE 7 increases the design loads and expands in some cases the seismic design areas.
		Energy Code- Commercial			
41	**CE196-16**	C405.2.4	Change	Increase	**Exterior Time-Switch.** Adds new requirement for a programmable exterior time-switch control for exterior lighting that has a clock that is not less than 7 day programmable, incorporates an automatic holiday setback feature and program backup capabilities that prevent the loss of programming.
		International Fire Code			
42	**F6-16**	IFC 304.3.3	Clarification	No change	**Dumpsters in Buildings.** Clarifies the exceptions for dumpster and containers inside and adjacent to buildings where protected by automatic sprinkler systems.
43	**F56 -16**	510.4.2.3, 604.2.3, IBC [F] 2702.2.3	Major Change	Decrease	**Stand-by Power.** Revises the duration for stand-by power to the emergency responders communication to last a minimum of 12 hours versus the 24 hours currently required under the 2015 IFC.
44	**F57 -16**	510.4.2.3, 604.2.3; IBC [F] 2702.2.3	Major Change	No change	**Stand-by Power.** Revises the duration for stand-by power to the emergency responders communication to last a minimum of 12 hours versus the 24 hours currently required under the 2015 IFC.
45	**F59 -16**	IFC: 510.4.2.5, 510.4.2.5 (New).	Major Change	Increase	**Monitoring Emergency Radio.** Adds new requirements for the monitoring the emergency radio enhancement system by a listed fire alarm control unit or by an audible signal at a constantly attended on-site location.
46	**F85-16 Part I**	IFC: 605.11, 605.11.1, 605.11.1.1, 605.11.1.2, 605.11.1.2.1, 605.11.1.2.1 (New), 605.11.1.2.2, 605.11.1.2.2 (New), 605.11.1.2.2.1 (New), 605.11.1.2.3, 605.11.1.2.4, 605.11.1.2.5, 605.11.1.3, 605.11.1.3.1, 605.11.1.3.2, 605.11.1.3.3, 605.11.2.	Major Change	Depends	**Fire Fighter Safety - Solar Panels.** Revises the provisions related to fire fighter safety in and around solar photovoltaic systems when installed in residential and non-residential occupancies. The 2018 code will now require a minimum of 4'-0'' pathways around all PV panels to allow firefighter access to conduct rooftop operations for smoke extraction and by providing 4'x8' clear areas every 20'-0" along the pathways to provide venting cutouts.

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47	F172-16	New IBC 903.3.1.2.3	Major Change	Increase	**Pedestal Construction - Fire Protection.** New provision in code tied directly to pedestal construction with Type III, IV and V construction if the roof assembly is located more than 55 feet above the fire department access. The change was submitted and approved in lieu of the numbers proposal submitted as a means to address the issue in other ways by limiting the hight of these types of buildings, requiring full NFPA 13 sprinklers systems, additional access roads, etc. Pedestal buildings constructed to the 2018 IBC will have to include one of the following: Sprinkler Protection in Attics Attic Built of Non-Combustible Construction Attics to be Built of Fire-Retardant-Treat Wood, or Attic Filled with Non-Combustible Insulation.
48	F197-16	907.2.13.3 (New) (IBC [F] 907.2.13.3 (New))	Major Change	Increase	**Alarm Systems.** Adds language to require multi-channel notifications in the alarm systems of high-rise buildings, in lieu of single channel systems.
49	F213-16	IBC and IFC 907.2.9.1	New Exception	Unknown	**Fire Alarm Technology.** Inserts into the code provisions to allow for new technology when fire alarm systems are required
50	F228-16	IBC 105.7.19 (New)	New Requirement	Increase	**Mass Notification Systems.** Adds requirements for when mass notification systems must be installed, tested and maintained per NFPA 72 in new Group B and college-university buildings in Group B, A, and R-2.
51	F247-16	1104.18, Table 1104.18	Clarification	No change	**Length of Dead-end Corridors.** The code change removes a conflict regarding the allowable length of dead-end corridors currently permitted under the IEBC. The code change correlates the IFC with the provisions from the IEBC for existing conditions in existing buildings and clarifies that all new or altered corridors must meet the requirements established for new construction.
52	F327-16	IFC: 3304.5, 3304.5.1 (New), 3304.5.2 (New), 3304.5.3 (New), 3308.1, 3308.1 (New), 3308.2, 3308.3, 3308.4, 3308.5, 3308.6, 3308.7, 3309.1, 3309.2 (New).	Major Change	Increase	**Fire Watch Duties.** Adds new language extending the duties and responsibilities of fire watch personnel and fire watch plan or recordation.
53	F329-16	3304.5.1 (New); IBC 3314 (New), [F] 3314.1	Major Change	Increase	**Fire Watch at 40 feet.** Adds new language requiring all construction projects dealing with combustible materials to employ a fire watch when the structure exceeds 40 feet in height.

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54	ADM94-16	ICC A117.1	Major Change	Increase	**Accessibility.** Accessibility and Usable Buildings and Facilities Standard which increases the turning circle from 60" to 65" and the clear floor space from 32"x48" to 32"x52". The increase areas have a major impact on other requirements such as T-turn, and knee and toe clearance. Final version applies to all new construction except buildings and Type B dwelling units.
55	G144-16		Major Change	Increase	**Allowable Height and Area.** The proposal would limit the building height and area doing away with the incentives in the code to encourage the use of sprinklers.
56	G162-16	IBC 510.2	Major Change	Increase	**Lot Line Construction Separation.** Require that Type V (wood frame) buildings with combustible structural elements above the building horizontal separation be separated from lot lines and buildings of the same lot by not less than 50 feet.
57	G171-16	IBC 602.1 and others	Major Change	Increase	**Fire Resistance Rating.** Approval would require a 1-hour rating of all exterior walls of buildings with Type IIB, IIIB, and VB construction in Seismic Design Categories C and D.
58	G209-16	IBC 202 and others	Appendix	Appendix	**Radon Mitigation.** Proposal places radon mitigation provisions based on the provisions in the IRC in the appendix of the IBC. Although the proponent had data showing that radon is a potential problem they have no data supporting the need for radon mitigation requirements in any building other than in the basement of single family occupancies in high radon areas.
59	G228-16	IBC 3304.2 new	Major Change	Increase	**Fire Department Access.** Require combustible buildings four or more stories in height to have a vehicle access plan for firefighters submitted and approved by the fire department prior to construction. Requires access to all sides of the building which could not be done if the building is next to another building or other items such as a lake.
60	G232-16	IBC 3314 new	Major Change	Increase	**Safeguards During Construction.** Approval would require fire watch during non-working hours. Provisions for safeguards during construction are already in the code.

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61	**G236-16**	N101 new	Appendix	Appendix	**Building Resiliency.** Place in the Appendix provisions for enhanced building resilience which limit the height and area of buildings in disasters associated with fires, flooding, high winds and earthquakes.
62	**M46-16**	M 505.2	Change	Increase	**Make Up Air Dampers.** Require gravity of barometric dampers on residential exhaust hood systems.
63	**F37-16**	IFC 503.1.2	Major Change	Increase	**Fire Department Access Roads.** Require 2 fire department access roads for buildings of Type III, IV and V construction that are 4 or more stories in height.
64	**F201-16**	IFC 907.2.9.1 IBC 907.2.9.1	Change	Increase	**Manual Fire Alarms.** Lower the requirement for manual fire alarms from 3 stories to 2 stories.
65	**F333-16**	IBC 3310.1	Major Change	Increase	**Access Roads During Construction.** Adds language for the protection, use and design of access roads during all phases of construction.
66	**F336-16**	IBC 23314.2 new	Major Change	Increase	**Sprinkler Installation During Construction.** Adds language that would prevent construction in combustible buildings not to exceed 40 feet until the sprinkler system is installed and operational in the stories below.
67	**CE105-16**	C 402.5	Major Change	Increase	**Whole Building Air-Leakage Testing.** Require whole building air leakage testing of commercial and multifamily buildings based on building size, climate zone, building use and the floor area of the conditioned space.
68	**CE107-16**	C 402.1	Change	Increase	**Air-Barrier Commissioning.** Adds additional requirements for commissioning the air-barrier that is duplicative to the inspection conducted by the code official.
69	**CE144-16**	C 403.2.6.3	Change	Increase	**Mechanical Ventilation.** Require mechanical ventilation of all dwelling units.
70	**CE222-16**	C 405.8	Major Change	Increase	**Benchmarking.** Require energy monitoring to measure, record and report energy consumption of buildings with a gross conditioned floor area over 25,000 square feet and to report energy consumption in numerous end-use categories.
71	**CE229-16**	C 406.1 new	Change	Increase	**Car Charging.** Require conduits for future installation of automobile charging stations.
72	**CE232-16**	C 406.1	Major Change	Increase	**Building Energy Efficiency.** Increase the required efficiency options from one to two.
73	**CE272-16**	New Sections	Major Change	Increase	**In Energy Code Move All R-2 (Apartments) Requirements to One Section.** The proposal combines the requirements for R-2 occupancies into one section to supposedly eliminate confusion without any increase in stringency. In fact it did just the opposite by taking the most stringent provisions for buildings less than 3-stories in height and those more than 4-stories in height.

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AMENDED IRC-2012	IRC-2015	IRC-2018
	CHAPTER 1 SCOPE AND ADMINISTRATION	
	R101.2 Scope. The provisions of the International Residential Code for One- and Two-family Dwellings shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location. Removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade plane in height. **Exceptions:** 1. Live/work units located in townhouses and complying with the requirements of Section 419 of the International Building Code shall be permitted to be constructed in accordance with the International Residential Code for One- and Two-Family Dwellings~~.built as one and two-family dwellings or townhouses~~. Fire suppression required by Section 419.5 of the International Building Code when constructed under the International Residential	**R101.2 Scope.** **Exceptions:** 1. Live/work units located in townhouses and complying with the requirements of Section 419 of the International Building Code. ~~shall be permitted to be constructed in accordance with the International Residential Code for One- and Two-Family Dwellings. Fire suppression required by Section 419.5 of the International Building Code when constructed under the International Residential Code for One- and Two-family Dwellings shall conform to Section P2940.~~ ~~2.~~ Owner-occupied lodging houses with five or fewer guestrooms. ~~shall be permitted to be constructed in accordance with the International Residential Code for One- and Two-family Dwellings where equipped with a fire sprinkler system in accordance with Section P2904.~~ 3. A care facility with five or fewer persons receiving custodial care within a dwelling unit. 4. A care facility with five or fewer persons receiving medical care within a dwelling unit. 5. A care facility for five or fewer persons receiving care that are within a single-family dwelling unit.

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AMENDED IRC-2012	IRC-2015	IRC-2018
	Code for One- and Two-family Dwellings shall conform to Section P2940.	
	R104.8.1 Legal defense. New section.	
	R104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code. Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code. Where the alternative material, design or methods of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. ~~in lieu of~~	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	~~specific requirements of this code shall also be permitted as an alternate.~~	
	R105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas. Add: For the purpose of this determination, a substantial shall mean any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the building or structure to its predamaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following: 1. Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions. 2. Any alteration of a historic building or structure, provided that the alteration will not preclude the continued designation as a historic building or structure. For the purposes of this exclusion, a	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	historic building shall be any of the following: 2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places. 2.2. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a distinct preliminarily determined to qualify as an historic district. 2.3. Designation as historic under a state or local historic preservation program that is approved by the Department of Interior.	
	R106.1.3 Information on braced wall design. New section inserted.	
	CHAPTER 2 DEFINITIONS	
		R202 ACCESS (TO). That which enables a device, an appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, door or similar obstruction.
	R202 ACCESSORY STRUCTURE. A structure that is accessory to and incidental to that	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	of the dwelling(s) and that is located on the same lot.	
	R202 ALTERNATING TREAD DEVICE. A device that has a series of steps between 50 and 70 degrees (0.87 and 1.22 rad) from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.	
		R202 APPROVED SOURCE. An independent person, firm or corporation, approved by the building official, who is competent and experienced in the application of engineering principles to materials, methods and systems analysis.
		R202 BATTERY SYSTEM, STATIONARY STORAGE. A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls and associated electrical equipment designed to provide electrical power to a building. The system typically used to provide standby and emergency power, an uninterruptable power supply. Load shedding, load sharing or similar capabilities.
	R202 BUILDING-INTEGRATED PHOTOVOLTAIC PRODUCT. A building product that incorporates photovoltaic modules and functions as a component of the building envelope.	
		R202 CARBON MONOXIDE ALARM. A single- or multiple-station alarm intended to detect carbon

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		monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.
		R202 CARBON MONOXIDE DETECTOR. A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.
		R202 CHANGE OF OCCUPANCY. A change in the use of a building or portion of a building that involves a change in the application of the requirements of this code.
	R202 CIRCULATING HOT WATER SYSTEM. a specifically designed water distribution system where one or more pumps are operated in the service of hot water piping to circulate heated water from the water-heating equipment to fixtures and back to the water-heating equipment.	
	R202 CLIMATE ZONE. A geographical region based on climatic criteria as specified in this code.	
		R202 COLLAPSIBLE SOILS. Soils that exhibit volumetric reduction in response to partial or full weight wetting under load.
	R202 COLLECTION PIPE. Unpressurized pipe used within the collection system that drains on-site nonpotable water or rain-water to a storage tank by gravity.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
		R202 COMPRESSIBLESOILS. Soils that exhibit volumetric reduction in response to the application of load even in the absence of wetting or drying.
	R202 CONTINUOUS INSULATION (ci). Insulating material that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.	
		R202 CRAWL SPACE. An underfloor space that is not a basement.
	R202 CROSS-LAMINATED TIMBER. A prefabricated engineered wood product consisting of not less than three layers of solid-sawn lumber or structural composite lumber where the adjacent layers are cross-oriented and bonded with structural adhesive to form a solid wood element.	
	R202 DIRECT SYSTEM. A solar thermal system in which the gas or liquid in the solar collector loop is not separated from the load.	
	R202 DRAIN-BACK SYSTEM. A solar thermal system in which the fluid in the solar collector loop is drained from the collector into a holding tank under prescribed conditions.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	R202 ENGINEERED WOOD RIM BOARD. A full-depth structural composite lumber, wood structural panel, structural laminated timber or prefabricated wood I-joist member designed to transfer horizontal (shear) and vertical (compression) loads, provide attachment for diaphragm sheathing, siding and exterior deck ledgers and provide lateral support at the ends of floor or roof joists or rafters.	
	R202 ERI REFERENCE DESIGN. A version of the rated design that meets the minimum requirements of the 2006 International Energy Conservation Code.	
		R202 EXPANSIVE SOILS. Soils that exhibit volumetric increase or decrease (swelling or shrinking) in response to partial or full wetting or drying under load.
	R202 FACTORY-MADE AIR DUCT. A listed and labeled duct manufactured in a factory and assembled in the field In accordance with the manufacturer's instructions and conditions of listing.	
		R202 FENESTRATION, VERTICAL. Windows that are fixed or movable, opaque doors, glazed doors, glazed block and combination opaque and glazed doors installed in a wall at less than 15 degrees from vertical.

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AMENDED IRC-2012	IRC-2015	IRC-2018
	R202 FIBER-CEMENT (BACKERBORD, SIDING, SOFFITT, TRIM AND UNDERLAYMENT) PRODUCTS. Manufactured thin section composites of hydraulic cementitious matrices and discrete nonasbestos fibers.	
	R202 FLEXIBLE AIR CONNECTOR. A conduit for transferring air between an air duct or plenum and an air terminal unit, an air inlet or air outlet. Such conduit is limited in its use, length and location.	
		R202 FULL-OPEN VALVE. A water control or shutoff component in the water supply system piping that, where adjusted for maximum flow, the flow path through the component's closure member is not a restriction in the component's through-flow area.
	R202 GYPSUM BOARD. The generic name for a family of sheet products consisting of a noncombustible core primarily of gypsum with paper surfacing. Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board and water-resistant gypsum backing board complying with the standards listed in Section R702.3 and Part IX of this code are types of gypsum board.	
	R202 HISTORIC BUILDINGS. Buildings that are listed in or eligible for listing in the National Register of Historic Places, or	**R202 HISTORIC BUILDINGS.** A building or structure that is one or more of the following:

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AMENDED IRC-2012	IRC-2015	IRC-2018
	designated as historic under an appropriate state or local law.	1. Listed, or certified as eligible for listing, by the State Historic Preservation Officer or Keeper of the National Register of Historic Places in the National Register of Historic Places. 2. Designated as historic under an applicable state or local law. 3. Certified as a contributing resource within a National Register-listed, or a state-designated or locally designated historic district. ~~Buildings that are listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law.~~
		R202 IMPACT PROTECTIVE SYSTEM. Construction that has been shown by testing to withstand the impact of test missiles and that is applied, attached, or locked over exterior glazing.
	R202 INDIRECT SYSTEM. A solar thermal system in which the gas or liquid in the solar collector loop circulates between the solar collector and a heat exchanger and such gas or liquid is not drained from the system or supplied to the load during normal operation.	
	R202 INSULATED VINYL SIDING. A vinyl cladding product, with manufacturer-installed insulating material as an integral part of the cladding product, having a minimum R-value of R-2.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	R202 INSULATED VINYL SIDING. A vinyl cladding product, with manufacturer-installed foam plastic insulating material as an integral part of the cladding product, having a thermal resistance of not less than R-2.	
International Electrical Code. The Electrical Code, whether the National Electrical Code or the International Electrical Code, as amended and adopted by the local jurisdiction.		
International Mechanical Code. The Mechanical Code, whether the Uniform Mechanical Code or the International Mechanical Code as amended and adopted by the local jurisdiction.		
International Plumbing Code. The Plumbing Code, whether the Uniform Plumbing Code or the International Plumbing Code, as amended and adopted by the local jurisdiction.		
International Fuel Gas Code. The Fuel Gas Code, whether NFPA 54 or the International Fuel Gas Code, as amended and adopted by the local jurisdiction.		
		R202 LOCKING-TYPE TAMPER-RESISTANT CAP. A cap designed to be unlocked by a specially designed tool or key to prevent the removal of the cap by means of hand-loosening or by commonly available tools.
	R202 MECHANICAL JOINT.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	1. A connection between pipes, fittings or pipes and fittings that is not welded, brazed, caulked, soldered, solvent cemented or heat-fused. 2. A general form of gas-or liquid-tight connections obtained by the joining of parts through a positive holding mechanical construction such as, but not limited to, flanged, screwed, clamped or flared connections.	
	R202 NAILABLE SUBSTRATE. A product or material such as framing, sheathing or furring, composed of wood or wood-based materials, or other materials or fasteners providing equivalent fastener withdrawal resistance.	
	R202 ON-SITE NONPOTABLE WATER REFUSE SYSTEMS. Water systems for the collection, treatment, storage, distribution and reuse of nonpotable water generated on site, including but not limited to greywater systems. This definition does not include rainwater harvested systems.	
	R202 PHOTOVOLTAIC MODULE. A complete, environmentally protected unit consisting of solar cells. Optic and other components, exclusive of a tracker,	

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	designed to generate DC power where exposed to sunlight.	
	R202 PHOTOVOLTAIC PANEL. A collection of photovoltaic nodules, mechanically fastened together, wired and designed to provide a field-installable unit.	
	R202 PHOTOVOLTAIC PANEL SYSTEM. A system that incorporates discrete photovoltaic panels that convert solar radiation into electricity, including rack support systems.	
	R202 PHOTOVOLTAIC SHINGLES. A roof covering that resembles shingles and that incorporates photovoltaic modules.	
	R202 PALSTIC COMPOSITE. A generic designation that refers to wood-plastic composites and plastic lumber.	
	R202 POLYPROPYLENE SIDING. A shaped material, made principally from polypropylene homopolymer, or copopolymer, that in some cases contains fillers or reinforcements, that is used to clad exterior walls or buildings.	
	R202 RECLAIMED WATER. Nonpotable water that has been derived from the treatment of waste water by a facility or system licensed or permitted to produce water meeting the jurisdiction's water requirements for its intended uses. Also know as "Recycled Water".	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	R202 REFLECTIVE DUCT INSULATION. A thermal insulation assembly consisting of one or more surfaces that have emittance of 0.1 or less, and that bound an enclosed air space or spaces.	
		R202 ROOF COATING. A fluid-applied, adhered coating used for roof maintenance or roof repair, or as a component of a roof covering system or roof assembly.
	R202 ROOF REPLACEMENT. The process of removing the existing roof covering, repairing any damages substrate and installing a new roof covering.	
	R202 SHINGLE FASHION. A method of installing roof or wall coverings, water-resistive barriers, flashing or other building components such that upper layers of material are placed overlapping lower layers of material to provide drainage and protect against water intrusion at unsealed penetrations and joints or in combination with sealed joints.	
	R202 SKYLIGHT AND SLOPED GLAZING. Glass or other transparent or translucent glazing material installed at a slope of 15 degrees (0.26 rad) or more from vertical. Glazing materials in skylights, including unit skylights, tubular daylighting devices, solariums, sunrooms, roofs and sloped walls are included in this definition.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	R202 SKYLIGHT UNIT. A factory assembled, glazed fenestration unit, containing one panel of glazing material, that allows for natural daylighting through an opening in the roof assembly while preserving the weather-resistant barrier of the roof.	
	R202 STAIRWAY, SPIRAL. A stairway with a plan view of closed circular form and uniform section-shaped treads radiating from a minimum-diameter circle.	
	R202 TUBULAR DAYLIGHTING DEVICE (TDD). A nonoperable fenestration unit primarily designed to transmit daylight from a roof surface to an interior ceiling via a tubular conduit. The basic unit consists of an exterior glazed weatherproof surface, a light-transmitting tube with a reflective interior surface, and an interior-sealing device such as translucent ceiling panel. The unit may be factory assembled, or field assembled from a manufactured kit.	
		R202 VAPOR DIFFUSION PORT. A passageway for conveying water vapor from an unvented attic to the outside atmosphere.
	R202 WASTE RECEPTOR. A floor sink, standpipe. Hib drain or a floor drain that receives the discharge of one or more indirect waste pipe.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
Whole-House Mechanical Ventilation System. An exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air for outdoor air when operating continuously or through a programmed intermittent schedule to satisfy the whole-house ventilation rate. ~~For definition applicable in Chapter 11, see NI 101.9.~~		
	R202 WINDBORNE DEBRIS REGION. Areas within hurricane-prone regions located in accordance in accordance with one of the following: 1. Within 1 mile (1.61 km) of the costal mean high water line where the ultimate design wind speed, V_{alt} is 130 mph (58 m/s) or greater. 2. In areas where the ultimate design wind speed , V_{ult} is 140 mph (63.6 m/s) or greater, or Hawaii.	
	CHAPTER 3 BUILDING PLANNING	
	R301.2.1.1 Wind limitations and wind design required. **Exceptions:** Add 3. Fire cold-formed steel light-frame construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R505, R603 and R804.	
	R301.2.1.1.1 Sunrooms. New section.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
TABLE R301.2(1) Amend Table R301.2(1) to read as follows:	**TABLE R301.2(1)** Revised.	
	TABLE R301.2(2) revised.	
	TABLE R301.2(3) revised.	
	FIGURE R301.2(4)A revised.	
	FIGURE R301.2(4)B revised.	
	FIGURE R301.2(7) revised.	
	R301.2.1.2.1 Application of ASTM E 1996. New section.	
	TABLE R301.2.1.3 revised.	
		R301.2.2 Seismic provisions. Buildings in Seismic Design Categories C, D_0,D_1, and D_2 shall be constructed in accordance with the requirements of this section and other seismic requirements of this code. The seismic provisions of this code shall apply as follows; 1. Townhouses in Seismic Design Categories C, D_0, D_1 and D_2. 2. Detached one- and two-family dwellings in Seismic Design Categories D_0, D_1 and D_2. Buildings in Seismic Design Category E shall be designed to resist seismic loads in accordance with the International Building Code, except where the seismic design category is reclassified to a lower seismic design category in accordance with Section R301.2.2.1. Components of buildings not required to be designed to resist seismic loads shall be constructed in accordance with the provisions of this code.
	R301.2.2.2.1 Weights of materials.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	Exceptions: Revise 1. Roof and ceiling dead loads not exceeding 25 pounds per square foot (1190 Pa) shall be permitted provided the wall bracing amounts in Section 602.10.3 are increased in accordance with Table R602.10.3(4). ~~Chapter 6 are increased in accordance with Table R301.2.2.2.1.~~	
		R301.2.2.5 Concrete construction. **Exception:** Detached one- and two-family dwellings in Seismic Design Category C with exterior above-grade concrete walls are allowed to comply with the requirements of Section R608.
	R301.3 Story height. Revise 1. For wood wall framing, the story height shall not exceed 11 feet 7 inches (3531 mm) and the laterally unsupported bearing ~~nearing~~ wall stud height permitted by Table R602.3(5) ~~plus a height of floor framing not to exceed 16 inches (406 mm~~). ~~**Exception.**~~ Deleted. Revise 2. For cold-formed steel wall framing, the story height shall not be more than 11 feet 7 inches (3531 mm) and the unsupported bearing wall clear height shall be not more than ~~a stud height of~~ 10 feet (3048 mm~~), plus a height of floor framing not to exceed 16 inches (406 mm).~~ . Revise 3. For masonry walls, the story height shall be not more than 13 feet 7 inches (4140 mm) and the bearing wall clear height shall be not greater than ~~a maximum bearing wall clear height of~~ 12 feet (3658 mm) ~~plus a~~	

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	~~height of floor framing not to exceed 16 inches (406 mm~~). Exception: An additional 8 feet (2438 mm) is permitted for gable end walls. Revise 5. For structural insulated panel (SIP) walls, the story height shall not be greater than 11 feet 7 inches (3531 mm) and the ~~maximum~~ bearing wall height per story as permitted by Section R610 ~~R613~~ tables shall not 10 feet (3048 mm) ~~plus a height of floor framing no to exceed 16 inches (406 mm)~~.	
	TABLE R301.7 Revised.	
SECTION R302.2 TOWNHOUSES		
Section R302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance rated wall assemblies meeting the requirements of Section R302.1 for exterior walls. **Exceptions:** 1. A common 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 id permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall, Electrical installations shall be installed I accordance with Chapters 33 through 42. Penetrations of electrical outlet boxes shall be installed in accordance with Section R302.4.	**R302.2 Townhouses.** Common walls separating townhouses shall be assigned a fire-resistance rating in accordance with Section R302.2, Item 1 or 2. The common wall shared by two townhouses shall be constructed without plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4. ~~Each townhouse shall be considered a separate building and shall~~	

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2. Where the building is equipped throughout with an automatic sprinkler system, a common 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119 or UL 263 id permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Section R302.4.	~~be separated by fire-resistance-rated wall assemblies meeting the requirements of~~ Section ~~R302.1 for exterior walls.~~ ~~**Exception:** A common 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119 or UL 263 is permitted for townhouses if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.~~ 1. Where a fire sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119 or UL 263. 2. Where a fire sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-	

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	resistance-rated wall assembly tested in accordance with ASTM E119 or UL 263.	
		R302.2.1 Double walls. New section.
SECTION R302.2.4 STRUCTURAL INDEPENDENCE		
Section R302.2.4 Structural Independence. Each individual townhouse shall be structurally independent. **Exceptions:** 1. Foundations supporting exterior walls or common walls. 2. Structural roof and wall sheathing from each unit may fasten to the common wall framing. 3. Nonstructural wall and roof coverings. 4. Flashing at termination of roof covering over common wall. 5. Townhouses separated by a common ~~1-hour~~ fire-resistance-rated wall as provided in Section R302.2.	**R302.2.4 Structural independence.** Each individual townhouse shall be structurally independent. Exceptions: 1. Foundations supporting exterior walls or common walls. 2. Structural roof and wall sheathing from each unit may fasten to the common wall framing. 3. Nonstructural wall and roof coverings. 4. Flashing at termination of roof covering over common wall. 5. Townhouses separated by a common ~~1-hour fire-resistance-rated~~ wall as provided in Section R302.2, Item 1 or 2.	
		R302.4.2 Membrane penetration. **Exceptions:** Add- 4. Ceiling membrane penetrations by listed luminaires or by luminaires protected with listed materials that have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

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	R302.6 Dwelling-garage fire separation. The garage shall be separated as required by Table R302.6. Openings in garage walls shall comply with Section R302.5. Attachment of gypsum board shall comply with Table R70 302.3.5. The wall separation provisions of Table R302.6 shall not ~~This provision does not~~ apply to garage walls that are perpendicular to the adjacent dwelling unit wall.	
	R302.10.1 Insulation. **Exception:** Revise 2. Cellulose fiber loose-fill insulation, that ~~which~~ is not spray applied, complying with the requirements of Section R302.10.3, shall only not be required to meet the smoke-developed index of not more than 450 and shall be required to meet a smoke-developed index of not more than 450 where tested in accordance with CAN/ULC S102.2.	
	R302.11.1 Fireblocking materials. Revise 8. Cellulose insulation installed as tested in accordance with ASTM E119 and UL 263, for the specific application.	
	R302.13 Fire protection of floors. New section inserted**.**	
SECTION R303.4 MECHANICAL VENTILATION		

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~~**Section R303.4 Mechanical ventilation.** Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. (50 Pa) in accordance with Section NI 102.4.1.2, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.~~		
	R303.5.1 Intake openings: Add **Exceptions:** 1. The 10-foot (3048 mm separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source. 2. Vents and chimneys serving fuel-burning appliances shall be terminated in accordance with the applicable portions of Chapters 18 and 24. 3. Clothes dryer exhaust ducts shall be terminated in accordance with Section M1503.3.	
	R303.7 Stairway illumination. **Exception:** A switch is not required where remote, central or automatic control of lighting is provided. ~~An artificial light source is not required at the top and bottom landing, provided an artificial light~~	

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	~~source is located directly over each stairway section.~~	
	R303.8 Exterior stairway illumination. New section.	
	R304.1 Minimum area. ~~Every dwelling unit shall have at least one~~ Habitable room that shall have not less than 70 square feet (6.5 in2~~) 120 square feet (11m2) of gross floor area~~.	
	R305.1 Minimum height. Habitable space, ~~hallways, bath rooms. Toilet rooms, laundry rooms~~ and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm). **Exceptions:** 1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm). 2. The ceiling height above bathrooms and toilet room fixtures shall have a minimum ceiling height of not less than 6 feet 8 inches (2032 mm) above not less than 30 inches by 30 inches (762 mm) at the showerhead. ~~At the center of the front~~	

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	~~clearance area for fixtures as shown in Figure R307.1. The ceiling height above fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) above a minimum area 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.~~ 3. Beams, girders ducts or other obstructions in basements containing habitable spaces shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.	
	R308.4.2 Glazing adjacent to doors. Glazing in an individual fixed or operable panel adjacent to a door Shall be considered to be a hazardous location where the ~~nearest vertical edge of the glazing is within a 24-inch (610 mm) arc of either vertical edge of the door in a closed position and where the~~ bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the floor or walking surface and it meets the following conditions: ~~shall be considered a hazardous location.~~ **1.** Where the glazing within 24 inches (610 mm) of either side of the door	

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	in plane of the door in a closed position. **2.** Where the glazing is on a wall perpendicular to the plane of the door in a closed position and within 24 inches (610 mm) od=f the hinge wised of an in-swinging door.	
		R308.4.4.1 Structural glass baluster panels. New section**.**
	308.6.9.1 Comparative analysis for glass-glazed nit skylights. New section**.**	
	SECTION R310 EMERGENCY AND RESCUE OPENINGS. Section rewritten.	
		R310.1 Emergency escape and recue opening required. **Exception:** 1. Storm shelters and basements used only to house mechanical equipment not exceeding a total floor area of 200 square feet (18.58 m^2). 2. Where the dwelling or townhouse is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in basements shall not be required to have emergency escape and rescue openings provided the basement has one of the following:

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		2.1 One means of egress complying with Section R311 and one emergency escape and rescue opening. 2.2 Two means of egress complying with Section R311.
		R310.3.2.1 Ladder and steps. New section.
	R311.1 Means of egress. Add- The required egress door shall open directly into a public way or to a yard or court that opens to a public way.	
	R311.7.2 Headroom. **Exceptions:** Add- 2. The headroom for spiral stairways shall be in accordance with Section R311.7.10.1).	
	R3117.5.1 Risers. **Exceptions:** Add- 2. The riser height of a spiral stairway shall be in accordance with Section R311.7.10.1.	
	R311.7.5.2.1 Winder treads. **Exception:** The tread depth at spiral stairways shall be in accordance with Section R311.7.10.1.	
		R311.7.8.2 Handrail projections. New section.
		R311.7.8.3 Handrail. clearance. New section.
	R311.7.11 Alternating tread devices. New section and subsections .	**R311.7.11 Alternating tread devices.** **Exception**: Alternating tread devices are allowed to be used as an element of a means of egress for lofts, mezzanines and similar areas of 200 gross square

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		feet (18.6 m^2) or less where such devices do not provide exclusive access to a kitchen or bathroom.
	R311.7.12 Ship ladders. New section and subsections.	**R311.7.12 Ship ladders.** **Exception: Ships ladders.** Ships ladders are allowed to be used as an element of a means of egress for lofts, mezzanines and similar areas of 200 gross square feet (18.6 m^2) or less that do not provide exclusive access to a kitchen or bathroom.
	R311.8.1 Maximum slope. Ramps shall have a maximum slope of 1unit vertical in 12 units horizontal (8.3 percent slope). All other ramps shall have a maximum slope of 1 unit vertical in 8 units horizontal (12.5 percent).	
SECTION R313.1 TOWNHOUSE AUTOMATIC FIRE SPRINKLER SYSTEMS		
~~**Section R3131.1 Townhouse automatic fire sprinkler system,** An automatic residential fire sprinkler system shall be installed in townhouse.~~ ~~**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are mode to existing townhouses that do not have an automatic residential fire sprinkler system installed.~~		
~~**Section R313.1.1 Design and installation.** Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~	**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13D.	

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	R314.1 Smoke detection and notification. All smoke alarms shall comply with NFPA 72 and Section R314.	
	R314.1.1 Listing. Smoke alarms shall be listed and labeled in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be listed in accordance with UL 217 and UL2034.	
	R314.2 Where required. Smoke alarms shall be provided in accordance with the section.	
	R314.2.1 New construction. Smoke alarms shall be provided in dwelling units.	
	R314.2.2 ~~R314.3.1~~ Alterations, repairs and additions. Where ~~When~~ alterations, repairs or additions requiring a permit occur, or when one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings. **Exceptions:** 1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirements of this section. 2. Installation, alteration or repairs of plumbing or mechanical systems are	

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	exempt from the requirements of this section.	
SECTION R315.1 CARBON MONOXIDE ALARMS	**R314.3 Location.** Smoke alarms shall be installed in the following locations: 1. In each sleeping room. 2. Outside each separate sleeping area in the immediate vicinity of the bedrooms. 3. On each additional story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level. 4. Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains bathtub or shower unless this would prevent placement of a smoke alarm required by Section R314.3.	
Section R315.1 Carbon monoxide alarms.	**R314.3.1 Installation near cooking appliances.** New section.	
	R314.4 ~~R314.5~~ Interconnection. Renumbered.	
	R314.5 Combination alarms. New section.	

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	R314.6 ~~R314.4~~ Power source. Smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection. Exceptions: 1. Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power. 2. Smoke alarms installed in accordance with Section R314.2.2 shall be permitted to be battery power. ~~Hard wiring of smoke alarms in existing areas shall not be required where the alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for hard wiring without the removal of interior finishes.~~	
	R314.7 Fire alarm systems. New section and subsections.	
Section R315.1 Carbon monoxide alarms. For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in	**R315.1 Carbon monoxide alarms**. For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the	

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dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages with a communicating opening.	immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages.	
	R315.1.1 Listings. New section inserted.	
	R315.2 Where required. New section and subsections inserted.	
Section R315.3 Where required in existing dwellings. Where work requiring a permit occurs in existing dwellings, ~~that have attached garages or in existing dwellings within which fuel-fired appliances exist,~~ carbon monoxide alarms shall be provided in accordance with Section R315.1 for the following: 1. Mechanical or gas work requiring a permit in which fuel-fired appliances are being replaced or installed. Addition and/or renovation of attached garages with communicating openings requiring building permit.	**R315.3 Location. New section inserted.**	
	R315.4 Combination alarms. New section inserted.	
	R315.5 Power source. New section inserted.	**R315.5 Interconnectivity.** New section inserted.
	R315.6 Carbon monoxide detection systems. New section and subsections inserted.	

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	R316.4 Thermal barrier. Unless otherwise allowed in Section R316.5 or Section R316.6, foam plastic shall be separated from the interior of a building by an approved thermal barrier of not less than ~~minimum~~ wallboard, 23/32-inch (18.2 mm) wood structural panel, or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.	
	R316.5.3 Attics. The thermal barrier specified in Section R316.4 is not required where all of the following apply: 1. Attic access is required by Section R807.1. 2. The space is entered only for purposes of repairs or maintenance. 3. The foam plastic insulation has been tested in accordance with Section R316.6 or the foam plastic insulation is protected against ignition using one of the following ignition barrier materials: 3.1. 1'/2-inch-thick (38 mm) mineral fiber insulation; 3.2. '/4-inch-thick (6.4 mm) wood structural panels; 3.3. V8-inch (9.5 mm) particleboard; 3.4. '/4-inch (6.4 mm) hardboard; 3.5. 3/8-inch (9.5 mm) gypsum board; ~~or~~	

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	3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm); 3.7. 1'/,-inch-thick (38 mm) cellulose insulation; or 3.8. ¼-inch (6.4 mm) fiber-cement panel, soffit or backer board.	
	R316.5.4 Crawl spaces. The thermal barrier specified in Section R316.4 is not required where all of the following apply: 1. Crawlspace access is required by Section R408.4 2. Entry is made only for purposes of repairs or maintenance. 3. The foam plastic insulation has been tested in accordance with Section R316.6 or the foam plastic insulation is protected against ignition using one of the following ignition barrier materials: 3.1. l'/2-inch-thick (38 mm) mineral fiber insulation; 3.2. '/4-inch-thick (6.4 mm) wood structural panels; 3.3. 3/8-inch (9.5 mm) particleboard; 3.4. '/4-inch (6.4 mm) hardboard; 3.5. 3/g-inch (9.5 mm) gypsum board; or 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).	**R316.5.4 Crawl spaces.** Add- 3.7 ¼-inch (6.4 mm) fiber-cement panel, soffit or backer board.

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	~~The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.~~	
	R316.5.11 Sill plates and headers. Foam plastic shall be permitted to be spray applied to a sill plate and headers or installed in the perimeter joist space without the thermal barrier specified in Section R316.4 subject to all of the following:	
	R316.5.12 Sheathing. Foam plastic insulation used as sheathing shall comply with Section R316.3 and Section R316.4. Where the foam plastic sheathing is exposed to the attic space at a gable or kneewall, the provisions of Section R316.5.3 shall apply. Where foam plastic Is used as an exterior wall sheathing on framed wall assemblies. It shall comply with Section R316.8.	
	R316.8 Wind resistance. New section.	
	R317.1.4 Wood columns. **Exceptions:** Add 3. Deck posts supported by concrete piers or metal pedestals projecting not less than 1 inch (25 mm) above a concrete floor or 6 inches (152 mm) above exposed earth.	

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	R317.3 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with preservative-treated wood and fire-retardant-treated wood shall be in accordance with this section. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153. Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F667.	
		R317.3.1 Fasteners for preservative-treated wood. Fasteners, including nuts and washers, for preservative-treated wood shall be of hot-dipped, zinc-coated galvanized steel, silicon bronze or copper. Staples shall be of stainless steel. Coatings types and weights for connectors in contact with the preservative-treated wood shall be in accordance with the connector manufacturer's recommendations. In absence of manufacturer's recommendations, a minimum of ASTM A 653 type G185 zinc-coated galvanized steel or equivalent, shall be used.
	R317.4 ~~Wood/~~plastic composites. ~~Wood/~~plastic composites used in exterior deck boards, stair treads, guards and handrails shall comply with the requirements of Section R507.3. ~~handrails and guardrail systems shall bear a label~~	

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	~~indicating the required performance levels and demonstrating compliance with the provisions of ASTM D7032.~~ ~~R317.4.1 Labeling. Deck boards and stair treads shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span. Handrails and guardrail systems or their packaging shall bear a label that indicates compliance to ASTM D 7032 and includes the maximum allowable span.~~ ~~R317.4.2 Installation. Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.~~	
	R320.1.1 Guestrooms. New section.	
	R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(I), and substantial improvement and restoration of substantial damage of buildings and structures in flood hazard areas, shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures that are located in more than one flood hazard	

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	area shall comply with the most restrictive flood hazard area. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.	
	R322.1.8 Flood-resistant materials. Building materials and installation methods used flor flooring and interior or exterior walls and wall coverings below the elevation required in Section R322.2 or R322.3 shall be flood damage-resistant materials that conform to the provisions of FEMA TB-2.~~used below the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones) shall comply with the following: 1. All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use or be the decay resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWPA U1. 2. Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA/FIA TB-2.~~	

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	R322.1.9 Manufactured homes. The bottom of the frame of new or replacement manufactured homes on foundations that conform to the requirements of Section R322.2 or R322.3, as applicable shall be elevated to or above the elevations specified in ~~accordance with~~ Section R322.2 (flood hazard areas including A Zones) or Section R322.3 in coastal high-hazard areas (V Zones). The anchor and tie-down requirements of the applicable state or federal requirements shall apply. ~~Sections AE604 andAE605 of Appendix E shall apply.~~ The foundation and anchorage of manufactured homes to be located in identified floodways shall be designed and constructed in accordance with ASCE 24.	
	R322.2 Flood hazard areas (including A Zones). All areas that have been determined to be prone to flooding but not subject to high-velocity wave action shall be designated as flood hazard areas. Flood hazard areas that have been delineated as subject to wave heights between l'/2 feet (457 mm) and 3 feet (914 mm) shall be designated as Coastal A Zones and are subject to the requirements of Section R322.3. All building and structures constructed in whole or in part	

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	in flood hazard areas shall be designed and constructed in accordance with Sections R322.2.1 through R322.2.3.	
	R322.2.1Elevationrequirements. 1. Buildings and structures in flood hazard areas, including flood areas ~~not~~ designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher. 2. ~~Buildings and structures in flood hazard areas designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or to the design flood elevation, whichever is higher.~~ 3. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet on the FIRM, or at least 3 feet (915 mm) ~~2 feet (610 mm)~~ if a depth number is not specified. 4. Basement floors that are below grade on all sides shall be elevated to or above the base flood elevations plus 1 foot (305 mm) or the design flood elevation, whichever is higher.	

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	Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R322.2.2.	
	R322.2.2 Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall: 1. Be used solely for parking of vehicles, building access or storage. 2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1: 2.1. ~~There shall be a minimum of two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.~~ 2.2. The total net area of all openings shall be at least 1 square inch (645 mm2) for each square foot (0.093 m2) of enclosed area where the enclosed area is measured on the exterior of the enclosure wall, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a	**R322.2.2 Enclosed area below design flood elevation**. Enclosed areas, including crawl spaces, that are below the design flood elevation shall: 1. Be used solely for parking of vehicles, building access or storage. 2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1: 2.12.2. The total net area of ~~all~~ nonengineered openings shall be at least 1 square inch (645 mm2) for each square foot (0.093 m2) of enclosed area where the enclosed area is measured on the exterior of the enclosure wall, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.6.2.2 of ASCE 24. 2.3. 2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.

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	registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.6.2.2 of ASCE 24. 2.3. ~~The bottom of each opening shall be 1 foot (305 mm) or less above the adjacent ground level.~~ 2.4. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall. 2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area. 2.6. <u>The presence of louvers, blades, screens and faceplates or other covers and devices shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open air.</u> ~~Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.~~	2.5. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed area. 2.6. The presence of louvers, blades, screens and faceplates or other covers and devices shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open air.
	<u>R322.2.2.1 Installation of openings.</u> <u>New section.</u>	
	<u>R322.2.4 Tanks.</u> <u>New section.</u>	

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	R322.3 Coastal high-hazard areas (including V Zones and Costal A Zone, where designated). Areas that have been determined to be subject to wave heights in excess of 3 feet (914 mm) or subject to high-velocity wave action or wave-induced erosion shall be designated as coastal high-hazard areas. Flood hazard areas that have been designated as subject to wave heights between 1 ½ feet (457 mm) and 3 feet (914 mm) or otherwise designated by the jurisdiction shall be designated as Costal A Zones. Buildings and structures constructed in whole or in part in coastal high-hazard areas and costal A Zones, where designated, shall be designed and constructed in accordance with Sections R322.3.1through R322.3.7.	
	R322.3.2 Elevation requirements. 1. ~~All~~ buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest ~~portion of all~~ horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher	

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	~~1.1. Located at or above the design flood elevation, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees (0.35 rad) from the direction of approach, or~~ ~~1.2. Located at the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees (0.35 rad) from the direction of approach.~~ 2. Basement floors that are below grade on all sides are prohibited. 3. The use of fill for structural support is prohibited. 4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways. ~~Exception:~~ 5. Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5	
	R322.3.3 Foundations. New section.	

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		322.3.4 Concrete slabs. New section inserted.
	R322.3.5.1 Protection of building envelope. New section.	
	R322.3.7 Tanks. New section.	**R322.3.7 Stairways and ramps.** New section inserted.
		R322.3.8 Decks and porches. New section inserted.
	SECTION R323 STORM SHELTERS. New section.	
	SECTION R324 SOALR ENERGY SYSTEMS. New section.	
		R324.3.1 Equipment listings. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.
		R324.4.1.1 Roof load. New section.
		R324.4.1.2 Wind load. New section.
		R324.4.2 Fire classification. New section.
		R324.4.3 Roof penetrations. New section.
		R324 6 Roof access and pathways. New section and subsections inserted.
		R324.5.2 Fire classification. New section.
	SECTION R325 MEZZANINES. New section.	
		R325.1 General. Mezzanines shall comply with Section R325 through R325.5. Habitable attics shall comply with Section R325.6.
		R325.3 Area limitation. **Exception:** The aggregate area of a mezzanine located within a dwelling unit equipped with a fire

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		sprinkler system in accordance with Section P2904 shall not be greater than one-half the floor area of the room, provided that the mezzanine meets all of the following requirements: 1. Except for enclosed bathrooms and closets, the mezzanine is open to the room in which such mezzanine is located. 2. The opening to the room is unobstructed except for walls not more than 42 inches (1067 mm) in height, columns and poles. 3. The exceptions to Section R325.5 are not applied.
		R325.6 Habitable attics. New section.
	SECTION R326 SWIIMING POOLS, SPAS AND HOT TUBS. New section.	
		SECTION R327 STATIONARY STORAGE BATTERY SYSTEMS. New sections and subsections.
	CHAPTER 4 FOUNDATIONS	
	R402 MASONRY. New section.	
	R403.1.1Minimum size. The minimum width, W, and thickness, T, for concrete footing shall be in accordance with Tables R403/1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable. ~~Minimum sizes for concrete and masonry footings shall be as set forth in Table R403.1and FigureR403.1(l).~~ The footing width~~, W,~~ shall be based on the load-bearing value of the soil in accordance	

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	with Table R401.4.1. ~~Spread footings shall be at least 6 inches (152 mm) in thickness,~~ ~~T.~~ Footing projections, P, shall be at least 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and project for fireplaces shall be in accordance with Section R100.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) andR403.1(3).	
	Table R403.1(1). Revised**.**	
	Table R403.1(2). Revised.	
	Table 403.1(3). Revised.	
	R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1, and D_2. Exterior walls of buildings located in Seismic Design Categories D_0, D_1, D_2 shall be supported by continuous solid or fully grouted masonry or concrete footings. Other footing materials or systems shall be designed in accordance with accepted engineering practice. All required internal braced wall panels in buildings located Seismic Design Categories D_0, D_1, D_2 with plan dimensions greater than 50 feet (15 240 mm) shall be supported by continuous	

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	solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4, with exception for two-story buildings in Seismic Design Category D_2, in which all braced wall panels, interior or exterior, shall be supported n continuous foundations. **Exceptions:** Two-story buildings shall be permitted to have internal braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that: 1. The height of the cripple walls does not exceed 4 feet (1219 mm). 2. First-floor braced wall panels are supported in double floor joists, continuous blocking or floor beams. 3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall. ~~braced wall panels at exterior walls of buildings located in Seismic Design Categories D0, D, and D2 shall be supported by continuous footings. All required interior braced wall panels in buildings with plan dimensions greater than 50 feet (15 240 mm) shall also be supported by continuous footings.~~	

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	R403.1.3 Footings and stem walls reinforcing in Seismic Design Categories D_0, D_1, and D_2. ~~Seismic Reinforcing.~~ New section**.**	
	R403.1.3.1 Concrete stem walls with concrete footings ~~Foundations with stem walls~~. New section**.**	
	R403.1.3.2 Masonry stem walls with concrete footings ~~Slabs-on-ground with turned-down footings~~. New section.	
	R403.1.3.2 Slabs-on-ground with turned-down footings. In Seismic Design Groups D_0, D_1, and D_2, slabs on ground casted monolithically with turned down footings shall have a minimum of one No.4 bar at the top and the bottom of the footing or one No. 5 bar or two No. 4 bars in the middle third of the footing depth. ~~Exception: For slabs-on-ground cast monolithically with the footing, locating one No. 5 bar or two No. 4 bars in the middle third of the footing depth shall be permitted as an alternative to placement at the footing top and bottom~~. Where the slab is not cast monolithically with the footing, No. 3 or larger vertical dowels with standard hooks on each end shall be installed at no more than 4 feet (1219 mm) on center ~~provided~~ in accordance with Figure R403.1.3~~.2.~~ Detail 2. Standard	

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	hooks shall comply with Section R608.5.4.5. ~~R611.5.4.5.~~	
	R403.1.3.4 Interior bearing and braced wall panel footings in Seismic Design Categories D_0, D_1, and D_2. New section.	
	R403.1.3.5 Reinforcement. New section and subsections.	
	Figure R403.1(1). Revised.	
	Figure R403.1(2). Revised.	
	Figure R403.1(3). Revised.	
	Figure R403.1.3 Revised.	
	R403.1.6 Foundation anchorage. New section.	
	TABLE R403.4. New table.	
	R404.1.1 Design required. New section.	
	R404.1.3 Concrete foundation walls. New section.	
	TABLE R404.1(1). Revised.	
	TABLE R404.1(2). Revised.	
	TABLE R404.1(3). Revised.	
	TABLE R404.1(4). Revised.	
	TABLE R404.2(2). Revised.	
	R404.1.3.1 Concrete cross-section. New section.	
	R404.1.3.2 Reinforcement for foundation walls. New section and subsections.	
	R404.1.3.3 Concrete, materials for concrete, and forms. New section and subsections.	
	TABLE R404.1.2(2). Revised.	

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	TABLE R404.1.2(3). Revised.	
	TABLE R404.1.2(4). Revised.	
	TABLE R404.1.2(5). Revised.	
	TABLE R404.1.2(6). Revised.	
	TABLE R404.1.2(7). Revised.	
	TABLE R404.1.2(8). Revised.	
	R404.1.3.4 Requirements for Seismic Design Category C. New section.	
	R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of 48 inches (1219 mm) ~~24 inches (610 mm)~~ of unbalanced fill, or retaining walls exceeding 24 inches (610 mm) in height that resist lateral loads in addition to soil, shall be designed in accordance with accepted engineering practice to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. This section shall not apply to foundation walls supporting buildings.	
	R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Drainage tiles, gravel or crushed stone	

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	drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall dis charge by gravity or mechanical means into an approved drainage system. Gravel or crushed stone drains shall extend at least 1foot (305 mm) beyond the outside edge of the footing and 6 inches (152 mm) above the top of the footing and be covered with an approved filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper. Except where otherwise recommended by the drain manufacturer, perforated drains shall be surrounded with an approved filter membrane or the filter membrane shall cover the washed gravel or crushed rock covering the drain. Drainage tiles or perforated pipe shall be placed on a mini¬ mum of 2 inches (51mm) of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches (152 mm) of the same material. Exception: A drainage system is not required when the foundation is installed on well-drained ground or sand gravel mixture soils according to the Unified Soil	

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	Classification System, Group I Soils, as detailed in Table R405.1.	
		408.3 Unvented crawl space. Add- 2.4 Dehumidification sized to provide 70 pints (33 liters) of moisture removal per day for every 1,000 square feet (93 m^2) of crawl space floor area.
	CHAPTER 5 FLOORS	
	~~**R501.3 Fire protection of floors.**~~ Deleted.	
	R502.1 General ~~Identification~~. Wood and wood-based products used for load-support purposes shall conform to the applicable provisions of this section. ~~Load-bearing dimension lumber for joists, beams and girders shall be identified by a grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.~~	
	R502.1.1 Sawn lumber. New section inserted	
	R502.1.4 ~~R502.1.6~~ Structural log members. Structural log members shall comply with the provisions of ICC-400. ~~Stress grading of structural log members~~	

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	~~of nonrectangular shape, as typically used in log buildings, shall be in accordance with ASTM D3957. Such structural log members shall be identified by the grade mark of an approved lumber grading or inspection agency. In lieu of a grade mark on the material, a certificate of inspection as to species and grade issued by a lumber-grading or inspection agency meeting the requirements of this section shall be permitted to be accepted.~~	
	R502.1.6 Cross-laminated timber. New section.	
	R502.1.7 Engineered wood rim board. New section.	
	R502.2.2 ~~R502.1.2~~ Blocking and subflooring. Section renumbered.	
	R502.5 Allowable girder spans. The allowable spans of girders fabricated of dimension lumber shall not exceed the values set forth in Tables R602.7(1), R702.7(2) and R602.7(3) ~~R502.5(l) and R502.5(2~~).	
		R502.6 Bearing. The ends of each joist, beam or girder shall not have less than 1 ½ inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on masonry or concrete, except where supported on a 1-inch by 4-inch (25 mm by 102 mm) ribbon strip and nailed to the adjacent stud or by the use of approved joist hangers. Alternatively, the

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		ends of joists shall be supported on a 1-inch by 4-inch (25 mm by 102 mm) ribbon strip and shall be nailed to the adjacent stud. The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch minimum (51 mm) nominal thickness, shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 mm).
	R502.10 Framing of openings. Openings in floor framing shall be framed with a header and trimmer joists. When the header joist span does not exceed 4 feet (1219 mm), the header joist may be a single member the same size as the floor joist. Single trimmer joists may be used to carry a single header joist that is located within 3 feet (914 mm) of the trimmer joist bearing. When the header joist span exceeds 4 feet (1219 mm), the trimmer joists and the header joist shall be doubled and of sufficient cross section to support the floor joists framing into the header. ~~Approved hangers shall be used for the header joist to trimmer joist connections when the header joist span exceeds 6 feet (1829 mm). Tail joists over 12 feet (3658 mm) long shall be supported at the header by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).~~	

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	SECTION R505 COLD-FORMED STEEL FLOOR FRAMING.	
	R505.2 Structural framing. Load-bearing cold-formed steel floor framing members shall be in accordance with this section. ~~comply with Figure R505.2(l) and with the dimensional and minimum thickness requirements specified in Tables R505.2(1) and R505.2(2). Tracks shall comply with Figure R505.2(2) and shall have a minimum flange width of 1 1/4inches (32 mm).~~	
	R505.2.1Material. Load-bearing cold-formed steel framing members shall be cold formed to shape from structural quality sheet steel complying with the requirements of ~~one of the following: 1. ASTM A 653: Grades 33 and 50 (Class 1 and 3). 2. ASTM A 792: Grades 33 and 50A. 3.~~ ASTM A 1003: Structural Grades 33 Type Hand Type H.	
	R505.2.3 Dimension, thickness and material grade. New section inserted.	
	TABLE R505.2.3 COLD-FORMED STEEL JOIST SIZES AND THICKNESSES. New section.	
	R505.2.4 Fastening requirements. Screws for steel-to steel connections shall be installed with a minimum edge distance and center-to-center spacing of '/2 inch (12.7 mm), shall be self-drilling tapping,	

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	and shall conform to ASTM C 1513. Floor sheathing shall be attached to cold formed steel joists with minimum No. 8 self-drilling tap¬ ping screws that conform to ASTM C 1513. Screws attaching floor-sheathing to cold-formed steel joists shall have a minimum head diameter of 0.292 inch (7.4 mm) with countersunk heads and shall be installed with a mini¬ mum edge distance of 3/8 inch (9.5 mm). Gypsum board ceilings shall be attached to cold-formed steel joists with minimum No. 6 screws conforming to ASTM C 954 or ASTM C 1513 with a bugle head style and shall be Installed in accordance with Section R702. For all connections, screws shall extend through the steel a minimum of three exposed threads. All fasteners shall have rust inhibitive coating suitable for the installation in which they are being used, or be manufactured from material not susceptible to corrosion. ~~Where No. 8 screws are specified in a steel-to-steel connection, the required number of screws in the connection is permitted to be reduced in accordance with the reduction factors in Table R505.2.4 when larger screws are used or when one of the sheets of steel being connected is thicker~~	

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	~~than 33 mils (0.84 mm). When applying the reduction factor, the resulting number of screws shall be rounded up.~~	
	FIGURE R505.2.6.3 FLOOR JOIST WEB HOLE PATCH. New figure.	
	TABLE R505.3.2 ALLOWABLE DPANS FOR COLD-FORMED STEEL JOISTS- SINGLE OR CONINTUOUS SPANS. New table.	
	R505.3.4 Bearing stiffeners. Bearing stiffeners shall be installed at each joist bearing location in accordance with this section, except for joists lapped over an interior sup¬ port not carrying a load-bearing wall above. Floor joists supporting jamb studs with multiple members shall have two bearing stiffeners in accordance with Figure R505.3.4(1). Bearing stiffeners shall be fabricated from a C-shaped, track or clip angle member in accordance with the one of following: 1. C-shaped bearing stiffeners: 1.1. Where the joist is not carrying a load-bearing wall above, the bearing stiffener shall be a minimum 33 mil (0.84 mm) thickness. 1.2. Where the joist is carrying a load-bearing wall above, the bearing stiffener shall be at least the same designation thickness as the wall stud above. 2. Track bearing stiffeners:	

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	2.1. Where the joist is not carrying a load-bearing wall above, the bearing stiffener shall be a minimum 43 mil (1.09 mm) thickness. 2.2. Where the joist is carrying a load-bearing wall above, the bearing stiffener shall be at least one designation thickness greater than the wall stud above. ~~3. Clip angle bearing stiffeners: Where the clip angle bearing stiffener is fastened to both the web of the member it is stiffening and an adjacent rim track using the fastener pattern shown in Figure R505.3.4(2), the bearing stiffener shall be a mini- mum 2 inch by 2inch (51 mm by 51 mm) angle sized in accordance with Tables R505.3.4(l), R505.3.4(2), R505.3.4(3), and R505.3.4(4).~~ The minimum length of a bearing stiffener shall be the depth of member being stiffened minus 3/8 inch (9.5 mm). Each bearing stiffener shall be fastened to the web of the member it is stiffening as shown in Figure R505.3.4(2). ~~Each clip angle bearing stiffener shall also be fastened to the web of the adjacent rim track using the fastener pattern shown in Figure R505.3.4(2). No. 8 screws shall be used for C-shaped and track members of~~	

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	~~any thickness and for clip angle members with a designation thickness less than or equal to 54. No. 10 screws shall be used for clip angle members with a designation thickness greater than 54.~~	
	SECTION R507 EXTERIOR DECKS	
	R507.2 Deck ledger connection to band joist. Deck ledger connections to band joists shall be in accordance with this section, Tables R507.2 and R507.2.1, and Figures R507.2.1(1) and R507.2.1(2). For other grades species, connection details and loading conditions, deck ledger connections be designed in accordance with Section R301. ~~For decks supporting a total design load of 50 pounds per square foot (2394 Pa) [40pounds per square foot (1915 Pa) live load plus 10pounds per square foot (479 Pa) dead load], the connection between a deck ledger of pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir or approved decay-resistant species, and a 2-inch (51 mm) nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with '/9-inch (12.7 mm) lag screws or bolts with washers in accordance with Table R507.2. Lag screws, bolts and washers~~	**507.2 Materials.** New section and subsections.

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	~~shall be hot-dipped galvanized or stainless steel.~~	
	R507.2.1 Ledger details. New section.	
	R507.2.2 Band joist details. New section.	
	R507.2.3 Ledger to band joist fastener connection. New section.	**R507.2.3 Fasteners and connectors.** New section.
	R507.2.4 ~~R507.2.3~~ Deck lateral load connection. The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figure R507.2.3(1) or R507.2.3(2). Where the lateral load connection is provided in accordance with Figure 507.2.3(1), hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches of each end of the deck. ~~and~~ Each device shall have an allowable stress design capacity of not less than 1,500pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.2.3(2), the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).	**R507.2.4 Flashing.** New section
		R507.2.5 Alternate materials. New section.
	R507.3 Plastic composite deck boards, stair treads, guards, or handrails. New section and subsections.	

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		R507.3. Footings ~~Decks~~. New section.
		R507.3.1 Minimum size ~~Labeling~~. New section.
	TABLE R507.2. Revised.	**R507.3.2 Minimum depth ~~Flame spread index.~~** New section.
		R507.4.1 ~~R507.8.1~~ Deck post to deck footing connection. Where posts ~~shall~~ bear on concrete footings in accordance with Section R403 and Figure 507.8.1, lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. Other footing systems shall be permitted. ~~Posts shall be restrained to prevent lateral displacement at the bottom support. Such lateral restraint shall be provided by manufacturer connectors installed in accordance with Section R507 and the manufacturer's instructions or a minimum post embedment of 12 inches (305 mm) in surrounding soils and concrete piers.~~ **Exception:** Where expansive/, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.
		TABLE R507.3.1 MINIMUM FOOTIGN SIZE FOR DECKS. New table.
	FIGURE R507.2.3(2) DECK ATTACHMENT FOR LATERAL LOADS. New figure.	
	TABLE R507.4 MAXIMUM JOIST SPACING. New table.	
	TABLE R507.5 DECK JOIST SPANS FOR COMMON LUMBER SPECIES. New table.	

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	FIGURE R507.5 TYPICAL DECK JOIST SPANS. New figure.	
	R507.4 Decking. New section.	
	R507.5 Deck joists. New section and subsections.	
	TABLE R507.6 DECK BEAM SPAN LENGTHS. New table.	
	R507.6 Deck beams. New section.	
	R507.7 Deck joists and deck beam bearing. New section and subsections.	**R507.6.1 ~~R507.7~~ Deck joists ~~and deck beam~~ bearing.** The ends of each joist and beam shall have not less than 1 ½ inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on concrete or masonry for the entire width, Joists bearing on top of a multiple-ply beam or ledger shall be fastened in accordance with Table R602.3(1). Joists bearing on top of a single-ply beam or ledger shall be attached by a mechanical connector. Joist framing into the side of a beam or ledger board shall be supported by approved joist hangers. ~~of the beam. Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. Joist bearing on a beam shall be connected to the beam to resist lateral displacement.~~
		R507.7 ~~R507.4~~ Decking. Maximum allowable spacing for joist supporting decking shall be in accordance with Table R507.7 ~~R507.4~~. Wood decking shall be attached to each supporting member with not less than (2) 8d threaded nails or (2) N0. 8 wood screws. Other approved decking or fastener systems shall be

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		installed in accordance with the manufacturer's installation requirements.
		R507.8 Vertical and lateral supports. New section.
		R507.9 Vertical and lateral support. New sections and subsections.
	CHAPTER 6 WALL CONSTRUCTION	
	R602.1 General ~~Identification~~. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section. ~~Load-bearing dimension lumber for studs, plates and headers shall be identified by a grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certification of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.~~	
	R602.1.1 Sawn lumber. New section inserted.	
	R602.1.4 ~~R602.1.3~~ Structural log members. Structural log members shall comply with the provisions of ICC 400. ~~Stress grading of structural log members of nonrectangular shape, as typi - cally used in log buildings, shall be in accordance with ASTM D 3957. Such~~	

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	~~structural logmembers shall be iden-tified by the grade mark of an approvedlumber grading or inspection agency. Inlieuof a grade mark on the material, a certificate of inspection as to species and grade, issued by a lumber-grading or inspection agency meeting the requirements of this section, shall be permitted to be accepted.~~	
	R602.1.6 Cross-laminated timber. New section.	
	R602.1.7 Engineered wood rim board. New section.	
	R602.1.8 Wood structural panels. New section.	
	R602.1.9 Particleboard. New section.	
	R602.1.10 Fiberboard. New section.	
		R602.1.11 Structural insulated panels. New section.
	R602.3 Design and construction. Exterior walls of wood frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures R602.3(l) and R602.3(2) or in accordance with AWC ~~AF&PA's~~ NDS. Components of exterior walls shall be fastened in accordance with Tables R602.3(l) through R602.3(4). Wall sheathing shall be fastened directly to framing members and, when placed on the exterior side of an exterior wall, shall	

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	be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3) and shall conform to the requirements of Table R602.3(3). ~~Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA 0437 or CSA 0325. All panels shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an approved agency and shall conform to the requirements of Table R602.3(3).~~ Wall sheathing used only for exterior wall covering purposes shall comply with Section R703. Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice. Exception: Jack studs, trimmer studs and cripple studs at openings in walls that comply with Tables R502.5(l) and R502.5(2).	
	TABLE R602.3(1). Revised**.**	

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	R602.3.1 Stud size, height and spacing. The size, height and spacing of studs shall be in accordance with Table R602.3.(5). **Exceptions:** Revise 2. Where snow loads are less than or equal to 25 pounds per square foot (1.2 kPa), and the ultimate design wind speed is less than or equal to 130 mph (58.1 m/s), 2 inch by 6 inch (38 mm by 14 mm) studs supporting a roof load with not more than 6 feet (1829 mm) of tributary length shall have a maximum height of 18 feet (406 mm) on center, or 20 feet (6096 mm) where spaced at 12 inches (304.8 mm) on center. Studs shall be minimum No. 2 grade lumber. ~~Studs more than 10 feet (3048 mm) in height which are in accordance with Table R602.3.1.~~	**R602.3.1 Stud size, height and spacing.** **Exception**: Add- 3. Exterior load-bearing studs not exceeding 12 feet (3658 mm) in height provided in accordance with Table R602.3(6). The minimum number of full-height studs adjacent to openings shall be in accordance with Section R602.7.5. The building shall be located in Exposure B, the roof live load shall not exceed 20 psf (0.96 kPa), and the ground now load shall not exceed 30 psf (1.4 kPa). Studs and plates shall be No. 2 grade lumber or better.
	R602.3.2 Top plate. Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints in top plates shall be offset at least 24 inches (610 mm). Joints in plates need not occur over studs. Plates shall be not less than 2-inches (51mm) nominal thickness and have a width at least equal to the width of the studs.	

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	Exception: Revise-A single top plate used as an alternative to a double top plate shall comply with the following: 1. The single top plate shall be tied at corners, intersecting walls, and at in-line splices in straight wall lines in accordance with Table R602.3.2. 2. The rafters or joists shall be centered over the studs with a tolerance of not more than 1 inch (25 mm). 3. Omission of the top plate is permitted over headers where the headers are adequately tied to adjacent wall sections in accordance with Table R%602.3.2. ~~may be installed in stud walls, provided the plate is adequately tied at joints, corners and intersecting walls by a minimum3-inch by 6-inch by a 0.036-inch-thick (76 mm by 152 mm by 0.914 mm) galvanized steel plate that is nailed to each wall or segment of wall by six 8d nails on each side, provided the rafters or joists are centered over the studs with a tolerance of no more than 1 inch (25 mm). The top plate may be omitted over lintels that are adequately tied to adjacent wall sections with steel plates or equivalent as previously described.~~	

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		TABLE R602.3(6) ALTERNATE WOOD BEARING WALL STUD SIZE, HEIGHT AND SPACING. New table.
	TABLE R602.3.2 SINGLE TOP-PLATE SPLICE CONNECTION DETAILS. New table.	
	R602.7.1 Single member headers. Single headers shall be framed with a single flat 2-inch-nominal (51 mm) member or wall plate not less in width than the wall studs on the top and bottom of the header in accordance with Figures R602.7.1(l) andR602.7.1(2) and face nailed to the top and bottom of the header with 10d box nails (3 inches x 0.128 inches) spaced 12 inches on center.	
	R602.7.2 Rim board headers. New section inserted.	
	TABLE R602.7(1) GIRDER SPANS AND HEADER SPANS FOR EXTERIOR BEARING WALLS. New table.	**TABLE R602.7(1) GIRDER SPANS AND HEADER SPANS FOR EXTERIOR BEARING WALLS.** Revised.
	TABLE R602.7(2) GIRDER SPANS AND HEADER SPANS FOR INTERIOR BEARING WALLS. New table.	
	TABLE R602.7(1) GIRDER SPANS AND HEADER SPANS FOR OPEN PORCHES. New table.	
	FIGURE R602.7.1(1) SINGLE MEMBER HEADER IN EXTERIOR BEARING WALL. Revised figure.	

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	FIGURE R602.7.1(2) ALTERNATIVE SINGLE MEMBER HEADER WITHOUT CRIPPLE. Revised figure.	
	FIGURE R602.7.2 RIM BOARD EHADER CONSTRUCTION Revised figure.	
	R602.7.5 Supports for headers. New section.	
	R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1, and D_2. Braced wall panels shall be located at each end of a braced wall line. **Exception:** Braced wall panels constructed of Methods WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4 shall be permitted to begin no more than 10 feet (3048 mm) from each end of a braced wall line provided each end complies with one of the following. 1. A minimum 24-inch-wide (610 mm) panel for Methods WSP, ~~BV-WSP,~~ CS-WSP, CS-G, and CS-PF~~, and 32-inch-wide (813 mm) panel for Method CS-SFB~~ is applied to each side of the building corner as shown in End Condition 4 ~~Condition 4~~ of Figure R602.10.7. 2. The end of each braced wall panel closest to the end of the braced wall line shall have an 1,800 lb (8 kN) hold-down device fastened to the stud at the edge of	

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	the braced wall panel closest to the corner and to the foundation or framing below as shown in Condition5 of Figure R602.10.7. 3. ~~For Method BV-WSP, hold-down devices shall be provided in accordance with Table R602.10.6.5 at the ends of each braced wall panel.~~	
	R602.10.4.1 Mixing methods. Mixing of bracing methods shall be permitted as follows: 1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted. 2. Mixing intermittent bracing methods from braced wall line to braced wall line within a story shall be permitted. Within Seismic Design Categories A, B and C or in regions where the basic wind speed is less than or equal to 130 ~~100~~ mph (58 ~~45~~ m/s), mixing of intermittent bracing and continuous sheathing methods from braced wall line to braced wall line within a story shall be permitted. 3. Mixing intermittent bracing methods along a braced wall line shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest	**R602.10.4.1 Mixing methods.** Revise 4. Mixing of continuous sheathing methods CSWSP, CS-G and CS-PF along a braced wall line shall be permitted. Intermediate methods ABW, PFH, and {FG shall be permitted to be used along a braced wall line with continuous sheathed methods, provided that the length of the required bracing for that braced wall line is determined in compliance with Table R602.10.3(1)nor R602.10.3(3) suing the highest value of the bracing method used..

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AMENDED IRC-2012	IRC-2015	IRC-2018
	value of all intermittent bracing methods used. 4. Mixing of continuous sheathing methods CSWSP, CS-G and CS-PF along a braced wall line shall be permitted. Intermediate methods ABW, PFH, and {FG shall be permitted to be used along a braced wall line with continuous sheathed methods. 5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a braced wall line with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same braced wall line shall be per¬ mitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the braced wall line.	
		R602.10.4.4 Panel joints. New section.
	TABLE R602.10.3(1). Revised.	
	TABLE R602.10.3(2). Revised.	

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	TABLE R602.10.3(3). Revised.	
	TABLE R602.10.3(4). Revised.	
		TABLE R602.10.5 MINIMUM LENGTH OF BRACED WALL PANELS. Revised.
	R602.10.6.5.1 Length of bracing. New section.	
	TABLE R602.10.4. Revised.	
	R602.10.8.2 Connections to roof framing. Top plates of exterior braced wall panels shall be attached to rafters or roof trusses above in accordance with Table R602.3(l) and this section. Where required by this section, blocking between rafters or roof trusses shall be attached to top plates of braced wall panels and to rafters and roof trusses in accordance with Table R602.3(l). A continuous band, rim, or header joist or roof truss parallel to the braced wall panels shall be permitted to replace the blocking required by this section. Blocking shall not be required over openings in continuously sheathed braced wall lines. In addition to the requirements of this section, lateral support shall be provided for rafters and ceiling joists in accordance with Section R802.8 and for trusses in accordance with Section R802.10.3. Roof ventilation shall be provided in accordance with SectionR806.1.	

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	1. For Seismic Design Categories A, B and C ~~and wind speeds less than 100 mph (45 m/s)~~ where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is 9V4 inches (235 mm) or less, blocking between rafters or roof trusses shall not be required. Where the distance from the top of the braced wall panel to the top of the rafters or roof trusses above is between 9'/4 inches (235 mm) and 15'/4 inches (387 mm), blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(1). **Exception:** Where the outside edge of the truss vertical web members aligns with the outside face of the wall studs below, wood structural panel sheathing extending above the top plate as shown in Figure R602.10.8.2(3) shall be permitted to be fastened at each truss web with three 8d nails 2(2 ½ inches x 0.131 inch) and blocking between the trusses shall not be required. 2. For Seismic Design Categories D_0, D_1, and D_2 ~~or wind speeds of 100 mph (45~~	

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	~~m/s) or greater,~~ where the distance from the top of the braced wall panel to the top of the rafters or roof trusses is 15'/4 inches (387 mm) or less, blocking between rafters or roof trusses shall be provided above the braced wall panel in accordance with Figure R602.10.8.2(l). 3. Where the distance from the top of the braced wall panel to the top of rafters or roof trusses exceeds 15'/4 inches (387 mm), the top plates of the braced wall panel shall be connected to perpendicular rafters or roof trusses above in accordance with one or more of the following methods: 3.1. Soffit blocking panels constructed in accordance with FigureR602.10.8.2(2); 3.2. Vertical blocking panels constructed in accordance with Figure R602.10.8.2(3); 3.3. Blocking panels provided by the roof truss manufacturer and designed in accordance with Section R802. ~~Full-height engineered blocking panels designed in accordance with the AF&PA WFCM; or~~ 3.4. Blocking, blocking panels, or other methods of lateral load transfer designed in accordance with the AWC WFCM or accepted engineering practice.	
		R602.10.6.5 Wall bracing for dwellings with stone and masonry veneer in Seismic Design Categories

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		D_0, D_1 and D_2. Where stone and masonry veneer are installed in accordance with Section R703.8, wall bracing in the exterior braced wall lines and braced wall lines on the interior of the building, backing or perpendicular to and laterally supporting veneered walls shall comply with this section. Where dwellings in Seismic Design Categories D_0, D_1 and D_2 have stone or masonry veneer installed in accordance with Section R703.8, and the veneer does not exceed the first story height, wall bracing shall be in accordance with Section R602.10.3. Where detached one- or two-family dwellings in Seismic Design Categories D_0, D_1 and D_2 have exterior ~~stone or masonry~~ veneer installed in accordance with Section R703.8, and are braced in accordance with Method WSP or CS-WSP, veneer shall be permitted in the second story in accordance with Item 1 or 2, provided that the dwelling does not extend more than two stories above grade plane, the veneer does not extend 5 inches (127 mm) in thickness, the height of veneer on gable-end walls does not extend more than 8 feet (2438 mm) above the bearing wall top plate elevation, and the total length of braced wall panel specified by Table R602.10.3(3) is multiplied by 1.2 for each first- and second-story braced wall line. 1. The total area of the veneer on the second-story exterior walls shall be permitted to extend up to 25 percent of the occupied second floor area.

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		2. The veneer on the second-story exterior walls shall be permitted to cover one side of the dwelling, including walls on bay windows and similar appurtenances within the one dwelling side. ~~the veneer exceeds the first-story height, with bracing at exterior braced wall lines and braced wall lines on the interior of the building shall be constructed using Method BV-WSP in accordance with this section and Figure R602.10.6.5. Cripple walls shall not be permitted, and required interior braced wall lines shall be supported on continuous foundations.~~ Townhouses in Seismic Design Categories D_0, D_1 and D_2 with stone or masonry veneer exceeding the first-story height shall be designed in accordance with accepted engineering practice.
	R602.10.11. Cripple wall bracing. Cripple walls shall be constructed in accordance with Section R602.9 and braced in accordance with this section. Cripple walls shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3), and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4), respectively, except that the length of cripple wall bracing shall be multiplied by a factor of 1.15. Where gypsum wall board is not used on the	

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	inside of the cripple wall bracing, the length adjustments for the elimination of the gypsum wallboard, or equivalent, shall be applied as directed in Tables R602.10.3(2) and R602.10.3(4) to the length of the cripple wall bracing required. This adjustment shall be taken in addition to the 1:15 increase. ~~The distance between adjacent edges of braced wall panels shall be reduced from 20 feet (6096 mm) to 14feet (4267 mm).~~	
	R602.12 Simplified wall design: Revised- 6. The structure shall be located where the ultimate ~~basic~~ wind speed is less than or equal to 130 ~~90~~ mph (58 ~~40~~ m/s), and the Exposure Category is B or C ~~A or B~~. Revised- 8. Cripple walls shall not be permitted in three-story ~~two-story~~ buildings.	
	R602.12.6.2 Method CSPF. Braced wall panels constructed as Method CS-PF in accordance with Section R602.10.6.4 shall be permitted when all framed portions of all exterior walls are sheathed with wood structural panels. Each CS-PF panel shall equal 0.75 ~~0.5~~ bracing units. Not more than ~~A maximum of~~ four CS-PF panels shall be permitted on all segments of walls parallel to each side of the circumscribed	

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	rectangle. Segments of wall that ~~which~~ include a Method CS-PF panel shall meet the requirements of Section R602.10.4.2.	
	R602.12.6.3 Methods ABW, PFH and PFG. Braced wall panels constructed as Method ABW, PFH and PFG shall be permitted when bracing units are constructed using wood structural panels. Each ABW and PFH panel shall equal one bracing unit and each PFG panel shall be equal to 0.75 bracing units.	
	TABLE R602.12.4. Revised.	
	SECTION R602 COLD-FORMED STEEL WALL FRAMING	
	R603.1.1 Applicability limits. The provisions of this section shall control the construction of exterior cold-formed steel wall framing and interior load-bearing cold-formed steel wall framing for buildings not more than 60 feet (18 288 mm) long perpendicular to the joist or truss span, not more than 40 feet (12 192mm) wide parallel to the joist or truss span, and less than or equal to three stories above grade plane. ~~All~~ Exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Cold-formed steel walls constructed in accordance with the provisions of this	**R603.1.1 Applicability limits**. The provisions of this section shall control the construction of exterior cold-formed steel wall framing and interior load-bearing cold-formed steel wall framing for buildings not more than 60 feet (18 288 mm) long perpendicular to the joist or truss span, not more than 40 feet (12 192mm) wide parallel to the joist or truss span, and less than or equal to three stories above grade plane. Exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Cold-formed steel walls constructed in accordance with the provisions of this section shall be limited to sites subjected to an ultimate design wind speed of 140 ~~139~~ miles per hour (62 m/s) Exposure B or C and a

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	section shall be limited to sites subjected to a ultimate ~~maximum~~ design wind speed of 139 ~~m~~iles per hour (62 ~~49~~ m/s) Exposure B or C and a maximum ground snow load is less than or equal to ~~of~~ 70 pounds per square foot (3.35 kPa).	maximum ground snow load is less than or equal to 70 pounds per square foot (3.35 kPa).
	R603.2 Structural framing. Load-bearing cold-framed steel wall framing members shall be in accordance with this section. ~~Load-bearing cold-formed steel wall framing members shall comply with Figure R603.2(l) and with the dimensional and minimum thickness requirements specified in Tables R603.2(l) and R603.2(2). Tracks shall comply with Figure R603.2(2) and shall have a minimum flange width of 1'/4 inches (32 mm).~~	
	R603.2.1 Material. Load-bearing cold-formed steel framing members shall be cold-formed to shape from structural quality sheet steel complying with the requirements of ASTM A 1003: Structural Grades 33 Type H and 50 Type H. ~~one of the following:~~ ~~1. ASTM A 653: Grades 33 and 50 (Class 1and 3).~~ ~~2. ASTM A 792: Grades 33 and 50A.~~ ~~3. ASTM A 1003: Structural Grades 33 Type H, and 50 Type H.~~	

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	R603.2.3 Dimension, thickness and material grade. New section inserted.	
	R603.3.2- Minimum stud sizes. Cold-formed steel walls shall be constructed in accordance with Figure R603.3.1(l), R603.3.1(2) or R603.3.1(3), as applicable. Exterior wall stud size and thickness shall be determined in accordance with the limits set forth in Tables R603.3.2(2) through R603.3.2(16 ~~31~~). Interior load-bearing wall stud size and thickness shall be determined in accordance with the limits set forth in Tables R603.3.2(2) through R603.3.2(16 ~~31~~) based upon an ultimate design wind speed of 115 ~~85~~ miles per hour (51 ~~38~~ m/s) Exposure Category B ~~A/B wind value~~ and the building width, stud spacing and snow load, as appropriate. Fastening requirements shall be in accordance with Section R603.2.5 ~~R603.2.4~~ and Table R603.3.2(l). Top and bottom tracks shall have the same minimum thickness as the wall studs. Exterior wall studs shall be permitted to be reduced to the next thinner size, as shown in Tables R603.3.2(2) through R603.3.2(16 ~~31~~), but not less than 33 mils (0.84 mm), where both of the following conditions exist:	

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	1. Minimum of ½- inch (12.7 mm) gypsum board is installed and fastened in accordance with Section R702 on the interior surface. 2. Wood structural sheathing panels of minimum 7/16inch-thick (11 mm) oriented strand board or l5/32inch-thick (12 mm) plywood is installed and fastened in accordance with Section R603.9.1 and Table R603.3.2(l) on the outside surface. Interior load-bearing walls shall be permitted to be reduced to the next thinner size, as shown in Tables R603.3.2(2) through R603.3.2(16 ~~3l~~), but not less than 33 mils (0.84 mm), where a minimum of 1/2-inch (12.7 mm) gypsum board is installed and fastened in accordance with Section R702 on both sides of the wall. The tabulated stud thickness for load- bearing walls shall be used when the attic load is 10 pounds per square feet (480 Pa) or less. A limited attic storage load of 20 pounds per square feet (960 Pa) shall be permitted provided that the next higher snow load column is used to select the stud size from Tables R603.3.2(2) through R603.3.2(16 ~~31~~). For two-story buildings, the tabulated stud thickness for walls supporting one floor, roof and ceiling shall be used when	

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	second floor live load is 30 pounds per square feet (1440 Pa). Second floor live loads of 40 psf (1920 pounds per square feet) shall be permitted provided that the next higher snow load column is used to select the stud size from Tables R603.3.2(2) through R603.3.2(11 ~~21~~). For three-story buildings, the tabulated stud thick¬ ness for walls supporting one or two floors, roof and ceiling shall be used when the third floor live load is 30 pounds per square feet (1440 Pa). Third floor live loads of 40 pounds per square feet (1920 Pa) shall be permit¬ ted provided that the next higher snow load column is used to select the stud size from Tables R603.3.2(22) through R603.3.2(16 ~~31~~).	
	TABLE R603.3.1. Revised.	**TABLE R603.3.1 WALL TO FOUNDATION CONENCTION REQUIREMENTS.** Revised.
	TABLE R603.3.1(1). Revised.	**TABLE R603.3.1(1) GABLE ENDWALL TO FLOOR CONNECTION REQUIREMENTS.** Revised.
	TABLE R603.3.1(2). Revised.	**TABLE R603.3.1(2) GABEL ENDWALL BOTTOM TRACK TO FOUNDATION CONNECTION REQUIREMENTS.** Revised.
	TABLE R603.3.2(2). Revised.	**TABLE R603.3.2(2) 24-FOOT-WIDE BUILDING SUPPORTING ROOF AND VEILING ONLY.** Revised.
	TABLE R603.3.2(3). Revised.	**TABLE R603.3.2(3) 24-FOOT-WIDE BUILDING SUPORTING ROOF AND CEILING ONLY.** Revised.

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	TABLE R603.3.2(4). Revised.	**TABLE R603.3.2(4) 24-FOOT-WIDE BUILDING SUPPORTING TOOF AND CEILING ONLY.** Revised.
	TABLE R603.3.2(5). Revised.	**TABLE R603.3.2(5) 35-FOOT-WAIDE BUILDING SUPPRTING ROOF AND CEILING ONLY.** Revised.
	TABLE R603.3.2(6). Revised.	**TABLE R603.3.2(6) 40-FOOT-WIDE BUILDING SUPPORTING ROOF AND C EILING ONLY.** Revised.
	TABLE R603.3.2(7). Revised.	**TABLE R603.3.2(7) 24-FOOT-WIDE BUILDING SUPPORTING ONE FLOOR, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(8). Revised.	**TABLE R603.3.2(8) 28-FOOT-WIDE BUILDING SUIPPORTING ONE FLOOR, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(9). Revised.	**TABLE R603.3.2 32-FOOT-WIDE BJUILDING SUIPPORTING ONE FLOOR, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(10). Revised.	**TABLE R603.3.2(10) 36-FOOT-WIDE SUPPORTING ONE FLOOR, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(11). Revised.	**TABLE R603.3.2(11) 40-FOOT-WIDE BUILDING SUPPORTING ONE FLOOR, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(12). Revised.	**TABLE R603.3.2(12) 24-FOOT WIDE BUILDING SUPPORTING TWO FLOORS, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(13). Revised.	**TABLE R603.3.2(13) 28-FOOT-WIDE BIULDING SUPPORTING TWO FLOORS, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(14) Revised.	**TABLE R603.3.2(14) 32-FOOT-WIDE BUILDING SUPPORTING TWO FLOORS, ROOF AND CEILING** Revised.

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	TABLE R603.3.2(15). Revised.	**TABLE R603.3.2(15) 36-FOOT-WIDE BUILDING SUPPORTING TWO FLOOR, ROOF AND CEILING.** Revised.
	TABLE R603.3.2(16). Revised.	**TABLE R603.3.2(16) 40-FOOT-WIDE BUILDING SUPPORTING TWO FLOORS, ROOF AND CEILING.** Revised.
	TABLE R603.3.2.1(1). Revised.	**TABLE R603.3.2.1(1) ALL BUILDING WIDTHS GABLE ENDWALLS 8,9 OR 10 FEET IN HEIGHT.** Revised.
	TABLE R603.3.2.1(2). Revised.	**TABLE R603.3.2.1(2) ALL BUILDING WIDTHS GABLE ENDWALLS OVER 10 FEET IN HEIGHT.** Revised.
	TABLE R603.6(1). Revised.	
	TABLE R603.6(2). Revised.	
	TABLE R603.6(3). Revised.	
	TABLE R603.6(4). Revised.	
	TABLE R603.6(5). Revised.	
	TABLE R603.6(6). Revised.	
		R603.2.5 Splicing. Steel studs and other structural members shall not be spliced without an approved design. Tracks shall be spliced in accordance with Figure R603.3.5.
		TABLE R603.7(2) HEADER TO KING STUD CONNECTION REQUIREMENTS. Revised.
		TABLE R603.8 HEAD AND SILL TRACK SPAN. Revised.
	R603.9.2 Determination of minimum length of full-height sheathing. **Exception:** Where stone or masonry veneer is installed, the required length of full-height sheathing and overturning anchorage required shall be determined in accordance with Section R603.9.5.	

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	TABLE R603.8. Revised.	
	R603.9.4.1 Wind speeds greater than 126 ~~100~~ mph. Where wind speeds are in excess of 126 ~~100~~ miles per hour (56 ~~45~~ m/s), Exposure Category C, walls shall be provided wind direct uplift connections in accordance with AISI S230, Section E13.3, and AISI S230, Section F7.2, as required for 139 ~~110~~ miles per hour (56 ~~49~~ m/s), Exposure Category C.	**R603.9.4.1 Wind speeds greater than 126 mph**. Where wind speeds are in excess of 130 ~~126~~ miles per hour (58 ~~56~~ m/s), Exposure Category C, walls shall be provided wind direct uplift connections in accordance with AISI S230, Section E13.3, and AISI S230, Section F7.2, as required for 140 ~~139~~ miles per hour (63 ~~56~~ m/s), Exposure Category C.
		TABLE R603.9.2(1) MINIMUM PERCENTAGE OF FULL-HEIGHT STRUCTURAL SHEATHING ON EXTERIOR WALLS. Revised.
	R603.9.5 Structural sheathing for stone and masonry veneer. ~~In Seismic Design Category C,~~ Where stone and masonry veneer is installed in accordance with Section R703.8 ~~R703.7~~, the length of structural sheathing for exterior and interior wall lines backing or perpendicular to and laterally supported with veneer shall comply with this section. ~~Walls supporting one story, roof and ceiling shall be the greater of the amount required by Section R603.9.2 or 36 percent, modified by Section R603.9.2 except Section R603.9.2.2 shall not be permitted.~~	
	R603.9.5.1 Seismic Design Category C. New section.	

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	R603.9.5.1 Seismic Design Categories D_0, D_1 and D_2. New section.	
	TABLE R603.9.5(1) REQUIRED LENGTH OF FULL-HEIGHT SHEATING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 33-MIL COLD-FORMED STEEL FRAMING AND 6-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING. New table.	
	TABLE R603.9.5(2) REQUIRED LENGTH OF FULL-HEIGHT SHEATING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 43-MIL COLD-FORMED STEEL FRAMING AND 6-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING. New table.	
	TABLE R603.9.5(3) REQUIRED LENGTH OF FULL-HEIGHT SHEATING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 33-MIL COLD-FORMED STEEL FRAMING AND 4-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING. New table.	

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	TABLE R603.9.5(4) REQUIRED LENGTH OF FULL-HEIGHT SHEATING AND ASSOCIATED OVERTURNING ANCHORAGE FOR WALLS SUPPORTING WALLS WITH STONE OR MASONRY VENEER AND USING 43-MIL COLD-FORMED STEEL FRAMING AND 4-INCH SCREW SPACING ON THE PERIMETER OF EACH PANEL OF STRUCTURAL SHEATHING. New table.	
	R604.3 Installation. Wood structural panel wall sheathing shall be attached to framing in accordance with Table R602.3(l) or R602.3(3). ~~Wood structural panels marked Exposure 1or Exterior are considered water-repellent sheathing under the code.~~	
	R606.2 Masonry construction materials. New section and subsections inserted.	
		R606.2.3 AAC masonry. AAC masonry units shall conform to ASTM C1691 and ASTM C1693 ~~C 1386~~ for the strength class specified.
		R606.2.6 Adhered manufactured stone masonry veneer units. New section inserted.
	TABLE R606.2.7 MORTAR PROPOSTIONS. New table inserted.	
	R606.3 Construction requirements. New section and subsections inserted.	
	R606.3.4 Protection for reinforcement. New section and subsections inserted.	

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	TABLE R606.3.4.1 MINIMUM CORROSION PROTECTION. New table inserted.	
	R606.3.5 Grouting requirements. New section and subsections inserted.	
	TABLE R606.2.11 GROUT PROPORTIONS BY VOLUME FOR MASONRY CONSTRUCTION. New table inserted.	
	TABLE R606.3.5.1 GROUT SPACE DIMENSIONS AND POUR HEIGHTS. New table inserted.	
	R606.3.6 Grouted multiple-wythe masonry. New section and subsections inserted.	
	R606.3.7 Masonry bonding pattern. New section and subsections inserted.	
	R606.6.3 Beam supports. New section inserted.	
	R606.6.3.1 Joist bearing. New section inserted.	
	R606.6.4 Lateral support. New section inserted.	
	TABLE R606.6.4 SPACING OF LATERAL SUPPORT FOR MASONRY WALLS. New table inserted.	
	R606.6.4.1 Horizontal lateral support. New section supports.	
	R606.6.4.1.1 Bonding pattern. New section inserted.	
	R606.6.4.1.2 Metal reinforcement. New section inserted.	

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	R606.6.4.2 Vertical lateral support. New section inserted.	
	R606.6.4.2.1 Roof structures. New section inserted.	
	R606.6.4.2.2 Floor diaphragm. New section inserted.	
	R606.9 Allowable stress. New section and subsections inserted.	
	TABLE R606.9 ALLOWABLE COMPRESSIVE STRESSES FOR EMPIRICAL DESIGN OF MASONRY. New table inserted.	
	R606.12.3 Seismic Design Category D_0 or D_1. Structures in Seismic Design Category D_0 or D_1 shall comply with the requirements of Seismic Design Category C and the additional requirements of this section. AAC masonry shall not be used for the design of masonry elements that are part of the lateral force-resisting system.	
	R606.13 Multiple-wythe masonry. New sections and subsections.	
	SECTION R607 ~~R610~~ GLASS UNIT MASONRY. Section and all subsections renumbered.	
	SECTION R608 ~~R611~~ EXTERIOR CONCRETE WALL CONSTRUCTION. Section and subsections renumbered.	
	R608.5.1.1. Cements. The following standards as referenced in Chapter 44 shall be permitted to be used.	

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	1. ASTM C 150 2. ASTM C 595 3. ASTM C 595 4. ASTM C 1157	
	R608.6.2 Wall reinforcement for wind. Vertical wall reinforcement for resistance to out-of-plane wind forces shall be determined from Table R608.6(1), R608.6(2), R608.6(3) or R608.6(4) ~~R611.6(1), R611.6(2), R611.6(3) or R611.6(4)~~. For the design of non-load bearing walls, in Tables R608.6(1), R608.6(2) and R608.6(3) use the appropriate column labeled "TOP". ~~Also, see Sections R611.7.2.2.2 and R611.7.2.2.3.~~ There shall be a vertical bar at all corners of exterior walls. Unless more horizontal reinforcement is required by Section R611.7.2.2.1, the minimum horizontal reinforcement shall be four No. 4 bars [Grade 40 (280 MPa)] placed as follows: top bar within 12 inches (305 mm) of the top of the wall, bottom bar within 12 inches (305 mm) of the finish floor, and one bar each at approximately one-third and two-thirds of the wall height.	
	TABLE 608.6(2) MINIMUM VERTICAL REINFORCEMENT FOR WAFFLE-GRID ABOVE-GRADE WALLS. Revised.	

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	TABLE 608.6(3) MINIMUM VERTICAL REINFORCEMENT FOR 6-INCH SCREEN - GRID ABOVE-GRADE WALLS. Revised.	
	TABLE 608.6(4) MINIMUM VERTICAL REINFORCEMENT FOR FLAT, WAFFLE, AND SCREEN-GRID ABOVE-GRADE WALLS DESIGNED WITH FOUNDATION STEM WALLS. Revised.	
	TABLE 608.7(1A) UNREDUCED LENGTH, UR, OF SOLID WALL REQUIRED AT EACH EXTERIOR ENDWALL FOR WIND PERPENDICULAR TO RIDGE ONE STORY OR TOP STORY OF TWO STORY. Revised.	
	TABLE 608.7(1B) UNREDUCED LENGTH, UR, OF SOLID WALL REQUIRED AT EACH EXTERIOR ENDWALL FOR WIND PERPENDICULAR TO RIDGE FIRST STORY OF TWO STORY. Revised.	
	TABLE 608.7(1C) UNREDUCED LENGTH, UR, OF SOLID WALL REQUIRED AT EACH EXTERIOR ENDWALL FOR WIND PARALLEL TO RIDGE. Revised.	
	R608.7.2.2.1 ~~R611.7.2.2.1~~ Horizontal shear reinforcement. Where reduction factors for design strength, $\underline{R_{3\_Rv}}$ ~~-~~from Table R608.7(4) ~~R611.7(4)~~ based on horizontal and vertical shear reinforcement being provided are used, solid wall segments shall have horizontal reinforcement consisting of minimum No.	

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	4 bars. Horizontal shear reinforcement shall be the same grade of steel required for the vertical reinforcement at the ends of solid wall segments by Section R611.7.2.2.2. The spacing of horizontal reinforcement shall not exceed the smaller of one-half the length of the solid wall segment, minus 2 inches (51 mm), and 18 inches (457 mm). Horizontal shear reinforcement shall terminate in accordance with Section R611.6.4.	
	R611.10 Floor, roof and ceiling diaphragms. Floors and roofs in all buildings with exterior walls of concrete shall be designed and constructed as diaphragms. Where gable-end walls occur, ceilings shall also be designed and constructed as diaphragms. The design and construction of floors, roofs and ceilings of wood framing or cold-formed-steel framing serving as diaphragms shall comply with the applicable requirements of this code, or AWC WFCM or AISI S230, ~~AF&PA/WFCM or AISI S230,~~ if applicable. Wood framing members shall be of a species having a specific gravity equal to or not greater than 0.42.	
	TABLE R608.9(1) WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR. Revised.	

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	TABLE R608.9(2) WOOD-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL Revised.	
	TABLE R608.9(3) WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR. Revised.	
	TABLE R608.9(4) WOOD-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL. Revised.	
	TABLE R608.9(5) COLD-FORMED STEEL-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PERPENDICULAR. Revised.	
	TABLE R608.9(6) COLD-FORMED STEEL-FRAMED FLOOR TO SIDE OF CONCRETE WALL, FRAMING PARALLEL. Revised.	
	TABLE R608.9(7) COLD-FORMED STEEL-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR. Revised.	
	TABLE R608.9(8) COLD-FORMED STEEL-FRAMED FLOOR TO TOP OF CONCRETE WALL, FRAMING PARALLEL. Revised.	
	TABLE R608.9(9) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR. Revised.	
	TABLE R608.9(10) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL. Revised.	

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	TABLE R608.9(11) WOOD-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PERPENDICULAR. Revised.	
	TABLE R608.9(12) COLD-FORMED STEEL-FRAMED ROOF TO TOP OF CONCRETE WALL, FRAMING PARALLEL. Revised.	
	SECTION R609 ~~R612~~ EXTERIOR WINDOWS AND DOORS. Section and subsections renumbered.	
	R609.2 ~~R612.2~~ Performance. Exterior windows and doors shall be designed to resist the design wind loads specified in Table R301.2(2) adjusted for height and exposure in accordance with Table R301.2(3) or determined in accordance with ASCE 7 using the allowable stress design load combinations of ASCE 7. Design wind loads for exterior glazing not part of a labeled assembly shall be permitted to be determined in accordance with Chapter 24 of the International Building Code.	
	R612.3 Testing and labeling. Exterior windows and sliding doors shall be tested by an approved independent laboratory, and bear a label identifying manufacturer, performance characteristics and approved inspection agency to indicate compliance with AAMA/WDMA/CSA 101/I.S.2/A440. Exterior side-hinged doors shall be tested	

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	and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 or AMD 100, or comply with Section R612.5. **Exception:** Decorative glazed openings.	
	R609.3.1 ~~R612.3.1~~ Comparative analysis. Structural wind load design pressures for window and door units different ~~smaller~~ than the size tested in accordance with Section R609.3 ~~R612.3~~ shall be permitted to be higher than the design value of the tested unit where determined in accordance with one of the following comparative analysis methods: 1. Structural wind load design pressures for window and door units smaller than the size tested in accordance with Section R609.3 shall be permitted to higher than the design value of the tested unit provided that such higher pressures are determined by accepted engineering analysis. Components of smaller units shall be the same as those of the tested unit. Where such calculated design pressures are used, they shall be validated by an additional test of the window or door unit having the highest allowable design pressure.	

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	2. In accordance with WDMA I.S.11. ~~provided such higher pressures are determined by accepted engineering analysis. All Components of the smaller unitssmall unit shall be the same as those of the tested unit. Where such calculated design pressures are used, they shall be validated by an additional test of the window or door unit having the highest allowable design pressure.~~	
	SECTION R610 ~~R613~~ STRUCTURAL INSULATED PANEL WALL CONSTRUCTION. Section and subsections renumbered.	
		R610.3 Materials. SIPs shall comply with the requirements of ANSI/APA PRS 610.1. ~~following criteria:~~ ~~1. ASTM C 578 and have a minimum density of 0.90 pounds per cubic feet (14.4 kg/m^2).~~ ~~2. Polyurethane meeting the physical properties shown in Table R610.3.1.~~ ~~3. An approved alternative.~~ ~~All cores shall meet the requirements of Section R316.~~
		R602.5.3 Panel-to-panel connection. New section inserted.
		R602.5.4 Corner bracing. New section inserted.
	R613.2 Applicability limits. The provisions of this section shall control the construction of exterior structural insulated panel walls and interior load-	

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	bearing structural insulated panel walls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist or truss span, not greater than 40 feet (12 192 mm) in width parallel to the joist or truss span and not greater than two stories in height with each wall not greater than 10 feet (3048 mm) high. All exterior walls installed in accordance with the provisions of this section shall be considered as load-bearing walls. Structural insulated panel walls constructed in accordance with the pro¬ visions of this section shall be limited to sites subjected to a maximum design wind speed (V_{ult}) of 155 ~~120~~ miles per hour (69 ~~54~~ m/s), Exposure ~~A or~~ B or 140 ~~110~~ miles per hour (63 ~~49~~ m/s) Exposure C, and a maximum ground snow load of 70 pounds per foot (3.35 kPa), and Seismic Design Categories A, B and C.	
	TABLE R610.5(1) ~~R613.5(1)~~ MINIMUM THICKNESS FOR SIP WALL SUPPORTING SIP OR LIGHT-FRAME ROOF ONLY (inches)3. Revised	
	TABLE R610.5(2) ~~R613.5(2)~~ MINIMUM THICKNESS FOR SIP WALLS SUPPORTING SIP OR LIGHT-FRAME ONE STORY AND ROOF (inches)3. Revised.	

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	CHAPTER 7 WALL COVERINGS	
		R702.3.1.1 Adhesives. New section.
	R702.3.7 Horizontal gypsum board diaphragm ceilings. Gypsum board and gypsum panel products ~~Use of gypsum board~~ shall be permitted on wood joists to create a horizontal diaphragm in accordance with Table R702.3.6 ~~R702.3.7~~. Gypsum board and gypsum panel products shall be installed perpendicular to ceiling framing members. End joints of adjacent courses of board shall not occur on the same joist. The maximum allowable diaphragm proportions shall be 1 ½:1 between shear resisting elements. Rotation or cantilever conditions shall not be permitted. Gypsum board shall not be used in diaphragm ceilings to resist lateral forces imposed by masonry or concrete construction. ~~All~~ Perimeter edges shall be blocked using wood members not less than 2-inch by 6-inch (51 mm by 152 mm) nominal dimension. Blocking material shall be installed flat over the top plate of the wall to provide a nailing surface not less than 2 inches (51 mm) in width for the attachment of the gypsum board or gypsum panel product.	
	R702.4.2 Backer board. ~~Fiber-cement, fiber-mat reinforced cementitious backer~~	

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	~~**units, glass mat gypsum backers and fiber-reinforced gypsum backers**~~. Materials used as backers for wall tile in tub and shower areas and wall panels in shower areas shall be of materials listed in Table R702.4.2, and shall be installed in accordance with the manufacturer's recommendations. ~~Fiber-cement, fibermat reinforced cementitious backer units, glass mat gyp- sum backers or fiber-reinforced gypsum backers in compliance with ASTM C 1288, C 1325, C 1178 or C 1278, respectively, and installed in accordance with manufacturers' recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas.~~	
	TABLE R702.4.2 BACKER BOARD MATERIALS. New table inserted.	
	R703.3 Nominal thickness and attachments. New section inserted.	
	TABLE R703.3(2) SCREW FASTENER SUBSTITUTION FR SIDING ATTACHMENT TO COLD-FLORMED STEEL LIGHT FRAME CONSTRUCTION. New table inserted.	
	R703.3.1 Wind limitations. New section inserted.	**R703.3.1 Soffit installation.** New section inserted**.** New section and subsections inserted.
	TABLE R703.3.1 LIMITS FOR ATTACHMENT PER TABKE R703.3(1). New table inserted.	

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	TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS. New table inserted.	
	R703.3.2 Fasteners. New section.	
	R703.3.3 Minimum fastener length and penetration. New section.	
	R703.4 ~~R703.8~~ Flashing. Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714.The flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashings shall be installed at all of the following locations:	
	R703.5 ~~R703.3~~ Wood, hardboard and wood structural panel siding. Wood, hardboard and wood structural panel siding shall be installed in accordance with this section and Table R703.3(1). Hardboard siding shall comply with CPA/ANSI A135.6. Hardboard siding used as architectural trim shall comply with CPA/ANSI 135.7.	

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	R703.5.1 Vertical wood siding. New section inserted.	
	R703.5.2 ~~R703.3.1~~ Panel siding. 3/8-inch (9.5 mm) wood structural panel siding shall not be applied directly to studs spaced more than 16 inches (406 mm) on center where long dimension is parallel to studs. Wood structural panel siding 7/16 inch (11.1 mm) or thinner shall not be applied directly to studs spaced more than 24 inches (610 mm) on center. The stud spacing shall not exceed to panel span rating provided by the manufacturer unless then panels are installed with the face grain perpendicular to the studs or over sheathing approved for that stud spacing. Joints in wood, hard board or wood structural panel siding shall be made as follows unless otherwise approved. Vertical joints in panel siding shall occur over framing members, unless wood or wood structural panel sheathing is used, and shall be ship lapped or covered with a batten. Horizontal joints in panel siding shall be lapped a minimum of 1 inch (25 mm) or shall be ship lapped or shall be flashed with Z-flashing and occur over solid blocking wood or wood structural panel sheathing.	

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	R703.6.1 ~~R703.5.1~~ Application. Wood shakes or shingles shall be applied either single-course or double-course over nominal ½-inch (12.7 ~~13~~ mm) wood-based sheathing or to furring strips over ‘/2-inch (13 mm) nominal non-wood-sheathing . A ~~permeable~~ water-resistive barrier shall be provided over all sheathing, with horizontal overlaps in the membrane of not less than 2 inches (51 mm) and vertical overlaps of not less than 6 inches (152 mm). Where horizontal furring strips are used, they shall be 1 inch by 3 inches or 1 inch by 4 inches (25 mm by 76 mm or 25 mm by 102mm) and shall be fastened ~~horizontally~~ to the studs with 7d or 8dbox nails and shall be spaced a distance on center equal to the actual weather exposure of the shakes or shingles, not to exceed the maximum exposure specified in Table R703.6.1 ~~R703.5.2~~. When installing shakes or shingles over a nonpermeable water-resistive barrier, fjurring strips shall be placed first vertically over the barrer and in addition, horizontally furring strips shall be fastened to the vertical furring strips prior to attaching the shakes or shingles to the horiztonal furring strips. The spacing between adjacent shingles to allow for	

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	expansion shall not exceed 1/8 inch (3.2 mm) to ¼ inch (6 mm) apart, and between adjacent shakes, it shall not ~~exceed~~ be 3/8 inch (9.5 mm) to ½ inch (12.7 ~~13~~ mm) apart. The offset spacing between joints in adjacent courses shall be a minimum of 1'/2 inches (38 mm).	
	TABLE R703.6.1 ~~R703.5.2~~ MAXIMUM WEATHER EXPOSURE FOR WOOD SHAKES AND SHINGLES ON EXTERIOR WALLS 3. Revised	
	TABLE R703.6.3(1). SINGLE COURSE SIDEWAKK FASTENERS. Revised.	
	TABLE R703.6.3(2). DOUBLE COURSE SIDEWAKK FASTENERS. Revised.	
		R703.7.1 Lath. **Exception:** Lath is not required over masonry, cast-in-place concrete, precast concrete or stone substrates prepared in accordance with ASTM C1063.
		R703.7.2 Plaster. Plastering with ~~portland~~ cement plaster shall be in accordance with ASTM C926. Cement materials shall be in accordance with one of the following: 1. Masonry cement conforming to ASTM C91 Type M, S or N. 2. Portland cement conforming to ASTM C150 Type I, II, or III. 3. Blended hydraulic cement conforming to ASTM C595 Type IP, IS (<70), IL, or IT (S<70).

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		4. Hydraulic cement conforming to ASTM C1157 Type GU, HE, MS, HS, or MH. 5. Plastic (stucco) cement conforming to ASTM C1328. Plaster shall be not less than three coats where applied over metal lath or wire lath and shall be not less than two coats where applied over masonry, concrete, pressure-preservative-treated wood or decay-resistant wood as specified in Section R317.1 or gypsum backing. If the plaster surface is completely covered by veneer or other facing material or is completely concealed, plaster application need be only two coats, provided the total thickness is as set forth in Table R702.1(1). On wood-frame construction with an on-grade floor slab system, exterior plaster shall be applied to cover, but not extend below, lath, paper and screed. The proportion of aggregate to cementitious materials shall be as set forth in Table R702.1(3).
	R703.8 Anchored stone and masonry veneer, general. New section and subsections.	
		R703.8.4 Anchorage. Masonry veneer shall be anchored to the supporting wall studs with corrosion-resistant metal ties embedded in mortar or grout and extending into the veneer a minimum 1 ½ inches (38 mm), with not less than 5/8-inch (15.9 mm) mortar or grout cover to outside face. Masonry veneer shall conform to Table R703.8.4(1). For masonry veneer tie attachment through insulating

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		sheathing not greater than 2 inches (51 mm) in thickness to not less than 7/16 performance category wood structural panel, see Table R703.8.4(2).
		TABLE R703.8.4(1) ~~R703.8.4~~ TIE ATTACHMENT AND AIRSPACE REQUIREMENTS. Renumbered**.**
		TABLE 703.8.4(2) REQUIRED BRICK TIE SPACING FOR DIRECT APPLICATION TO WOOD STRUCTURAL PANEL SHEATHING. New table.
	R703.11.1.1 Fasteners ~~R703.ll.1.1Vinyl soffit panels~~. Unless specified otherwise by the manufacturer's instructions, fasteners for vinyl siding shall be 0.120-inch (3 mm) shank diameter nail with a 0.313-inch (8 mm) head or 16-gauge staple with a 3/8-inch (9.5 mm) to ½-inch (12.7 mm) crown. ~~Soffit panels shall be individually fastened to a supporting component such as a nailing strip, fascia or subfascia component or as specified by the manufacturer's instructions~~.	
	R703.11.1.2 Penetration depth. New section.	
	R703.11.1.3 Spacing. New section.	
	R703.11.1.4 Vinyl soffit panels. New section.	
		R703.11.2 Installation over foam plastic sheathing. Where vinyl siding and insulated vinyl siding used with foam plastic sheathing shall be installed in accordance with Section R703.11 ~~R703.11.2.1,~~

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		~~R703.11.2.2 or R703.11.2.3~~ and shall have a design wind pressure resistance in accordance with Table R703.11.2. **Exception:** 1. Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1. 2. Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions. 3. Where the foam plastic sheathing and its attachment have a design wind pressure resistance complying with Sections R316.8 and R301.2.1, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.
	R703.11.2.1 Basic wind speed not exceeding 115 ~~90~~ miles per hour and Exposure Category B. Where the basic wind speed does not exceed 115 ~~90~~ miles per hour (51 ~~40~~ m/s), the Exposure	

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	Category is B and gypsum wall board or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1'/4inches (32 mm) using minimum 0.120-inch diameter nail (shank) with a minimum 0.313-inch diameter head, 16 inches on center. The foam plastic sheathing shall be minimum V2-inch-thick (12.7 mm) (nominal) extruded polystyrene per ASTM C 578, '/2-inch-thick (12.7 mm) (nominal) polyisocyanurate per ASTM C 1289, or 1inch-thick (25 mm) (nominal) expanded polystyrene per ASTM C 578.	
	R703.11.2.2Basic wind speed exceeding 115 ~~90~~ miles per hour or Exposure Categories C and D. Where the basic wind speed exceeds 115 ~~90~~ miles per hour (51 ~~40~~ m/s) or the Exposure Category is C or D, or all conditions of Section R703.ll.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Tables R301.2(2) adjusted for height and exposure using Table R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product	

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	specifications shall be adjusted for the following wall assembly conditions: 1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39. 2. For wall assemblies with foam plastic sheathing on the exterior side and no gypsum wall board or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.	
	R703.12 Adhered masonry veneer installation. Adhered masonry veneer shall <u>comply with the requirements of Section R703.7.3 and the requirements in Sections 12.1 ans 12.3 of TMS 402/ACI 530/ASCE 5. Adhered masonry veneer shall be installed in accordance with Section R703.7.1, Article 3.3C of TMS 602/ACI 530.1/ASCE 6 or</u> ~~installed in accordance with~~ the manufacturer's instructions.	
	R703.12.2 Flashing at foundation. A corrosion-resistant screed or flashing of a minimum 0.019-inch (0.48 mm) or 26-gage galvanized or plastic with a minimum vertical attachment flange of 3'/2 inches	

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	(89 mm) shall be installed to extend a minimum of 1inch (25 mm) below the foundation plate line on exterior stud walls in accordance with Section R703.8. The water-resistive barrier, as required by Table R703.4~~, Footnote w, shall lap over the exterior of the attachment flange of the screed or flashing~~.	
	R703.12.3 Water-reactive barrier. New section.	
	R703.13 Insulated vinyl siding. New section and subsections.	
	R703.14 Polypropylene siding. New section and subsections.	
		R703.14.3 Flame spread index. New section.
		TABLE R703.11.2 ADJUSTED MINIMUM DESIGN WIND PRESSURE REQUIREMENT FOR VINYL SIDING. New table.
	R703.15 Cladding attachment over foam sheathing to wood framing. New section and subsections.	
		TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHAETHING TO SUPPORT CLADDING WEIGHT. Revised.
	R703.16 Cladding attachment over foam sheathing to cold-form steel framing. New section and subsections.	
		TABLE R703.16.1 CLADDING MINIMUM FASETNING REQUIREMENTS FOR DIRECT ATTACHMENT OVER

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		FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT. Revised.
		TABLE R703.16.1 FURRING MINIMUM FASETNING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT. Revised.
	R703.17 Cladding attachment over foam sheathing to masonry or concrete wall construction. New section and subsections.	
	CHAPTER 8 ROOF-CEILING CONSTRUCTION	**CHAPTER 8 ROOF-CEILING CONSTRUCTION**
	R802.1 General ~~Identification~~. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section ~~Load-bearing dimension lumber for rafters, trusses and ceiling joists shall be identified by a grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted~~.	
	R802.1.1 Sawn lumber ~~Blocking~~. Revised ~~Blocking shall be a minimum of utility grade lumber~~.	

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	R802.1.2 Structural glued laminated timbers. New section.	
	R802.1.3 Structural log members. New section.	
	R802.1.4 Structural composite lumber. New section.	
		R802.1.5.4 Labeling. In addition to the labels required by Section 802.1.1 for sawn lumber and Section 803.2.1 for wood structural panels, each piece of fire-retardant-rated lumber and wood structural panels shall be labeled. The label shall contain:
	R802.1.6 Cross-laminated timbers. New section.	
	R802.1.7 Engineered wood rim board. New section.	
		R802.1.8 Prefabricated wood I-joists. New section.
		R802.2 Design and construction. The roof and ceiling assembly shall provide continuous ties across the structure to prevent roof thrust from being applied to the supporting walls. The assembly shall be designed and constructed ~~The framing details required in Section R802 apply to roofs having a minimum slope of three units in 12 units horizontal (25 percent slope) or greater. Roof ceilings shall be designed and constructed~~ in accordance with the provisions of this chapter and Figures R606.11(11), R606.11(12) and R606.1.3(3) or in accordance with AWC NDS. ~~Components of roof ceilings shall be fastened in accordance with Table R602.3(1).~~

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		R802.3 Ridge. New section.
	R802.3.3 Blocking. New section.	
		R802.4 Rafters. New section.
		R802.4.1 Ridge size. New section.
		R802.4.4 Rafter supports. New section.
		R802.4.6 Collar ties. New section.
		R802.5 Ceiling joists. New section and subsections.
	TABLE R802.11 RAFTER OR TRUSS UPLIFT CONNECTION FORCES FROM WIND (POUNDS PER CONNECTION). Revised.	
		R803.2.3 Installation. Wood structural panel used as roof sheathing shall be installed with joints staggered or not staggered in accordance with Table R602.3(1), APA E30 for wood roof framing or with Table R804.3 for cold-formed steel roof framing. Wood structural panel roof sheathing in accordance with Table R503.2.1.1(1) shall not cantilever more than 9 inches (229 mm) beyond the gable endwall unless supported by gable overhang framing.
	R804.2.1 Material. Load-bearing, cold-formed steel framing members shall be cold-formed to shape from structural quality sheet steel complying with the requirements of ASTM A 1003, Structural Grades 33 Type H and 50 Type H.~~one of the following:~~ ~~1. ASTM A 653: Grades 33 and 50 (Class 1 and 3).~~ ~~2. ASTM A 792: Grades 33 and 50A.~~	

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	~~3. ASTM A 1003: Structural Grades 33 Type Hand 50 Type H.~~	
	R804.2.3 Dimension, thickness and material grade. New section.	
	R804.2.5 ~~R804.2.4~~ Fastening requirements. Screws for steel-to-steel connections shall be installed with a minimum edge distance and center-to-center spacing of '/2 inch (12.7 ~~13~~ mm), shall be self-drilling tapping, and shall conform to ASTM C 1513. Structural sheathing shall be attached to cold-formed steel roof rafters with minimum No. 8 self-drilling tapping screws that conform to ASTM C 1513. Screws for attaching structural sheathing to cold-formed steel roof framing shall have a minimum head diameter of 0.292 inch (7.4 mm) with countersunk heads and shall be installed with a minimum edge distance of 3/8 inch (9.5 ~~10~~ mm). Gypsum board ceilings shall be attached to cold-formed steel joists with minimum No. 6 screws conforming to ASTM C 954 or ASTM C 1513 with a bugle-head style and shall be installed in accordance with Section R805.For all connections, screws shall extend through the steel a minimum of three exposed threads. Fasteners shall have rust-inhibitive coating suitable for	

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	the installation in which they are being used, or be manufactured from material not susceptible to corrosion. Where No. 8 screws are specified in a steel-to-steel ~~connection, reduction of the required number of screws in the connection is permitted in accordance with the reduction factors in Table R804.2.4 when larger screws are used or when one of the sheets of steel being connected is thicker than 33 mils (0.84 mm). When applying the reduction factor, the resulting number of screws shall be rounded up.~~	
	TABLE R804.3 ROOF FRAMING FASTENING SCHEDULE. Revised.	
	TABLE R804.3.1.1(1) CEILING JOIST SPANS SINGLE SPANS WITH BEARING STIFFENERS 10 PSF LIVE LOAD (NO ATTIC STORAGE). Revised.	**TABLE R804.3.1.1(1) CEILING JOIST SPANS SINGLE SPANS WITH BEARING STIFFENERS 10 PSF LIVE LOAD (NO ATTIC STORAGE).** Revised.
	TABLE R804.3.1.1(2) CEILING JOIST SPANS SINGLE SPANS WITH BEARING STIFFENERS 20 ~~10~~ PSF LIVE LOAD (LIMITED ~~NO~~ ATTIC STORAGE). Revised.	**TABLE R804.3.1.1(2) CEILING JOIST SPANS SINGLE SPANS WITH BEARING STIFFENERS 20 PSF LIVE LOAD (LIMITED ATTIC STORAGE).** Revised.
	TABLE R804.3.2.1(1) ROOF RAFTER SPANS. Revised.	**TABLE R804.3.2.1(1) ROOF RAFTER SPANS.** Revised.
		TABLE R804.3.2.1(2) ULTIMATE DESIGN WIND SPEED TO EQUIVALENT SNOW LOAD CONVERSION. Revised.
	R804.3.8 ~~R804.3.9~~ Roof tie-down. Roof assemblies shall be connected to walls	

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	below in accordance with Table R804.3. A continuous load path shall be provided to transfer uplift loads to the foundation. ~~subject to wind uplift pressures of 20 pounds per square foot (0.96 kPa) or greater, as established in Table R301.2(2), shall have rafter-to-bearing wall ties provided in accordance with Table R802.ll.~~	
		TABLE R804.3.7.1 REQUIRED LENGTHS FOR CEILING DIAPHRAGMS AT GABLE ENDWALLS GYPSUM BOARD SHEATHED, CEILING HEIGHT = 8 FEET. Revised.
	R806.1 Ventilation required. Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of '/16inch (1.6 mm) minimum and '/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than '/4 inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and '/4 inch (6.4 mm) maximum. Ventilation openings	

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	having a least dimension larger than ¼ inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and ¼ inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of Section R802.7. Required ventilation openings shall open directly to the outside air. ~~Openings in roof framing members shall conform to the requirements of Section R802.7. Required ventilation openings shall open directly to the outside air.~~ ~~Exception: Attic ventilation shall not be required when determined not necessary by the code official due to atmospheric or climatic conditions.~~	
	R806.5 Unvented attic and unvented enclosed rafter assemblies. Unvented attic assemblies (spaces between the ceiling joists of the top story and the roof rafters) and unvented enclosed rafter assemblies (spaces between ceilings that are applied directly to the underside of roof framing members/rafters and the structural roof sheathing at the top of the roof framing embers/rafters) shall be	**R806.5 Unvented attic and unvented enclosed rafter assemblies**. Revise-5.2. In Climate Zone 1, 2 and 3, ait-permeable insulation installed in unvented attics shall meet the following requirements; ~~Where preformed insulation board is used as the air impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.~~ 5.2.1 An approved vapor diffusion port shall be installed not more than 12 inches (305

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	permitted if all the following conditions are met: 1. The unvented attic space is completely contained within the building thermal envelope. 2. No interior Class I vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly or on the ceiling side of the unvented enclosed rafter assembly. 3. Where wood shingles or shakes are used, a minimum ¼ inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing. 4. In Climate Zones 5, 6, 7 and 8, any air-impermeable insulation shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation. 5. Insulation shall be located in accordance with the following: ~~Either Items 5.1, 5.2 or 5.3 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.~~ 5.1. Item 5.1.1., 5.1.2, 5.1.3 or 5.1.4 shall be met, dependent on the air	mm) from the highest point if the roof, measured vertically from the highest point of the roof to the lower edge of the port. 5.2.2 The port area shall be greater than or equal to 1:600 of the ceiling area. Where there are multiple ports in the attic, the sum of the port area shall be greater than or equal to the area requirement. 5.2.3 The vapor-permeable membrane in the vapor diffusion port shall have a vapor permeance rating greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96. 5.2.4 The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building. 5.2.5 The vapor diffusion port shall protect the attic against the entrance of rain and snow. 5.2.6 Framing members and blocking shall block the free flow of water vapor to the port. Not less than a 2-inch (51 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space. 5.2.7 The roof slope shall be greater than or equal to 3:121 (vertical/horizontal).

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	impermeability of the insulation directly under the structural roof sheathing. 5.1.1. Where only air-impermeable insulation is provided, it shall be applied in direct contact with the underside of the structural roof sheathing. ~~only. Insulation shall be applied indirect contact with the under– side of the structural roof sheathing.~~ 5.1.2. Where air-permeable insulation is provided inside of the building thermal envelope, it shall be installed in accordance with Section 5.1. In addition to the air-permeable insulation installed directly below the structural, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the R-values in Table R806.5 for condensation control. 5.1.3. Where both air-impermeable and air-permeable insulation are provided, the air-permeable insulation shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the R-values in Table R806.5 for condensation control. The air-permeable insulation shall be installed directly under the air-impermeable insulation shall be	5.2.8 Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing. 5.2.9 Air-impermeable insulation, if any, shall be directly above or below the structural roof sheathing and is not required to meet the R-value in Table 806.5. Where directly below the structural roof sheathing, there shall be no space between the air-impermeable insulation and air-permeable insulation. 5.2.10 The air shall be supplied at a flow rate greater than or equal to 50 CFM (23.6 L/s) ore 1,000 square feet (93 m^3) of ceiling. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating.

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	installed directly under the air-impermeable insulation. 5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45 ^{0}F (7^{0}C). For calculation purposes, an interior air temperature of 68^{0}F (20^{0}C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months. 5.2. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.	
	CHAPTER 9 ROOF ASSEMBLIES	**CHAPTER 9 ROOF ASSEMBLIES**
	R902.1 Roofing covering materials. **Exceptions:** Add- 4. Class A roof assemblies include slate installed over underlayment over combustible decks.	
	R902.3 Building-integrated photovoltaic product. New section.	
	R902.4 Rooftop-mounted panels and modules. New section.	

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SECTION R903.5 SNOW SHEDDING AND IMPACT AREAS		
Section R903.5 Snow shedding and impact areas. Snow shedding onto adjacent properties is prohibited. Snow shed impact areas shall be designed to contain shedding snow from structures and prevent snow from encroaching onto adjacent properties exceed 154 p_g when located in Washoe County or Carson City, or exceeds 69 p_g when located in Storey County. The roof and eaves of all structures shall be designed so that snow shed impact areas will not occur in or on required exits, parking areas, driveways, LPG storage tanks, walkways, and public areas. **Exception:** The snow shed impact areas may be reduced provided an engineered snow restraint system, designed in accordance with this code, is incorporated into the roof design and the roof drainage system.		
	R905.1.1 Underlayment. New section and subsections.	**R905.1.1 Underlayment.** **Exceptions:** Add- 3. As an alternative, two layers of underlayment complying with ASTM D226 Type II I or ASTM D4869 Type III or Type IV shall be permitted to be installed as follows in 3.1-3.4: 3.1 Apply a 19-inch-wide (483 mm) strip of underlayment parallel with the eave. Starting

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		at the eave, apply 36-inch-wide (914 mm) strips of underlayment felt, overlapping successive sheets 19 inches (483 mm). end laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). 3.2 The underlayment shall be attached with corrosion-resistant fasteners in a grid pattern of 12 inches (305 mm) between side laps with a 6-inch (152 mm) spacing at side and end laps. 3.3 Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch (25 mm). Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a thickness of not less than 0.010 inch (0.25 mm). Minimum thickness of the outside edge of plastic caps shall be 0.035 inch (0.89 mm). 3.4 The cap nail shank shall be not less than 0.083 inch (2.11 mm) for ring shank cap nails and 0.091 inch (2.31 mm) for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than ¾ inch (19 mm) into the roof sheathing.
	R905.1.2 Ice barriers. New section.	
	TABLE R905.1.1(1) UNDERLAYMENT TYPES. New table.	

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	TABLE R905.1.1(2) UNDERLAYMENT APPLICATION. New table	
	TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT New table	
	R905.2.7 Ice barriers. New section.	
		R905.2.8 Flashing. Flashing for asphalt singles shall comply with this section and the asphalt shingle manufacturer's approved installation instructions.
	R905.3.7 Application. Tile shall be applied in accordance with this chapter and the manufacturer's installation instructions, based on the following: 1. Climatic conditions. 2. Roof slope. 3. Underlayment system. 4. Type of tile being installed. Clay and concrete roof tiles shall be fastened in accordance with this section and the manufacturer's installation instructions. Perimeter tiles shall be fastened with a minimum of one fastener per tile. Tiles with installed weight less than 9 pounds per square foot (0.4 kg/m^2) require not less than ~~a minimum of~~ one fastener per tile regardless of roof slope. Clay and concrete roof tile attachment shall be in accordance with the manufacturer's installation instructions where applied in areas where the ultimate design wind speed exceeds 130 ~~100~~ miles	

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	per hour (58 ~~45~~ m/s) and on buildings where the roof is located more than 40 feet (12 192 mm) above grade. In areas subject to snow, a minimum of two fasteners per tile is required. In all other areas, clay and concrete roof tiles shall be attached in accordance with Table R905.3.7.	
	R905.4.3.1 Ice barriers. New section.	
	R905.5.3.1 Ice barriers. New section.	
	R905.6.3.1 Ice barrier. Where required, ice barriers shall comply with Section 905.1.2. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(I), an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof sur- faces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.~~ ~~Exception: Detached accessory structures that contain no conditioned floor area.~~	
	R905.7.5 Application. Wood shingles shall be installed according to this chapter and the manufacturer's installation instructions. Wood shingles shall be laid	

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	with a side lap not less than l'/2 inches (38 mm) between joints in courses, and ~~no~~ two joints shall be in direct alignment in any three adjacent courses. Spacing between shingles shall not be less than '/4 inch to 3/g inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Ta=ble R905.7.5(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of AASTM A 153 Class D (1.0 oz/ft^2). Alternatively, two 16-gauge stainless steel Type 304 or 316 staples with crown widths 7/16 inch (11.1 mm) minimum, ¾ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of salt water costal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservation-treated shingles of naturally durable wood in accordance with AWPA U1 shall be stainless steel Type 316. All fasteners shall have a minimum penetration into the sheathing of ¾ inch (19.1 mm). For sheathing less than ¾ inch (19.1 mm)	

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	thickness, each fastener shall penetrate through the sheathing. ~~Fasteners for wood shingles shall be corrosion resistant with a minimum penetration of ‘/2 inch (13 mm) into the sheathing. For sheathing less than V2 inch (13 mm) in thickness, the fasteners shall extend through the sheathing.~~ Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer’s installation instructions. Fastener packaging shall bear a label indicating the appropriate grade material or coating material. ~~No more than 3/4 inch (19 mm) from each edge and no more than 1 inch (25 mm) above the exposure line.~~	
	TABLE R905.7.5(1) ~~R905.7.5~~ WOOD SHINGLE WEATHER EXPOSURE AND ROOF SLOPE. Renumbered and revised**.**	
	TABLE R905.7.5(2) NAIL REQUIREMENTS FOR WOOD SHAKES AND WOOD SHINGLE. New table**.**	
	R905.8.3.1 Ice barrier. New section**.**	
	R905.8.6 Application. Wood shakes shall be installed according to this chapter and the manufacturer’s installation instructions. Wood shakes shall be laid with a side lap not less than 1’/2 inches (38 mm) between joints in adjacent	

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	courses. Spacing between shakes in the same course shall be 3/g inch to 5/s inch (9.5 mm to 15.9 mm) for shakes and taper sawn shakes of naturally durable wood and shall be 3/8 inch to 78 inch (9.5 mm to 15.9 mm) for preservative-treated taper sawn shakes. Weather exposure for wood shakes shall not exceed those set forth in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A 153 Class D (1.0 oz/ft^2). Alternatively, two 16-gauge Type 304 or Type 316 stainless steel staples, with crown widths 7/16 inch (11.1 mm) minimum, ¾ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of salt water costal areas shall be stainless steel Type 316. ~~Corrosion resistant, with a minimum penetration of '/2 inch (12.7 mm) into the sheathing. For sheathing less than '/2 inch (12.7 mm) thick, the fasteners shall extend through the sheathing.~~ Wood shakes shall be attached to the roof with two fasteners per shake, positioned in accordance with the	

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	manufacture's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-treated (as defined in Section R902) in accordance with AWPA U1 shall be stainless steel Type 316. All fasteners shall have a minimum penetration into the sheathing of ¾ inch (19.1 mm). where the sheathing is less than ¾ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fasteners shall bear a label indicating the appropriate grade material or coating weight. ~~No more than 1 inch (25 mm) from each edge and no more than 2 inches (51 mm) above the exposure line.~~	
		R905.9 Built-up roofs. The installation of built-up roofs shall comply with the provisions of this section and the manufacturer's approved installation instructions.
		R905.11 Modified bitumen roofing. The installation of modified bitumen roofing shall comply with the provisions of this section and the manufacturer's approved installation instructions.
		R905.11.2.1 Base sheet. New section.
		R905.12.2 Material standards. Thermoset single-ply roof coverings shall comply with ASTM D 4637 or ASTM D 5019 ~~or CGSB 37-GP-52M~~.

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R905.13.		**R905.13.2 Material standards.** Spray-applied polyurethane foam insulation shall comply with ASTM D4434, ASTM D6754 or ASTM D6878.~~ASTM C 1029, Type III or IV or ASTM D 7425.~~
R905.9	**R905.14.2 Material standards**. Spray-applied polyurethane foam insulation shall comply with ASTM C 1029, Type III or IV or ASTM D 7425.	
	R905.16 Photovoltaic ~~modules/~~shingles. The installation of photovoltaic ~~modules/~~shingles shall comply with the provisions of this section, Section R324 and NFPA 70.	
	R905.16.1 Deck requirements. New section.	
	R905.16.2 Deck slope. New section.	
	R905.16.3 Underlayment. New section.	
	R905.16.4 Underlayment application. New section.	
	R905.16.4.1 Ice barrier. New section.	
	R905.16.4.2 Underlayment and high winds. New section.	
		R905.17 Building-integrated Photovoltaic (BIPV) roof panels applied directly to the roof deck. New sections and subsection.
	TABLE R906.2 MATERIAL STANDARDS FOR ROOF INSULATION. Revised.	
	SECTION R907 ROOFTOP-MOUNTED PHOTOVOLTAIC SYSTEMS. New section and subsections inserted.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	SECTION R908 ~~R907~~ REROOFING. Renumbered.	
	R907.1 General. **Exception:** 1. Reroofing shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide positive roof drainage. 2. For roofs that provide positive drainage, re-covering or replacing an existing roof covering shall not require secondary (emergency overflow) drains or scuppers of Section R903.4.1 to be added to an existing roof.	
	R908.3 Roof replacement. New section.	
	R908.3.1 Roof re-cover. New section.	**R908.3.1 Roof re-cover.** Add- 4. The application of a new protective roof coating over an existing protective roof coating, metal roof panel, metal roof shingle, mineral surfaced roll roofing, built-up roof, modified bitumen roofing, thermoset and thermoplastic single-ply roofing and spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.
	R908.3.1.1 Roof re-cover not allowed. New section.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	SECTION R909 ROOFTOP-MOUNTED PHOTOVOLTAIC PANEL SYSTEMS. New section and subsections.	
	CHAPTER 10 CHIMNEYS AND FIREPLACES	**CHAPTER 10 CHIMNEYS AND FIREPLACES**
	R1001.4.1.1 Cold-formed steel framing. New section**.**	
	R1002.2 Installation. Masonry heaters shall be installed in accordance with this section and comply with one of the following: 1. Masonry heaters shall comply with the requirements of ASTM E 1602.~~;or~~ 2. Masonry heaters shall be listed and labeled in accordance with UL 1482 or CEN 1250 and installed in accordance with the manufacturer's installation instructions.	
	R1002.5 Masonry heater clearance. **Exceptions:** Revise- 2. Masonry heaters listed and labeled in accordance with UL 1482 or CEN 15250 and ~~may be~~ installed in accordance with the listing specifications and the manufacturer's written instructions.	
	R1003.4.1.1 Cold-formed steel framing. New section**.**	
	R1003.18 Chimney clearances. **Exceptions:**	

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	Revise- 3. Exposed combustible trim and the edges of sheathing materials, such as wood siding and flooring, shall be permitted to abut the masonry chimney side walls, in accordance with Figure R1003.18, provided such combustible trim or sheathing is not less than 8 inches (203 mm) ~~a minimum of 12 inches (305 mm)~~ from the inside surface of the nearest flue lining. ~~Combustible material and trim shall not overlap the comers of the chimney by more than 1 inch (25 mm).~~	
	R1004.5 Gasketed fireplace doors. New section**.**	
		R1005.8 Insulation shield. New section.
	R1006.5 Outlet. The exterior air outlet shall be located in the back or side of the fireplace chamber or shall be located outside of the firebox, at the level of the hearth and not greater that ~~Locating the exterior air outlet in the back or sides of the firebox chamber or within~~ 24 inches (610 mm) from ~~of~~ the firebox opening ~~on or near the floor is permitted~~. The outlet shall be closable and designed to prevent burning material from dropping into concealed combustible spaces.	
	CHAPTER 11 ENERGENCY EFFICIENCY	**CHAPTER 11 ENERGY EFFICIENCY**

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AMENDED IRC-2012	IRC-2015	IRC-2018
		N1101.6 AIR-IMPERMEABLE INSULAYION. New definition.
CHAPTER 11 ENERGY EFFICIENCY- entire chapter deleted	**N1101.6 ALTERATION.** New definition.	
	N1101.6 CIRCULATING HOT WATER SYSTEM. New definition	
	N1101.6 CONDITIONED SPACE. Revised section.	
	N1101.6 CONTINIOUS INSULATION. New definition	
	N1101.6 FENESTRATION. Revised section.	
	N1101.6 FENESTRATION, VERTICAL. New definition	
	N1101.6 HISTORIC BUILDING. New definition	
	N1101.6 INSULATED SIDING. New definition	
	N1101.6 RATED DESIGN. New definition	
	N1101.6 REPAIR. Revised section.	
	N1101.6 REROOFING. New definition	
	N1101.6 ROOF RECOVER. New definition	
	N1101.6 ROOF REPAIR. New definition	
	N1101.6 ROOF REPAIR. New definition	
	N1101.6 ROOF REPLACEMENT. New definition	
	N1101.8 TROPICAL CLIMATE ZONE. New definition	
		N1101.10.1 (R303.1.1) Building thermal envelope issuance.

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AMENDED IRC-2012	IRC-2015	IRC-2018
		Exception: For roof insulation installed above the deck, the R-value shall be labeled as required by the material standards specified in Table R906.2.
		TABLE N1102.10.3(1) [R303.1.3(1)] DEFAULT GLAZED WINDOW, GLASS DOOR AND SKYLIGHT ~~FENESTRATION~~ U-FACTORS. Revised.
		TABLE N1102.10.3(2) [R303.1.3(1)] DEFAULT OPAQUE DOOR U-FACTORS. Revised.
	N1101.12.1 (R303.1.1) Building thermal envelope insulation. An R-value identification mark shall be applied by the manufacturer to each piece of building thermal envelope insulation 12 inches (305 mm) or greater in width. Alternately, the insulation installers shall provide a certification listing the type, manufacturer and R-value of insulation installed in each element of the building thermal envelope. For blown or sprayed insulation (fiberglass and cellulose), the initial installed thickness, settled thickness, settled R-value, installed density, coverage area and number of bags installed shall be listed on the certification. For insulated siding, the R-value shall be labeled on the products package and shall be listed on the certification. ~~sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and R-value of installed thickness shall be listed on the~~	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	~~certification.~~ The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.	
	N1101.12.3 (R303.1.3) Fenestration product rating. U-factors of fenestration products (windows, doors and sky lights) shall be determined in accordance with NFRC 100 ~~by an accredited, independent laboratory, and labeled and certified by the manufacturer~~. **Exception:** where required, garage door U-factors shall be determined in accordance with either NFRC 100 or AS+NSI/DASMA 105. U-factors shall be determined by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled U-factor shall be assigned a default U-factor from Table N1101.12.3(1) or N1101.12.3(2). The solar heat gain coefficient (SHGC) and visible transmittance (VT) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled SHGC or VT shall be assigned a default SHGC or VT from Table N1101.12.3(3).	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	N1101.10.4.1 (R303.1.4.1) Insulated siding. New section.	
	N1101.15 (R401.2) Compliance. Projects shall comply with one of the following: 1. Sections N1101.14 through N1104. 2. Sections H1105 and the provisions of Sections N1101.14 through N1104 labeled “Mandatory”. 3. An energy rating index (ERI) approach in Section N1106. ~~Sections identified as "mandatory" and with either sections identified as "prescriptive" or the performance approach in SectionN1105.~~	
	N1101.13.1 (R401.2.1) Tropical zone. New section.	
	N1102.1 (R402.1) General (Prescriptive). The building thermal envelope shall meet the requirements of Sections N1102.1.1through N1102.1.5 ~~N1102.1.4~~. **Exception:** The following low energy buildings, or portions thereof, separated from the rest of the building by the building thermal envelope assemblies complying with this section shall be exempt from the building thermal envelope provisions of Section N1102. 1. Those with a peak design rate of energy usage less than 3.4 BTU/h-ft^2 (10.7 W/m^2) or 1.0 watt/ft^2 of	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	floor area for space conditioning purposes. 2. Those that do not contain condition spaces.	
	N1102.1.1 (R402.1.1) Vapor retarder. New section.	
	N1102.1.2 (R402.1.2) R-value computation. Insulation material used in layers, such as framing cavity insulation or continuous insulation ~~and insulating sheathing,~~ shall be summed to compute the component R-value. The manufacturer's settled R-value shall be used for blown insulation. Computed R-values shall not include an R-value for other building materials or air films. Where insulated siding is used for the purpose of complying with the continuous insulation requirements of Table N1102.1.2, the manufacturer's labeled R-vale siding shall be reduced by R-0.6.	
	N1102.2.4 (R402.2.4) Access hatches and doors. Add- **Exception:** Vertical doors that provide access from conditioned to unconditioned spaces shall be permitted to meet the fenestration requirements of Table R1102.1.2 based on the applicable climate zone specified in Chapter 3.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	N1102.2.5 (R402.2.5) Mass walls. Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs, or any other wall having a heat capacity greater than or equal to 6 BTU/ft^2 x ^{0}F (123 kJ/m^2 x K).	**N1102.2.5 (R402.2.5) Mass walls**. Mass walls where used as a component of the building thermal envelope shall be one of the following: 1. Above-ground walls of concrete block, concrete, insulated concrete form, masonry cavity, brick but not brick veneer, adobe, compressed earth block, rammed earth, solid timber or solid log. 2. Any wall having a heat capacity greater than or equal to 6 Btu/ft^2* ^{0}F (123 kJm^2*K). for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs, or any other wall having a heat capacity greater than or equal to 6 BTU/ft^2 x ^{0}F (123 kJ/m^2 * K).
	N1102.2.7 (R402.2.7) Walls with partial structural sheathing. New section.	
	N1102.2.7 (R402.2.7) Floors. Add- **Exception:** The floor framing-cavity insulation shall be permitted to be in contact with the topside of sheathing or continuous insulation installed on the bottom side of floor framing where combined with insulation that meets or exceeds the minimum wood frame wall R-value in or exceed the minimum wood frame wall R-value in Table 1102.1.2 and	

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	that extends from the bottom to the top of all perimeter floor framing members.	
	N1102.3.2 (R402.3.2) Glazed fenestration SHGC. An area-weighted average of fenestration products more than 50-percent glazed shall be permitted to satisfy the SHGC requirements. Dynamic glazing shall be permitted to satisfy the SHGC requirements of Table R1102.1.2 provided the ratio of the higher to lower labeled SHGC is greater than or equal to 2.4, and the dynamic glazing is automatically controlled to modulate the amount of solar gain into the space in multiple steps. Dynamic glazing shall be considered separately from other fenestration, and area-weighted averaging with other fenestration that is not dynamic glazing shall not be permitted. **Exception:** Dynamic glazing is not required to comply with this section when both the lower and higher labeled SHGC already comply with the requirements of Table N1102.1.2.	
	N1102.3.5 (R402.3.5) Sunroom fenestration ~~R-factor~~. ~~All~~ Sunrooms enclosing conditioned spaces shall meet the fenestration requirements of this code.	

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	Exception: For sunrooms with thermal isolation and enclosing conditioned spaces~~,~~ in Climate Zones 2 ~~4~~ through 8, the maximum fenestration U-factor shall be 0.45 and the maximum skylight U-factor shall be 0.70. ~~the following exceptions to the fenestration requirements of this code shall apply:~~ 1. ~~The maximum fenestration R-factor shall be 0.45; and 2. The maximum skylight R-factor shall be 0.70.~~ New fenestration separating the sunroom with thermal isolation from conditioned space shall meet the building thermal envelope requirements of this code.	
	N1102.4.2 (R402.4.2) Fireplaces. New wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace. Where using tight-fitting doors on masonry fireplaces, the doors shall be listed and labeled in accordance with UL 907.	
	N1102.4.4 (R402.4.4) Rooms containing fuel-burning appliances. New section.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	TABLE N1102.4.1.1 (R402.4.1.1) AIR BARRIER AND INSULATION INSTALLATION. Revised**.**	
	N1103.2 (R403.2) Hot water boiler outdoor temperature setback. New section**.**	
	N1103.2.1 (R403.2.1) Insulation (Prescriptive). Supply and return ducts in attics shall be insulated to a minimum of R-8 where 3 inches (76.2 mm) in diameter and greater and R-6 where less than 3 inches (76.2 mm) in diameter. Supply and return ducts in other portions of the building shall be insulated to a minimum of R-6 where 3 inches (76.2 mm) in diameter or greater and R-4.2 where less than 3 inches (76.2 mm) in diameter. ~~All other ducts shall be insulated to a minimum of R-6.~~ **Exception**: Ducts or portions thereof located completely inside the building thermal envelope.	
	NI103.2.2 (R403.2.2) Sealing (Mandatory). **Exceptions:** Revise- 2. For ducts having a ~~static~~ ~~Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.~~	

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	~~3. Continuously welded and locking-type longitudinal joints and seams in ducts~~ operating at static pressure classification less than 2 inches of water column (500 Pa), pressure classification shall not be required for continuously welded joints and seams, and locking-type joints and seams of other than the snap-lock and button-lock types. ~~require additional closure systems.~~	
	N1103.3.3 (R403.3.3) Duct testing (Mandatory). New section.	**N1103.3.3 (R403.3.3) Duct testing (Mandatory).** **Exceptions:** 1. A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the building thermal envelope. 2. A duct air-leakage shall not be required for ducts serving heat or energy recovery ventilators that are not integrated with ducts serving heating or cooling systems. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.
	N1103.3.4 (R403.3.4) Duct testing (Prescriptive). New section.	
		N1103.3.6 (R403.3.6) Ducts buried within ceiling insulation. New section and subsections.
		N1103.3.7 (403.3.7) Ducts located in conditioned space. New section.
	N1103.5.1 (R403.5.1) Heated water circulation and temperature maintenance	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	systems (Mandatory). New section and subsections.	
	N1103.5.2 (R403.5.2) Demand recirculation systems. New section and subsections.	
	N1103.5.3 (R403.5.3) ~~**N1103.4.2 (R403.4.2)**~~ **Hot water pipe insulation (Prescriptive)**. Insulation for hot water pipe with a minimum thermal resistance (R-value) of R-3 shall be applied to the following: 1. Piping larger than ¾ inch (19 mm) and larger nominal diameter. 2. Piping serving more than one dwelling unit. 3. ~~Piping from the water heater to kitchen outlets.~~ 4. Piping located outside the conditioned space. 5. Piping from the water heater to a distribution manifold. 6. Piping located under a floor slab. 7. Buried piping. 8. Supply and return piping in recirculation systems other than demand recirculation systems. 9. ~~Piping with run lengths greater than the maximum run lengths for the nominal pipe diameter given in Table N1103.4.2.~~	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	~~All remaining piping shall be insulated to at least R-3 or meet the run length requirements of Table N1103.4.2.~~	
		N1103.10.3 (R403.10.3) Covers. **Exception:** Where more than 75 ~~70~~ percent of the energy for heating, computed over an operation season of not less than 3 calendar months, is from site-recovered energy, such as from a heat pump or solar energy source, covers or other vapor-retardant means shall not be permitted.
	N1103.11 (R403.11) Portable spas (mandatory). New section.	
	N1103.12 (R403.12) Residential pools and permanent spas. New section.	
	N1105.4.2 (R405.4.2) Compliance report. New section.	
	N1105.4.2.1 (R405.4.2.1) Compliance report for permit application. New section.	
	N1105.4.2.2 (R405.4.2.2) Compliance report for certificate of occupancy. New section.	
	TABLE N1105.5.2(1) [R405.5.2(1)] SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS. Revised.	
	SECTION N1106 (R406) ENERGY RATING INDEX COMPLIANCE ALTERNATIVE. New section.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
		N1106.3 (R406.3) Energy rating index. The Energy Rating Index (ERI) shall be determined in accordance with RES-NET/ICC 301 except that the ERI design ventilation are shall be in accordance with Equation 11.1. Ventilation rate, CFM=(0.01 x total square foot area if house) + [7.5 x (b=number of bedrooms + 1)] **(Equation 11-1)** Energy used to recharge or refuel a vehicle used for transportation on roads that are not on the building site shall not be included in the ERI reference design or the rated design. ~~a numerical integer value that is based on a linear scale constructed such that the ERI reference design ahs an Index value of 100 and a residential building that uses no net energy purchased energy has an Index value of 0. Each integer value on the scale shall represent a 1 percent change in the total energy use of the rated design relative to the total energy use of the ERI reference design. The ERI shall consider all energy used in the residential building.~~
		TABLE N1106.4 (R406.4) MAXIMUM ENERGCY RATING INDEX. Revised.
		N1106.6.4 (R406.6.4) N1106.7.2 (406.7.2) Specific approval. Performance analysis tools meeting the applicable sections of Section N1106 shall be approved. Documentation demonstrating the approval of performance analysis tools in accordance with Section N1106.6.1 shall be provided. ~~Tools are permitted to be approved based~~

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AMENDED IRC-2012	IRC-2015	IRC-2018
		~~on meeting a specified threshold for a jurisdiction. The code official shall approve tools for a specified application or limited scope.~~
		N1106.7.3 (R406.7.3) Input value. When calculations require input values not specified by Sections N1102, N1103, N1104 and N1105, those input values shall be taken from RESNET/ICC 301 ~~an approved source~~.
	SECTION N1107 (R501) EXISTING BUILDINGS- GENERAL. New section.	
	SECTION N1108 (R502) ADDITIONS. New section.	
	SECTION N1109 (R503) ALTERATIONS. New section.	
	CHAPTER 12 MECHANICAL ADMINISTRATION	
	CHAPTER 13 GENERAL MECHANICAL SYSTEM REQUIREMENTS	**CHAPTER 13 GENERAL MECHANICAL SYSTEM REQUIREMENTS**
	M1305.1 Appliance access for inspection service, repair and replacement. Appliances shall be accessible for inspection. Service, repair and replacement without removing permanent construction, other appliances or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced. A level working space at least 30 inches	

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	deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an appliance. ~~Installation of room heaters shall be permitted with at least an 18-inch (457 mm) working space. A platform shall not be required for room heaters.~~	
	M1305.1.3.1 Electrical requirements. A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be installed at or near the appliance location in accordance with Chapter 39. Exposed lamps shall be protected from damage by location or lamp guards.	
		M1305.1.3.2 Pit locations. New section.
	M1305.1.4.3 Electrical requirements. A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be installed t or near the appliance location in accordance with Chapter 39. Exposed lamps shall be protected from damage by location or lamp guards.	
	M1306.2 Clearance reduction. Reduction of required clearances to combustible assemblies or combustible materials shall be based on Section M1360.2.1 or Section M1306.2.2. ~~clearances shall be in accordance with the appliance~~	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	~~manufacturer's instructions and Table M1306.2. Forms of protection with ventilated air space shall conform to the following requirements:~~ ~~1. Not less than 1-inch (25 mm) air space shall be provided between the protection and combustible wall surface.~~ ~~2. Air circulation shall be provided by having edges of the wall protection open at least 1inch (25 mm).~~ ~~3. If the wall protection is mounted on a single flat wall away from corners, air circulation shall be provided by having the bottom and top edges, or the side and top edges open at least 1 inch (25 mm).~~ ~~4. Wall protection covering two walls in a corner shall be open at the bottom and top edges at least 1 inch (25 mm).~~	
	M1306.2.1 Labeled assemblies. New section.	
	M1306.2.2 Reduction table. Reduction of clearances shall be in accordance with the appliance manufacturer's instructions and Table M1306.2. Forms of protection with ventilated air space shall conform to the following requirements: 1. Not less than 1-inch (25 mm) air space shall be provided between the protection and combustible wall surface.	

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	2. Air circulation shall be provided by having edges of the wall protection open at least 1inch (25 mm). 3. If the wall protection is mounted on a single flat wall away from corners, air circulation shall be provided by having the bottom and top edges, or the side and top edges open at least 1 inch (25 mm). 4. Wall protection covering two walls in a corner shall be open at the bottom and top edges at least 1 inch (25 mm).	
	MI307.2 Anchorage of appliances. Appliances designed to be fixed in position shall be fastened or anchored in an approved manner. In Seismic Design Categories D_0, D_1 and D_2, and in townhouses in Seismic Design Categories C, water heaters and thermal storage units shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in accordance with one of the following: 1. Anchorage and strapping shall be designed to resist a horizontal force equal to one third of the operating weight of the water heater storage tank, acting in any horizontal direction. Strapping shall be at points within the upper one-third and lower one third of	

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	the appliance's vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102 mm) above the controls. 2. The anchorage strapping shall be in accordance with the appliance manufacturer's recommendations.	
	M1308.2 Protection against physical damage. Where piping will be concealed within light-frame construction assemblies, the piping shall be protected against penetration by fasteners in accordance with Section M1308.2.1 through M1308.2.3. Exception: Cast iron piping and galvanized steel piping shall not be required to be protected. ~~In concealed locations where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1.5 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage), shall cover the area of the pipe where the member is notched or bored, and shall extend a minimum of 2~~	

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	~~inches (51 mm) above sole plates and below top plates.~~	
	M1308.2.1 Piping through bored holes or notches. New section.	
	M1308.2.2 Piping on other locations. New section.	
	Mq1308.2.3 Shield plates. New section.	
	CHAPTER 14 HEATING AND COOLING EQUIPMENT AND APPLIANCES	
	M1401.3 Equipment and appliance sizing. **Exceptions:** Heating and cooling equipment and appliance sizing shall not be limited to the capacities determined in accordance with Manual S where either of the following conditions applies: 1. The specified equipment or appliance utilizes multistage technology or variable refrigerant flow technology and the loads calculated in accordance with the approved heating and cooling calculation methodology are within the range of the manufacturer's published capacities for that equipment or appliance. 2. The specified equipment or appliance manufacturer's published capacities cannot satisfy	The

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	both the total and sensible heat gains calculated in accordance with the approved heating and cooling calculation methodology and the next larger standard size unit is specified.	
	M1410.2 Floor mounting. **Exceptions**: Revise- 1. Listed room heaters shall be installed on noncombustible floors, assemblies constructed of noncombustible materials or listed floor protectors listed and labeled in accordance with UL 1618. The materials and dimensions shall be ~~with materials and dimensions~~ in accordance with the appliance manufacturer's instructions.	
	M1411.3.3 Drain line maintenance. New section.	
	M1411.4 Condensate pumps. New section.	
	M1411.7 Location and protection of refrigerant piping. New section.	
	M1412.1Approval of equipment. Absorption systems shall be installed in accordance with the manufacturer's installation instructions. Absorption equipment shall comply with UL 1995 or UL/CSA/ANCE 60335-2-40.	

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AMENDED IRC-2012	IRC-2015	IRC-2018
	M1413.1 General. Evaporative cooling equipment and appliances shall comply with UL 1995 or UL/CSA/ANCE 60335-2-40 and shall be installed:	
	CHAPTER 15 EXHAUST SYSTEMS	**CHAPTER 15 EXHAUST SYSTEMS**
	M1502.4.4 Dryer exhaust duct power ventilators. New section.	
	M1502.4.5. Dryer exhaust duct power ventilators. New section.	
		SECTION M1503 DOMESTIC COOKING EXHAUST EQUIPMENT ~~RANGE HOODS~~
		M1503.1 General. New section.
		M1503.2 Domestic cooking exhaust. New section.
		M1503.2.1 Open-top broiler exhaust. New section.
		M1503.3 Exhaust discharge. New section.
Section M1503.4 Makeup air required. Exhaust hood systems capable of exhausting in excess of ~~400~~ 600 cubic feet per minute (~~0.19~~ 0.28 m^3/s) shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such Makeup air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.	**M1503.4 Makeup air required**. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m3/s) shall be mechanically or naturally provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not less than one damper. Each damper shall be a gravity damper or electrically operated damper that automatically opens when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing	

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	permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced. ~~A means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.~~	
	M1503.4.1 Location. New section.	
		M1503.6 Makeup air required. **Exception:** Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.
		M1503.6.2 Makeup air dampers. New section.
		M1504.3 Exhaust openings. New section.
		M1505.2 Recirculation of air ~~Duct length~~. New section.
		M1505.3 Exhaust equipment. New section.
		M1505.4 Whole-house mechanical ventilation system. New section and subsections.
	M1506.2 Duct lengths. New section.	
	CHAPTER 16 DUCT SYSTEMS	**CHAPTER 16 DUCT SYSTEMS**
	M1601.1 Duct design. Duct systems serving heating, cooling and ventilation equipment shall be installed in accordance with the provisions of this section and ACCA Manual D, the appliance manufacturer's installation instructions or other approved methods.	

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	M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following: Revise- 2. Factory-made air ducts shall be listed and labeled in accordance with UL 181 and installed in accordance with the manufacturer's instructions ~~constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1)~~. Revise- 4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the SMACNA HVAC Duct Construction Standards- Metal and Flexible except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A 653. ~~Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653. Metallic ducts shall be fabricated in accordance with SMACNA Duct Construction Standards Metal and Flexible~~	**M1601.1.1 Above-ground duct systems.** Add- 8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.
	TABLE M1601.1 DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESS FOR SINGLE DWELLING UNITS. New table.	
	Ml601.3 Duct insulation materials. Insert- 3. External reflective duct insulation shall be legibly printed or identified at intervals not greater than 36 inches (914 mm) with the name of the	

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	manufacturer, the product R-value at the specified installed thickness and the flame spread and smoke-developed indices. The installed thickness of the external duct insulation shall include the enclosed air space(s). the product R-value for external reflective duct installation shall be determined in accordance with ASTM C1668.	
	Ml601.4.1 Joints, seams and connections. AH longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. ~~All~~ Joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, liquid sealants or tapes. Tapes and mastics used to seal fibrous glass ductwork shall be listed and labeled in accordance with UL 181A and shall be marked “181A-P” for pressure-sensitive tape, “181 A-M” for mastic or “181 A-H” for heat-sensitive tape. Tapes and mastics ~~Closure systems~~ used to seal flexible air ducts and flexible air	

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	connectors shall comply with UL 18IB and shall be marked "181B-FX" for pressure-sensitive tape or "181BM" for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 18IB and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of not less than 1 inch (25.4 mm) and shall be mechanically fastened by means of not less than three sheet-metal screws or rivets equally spaced around the joint. Closure systems used to seal all ~~metal~~ ductwork shall be installed in accordance with the manufacturer's instructions. ~~Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint. Unlisted duct tape shall not be permitted as a sealant on any duct.~~ Exceptions: 1. Spray polyurethane foam shall be permitted to be applied without additional joint seals. 2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the	

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	exposed portion of the joint so as to prevent a hinge effect. 3. For ducts having a static pressure classification of less than 2 inches of water column (500 Pa), additional closure systems shall not be required for continuously welded joints and seams and locking-type joints and seams of other than the snap-lock and button-lock types. ~~Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.~~	
	M1601.4.2 Duct lap. New section.	
	M1604.4 ~~M1601.4.3~~ Support. Flexible-made ducts listed in accordance with UL 181 shall be supported in accordance with the manufacturer's installation instructions. Field- and Shop-fabricated fibrous glass ducts shall be supported in accordance with the SMACB+NA Fibrous Glass Duct Construction Standards or the NAIMA Fibrous Glass Duct Construction Standards. Field- and shop-fabricated metal and flexible ducts shall be supported in accordance with the SMACNA HVAC Duct Construction Standards- Metal and Flexible. ~~Metal~~	

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	~~ducts shall be supported by '/2 inch wide (13 mm) 18 gage metal straps or 12 gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other approved means. Nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.~~	
	M1602.1 Outdoor air openings. New section inserted.	
	M1602.2 Return air openings. New section inserted.	**M1602.2 Return air openings.** Insert- 5. For other than dedicated HVAC systems, return air shall not be taken from indoor swimming pool enclosures and associated deck areas except where the air in such spaces is dehumidified.
	CHAPTER 18 CHIMNEYS AND VENTS	
	M1804.4 Door swing. New section.	
	CHAPTER 19 SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS	
		M1901.1 Clearances. Freestanding or built-in ranges shall have a vertical clearance above the cooking top of not less than 30 inches (762 mm) to unprotected combustible material. Reduced clearances are permitted in accordance with the listing and labeling of the range hoods or ovens with integral exhaust. ~~appliances. The installation of the listed and labeled cooking appliance or microwave oven over a listed and labeled cooking appliance shall be in accordance with Section M1504.1. The clearances for a domestic~~

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		~~open-top broiler unit shall be in accordance with Section M1504.1.~~
		M1901.2 Cooking appliances. Cooking appliances shall be listed and labeled for household use and shall be installed in accordance with the manufacturer's instructions. The installation shall not interfere with combustion air or access for operation and service. Electric cooking appliances shall comply with UL 1026 or UL 858. Solid-fuel-fired fireplace stoves shall comply with UL 737. Microwave ovens shall comply with UL 923.
Section M1901.3 Prohibited location. Cooking appliances designed, tested, listed and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur. Unless approved by the Building Official.	**~~M1901.3 Prohibited location. Cooking appliances designed. Tested, listed and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.~~** Deleted.	
	CHAPTER 20 BOILERS AND WATER HEATERS	**CHAPTER 20 BOILERS AND HEATERS**
	M2001.1.1 Standards. Packaged oil-fired boilers ~~and their control systems~~ shall be listed and labeled in accordance with UL 726. Packaged electric boilers ~~and their control systems~~ shall be listed in accordance with UL 834. Solid-fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed, ~~and~~ constructed and certified in	

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	accordance with the requirements of ~~ASME CSD-1 and as applicable,~~ the ASME Boiler and Pressure Vessel Code, Sections I and IV. Controls and safety devices for boilers with the fuel input ratings of 12,500,000 BTU/hr (3 663 388 watts) or less shall meet the requirements of ASME CSD-1. Gas-fired boilers shall conform to the requirements listed in Chapter 24.	
	M2002.5 Boiler low-water cutoff. ~~All~~ Steam and hot water boilers shall be protected with a low-water cutoff control. ~~The low-water cutoff shall automatically stop the combustion operation of the appliance when the water level drops below the lowest safe water level as established by the manufacturer.~~ **Exception:** A low-water cutoff is not required for coil-type and water-tube type boilers that require forced circulation of water through the boiler and that are protected with a flow sensing control.	
	M2002.6 Operation. New section.	
		M2006.1 General. **Exception:** Portable residential spas and portable residential exercise spas shall comply with UL 1563 or SCA C22.2 No. 218.1.
	CHAPTER 21 HYDRONIC PIPING	**CHAPTER 21 HYDRONIC PIPING**

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	M2101.10 Tests. Hydronic piping shall be tested hydrostatically at a pressure of one and one-half times the maximum system design pressure, but not less than 100 pounds per square inch (690 kPa). The duration of each test shall be ~~for a duration of~~ not less than 15 minutes and not more than 20 minutes.	**M2101.10 Tests.** **Exception:** For PEX piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by all of the manufacturer's instructions for the PEX pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.
	TABLE M2101.1 HYDRONIC PIPING MATERIALS. Revised.	
		M2103.2 Thermal barrier required. Radiant floor heating systems shall have a thermal barrier in accordance with Sections M2103.2.1 and M2103.2.2. Insulation R-values for slab-on-grade and suspended floor installations shall be in accordance with Chapter 11.
	M2103.3 Piping joints. Copper and copper alloy systems shall be soldered in accordance with ASTM B 828. Fluxes for soldering shall be in accordance with ASTM B 813. Brazing fluxes shall be in accordance with AWS A5.31. Piping joints that are embedded shall be installed in accordance with the following requirements: 6. Steel pipe joints shall be welded. Revise- 2. Copper tubing shall be joined with brazing complying with Section	**M2103.3 Piping joints**. Copper and copper alloy systems shall be soldered, brazed, or press connected ~~in accordance with ASTM B 828~~. Fluxes for soldering shall be in accordance with ASTM B 813. Brazing fluxes shall be in accordance with AWS A5.31. Press-connected joints shall be in accordance with ASME B16.51. Piping joints that are embedded shall be installed in accordance with the following requirements:

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	P3003.6.1 ~~material having a melting point exceeding 1,000°F(538°C)~~. 3. Polybutylene pipe and tubing joints shall be installed with socket-type heat-fused polybutylene fittings. 4. CPVC tubing shall be joined using solvent cement joints. 5. Polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings. 6. Cross-linked polyethylene (PEX) tubing shall be joined using cold expansion, insert or compression fittings. Add- 7. Raised temperature polyethylene (PE-RT) tubing shall be joined using insert or compression fittings.	
	M2104.2 Piping joints. Piping joints, other than those in Section M2103.3. that are embedded shall comply with the following requirements: Add- 4. Raised temperature polyethylene (PE-RT) shall be installed in accordance with the manufacturer's instructions.	
	M2104.3.3 PE-RT insert fittings. New section.	
	SECTION M2105 GROUND-SOURCE HEAT-PUMP SYSTEM LOOP PIPING. Section and subsections rewritten.	
		M2105.13.3 Heat-fusion joints. New section.

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		M2105.13.4 Electro fusion joints. New section.
	CHAPTER 23 THERMAL SOLAR ENERGY SYSTEMS	**CHAPTER 23 SOLAR THERMAL ENERGY SYSTEMS**
	M2301.2 Design and installation. The design and Installation of thermal solar energy systems shall comply with Sections M2301.2.1 through M2301.2.13 ~~M2301.2.1through M2301.2.9~~.	
		M2301.2.1 Access. Access shall be provided to solar energy equipment for maintenance. Solar systems and appurtenances shall not obstruct or interfere with the operation of any doors, windows or other building components requiring operation or access. Roof-mounted solar thermal equipment shall not obstruct or interfere with the operation of roof-mounted equipment, appliances, chimneys, plumbing vents, roof hatches, smoke vents, skylights and other roof penetrations and openings. ~~Solar energy collectors, controls, dampers, fans, blowers and pumps shall be accessible for inspection, maintenance, repair and replacement.~~
	M2301.2.2 Collectors and panels. New section inserted.	
	M2301.2.2.2 Collector sensors. New section inserted.	**M2301.2.2.2 Collector sensors.** Collector sensor installation, sensor location and the protection of exposed sensor wires from degradation ~~ultraviolet light~~ shall be in accordance with ICC 900/SRCC 300.

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	M2301.2.3 Pressure and temperature relief. System components containing fluids shall be protected with pressure- and temperature-relief valves. Relief devices shall be installed in sections of the system so that a section cannot be valved off or isolated from a relief device. Direct systems and the potable water portion of indirect systems shall be equipped with a relief valve in accordance with Section P2804. For indirect systems, pressure relief valves in solar loops shall comply with SRCC 300. System components shall have a working pressure rating of not less than the setting of the pressure relief device.	
		M2301.2.4 Vacuum relief. System components that might be subjected to a vacuum ~~pressure drops below atmospheric pressure~~ during operation or shutdown shall be protected by a vacuum-relief valve.
	M2301.2.5 Piping insulation. New section inserted.	
		M2301.2.6 Protection from freezing. System components shall be protected from damage resulting from freezing of heat-transfer liquids at the winter design temperature provided in Table R301.2(1). Freeze protection shall be provided in accordance with ICC 900/SRCC 300. Darin-back systems shall be installed in compliance with Section

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		M2301.2.6.1. Systems utilizing freeze-protection valves shall comply with Section M2301.2.6.2. ~~by heating, insulation, thermal mass and heat transfer fluids with freeze points lower than the winter design temperature, heat tape or other approved methods, or combinations thereof.~~ **Exception:** Where the 97.5percent winter design temperature is greater than or equal to 48^0F (9^0C) ~~32^0F (0^0C)~~.
		M2301.2.6.1 Drain-back systems. New section.
		M2301.2.6.2 Freeze-protection valves. New section.
	M2301.2.7 Storage tank sensors. New section inserted.	
	M2301.2.8 Expansion tanks. Expansion tanks in solar energy systems shall be installed in accordance with Section M2003 in solar collector ~~closed fluid~~ loops that contain pressurized heat transfer fluid. Where expansion tanks are used, the system shall be designed in accordance with SRCC 300 to provide ab expansion tank that is sized to withstand the maximum operating pressure of the system. **Expansion:** Expansion tanks shall not be required in drain-back systems.	**M2301.2.8 Expansion tanks.** Expansion tanks in solar energy systems shall be installed in accordance with Section M2003 in solar collector loops that contain pressurized heat transfer fluid. Where expansion tanks are used, the system shall be designed in accordance with SRCC 300 to provide ab expansion tank that is sized to withstand the maximum operating pressure of the system. **Expansion:** Expansion tanks shall not be required in the collective loop of drain-back systems.
	M2301.2.10 Description and warning labels. New section.	
	M2301.2.11 Solar loop. New section.	

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	M2301.2.11.2 Drain and fill valve labels and caps. New section.	
	M2301.3.1 Collectors. Collectors shall be listed and labeled in accordance with SRCC 100 or SRCC 600. Collectors and panels shall be listed and labeled to show the manufacturer's name, model number, serial number, collector weight, collector maximum allowable temperatures and pressures, and the type of heat transfer fluids that are compatible with the collector or panel. The label shall clarify that these specifications apply only to the collector or panel.	**M2301.3.1 Collectors.** Solar thermal collectors and panels ~~Collectors~~ shall be listed and labeled in accordance with ICC 901/SRCC 100 ~~or SRCC 600~~. Factory-built collectors shall bear a label indicating the ~~Collectors and panels shall be listed and labeled to show the~~ manufacturer's name, model number, serial ~~number, collector weight, collector maximum allowable temperatures and pressures, and the type of heat transfer fluids that are compatible with the collector or panel. The label shall clarify that these specifications apply only to the collector or panel.~~
		M2301.3.2 Thermal storage units. Pressurized water ~~thermal~~ storage units shall be listed and labeled to show the manufacturer's name, model number, serial number, storage unit maximum and minimum allowable operating temperatures and pressures, and the type of heat transfer fluids that are compatible with the storage unit. the label shall clarify that these specifications apply only to the thermal storage unit.
	M2301.4 Heat transfer gasses or liquids and heat exchangers. New section.	
	M2301.6 Filtering. New section.	
	M2301.7 Solar thermal systems for heating potable water. New section and subsections.	

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	CHAPTER 24 FUEL GAS	**CHAPTER 24 FUEL GAS**
Section G2404.1.1 (301.1.2) LP-Gas Installations. Whenever there is a conflict between this code and NFPA 54 and NFPA 58 as adopted by the Nevada LP-Gas Board for LP-Gas installations, the adopted codes of the Nevada LP-Gas Board shall govern.		
Section G2404.11 (301.16) Snow hazard. On any new installation or reconnecting the gas service or an existing installation, gas meters above 5000 feet in elevation in Storey County or 6225 feet in elevation in Carson City or Washoe County must be protected from falling, sliding and accumulating of snow, unless the gas meter is installed in a protected location such as under an engineered deck, roof or shed. Engineered decks, roofs, or sheds shall be enclosed in all sides when used to protect gas meters on the snow shedding sides of a structure as approved by the gas utility.	**G2402.11 (307.6) Condensate pump.** New section**.**	
		G2411.2 (310.2) CSST. New section and subsections**.**
	G2411.1.1.1 (310.1.1.1) Point of connection. New section.	
	G2411.1.1.2 (310.1.1.2) Size and material of jumper. New section.	
	G2411.1.1.3 (310.1.1.3) Bonding jumper length. New section.	
	G2411.1.1.4 (310.1.1.4) Bonding connections. New section.	
	G2411.1.1.5 (310.1.1.5) Connection devices. New section.	

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		G2412.9 (401.9) Identification: **Exceptions:** 1. Steel pipe sections that are 2 feet (610 mm) and less in length and are cut from longer sections of pipe. 2. Steel pipe fittings 2 inches and less in size. 3. Where identification is provided on the product packaging or crating. 4. Where other approved documentation is provided.
		G2412.10 (401.10) Piping materials standards. New section.
		G2413.5 (402.5) Noncorrugated stainless steel tubing. New section.
		2413.7 (402.7) ~~**G2413.6 (402.6)**~~ **Maximum operating pressure.** Insert- 2. The piping joints are flanged and pipe-to-flange connections are made by welding or brazing.
		G2413.7.1 (402.7.1) Operation below -5^{0}F (-21^{0}C). New section.
		G2414.10.3 (403.10.3) Stainless steel tubing joints. New section.
	G2414.10.4 (403.10.4) Metallic fittings. Metallic fittings, including valves, strainers and filters shall comply with the following: Add- 5. Where pipe fittings are drilled and tapped on the field, the operation shall be in accordance with all of the following: 5.1 The operation shall be performed on systems having operating	

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	pressures of 5 psi (34.5 kPa) or less. 5.2 The operation shall be performed by the gas supplier or the gas suppliers designated representative. 5.3 The drilling and tapping operation shall be performed in accordance with written procedures prepared by the gas supplier. 5.4 The fittings shall be located outdoors. 5.5 The tapped fitting assembly shall be inspected and proven to be free of leakage.	
		G2414.4.2 (403.4.2) Steel. Steel stainless steel and wrought-iron pipe shall be not lighter than Schedule 10 and shall comply with the dimensional standards of ASME B36.10, 10M and one of the following standards ~~at least of standard weight (Schedule 40) and shall comply with one of the following standards~~: 1. ASTM A 53/A 53M 2. ASYM A 106 3. ASTM A312
	G2415.5 (404.5) Fittings in concealed locations. New section.	
	G2415.7 (404.7) Protection against physical damage. Where piping will be concealed within light-frame construction	

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	assemblies, the piping shall be protected against penetration by fasteners in accordance with Sections G2415.7.1 through G2415.7.3. Exception: Black steel piping and galvanized steel piping shall not be required to be protected. ~~In concealed locations, where piping other than black or galvanized steel is installed through holes or notches in wood studs, joists, rafters or similar members less than 1'/2 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 Gage) shall cover the area of the pipe where the member is notched or bored and shall extend a minimum of 4 inches (102 mm) above sole plates, below top plates and to each side of a stud, joist or rafter.~~	
	G2415.7.1 (404.7.1) Piping through bored holes or notches. New section.	
	G2415.7.2 (404.7.2) Piping installed in other locations. New section.	
	G2415.7.3 (404.7.3) Shield plates. New section.	
		G2415.11.1 (404.11.1) Galvanizing. New section.

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		G2415.11.2 (404.11.2) Protection methods. New section.
		G2415.11.3 (404.11.3) Dissimilar metals. New section.
		G2415.11.4 (404.11.4) Protection of risers. New section.
Section G2417.4.1 (406.4.1) Test pressure. The test pressure to be used shall be no less than 1-1/2 times the proposed maximum working pressure, but not less than ~~3~~ 25 psig (~~20~~ 172.4 kPa gauge), irrespective of design pressure. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe. This test shall be made before any fixtures, appliances or shut-off valves have been attached and before being concealed,		
Section G2417.4.2 (406.4.2) Test duration. Test duration shall not be less than ~~10 minutes~~ 30 minutes.		
Section G2417.6.2 (406.6.2) Turning gas on. During the process of turning gas on into a system of new gas piping or into a system or portion of a gas system that has been restored after an interruption of service, the entire system shall be inspected to determine that there are no open fittings or ends and that all vales at unused outlets are closed and plugged or capped. In the City of Fernley, City of Reno, City of Sparks, Storey		

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County and Washoe County, a manometer test shall be made after all valves, connectors and piping to the appliance are complete. A pressure test shall be made with the use of a manometer gauge measuring inches of water column. With all valves including gas cock and gas control valves in the open position, a pressure of at least eleven (11) to fifteen (15) inches of water column shall be measured for at least fifteen (15) minutes, with no perceptible drop in pressure.		
Section G2417.6.2.1 (405.6.2.1) For medium pressure gas systems. Where the appliance is rated for seven (7) to eleven (11) inches of water column, a manometer test if eleven (11) to fifteen (15) inches of water column will be conducted between the pressure regulating valve and the appliance and shall be measured for at least fifteen (15) minutes with no perceptible drop in pressure.		
Section G2417.6.2.2 (406.2.2) For appliances or equipment requiring pounds of pressure: A pressure test using a pressure gauge measuring in one tenth (1/10) increments shall be conducted on the gas train of that appliance or equipment. The pressure shall be equal to the appliance's normal operating pressure for a period of thirty (30) minutes with no perceptible drop in pressure.		

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Section G2417.6.2.3 (406.2.3) Manometer testing. Manometer testing shall be performed by a person holding a valid Washoe County manometer tester card for which the number is to be provided at the time of request for inspection. A visual manometer test to be witnessed by the authority having jurisdiction may be allowed by the Building Official. A manometer test does not need to be reported when the serving gas utility preforms a manometer or clock test prior to providing service.		
	G2415.18 (404.18) Pipe cleaning. New section.	
		G2420.6 (409.7) Shutoff valves in tubing systems. New section.
	G2421.2 (410.2) MP regulators. MP pressure regulators shall comply with the following: Add- 7. Where connected to rigid piping, a union shall be installed within 1 foot (304 mm) of either side of the MP regulator.	**G2421.2 (410.2) MP regulators**. MP pressure regulators shall comply with the following: Revise 6. A tee fitting with one opening capped or plugged shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Such tee fitting shall be positioned to allow connection of a pressure-measuring instrument. The tee fitting is not required where the MP regulator serves an appliance that has a pressure test port n the gas control inlet side and the appliance is located in the same room as the MP regulator.
	G2422.1.5 (411.1.4) Movable appliances. Where appliances are equipped with casters or are otherwise subject to	

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	periodic movement or relocation for purposes such as routine cleaning and maintenance, such appliances shall be connected to the supply system piping by means of an appliance connector listed as complying with ANSI Z21.69 or by means of Item 1 of Section G2422.1. ~~approved flexible connector designed and labeled for the application~~. Such flexible connectors shall be installed and protected against physical damage in accordance with the manufacturer's installation instructions	
	G2426.7.1 (502.7.1) Door swing. New section.	
		G2427.4.1 (503.4.1) Plastic piping. Where plastic piping is used to vent an appliance, the appliance shall be listed for use with such venting materials and the appliance manufacturer's installation instructions shall identify the specific plastic piping material. The plastic pipe venting materials shall be labeled in accordance with the product standards specified by the appliance manufacturer or shall be listed in accordance with UL 1738.
		G2427.4.1.1 (503.4.1.1) Plastic vent joints. Plastic pipe and fittings used to vent appliances shall be installed in accordance with the appliance manufacturer's instructions. Plastic pipe venting materials listed and labeled in accordance with the

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		vent manufacturer's instructions. Where a primer is required, it shall be of a contrasting color.
		G2427.5.10 (503.5.11) Insulation shield. New section.
		G2427.6.1 (503.6.1) Materials. New section.
	G2427.6.8.3 (503.6.9.3) Category II, III and IV appliances. The sizing of gas vents for Category II, Ill and IV appliances shall be in accordance with the appliance manufacturer's instructions. The sizing of plastic pipe that is specified by the appliance manufacturer as a venting material for Category II, III and IV appliances, shall be in accordance with the manufacturer's instructions.	
		G2427.6.9 (503.6.10) Size of gas vents. New section and subsections.
	G2427.8 (503.8) Venting system termination location. Add- 5. Vent systems for Category IV appliances that terminate through an outside wall of a building and discharge flue gases perpendicular to the adjacent wall shall be located not less than 10 feet (3048 mm) horizontally from an operable opening in an adjacent building. This requirement shall not apply to vent terminals that are 2 feet (607mm) or more above or 25 feet (7620 mm) or more below operable openings.	**G2427.8 (503.8) Venting system termination location.** Replace- 3. The clearances for through-the-wall, direct-vent terminals shall be in accordance with Table G2427.8.

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		TABLE G2427.8 (503.8) THROUGH-THE-WALL, DRIECT-VENT TERMINATION CLEARANCES. New table.
		G2439.3.1 (614.4.1) Exhaust termination outlet and passageway. New section.
	G2439.4 (614.5) Dryer exhaust duct power ventilators. New section inserted.	
	G2439.6 (614.7) Protection required. New section.	
	G2439.7 (614.8) Domestic clothes dryer exhaust ducts. New section.	
	G2439.7.1 (614.8.1) Material and size. New section.	
	G2439.7.2 (614.8.2) Duct installation. New section.	
	G2439.7.4.3 (614.8.4.3) Dryer exhaust duct power ventilator length. New section.	
	G2439.7.5 (614.8.5) Length identification. New section.	
	G2447.2 (623.2) Prohibited location. **Exception:** Appliances that are also listed as domestic cooking appliances.	**G2447.2 (623.2) Prohibited location.** **Exceptions:** **1.** Appliances that are also listed as domestic cooking appliances. **2.** Where the installation is designed by a licensed Professional Engineer, in compliance with the manufacturer's installation instructions.

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	CHAPTER 25 PLUMBING ADMINISTRATION	**CHAPTER 25 PLUMBING ADMINSTRATION**
	P2502.1 Existing building sewers and drains. Where the entire sanitary drainage system of an existing building is replaced, existing buildings under concrete slabs and existing building sewers that will serve the new system shall be internally examined to verify that the piping is sloping in the correct direction, is not broken, is not obstructed and is sized for the drainage load of the new plumbing drainage system to be installed. ~~Existing building sewers and drains shall be used in connection with new systems when found by examination and/or test to conform to the requirements prescribed by this document.~~	
Section P2503.5.1 Rough plumbing. DWV systems shall be tested n completion of the rough piping installation by water or ~~for piping systems other than plastic,~~ by air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping have been installed, as follows: 1. Water test. Each section shall be filled with water to a point not less than 10 feet (3048 mm) above the highest fitting connection in the section under that section, or to the highest point in the completed		

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system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection. 2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.		
		P2503.7 Water-supply system testing. **Exception.** For PEX piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the PEX pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.
	CHAPTER 26 GENERAL PLUMBING REQUIREMENTS	**CHAPTER 26 GENERAL PLUMBING REQUIREMENTS**
		P2602.1 General. The water-distribution system of ~~and drainage system or~~ any building or premises where plumbing fixtures are installed shall be connected to a public water supply. ~~or sewer system, respectively, if available.~~ Where either a public water-supply ~~or sewer~~ system~~, or both, are~~ is

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		not available, or connection to them is not feasible, an individual water supply ~~or individual (private) sewage disposal system, or both,~~ shall be provided. Individual water supplies shall be constructed and installed in accordance with the applicable state and local laws. Where no such laws do not address the requirements set forth in NGWA-01, individual water supplies shall comply with NGWA-01 for those requirements not addressed by state and local laws. Sanitary drainage piping from plumbing fixtures in buildings and sanitary drainage piping systems from premises shall be connected to a public sewer. Where a public sewer is not available, the sanitary drainage piping and systems shall be connected to a private sewage disposal system in compliance with state or local requirements. Where state or local requirements do not exist for private sewage disposal systems, the sanitary drainage piping and systems shall be connected to an approved private sewage disposal system that is in accordance with the International Private Sewage Disposal Code. **Exception:** Sanitary drainage piping and systems that convey only the discharge from bathtubs, showers, lavatories, clothes washers and laundry trays shall not be required to connect to a public sewer or to a private sewage disposal system provided that the piping or systems are connected to a system in accordance with Section P2910 or P2911.

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	P2603.2.1 Protection against physical damage. In concealed locations, where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1 ¼ ~~l'/2~~ inches (31.8 ~~38~~ mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 Gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.	
	P2603.3 Protection against corrosion. New section.	
Section P2603.5.1 Sewer depth. Building sewers that connect to private sewage disposal systems shall be ~~a~~ not less than twelve (12) inches (305 mm) below finished grade at the point of septic tank connection. Building sewers shall be not less than twelve (12) inches (305 mm) below grade.		
	P2604.2 Water service and building sewer in same trench ~~Common trench.~~ ~~See Section P2905.4.2.~~ Where the water service piping and building sewer piping is installed in the same trench, the	

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	installation shall be in accordance with Section P2906.4.1.	
		P2605.1 General. Insert- 4. Where horizontal pipes 4 inches (102 mm) and larger convey drainage or waste, and where a pipe fitting changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.
	P2607.1 Pipes penetrating roofs. New section.	
	P2607.2Pipes penetrating exterior walls. New section.	
	P2609.1 Identification. Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer and any markings required by the applicable referenced standards. Nipples created from the cutting and threading of approved pipe shall not be required to be identified. **Exceptions:** Where the manufacturer identification cannot be marked on pipe fittings and pipe nipples because of the small size of such fittings, the identification shall be printed on the item	

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	packaging or on documentation provided with the item.	
	CHAPTER 27 PLUMBING FIXTURES	
	P2702.1 Plumbing fixtures. Plumbing fixtures, other than water closets, shall be provided with approved strainers**.** **Exception:** Hub drains receiving only clear water waste and standpipes shall not require strainers**.**	
	P2706.1.2.1 Laundry tray connection to standpipe. New section.	
	P2708.2 Shower drain. New section**.**	
	P2711.1 Approval. Lavatories shall conform to ASME A112.19.1/CSA, B45.2, ASME A112.19.2/CSA B45.1, ASEM A112.19.3/CSA B45.4 or CSA B45.5/IAPMO X124. ~~ANSI Z124.3. ASME I 12.19.1/CSA B45.2. ASME A 1 12.19.2/ CSA B45.1or ASME A112.19.3/CSA B45.4.~~	
	P2711.2 Cultured marble lavatories. Cultured marble vanity tops with an integral lavatory shall conform to ~~ANSI Z 124.3 or~~ CSA B45.5/1APMOZ124.	
	P2712.1 Approval. Water closets shall conform to the water consumption requirements of Section P2903.2 and shall conform to ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124. ~~ANSI Z124.4. ASME Al~~	

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	~~12.19.2/CSA B45.1. ASME A112.19.3/CSA B45.4 or CSA B45.5.~~ Water closets shall | conform to the hydraulic performance requirements of ASME Al 12.19.2/CSA B45.L Water closet tanks shall con- I form to ANSI Z124.4. ASME Al 12.19.2/CSA B45.L ASME I A 112.19.3/CSA B45.4 or CSA B45.5. Water closets that | have an invisible seal and unventilated space or walls that are not thoroughly washed at each discharge shall be prohibited. Water closets that permit backflow of the contents of the bowl into the flush tank shall be prohibited. Water closets equipped either a dual flushing device shall comply with ASME A112.19.14.	
	P2716.1 Food waste grinder disposal waste outlets. Food waste grinders shall be connected to a drain of not less than l'/2 inches (38 mm) in diameter.	
	P2716.2 Water supply required. A sink equipped with a food-waste disposer shall be provided with a faucet. ~~Food waste grinders shall be provided with an adequate supply of water at a sufficient flow rate to ensure proper functioning of the unit.~~	
	P2717.1 Protection of water supply. The water supply to a ~~for~~ dishwasher~~s~~ shall be protected against backflow by an air gap	

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	complying with ASME A112.1.3 or A112.1.2 that is installed integrally within the machine or a backflow preventer in accordance with Section P2902 ~~or integral backflow preventer.~~	
	P2725.1 General. New section.	
	CHAPTER 28 WATER HEATERS	
	P2801.2 Drain valves. New section.	
	P2801.5.1 Pan size and drain. The pan shall be not less than l'/2 inches (38 mm) deep and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe of not less than 3/4 inch (19 mm) diameter. Piping for safety pan drains shall be of those materials listed in Table P2905.5. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.	
	SECTION P2802 SOLAR WATER HEATING SYSTEMS. New sections and subsections inserted.	
	P2803.6.1 Requirements for discharge pipe. The dis¬ charge piping serving a pressure-relief valve, temperature relief valve or combination valve shall:	

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	Revise- 10. Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim. ~~Not terminate more than 6 inches (152 mm) above the floor or waste receptor.~~ Add- 14. Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is constructed of PEX or PE-RT tubing. The outlet end of such tubing shall be fastened in place.	
	CHAPTER 29 WATER SUPPLY AND DISTRIBUTION	
	P2901.2 Identification of nonpotable water systems. New section and subsections.	
	TABLE P2901.2.2 SIZE OF PIPE IDENTIFICATION. New table.	
	P2902.3.2 Atmospheric-type vacuum breakers. ~~Pipe applied~~ Atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1. CSA B64.2.1.1, CSA B64.2.2 or CSA B64.7. Both types of vacuum breakers shall be installed with the outlet continuously open to the atmosphere. The critical level of	

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	atmospheric vacuum breaker shall be set at not less than6 inches (152 mm) above the highest elevation of downstream piping and the flood level rim of the fixture or device. ~~These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height~~.	
	P2902.3.3 Backflow preventer with intermediate atmospheric vent. Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012 or CAN/ CSA B64.3. These devices shall be permitted to be installed where subject to continuous pressure conditions. These devices shall be prohibited as a means of protection where any hazardous chemical additives are introduced downstream of the device. The relief opening shall discharge by air gap and shall be prevented from being submerged.	
	P2902.3.4 Pressure vacuum breaker assemblies. Pressure vacuum breaker assemblies shall conform to ASSE 1020 or CSA B64.1.2. Spill-resistant vacuum breaker assemblies shall comply with ASSE 1056. These assemblies are designed for installation under continuous pressure conditions where the critical level is installed at the required height. The	

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	critical level of a pressure vacuum breaker shall be set at not less than 12 inches (304 mm) above the highest elevation of downstream piping and flood level rim of the fixture or device. Pressure vacuum breaker assemblies shall not be installed in locations where spillage could cause damage to the structure.	
	P2902.3.6 Double check-valve assemblies. Double check-valve assemblies shall conform to ASSE 1015, CSA B64.5, CSA B64.5.1 or AWWA C510. Double check detector fire protection backflow prevention assemblies shall conform to ASSE 1048. ~~Double detector check-valve assemblies shall conform to ASSE 1048.~~ These devices shall be capable of operating under continuous pressure conditions	
	P2902.3.7 Dual check backflow preventer. New section.	
	P2902.5.2 Heat exchangers. Heat exchangers using an essentially toxic transfer fluid shall be separated from the potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Single-wall construction heat exchangers shall be used only where an essentially nontoxic transfer fluid is	

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	utilized. ~~Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single wall construction.~~	
	P2902.5.5 Solar thermal systems. Revised ~~The potable water supply to a solar system shall be equipped with a backflow preventer with intermediate atmospheric vent complying with ASSE 1012 or a reduced pressure principle backflow preventer complying with ASSE 1013. Where chemicals are used, the potable water supply shall be protected by a reduced pressure principle backflow preventer. Exception: Where all solar system piping is a part of the potable water distribution system, in accordance with the requirements of the International Plumbing Code, and all components of the piping system are listed for potable water use, cross-connection protection measures shall not be required~~.	
	P2902.5.5.1 Indirect systems. New section.	
	P2902.5.5.2 Direct systems for potable water distribution systems. New section.	
	P2902.5.5.2 Direct systems for other than potable water distribution systems. New section.	

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	P2903.3 Minimum pressure. Where the water pressure supplied by the public water main or an individual water supply system is insufficient to provide for the minimum pressures and quantities for the plumbing fixtures in the building, the pressure hall be increased by means of an elevated water tank, a hydropnuematic pressure booster system or a water pressure booster pump. ~~The static water pressure (as determined by the local water authority) at the building entrance for either public or private water service shall be not less than 40 psi (276 kPa).~~	
	P2903.8 Gridded and parallel water distribution system manifolds. Hot water and cold water manifolds installed with ~~gridded or~~ parallel-connected individual distribution lines and cold water manifolds installed in gridded distribution lines to each fixture or fixture fittings shall be designed in accordance with Sections P2903.8.1through P2903.8.5 ~~P2903.8.6~~. Gridded systems for hot water distribution systems shall be prohibited.	
	TABLE P2903.9.4 VALVES. New table.	
	P2903.11 Drain water heat recovery units. New section.	
	P2904.3 Sprinkler piping system.	

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	Exception: For plastic piping, it shall be permissible to follow the manufacturer's installation instructions.	
	SECTION P2905 HEATED WATER DISTRIBUTION SYSTEMS. New sections inserted.	
	SECTION P2906 ~~P2905~~ MATERIALS, JOINTS AND CONNECTIONS. Renumbered.	
	P2906.2.1 Lead content of drinking water pipe and fittings. New section.	
	P2906.4.1 Separation of water service and building sewer. New section.	
	P2906.9.1.3 CPVC/AL/CPVC pipe. New section.	
	P2906.18 Press-connect joints. Press-connect joints shall conform to one of the standards indicated in Table P2906.6. Press-type mechanical joints in copper tubing shall be made in accordance with the manufacturer's instructions. Cut tube ends shall be reamed to the full inside diameter of the tube end. Joint surfaces shall be cleaned. The tube shall be fully inserted into the press connect fitting. Press-connect joints shall be pressed with a tool certified by the manufacturer. ~~using approved tools which affix the copper fitting with integral O-ring to the tubing.~~	

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	SECTION P2910 NONPOTABLE WATER SYSTEMS. New sections and subsections.	
	SECTION P2911 ON-SITE NONPOTABLE WATER REUSE SYSTEMS. New sections and subsections.	
	SECTION P2912 NONPOTABLE RAINWATER COLLECTORS AND DISTRIBUTION SYSTEMS. New sections and subsections.	
	SECTION P2913 RECLAIMED WATER SYSTEMS. New sections and subsections.	
	CHAPTER 30 SANITARY DRAINAGE	**CHAPTER 30 SANITARY DRAINAGE**
Section P3002.2 Building sewer. Building sewer piping shall be as shown in Table P3002.2. Forced main sewer piping shall conform to one of the standards for ABS plastic pipe, copper or copper-alloy tubing, PVC plastic pipe or pressure-rated pipe listed in Table P3002.2.		
	P3002.2.1 Building sewer pipe near the water service. New section.	
	P3003.1.4.2 Solvent cementing. **Exceptions:** A primer shall not be required where all of the following conditions apply: 1. The solvent cement used is third-party certified as conforming to ASTM D 2564. **2.** The solvent cement is used only for joining PVC drain, waste and	

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	vent pipe and fittings in non-pressure applications in non-pressure applications in sizes up to and including 4 inches (102 mm) in diameter.	
Section P3004.1 DWV system load. The load n DWV-system piping shall be computed in terms if drainage fixture unit (dfu) values in accordance with Table P3004.1. Minimum building sewer size shall be four (4) inches in **diameter**.		
		P3005.1.6 Drainage piping size reduction in the direction of flow ~~Change in size~~. The size of the drainage piping shall not be reduced in size in the direction of the flow. The following shall not be considered a reduction in size in the direction of flow: 1. A 4-inch by 3-inch (102 mm by 76 mm) water closet flange. ~~connection shall not be considered as a reduction in size.~~ 2. A water closet bend fitting having a 4-inch (102 mm) inlet and a 3-inch (76 mm) outlet provided that the 4-inch leg of the fitting is upright and below, but not necessarily directly connected to, the water closet flange. 3. An offset closet flange.
	P3005.2 Cleanouts required. New sections and subsections.	
	P3008.1 Sewage backflow.	

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	Exception: In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not be prohibited from discharging through a backwater valve.	
	SECTION P3009 SUSYRFACE LANSCAPE IRRIGATION SYSTEMS. New sections and subsections.	
	SECTION P3010 REPLACEMENT OF UNDERGROUND SEWERS BY PIPE BURSTING METHODS. New sections and subsections.	
		SECTION 3011 REPLACEMENT OF UNDERGROUND SEWERS BY PVC FOLD AND FORM METHODS. New section.
	CHAPTER 31 VENTS	**CHAPTER 31 VENTS**
		P3103.1 Vent pipes terminating outdoors. New section and subsections.
		P3111.1 Type of fixtures. A combination waste and vent system shall not serve fixtures other than floor drains, sinks, lavatories and drinking fountains. A combination waste and vent system shall be considered to be the vent for those fixtures. The developed length of a fixture drain to the combination waste and vent system piping shall not exceed the limitations of Table P3105.1. ~~not receive the discharge of a food waste disposer.~~
		P3111.1 Single-fixture systems. New section.
	CHAPTER 32 TRAPS	

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	P3201.2 Trap seals. New section and subsections.	
	P3201.4 Building traps. Building traps shall be prohibited ~~not be installed, except in special cases where sewer gases are extremely corrosive or noxious, as directed by the budding official~~.	
	CHAPTER 34 GENERAL REQUIREMENTS	**CHAPTER 34 GENERAL REQUIREMENTS**
	E3404.12 Field-applied hazard markings. New section.	
		E3405.2 Working clearances for energized equipment and panelboards. Add- Where such equipment is required by installation instructions or function is located in a space with limited access, all of the following shall apply: 1. Where the equipment is installed above a lay-in ceiling, there shall be an opening not smaller than 22 inches by 22 inches (559 mm by 559 mm), or in a crawl space, there shall be an accessible opening not smaller than 22 inches by 30 inches (559 mm by 762 mm). 2. The width of the working space shall be the width of the equipment enclosure or not less than 30 inches (762 mm), whichever is greater. 3. Enclosure doors and hinged panels shall be capable of opening not less than 90 degrees.

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		4. The space in front of the enclosure shall comply with the depth requirements of Table 110.26(a)(1) of NFPA 70. The maximum height of the working space shall be the height necessary to install the equipment in the limited space. A horizontal ceiling structural member or access panel shall be permitted in the space. [110.26(A)(1), (2), (3), (4)]
	E3405.4 Outdoor dedicated panelboard space. New section.	
		E3406.12 Installation. New section.
	E3406.13 Connection of grounding and bonding equipment. New section and subsections.	
	CHAPTER 36 SERVICES	**CHAPTER 36 SERVICES**
Section E3601.6.2 Service disconnect location. The service disconnecting means shall be installed at a readily accessible location either outside of as building or structure ~~inside~~ nearest the point of entrance of the service conductors. ~~Service disconnecting means shall not be installed in bathrooms. Each occupant shall have a access to the disconnect serving the dwelling unit in which they reside.~~ The disconnecting means may be located independent of the building or structure served in direct line of sight, but nor to exceed thirty (30) feet.		

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Exception: The service disconnecting means may be installed within a building when an external remote shunt trip switch is provided. All shunt trip switches shall be located at seven feet (7') above finish grade at a location approved by the fire department. All shunt trip switches shall be located within a twelve inch (12") equilateral triangle, red in color		
	E3603.1 Grounded and ungrounded service conductor size. Service and feeder conductors supplied by a single-phase, 120/240-volt system shall be sized in accordance with Sections E3603.1.1 through E3603.1.4 and Table 3705.1. Conductors used as ungrounded service entrance conductors, service lateral conductors, and feeder conductors that serve as the main power feeder to a dwelling unit shall be those listed in Table E3603.1. The main power feeder shall be the feeder(s) between the main disconnect and the panelboard that supplies, either by branch circuits or by feeders, or both, all loads that are part of or are associated with the dwelling unit. The feeder conductors to a dwelling unit shall not be required to have an allowable ampacity greater than that of the service-entrance conductors that supply them. Ungrounded service conductors shall have	

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	a minimum size in accordance with Table E3603.1. The grounded conductor ampacity shall be not less than the maximum unbalance of the load and its size shall be not smaller than the required minimum grounding electrode conductor size specified in Table E3603.1.	
	3603.1.1 Underground service conductors. New section.	
	3603.1.2 Underground feeder conductors. New section.	
	3603.1.3 Feeder size relative to service size. New section.	
	3603.1.4 Grounded conductors. New section.	
		E3603.1.5 Adjustment/correction factors. New section**.**
		E3603.3.3 Location. The service overcurrent device shall be an integral part of the service disconnecting means or shall be located immediately adjacent thereto. Where fuses are used as the service overcurrent device, the disconnecting means shall be located in the supply side of the fuses (230.91)
	E3604.5 Service masts as supports. ~~Where~~ A service mast ~~is~~ used for the support of service-drop conductor~~s~~ or overhead service conductor shall comply with Sections E3604.5.1 and E3604.5.2. ~~, it shall be of adequate strength or be supported by braces or guys to withstand~~	

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	~~the strain imposed by the service drop. Where raceway type service masts are used, all equipment shall be approved.~~ Only power service drop conductors shall be permitted to be attached to a service mast	
	E3604.5.1 Strength. New section.	
	E3604.5.2 Attachment. New section.	
		E3604.6 Supports over buildings. Service conductors passing over a roof shall be securely supported by a substantial structure. For a grounded system, where the substantial structure is metal, is shall be bonded by means of a bonding jumper and listed connector to the grounded overhead service conductor. Where practicable, such supports shall be independent of the building. (230.39)
		E3606.4 Marking. **Exception:** Meter sockets supplied by and under the exclusive control of an electric utility shall not be required to be listed. (230.66 Exception)
		E3608.7 Pool, spa and hot tub structures and structural reinforcing streel. New section.
		E3609.3.1 Intersystem bonding termination device. New section.
		E3609.3.2. New section.
		E3611.5 Rebar type concrete-encased electrode. New section.
	CHAPTER 37 BRANCH CIRCUIT AND FEEDER REQUIREMENTS	**CHAPTER 37 BRANCH CIRCUIT AND FEEDER REQUIREMENTS**

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		E3701.3 Selection of ampacity. **Exception:** Where two different ampacities apply to ~~adjacent~~ portions of a circuit, the higher ampacity shall be permitted to be used where the total portion(s) of the circuit with the lower ampacity does not exceed the lesser of ~~beyond the point of transition, a distance equal to~~ 10 feet (3048 mm) or 10 percent of the total circuit ~~length figured at the higher ampacity, whichever is less~~. [310.15(A)(2)Exception]
	E3701.5.2 Grouping. The ungrounded and grounded circuit conductors of each multiwire branch circuit shall be grouped by cable ties or similar means in at least one location within the panelboard or other point of origination. **Exception:** Grouping shall not be required where the circuit conductors enter from a cable or raceway unique to the circuit, thereby making the grouping obvious, or where the conductors are identified at their terminations with numbered wire markers corresponding to their appropriate circuit number [210.4(D)Exception].	
	E3702.13 Electric vehicle branch circuit. New section inserted.	
		E703.5 Garage branch circuits. New section.
	E3705.4.5 Conductors of Type SE cable. New section.	

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Section E3705.6.1 Edison Fuses. Plug fuses if he Edisonbased shall be used only for replacement in existing installations where there is no evidence of overfusing or tampering. In any existing building where alterations or additions are made to any of the premises wiring, all fuse holders shall be made to comply with the requirements for a Type S fuse holder through the installation of a tamper proof (rejection type) base.		
		CHAPTER 38 WIRING METHODS
		E3802.6 Cable-securing means. New section.
	CHAPTER 39 POWER AND LIGHTING DISTRIBUTION	**CHAPTER 39 POWER AND LIGHTING DISTRIBUTION**
	E3901.9 Basements, garages and accessory buildings. Not less than one receptacle outlet, in addition to any provided for specific equipment, shall be installed in each separate unfinished portion of a basement, in each attached garage, and in each detached garage or accessory building that is provided with electrical power. the branch circuit supplying the receptacle(s) in a garage sg=hall not supply outlets outside of the garage and not less than one receptacle outlet shall be installed for each motor vehicle space. [210.52(G)(1), (2), and (3)]. ~~At least one receptacle outlet, in addition~~	

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	~~to any provided for specific equipment, shall be installed in each basement and in each attached garage, and in each detached garage or accessory building that is provided with electrical power. Where a portion of the basement is finished into one or more habitable room(s), each separate unfinished portion shall have a receptacle outlet installed in accordance with this section.~~	
	E3902.5 Unfinished basement receptacles. **Exception**: A receptacle supplying only a permanently installed fire alarm or burglar alarm system. Receptacles installed in accordance with this exception shall not be considered as meeting the requirement of Section E3901.0. [210.8(A)(6)]	
	E3902.8 Bathroom or shower stall receptacles. New section.	
	E3902.9 Laundry areas. New section.	
	E3902.10 Kitchen dishwasher branch circuit. New section.	
~~**Section E3902.12 Arc-fault circuit interrupter protection for branch circuit extensions or modifications.** Where branch circuit wiring is modified, replaced or extended in any of the areas specified in Section E3905.12, the branch circuit shall be protected by one of the following:~~		

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~~1. A combination type AFCI located at the origin of the branch circuit.~~ 2. ~~An outlet branch circuit type AFCI located at the first receptacle out of the existing branch circuit.~~		
	E3902.15 Location of arc-fault circuit interrupters. New section.	
	E3902.16 Arc-fault circuit-interrupter protection. New section and subsections.	
	E3905.ll Damp or wet locations. In damp or wet locations, boxes, conduit bodies and fittings shall be placed or equipped so as to prevent moisture from entering or accumulating within the box, conduit body or fitting. Boxes, conduit bodies and fittings installed in wet locations shall be listed for use in wet locations. Where drainage openings are installed in the field in boxes or conduit bodies listed for use in damp or wet locations, such openings shall be approved and not larger than ¼ inch (6.4 mm). For listed drain fittings, larger openings are permitted where installed in the field in accordance with the manufacturer's instructions. (314.15)	
		E3905.12.1 Box volume calculations. The volume of a wiring enclosure (box) shall be the total volume of the assembled sections, and, where used, the space provided by plaster rings, domed covers, extension rings, etc., that are marked with their volume in cubic inches or are made from boxes the dimensions

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		of which are listed in Table E3905.12.1. Where a box is provided with one or more securely installed barriers, the volume shall be apportioned to each of the resulting spaces. Each barrier, if not marked with its volume, shall be considered to take up to .5 cubic inch (8.2 cm^3) if metal, and 1.0 cubic inch (16.4 cm^3) if nonmetallic [314.16(A)]
	E3905.12.2.2 Clamp fill. Where one or more internal cable clamps, whether factory or field supplied, are present in the box, a single volume allowance in accordance with Table E3905.12.2.1shall be made based on the largest conductor present in the box. No allowance shall be required for a cable connector with its clamping mechanism outside the box. A clamp assembly that incorporates a cable termination for the cable conductors shall be listed and marked for use with specific nonmetallic boxes. Conductors that originate within the clamp assembly shall be included in conductor fill calculations provided in Section E3905.12.2.1 as though they entered from outside of the box. The clamp assembly shall not require a fill allowance, but, the volume of the portion of the assembly that remains within the box after installation shall be excluded from the box volume as marked	

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	in accordance with Section E3905.12.1.2 [314.16(B)(2)]	
		E3906.5 Flush-mounted installations. New section inserted.
	E3906.9 Covers and canopies. Outlet boxes shall be effectively closed with a cover, faceplate or fixture canopy. Screws used for the purpose of attaching covers, or other equipment to the box shall be machine screws matching the thread gauge or size that is integral to the box or shall be in accordance with the manufacturer's instructions. (314.25)	
		E3906.12 Separable attachment fittings. New section inserted.
		E3907.1.1 Power monitoring equipment. New section**.**
	E3907.9 Wire-bending space within an enclosure containing a panelboard. New section and subsections inserted.	
	TABLE E3907.9.1(1) [Table 312.6(B)] MINIMUM WIRE-BENDING SPACE AT TERMINALS. New table.	
	TABLE E3907.9.1(2) [Table 312.6(A)] MINIMUM WIRE-BENDING SPACE AT TERMINALS AND WIDTH OF WIRING GUTTERS. New table.	
	E3908.15 Metal boxes. Revise- 2. Machine screw-type fasteners that are secured with a nut.	

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Section E3908.18 Bonding other enclosures. Metal raceways, cable armor, cable sheath, enclosures, frames, fittings and other metal noncurrent-carrying parts that serve as grounding conductors, with or without the use of supplementary equipment grounding conductors, shall be effectively bonded where necessary to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them. Any nonconductive paint, enamel and similar coating shall be removed at threads, contact points and contact surfaces, or connections shall be made by means of fittings designed so as to make such removal unnecessary. The Authority Having Jurisdiction shall require a supplementary grounding conductor where a metallic raceway is subject to damage or is likely to be disturbed. FON: An example of "subject to damage" might be a surface mounted conduit along a traffic path in a warehouse. An example of "likely o]to be disturbed" night be conduit across a rooftop, where re-roofing operations will require the conduit to be removed.		
	CHAPTER 40 DEVICES AND LUMINAIRES	**CHAPTER 40 DEVICES AND LUMINAIRES**
	E4001.6 Access. **Exception**: This section shall not apply to switches and circuit breakers that are accessible by portable means and are	

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	installed adjacent to the motors, appliances and other equipment that they supply. [404.8(A) Exception]	
	E4001.10 Box mounted. Flush-type snap switches mounted in boxes that are recessed from the finished wall surfaces as covered in Section E3906.5 shall be installed so that the extension plaster ears are seated against the surface of the wall. Flush-type snap switches mounted in boxes that are flush with the finished wall surface or project therefrom shall be installed so that the mounting yoke or strap of the switch is seated against the box. Screws used for the purpose of attaching a snap switch to a box shall be of the type provided with a listed snap switch, or shall be machine screws having 32 threads per inch or part of listed assemblies or systems, in accordance with the manufacturer's instructions. [404.10(B)]	
	E4001.15 Switches controlling lighting loads. The grounded circuit conductor for the controlled lighting circuit shall be provide at the location where switches control lighting loads that are supplied by a grounded general-purpose branch circuit for other than the following:	**E4001.15 Switches controlling lighting loads**. The grounded circuit conductor for the controlled lighting circuit shall be installed ~~provide~~ at the location where switches control lighting loads that are supplied by a grounded general-purpose branch circuit serving bathrooms, hallways, stairways, or rooms suitable for human habitation or occupancy as defined in this code. Where multiple switch

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	~~Where switches control lighting loads supplied by a grounded general-purpose branch circuit, the grounded circuit conductor for the controlled lighting circuit shall be provided at the switch location.~~ ~~**Exception:** The grounded circuit conductor is not required to be provided at the switch enclosure where either of the following conditions apply:~~ ~~1. The conductors enter the box through a raceway. The raceway shall have sufficient cross-sectional 738 area to accommodate the extension of the grounded circuit conductor of the lighting circuit to the switch location whether or not the conductors in the raceway are required to be increased in size to comply with Section E3705.3.~~ ~~2.Cable assemblies enter the box through a framing cavity that is open at the top or bottom on the same floor level, or through a wall, floor, or ceiling that is unfinished on one side.~~ 1. Where conductors enter the box enclosing the switch through a raceway, provided that the raceway is large enough for all contained conductors, including a grounded conductor.	locations control the same lighting load such that the entire floor area of the room or space is visible from the single or combined switch locations, the grounded conductor shall be required only at one location. A grounded conductor shall not be required to be installed at lighting switch locations under any of the following conditions: ~~for other than the following:~~ 1. Where conductors enter the box enclosing the switch through a raceway, provided that the raceway is large enough for all contained conductors, including a grounded conductor. 2. Where the box enclosing the switch is accessible for the installation of an additional or replacement cable without removing finish materials. 3. Where snap switches with integral enclosures comply with E3905.1.3. 4. ~~Where the switch does not serve a habitable room or bathroom.~~ ~~5. Where multiple switch locations control the same lighting load such that the entire floor area of the room or space is visible from the single or combined switch locations.~~ 6. Where lighting in the area is controlled by automatic means. 7. Where the switch controls a receptacle load. [404.2(C)] Effective January 1, 2020, the grounded conductor shall be extended to any switch location as necessary and shall be connected to switching

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	2. Where the box enclosing the switch is accessible for the installation of an additional or replacement cable without removing finish materials. 3. Where snap switches with integral enclosures comply with E3905.1.3. 4. Where the switch does not serve a habitable room or bathroom. 5. Where multiple switch locations control the same lighting load such that the entire floor area of the room or space is visible from the single or combined switch locations. 6. Where lighting in the area is controlled by automatic means. 7. Where the switch controls a receptacle load. [404.2(C)]	devices that require line-to-neutral voltage to operate the electronics of the switch in the standby mode. The requirement for connection to switching devices shall not apply to replacement or retrofit switches installed in locations prior to the adoption of Section E4001.15 and where the grounded conductor cannot be extended without removing finish materials. The number of electronic lighting control switches on a branch circuit shall not exceed five, and the number connected to any feeder on the load side of a system or main bonding jumper shall not exceed 25.
	E4002.6 Receptacle mounted in boxes. Receptacles mounted in boxes that are set back from the finished wall surface as permitted by Section E3906.5 shall be installed so that the mounting yoke or strap of the receptacle is held rigidly at the finished surface of the wall. Screws used for the purpose of attaching receptacles to a box shall be of the type provided with a listed receptacle, it shall be machine screws having 32 threads per inch or part of listed assemblies or systems, in accordance with	

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	manufacturer's instructions. Receptacles mounted in boxes that are flush with the wall surface or project therefrom shall be so installed that the mounting yoke or strap is seated against the box or raised cover. [406.5(C)]	
		E4002.9 Fifteen- and 20-ampere receptacles in wet locations. **Exception:** 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing need not have an enclosure that is waterproof when the attachment plug is inserted.
	E4002.15 Dimmer-controlled receptacles. New section.	**E4002.15 Receptacles in countertops.** New section.
		E4002.16 Receptacle position. New section.
	E4004.2 Combustible material at outlet boxes. Combustible wall or ceiling finish exposed between the inside edge of a luminaire canopy or pan and the outlet box and having a surface area of 180 in.^{2} (116.129 mm^2) or more shall be covered with a noncombustible material. (410.23) ~~to which the luminaire connects shall be covered with a noncombustible material~~.	
		CHAPTER 41 APPLAINCE INSTALLATION
		E4101.8 Lockable disconnecting means. New section.

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	CHAPTER 42 SWIMMING POOLS	**CHAPTER 42 SWIMMING POOLS**
	E4201.2 STORABLE SWIMMING, ~~OR~~ WADING POOL OR IMMERSION POOLS; STORABLE/PORTABLE SPAS AND HOT TUBS. Revised.	
		E4202.2 Corrosive environment. New section.
		E4202.2.1 Wiring method. New section.
	E4203.1.3 GFCI protection. All 15- and 20-ampere, single phase, 125-volt receptacles located within 20 feet (6096 mm) of the inside walls of pools and outdoor spas and hot tubs shall be protected by a ground-fault circuit interrupter. Outlets supplying pool pump motors from branch circuits with short-circuit and ground-fault protection rated at 120 volts through 240 volts ~~15 or 20 amperes, 125 volts through 240 volts,~~ single phase, whether by receptacle or direct connection, shall be provided with ground-fault circuit-interrupter protection for personnel. [680.43(A) and 680.43 (A)(1)]	
	E4203.4.2Indoor locations.	
	Insert- 2. Ceiling-supported paddle fans are identified for use beneath ceiling structures such as porches and patios.	
	E4203.4.3 Low-voltage luminaires. New section inserted.	
	E4203.6 Overhead conductor clearances. Except where installed with the clearances	

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	specified in Table E4203.5, the following parts of pools and outdoor spas and hot tubs shall not be placed under existing service-drop conductors, overhead service conductors, or any other open overhead wiring; nor shall such wiring be installed above the following: 1. Pools and the areas extending 10 feet (3048 mm) horizontally from the inside of the walls of the pool. 2. Diving structures and the areas extending not less than 10 feet (3048 mm) horizontally from the outer edge of such structures. 3. Observation stands, towers, and platforms and the areas extending not less than 10 feet (3048 mm) horizontally from the outer edge of such structures.	
		E4203.4.7 Low-voltage gas-fired luminaires, decorative fireplaces, fire pits and similar equipment. New section.
	E4204.I Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the prescribed areas of permanently installed swimming pools and spas and hot tubs other than the storable/portable type. ~~area as prescribed.~~	
	E4204.2Bonded parts. 2.Perimeter surfaces	

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	Exceptions: Add- 1. Equipotential bonding of perimeter surfaces shall be required for spas and hot tubs where all of the following conditions apply: 1.1 The spa or hot tub is listed as a self-contained spa for aboveground use. 1.2 The spa or hot tub is not identified as suitable only for inside use. 1.3 The installation is in accordance with the manufacturer's instructions and is located on or above grade. 1.4 The top rim of the spa or hot tub is not less than 28 in. (711 mm) above all perimeter surfaces that are within 30 in. (762 mm), measured horizontally from the spa or hot tub. The height of nonconductive external step for entry to or exit from the self-contained spa is not used to reduce or increase this rim height measurement.	

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	Revise. 2. The equipotential bonding requirements for perimeter surfaces shall not apply to a listed self-contained spa or hot tub located indoors and installed above a finished floor.	
	E4204.5.2 Connections. Connections to bonded parts shall be made in accordance with Section E3406.13.1. ~~shall be made by exothermic welding or by listed pressure connectors or clamps that are labeled as being suitable for the purpose and that are made of stainless steel, brass, copper or copper alloy. Connection devices or fittings that depend solely on solder shall not be used. Sheet metal screws shall not be used to connect bonding conductors or connection devices.~~	
		E4205.5 Motors. Wiring methods installed in the corrosive environment described in Section E4202.2.1 shall comply with Section E4202.2.2 or shall be Type MC cable listed for that location. Wiring methods installed in corrosive environments described in Section E4202.2.1 shall contain an insulated copper equipment conductor sized in accordance with Table E3908.12 but not smaller than 12 AWG. Where installed in noncorrosive environments, branch circuit wiring methods shall comply with Chapter 38. [650.21(A)(1)]

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		~~Pool-associated motors shall be connected to an insulated copper equipment grounding conductor sized in accordance with Table E3908.12, but not smaller than 12 AWG. Where the branch circuit supplying the motor is installed in the interior of a one-family dwelling, in the interior of an accessory building associated with a one-family dwelling, using a cable wiring method permitted by Table 4202.1, an uninsulated equipment grounding conductor shall be permitted provided that it is enclosed within the outer sheath of the cable assembly. [680.21(A)(1) and (A)(4)]~~
		E4205.6 Feeders. These provisions shall apply to any feeder on the supply side of panelboards supplying branch circuits for pool equipment covered in this chapter and on the load side of the service equipment. Where feeders are installed in corrosive environment as described in Section E4202,2,1, the wiring method of that portion of the feeder shall comply with Section 4202.2.2 or shall be liquid-tight flexible metallic conduit (LFNMC). Wiring methods installed in corrosive environments as described in Section E4202.2.1 shall contain an insulated copper equipment grounding conductor sized in accordance with Table E3908.12, but not smaller than 12 AWG. ~~An equipment grounding conductor shall be installed with the feeder conductors between the grounding terminal of the pool equipment panelboard and the grounding terminal of the applicable service equipment. The equipment~~

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		~~grounding conductor shall be insulated, shall be sized in accordance with Table E3608.12m=, and shall be not smaller than 12 AWG.~~
		E4205.6 Grounding and bonding terminals. New section.
		E4206.11 Electrically operated pool covers. **Exception:** 1. Motors that are part of the listed systems with ratings not to exceed the low-voltage contact limit and that are supplied by listed transformers or power supplies that comply with Section E4206.1 shall be permitted to be located less than 5 feet (1524 mm) from the inside wall of the pool. 2. Motors that are part of listed systems with ratings not exceeding the low-voltage contact limit and that are supplied by listed transformers or power supplies that comply with Section E4206.1 shall not be required to be connected to a branch circuit protected by a ground fault circuit-interrupter. ;680.27(B)(1) and (b)(2)]
	SECTION E4207 STORABLE SWIMMING POOLS, STORABLE SPAS, AND STORABLE HOT TUBS	
	E4207.5 Clearances. New section.	
	E4207.6 Disconnecting. New section.	
	E4207.7 Ground-fault circuit interrupters. New section.	

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	E4207.8 Grounding of equipment. New section.	
	E4207.9 Pool water heaters. New section.	
		E4209.1 General. New section.
		E4209.5 Bonded parts. New section.
		E4209.6 Method of bonding. New section.
	CHAPTER 43 CLASS 2 REMOTE-CONTROL, SIGNALING AND POWER-LIMITED CIRCUITS	
		E4302.1 Power sources for Class 2 circuits. Revise- 4. Listed audio/video information technology (computer) communications and industrial equipment limited power circuits.
	TABLE E4303.2 CABLE USES AND PERMITTED SUBSTITUTIONS. Revised.	
	E4302.4 Type CL2R cables. New section.	
	E4304.5 Installation of conductors and cables. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that they will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties or similar fittings designed so as to not damage the cable. Nonmetallic cable ties and other nonmetallic accessories used to secure and support cables located in stud cavity and joist	

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	space plenums shall be listed as having low smoke and heat release properties. The installation shall comply with Table E3802.1 regarding cables run parallel with framing members and furring strips. The installation of wires and cables shall not prevent access to equipment nor prevent removal of panels, including suspended ceiling panels. Raceways shall not be used as a means of support for Class 2 circuit conductors, except where the supporting raceway contains conductors supplying power to the functionally associated equipment controlled by the Class 2 conductors.	
		APPENDIX E MANUFACTURED HOUSING USED AS DWELLINGS
		AE101.2 Flood hazard areas. New section.
	APPENDIX G PIPING STANDARDS FOR VARIOUS APPLICATIONS. New appendix.	
Section AH105.2 Footings. ~~**In areas with a frostline depth of zero as specified in Table R301.2(1).**~~ An unenclosed patio cover shall be permitted to be supported on a slab on grade without footings, provided the slab conforms to the provisions of Section R506, is not less than 3.5 inches (89 mm) thick and the columns do not support live and dead		

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loads in excess of 750 pounds (3.34 kN) per column.		
	APPENDIX J EXISTING BUILDINGS AND STRUCTURES	
	AJ102.4 Replacement windows. New subsections**.**	
	AJ102.6 Equivalent alternatives. Work performed in accordance with the International Existing Building Code shall be deemed to comply with the provisions of this appendix. These provisions are not intended to prevent the use of any alternative material, alter¬ native design or alternative method of construction not specifically prescribed herein, provided any alternative has been deemed to be equivalent and its use authorized by the building official**.**	
		APPENDIX Q TINY HOUSES. New appendix**.**
	APPENDIX R LIGHT STRAW-CLAY CONSTRUCTION. New appendix.	**APPENDIX R LIGHT STRAW-CLAY CONSTRUCTION.**
		AR101.1 Scope. This appendix shall govern the use of light straw-clay as nonbearing building material and wall infill system in Seismic Design Categories A and B. Use of light straw-clay in Seismic Design Categories C, D_0, D_1, and D_2 shall require an

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		approved engineered design by a registered design professional in accordance with Section R301.1.
		AR103.2.4 Stabilization of light straw-clay. New section.
		AR103.5.1Dimensional stability of light straw-clay prior to application to plaster finish. New section.
		AR104.1 Thermal characteristics. New section.
		AR104.2 Thermal resistance. New section.
	APPENDIX S LIGHT STRAWBALE CONSTRUCTION. New appendix.	**APPENDIX S LIGHT STRAWBALE CONSTRUCTION.**
		AS104.2 Purpose and where required. Strawbale walls shall be finished so as to provide mechanical protection, fire resistance and protection from weather and to restrict the passage of air through the bales, in accordance with this appendix and this code. Vertical strawbale wall surfaces shall receive a coat of plaster not less than 3/8 inch (10 mm) thick, or greater where required elsewhere in this appendix, or shall fit tightly against a solid wall panel or dense-packed cellulose insulation with a density of not less than 3.5 cubic foot (56 kg/m^3) blown into an adjacent framed wall. The tops of strawbale walls shall receive a coat of plaster not less than 3/8 inch (10 mm) thick where straw would otherwise be exposed.
		AS104.4.3.2 Clay subsoil requirements. New section.

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		FIGURE AS105.1(1) TYPICAL BASE OF PLASTERED STRAWBALE WALL ON CONCRETE SLAB AND FOOTING. New figure.
		FIGURE AS105.1(2) TYPICAL BASE OF PLASTERED STRAWBALE WALL OVER RAISED FLOOR. New figure.
		FIGURE AS105.1(3) TYPICAL TOP OF LOAD-BEARING STRAWBALE WALL. New figure.
		FIGURE AS105.1(4) TYPICAL TOP OF POST-AMD BEAM WALL WITH PLASTERED STRAWBALE INFILL. New figure.
		AS105.3.1 Exterior sill plates. New section.
		TABLE AS105.4 OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL DIMENSION LIMITS. Revised.
		AS 105.6.9 Separation of exterior plaster and foundation. New section.
		AS06.2 Building limitations and requirements for use of strawbale structural walls. New section.
		AS106.12.3 Roof-bearing assembly. New section and subsections.
		AS016.15 Post-and-beam with strawbale infill. New section.
		AS108.1 R-value. The unit R-value of a strawbale wall with bales laid flat is R-1.22 ~~R-1.3~~ per inch of bale thickness. The unit R-value of a strawbale wall with bales on-edge is R-1.85 ~~R-2~~ per inch of bale thickness.
		AS108.2 Compliance with Section R302.10.1 New section.

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	APPENDIX T RECOMMENDED PROCEDURE FOR WORST-CASE TESTING OF ATMOSPHERIC VENTING SYSTEMS UNDER N1102.4 OR N1105 CONDITIONS. New appendix.	
	APPENDIX U SOLAR-READY PROVISIONS-DETACHED ONE- AND TWO-FAMILY DWELLINGS, MULTIPLE SINGLE-FAMILY DWELLINGS (TOWNHOUSES). New appendix.	**APPENDIX U SOLAR-READY PROVISIONS-DETACHED ONE- AND TWO-FAMILY DWELLINGS, MULTIPLE SINGLE-FAMILY DWELLINGS (TOWNHOUSES).**
		T103.5 Shading. New section.
		T103.6 Capped roof penetration sleeve. New section.

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2018 IBC Comparison and Significant Changes			
2018 Section	**2018 IBC**	**2012 IBC**	**Comments**
CHAPTER 23			
2303.1.4	**Structural glued cross-laminated timber.**	Not Covered	Added, No longer an alternate material.
2303.1.13	**Engineered wood rim board**	Not Covered	Added, No longer an alternate material.
2303.2.2	**Fire-retardant-treated wood, Other means during manufacture**	Expanded	Clarifies surface treatments cannot create *fire-retardant-treated wood*.
2303.4.1.1 (9)	**Truss design drawings**	Reworked	Allows truss connections to be other than metal connector plates.
2303.6	**Nails and Staples**	Expanded	Identifies required bending moment strengths for staples.
2304.9.3.2	**Mechanically laminated decking, Nailing**	2304.8.3.2, Expanded	Adds a table to easily show compliance with code connection requirements. (Note this is usually called Nail-Laminated Timber).
2304.10.5.1 and 2304.10.5.3	**Fasteners and connectors for treated wood. (titles differ from shown).**	2304.9.5.1 and 2304.9.5.3, Expanded	Requires staples used in *preservative-treated wood* and *fire-retardant-treated wood* to be stainless steel.
****Table 2304.11**	**Minimum Dimensions for Heavy Timber Structural Members**	Not Covered	Provides minimum nominal dimensions for structural elements.
2304.11.2	**Heavy timber construction, Partitions and walls**	Not Covered	Added, allows cross-laminated timber (CLT) in exterior walls in heavy timber. This is also shown in 602.4.2. This could potentially create some confusion about following the requirements of 602.4.2.
****2304.11.3 and 2304.11.4**	**Heavy timber construction, Floors and Roof decks**	2304.10.2 thru 2304.10.5, Rearranged and Expanded	Added specific dimensional and construction requirements for CLT and sawn or glued-laminated plank floors and roof. Also, specifically does not allow concealed spaces for roof decks.
2304.12.2.6	**Ventilation beneath balcony or elevated walking surfaces**	Not Covered	Added ventilation requirements for enclosed framing that is exposed to water sources associated with irrigation. (This section is terribly misplaced and belongs in chapter 15).
2305.3	**Shear wall deflection**	2305.3, Changed	Introduced a 4 in the denominator of the shear component of deflection. <u>This is almost certainly a copying error as no bar appeared in the margin in 2015 or 2018 IBCs and it now no longer agrees with the SDPWS shear deflection component.</u>
2308	**Conventional Light-Frame Construction**	2308, Reworked	Section entirely reworked in 2015 IBC to agree with the International Residential Code (IRC).
Table 2308.4.1.1(1) and 2308.5.5.1	**Header and girder spans for exterior bearing walls, and, Openings in exterior bearing walls**	Table 2308.9.6 and 2308.9.5.1, Expanded	Added single member header and girder spans. Added single member headers being allowed, with nailing requirements, and added figures 2308.5.5.1(1) and (2) showing this condition.
****Table 2308.6**	**IRC bracing methods added to the 2018 IBC.**	Not Covered	The bracing methods of the IRC added to the 2015 IBC.

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**Figure 2308.6.5.1 & 2308.6.5.2	**Maximum wall heights for braced wall panels limited to 10 feet in the 2018 IBC**	Expanded	The maximum wall height for braced wall panels, alternative braced wall panel and portal frames is limited to 10 feet in the 2018 IBC. The 2018 IRC allows a maximum height of 12 feet with some restrictions.

**Revised 11-28-17

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2018 IBC Transition from the 2012 IBC

Based on the
2012, 2015 and 2018 editions of the
International Building Code®, (IBC®)

LEARNING center

Identify changes between
the 2012 and 2018 IBC

Includes those changes that occurred in the 2015
and 2018 editions of the IBC.

OBJECTIVES

- Identify the differences between 2012 IBC and 2018 IBC.
- Explain how the changes impact design and construction under the IBC.

Nick Youngson - link to - http://nyphotographic.com/

Tips

Guide to a successful class:

- Slides contain some text and iconic images to help you learn.
- Text and commentary is in the handout.
- Follow along in the course handout.
- Ask Questions, ask questions, ASK QUESTIONS!!!!

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Topics

- Administration, Chapters 1 and 2
- Building Planning, Chapters 3 through 6
- Fire Protection, Chapters 7 through 9
- Means of Egress, Chapter 10
- Accessibility, Chapter 11
- Building Envelope, Structural Systems and Construction, Chapters 12 through 26
- Building Services, Special Devices, and Special Conditions, Chapters 27 through 34

Selection of Topics

- Provisions addressed based primarily on:
  - Frequency of application
  - Special significance
  - Change in application

Marginal Markings within the International Building Code

- **Solid vertical lines** in the margins within the body of the code indicate a technical change from the requirements of the 2015 edition.
- **Deletion indicators in the form of an arrow** are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted.
- **A single asterisk** [*] placed in the margin indicates that text or a table has been relocated within the code.
- **A double asterisk** [**] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code.

Letter Designations in Front of Section Numbers

- In each code development cycle, proposed changes to the code are considered at the Code Development Hearings.
- Proposed changes to a code section that has a number beginning with a letter in brackets are considered by a different code development committee.

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Letter Designations in Front of IBC Section Numbers

- The content of sections in this code that begin with a letter designation is maintained by another code development committee:

[A] = Administrative Code Development Committee;
[E] = International Energy Conservation Code Development Committee;
[EB] = International Existing Building Code Development Committee;
[F] = International Fire Code Development Committee;
[FG] = International Fuel Gas Code Development Committee;
[M] = International Mechanical Code Development Committee; and
[P] = International Plumbing Code Development Committee.

Chapter 1

Scope and Application

111.1, 202 Change of Use or Occupancy Classification

2015
2018

- A change in a building's use, or a portion of a building's use, with no change in its occupancy classification now requires that a new certification of occupancy be issued by the building official.
- Based upon recent code decisions where individual occupancy categories contain varying hazard levels.
- Examples include:
  - Clerical office to ambulatory care facility
  - Electronics sales to furniture/mattress sales building
- By definition, change of occupancy now includes:
  - Change of classification
  - Change from one group to another within classification
  - Change of use within group where change in application of code requirements occurs

Chapter 2

Definitions

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2018

202 Definition of Greenhouse

- Structure of thermally-isolated area of building that maintains a specialized sunlit environment
- Focus is on the cultivation, protection and maintenance of plants rather than the structure itself or the presence of plants

2015

202 Definition of Private Garage

- **202. Private Garage.** *A building or portion of a building in which motor vehicles used by the tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.*
- Previously, no definition provided as scope of “private garage” provisions based on building size.
- Although 1,000 sf was base limit, typically private garages could be up to 3,000 sf in floor area

2018

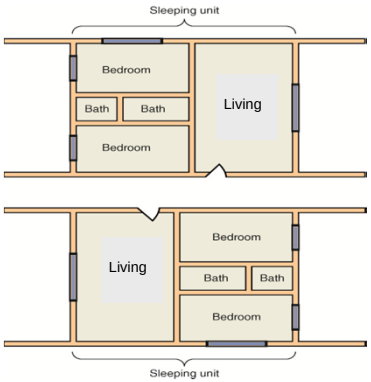
202 Definition of Repair Garage

- Motor vehicle:
  - Servicing, or
  - Repair

2018

202 Definition of Sleeping Unit

- Clarifies bedrooms within residential unit not to be considered as sleeping units
- Consistent with dwelling unit provisions



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Chapter 3

Occupancy Classification and Use

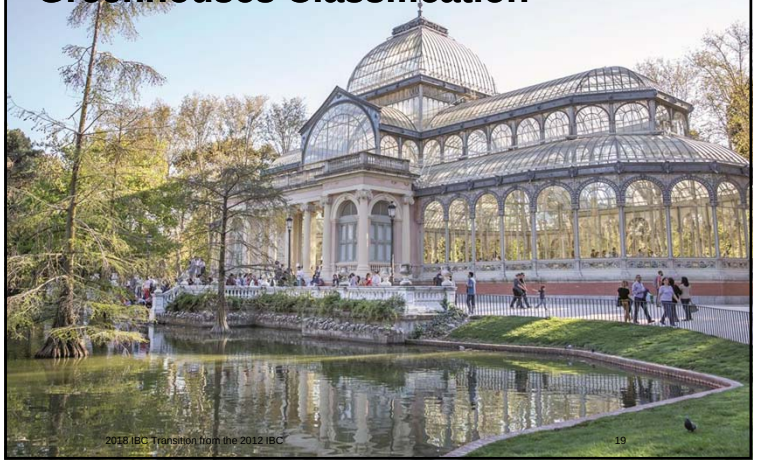
17

302.1 Classification of Outdoor Areas

2018

303.4 Assembly Use of Greenhouses Classification

2018



304.1 Food Processing Facilities and Commercial Kitchens

2015

- **304.1 Business Group B.** Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following: …
  - Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2500 square feet (232 m^2) in area.

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304.1 Training and Skill Development Facilities

2015

- **304.1 Business Group B.** Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following: …
  - Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy).

308.2 Group I-1 Occupancy Classification

2015

- The uses permitted in a Group I-1 custodial care facility have been expanded to include care recipients who may need a limited degree of verbal or physical assistance if responding to a fire or other emergency situation.

308.3 Group I-1 Occupancy Classification

2015

- Condition 2 is a more hazardous than Condition 1, with more stringent requirements in the following areas:
  - Story limits (1 story less permitted)
  - Smoke barriers (cross-corridor doors addressed)
  - Sprinkler protection (NFPA 13R system not permitted)
  - Smoke detection required (in habitable spaces)

309.1 Mercantile Use of Greenhouses Classification

2018

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Section 310.3, 310.4 Classification of Congregate Living Facilities

2018

- Dormitories and similar nontransient uses now are to be considered as Group R-3 occupancies where the occupant load is 16 or less. In addition, transient lodging houses, such as bed-and-breakfast establishments, can only be considered as Group R-3 occupancies where their total occupant load is 10 or less.
-

310.4.2 Owner-Occupied Lodging Houses

2018

- Owner-occupied lodging houses permitted to comply with IRC where:
  - 5 or fewer guest rooms, and
  - 10 or fewer total occupants

310.5 Group R-4 Facilities

2015

- The uses permitted in a Group R-4 custodial care facility have been expanded to include care recipients who may need a limited degree of verbal or physical assistance while responding to a fire or other emergency situation.

311.1.1 Classification of Accessory Storage Rooms

2015
2018

- Room or space used for storage accessory to another occupancy to be classified as part of that occupancy

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Chapter 4

Special Detailed Requirements Based on Use and Occupancy

29

403.2.1.1 Type of Construction in High-Rise Buildings

2018

- Type IB high-rise buildings containing Group H-2, H-3 or H-5 occupancy not permitted to be regulated as Type IIA for fire-resistance ratings

404.5 Exception, Atrium Smoke Control in Group I Occupancies

2015

- Smoke control is now required in atriums in Group I-2 occupancies, as well as those in Group I-1 occupancies classified as Condition 2, that connect two stories.

404.6 Enclosure of Atriums

2018

The requirement that those spaces not separated from an atrium be accounted for in the design of the smoke control system now applies only in those cases where the atrium is provided with a smoke control system.

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406.1 Motor Vehicle-Related Occupancies

2018

- Reorganization includes grouping of requirements that apply to all motor-vehicle-related uses

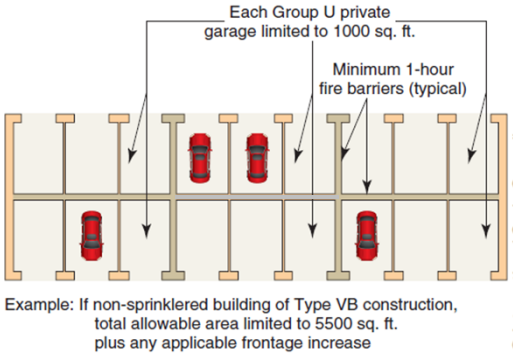
406.3.1 Private Garage Floor-Area Limitation

2015

- A Group U private garage is now limited to a maximum floor area of 1000 square feet; however, multiple Group U private garages are permitted in the same building where they are compartmentalized by minimum 1-hour fire separations.
- Carports not limited to 1000 square feet
- Both garage and carport buildings only limited in total allowable area under provisions of Chapter 5.

406.3.1 Private Garage Floor-Area Limitation

2015



Example: If non-sprinklered building of Type VB construction, total allowable area limited to 5500 sq. ft. plus any applicable frontage increase

407.2.5 Group I-2 Shared Living Spaces

2015

- Shared living spaces, group meeting areas, and multipurpose therapeutic spaces are now permitted to be open to corridors in Group I-2, Condition 1 nursing homes provided five specific conditions are met.

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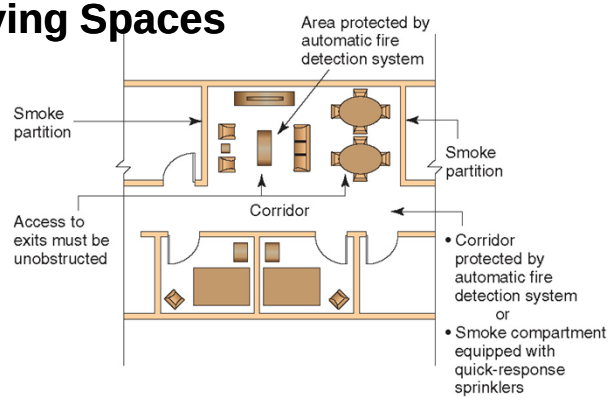
407.2.5 Group I-2 Shared Living Spaces

2015



407.2.6 Group I-2 Cooking Facilities

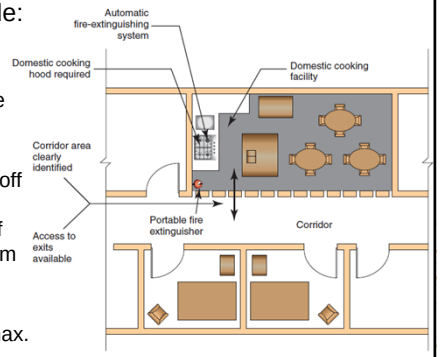
2015

- A room or space containing a cooking facility with domestic cooking appliances is now permitted to be open to the corridor in a Group I-2, Condition 1 nursing home provided 13 specific conditions are met.
- Intent consistent with new provisions for shared living spaces
- Limited to 30 persons in smoke compartment
- Also limited to 30 persons served by cooking facility
- Only one cooking facility area permitted in a smoke compartment

407.2.6 Group I-2 Cooking Facilities

2015

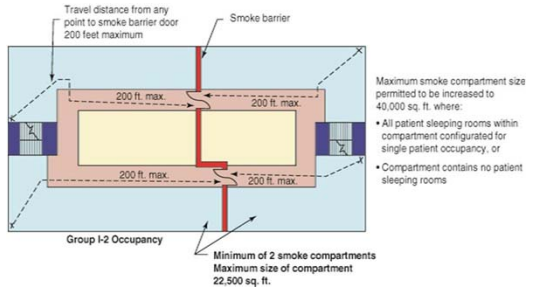
- Other conditions include:
  - Limited to domestic cooking appliances
  - Manual actuation device provided for hood suppression
  - Interlock device to shut off power or fuel supply to range upon activation of hood suppression system
  - Timer to automatically deactivate cooking appliances at 2 hours max.



407.5 Maximum Smoke Compartment Size

2015
2018

- Applicable to Group I-2, Condition 2 occupancies



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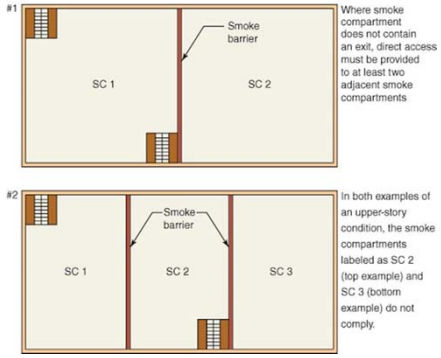
407.5.4 Required Egress from Smoke Compartments

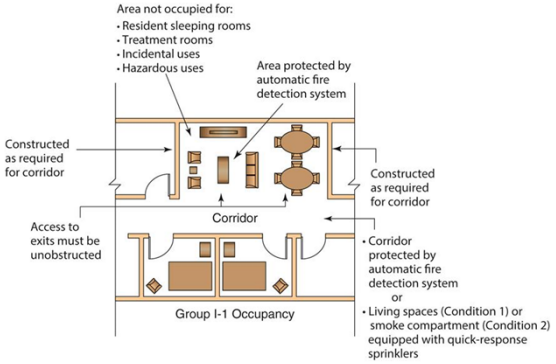
2018

NONCOMPLIANT EXAMPLES



420.7 Corridor Protection in Assisted Living Units

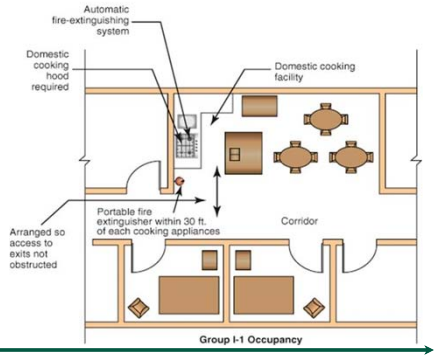
2018



420.8 Group I-1 Cooking Facilities

2018

- Appliances limited to ovens, cooktops, ranges, warmers and microwaves
- Fuel and electrical supply to cooking equipment be provided with shut-off accessible only to staff
- Timer to deactivate cooking appliances within 2 hours



420.10 Group R-2 Dormitory Cooking Facilities

2018

- Domestic cooking appliances for resident use now regulated
- Cooktops, ranges and ovens not permitted in sleeping rooms

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423.3 Storm Shelters Serving Critical Emergency Operations Facilities

2015

- The construction of complying storm shelters is now required in critical emergency operations facilities where such facilities are located in geographical areas where the shelter design wind speed for tornadoes per ICC 500 is 250 mph.

423.4 Storm Shelters Serving Group E Occupancies

2015

- Storm shelters are now required in Group E occupancies located in those areas of the United States where the shelter design wind speed for tornadoes is 250 mph.

423.4 Storm Shelters

2018

- Capacity for shelter in Group E is based on greater of:
  - classrooms, vocational rooms and offices, or
  - any indoor assembly space associated with Group E

427 Medical Gas Systems

2018

- IFC construction-related provisions for medical gas systems now replicated in IBC

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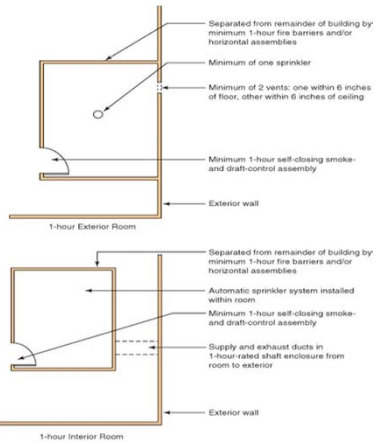
2018

427 Medical Gas Systems



2018

428 Higher Education Laboratories

- Special allowances and provisions for Group B laboratories in college and university buildings
- Similar to 'control area' concept

2018

428 Higher Education Laboratories

TABLE 428.3 Design and Number of Laboratory Suites Per Floor

Floor Level		Percentage of the Maximum Allowable Quantity Per Lab Suitea	Number of Lab Suites Per Floor	Fire-Resistance Rating for Fire Barriers in Hoursb
Above Grade Plane	211	Not allowed	Not Permitted	Not Permitted
	16-20	25	1	2c
	11-15	50	1	2c
	7-10	50	2	2c
	4-6	75	4	1
	3	100	4	1
	1-2	100	6	1
Below Grade Plane	1	75	4	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 307.1(1) and 307.1(2), with all increases allowed in the footnotes to those tables.
b Fire barriers shall include walls, floors and ceilings necessary to provide separation from other portions of the building.
c Vertical fire barriers separating laboratory suites from other spaces on the same floor shall be permitted to be 1-hour fire-resistance rated.

Chapter 5

General Building Heights and Areas

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503 General Building Height and Area Limitations

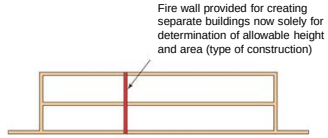
2015

- The provisions regulating building height and area limitations have been extensively revised with no change in technical application in order to provide an increased degree of user-friendliness and technical consistency.
- Most obvious format change is replacing Table 503 with separate tables addressing maximum allowable:
  - Height in feet above grade plane
  - Height in stories above grade plane
  - Floor area in square feet

503.1, 706.1 Scope of Fire Wall Use

2018

- Use of fire wall <u>to create separate buildings</u> now limited to only the determination of permissible types of construction, based upon allowable building height and area
- Fire walls to continue to be used for horizontal exits, fire area separations, fire-flow calculations, etc.



503.1.4 Allowable Height and Area of Occupied Roofs

2018

- Allowable area and height of occupied roofs now addressed
  - Area not to be included in building area
  - Height (in stories) regulated based on uppermost story (unless exception applied)
- Enclosures of occupied roofs limited to 48 inches in height above roof deck, except for:
  - Penthouses, towers, spires, etc.

503.1.4 Allowable Height and Area of Occupied Roofs

2018

Example:
If building of Type VA construction,
Group B: 4 stories max. (S)
Group A-3: 3 stories max. (S)

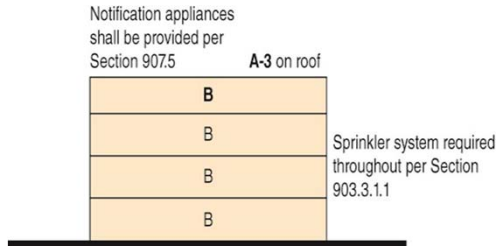


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Table 504.3 Building Height in Feet Above Grade Plane

2015

TABLE ~~503~~ 504.3[a] Allowable Building Heights ~~and Areas~~ in Feet Above Grade Plane

Occupancy Classification	See Footnotes	Type of Construction								
		Type I		Type II		Type III		Type IV	Type V	
		A	B	A	B	A	B	HT	A	B
A,B,E,F,M,S,U	NS[b]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
H-1, H-2, H-3, H-5	NS[c,d]	UL	160	65	55	65	55	65	50	40
	S									

Note: UL = Unlimited; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1

(Only a portion of Table 504.3 is shown above.)

Table 504.4 Number of Stories Above Grade Plane

2015

TABLE ~~503~~ 504.4[a,b] Allowable ~~Building Heights and Areas~~ Number of Stories Above Grade Plane

Occupancy Classification	See Foot-Notes	Type of Construction								
		Type I		Type II		Type III		Type IV	Type V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2

Note: UL = Unlimited; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1

(Only a portion of Table 504.4 is shown above.)

505.2.3, Exception 2, Mezzanine Openness

2015

- Exception 2 allowing open mezzanines has been modified such that direct access to at least one exit at the mezzanine level is no longer required.
  - Only requirement is that two or more means of egress provided
- Exception 5 no longer has any application as it is now superseded by revised Exception 2.
  - Minimum of two means of egress
  - Not applicable to Group H or I
  - Limited to one- and two-story buildings
  - Building to be sprinklered

Table 506.2 Allowable Building Area

2015

TABLE ~~503~~ 506.2[a,b] Allowable ~~Building Heights and~~ Areas Factor (A_t = NS, S1, S13R or SM, as applicable) in Square Feet

Occupancy Classification	See Footnotes	Type of Construction								
		Type I		Type II		Type III		Type IV	Type V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000

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Table 506.2, Note i, Allowable Area of Group U Greenhouses

2018

- The tabular allowable area for nonsprinklered single-story greenhouses classified as Group U occupancies has been substantially increased for Type VB buildings to be consistent with those greenhouses classified as Group B, M, F-2 and E.
- Slight increases also occurred to construction ypes IIB and IIIB.

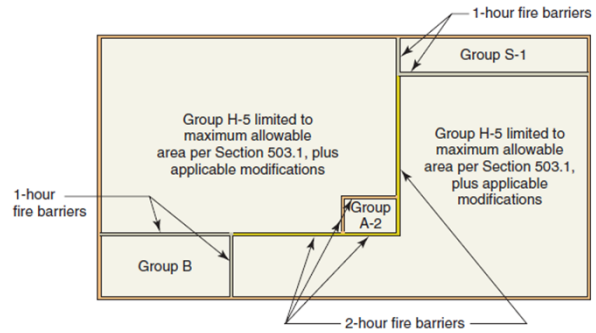
507.9 Group H-5 in Unlimited Area Buildings

2015

- Group H-5 buildings are now permitted to be unlimited in area under the special provisions of Section 507.
- Limited to buildings of Type I or II construction no more than two stories in height.
- Other occupancies to be separated as required by Sections 415.11(fab areas) and 508.4 (separated occupancies).
- Each Group H-5 area limited to maximum allowable area as established in Chapter 5
  - 2-hour fire barriers used to separate Group H-5 areas such that maximum allowable areas not exceeded

507.9 Group H-5 in Unlimited Area Buildings

2015



508.3.1.2 Group I-2, Condition 2 Nonseparated Occupancies

2018

- Where nonseparated occupancies method used in mixed-occupancy condition containing a Group I-2, Condition 2 occupancy, applicable within fire area to most restrictive provisions of:
  - Sec. 407 Group I-2
  - Sec. 509 Incidental uses
  - Sec. 712 Vertical openings
- Most restrictive means of egress provisions to apply

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508.3.1.2 Group I-2, Condition 2 Nonseparated Occupancies

2018

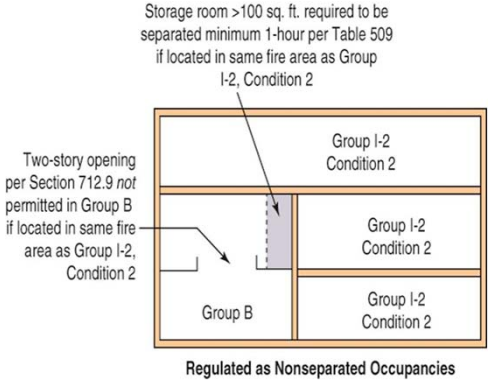

Table 509 Fire Protection from Incidental Uses

2015

- A more detailed analysis of various support spaces within a healthcare or ambulatory care facility is now possible due to modifications to Table 509 regulating incidental uses.

TABLE 509 Incidental Uses

Room or Area	Separation and/or Protection
Furnace room where any piece of equipment is over 400,000 Btu per hour input.	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen cutoff fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies;

Table 509 Fire Protection from Incidental Uses

2015

INCIDENTAL USES SPECIFIC TO AMBULATORY CARE FACILITIES		
Room or Area	2015 IBC	2012 IBC
Laboratories not classified as Group H occupancies	1-hour separation or provide automatic sprinkler system	Not considered as an incidental use
Waste and linen collection rooms	1-hour separation for rooms where containers have an aggregate volume of 10 cubic feet or more	1-hour regardless of amount of collection
Storage rooms more than 100 square feet in floor area	1-hour separation	Not considered as an incidental use

Table 509 Fire Protection from Incidental Uses

2015

INCIDENTAL USES SPECIFIC TO GROUP I-2 OCCUPANCIES		
Room or Area	2015 IBC	2012 IBC
Laboratories not classified as Group H occupancies	1-hour separation *and* provide automatic sprinkler system	1-hour separation *or* provide automatic sprinkler system
Laundry rooms	1-hour separation where more than 100 square feet in floor area	1-hour separation *or* provide automatic sprinkler system where more than 100 square feet in floor area
Patient rooms equipped with padded surfaces	1-hour separation	Not considered as an incidental use
Physical plant maintenance shops	1-hour separation	Not considered as an incidental use
Waste and linen collection rooms	1-hour for rooms where containers have an aggregate volume of 10 cubic feet or more	1-hour regardless of amount of collection
Storage rooms more than 100 square feet in floor area	1-hour separation	Not considered as an incidental use

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510.2 Horizontal Building Separation

2015
2018

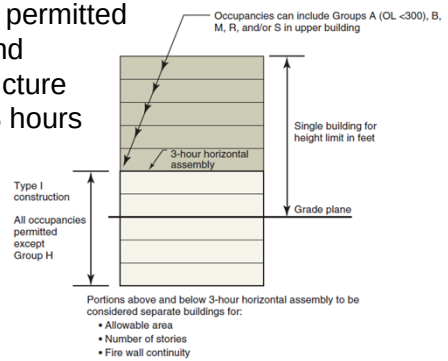
CHANGE TYPE: Modification

- In the special provisions of Section 510.2 addressing pedestal buildings, there is no longer a limit of one story above grade plane for that portion of the structure that occurs below the 3-hour horizontal separation.
- Upper 'building' height in feet continues to be based on height above grade plane.
- Occupancies permitted below horizontal separation expanded to include all occupancy classifications except Group H.

510.2 Horizontal Building Separation

2015
2018

- Vertical offsets permitted where offset and supporting structure rated at least 3 hours



Chapter 6

Types of Construction

Table 601 Fire Protection of Structural Roof Members

2018

TABLE 601 Fire-Resistance Rating Requirements for Building Elements

	Type I		Type II		Type III		Type IV	Type V	
Building Element	A	B	A	B	A	B	HT	A	B
Primary structural frame [f]	3[a,b]	2[a,b]	1[b]	0	1[b]	0	HT	1[b]	0
Roof construction and associated secondary members	1½[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	HT	1[b,c]	0

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

(No changes to other portions of Table 601 and notes.)

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Table 601 Fire Protection of Structural Roof Members

2018

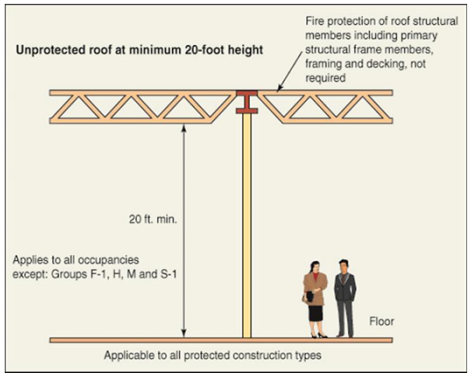

Table 601, Footnote d One-Hour Substitution

2015

- Footnote ‘d’ to Table 601 regarding “one-hour substitution” has been deleted.
- Allowance to substitute sprinkler protection for 1-hour construction in buildings of Type IIA, IIIA and VA no longer addressed because of:
  - Limited, if any benefit
  - Confusing terminology

Table 601, Footnote d One-Hour Substitution

2015

Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	1½[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.

~~d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.~~

~~e.~~ d. Not less than the fire-resistance rating required by other sections of this code.

~~f.~~ e. Not less than the fire-resistance rating based on fire separation distance (See Table 602).

~~g.~~ f. Not less than the fire-resistance rating as referenced in Section 704.10.

602.3, 602.4.1 FRT Wood Sheathing in Exterior Wall Assemblies

2018

- Fire-retardant-treated wood framing and sheathing permitted within exterior walls of Type III and IV construction

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Chapter 7

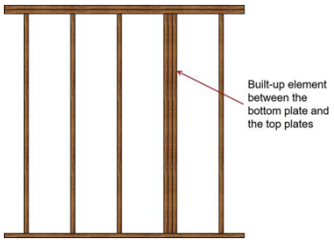
Fire and Smoke Protection Features

77

704.2, 704.4.1 Column Protection in Light-Frame Construction

2018

- Required fire-resistance rating permitted to be provided with membrane protection

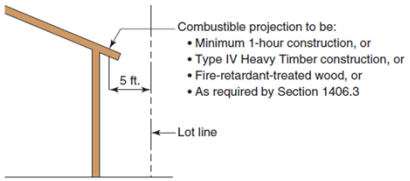


705.2.3 Combustible Projections

2015

CHANGE TYPE: Modification

- The provisions regulating combustible projections adjacent to an interior lot line or other line used to determine the fire separation distance have been modified to provide a simple and consistent approach that is less restrictive than previously determined.



705.2.3, 705.2.3.1, 705.2.4 Combustible Balconies, Projections, and Bay Windows

2018

- Provisions relocated from Section 1406 (Combustible Materials on the Exterior Side of Exterior Walls)
- Plastic composites now permitted to be installed in guard components where untreated wood allowed

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705.6 Structural Element Bracing of Exterior Walls

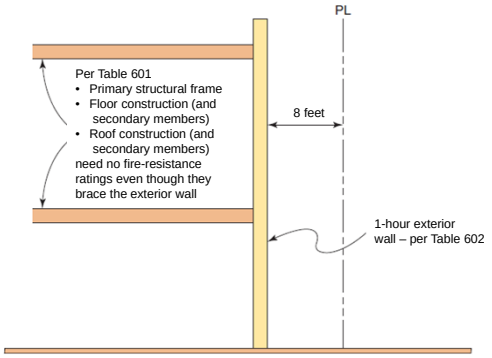
2015

CHANGE TYPE: Modification

- Interior structural elements, such as floor or roof elements, that brace exterior walls are no longer required to be regulated for fire resistance due to the exterior wall's rating regardless of the building's proximity to a lot line.
- Interior bracing elements, such as a floor and/or roof system, that are not in plane of exterior wall, need only be protected based on Table 601.
- Provision has traditionally been interpreted in a variety of ways.

705.6 Structural Element Bracing of Exterior Walls

2015



Example: Group B occupancy of Type VB construction

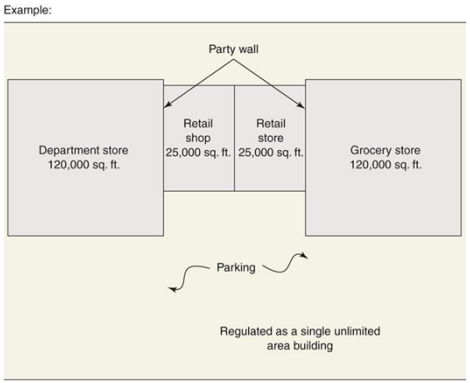
706.1.1 Party Walls Not Constructed as Fire Walls

2018

- Fire walls not required on lot lines dividing a building for ownership purposes where:
  - Aggregate height and area do not exceed maximum requirements
  - Dedicated access easements and contractual agreements are provide to allow access for purposes of maintaining fire and life safety systems necessary for building operation
    - Subject to review and approval by building official

706.1.1 Party Walls Not Constructed as Fire Walls

2018



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706.2 Structural Stability of Fire Walls

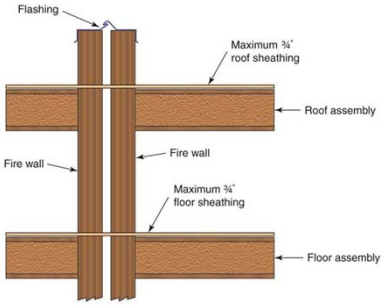
2015

- The reference to NFPA 221 for fire wall design and construction has been expanded to permit the use of the “tied” and “cantilevered” options addressed in the standard.
- Previously was limited to use for double fire walls.
- Now also includes tied and cantilevered fire walls, as well as high-challenge fire walls with enhanced FR ratings and related elements.

706.2 Structural Continuity of Double Fire Walls

2018

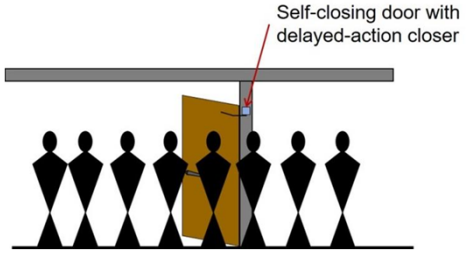
- Applicable only in SDCs D, E and F
- Allows for continuous diaphragm for floor and/or roof assembly
- Also stabilizes double fire walls to resist impact during seismic event



716.2.6.5 Delayed-Action Self-Closing Doors

2018

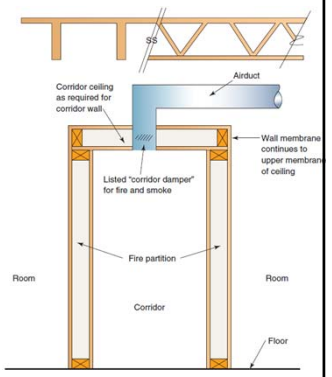
- Delay-action closers permitted where automatic-closing not required
- Defined as mechanical devices with an adjustable delay
- Time delay not specifically addressed



717.3.2.4, 717.5.4.1 Corridor Dampers

2015

- Where a duct penetration occurs in the ceiling of a fire-resistance-rated corridor where the lid of the corridor is constructed using a corridor wall placed horizontally, a corridor damper is now specifically mandated.



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Chapter 8

Interior Finishes

89

803.1.1, 803.1.2 Interior Wall and Ceiling Finish Testing

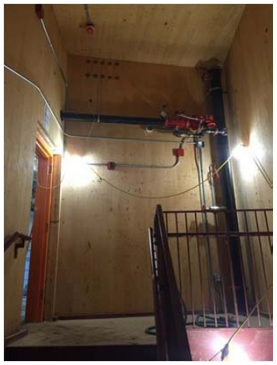
2018

- Criteria reorganized by:
  - Initially addressing allowance for compliance with NFPA 286 for all applications
  - Followed by testing under ASTM E84 and UL 723
  - Then other methods identified for special conditions such as textile coverings

803.3 Interior Finish Requirements for Heavy Timber Members

2018

- Interior finish requirements now applicable to heavy timber members in:
  - interior exit stairways
  - interior exit ramps
  - exit passageways



Chapter 9

Fire Protection Systems

92

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903.2.1 Sprinklers Required in Group A Occupancies

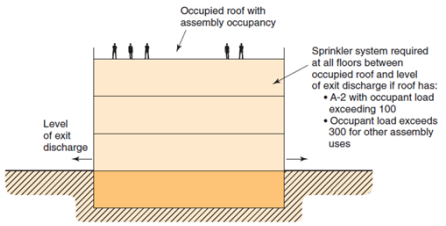
2018

- Sprinkler protection now also required for all enclosed Group A-5 accessory use areas that exceed 1,000 sf
- Where enclosed spaces are under grandstands or bleachers, sprinkler protection required where:
  - Enclosed area exceeds 1,000 sf, or
  - Enclosed area is not over 1,000 sf, but it is not separated from seating area by 1-hour construction

903.2.1.6 Sprinkler Systems—Assembly Occupancies

2015

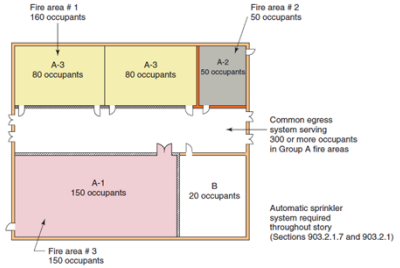
- An automatic sprinkler system is now required to be installed where the roof is used for a Group A-2 assembly occupancy with an occupant load exceeding 100, as well as for other Group A occupancies where the occupant load exceeds 300.



903.2.1.7 Multiple Fire Areas

2015

- Where Group A fire areas share a common means of egress, the occupant load of the spaces must now be added together to determine if a sprinkler system is required.



903.2.3 Sprinklers in Group E Occupancies

2018

- Sprinkler protection now also required for Group E fire areas where fire area:
  - Located on a floor other than the level of exit discharge, or
  - Has an occupant load of 300 or more

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903.3.1.1.2 Omission of Sprinklers in Group R-4 Bathrooms

2015

- Group R-4 now included with other residential occupancies where sprinkler protection not required in small bathrooms

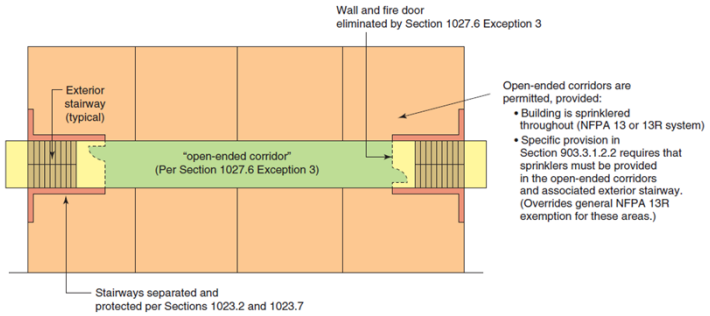
903.3.1.2.2 Open-Ended Corridors

2015

- Sprinkler protection must be extended to open-ended corridors where building protected by NFPA 13R sprinkler system.
- 13R standard allows for omission of sprinklers at open corridors and stairways.
- Code provision overrides allowance in standard

903.3.1.2.2 Open-Ended Corridors

2015



903.3.1.2.3 Protection of Attics in Group R Occupancies

2018

- Additional sprinkler protection or acceptable alternative methods now required for attics in multi-family occupancies equipped with an NFPA 13R system
- Applicable where roof assembly more than 55 feet above LLFDA
- Method of determining height of roof assembly established as greatest of:
  - Eave of highest pitched roof
  - Intersection of highest roof to exterior wall
  - Top of highest parapet

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903.3.1.2.3 Protection of Attics in Group R Occupancies

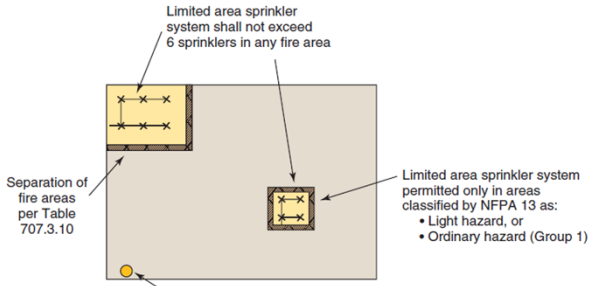
2018

- Applicable to Type III, IV and V construction
- Methods of protection include:
  - Provide sprinkler protection
  - Construct attic of noncombustible materials
  - Construct attic of FRT wood
  - Fill attic with noncombustible insulation

903.3.8 Limited Area Sprinkler Systems

2015

- Additional restrictions have been placed on limited area sprinkler systems, including a reduction in the system size to a maximum of six sprinklers within a single fire area.
- Previously, up to 19 sprinklers could be provided on any connection.



904.13 Domestic Cooking Protection in Institutional and Residential Occupancies

2018

- Automatic fire-extinguishing system now required at required hood over any domestic cooktop or range in:
  - Group I-1 occupancies
  - Group R-2 college dormitories
- Option where burners tested and listed to prevent ignition of cooking oil (max temp for 30 min)

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905.3.1 Class III Standpipes

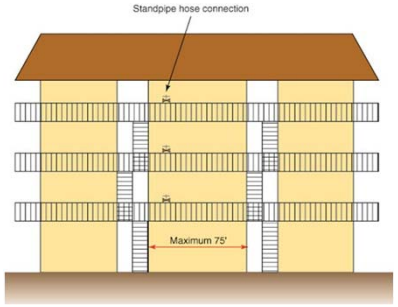
2018

- Class III standpipe system required where four or more stories above or below grade plane
- Class I standpipes now allowed:
  - In Group B occupancies
  - In Group E occupancies
  - Where occupant-use hose lines will not be utilized by trained personnel or fire department

905.4 Class I Standpipe Connection Locations

2018

- Single hose connection permitted in open corridor or open breezeway between open stairs



905.4 Class I Standpipe Connection Locations

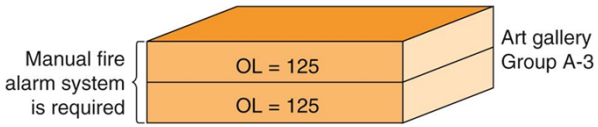
2018

- Within interior exit stairways, hose connections to be located at the main floor landings, unless otherwise approved by fire code official
- Allowance consistent with NFPA 14

907.2.1 Fire Alarms in Group A Occupancies

2018

- Manual fire alarm system required where Group A occupant load exceeds 100 above or below the lowest level of exit discharge



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907.2.3 Fire Alarms—Group E Occupancies

2015

- The threshold for alarm systems in Group E occupancies has been increased such that a manual fire alarm is required where the occupant load exceeds 50, and an emergency voice/alarm communication (EVAC) system must only be provided where the occupant load exceeds 100.
- Previously, both manual alarm and EVAC system triggered at 31 or more occupants.
- EVAC threshold higher due to potential for multiple rooms and less direct contact

907.2.3 Fire Alarms—Group E Occupancies

2015

Group E Alarm Requirements

Occupant load	Type of system required
≤50	No Requirement (907.2.3 Exception 1)
51–100[a]	Manual Fire Alarm System (907.2.3 Exception 2) • Activates occupant notification system complying with Section 907.5
>100[a]	Emergency voice/alarm communication (EVAC) system (907.2.3) • See Section 907.5.2.2 for special occupant notification requirements

[a] Manual fire alarm boxes may be eliminated at specific locations and under specific conditions. (See Section 907.2.3 Exceptions 3 and 4.)

907.2.10 Group R-4 Fire Alarm Systems

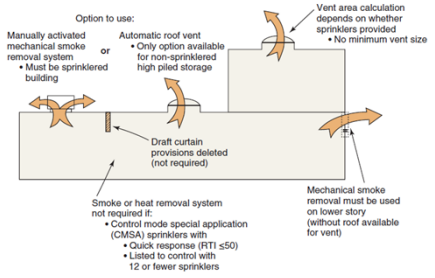
2018

- Installation of manual fire alarm system and automatic smoke detection system no longer required in Group R-4 occupancies
- Smoke alarms continue to be required

910 Smoke and Heat Removal

2015

- The format and technical requirements for smoke and heat removal systems have been revised, including a new allowance permitting a mechanical smoke removal system as an alternative to smoke and heat vents.



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2015

915 Carbon Monoxide Detection

CHANGE TYPE: Modification

- The carbon monoxide (CO) alarm provisions have been relocated, reformatted and revised; the scope has been modified to exclude Group I-3 occupancies while adding Group E occupancies.
- Now applicable to Groups I-1, I-2, I-4, R, and classrooms of Group E.
- Specific requirements and exceptions for:
  - Fuel-burning, forced-air furnaces
  - Fuel-burning appliances and fuel-burning fireplaces
  - Private garages

Chapter 10

Means of Egress

2015

Chapter 10 Means of Egress

- Provisions addressing the minimum required number of means of egress and their arrangement for rooms and spaces, as well as stories, have been reformatted and relocated.
- **Section ~~1015~~ 1006 Numbers of Exits and Exit Access Doorways**
- **~~Section 1021 Number of Exits and Exit Configuration~~**
- **Section 1007 Exit and Exit Access Doorway Configuration**

2015

1004.2.1 Cumulative Occupant Loads

- The determination of the cumulative design occupant load for intervening spaces, adjacent levels and adjacent stories has been clarified.
- Design of egress path capacity to be based on cumulative portion of occupant loads along egress path
  - Not applicable to number of means of egress

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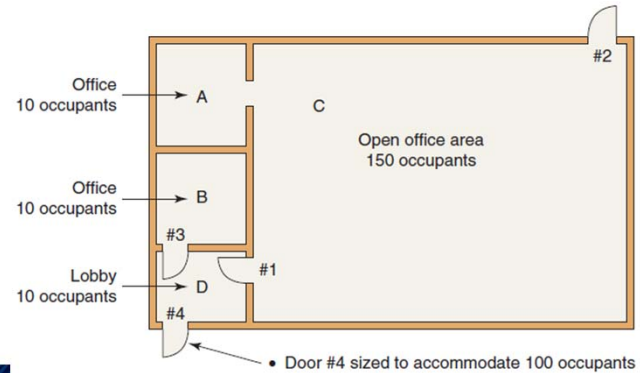
2015

1004.2.1 Cumulative Occupant Loads



2015

1004.2.2 Cumulative Occupant Loads

- Mezzanine occupant load added to room or area below for travel through lower space
  - Previously applied wherever any unenclosed exit access stairways provided.
  - Consistent with 2009 IBC provisions.

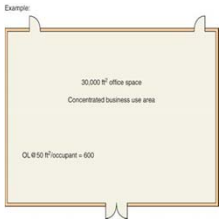
2018

Table 1004.5, 1004.8 Occupant Load Calculation in Business Use Areas

TABLE ~~1004.1.2~~ 1004.5 Maximum Floor Area Allowances Per Occupant

Function of Space	Occupant Load Factor[a]
Business areas	~~100~~150 gross
Concentrated business use areas	See Section 1004.8

(No changes to other portions of table.)



2015

Table 1004.5 Occupant Load Factors

- The mercantile occupant load factor has been revised such that a single factor of 60 sf/occupant is now applicable regardless of the story on which the mercantile use is located.

TABLE 1004.1.2 Maximum Floor Area Allowances per Occupant

Function of Space	Occupant Load Factor[a]
Mercantile	60 gross
~~Areas on other floors~~	~~60 gross~~
~~Basement and grade floor areas~~	~~30 gross~~
Storage, stock, shipping areas	300 gross

For SI: 1 square foot = 0.0929 m².
a. Floor area in square feet per occupant.
(Remaining portions of table not shown are unchanged.)

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1006, 1007 Numbers of Exits and Exit Access Doorways 2015

- The limitations for spaces with one exit or exit access doorway have been consolidated into a single Table 1006.2.1, addressing both:
  - Maximum occupant load of space, and
  - Maximum common path of egress travel distance.

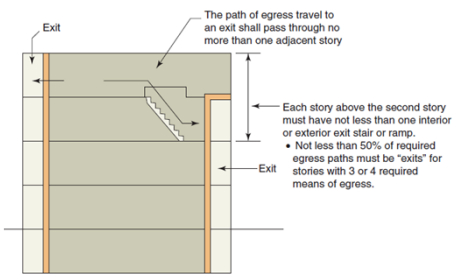
TABLE 1006.2.1 Spaces with One Exit or Exit Access Doorway

Occupancy	Maximum Occupant Load of Space	Maximum Common Path of Egress Travel Distance (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[d]
B	49	100	75	100[d]
F	49	75	75	100[d]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[f], I-4	10	NP	NP	75[d]
I-3	10	NP100	NP100	100[d]
R-1	10	NP75	NP75	75[d]
R-2	10	NP75	NP75	125[d]
R-3[g]	10	NP75	NP75	125[d]
R-4[g]	10	75	75	125[d]
S[e]	29	100	75	100[d]
U	49	100	75	75[d]

For SI: 1 foot = 304.8 mm.
NP = Not Permitted
a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.
b. Group H occupancies equipped throughout with an *automatic sprinkler system* in accordance with Section 903.2.5.
c. For a room or space used for assembly purposes having fixed seating, see Section 1028.6 1029.6.
d. For the travel distance limitations in Group I-2, see Section 407.4.
e. The length of common path of egress travel distance in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 congregate living facility.
f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006, 1007 Numbers of Exits and Exit Access Doorways 2015

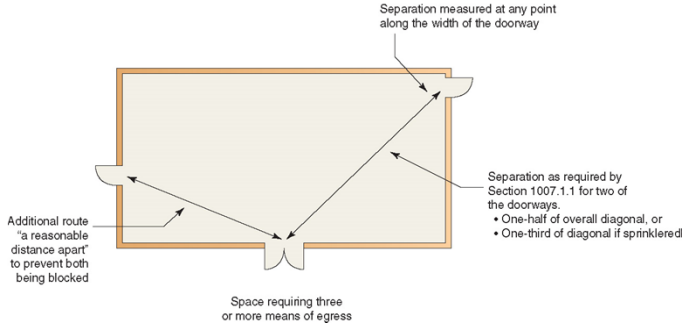
- The means of egress requirements for stories have been clarified to address the limits of exit access vertical travel until an exit element is reached.



1007.1.2 Exit and Exit Access Doorway Configuration 2015

- Where access to three or more exits is required, two exit or exit access doorways shall be separated based on the maximum overall diagonal of the area served.
- Additional required exit or exit access doorways shall be arranged a reasonable distance apart such that if one becomes blocked, the others will be available.
- Performance language in 2000 and 2003 IBCs, but removed in 2006 edition as being too subjective.
- Provision reinstated to provide intent and purpose based upon a single fire condition.

1007.1.2 Exit and Exit Access Doorway Configuration 2015



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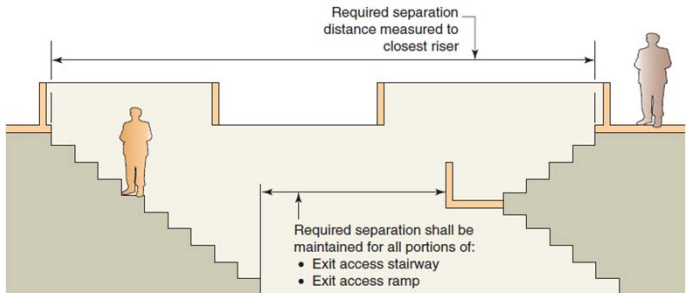
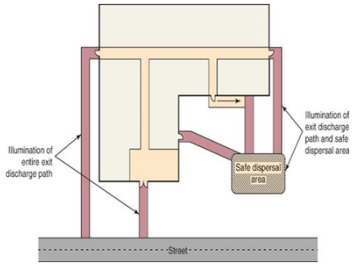
1007.1.3 Exit Access Stairway Configuration 2015



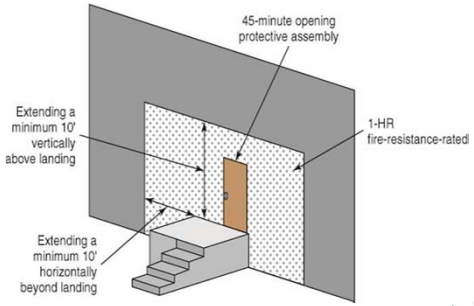
1008.2.3 Illumination of the Exit Discharge 2018

- Where safe dispersal area is utilized, illumination required along exit discharge path as well as in dispersal area



1009.7.2 Protection of Exterior Areas of Assisted Rescue 2018

- Exterior wall rating and opening protectives not required where building fully sprinklered



1010.1.4.4 Locking Arrangements in Educational Occupancies 2018

- Applicable to both Groups E and B
- Addresses locking devices designed to keep intruders from entering room
- Conditions include:
  - Allows for outside unlocking
  - Openable from within room
  - Modifications to door hardware or closers not permitted

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1010.1.9 Door Operations—Locking Systems

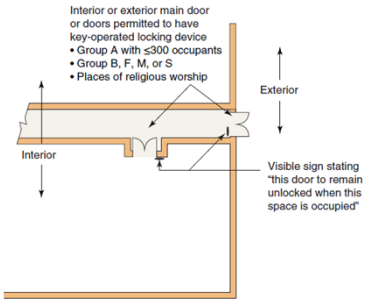
2015

- Numerous revisions throughout the locking provisions now help clarify requirements and their application through the use of consistent terminology.
- Provisions modified include those for:
  - Locks and latches
  - Controlled doors in Groups I-1 and I-2
  - Sensor release of electrically locked egress doors
  - Electromagnetically locked egress doors

1010.1.9.4 Locks and Latches

2018

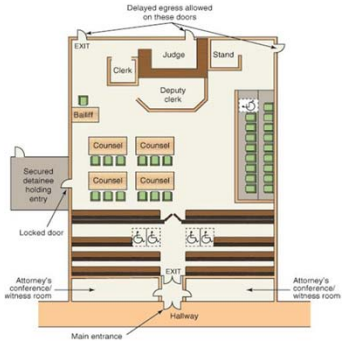
- Commonly-used key-lock exception now not limited to exterior doors.
- Required signage also reflects change in application.



1010.1.9.8 Use of Delayed Egress Locking Systems in Group E Classrooms

2018

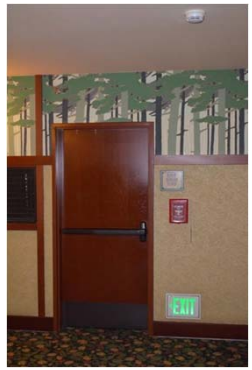
- Delayed egress locking devices now permitted on Group E classrooms with an occupant load < 50
- Also permitted on courtroom means of egress doors other than main door(s) where building is sprinklered



1013.2 Floor Level Exit Sign Location

2018

- Bottom of 'low-level' exit signs now limited to maximum 18 inches above floor level



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1017.2.2 Travel Distance Increase for Groups F-1 and S-1

2015

- An increased exit access travel distance is now permitted for Groups F-1 and S-1 occupancies where specific requirements are met.

TABLE ~~1016.2~~ 1017.2 Exit Access Travel Distance[a]

Occupancy	Without Sprinkler System (feet)	With Sprinkler System (feet)
A, E, F-1, M, R, S-1	200	250[b]
F-2, S-2, U	300	400[c]

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:
Section 412.7: For the distance limitations in aircraft manufacturing facilities.
Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

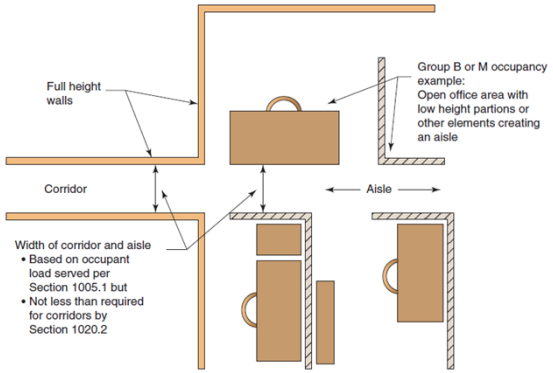
1017.2.2 Travel Distance Increase for Groups F-1 and S-1

2015

- Maximum travel distance of 250 feet for fully-sprinklered Group F-1 and S-1 occupancies as established in Table 1017.2 increased by Section 1017.2.2 to 400 feet, where:
  - Portion of building containing Group F-1 or S-1 is limited to one story in height, and
  - Minimum height of 24 feet is provided from finished floor to bottom of ceiling or deck above, and
  - Building is sprinklered throughout.

1018.3 Aisles in Groups B and M

2015



1023.5, 1024.6 Exit Stairway and Exit Passageway Penetrations

2018

- Allowable penetrations into or through interior exit stairways/ramps and exit passageways now include:
  - Security systems
  - Two-way communication systems

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1025.1 Luminous Egress Path Marking in Group I-1 Occupancies

2018

- Luminous egress path markings no longer required in high-rise buildings classified as Group I-2, I-3 or I-4 occupancies

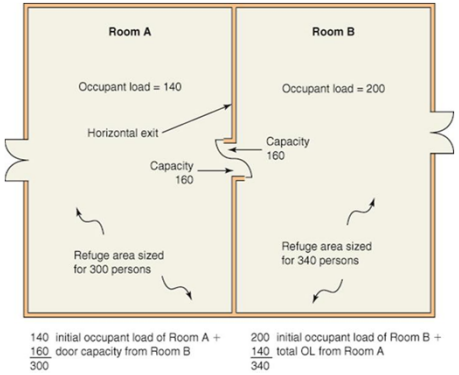
1026.4 Refuge Areas for Horizontal Exits

2018

- Refuge area to accommodate:
  - Original occupant load of refuge area, plus
  - Occupant load anticipated from adjoining compartment
- Anticipated occupant load to be based on:
  - Capacity of horizontal exit doors entering the refuge area, or
  - Total occupant load of adjoining compartment, whichever is less
- Floor area/occupant now references Chapter 4

1026.4 Refuge Areas for Horizontal Exits

2018



1029.6, 1029.6.3, 202 Open-Air Assembly Seating

2018

- Outdoor smoke-protected assembly seating now referred to as “open-air assembly seating”
- New definition recognizing seating served by means of egress not subject to smoke accumulation within or under a structure and open to atmosphere

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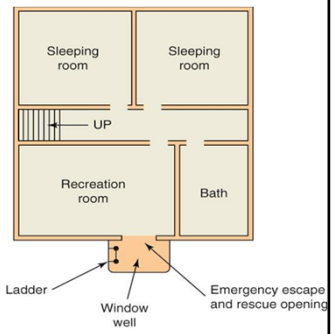
1030.1 Required Emergency Escape and Rescue Openings

2018

- Clarified scope of provisions regarding single-exit stories
- Group R-4 now specifically addressed
- In sprinklered buildings, basement sleeping rooms not required to have EEROs where:
  - One MOE and one EERO, or
  - Two MOEs



Chapter 11

Accessibility

1103.2.8 Areas in Places of Religious Worship

2015

- Small areas used for religious ceremonies are now exempt from all accessibility requirements.

1103.2.8 Areas in Places of Religious Worship

2015

- Areas used for religious ceremonies, such as altars, baptistries and pulpits, not required to be accessible where:
  - Raised above or below finished floor at least 7 inches, and
  - No more than 300 square feet in floor area (not aggregate).
- Similar to exception for elevated work areas.
- Based on religious traditions or rituals.
- Not regulated by ADA Standards as all religious facilities are exempt.

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1103.2.14 Access to Walk-In Coolers and Freezers

2018

- Walk-in cooler and freezer <u>equipment</u> exempted from accessibility provisions where accessed <u>only</u> from work areas

1104.4 Multistory Buildings and Facilities

2015

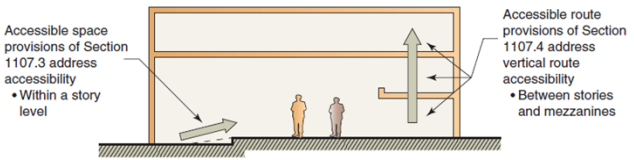
- A distinction has been made between the requirements for access within a story and those with greater level changes, such as between stories or mezzanines.
- Section 1104.3 continues to require accessible route to all portions of a building as base provision.
- Exception 1 (refers to Section 1104.4) now applies to only “stories” and “mezzanines,” rather than “levels.”
- Thus, exceptions in Section 1104.4 now only applicable to story and/or mezzanine conditions.

1107.3, 1107.4 Accessible Spaces and Routes

2015

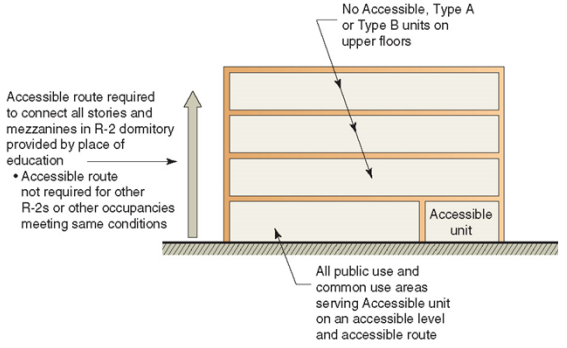
CHANGE TYPE: Modification

- The provisions for connecting all spaces within a Group I or Group R building have been modified to clearly identify the distinction for those with a change of elevation between stories or mezzanines.
- Similar to changes in Sections 1104.3 and 1104.4.



1107.3, 1107.4 Accessible Spaces and Routes

2015



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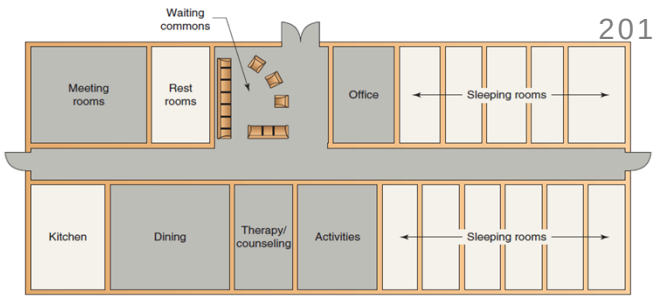
1107.5.1.1, 1107.6.4.1 Accessible Units in Groups I-1 and R-4

2015

- The minimum number of Accessible units required in Group I-1 and R-4 occupancies now varies based upon the egress capabilities of the residents.
- Assisted living facilities and similar occupancies now classified as Condition 2 require more Accessible units than previously mandated.
- No change in requirements for Condition 1 facilities.
- Bedrooms in Group R-4 shall be counted as sleeping units.

2015



Accessible Units in Group I-1 and R-4 Occupancies			
I-1 Occupancies		R-4 Occupancies	
Condition 1	Condition 2	Condition 1	Condition 2
≥4% but not less than 1	≥10% but not less than 1	At least 1	At least 2 units*

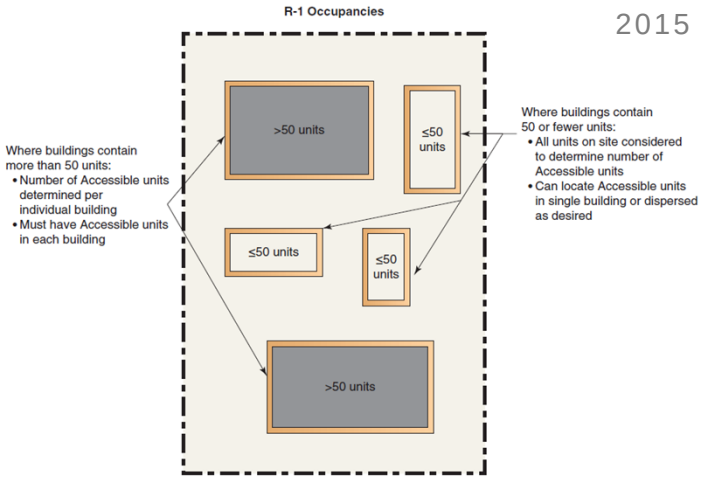
* Bedrooms within Group R-4 facilities shall be counted as sleeping units for the purpose of determining the number of units.

1107.6.1.1 Group R—Accessible Units

2015

- The method by which multiple buildings on a site are reviewed when determining the required number of Accessible units has been revised to consider the number of units per building in addition to the total number of units on the site.
- Revision requires buildings with more than 50 units to be provided with Accessible units within the same building.
- Coordinates with provisions of ADA Standard

2015



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1109.2.1.2 Fixtures in Family or Assisted-Use Toilet Rooms

2018

- Additional fixtures permitted in a family or assist-use toilet room now include:
  - Child-height water closet
  - Child-height lavatory
- Provides additional accommodation on an optional basis

1109.15 Access to Gaming Machines and Gaming Tables

2018

- Access to gaming areas in casinos and similar facilities now regulated separately for:
  - Gaming machine type
  - Gaming table type
- Requirement for front approach at gaming machines and gaming tables deleted

1110 Recreational Facilities

2015

- Facilities now addressed for accessibility also include:
  - Animal containment areas
  - Amusement rides
  - Recreational boating facilities
  - Exercise machines and equipment
  - Fishing piers and platforms
  - Miniature golf facilities
  - Swimming pools, wading pools, hot tubs and spas
  - Shooting facilities with firing positions

Chapter 12

Interior Environment

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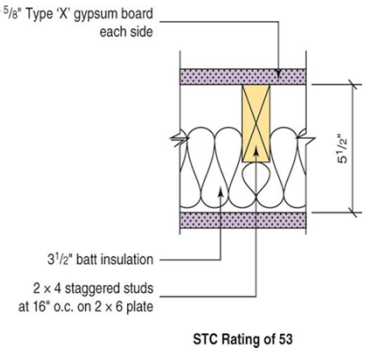
1206.2, 1207.3 Engineering Analysis of Sound Transmission

2018

- Performance-based approach to sound transmission compliance
- Based on a comparison with designs tested to ASTM E90
- Applies to both:
  - Air-borne sound
  - Structural-borne sound



Chapter 14

Exterior Walls

1404.18 Polypropylene Siding

2018

- Polypropylene siding now permitted for use on exterior walls of all types of construction
- Previously limited to Type VB construction

Chapter 15

Roof Assemblies and Rooftop Structures

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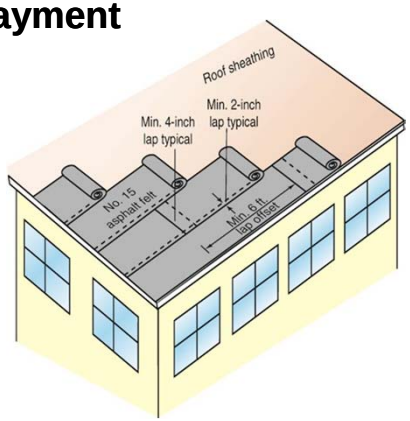
2018

1507.1 Underlayment

- Underlayment and ice barrier requirements relocated to a single location in code to address:
  - Type
  - Attachment
  - Application



2018

1507.1 Underlayment

TABLE 1507.1.1(2) Underlayment Application

Roof Covering	Section	Maximum Basic Design Wind Speed, V < 140 mph	Maximum Basic Design Wind Speed, V ≥ 140 mph
Asphalt shingles	1507.2	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied as follows: Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm). End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm). Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied as follows: Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm). Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches (102 mm) and shall be offset by 6 feet (1829 mm).	Same as Maximum Basic Design Wind Speed, V < 140 mph except all laps shall be not less than 4 inches (102 mm).

Chapter 16

Structural Design

2015

1603.1.8 Special Loads

- The dead load of any rooftop-mounted photovoltaic (PV) solar panels must now be identified on the construction documents.
- Considered as fixed equipment (special loads).
- Section 1607.12.5 provides loading requirements for roof structures supporting PV panel systems.

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2015

1604.5 Risk Category

- In the application of assigning the appropriate risk category for a structure, Section 1604.5 has been revised to clarify that where standards refer to ASCE 7 Table 1.5-1, IBC Table 1604.5 should be used instead.
- In addition, descriptions for Risk Category III structures used for educational purposes have been revised to include occupancy classifications to help clarify the intent.

2015

1604.5 Risk Category

TABLE 1604.5 Risk Category of Buildings and Other Structures

Risk Category	Nature of Occupancy
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing ~~elementary school, secondary school or day care facilities~~ Group E occupancies with an occupant load greater than 250. • Buildings and other structures containing ~~adult education facilities, such as colleges and universities~~ educational occupancies for students above the 12th grade with an occupant load greater than 500. • Group I-2 occupancies with an occupant load of 50 or more resident care recipients but not having surgery or emergency treatment facilities. • Group I-3 occupancies. • Any other occupancy with an occupant load greater than 5,000[a]. • Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Risk Category IV. • Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that: Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the *International Fire Code*; and Are sufficient to pose a threat to the public if released[b].

2018

1604.10 Storm Shelters

- ICC 500 standard now referenced for load determinations of storm shelters
  - Provides wind speeds for tornado and hurricane shelter design using ASCE 7 load combinations

2018

Table 1607.1 Deck Live Load

TABLE 1607.1 Minimum Uniformly Distributed Live Loads, L_o, and Minimum Concentrated Live Loads

Occupancy or Use	Uniform (psf)	Concentrated (pounds)
5. Balconies and decks[h]	1.5 times the live load for the area served, not required to exceed 100 ~~Same as occupancy served~~	—

h. See Section 1604.8.3 for decks attached to exterior walls.

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2015

1607.5 Partition Loads

- In office buildings and in other buildings where the location of partitions is subject to change, partition loads are to be considered unless the floor is designed for an 80-psf or greater live load.

2015

1607.5 Partition Loads

- Per Table 1607.1, corridors above the first story shall be designed for minimum 80 psf live load.
- Where partition locations are subject to change, such as in offices, libraries and hospitals, the entire floor load is commonly designed at 80 psf to account for the relocation of partitions and creation of new corridors.
- However, at 80 psf, the partition loads were previously required to be included as the allowance was for floors designed at more than 80 psf.
- Now the inclusion of partition loads is only required where the floor design live load is less than 80 psf.
- Also now creates inconsistency with ASCE 7.

2015

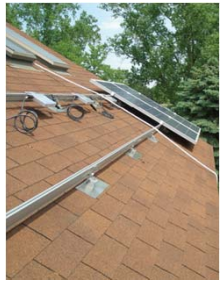
1607.13 Roof Loads

- The term “vegetative roof” is now defined in Section 202 as “ assembly of interacting components designed to waterproof and normally insulate a building’s top surface that includes vegetation and related landscape elements.”
- A reference to ASTM E 2397 has been added to Section 1607 for computing dead load.
- Table 1607.1 referenced for uniform design live loads for occupied roofs.
  - 20 psf for unoccupied landscaped areas

2015

1607.13.5 Photovoltaic Panel Systems

- Design requirements for roof structures supporting photovoltaic (PV) solar panels and modules have been added to Section 1607.
- Addresses:
  - PV panels and modules
  - Independent structures
  - Ballasted PV panel systems



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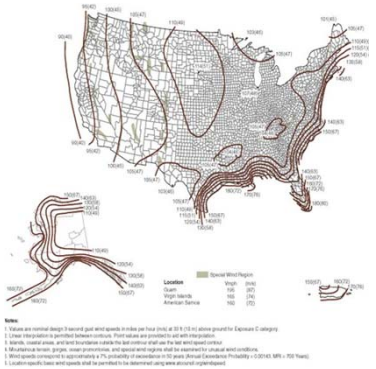
1609 Wind Loads

2018

- Updated wind speed maps
- Terminology changed from “ultimate design” to “basic design”
- Consistent with 2016 ASCE 7
- Added Hawaii



1613 Earthquake Loads

2018

- Values of site coefficients now in alignment with newest generation of ground motion attenuation equations
- Modifications made for both short period and 1-second period parameters
- Previous coefficients based on soil studies performed in early 1990s

1613 Earthquake Loads

2018

TABLE 1613.3.3(1) 1613.2.3(1) Values of Site Coefficient F_a[a]

Site Class	Mapped Risk Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameter at short period					
	$S_s \le 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s \ge 1.25$	$S_s \ge 1.5$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.9 1.0	0.9 1.0	0.9 1.0	0.9 1.0	0.9 1.0	0.9
C	1.3 1.2	1.3 1.2	1.2 1.1	1.2 1.0	1.2 1.0	1.2
D	1.6	1.4	1.2	1.1	1.0	1.0
E	2.4 2.5	1.7	1.3 1.2	Note b 0.9	Note b 0.9	Note b
F	Note b	Note b	Note b	Note b	Note b	Note b

a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period, S_s.
b. Values shall be determined in accordance with Section 11.4.7 11.4.8 of ASCE 7.

TABLE 1613.3.3(2) 1613.2.3(2) Values of Site Coefficient F_v[a]

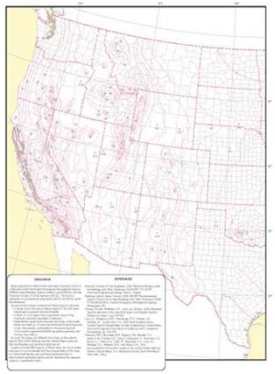
Site Class	Mapped Risk Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameter at 1-second period					
	$S_1 \le 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 0.4$	$S_1 \ge 0.5$	$S_1 \ge 0.6$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.8 1.0	0.8 1.0	0.8 1.0	0.8 1.0	0.8 1.0	0.8
C	1.5 1.7	1.5 1.6	1.5	1.5 1.4	1.5 1.3	1.4
D	2.4	2.2[c] 2.0	2.0[c] 1.8	1.9[c] 1.6	1.8[c] 1.5	1.7[c]
E	4.2 3.5	3.3[c] 3.2	2.8[c]	2.4[c]	2.2[c] 2.4	2.0[c]
F	Note b	Note b	Note b	Note b	Note b	Note b

a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at 1-second period, S_1.
b. Values shall be determined in accordance with Section 11.4.7 11.4.8 of ASCE 7.
c. See requirements for site-specific ground motions in Section 11.4.7 11.4.8 of ASCE 7.

1613.2.1 Seismic Maps

2018

- Seismic maps updated to match new maps in
  - 2015 NEHRP
  - 2016 ASCE 7



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1613.6 Ballasted Photovoltaic Panel Systems

2015

- Seismic requirements for ballasted roof-mounted photovoltaic (PV) solar panels have been added.

1615 Tsunami Loads

2018

- New section and definitions address tsunami-resistant design of critical infrastructure and essential facilities
- Applicable to Risk Category III and IV structures located in Tsunami Design Zones

Chapter 17

Special Inspections and Tests

1704.6 Structural Observation

2018

- Structural observation now required in <u>all</u> buildings classified as:
  - High-rise
  - Risk Category IV

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1705.2.3 Open Web Steel Joists and Joist Girders

2015

- Special inspections are now required during the installation of open web steel joists and joist girders, and a new table specifies the type of inspection and applicable referenced standard.
- Addresses bearing seat attachments, field splices and bridging attachments.

Table 1705.3 Required Special Inspections of Concrete Construction

2015

- The requirement for special inspection of cast-in-place anchors in concrete where allowable loads have been increased or strength design is used has been deleted from Table 1705.3.
- Specific requirements for the design and installation of adhesive anchors are now included in ACI 318, and continuous special inspection has been added for these types of anchors installed horizontally or in upwardly inclined orientations with sustained loads.

Table 1705.3 Required Special Inspections of Concrete Construction

2015

TABLE 1705.3 Required Special Inspections and Tests of Concrete Construction

Type	Continuous Special Inspection	Periodic Special Inspection	Referenced Standard[a]	IBC Reference
1. ~~Inspection of~~ Inspect reinforcement, including prestressing tendons, and ~~verify~~ placement.	—	X	ACI 318: ~~3.5, 7.1-7.7~~ Ch. 20, 25.2, 25.3, 26.5.1-26.5.3	~~1910.4~~ 1908.4
2. ~~Inspection of~~ Reinforcing ~~steel~~ bar welding ~~in accordance with Table 1705.2.2, Item 2b:~~				
a. Verify weldability of reinforcing bars other than ASTM A706.	—	X	AWS D1.4; ACI 318: ~~3.5.2~~ 26.5.4	—
b. Inspect single-pass fillet welds, maximum 5/16".	—	X		
c. All other welds.	X	—		
3. Inspect anchors cast in concrete ~~where allowable loads have been increased or where strength design is used.~~		X	ACI 318: ~~8.1.3, 21.2.8 D.9.2.~~ 17.8.2	~~1908.5, 1909.1~~
4. Inspect anchors post-installed in hardened concrete members[b]:				
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	X		ACI 318: ~~3.8.6, 8.1.3, 21.2.8 D.9.2.4~~ 17.8.2.4; ACI 318: ~~D.9.2~~ 17.8.2	~~1909.1~~
b. Mechanical anchors and adhesive anchors not defined in 4.a.		X		—

(Portions of table not shown remain unchanged.)

1705.5.2 Metal-plate-connected Wood Trusses

2018

- Special inspection of wood trusses required where:
  - Clear span exceeds 60 feet, or
  - Overall height is 60 inches or greater
- If permanent bracing required, periodic special inspection required to verify installation meets approved submittal package

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1705.11 Special Inspection for Wind Resistance

2015

- To better identify the intent, revisions have been made to the special inspection requirements for wind resistance.
- Specific requirements for the inspection of wind-resisting components have also been clearly identified.
- The term “braces” has been deleted as provision applies to shear walls, not braced walls.
- The terms “drag struts” and “hold-downs” have been replaced with general term “components of the wind-force-resisting” system.

1705.12.6 Fire Sprinkler Clearance

2018

- Provisions added for periodic special inspection of minimum clearance of fire sprinkler components to mechanical, electrical and plumbing systems
  - Not required where flexible sprinkler hose fittings are used

Chapter 18

Soils and Foundations

1804.1 Excavation Near Foundations

2015

- Basic requirements for providing safe and adequate underpinning at excavations have been added because the code has not been specific on how to address excavations adjacent to structures.

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2018

1804.4 Site Grading

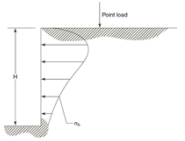
Exceptions:

- Impervious surfaces now permitted to slope less than 2% where surface is a door landing or ramp required to comply with egress provisions
- General provisions require minimum 2% slope to allow for water drainage away from building

2015

1808.3.2 Design Surcharge Loads

- Requirements pertaining to surcharge loads that could affect an adjacent structure have been added.
- New provisions address fill or other surcharge loads that are placed adjacent to a building.
- Exceptions for minor grading for landscaping purposes.



Chapter 22

Steel

2018

2209.2 Cantilevered Steel Storage Racks

- Reference is now made to RMI standard for cantilevered steel storage racks
- Provisions already address pallet racks

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Chapter 23

Wood

193

2303.2.2 Fire-Retardant-Treated Wood

2018

- Engineered lumber of FRT wood to be impregnated with chemicals
- Paints, coating, stains and other surface treatments not an approved method

2304.10.5 Fasteners in Treated Wood

2018

- Staples used in preservative-treated wood and fire-retardant-treated wood now required to be made of stainless steel
- Due to thinner gage, more susceptible to corrosion

2304.11 Heavy-Timber Construction

2018

- Heavy timber provisions of Chapter 23 have been reorganized
- Table on engineered lumber dimensional equivalencies relocated from Section 602.4

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2304.11 Heavy-Timber Construction

2018

TABLE 602.4TABLE 2304.11 ~~Wood Member Size Equivalencies~~ Minimum Dimensions of Heavy Timber Structural Members

Supporting	Heavy Timber Structural Elements	Minimum Nominal Solid Sawn Size Width, inch	Minimum Nominal Solid Sawn Size Depth, inch	Minimum Glued-laminated Net Size Width, inch	Minimum Glued-laminated Net Size Depth, inch	Minimum Structural Composite Lumber Net Size Width, inch	Minimum Structural Composite Lumber Net Size Depth, inch
Floor loads only or combined floor and roof loads	• Columns; • Framed sawn or glue-laminated timber arches which spring from the floor line • Framed timber trusses • Wood beams and girders	8 6	8 10	6¾ 5	8¼ 10½	7 5¼	7½ 9½
Roof loads only	• Columns (roof and ceiling loads) • Lower half of wood-frame or glue-laminated arches which spring from the floor line or from grade • Upper half of wood-frame or glue-laminated arches which spring from the floor line or from grade • Framed timber trusses and other roof framing[a] • Framed or glue-laminated arches that spring from the top of walls or wall abutments	6 6 4[b]	8 6 6	5 5 3[b]	8¼ 6 6¾	5¼ 5¼ 3½[b]	7½ 5½ 5½

For SI: 1 inch = 25.4 mm.

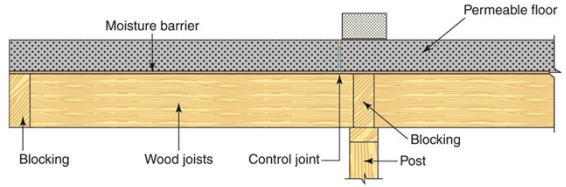
a. Spaced members shall be permitted to be composed of two or more pieces not less than 3 inches (76 mm) nominal in thickness where blocked solidly throughout their intervening spaces or where spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) nominal in thickness secured to the underside of the members. Splice plates shall be not less than 3 inches (76 mm) nominal in thickness.

b. Where protected by approved automatic sprinklers under the roof deck, framing members shall be not less than 3 inches (76 mm) nominal in width.

2304.12.2.5, 2304.12.2.6 Supporting Members for Permeable Floors and Roofs

2018

- Where an impervious moisture barrier system is used to protect the wood structure supporting floors, positive drainage shall be provided for water that infiltrates the moisture-permeable floor topping.



2308 Conventional Light-Frame Construction

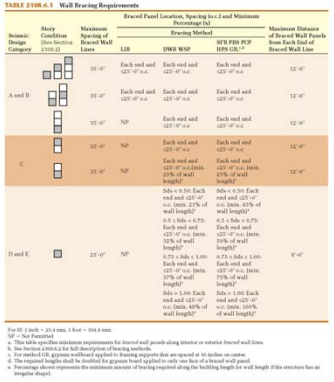
2015

- Section 2308, which contains prescriptive requirements for conventional wood frame construction, has been reformatted and reorganized in its entirety.
- Significant changes include the introduction of new designations for wall bracing methods similar to those in the IRC as shown in new Table 2308.6.3(1), and reformatted wall bracing requirements set forth in Table 2308.6.1.

2308 Conventional Light-Frame Construction

2015

- Braced wall line spacing shall not exceed the distance specified in Table 2308.6.1.



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2308 Conventional Light-Frame Construction

2015

2012 IBC Bracing Method	2015 IBC Bracing Method	Description
1	LIB	Let-in brace
2	DWB	Diagonal wood board
3	WSP	Wood structural panel
4	SFB	Structural fiberboard
5	GB	Gypsum board
6	PBS	Particleboard sheathing
7	PCP	Portland cement plaster
8	HPS	Hardboard panel siding
Alternate braced wall panel	ABW	Alternate braced wall panel
Alternate braced wall panel adjacent to an opening	PFH	Portal frame with hold-downs

Table 2308.4.1.1 (1) Header and Girder Spans – Exterior Walls

2018

TABLE 2308.4.1.1(1) Header and Girder Spans[a,b] for Exterior Bearing Walls

Headers and Girders Supporting	Size	Ground Snow Load (psf)[c] 30 — Building Width[c] (feet) 12 — Span[f]	NJ[d]	24 — Span[f]	NJ[d]	36 — Span[f]	NJ[d]	50 — 12 — Span[f]	NJ[d]
Roof and Ceiling	1-2 × 6	4 - 0	1	3 - 1	2	2 - 7	2	3 - 5	1
	1-2 × 8	5 - 1	2	3 - 11	2	3 - 3	2	4 - 4	2
	1-2 × 10	6 - 0	2	4 - 8	2	3 - 11	2	5 - 2	2
	1-2 × 12	7 - 1	2	5 - 5	2	4 - 7	3	6 - 1	2
	2-2 × 4	4 - 0	1	3 - 1	1	2 - 7	1	3 - 5	1
	2-2 × 6	6 - 0	1	4 - 7	1	3 - 10	1	5 - 1	1
	2-2 × 8	7 - 7	1	5 - 9	1	4 - 10	2	6 - 5	1
	2-2 × 10	9 - 0	1	6 - 10	2	5 - 9	2	7 - 8	2
	2-2 × 12	10 - 7	2	8 - 1	2	6 - 10	2	9 - 0	2
	3-2 × 8	9 - 5	1	7 - 3	1	6 - 1	1	8 - 1	1
	3-2 × 10	11 - 3	1	8 - 7	1	7 - 3	2	9 - 7	1
	3-2 × 12	13 - 2	1	10 - 1	2	8 - 6	2	11 - 3	2
	4-2 × 8	10 - 11	1	8 - 4	1	7 - 0	1	9 - 4	1
	4-2 × 10	12 - 11	1	9 - 11	1	8 - 4	1	11 - 1	1
	4-2 × 12	15 - 3	1	11 - 8	1	9 - 10	2	13 - 0	1
Roof, ceiling and one center-bearing floor	1-2 × 6	3 - 3	1	2 - 7	2	2 - 2	2	3 - 0	2
	1-2 × 8	4 - 1	2	3 - 3	2	2 - 9	2	3 - 9	2
	1-2 × 10	4 - 11	2	3 - 10	2	3 - 3	3	4 - 6	2

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir. ~~No. 1 or better grade lumber shall be used for Southern Pine.~~
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.
e. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.
f. Spans are calculated assuming the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), tabulated spans for headers consisting of 2x8, 2x10, or 2x12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.

Table 2308.4.1.1 (2) Header and Girder Spans – Interior Walls

2018

TABLE 2308.4.1.1(2) Header and Girder Spans[a,b] for Interior Bearing Walls

Headers and Girders Supporting	Size	Building Width[c] (feet) 12 — Span[e]	NJ[d]	24 — Span[e]	NJ[d]	36 — Span[e]	NJ[d]
One floor only	2-2 × 4	4 - 1	1	2 - 10	1	2 - 4	1
	2-2 × 6	6 - 1	1	4 - 4	1	3 - 6	1
	2-2 × 8	7 - 9	1	5 - 5	1	4 - 5	2
	2-2 × 10	9 - 2	1	6 - 6	2	5 - 3	2
	2-2 × 12	10 - 9	1	7 - 7	2	6 - 3	2
	3-2 × 8	9 - 8	1	6 - 10	1	5 - 7	1
	3-2 × 10	11 - 5	1	8 - 1	1	6 - 7	2
	3-2 × 12	13 - 6	1	9 - 6	2	7 - 9	2
	4-2 × 8	11 - 2	1	7 - 11	1	6 - 5	1
	4-2 × 10	13 - 3	1	9 - 4	1	7 - 8	1
	4-2 × 12	15 - 7	1	11 - 0	1	9 - 0	2
Two floors	2-2 × 4	2 - 7	1	1 - 11	1	1 - 7	1
	2-2 × 6	3 - 11	1	2 - 11	2	2 - 5	2
	2-2 × 8	5 - 0	1	3 - 8	2	3 - 1	2
	2-2 × 10	5 - 11	2	4 - 4	2	3 - 7	2
	2-2 × 12	6 - 11	2	5 - 2	2	4 - 3	3
	3-2 × 8	6 - 3	1	4 - 7	2	3 - 10	2
	3-2 × 10	7 - 5	1	5 - 6	2	4 - 6	2
	3-2 × 12	8 - 8	2	6 - 5	2	5 - 4	2
	4-2 × 8	7 - 2	1	5 - 4	1	4 - 5	2
	4-2 × 10	8 - 6	1	6 - 4	2	5 - 3	2
	4-2 × 12	10 - 1	1	7 - 5	2	6 - 2	2

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.
b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir. ~~No. 1 or better grade lumber shall be used for Southern Pine.~~
c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.
d. NJ - Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.
e. Spans are calculated assuming the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), tabulated spans for headers consisting of 2x8, 2x10, or 2x12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.

2308.5.5.1 Openings in Exterior Bearing Walls

2018

- Single member headers now permitted under conventional light-frame construction provisions of Section 2308
- Typically limited to spans of two to four feet as set forth in Table 2308.4.1.1(1)
- Increases energy efficiency by allowing for a greater thickness of cavity insulation

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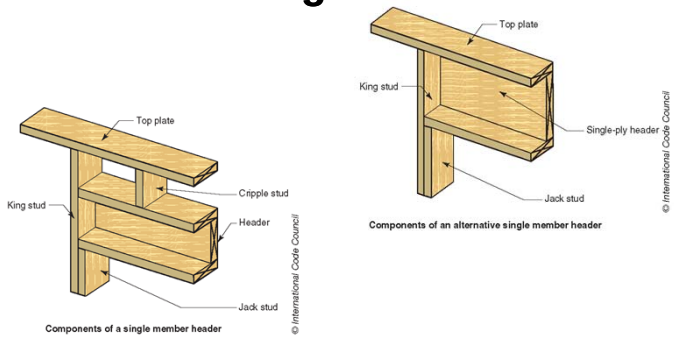
2308.5.5.1 Openings in Exterior Bearing Walls

2018



2308.7 Roof and Ceiling Framing

2015

- Ceiling joist and rafter span tables from the IRC have been incorporated into the conventional construction provisions of the IBC.
- Span tables have been modified in some areas for certain lumber species and grades.
- Intent is to have IBC correlated with provisions that are incorporated in the IRC.

2309 Wood Frame Construction Manual

2015

- Section 2309 has been added to reference the American Wood Council's (AWC) *Wood Frame Construction Manual* (WFCM) for structural design of wood frame buildings assigned to Risk Category I or II.
- WFCM establishes applicability limitations for all occupancies.

Chapter 24

Glass and Glazing

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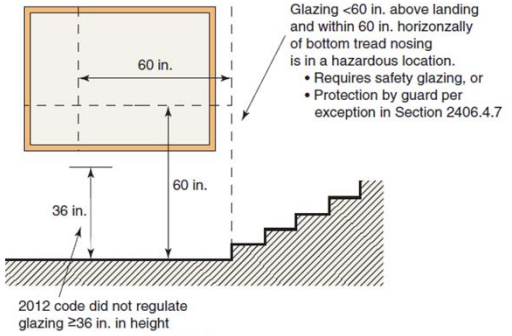
2406.4.7 Safety Glazing Adjacent to Bottom Stair Landing

2015

- The height criteria for regulating glazing at the landing at the bottom of a stair has been revised from 36 inches to 60 inches.
- Returns to previous threshold established in 2009 IBC and prior editions.
- In addition, the method for measuring the horizontal distance has been clarified.

2406.4.7 Safety Glazing Adjacent to Bottom Stair Landing

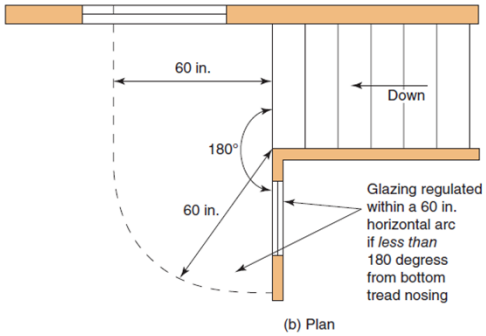
2015



(a) Section

2406.4.7 Safety Glazing Adjacent to Bottom Stair Landing

2015



(b) Plan

Requirement for safety glazing adjacent to bottom stairway landing

Chapter 26

Plastic

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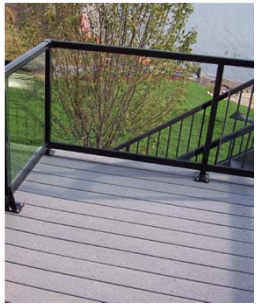
2015

2612 Plastic Composites

- New definitions and applicable test standards now address the use of plastic composites for use as exterior deck boards, stair treads, handrails and guards.
- Such materials are permitted for use only in buildings of Type VB construction.



Chapter 29

Plumbing Systems

2018

2902.1.2 Single User Toilet Rooms

- Can now count towards required fixture counts even where family or assisted-use facilities not required
- Required to be gender neutral

2018

2902.2, Exception 4 Separate Facilities

- Business classifications with 25 or fewer occupants not required to have separate sex facilities

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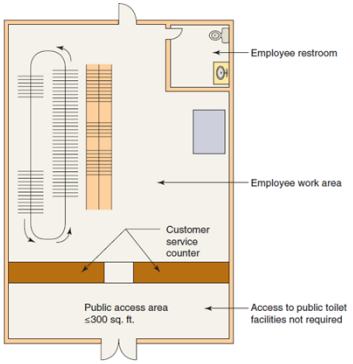
2015

2902.3 Public Toilet Facilities

- Limited-size quick-service tenant spaces are no longer required to provide toilet facilities for the public customers.



Toilet facilities for the public are not required

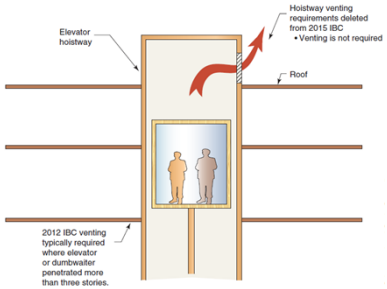
Chapter 30

Elevators and Conveying Systems

2015

~~3004~~ Elevator Hoistway Venting

- The elevator hoistway venting provisions of Section 3004 have been deleted; such hoistways are no longer required to be vented to the exterior.



Hoistway venting is not required

2015

3006 Elevator Lobbies

- The elevator lobby requirements have been relocated from Section 713.14.1, where they were previously included with the general shaft enclosure requirements, to Chapter 30, which addresses elevators.
- New formatting introduces scoping provisions indicating where lobbies are required throughout the code.
  - Section 3006.2 for shaft enclosure protection
  - Section 405.4.3 for underground buildings
  - Section 1009.6 for areas of refuge
  - Section 3007.6 for fire service access elevators
  - Section 3008.6 for occupant evacuation elevators

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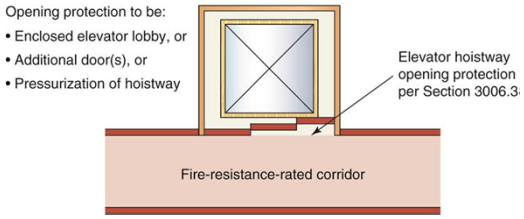
3006.2.1 Corridors Adjacent to Elevator Hoistway Openings

2018

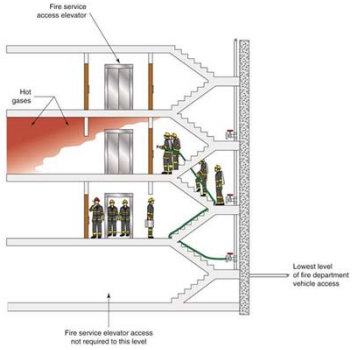
- Hoistway openings to be protected where corridors to be fire-resistance-rated per Section 1020.1



3007.1 Extent of Fire Service Access Elevator Travel

2018

- Only floors at and above lowest level of fire department vehicle access need to served by fire service access elevators
- Not required for elevators that only serve parking garage and lobby levels



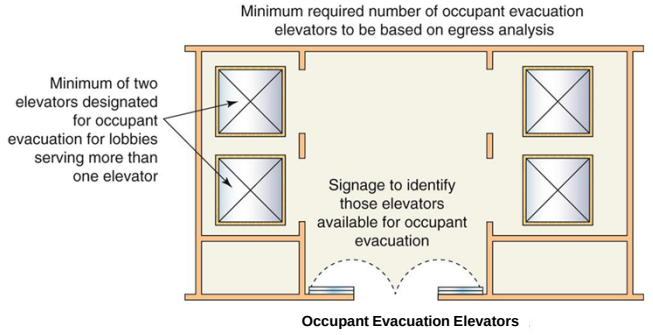
3008.1.1 Required Number of Occupant Evacuation Elevators

2018

- Minimum number of required occupant evacuation elevators based on one of two egress scenarios
  - Full building evacuation in less than 1 hour, or
  - Evacuation of 5 consecutive floors with highest accumulated occupant load in less than 15 minutes

3008.1.1 Required Number of Occupant Evacuation Elevators

2018



Occupant Evacuation Elevators

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Chapter 31

Special Construction

225

2018

3113 Relocatable Buildings

- Compliance required as for new construction
- Provisions address:
  - Supplemental information
  - Manufacturer's data plate
  - Inspection agencies

Chapter 33

Safeguards During Construction

227

2018

3310.1 Stairways in Buildings under Construction

- Stairway to be provided where building construction exceeds 40 feet above lowest level of fire department vehicle access
- As construction progresses, stairway to extend within one floor of highest point with secured decking/flooring

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3314 Fire Watch During Construction

2018

- Fire watch can be required by fire code official
  - Provided during non-business hours
  - Applicable where construction exceeds 40 feet above lowest adjacent grade

Chapter 34

Existing Structures

~~Chapter 34~~ Existing Structures

2015

- Chapter 34 has been deleted from the IBC in its entirety, and existing buildings will now be solely regulated by the *International Existing Building Code* (IEBC).
- Previously, only IEBC Chapters 4 (Prescriptive Compliance Method) and 14 (Performance Compliance Methods) were replicated in IBC Chapter 34.
- These two methods, plus Work Area Method, included in IEBC.

Appendix N

Replicable Buildings

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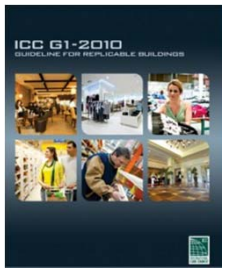
Appendix N Guidelines for Replicable Buildings

2018

- Based on ICC Guideline G1
- Benefits include:
  - More uniform review process
  - Elimination of repetitive reviews
  - Reduces time between permit submittal and construction mobilization



Discussion Activity

Final Reflection

- **What?** What happened and what was observed in the training?
- **So what?** What did you learn? What difference did this training make?
- **Now what?** How will you do things differently back on the job as a result of this training?

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INTERNATIONAL CODE COUNCIL

Thank you for participating!!

LEARNING center

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-184

APPROVE A RESOLUTION ACCEPTING THE COTTONWOOD GREENS PUD FINAL PLAT AND FINAL PUD PLAN FOR FILING NO. 4.

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:

a. Proposed Resolution
b. Land Use Application & Project Description
c. Final Plat & Final PUD Plan
d Landscape Plan Drawings
e. Development Reports & Traffic Studies
f. Construction Drawings
g. Cost Estimates
h. Proposed Elevations
i. Mineral Notice Affidavit
j. Referral Responses

III. Summary Statement:

The applicant, Arbor Capital Partners, LLC, has applied for approval of a Final Plat and Final PUD Plan for the City Council's consideration for Filing No. 4 of the Cottonwood Greens PUD Subdivision. The Final Plat and Final PUD Plan is located north and adjacent to 9th Street and approximately 0.29 miles west of County Road 31 in Fort Lupton. The proposal is for a single-family attached residential subdivision on 16.22 acres, more or less, that will include 137 townhomes, as well as common areas and interconnecting trails.

IV. Submitted by: _____ City Planner

V. Finance Reviewed _____ Finance Director

VI. Approved for Presentation: _____ City Administrator

VII. Attorney Reviewed _____ Approved _____ Pending Approval

VIII. Certification of Council Approval: _____ City Clerk _____ Date

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IX. Detail of Issue/Request:

The applicant, Arbor Capital Partners, LLC, has applied for approval of a Final Plat and Final PUD Plan for the City Council's consideration for Filing No. 4 of the Cottonwood Greens PUD Subdivision. The Final Plat and Final PUD Plan is located north and adjacent to 9th Street and approximately 0.29 miles west of County Road 31 in Fort Lupton. The proposal is for a single-family attached residential subdivision on 16.22 acres, more or less, that will include 137 townhomes, as well as common areas and interconnecting trails. This project is part of the larger Cottonwood Greens PUD Subdivision, with Filing Nos. 1 – 3 for single family detached residential lots being approved by City Council on May 19, 2020.

Additional information on this application can be found in the attached Staff Report and other supportive documents. Other submittal documents may not be included with this packet, but can be available for review upon request.

X. Legal/Political Considerations:

The final plat and PUD plan is being reviewed under the final plat provisions of the Subdivision Regulations of the Fort Lupton Municipal Code. Section 17-23 states that a final plat is to be reviewed by Council, and does not require Planning Commission review. The Code requires that a subdivision improvements agreement be submitted by the applicant for review by the City Attorney and City Council. A subdivision improvements agreement has been addressed in the conditions of approval included on the proposed resolution.

This is the final step in the major subdivision process. The first step is approval of a sketch plat (reviewed and approved on May 6, 2019), and the second step is approval of the preliminary plat and preliminary PUD plan (reviewed concurrently with this final plat and final PUD plan on November 2, 2021).

Notifications are not required for a final plat; however, referral agencies were provided with the submittal documents for review. All referral comments received are enclosed with this Action Memorandum.

The subdivision is currently zoned PUD Planned Unit Development. The zoning permits residential uses within the R-1, R-1A, R-2 and R-3 portion of the Municipal Code. The Comprehensive Plan designates this area as Single Family Detached, however also states that this can consist of a variety of development types, including higher density homes within residential growth areas. The proposed use complies with the current zoning and comprehensive plan designation.

XI. Alternatives/Options:

The City Council has the following options for each request:

a) Approve the proposed resolution.
b) Approve the proposed resolution with conditions.
c) Continue the meeting for additional information or further study.
d) Deny the proposed resolution.

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XII. Financial Considerations:

All applicable land use application fees have been paid and a fee deposit has been submitted to cover costs related to the application.

XIII. Staff Recommendation:

Staff recommends conditional approval of Filing No. 4 of the Cottonwood Greens PUD Final Plat and Final PUD Plan.

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RESOLUTION NO. 2021Rxxx

A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE COTTONWOOD GREENS PUD FINAL PLAT AND FINAL PUD PLAN FOR FILING NO. 4 SUBMITTED BY ARBOR CAPITAL PARTNERS, LLC TO CREATE A RESIDENTIAL SUBDIVISION LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO.

WHEREAS, Arbor Capital Partners, LLC ("Applicant") has applied for approval of the Cottonwood Greens PUD Final Plat and Final PUD Plan and Final Plat for Filing No. 4 (the "Application") for a single-family attached (townhome) residential subdivision; and

WHEREAS, pursuant to Section 16-45(c)(3) of the Fort Lupton Zoning Regulations, PUD development plan applications shall be processed in the same manner as set forth in the Fort Lupton Subdivision Regulations; and

WHEREAS, the Fort Lupton City Council held a public hearing on November 2, 2021, for the purpose of reviewing the Cottonwood Greens Final Plat and Final PUD Plan for Filing No. 4 to subdivide the property for a single-family attached (townhome) residential subdivision; and

WHEREAS, after review of the Application, and consideration of staff comments, Applicant's presentation, and any public input, the City Council finds that the Application is in conformance with the Colorado Revised Statutes, City codes and policies, and Comprehensive Plan adopted by the City; and

NOW THEREFORE BE IT RESOLVED that the Fort Lupton City Council reviewed the plans and supporting documentation, all referral comments and any citizen input in response to this application. Based upon review of the applicable policies and goals in the Fort Lupton Comprehensive Plan, review of the Subdivision and Zoning Regulations, an analysis of referral comments and facts presented on this date, the City Council hereby recommends approval of the Cottonwood Greens PUD Final Plat and Final PUD Plan for Filing No. 4 located in the Southeast Quarter of Section 33, Township 2 North, Range 66 West of the 6th P.M,, City of Fort Lupton, County of Weld, State of Colorado with the following conditions:

I. Prior to recording the Final Plat for Filing No. 4:

A. The title of the Final Plats shall be updated to include the Project No. LUP2021-0019 and Plan No. FPL2021-0004.

B. Any redlines provided by City staff shall be made to the Final Plat maps.

C. Submit cash-in-lieu or transfer appropriate water shares for the filings being recorded.

D. Written evidence shall be provided to show that the comments from United Power have been adequately addressed.

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E. Written evidence shall be provided to show that the comments from Xcel Energy (Public Service Company) have been adequately addressed.

F. Written evidence shall be provided to show that any comments from the Public Works Director have been adequately addressed.

G. Applicant shall finalize a subdivision improvements agreement for review by City staff and approval by City Council.

H. Provide information concerning any existing surface use agreements and provide detail how the agreements have been addressed on the design of the development.

I. Provide information concerning any existing metro district and/or planned homeowners association.

J. The preliminary PUD plat map shall be finalized with any redline comments from City staff.

II. Prior to the start of construction:

A. Applicant shall provide written evidence that the comments from the Fort Lupton Fire Protection District have been adequately addressed.

III. The Final Plat shall be recorded within three (3) years of approval.

APPROVED AND PASSED BY A MAJORITY VOTE OF THOSE ELECTED TO THE CITY COUNCIL OF THE CITY OF FORT LUPTON, COLORADO THIS 2ND DAY OF NOVEMBER 2021.

City of Fort Lupton, Colorado

_____

Zo Stieber, Mayor

Attest:

_____

Maricela Peña, City Clerk

Approved as to form:

_____

Andy Ausmus, City Attorney

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CITY OF Fort Lupton EST 1836
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COTTONWOOD GREENS PUD FILING NO. 4 PRELIMINARY PLAT & PRELIMINARY PUD PLAN
STAFF REPORT
LUP2021-0019 & PPL2021-0004

PROJECT DESCRIPTION

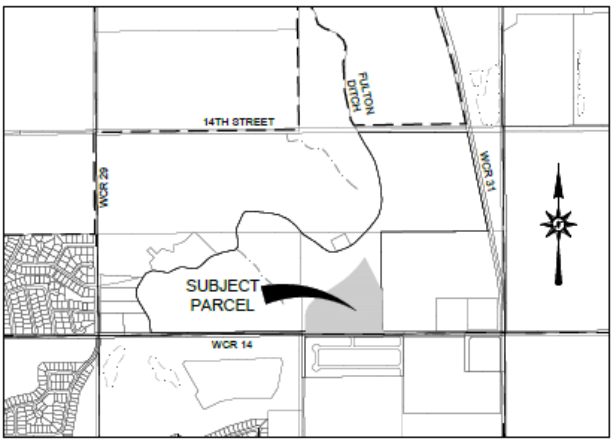
Project Nos.: LUP2021-0019 & PPL2021-0004

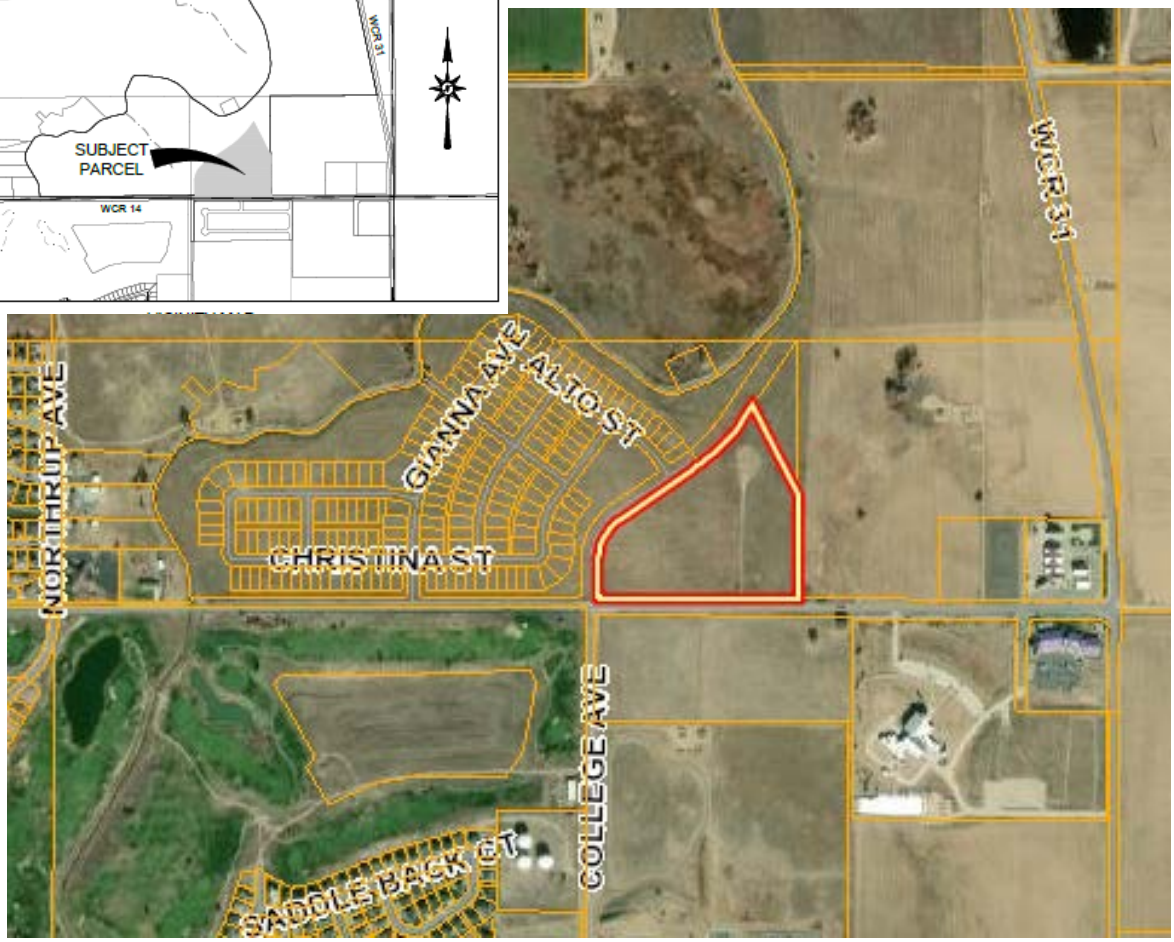
Project Name: Cottonwood Greens PUD Filing No. 4 Preliminary Plat & Preliminary PUD Plan

Applicant's Name: Arbor Capital Partners, LLC ("Applicant")

Location of Request:

The site consists of land located north and adjacent to 9th Street and west and adjacent to County Road 31 (the "Property"). The Property is located in the Southeast Quarter of Section 33, Township 2 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton., County of Weld, State of Colorado.





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Nature of Request:

The Applicant has submitted a request for a preliminary plat and preliminary PUD plan for 137 single family attached (townhouse) residential units, and will include common areas and interconnecting trails.

Site Size: 16.22 acres, more or less.

Zone District: PUD Planned Unit Development.

Proposed Use: Residential uses to include 137 single family attached (townhouse) residential units, including common areas and interconnecting trails.

Existing Use: Vacant.

Hearing Dates: Planning Commission – October 14, 2021 at 6:00 PM; and
City Council – November 2, 2021 at 7:00 PM.

Hearing Location: Fort Lupton City Hall – Council Chambers, 130 S. McKinley Ave., Fort Lupton, Colorado, with an option to attend virtually via GoToMeeting.

Staff Recommendation: Approval with conditions, as shown on the proposed resolution.

SUMMARY OF PREVIOUS APPLICATIONS

In 2006, the City Council approved a metropolitan district, final plat, subdivision improvement agreement, and PUD development plan for this property. However, the subdivision was never developed, and the property ownership became fragmented. The metropolitan district remains in effect, however each separate ownership parcel(s) will be required to start the development process over.

On May 6, 2019, the Fort Lupton City Council approved the Cottonwood Greens Sketch PUD Plat (Resolution No. 2019R034), and on December 16, 2019, the PUD Development Plan and Preliminary PUD Plat for the overall Cottonwood Greens Development was approved (Resolution No 2019R090).

On May 19, 2020, City Council approved the Final PUD Development Plan and Final Plats for Filing Nos. 1 – 3 (Resolution No. 2020R048). The Subdivision Improvements Agreement was approved on June 2, 2020 (Resolution No. 2020R050).

APPLICATION PROCESS

The Applicant is requesting approval of a preliminary plat and preliminary PUD plan for a residential subdivision that will include 137 single family attached homes, including common areas and interconnecting trails.

Under the Fort Lupton Municipal Code, after required public notice of the preliminary plat and PUD plan, the Planning Commission shall consider the application, referral comments and any public testimony at a public hearing and make a recommendation to City Council to approve, approve with conditions or deny the preliminary plat. The Planning Commission's comments shall be based on the evidence presented, conformance with the Comprehensive Plan and compliance with the City's standards, regulations and policies.

The City Council shall then conduct a public hearing and evaluate the preliminary plat and preliminary PUD plan, referral agency comments, Planning Commission recommendation and any public testimony.

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City Council shall approve, conditionally approve, continue for additional information or for further study or deny the application based on the evidence presented and compliance with the City's standards, regulations and policies and other guidelines.

References to the Preliminary PUD Plan establishes the unique regulations and standards for development on the Property. This includes, but is not limited to, any deviations from the City's Zoning Regulations, Residential Design Standards and Specification for Design and Construction of Public Improvements and Zoning Regulations.

NOTIFICATION REQUIREMENTS

The Subdivision Regulations require published notice of the hearings in a timely manner prior to the hearings. The Planning Commission and City Council hearings were published in the Fort Lupton press on September 29, 2021.

Notice of the public hearings were posted on the Property on September 29, 2021, pursuant to the Subdivision Regulations, which require the Applicant post the Property with notice of the hearings at least fifteen (15) days prior to the hearings.

Notice was mailed to neighbor within 500 feet of the Property, and owners and lessees of mineral interests on September 28, 2021.

CONFORMANCE WITH CITY STANDARDS, REGULATIONS AND POLICIES

The area is zoned PUD Planned Unit Development with residential uses. The objective of a PUD is to provide for the planning and development of substantial tracts of land, suitable in location and character for the uses proposed, as unified and integrated entities in accordance with detailed development plans.

The Preliminary Plat and Preliminary PUD Plan is for a residential subdivision to include 137 single family attached (townhouse) residential units, including common areas and interconnecting trails. The Applicant has submitted the required documents pursuant to the Code.

Approval of a PUD Plan is being reviewed concurrently with the Preliminary Plat. All development within a PUD zone district must be in accordance with a PUD plan. PUD plans shall contain unique district regulations that apply to the PUD zone district. All provisions of the City's Code and adopted standards and specifications shall apply within PUD zone districts, unless specifically modified in the PUD plan. Deviations from the City's standards are noted on the Preliminary Plat and Preliminary PUD Plan map.

CONFORMANCE WITH THE COMPREHENSIVE PLAN

The Future Land Use Map designates this area as Single-Family Detached land use. The Single-Family Detached designation allows for neighborhoods of predominantly singe family detached homes on individual lots. This can consist of a variety of development types, including higher density homes within the City's urban core and planned subdivisions within residential growth areas. In addition to single family units, these neighborhoods may include scattered single family attached and multi-family housing options, as well as public and semi-public uses. Given market demand, single family neighborhoods are likely to remain the primary residential designation within Fort Lupton and should see considerable growth in the future.

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The proposed development plans for single family attached homes within Filing No. 4. Filing Nos. 1 – 3 included singe family detached homes. The application complies with and meets the intent of the Comprehensive Plan by including a mix of residential types including townhomes, as well as single family detached homes.

The proposal also complies with the Parks and Trails Master Plan, which identifies the Fulton Ditch Trail along the College Avenue. A proposed 10-foot concrete sidewalk is proposed along this roadway. There is also a connection trail identified in the Plan along 9th Street, and a planned community trail is included in the plans. The proposal includes plans for other interconnecting trails and common areas for the residents of the subdivision.

REFERRALS

Referrals were provided to the list below. Any comments received are enclosed with the Planning Commission packet.

Buildings/Grounds Manager	City Attorney	Police Chief
Public Works Director	Building Inspector	Recreation Manager
Golf Course Manager	Wastewater Treatment Plant Manager	GIS Specialist
Finance Director	Fort Lupton Fire Protection District	CDOT
Colorado Parks & Wildlife	Division of Water Resources	United Power
Comcast	CenturyLink	Xcel Energy
Postmaster	Weld County Department of Planning	Weld County Public Works
Weld County School District RE-8	NCWCD	Fulton Ditch Company

For more information on this development, please refer to the Planning Commission packet provided. Additional documents are available for review at the Fort Lupton City Hall.

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Form PLAN002

CITY OF Fort Lupton EST 1836

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Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortlupton.org

Project No. _____

Land Use Application Form

A. CONTACT INFORMATION

1) Property Owner Name: Cottonwood Development Partners LLC.

Company: _____

Phone: (949) 230-1496 Email: tdharris@arborcapitalpartners.com

Address: 4040 MacArthur Blvd., Ste. 250 Newport Beach, CA 92660

Preferred method of contact? Email: ☑ Phone: ☐ Mail: ☐

2) Representative Name: Kristin Turner

Company: TB Group

Phone: 970.532.5891 Email: kristin@tbgroup.us

Address: 444 Mountain Avenue Berthoud, CO 80513

Preferred method of contact? Email: ☑ Phone: ☐ Mail: ☐

3) Billing Contact *(where invoices should be directed to)*: Attn: Gloria Morales

Billing Company: Cottonwood Development Partners LLC

Phone: (949)566-8163 Email: Gloria@rfcomsites.com

Address: 4040 MacArthur Blvd., Ste. 250 Newport Beach, CA 92660

B. SITE DESCRIPTION

Site Address: Vacant Land, County Road 14 Fort Lupton, CO 80621

Parcel Number: 130933416019

Existing Zone Classification: PUD Proposed Zone Classification: PUD

Water Type: Municipal Name: Fort Lupton

Sewage Type: Municipal District Name or Location Hauled to: _____

C. APPLICATION TYPE (CHECK ALL THAT APPLY)

☐ Sketch Plat	☐ Administrative Site Plan	☐ PUD Plan (Preliminary & Final)
☑ Preliminary Plat	☐ Special Use Permit	☐ Variance
☐ Final Plat	☐ Oil & Gas Permit	☐ Administrative Variance
☐ Minor Subdivision	☐ Annexation & Initial Zone	☐ Appeal
☐ Amended Plat	☐ Change of Zone	☐ Other: _____
☐ Site Plan	☐ Comp Plan Amendment	

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Project No. _____

D. PROJECT DESCRIPTION

Project Name: Cottonwood Greens

Please provide a short description of the proposed project in the space provided below:

This is a proposal for development of a future development tract (outlot A) within the Cottonwood Greens subdivision. The site has existing PUD zoning. Single family attached (townhomes) are proposed for this portion of the site.

E. REQUIRED DOCUMENTS

For an application to be considered complete, and for planning staff to begin review and schedule any applicable public hearings, this Land Use Application Form must be fully completed and all required attachments included. Planning staff will review the application for completeness and will provide notice to the representative and/or owner whether the application has been deemed complete.

F. CERTIFICATIONS

Representative Certification

By signing this application, I attest that I am acting with the knowledge and consent of all owners of the property that is the subject of this application, and that I have been designated to act as the representative for the project described in this land use application. I further certify that all information submitted with this application is true and accurate to the best of my knowledge.

Representative: _____ Date: 6/4/21

Owner Certification

I hereby certify that I am the legal owner of record of the property that is the subject of this application. I hereby authorize the representative listed on this application, if any, to communicate directly with City officials and to submit documentation and information regarding this application on my behalf.

Owner: _____ Date: 6/16/21

For Office Use Only

Received Date: _____

If the application is not complete, state reasons why it is incomplete:

_____

_____

_____

Deemed Complete Date: _____

Fees Submitted: _____ Escrow Submitted: _____

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Instructions for Submitting the Land Use Application Form

DEFINITIONS

Words in the singular include the plural and words in the plural include the singular.

Application refers to the official submittal to the City of Fort Lupton's Planning Department for review of the proposed land use development identified in the land use application form. The application includes the form, all materials submitted for review of the project, including those documents required under the Land Use Regulations of the Municipal Code, and any additional information provided.

Project refers to the land use development identified on the land use application form and application materials.

Property refers to the land that is being proposed for development as described in the land use application form and application materials.

A. CONTACT INFORMATION

1) Provide contact information for all owners of any property that is the subject of the application. If the contact information for all property owners will not fit on the space provided, submit a separate sheet for the additional owners.
2) Provide contact information for all persons, firms or businesses that are authorized by the owners identified in Section A(1) to work on the land use application, including, but not limited to, discussing the project, submitting application materials, and attending meeting and hearings. If the contact information for all representatives will not fit on the space provided, submit a separate sheet for the additional representatives.
3) Provide contact and mailing information for the person that should receive all invoices for the project. If this person changes at any time, contact the Planning Department immediately to update this information.

B. SITE DESCRIPTION

Provide all information requested. Parcel numbers and address information may be found at the Weld County Property Portal at https://www.co.weld.co.us/maps1/propertyportal/. Current zoning can be found at http://www.fortlupton.org/405/Zoning.

C. APPLICATION TYPE

Select the land use application that is applicable to the project. If there are multiple land use application types being submitted to run concurrently, select all that apply. The land use application types will be identified during the required pre-application meeting. If you have any questions about this, please contact the Planning Department at 303.857.6694 or planningdept@fortlupton.org.

D. PROJECT DESCRIPTION

Please select a project name that will be referenced throughout the project and a description of what the project entails. If you need more space for the project description, please attach a separate sheet.

E. REQUIRED DOCUMENTS

Required documents will be discussed during the pre-application meeting with the Planning Department. If any documents are missing, the acceptance of the application may be delayed until the submittal is complete.

F. CERTIFICATIONS

Representative Certification. Provide the signature of all authorized representatives in this section.
Owner Certification. Provide the signature of all owners of properties included in the application in this section.

For any other questions, please contact the Planning Department at 303.857.6694 or planningdept@fortlupton.org.

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TB GROUP
landscape architecture | planning | illustration

Cottonwood Greens PUD No. 4: Preliminary/Final Plat Narrative
June 21, 2021

General Description/Site Features and Proposed Land Uses

The property is located on the north side of 9th street and west of College Avenue. The property is approximately 16.22 acres with existing PUD zoning. Proposed uses will include 137 single family attached residential units. The overall project density is approximately 8.4 du/ac. The development will include common areas and interconnecting trails.

Compliance with the City of Fort Lupton Comprehensive Plan

The proposed development integrates the goals set out in the Town Comprehensive Plan in the following ways:

Growth and Development
The proposed development is designed to provide connections at pre-determined locations to existing and adjacent neighborhoods. In addition, the layout provides continuous, direct, convenient, and safe pedestrian pathways to adjacent subdivisions and proposed parks. The site is well situated for housing per the Comprehensive Plan. The plan also provides for diversity in housing types for the community.

Transportation and Mobility
This plan provides a safe and efficient transportation network that accommodates pedestrians, vehicles and bicycles. Two connections to College Avenue will extend through the site. Designated as a collector roadway, it will provide convenient access to local streets for vehicles, bicycles, and pedestrians. The project is planned as a pedestrian oriented and walkable community with sidewalks, street trees and connections throughout the community, to future and existing adjacent neighborhoods.

Parks, Open Space and Environmental Features
The open space and trails within the development will provide high quality recreational opportunities for neighborhood residents and create connections to future and existing neighborhoods and uses beyond our project boundaries. This project will construct the Connector Trail proposed along 9th Street. Trail connections will be provided throughout the site with extensions to all sides of the development tract. A neighborhood park was designed as part of Cottonwood Greens PUD No. 1, to serve the overall development. In addition, a trail head with access to multiple Town trails is located across the street from this development.

444 Mountain Ave.
Berthoud, CO 80513
TEL 970.532.5891
WEB TBGroup.us

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Public Facilities and Services

The proposed development is a logical extension of the City of Fort Lupton public services without placing additional burdens on existing residents and businesses. Infrastructure will be provided so as to meet the requirements of the Comprehensive Plan and/or the Land Use Code.

Water will be provided by the Town of Fort Lupton by connecting to an existing 16” water main in 9th Street and an existing 12” water main Weld County Road 31. There will also be a network of 8” mains throughout the site. Irrigation flows will be provided by a separate irrigation system.

Sewer will be provided by the Town of Fort Lupton through three connection points: one to the northwest in Northrop Avenue, one in the center of the site, and on in 14th Street. The existing mains have capacity for the proposed development.

Stormwater will be treated using appropriate water quality measures, with on-site detention being utilized throughout the site to maintain stormwater releases at or below historic rates from the site. The release will be to a single pipe to be constructed through the site to the west adjacent to the existing sanitary sewer. The project area is not located with any FEMA regulated floodplain.

Planned Phasing

The development is proposed in one phase.

Statement of Commercial Mineral Deposits

There are currently oil & gas facilities within the property but there are no known commercial mineral deposits on-site.

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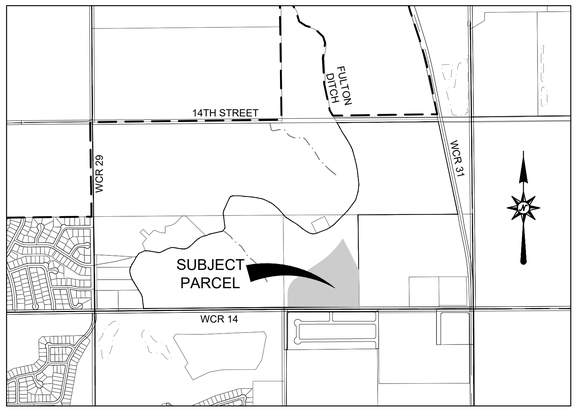
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-XXXX / PLAN NO. PPL2021-XXXX

FINAL PUD PLAT

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO



VICINITY MAP
SCALE: 1"=1000'

0' 1000' 2000' 3000'

SCALE: 1" = 1000'

LEGAL DESCRIPTION

TRACT D AND OUTLOT A, COTTONWOOD GREENS PUD FILING NO. 3
COUNTY OF WELD, STATE OF COLORADO

RECORDED AT RECEPTION NO. 4681486, WELD COUNTY RECORDS

SAID PARCEL OF LAND CONTAINS 706,426 SQUARE FEET, OR 16.22 ACRES, MORE OR LESS (±).

DEVELOPER/APPLICANT
COTTONWOOD DEVELOPMENT PARTNERS
JIM RIGHEIMER
4040 MACARTHUR BLVD., #250
NEWPORT BEACH, CA 92660 (303)-905-3496

SITE ENGINEER
ATWELL, LLC
DANIEL RODRIGUEZ, P.E.
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, COLORADO 80228 (303) 462-1100

SURVEYOR
ATWELL, LLC
MICHAEL LLOYD POOL, PLS
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, COLORADO 80228 (303) 462-1100

PUD ZONING REQUIREMENTS:

PARCEL	PUD ZONING	R3 ZONING
ALLOWABLE LAND USE	SFD, MFD	SFD, MFD
MINIMUM LOT SIZE (SF)	5,000 SF	5,000 SF
MINIMUM LOT WIDTH	30'	30'
MAXIMUM LOT COVERAGE	N/A	N/A
PRIMARY USES		
MAXIMUM HEIGHT	35'	35'
MINIMUM FRONT YARD SETBACK (PRINCIPLE STRUCTURE)	15' TO HOUSE/20' TO GARAGE	25'
MINIMUM SIDE YARD SETBACK	5'	5'
MINIMUM REAR YARD SETBACK	15'	20'
MINIMUM SIDE YARD (CORNER) SETBACK	15'	20'
MINIMUM DWELLING SIZE (SF)	750 SF (SFD)/ 500 SF (MFD)	750 SF (SFD)/500 SF (MFD)
ACCESSORY USE		
HEIGHT	35'	35'
FRONT SETBACK	N/A	N/A
SIDE SETBACK	5'	20'
REAR SETBACK	5'	N/A

NOTES:

1. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY ATWELL, LLC TO DETERMINE OWNERSHIP OR EASEMENTS OF RECORD. ATWELL, LLC RELIED UPON (TITLE COMPANY), COMMITMENT FILE NO: XX DATED XX IN THE PROCESS OF THIS SURVEY TO AID IN EASEMENT AND OWNERSHIP RESEARCH.
2. GROSS LAND AREA IS 619,698 SQUARE FEET, OR 14.23 ACRES, MORE OR LESS.
3. THE LINEAR UNIT OF MEASUREMENT FOR THIS SURVEY IS U.S. SURVEY FEET.
4. THE BASIS OF BEARINGS IS THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 33 AS BEARING NORTH 00° 09' 31" WEST, AND MONUMENTED AS SHOWN ON DRAWING.
5. CURRENT ZONING: PUD
6. UTILITY EASEMENTS ARE DEDICATED TO THE CITY FORT LUPTON FOR THE BENEFIT OF THE APPLICABLE UTILITY PROVIDERS FOR THE INSTALLATION, MAINTENANCE, AND REPLACEMENT OF ELECTRIC, GAS, TELEVISION, CABLE, AND TELECOMMUNICATIONS FACILITIES (DRY UTILITIES). UTILITY EASEMENTS SHALL ALSO BE GRANTED WITHIN ANY ACCESS EASEMENTS AND PRIVATE STREETS IN THE SUBDIVISION. PERMANENT STRUCTURES, IMPROVEMENTS, OBJECTS, BUILDINGS, WELLS, WATER METERS AND OTHER OBJECTS THAT MAY INTERFERE WITH THE UTILITY FACILITIES OR USE THEREOF (INTERFERING OBJECTS) SHALL NOT BE PERMITTED WITHIN SAID UTILITY EASEMENTS AND THE UTILITY PROVIDERS, AS GRANTEES, MAY REMOVE ANY INTERFERING OBJECTS AT NO COST TO SUCH GRANTEES, INCLUDING, WITHOUT LIMITATION, VEGETATION. PUBLIC SERVICE COMPANY OF COLORADO (PSCO) AND ITS SUCCESSORS RESERVE THE RIGHT TO REQUIRE ADDITIONAL EASEMENTS AND TO REQUIRE THE PROPERTY OWNER TO GRANT PSCO AN EASEMENT ON ITS STANDARD FORM.

SURVEY CERTIFICATION

I, MICHAEL LLOYD POOL, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THE SURVEY REPRESENTED BY THIS PLAT WAS MADE UNDER MY SUPERVISION, AND THE MONUMENTS SHOWN HEREIN ACTUALLY EXIST, AND THIS PLAT ACCURATELY REPRESENTS SAID SURVEY.

COLORADO LICENSED MICHAEL LLOYD POOL 38304 PROFESSIONAL LAND SURVEYOR

PRELIMINARY

MICHAEL LLOYD POOL, PLS
COLORADO REG. NO. 38304
FOR AND ON BEHALF OF ATWELL, LLC

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATE SHOWN HEREON.

RIGHT TO FARM STATEMENT:

WELD COUNTY IS ONE OF THE MOST PRODUCTIVE AGRICULTURAL COUNTIES IN THE UNITED STATES, TYPICALLY RANKING IN THE TOP TEN COUNTIES IN THE COUNTRY IN TOTAL MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD. THE RURAL AREAS OF WELD COUNTY MAY BE OPEN AND SPACIOUS, BUT THEY ARE INTENSIVELY USED FOR AGRICULTURE.
PERSONS MOVING INTO A RURAL AREA MUST RECOGNIZE AND ACCEPT THERE ARE DRAWBACKS, INCLUDING CONFLICTS WITH LONG-STANDING AGRICULTURAL PRACTICES AND A LOWER LEVEL OF SERVICES THAN IN TOWN. ALONG WITH THE DRAWBACKS COME THE INCENTIVES WHICH ATTRACT URBAN DWELLERS TO RELOCATE TO RURAL AREAS: OPEN VIEWS, SPACIOUSNESS, WILDLIFE, LACK OF CITY NOISE AND CONGESTION, AND THE RURAL ATMOSPHERE AND WAY OF LIFE. WITHOUT NEIGHBORING FARMS, THOSE FEATURES WHICH ATTRACT URBAN DWELLERS TO RURAL WELD COUNTY WOULD QUICKLY BE GONE FOREVER.

AGRICULTURAL USERS OF THE LAND SHOULD NOT BE EXPECTED TO CHANGE THEIR LONG-ESTABLISHED AGRICULTURAL PRACTICES TO ACCOMMODATE THE INTRUSIONS OF URBAN USERS INTO A RURAL AREA. WELL-RUN AGRICULTURAL ACTIVITIES WILL GENERATE OFF-SITE IMPACTS, INCLUDING NOISE FROM TRACTORS AND EQUIPMENT; SLOW-MOVING FARM VEHICLES ON RURAL ROADS; DUST FROM ANIMAL PENS, FIELD WORK, HARVEST AND GRAVEL ROADS; ODOR FROM ANIMAL CONFINEMENT, SILAGE AND MANURE; SMOKE FROM DITCH BURNING; FLIES AND MOSQUITOES; HUNTING AND TRAPPING ACTIVITIES; SHOOTING SPORTS, LEGAL HAZING OF NUISANCE WILDLIFE; AND THE USE OF PESTICIDES AND FERTILIZERS IN THE FIELDS, INCLUDING THE USE OF AERIAL SPRAYING. IT IS COMMON PRACTICE FOR AGRICULTURAL PRODUCERS TO UTILIZE AN ACCUMULATION OF AGRICULTURAL MACHINERY AND SUPPLIES TO ASSIST IN THEIR AGRICULTURAL OPERATIONS. A CONCENTRATION OF MISCELLANEOUS AGRICULTURAL MATERIALS OFTEN PRODUCES A VISUAL DISPARITY BETWEEN RURAL AND URBAN AREAS OF THE COUNTY. SECTION 35-3.5-102, C.R.S., PROVIDES THAT AN AGRICULTURAL OPERATION SHALL NOT BE FOUND TO BE A PUBLIC OR PRIVATE NUISANCE IF THE AGRICULTURAL OPERATION ALLEGED TO BE A NUISANCE EMPLOYS METHODS OR PRACTICES THAT ARE COMMONLY OR REASONABLY ASSOCIATED WITH AGRICULTURAL PRODUCTION.

WATER HAS BEEN, AND CONTINUES TO BE, THE LIFELINE FOR THE AGRICULTURAL COMMUNITY. IT IS UNREALISTIC TO ASSUME THAT DITCHES AND RESERVOIRS MAY SIMPLY BE MOVED "OUT OF THE WAY" OF RESIDENTIAL DEVELOPMENT. WHEN MOVING TO THE COUNTY, PROPERTY OWNERS AND RESIDENTS MUST REALIZE THEY CANNOT TAKE WATER FROM IRRIGATION DITCHES, LAKES OR OTHER STRUCTURES, UNLESS THEY HAVE AN ADJUDICATED RIGHT TO THE WATER.

WELD COUNTY COVERS A LAND AREA OF APPROXIMATELY FOUR THOUSAND (4,000) SQUARE MILES IN SIZE (TWICE THE SIZE OF THE STATE OF DELAWARE) WITH MORE THAN THREE THOUSAND SEVEN HUNDRED (3,700) MILES OF STATE AND COUNTY ROADS OUTSIDE OF MUNICIPALITIES. THE SHEER MAGNITUDE OF THE AREA TO BE SERVED STRETCHES AVAILABLE RESOURCES. LAW ENFORCEMENT IS BASED ON RESPONSES TO COMPLAINTS MORE THAN ON PATROLS OF THE COUNTY, AND THE DISTANCES WHICH MUST BE TRAVELED MAY DELAY ALL EMERGENCY RESPONSES, INCLUDING LAW ENFORCEMENT, AMBULANCE AND FIRE. FIRE PROTECTION IS USUALLY PROVIDED BY VOLUNTEERS WHO MUST LEAVE THEIR JOBS AND FAMILIES TO RESPOND TO EMERGENCIES. COUNTY GRAVEL ROADS, NO MATTER HOW OFTEN THEY ARE BLADED, WILL NOT PROVIDE THE SAME KIND OF SURFACE EXPECTED FROM A PAVED ROAD. SNOW REMOVAL PRIORITIES MEAN THAT ROADS FROM SUBDIVISIONS TO ARTERIALS MAY NOT BE CLEARED FOR SEVERAL DAYS AFTER A MAJOR SNOWSTORM. SERVICES IN RURAL AREAS, IN MANY CASES, WILL NOT BE EQUIVALENT TO MUNICIPAL SERVICES. RURAL DWELLERS MUST, BY NECESSITY, BE MORE SELF-SUFFICIENT THAN URBAN DWELLERS.

PEOPLE ARE EXPOSED TO DIFFERENT HAZARDS IN THE COUNTY THAN IN AN URBAN OR SUBURBAN SETTING. FARM EQUIPMENT AND OIL FIELD EQUIPMENT, PONDS AND IRRIGATION DITCHES, ELECTRICAL POWER FOR PUMPS AND CENTER PIVOT OPERATIONS, HIGH-SPEED TRAFFIC, SAND BURS, PUNCTURE VINES, TERRITORIAL FARM DOGS AND LIVESTOCK AND OPEN BURNING PRESENT REAL THREATS. CONTROLLING CHILDREN'S ACTIVITIES IS IMPORTANT, NOT ONLY FOR THEIR SAFETY, BUT ALSO FOR THE PROTECTION OF THE FARMER'S LIVELIHOOD. (WELD COUNTY CODE ORDINANCE 2002-6; WELD COUNTY CODE ORDINANCE 2008-13)

RECORDER'S CERTIFICATE

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK AND RECORDER OF WELD COUNTY, COLORADO

AT _____ _.M. ON THE DAY OF _____ , A.D. 20___

IN BOOK _____, PAGE _____, RECEPTION NO. _____

_____
COUNTY CLERK AND RECORDER

_____
DEPUTY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS

SHEET 1 OF 4

FILE NO. 20002948-PRELIM PLAT
DATE 06/15/2021
DRAWN BY TWK
CHECK BY MLP
JOB NO. 20002948

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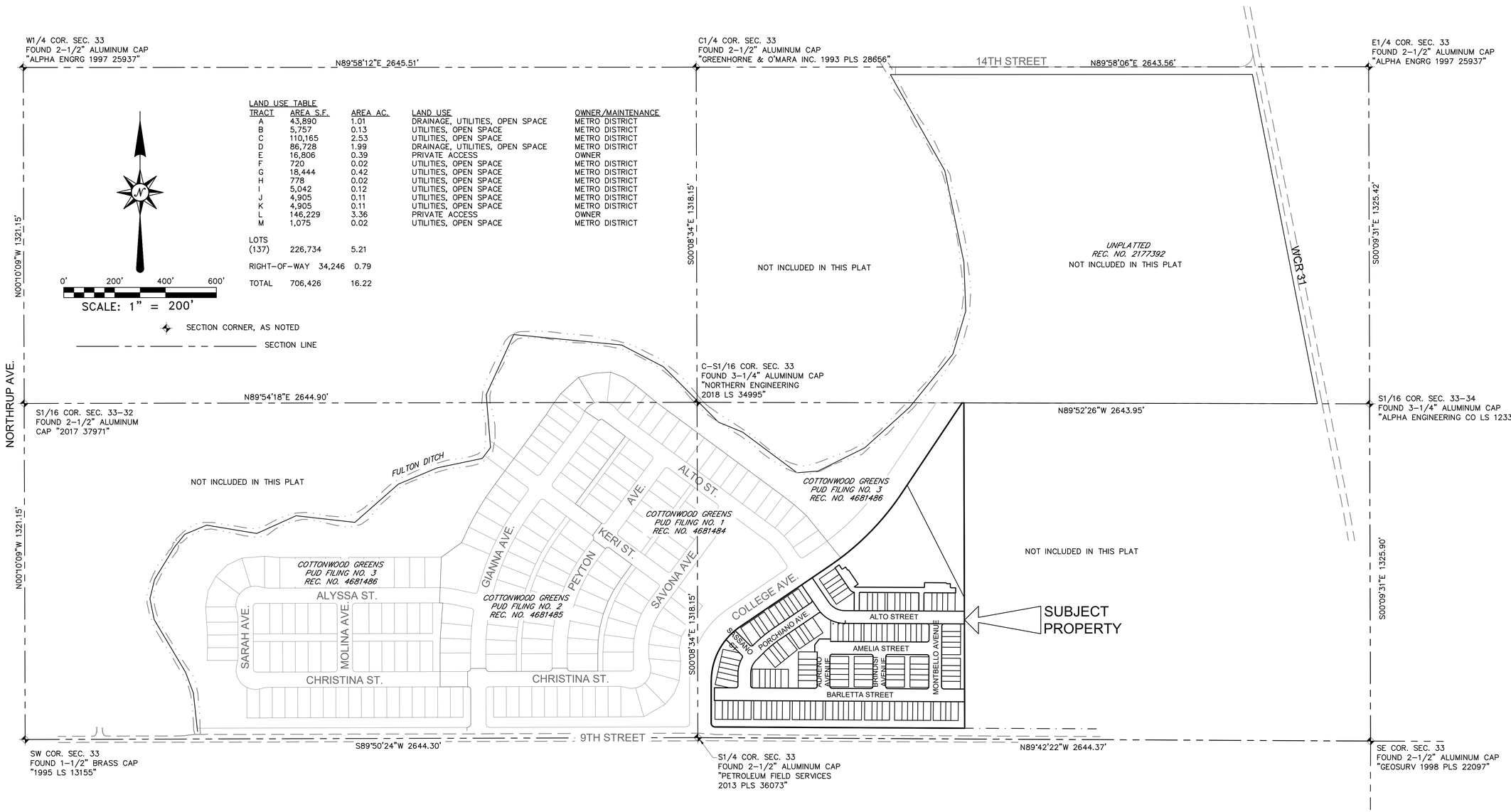
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-000X

FINAL PUD PLAT

LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



LAND USE TABLE

TRACT	AREA S.F.	AREA AC.	LAND USE	OWNER/MAINTENANCE
A	43,890	1.01	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
B	5,757	0.13	UTILITIES, OPEN SPACE	METRO DISTRICT
C	110,165	2.53	UTILITIES, OPEN SPACE	METRO DISTRICT
D	86,728	1.99	DRAINAGE, UTILITIES, OPEN SPACE	METRO DISTRICT
E	16,806	0.39	PRIVATE ACCESS	OWNER
F	720	0.02	UTILITIES, OPEN SPACE	METRO DISTRICT
G	18,444	0.42	UTILITIES, OPEN SPACE	METRO DISTRICT
H	778	0.02	UTILITIES, OPEN SPACE	METRO DISTRICT
I	5,042	0.12	UTILITIES, OPEN SPACE	METRO DISTRICT
J	4,905	0.11	UTILITIES, OPEN SPACE	METRO DISTRICT
K	4,905	0.11	UTILITIES, OPEN SPACE	METRO DISTRICT
L	146,229	3.36	PRIVATE ACCESS	OWNER
M	1,075	0.02	UTILITIES, OPEN SPACE	METRO DISTRICT
LOTS				
(137)	226,734	5.21		
RIGHT-OF-WAY	34,246	0.79		
TOTAL	706,426	16.22		

COLORADO LICENSED
MICHAEL LLOYD KOL
36304
PROFESSIONAL LAND SURVEYOR
PRELIMINARY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS

SHEET 2 OF X

FILE NO.	19003254-PRELIM PLAT
DATE	06/15/2021
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

K:\2000\19003254\DWG\Survey\20003548_PRELIMINARY PLAT.dwg, PLAT MAP 2, 6/22/2021 12:46:10 PM

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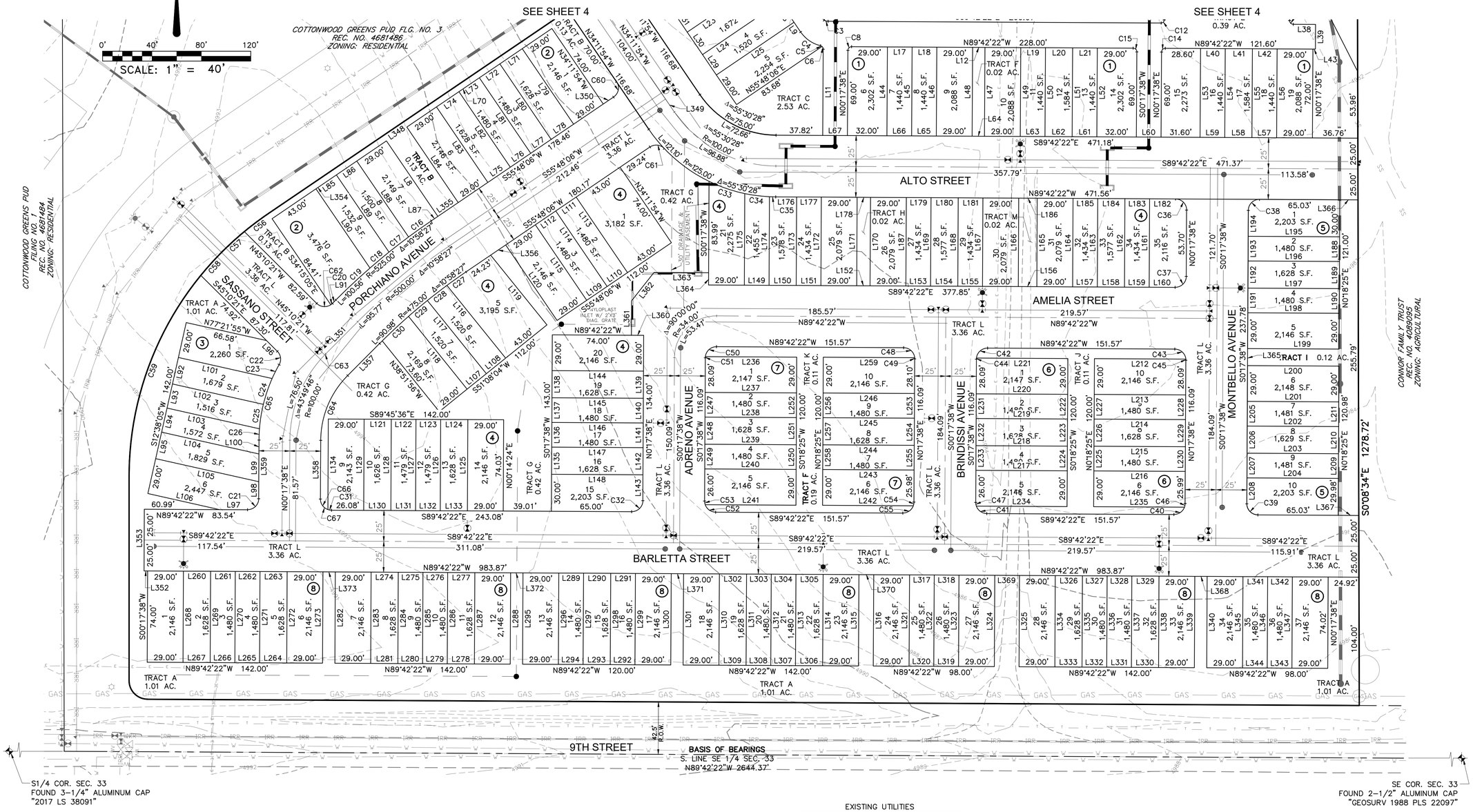
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-00XX

FINAL PUD PLAT
LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2
NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF WELD, STATE OF COLORADO



LEGEND

- SECTION CORNER, AS NOTED
- OIL/GAS WELL
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP "LS 12330"
- 20.0' REFERENCE MONUMENT FOUND #5 REBAR WITH 2" ALUMINUM CAP "LS 25379 20.0' RM"
- FOUND #4 REBAR

PROPERTY BOUNDARY	LOT LINE
SECTION LINE	R.O.W. CENTER LINE
MATCH LINE	R.O.W. LINE
UTILITY EASEMENT LINE	WETLAND SETBACK LINE
DRAINAGE EASEMENT LINE	WETLAND LINE

PROPOSED UTILITIES

PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

EXISTING UTILITIES

GAS GAS GAS
W W W W
OHE OHE OHE
SS SS SS
FO FO FO FO FO

COLORADO LICENSED PROFESSIONAL LAND SURVEYOR
MICHAEL LLOYD POOL
38304

PRELIMINARY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS
REVISED 01/28/2020
REVISED 02/05/2020
REVISED 02/28/2020

SHEET 5 OF 9

FILE NO.	19003254-PRELIM PLAT
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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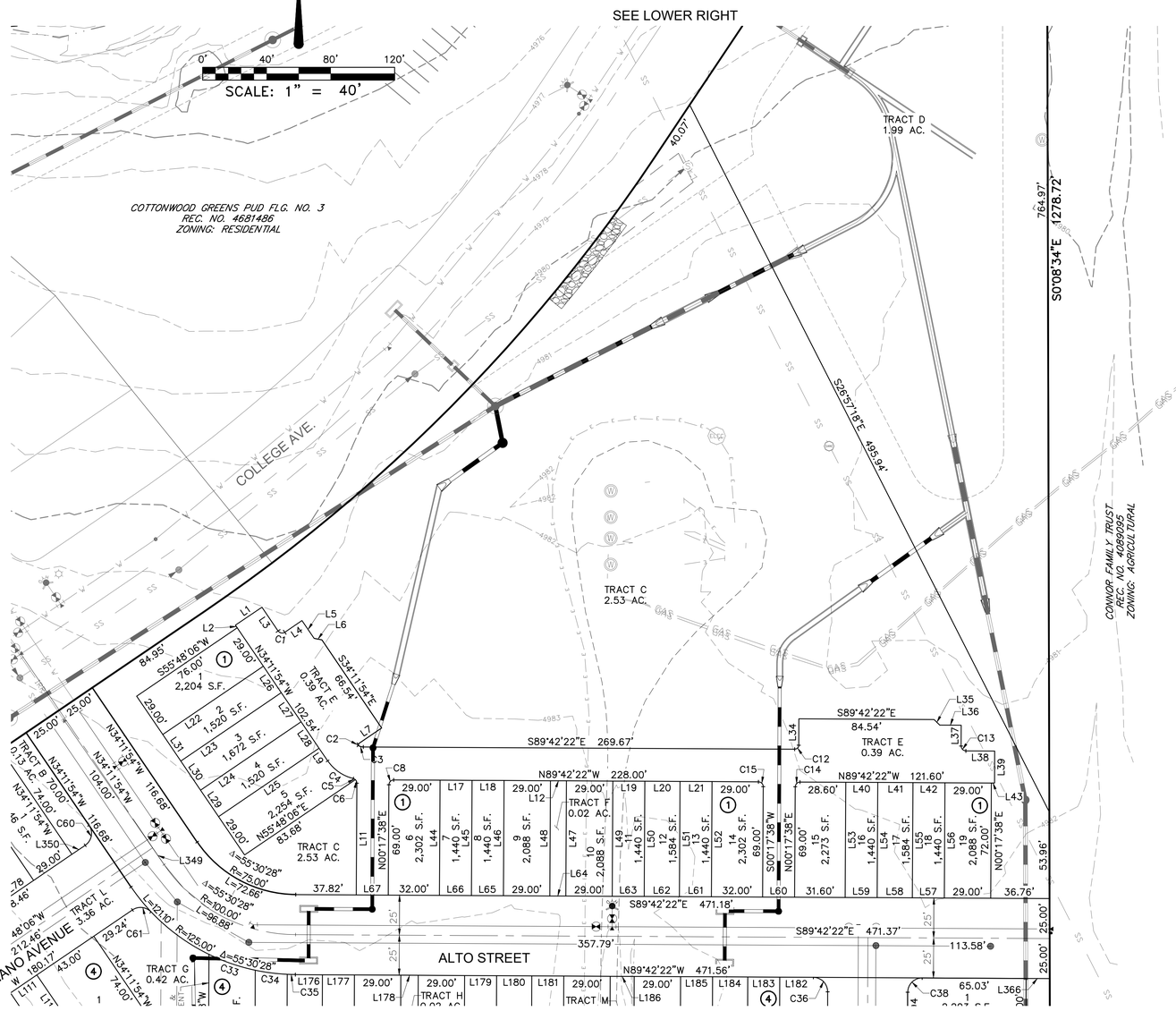
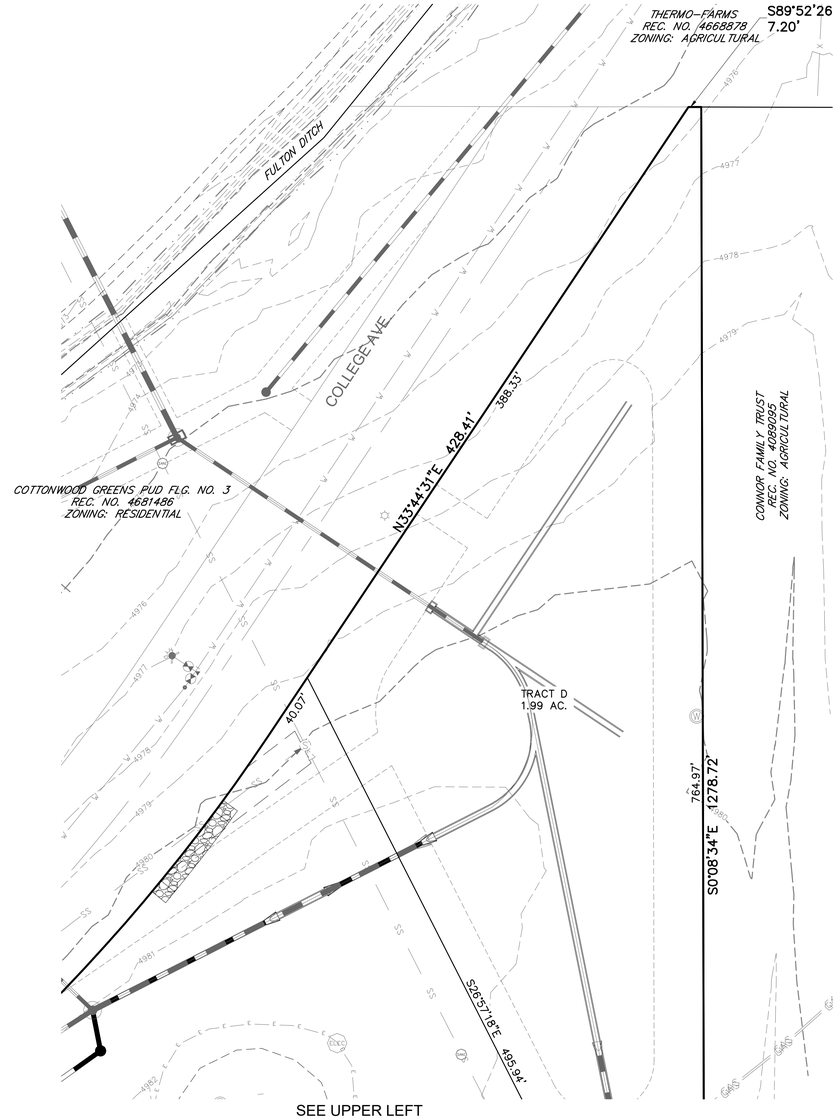
COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO. LUP2021-00XX / PLAN NO. PPL2021-00XX

FINAL PUD PLAT

LOCATED IN THE SOUTHEAST QUARTER OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO





LEGEND

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PROPERTY BOUNDARY
SECTION LINE
MATCH LINE
UTILITY EASEMENT LINE
DRAINAGE EASEMENT LINE

LOT LINE
R.O.W. CENTER LINE
R.O.W. LINE
WETLAND SETBACK LINE
WETLAND LINE

PROPOSED UTILITIES
PROPOSED STORM SEWER
PROPOSED WATER LINE
PROPOSED IRRIGATION LINE
PROPOSED SANITARY SEWER

EXISTING UTILITIES
GAS GAS GAS
W W W W
OHE OHE OHE
SS SS SS
ro ro ro ro ro

COLORADO LICENSED
MICHAEL LICHTENTHALER
38504
PROFESSIONAL LAND SURVEYOR
PRELIMINARY

ATWELL
866.850.4200 www.atwell-group.com
143 UNION BOULEVARD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

REVISIONS
REVISED 01/28/2020
REVISED 02/05/2020
REVISED 02/28/2020

SHEET 5 OF 9

FILE NO.	19003254-PRELIM PUD
DATE	10/01/19
DRAWN BY	TWK
CHECK BY	BCR
JOB NO.	19003254

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COTTONWOOD GREENS FILING NO. 4

A TRACT OF LAND LOCATED IN THE SOUTH HALF OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO

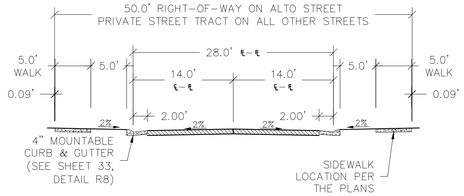
FILING NO. 4 CONSTRUCTION PLANS

LEGAL DESCRIPTION:

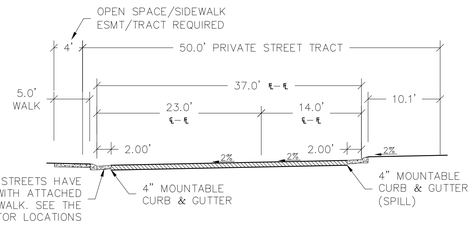
TRACT D AND OUTLOT A, COTTONWOOD GREENS PUD FILING NO. 3
COUNTY OF WELD, STATE OF COLORADO

RECORDED AT RECEPTION NO. 4681486, WELD COUNTY RECORDS

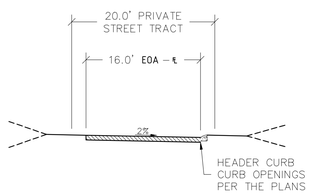
SAID PARCEL OF LAND CONTAINS 706,426 SQUARE FEET, OR 16.22 ACRES, MORE OR LESS (±).



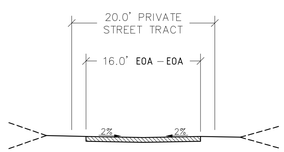
MODIFIED LOCAL STREET SECTION WITH 50' ROW / PRIVATE STREET TRACT
1:10 HOR.



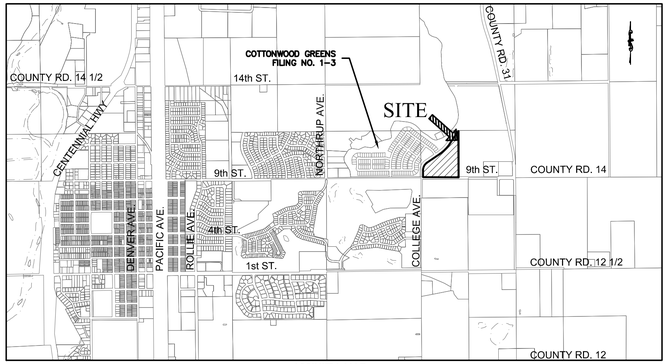
BARLETTA STREET SUPER ELEVATED WITH PARKING AND ATTACHED SIDEWALK
1:10 HOR.



PRIVATE ALLEY DRIVEWAY
1:10 HOR.



PRIVATE ALLEY DRIVEWAY
1:10 HOR.



VICINITY MAP
SCALE: 1"=2,000'

Sheet List Table	
SHEET NUMBER	SHEET TITLE
01	COVER SHEET
02	NOTES & LEGEND
GESC PLANS	
03	GESC INITIAL PLAN
04	GESC INTERIM PLAN
05	GESC FINAL PLAN
06	GESC DETAILS
07	GESC DETAILS
DETAIL GRADING	
08	DETAIL GRADING PLAN
09	DETAIL GRADING PLAN
10	DETAIL GRADING PLAN
11	DETAIL GRADING PLAN
12	DETAIL GRADING PLAN
13	DETAIL GRADING PLAN
STREET PLAN & PROFILE	
14	SASSANO ST. & PORCHIANO AVE.
15	ALTO ST.
16	MONTBELLO AVE.
17	BARLETTA ST.
18	AMELIA ST. & BRINDISI AVE.
19	ALLEY 01, 02 & 03
SANITARY SEWER PLAN & PROFILE	
20	ALTO STREET
21	PORCHIANO AVE.
22	BARLETTA ST.
23	BARLETTA ST. & AMELIA ST.
24	BARLETTA ST., AMELIA ST. & BRINDISI AVE.
25	MONTBELLO AVE.
STORM SEWER PLAN & PROFILE	
26	STORM RUN 1 & 3
27	STORM RUN 2 & 4
WATER PLAN & PROFILE	
28	SASSANO ST. & PORCHIANO AVE.
29	ALTO STREET
30	MONTBELO AVE. & AMELIA ST.
31	BARLETTA ST. & BRINDISI AVE.
IRRIGATION PLAN & PROFILE	
32	SASSANO ST. & ALTO ST.
DETAILS	
33	STREET DETAILS
34	SANITARY DETAILS
35	SANITARY DETAILS
SIGNAGE & STRIPING	
36	SIGNAGE & STRIPING

CITY ENGINEER'S APPROVAL:

APPROVED THIS ___ DAY OF _____, 2020.

_____
CITY ENGINEER

CITY WATER AND SEWER DEPARTMENT APPROVAL:

APPROVED THIS ___ DAY OF _____, 2020.

_____
DIRECTOR OF PUBLIC WORKS

CITY ADMINISTRATOR'S APPROVAL:

APPROVED THIS ___ DAY OF _____, 2020.

_____
CITY ADMINISTRATOR

PLANNING COMMISSION RECOMMENDATION:

RECOMMENDED THIS ___ DAY OF _____, 2020, BY RESOLUTION NO. _____,

_____
CHAIRPERSON, FORT LUPTON
PLANNING COMMISSION

MAYOR'S CERTIFICATE:
THIS IS TO CERTIFY THAT A PLAT OF THE ABOVE-DESCRIBED PROPERTY WAS APPROVED BY [ORDINANCE/RESOLUTION] NO. _____ OF THE CITY OF FORT LUPTON PASSED AND ADOPTED ON THE _____ DAY OF _____, A.D., 2020 AND THAT THE MAYOR OF THE CITY OF FORT LUPTON, AS AUTHORIZED BY SAID [ORDINANCE/RESOLUTION] ON BEHALF OF THE CITY OF FORT LUPTON, HEREBY ACKNOWLEDGES AND ADOPTS THE SAID PLAT UPON WHICH THIS CERTIFICATE IS ENDORSED FOR ALL PURPOSES INDICATED THEREON.

_____
MAYOR

ATTEST: _____

_____
CITY CLERK

(SEAL)

OWNER:
ARBOR CAPITAL PARTNERS, LLC.
4040 MACAURTHER BLVD.,
SUITE 250
NEWPORT BEACH, CA 92660
(303) 905-3496
CONTACT: JIM RIGHEIMER

CIVIL ENGINEER:
ATWELL, LLC.
143 UNION BLVD.,
SUITE 700
LAKEWOOD, CO 80228
(303) 462-1100
CONTACT: DANIEL RODRIGUEZ

SURVEYOR:
ATWELL, LLC.
143 UNION BLVD.,
SUITE 700
LAKEWOOD, CO 80228
(303) 462-1100
CONTACT: MICHAEL L. POOL

CITY OF FORT LUPTON:
130 S. McKINLEY AVE.
FORT LUPTON, CO 80621
(303) 857-6694
CONTACT: ROY VESTAL

XCEL ENERGY(GAS):
5460 W. 60TH AVE.
ARVADA, CO 80003
(800) 895-4999
CONTACT: DONNA SANDERS

UNITED POWER (ELEC):
P.O. BOX 929
BRIGHTON, CO 80601
(303) 659-0551
CONTACT: HECTOR AVENDANO

CENTURYLINK (FIBER OPTIC):
5324 WADSWORTH BYP.,
SUITE F
ARVADA, CO 80002
(303) 403-9980

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

ENGINEER'S STATEMENT

THE CONSTRUCTION PLANS INCLUDED HEREIN HAVE BEEN PREPARED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE REQUIREMENTS OF FORT LUPTON ENGINEERING CONSTRUCTION STANDARDS AND SPECIFICATIONS MANUAL.

_____ _____
DANIEL J. RODRIGUEZ, P.E. DATE
COLORADO NO. 48683
FOR AND ON BEHALF OF ATWELL, LLC.

811 Know what's below. Call before you dig.

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ATWELL
866.850.4200 www.atwell-group.com
143 UNION BLVD. SUITE 700
LAKEWOOD, CO 80228
303.462.1100

DEVELOPER
ARBOR CAPITAL PARTNERS, LLC
4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496

CLIENT
ARBOR CAPITAL PARTNERS, LLC
COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO
CONSTRUCTION PLANS
COVER SHEET

DATE 6/22/2021

REVISIONS

DR. NA CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 01

CAD FILE: 20002948-COVER SHEET.DWG

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GENERAL NOTES – WATER & SANITARY SEWER

1. ALL CONSTRUCTION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF FORT LUPTON STANDARD SPECIFICATIONS, LATEST EDITION OR PROJECT SPECIFICATIONS, WHICHEVER IS MORE STRINGENT.

2. ALL OVER LOT GRADING IN THE RIGHT-OF-WAY OR EASEMENT SHALL BE COMPLETED PRIOR TO INSTALLING WATER OR SANITARY SEWER LINES.

3. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CALL UTILITY NOTIFICATION CENTER OF COLORADO AT 811 OR 1-800-922-1987 BEFORE DIGGING, GRADING OR EXCAVATING.

4. MAINTAIN A MINIMUM OF 10 FOOT HORIZONTAL CLEAR DISTANCE SEPARATION BETWEEN WATER AND SANITARY SEWER MAINS AND SERVICES. WATER MAINS AND SERVICES ARE TO BE LOCATED 18 INCHES MINIMUM ABOVE THE SANITARY SEWER MAIN OR SERVICES. IF FIELD CONDITIONS VARY FROM THOSE SHOWN ON THESE PLANS AND THE SANITARY SEWER CANNOT BE LOCATED BELOW THE WATER MAIN OR SERVICE, A CLEAR VERTICAL DISTANCE OF 18 INCHES CANNOT BE MAINTAINED, OR A MINIMUM 10 FOOT HORIZONTAL SEPARATION CANNOT BE ACHIEVED, THE CITY OF FORT LUPTON INSPECTION SERVICES SHALL BE CONTACTED IMMEDIATELY TO REVIEW THE SITUATION. IF NO OTHER FEASIBLE SOLUTION CAN BE USED TO MAINTAIN THE REQUIRED CLEARANCES, THE SANITARY SEWER SHALL BE ENCASED PER CURRENT CONSTRUCTION STANDARDS.

5. WHERE WATER AND SANITARY SEWER LINES ARE LOCATED IN COMMON UTILITY EASEMENT AREAS, THERE SHALL BE NO OTHER UTILITIES LOCATED HORIZONTALLY WITHIN 10 FEET OF EITHER LINE EXCEPT AT APPROVED CROSSINGS.

6. CONTRACTOR SHALL NOTIFY THE CITY OF FORT LUPTON ONE WEEK PRIOR TO COMMENCING WORK AFTER DRAWING DISTRIBUTION AND PRECONSTRUCTION MEETING HELD WITH THE CITY.

7. CONTRACTOR TO OBTAIN ALL PERMITS, DO ALL EXCAVATION FOR OSHA SAFE TRENCH.

8. CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES TO BE CROSSED BY WATER AND/OR SEWER LINES AT LEAST 24 HOURS PRIOR TO CROSSING TO ENSURE 18 INCH MINIMUM CLEARANCE IF OPEN CUT METHODS ARE USED AND 24 INCH MINIMUM CLEARANCE FOR BORED CROSSINGS. IF VERTICAL CLEARANCE CANNOT BE MET AS SHOWN ON THE DRAWINGS, CONTACT THE DESIGN ENGINEER IMMEDIATELY. HORIZONTAL AND VERTICAL LOCATION OF CROSSED EXISTING UTILITIES SHALL BE RECORDED ON THE AS-BUILT RECORD DRAWINGS.

9. SHOULD ANY VARIATIONS BEFORE OR DURING CONSTRUCTION TO THE WATER MAIN OR SANITARY SEWER COLLECTION SYSTEM DESIGN(S) BE CONSIDERED, NOTICE MUST FIRST BE GIVEN TO THE ENGINEER (BRAD EATON, 970-395-9880).

10. THE CONTRACTOR SHALL PROVIDE THE OWNER WITH AS-BUILT RECORD DRAWINGS UPON COMPLETION OF WORK.

11. ALL WATER MAINS, FIRE HYDRANTS, AND SERVICES SHALL HAVE A MINIMUM COVER OF 5.0 FEET AND A MAXIMUM COVER OF 6.0 FEET UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

12. ALL NEW WATER MAINS SHALL BE BULKHEADED AND TESTED AND APPROVED PRIOR TO CONNECTION TO THE EXISTING WATER SYSTEM. VALVES WHICH PASS TESTING FOR PRESSURE AND LEAKAGE AT THE TIME OF INSTALLATION AND THE TESTING WAS PERFORMED IN THE PRESENCE OF THE CITY MAY BE CONSIDERED AS A BULKHEAD.

13. ALL VALVES AT DEAD ENDS SHALL BE RESTRAINED WITH RESTRAINING GLANDS UPSTREAM OF THE VALVE. LENGTH OF RESTRAINT IS SHOWN ON THE DRAWINGS.

14. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE POLYWRAPPED IN ACCORDANCE WITH AWWA STANDARD C-105.

15. NO POLYVINYL CHLORIDE (PVC) PIPE STORED OUTSIDE AND EXPOSED TO SUNLIGHT SHALL EXCEED THE MANUFACTURER'S RECOMMENDATION EXPOSURE TIME. THIS TIME SHALL BEGIN FROM THE DATE OF MANUFACTURE. IF THE TIME WILL BE GREATER THAN THE MANUFACTURE'S RECOMMENDED TIME, THE PIPE SHALL BE COVERED WITH AN OPAQUE MATERIAL. AIR CIRCULATION SHALL BE PROVIDED UNDER THE COVERING.

16. COPPER TRACING WIRE SHALL BE INSTALLED PER SPECIFICATIONS FOR ALL WATER PIPE.

17. FOR TAPPING PVC C-900 PIPE, AN APPROVED TAPPING SADDLE SHALL BE USED. THE TAPPING MACHINE USED TO MAKE THE CONNECTION MUST OPERATE WITH A CUTTING/TAPPING TOOL WHICH IS CLASSIFIED AS A CORE CUTTING TOOL (EITHER WITH INTERNAL TEETH OR WITH DOUBLE SLOTS) OF THE SHELL DESIGN WHICH RETAINS THE COUPON WHILE PENETRATING THE WALL OF THE WATER MAIN. THE TAPPING MACHINE SHOULD PROVIDE THE STANDARD RATCHET HANDLE ON THE BORING BAR AND SHOULD BE OF THE DESIGN WHERE CUTTING AND TAPPING IS CONTROLLED AND ACCOMPLISHED WITH A FEED-NUT OR FEED-SCREW AND YOKE.

18. ALL BACKFLOW PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH THE COLORADO CROSS-CONNECTION CONTROL MANUAL, LATEST EDITION, AND AS REQUIRED NECESSARY BY THE CITY OF FORT LUPTON WATER AND SEWER DEPARTMENT. ALL BACKFLOW ASSEMBLIES MUST BE TESTED UPON INSTALLATION AND JUST PRIOR TO END OF WARRANTY PERIOD. OWNER SHALL BE RESPONSIBLE FOR TESTING EACH YEAR THEREAFTER.

19. ALL DUCTILE IRON PIPE (D.I.P.) WATER MAINS SHALL BE THICKNESS CL. 50 UNLESS OTHERWISE NOTED.

20. THERE SHALL BE NO PERMANENT STRUCTURES, FENCES, OR LANDSCAPING (PLANTINGS OR BERMS) PLACED WITHIN A 10.0 FOOT RADIUS OF FIRE HYDRANTS AS CONSTRUCTED.

21. BEDDING FOR DUCTILE IRON PIPE SHALL BE TYPE 3 AS PER AWWA C-151 STANDARD LAYING CONDITIONS UNLESS OTHERWISE SPECIFIED.

22. PVC POTABLE (DOMESTIC) WATER MAIN PIPE SHALL MEET THE FOLLOWING QUALITY STANDARDS: AWWA C-900; CLASS 200 – DR 14 ELASTOMERIC RING – ASTM D1869 & F477 RING TIGHT JOINT.

23. PVC WATER PIPE SHALL BE INSTALLED USING A CDOT CLASS B BEDDING 6 INCHES ABOVE AND 6 INCHES BELOW THE PIPE.

24. INSULATED 12 GAUGE TRACER WIRE SHALL BE AFFIXED TO THE PROPOSED WATER MAINS.
   A. PASS CURRENT THROUGH WIRE AND DEMONSTRATE THAT THE WIRE IS CAPABLE OF LOCATING THE WATER MAINS.
   B. IF WIRE WILL NOT PASS CURRENT, LOCATE BREAK IN CIRCUIT AND TEST UNTIL TRACER WIRE WORKS IN ACCORDANCE WITH ITS INTENDED USE.

25. ALL IRRIGATION WATER PIPE SHALL BE EITHER PVC OR HDPE, MANUFACTURED IN A PURPLE COLOR AND SHALL BE EMBOSSED OR INTEGRALLY STAMPED WITH A STATEMENT THAT CLEARLY INDICATES THAT THE PIPE DOES NOT CONTAIN POTABLE WATER.

26. ALL IRRIGATION SYSTEM VALVE BOX LIDS, METER PIT COVERS, MANHOLE COVERS AND VAULT COVERS SHALL BE FURNISHED WITH THE WORD "IRRIGATION" OR AN ACCEPTABLE ABBREVIATION, CLEARLY CAST ON THE SURFACE. IRRIGATION WATER MAIN VALVE BOX LIDS SHALL BE TRIANGULAR, AND IRRIGATION METER PIT COVERS SHALL BE CAP-TYPE COVERS TO DISTINGUISH THEM FROM THE RECESSED COVERS USED ON POTABLE WATER METER PITS.

27. ALL SANITARY SEWER LINES SHALL BE ASTM D-3034 (PVC SDR 35) UNLESS OTHERWISE NOTED.

28. ALL SANITARY SEWER LINES SHALL HAVE A MINIMUM OF 10.0' HORIZONTAL & 18" VERTICAL CLEARANCE FROM PROPOSED OR EXISTING WATER LINES & STORM DRAIN LINES.

29. ALL SANITARY SEWER SERVICES TO BE 4" DIAMETER PVC (SDR 35) & SHALL NOT HAVE A SLOPE LESS THAN 2% OR MORE THAN 8%.

PROJECT GENERAL NOTES:

1. THE FOLLOWING SHALL BE FURNISHED WITH EACH BITUMINOUS PAVER:
   - A SKID TYPE DEVICE AT LEAST 30 FEET IN LENGTH. THIS DEVICE SHALL BE USED ON ALL PASSES AND LIFTS OF BITUMINOUS PAVEMENT PLACED.
   - ANY LAYER OF BITUMINOUS PAVEMENT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL WIDTH BEFORE SUCCEEDING LAYER IS PLACED.

2. TYPE OF COMPACTION FOR THIS PROJECT SHALL BE AASHTO T-99 (ASTM D698) (STANDARD PROCTOR) FOR SUBGRADE SOILS AND AASHTO T-180 (ASTM D1557) (MODIFIED PROCTOR) FOR AGGREGATE BASE COURSE.

3. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL, AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE NECESSARY EQUIPMENT AND MATERIALS TO SATISFACTORILY CONTROL DUST AT ALL TIMES, AND AS DIRECTED BY THE CITY. WATER SHALL BE USED AS THE DUST PALLIATIVE WHERE REQUIRED. THE CONTRACTOR WILL FURNISH AND SPREAD WATER AT NO ADDITIONAL COST TO THE PROJECT.

4. DEPTH OF MOISTURE-CONTROL FOR THIS PROJECT SHALL BE AS FOLLOWS:
   - FULL DEPTH OF ALL EMBANKMENTS
   - BASE OF CUTS AND FILLS, 0.5 FT.
   - EXCAVATION AND DIGGING AS REQUIRED FOR THE COMPACTION OF BASES OF CUTS AND FILLS WILL BE CONSIDERED SUBSIDIARY TO THAT OPERATION AND WILL NOT BE PAID FOR SEPARATELY.

5. WHEN EXISTING ASPHALT PAVEMENT IS TO BE REMOVED, IT SHALL BE CUT TO A NEAT WORK LINE WITH A CUTTING WHEEL ATTACHED TO A BLADE, SAW OR OTHER METHODS AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED AS SUBSIDIARY TO OTHER WORK.

6. ALL DEBRIS, RUBBISH AND OTHER MATERIALS RESULTING FROM DEMOLITION OPERATIONS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF OFF-SITE. LOCATION OF DUMP, LENGTH OF HAUL, AND DISPOSAL EXPENSES SHALL BE CONTRACTOR'S RESPONSIBILITY.

7. THE STREETS ADJACENT TO THE CONSTRUCTION AREA SHALL BE CLEARED OF DEBRIS GENERATED BY THE PROJECT BY THE CONTRACTOR AT THE EARLIEST OPPORTUNITY, BUT IN NO CASE SHALL THE ROADS BE LEFT UNCLEARED AFTER THE COMPLETION OF THE DAY'S WORK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE NECESSARY EQUIPMENT AND MATERIAL TO SATISFACTORILY CLEAN THE ROADWAYS AT NO ADDITIONAL COST TO THE PROJECT.

8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITE GRADING IN A MANNER CONSISTENT WITH THE PLANS.

9. THERE SHALL BE A MINIMUM 12" VERTICAL SEPARATION WHERE UTILITY SLEEVES ARE LOCATED IN THE SAME TRENCH.

10. CONTRACTOR SHALL SUBMIT AS-BUILT INFORMATION TO THE PROJECT ENGINEER TO REVIEW AND PREPARE FINAL AS-BUILT RECORD DRAWINGS.

11. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY OR EASEMENT SHALL CONFORM TO THE CITY OF FORT LUPTON CONSTRUCTION SPECIFICATIONS AND DESIGN STANDARDS.

12. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF ANY WORK ON THE PROJECT. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD WITH CITY REPRESENTATIVES BEFORE A PERMIT WILL BE ISSUED.

13. THE CONTRACTOR SHALL NOTIFY CITY OF FORT LUPTON AT LEAST 24-HOURS PRIOR TO THE DESIRED INSPECTION.

14. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER OF ANY PROBLEMS IN CONFORMING TO THE ACCEPTED PLANS FOR ANY ELEMENT OF THE PROPOSED IMPROVEMENTS PRIOR TO ITS CONSTRUCTION.

15. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, DURING THE PERFORMANCE OF THE WORK. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND SHALL NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTY OF THE ENGINEER OR CITY TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.

16. THE CONTRACTOR SHALL PROVIDE ALL LIGHTS, SIGNS, BARRICADES, FLAG PERSONS, OR OTHER DEVICES NECESSARY TO PROVIDE FOR PUBLIC SAFETY IN ACCORDANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

17. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL SURVEY MONUMENTS. ANY MONUMENT THAT MUST BE DESTROYED FOR CONSTRUCTION MUST BE REPLACED. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A LICENSE SURVEYOR PRIOR TO DISTURBING ANY MONUMENTS.

18. PRIOR TO FINAL PLACEMENT OF SURFACE PAVEMENT, ALL UNDERGROUND UTILITY MAINS SHALL BE INSTALLED.

UTILITY MAINTENANCE STATEMENT:

1. ALL PUBLIC WATER, STORM SEWER AND SANITARY SEWER MAINS AND APPURTENANCES LOCATED IN PUBLIC ROW SHALL BE MAINTAINED BY THE CITY OF FORT LUPTON PUBLIC WORKS DEPARTMENTS. ALL PUBLIC WATER, STORM SEWER, SANITARY SEWER MAINS AND APPURTENANCES UNDER PRIVATE DRIVES ARE LOCATED IN UTILITY EASEMENTS. CITY IS RESPONSIBLE FOR MAINTENANCE OF THESE WATER, STORM AND SANITARY SEWER FACILITIES. CITY IS NOT RESPONSIBLE FOR REPAIR OR REPLACEMENT OF PRIVATE DRIVE, CURB AND GUTTER OR LANDSCAPING DAMAGED DURING UTILITY REPAIR OR MAINTENANCE.

GENERAL NOTES – STORM DRAIN

1. SEE DETAIL SHEET NO. XXXXX DETAIL ST4, FOR STORM DRAIN BEDDING REQUIREMENTS.

2. RCP SHALL HAVE FLEXIBLE GASKET MATERIAL (WATER TIGHT RUBBER GASKETS) MEETING ASTM C443 AND TYPE 4-G BELL AND SPIGOT JOINTS.

3. ALL PVC STORM DRAINS SHALL BE SDR 35 PUSH-ON BELL & SPIGOT TYPE MEETING ASTM D1784, D3034 & D3212. ALL GASKETS SHALL BE OF AN O-RING TYPE IN ACCORDANCE WITH ASTM F477.

4. ALL STORM DRAINAGE CONSTRUCTION SHALL CONFORM TO THE CITY OF FORT LUPTON'S MOST RECENT STORM DRAINAGE DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS. A COPY OF THE SPECIFICATIONS MAY BE OBTAINED FROM THE CITY.

5. STORM DRAIN PIPE MATERIAL SPECIFICATIONS ARE AS FOLLOWS:

REINFORCED CONCRETE PIPE (RCP) – REINFORCED CONCRETE PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR REINFORCED CONCRETE CULVERT, STORM DRAIN AND SEWER PIPE," ASTM C-76, LATEST REVISION. SHOP DRAWINGS WILL BE REQUIRED WHEN STEEL PLACEMENT IS DIFFERENT THAN THAT SHOWN OR REQUIRED BY THE APPLICABLE ASTM SPECIFICATION. RCP SHALL BE CLASS III, UNLESS SPECIFIED OTHERWISE, AND OF THE SIZE INDICATED ON THE DRAWINGS. INTERNAL PIPE WALL SHALL BE REASONABLY SMOOTH AND FREE OF DEFECTS. PIPE THAT IS ROUGH OR UNEVEN SHALL BE REMOVED FROM THE JOB SITE.

6. THE CONTRACTOR SHALL VERIFY THE HORIZONTAL AND VERTICAL ALIGNMENT OF ALL POINTS OF CONNECTION AND UTILITY CROSSINGS PRIOR TO INSTALLING ANY STORM DRAIN PIPE. IF A DESIGN MODIFICATION IS REQUIRED IT SHALL BE COORDINATED WITH THE ENGINEER.

GEOTECHNICAL NOTES:

A GEOTECHNICAL REPORT "SUBSURFACE EXPLORATION PROGRAM GEOTECHNICAL AND PAVEMENT" RECOMMENDATIONS XXXXXX FORT LUPTON, COLORADO HAS BEEN PREPARED BY GROUND ENGINEERING CONSULTANTS, INC., PROJ. NO. 12-3636, DATE NOVEMBER 15, 2018. REFER TO GEOTECHNICAL REPORT FOR ANY REQUIREMENTS EXCEEDING CITY STANDARDS.

ALLOWABLE PAVEMENT SECTION THICKNESS (INCHES)

	ASPHALT CONCRETE SURFACE	AGGREGATE BASE COURSE	FULL DEPTH ASPHALT	PORTLAND CEMENT CONCRETE
PARKING LOT	6.5"			
DRIVE LANES HEAVY TRUCK TRAFFIC	7.5"	6"		
FULL DEPTH				

LEGEND

- PROPERTY BOUNDARY
- PROPOSED RIGHT-OF-WAY
- EXISTING RIGHT-OF-WAY
- PROPOSED LOT LINE
- EXISTING LOT LINE
- PROPOSED CATCH CURB & GUTTER
- PROPOSED SPILL CURB & GUTTER
- EXISTING CURB & GUTTER
- PROPOSED SIDEWALK
- EXISTING SIDEWALK
- EXISTING SECTION LINE
- PROPOSED EASEMENT
- EXISTING EASEMENT
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PROPOSED SANITARY
- EXISTING SANITARY
- PROPOSED SANITARY SERVICE
- PROPOSED STORM
- EXISTING STORM
- PROPOSED WATER
- EXISTING WATER
- PROPOSED WATER SERVICE
- PROPOSED HYDRANT
- EXISTING HYDRANT
- PROPOSED WATER VALVE
- EXISTING WATER VALVE
- EXISTING POWER POLE
- EXISTING IRRIGATION LINE
- EXISTING GAS LINE
- EXISTING TELEPHONE LINE
- EXISTING OVERHEAD ELECTRICAL
- EXISTING ELECTRICAL
- EXISTING CABLE TV
- EXISTING FIBER OPTIC CABLE
- EXISTING FENCE

PROJECT NO.: LUP2019-0033 &
PLAN NO.: PPL2019-0002

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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143 UNION BLVD, SUITE 700
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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS

NOTES & LEGEND

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. NA CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 02

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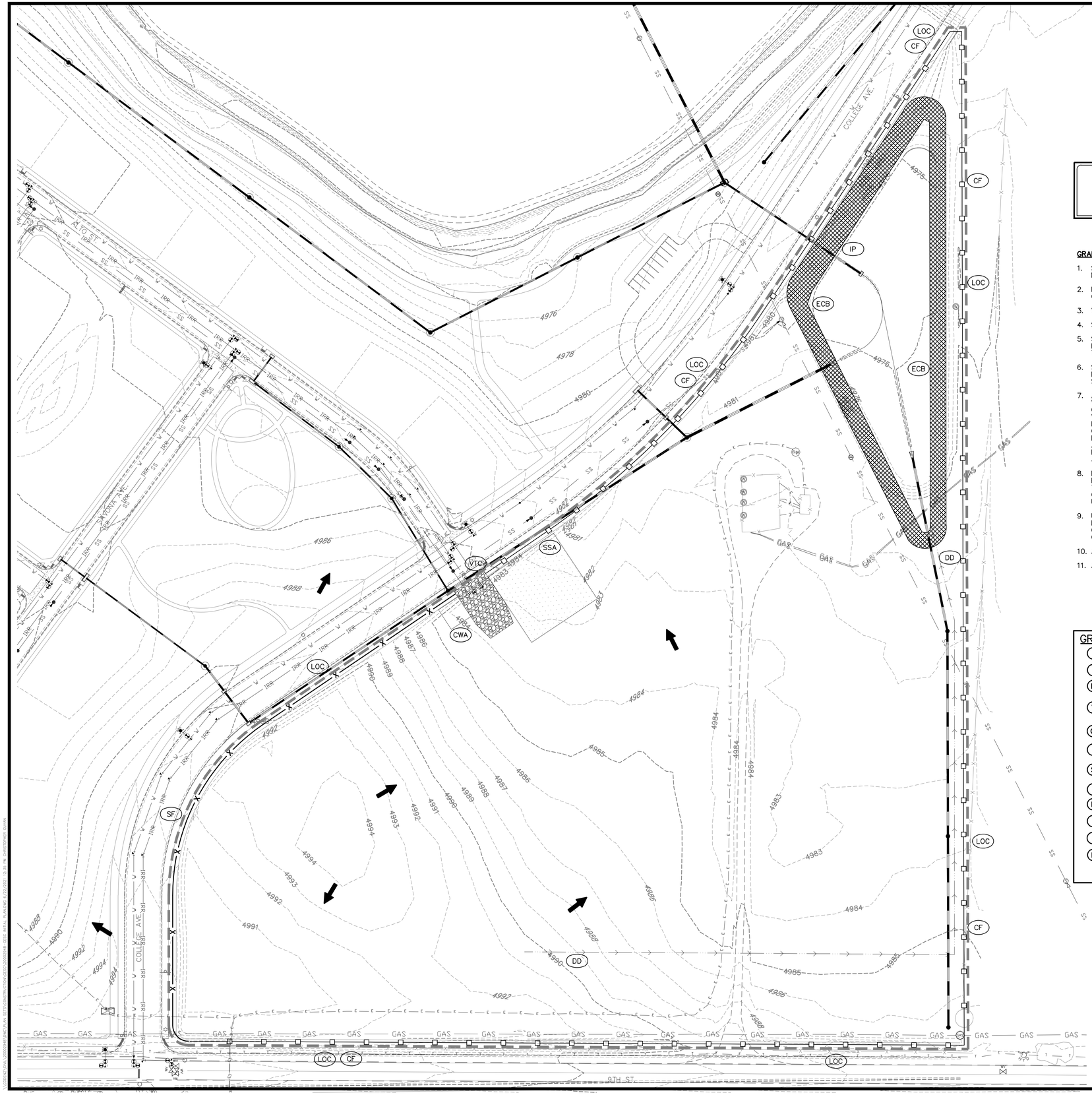
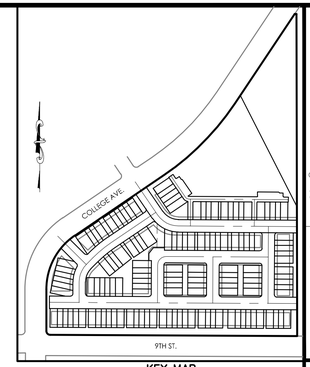


LEGEND

EXISTING GROUND CONTOURS



KEY MAP
N.T.S.

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GRADING AND EROSION CONTROL NOTES:

1. SILT FENCE TO BE REMOVED AFTER PLACEMENT OF ECB OR SEEDING & MULCHING OF LOTS.
2. INLET PROTECTION TO BE REMOVED AFTER DEVELOPMENT AND STABILIZATION OF LOTS.
3. VTC TO BE REMOVED UPON COMPLETION OF PAVING OPERATIONS.
4. SEE COVER SHEET FOR COMMERCE CITY STANDARD GRADING NOTES.
5. SHADED BMP'S WERE INSTALLED IN INITIAL OR INTERIM STAGES AND SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE CITY.
6. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITIES, CULVERTS, STORM DRAINS, AND OUTLET PROTECTION.
7. A RELEASE OF ANY CHEMICAL, OIL, PETROLEUM PRODUCT, SEWAGE, ETC. WHICH MAY ENTER STATE WATERS (WHICH INCLUDE SURFACE WATER, GROUNDWATER AND DRY GULLIES OR STORM SEWERS LEADING TO SURFACE WATER) MUST BE REPORTED TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) IMMEDIATELY. WRITTEN NOTIFICATION TO CDPHE MUST FOLLOW WITHIN FIVE DAYS. THE CDPHE TOLL-FREE 24-HOUR ENVIRONMENTAL EMERGENCY SPILL REPORTING LINE IS 1-877-518-5608. ANY ACCIDENTAL DISCHARGE TO THE SANITARY SEWER SYSTEM MUST BE REPORTED TO SOUTH ADAMS COUNTY WATER AND SANITATION DISTRICT AT 303-288-2646.
8. E. 112TH AVENUE IMPROVEMENTS INCLUDING POND 7A HAVE BEEN DESIGNED BY JR ENGINEERING AND ARE CURRENTLY UNDER CONSTRUCTION. CONFIRM THAT THIS PROJECT AND GRADING IS COMPLETED PRIOR TO GRADING COMMENCEMENT OF REUNION FILING NO. 38. AS-BUILT STREET TIE-INS AND UTILITY INVERTS TO CONFIRM PROPER CONNECTIONS.
9. UTILITY IMPROVEMENTS ON CHAMBERS ROAD HAVE BEEN DESIGNED BY JR ENGINEERING AND SHOULD BE COMPLETED PRIOR TO GRADING COMMENCEMENT OF REUNION FILING NO. 38. AS-BUILT UTILITY INVERTS TO CONFIRM PROPER CONNECTIONS.
10. ALL TREE LAWNS SHALL BE SEEDED AND MULCHED.
11. ALL STREETS NEED TO BE CLEANED DAILY.

GRADING AND EROSION CONTROL LEGEND

SF	SILT FENCE
IP	INLET PROTECTION
RRC	CULVERT PROTECTION
VTC	VEHICLE TRACKING CONTROL
CWA	CONCRETE WASHOUT AREA
RS	ROCK SOCK
SSA	STABILIZED STAGING AREA
SM	SEEDING AND MULCHING
LOC	LIMITS OF CONSTRUCTION
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
ECB	EROSION CONTROL BLANKET

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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FORT LUPTON, COLORADO

GESC PLANS

GESC INITIAL PLAN

DATE 6/22/2021

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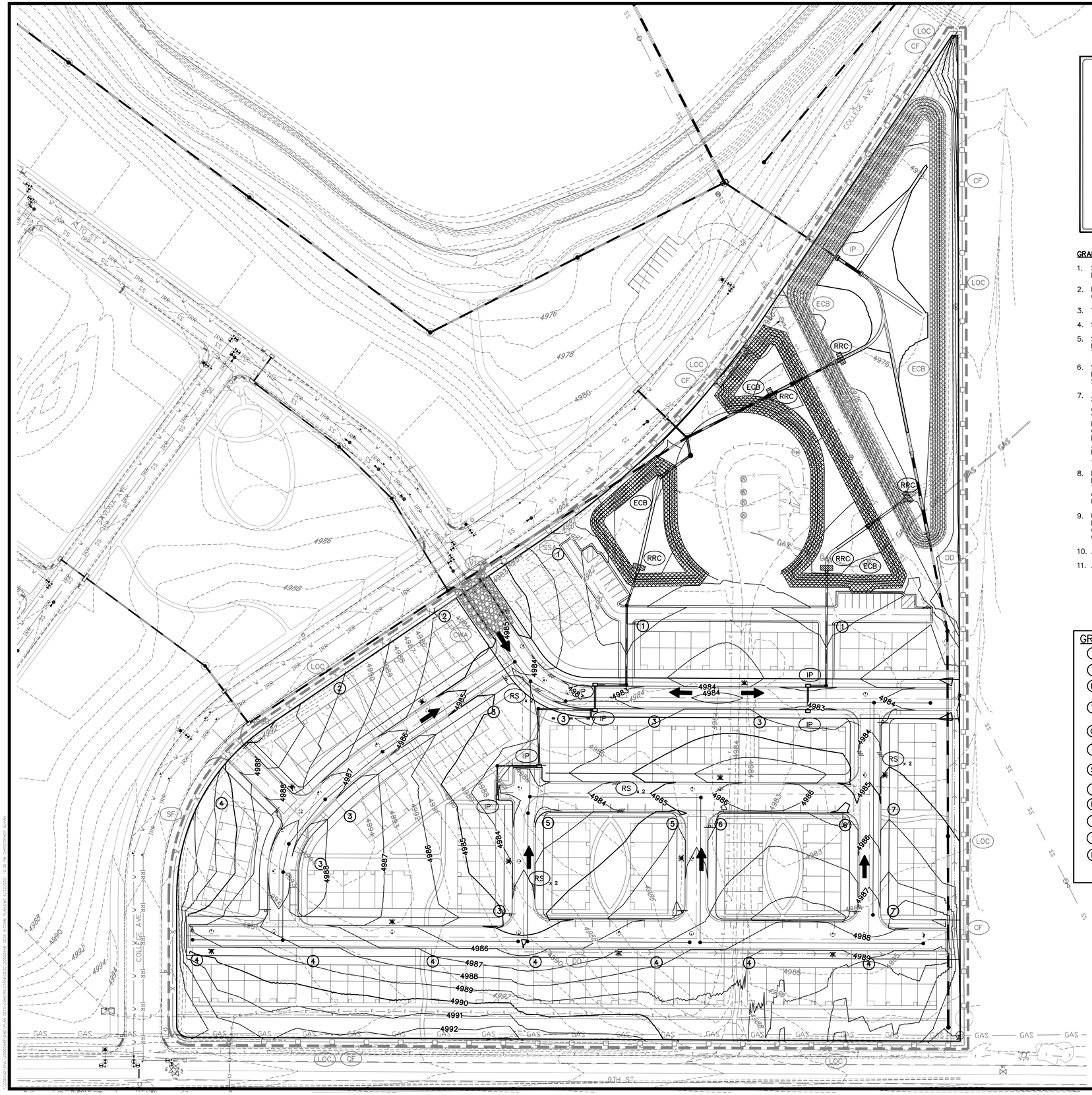


LEGEND

PROPERTY BOUNDARY LINE

×40.15 PROP. OVERLOT GRADE SPOT ELEV.

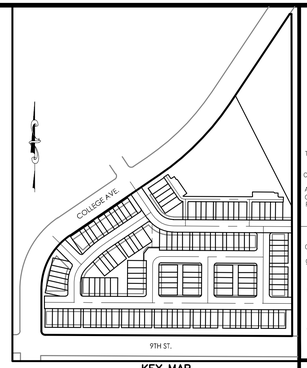
×40.15 EXIST. OVERLOT GRADE SPOT ELEV.

PROPOSED LOT LINE

EXISTING CONTOURS

PROPOSED CONTOURS

DRAINAGE FLOW ARROWS



KEY MAP
N.T.S.

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GRADING AND EROSION CONTROL NOTES:

1. SILT FENCE TO BE REMOVED AFTER PLACEMENT OF ECB OR SEEDING & MULCHING OF LOTS.
2. INLET PROTECTION TO BE REMOVED AFTER DEVELOPMENT AND STABILIZATION OF LOTS.
3. VTC TO BE REMOVED UPON COMPLETION OF PAVING OPERATIONS.
4. SEE COVER SHEET FOR COMMERCE CITY STANDARD GRADING NOTES.
5. SHADED BMP'S WERE INSTALLED IN INITIAL OR INTERIM STAGES AND SHALL BE LEFT IN PLACE UNTIL REVEGETATION ESTABLISHMENT IS APPROVED BY THE CITY.
6. SEE CONSTRUCTION PLANS FOR DETAILS OF PERMANENT DRAINAGE FACILITIES SUCH AS DETENTION FACILITIES, WATER QUALITIES, CULVERTS, STORM DRAINS, AND OUTLET PROTECTION.
7. A RELEASE OF ANY CHEMICAL, OIL, PETROLEUM PRODUCT, SEWAGE, ETC. WHICH MAY ENTER STATE WATERS (WHICH INCLUDE SURFACE WATER, GROUNDWATER AND DRY GULLIES OR STORM SEWERS LEADING TO SURFACE WATER) MUST BE REPORTED TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) IMMEDIATELY. WRITTEN NOTIFICATION TO CDPHE MUST FOLLOW WITHIN FIVE DAYS. THE CDPHE TOLL-FREE 24-HOUR ENVIRONMENTAL EMERGENCY SPILL REPORTING LINE IS 1-877-518-5608. ANY ACCIDENTAL DISCHARGE TO THE SANITARY SEWER SYSTEM MUST BE REPORTED TO SOUTH ADAMS COUNTY WATER AND SANITATION DISTRICT AT 303-288-2646.
8. E. 112TH AVENUE IMPROVEMENTS INCLUDING POND 7A HAVE BEEN DESIGNED BY JR ENGINEERING AND ARE CURRENTLY UNDER CONSTRUCTION. CONFIRM THAT THIS PROJECT AND GRADING IS COMPLETED PRIOR TO GRADING COMMENCEMENT OF REUNION FILING NO. 38. AS-BUILT STREET TIE-INS AND UTILITY INVERTS TO CONFIRM PROPER CONNECTIONS.
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11. ALL STREETS NEED TO BE CLEANED DAILY.

GRADING AND EROSION CONTROL LEGEND

SF	SILT FENCE
IP	INLET PROTECTION
RRC	CULVERT PROTECTION
VTC	VEHICLE TRACKING CONTROL
CWA	CONCRETE WASHOUT AREA
RS	ROCK SOCK
SSA	STABILIZED STAGING AREA
SM	SEEDING AND MULCHING
LOC	LIMITS OF CONSTRUCTION
CF	CONSTRUCTION FENCE
DD	DIVERSION DITCH
ECB	EROSION CONTROL BLANKET

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496

CLIENT
ARBOR CAPITAL PARTNERS, LLC

COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

GESC PLANS

GESC INTERIM PLAN

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. EP	CH. CJG
P.M. DJR	
JOB 20002948	
SHEET NO. 04	

CAD FILE: 20002948-GESC INTERIM PLANDWG

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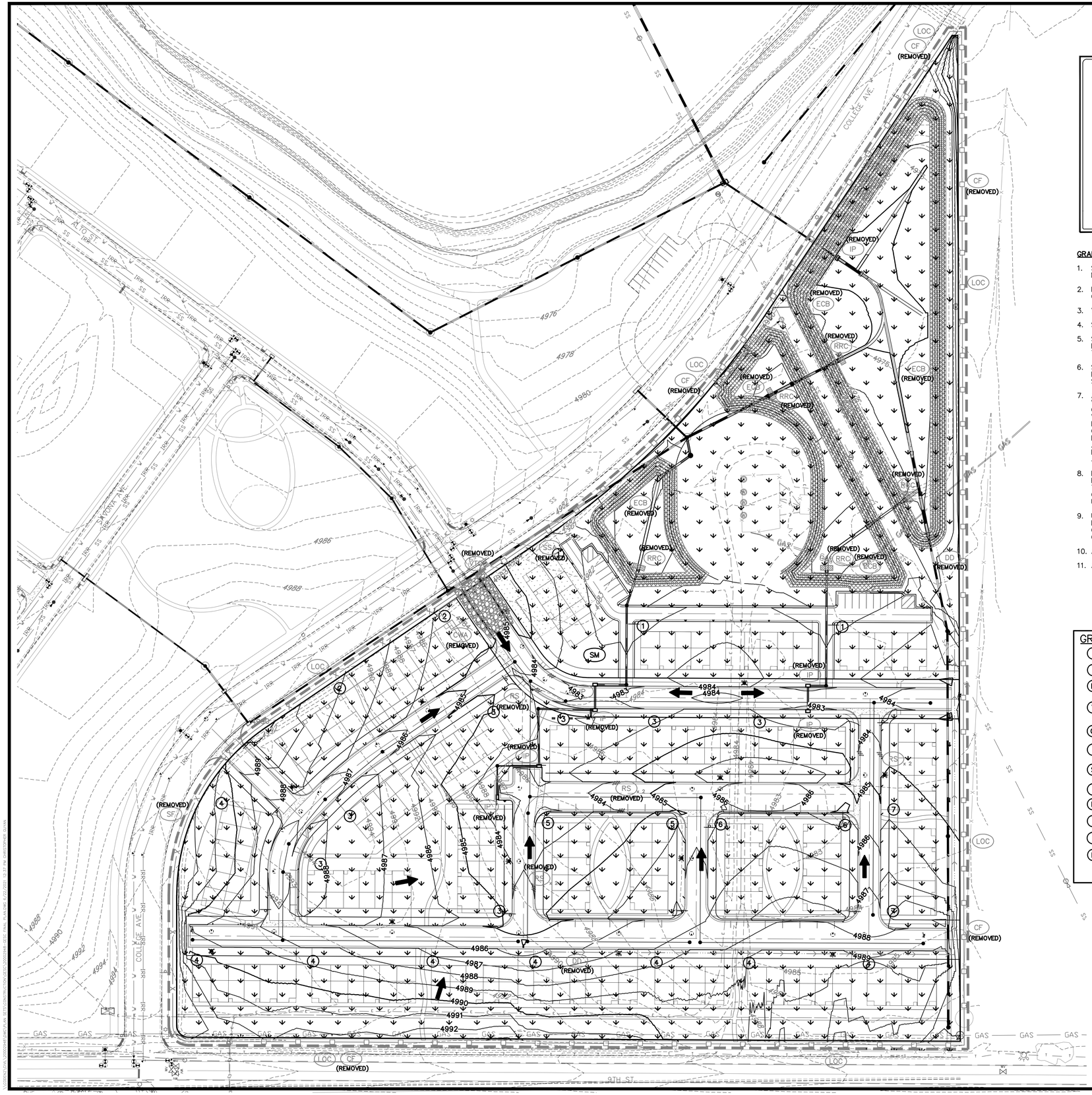

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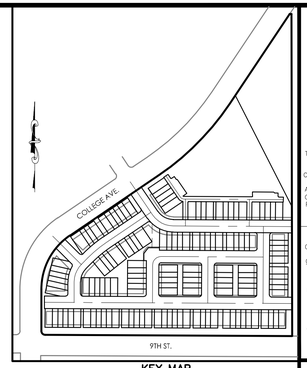

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GESC PLANS

GESC FINAL PLAN

DATE 6/22/2021

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SHEET NO. 05

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TITLE	KEY	SYMBOL
CHECK DAM	CD	
CONSTRUCTION ROAD STABILIZATION	CRS	
CURB SOCK INLET PROTECTION	CS	
CONCRETE WASHOUT AREA	CWA	
DIVERSION DITCH AND DIKE, TEMPORARY	DD	
DIVERSION CHANNEL, TEMPORARY	DV	
DEWATERING	DW	
EROSION CONTROL BLANKET	ECB	
INLET FILTER	IF	
STORM DRAIN INLET PROTECTION	IP	
MULCHING	MU	

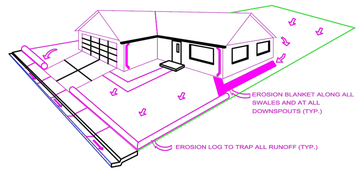
DESIGN STANDARDS	STANDARD DRAWING
MAP SYMBOLS	EC1
	DATE: 8/15/14

TITLE	KEY	SYMBOL
OUTLET PROTECTION	OP	
PAVED FLUME	PF	
PERMANENT SEEDING	PS	
REINFORCED CONCRETE DAM	RCD	
ROUGH CUT STREET CONTROL	RCS	
SEDIMENT BASIN	SB	
STRAW BALE BARRIER	SBB	
SILT FENCE	SF	
SURFACE ROUGHENING	SR	

DESIGN STANDARDS	STANDARD DRAWING
MAP SYMBOLS	EC2
	DATE: 8/15/14

TITLE	KEY	SYMBOL
STABILIZED STAGING AREA	SSA	
SEDIMENT TRAP	ST	
SEDIMENT LOG	SCL	
TERRACING	TER	
TEMPORARY SEEDING	TS	
TEMPORARY STREAM CROSSING CULVERT/BRIDGE TYPE	TSC C	
TEMPORARY STREAM CROSSING FORD TYPE	TSC F	
TEMPORARY SLOPE DRAIN	TSD	
VEHICLE TRACKING CONTROL	VTC	
VEHICLE TRACKING CONTROL WITH WASH RACK	WR	

DESIGN STANDARDS	STANDARD DRAWING
MAP SYMBOLS	EC3
	DATE: 8/15/14

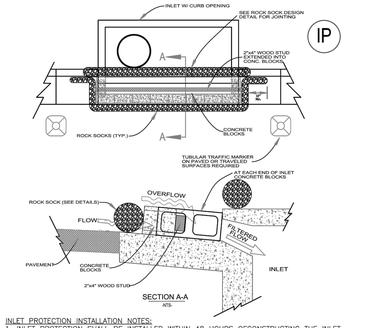


NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES AS DIRECTED BY THE CITY

EROSION LOG AND BLANKET BARRIER

RESIDENTIAL INSTALLATION

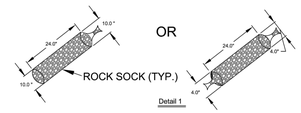
DESIGN STANDARDS	STANDARD DRAWING
SINGLE FAMILY EROSION CONTROL PLAN	EC4
	DATE: 8/15/14

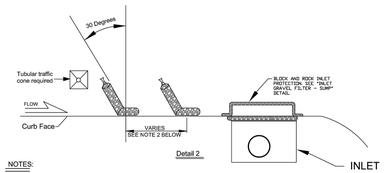


INLET PROTECTION INSTALLATION NOTES:
1. INLET PROTECTION SHALL BE INSTALLED WITHIN 48 HOURS OFCONSTRUCTING THE INLET.
2. SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
3. CONCRETE "CINDER" BLOCKS SHALL BE LAID ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW ABUTTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.
4. GRAVEL SOCKS SHALL BE PLACED AROUND THE CONCRETE BLOCKS, CLOSELY ABUTTING ONE ANOTHER AND JOINTED IN ACCORDANCE WITH THE ROCK SOCK DESIGN DETAIL.

DESIGN STANDARDS	STANDARD DRAWING
INLET GRAVEL FILTER - SUMP	EC5
	DATE: 8/15/14

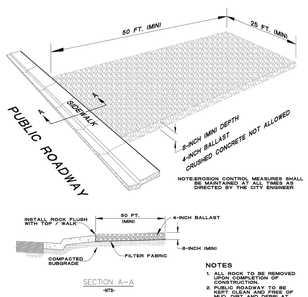
CS





NOTES:
1) SOCKS WILL BE USED UPGRADIENT OF THE INLET AND FLUSH WITH THE CURB.
2) NO LESS THAN TWO 10 INCH DIAMETER SOCKS MUST BE USED IN SEQUENCE, SPACED NO MORE THAN FIVE FEET APART; NO LESS THAN SIX SOCKS SHALL BE USED IF THE 4 INCH SOCK IS USED, ALSO SPACED AT NO MORE THAN 5 FEET APART.
3) ALIGN AT 30 DEGREES FROM PERPENDICULAR, OPPOSITE THE DIRECTION OF FLOW (SEE DETAIL 2.
4) EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES AS DIRECTED BY THE CITY.

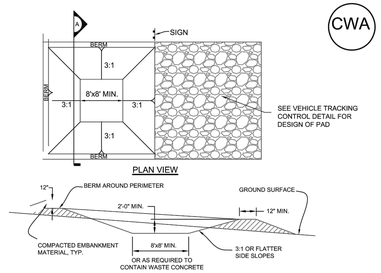
DESIGN STANDARDS	STANDARD DRAWING
ON GRADE INLET PROTECTION	EC 6
	DATE: 8/15/14



NOTES
1. ALL ROCK TO BE REMOVED UPON COMPLETION OF CONSTRUCTION.
2. PUBLIC ROADWAY TO BE KEPT CLEAN AND FREE OF MUD, SOIL AND DEBRI AT ALL TIMES.

DESIGN STANDARDS	STANDARD DRAWING
VEHICLE TRACKING PAD	EC 8
	DATE: 8/15/14

CWA



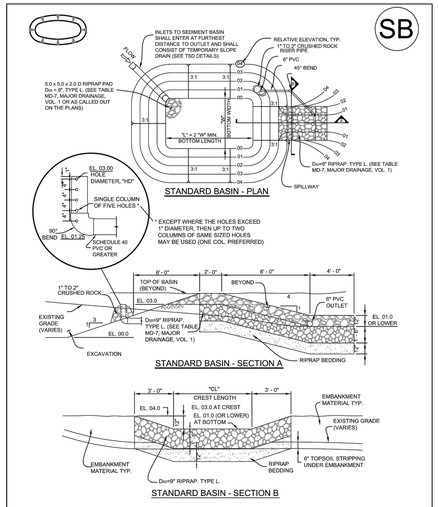
SECTION A

CONCRETE WASHOUT AREA INSTALLATION NOTES
1. SEE PLAN VIEW FOR LOCATIONS OF CONCRETE WASHOUT AREA.
2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
3. VEHICLE TRACKING CONTROL IS REQUIRED AT THE ACCESS POINT.
4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT ARE TO OPERATORS OF CONCRETE TROUYKS AND PUMP RIGS.

CONCRETE WASHOUT AREA MAINTENANCE NOTES
1. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
2. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AND APPROVED WASTE SITE.
3. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, DRILL SEED AND CRIMP MULCH, OR OTHERWISE STABILIZE IN A MANNER APPROVED BY THE CITY.
4. INSPECT WEEKLY, DURING AND AFTER ANY STORM EVENT.
5. PORTABLE ROLLOFF TYPE OF CONCRETE WASHOUT FACILITIES WILL ALSO BE ALLOWED.

DESIGN STANDARDS	STANDARD DRAWING
CONCRETE WASHOUT AREA	EC 9
	DATE: 8/15/14

SB



DESIGN STANDARDS	STANDARD DRAWING
SEDIMENT BASIN DETAILS	EC 11
	DATE: 8/15/14

SB

SIZING INFORMATION FOR STANDARD SEDIMENT BASIN

Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 1/2	2	9/32
2	21	3	13/16
3	28	5	1/2
4	33 1/2	6	9/16
5	38 1/2	8	21/32
6	43	9	21/32
7	47 1/4	11	25/32
8	51	12	27/32
9	55	13	7/8
10	58 1/4	15	15/16
11	61	16	31/32
12	64	18	1
13	67 1/2	19	1 1/16
14	70 1/2	21	1 1/8
15	73 1/4	22	1 3/16

Minimum Bottom Width and diameter of outlet plate holes based on 2,700 cu. ft. / acre of tributary area and 72 hour drain time.

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW AND SECTIONS FOR:
   - LOCATION OF SEDIMENT BASIN
   - TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN),
   - FOR STANDARD BASIN, BOTTOM WIDTH, "W", CREST LENGTH, "CL", AND HOLE DIAMETER, "HD".
   - FOR NONSTANDARD BASIN, SEE THE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT, "H", NUMBER OF COLUMNS, "N", HOLE DIAMETER, "HD", AND PIPE DIAMETER "D".
2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
3. SEDIMENT BASINS INDICATED ON INITIAL SWMP PLAN SHALL BE INSTALLED PRIOR TO ANY OTHER LAND-DISTURBING ACTIVITY.
4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D 698.
6. PIPE SCH 40 OR GREATER SHALL BE USED.
7. THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) IDENTIFIED ON THE SWMP PLAN VIEW DRAWINGS USED FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT SEDIMENT BASIN WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED WHEN SEDIMENT DEPTH IS ONE FOOT (I.E., 2-FEET BELOW THE SPILLWAY CREST).
3. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE CITY.
4. WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY THE CITY.

DESIGN STANDARDS	STANDARD DRAWING
SEDIMENT BASIN SIZING & NOTES	EC 12
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CONSTRUCTION PLANS
GESC PLANS
GESC DETAILS

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SHEET NO. 06

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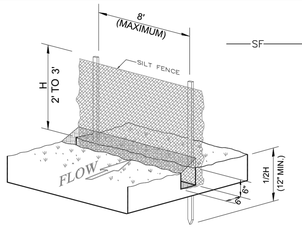
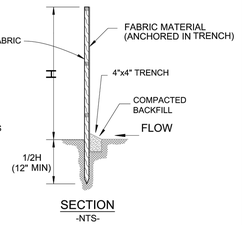


SILT FENCE INSTALLATION
-NTS-

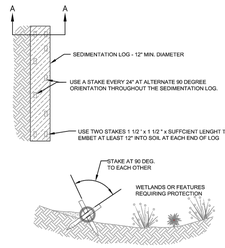


NOTE: EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL LANDSCAPING IS COMPLETED, OR AS DIRECTED BY THE CITY

SECTION
-NTS-

CITY OF FORT LUPTON	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	SILT FENCE	EC 15
		DATE: 8/15/14

SCL



SECTION A - A

SEDIMENT CONTROL LOG INSTALLATION NOTES

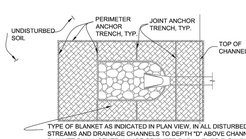
1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF SEDIMENT CONTROL LOG.
2. SEDIMENT CONTROL LOGS INDICATED ON INITIAL SWMP PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR, OR COCONUT FIBER.
4. NOT FOR USE IN CONCENTRATED FLOW AREAS.
5. THE SEDIMENT CONTROL LOG SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 2".

SEDIMENT CONTROL LOG MAINTENANCE NOTES

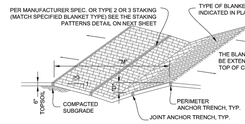
1. THE SWMP MANAGER SHALL INSPECT SEDIMENT CONTROL LOGS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOGS SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE CREST OF LOG.
3. SEDIMENT CONTROL LOG SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE COVERED WITH TOP SOIL, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE CITY.

CITY OF FORT LUPTON	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	SEDIMENT CONTROL LOGS	EC 16
		DATE: 8/15/14

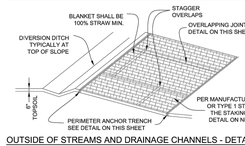
ECB



AT PIPE OUTLET AREAS OF STREAMS AND DRAINAGE CHANNELS - DETAIL A

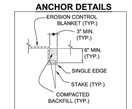


IN DIVERSION DITCH OR SMALL DITCH DRAINAGE WAY - DETAIL B

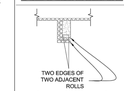


OUTSIDE OF STREAMS AND DRAINAGE CHANNELS - DETAIL C

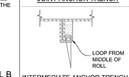
ANCHOR DETAILS



PERIMETER ANCHOR TRENCH



JOINT ANCHOR TRENCH



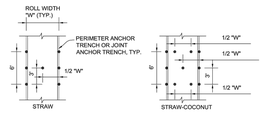
INTERMEDIATE ANCHOR TRENCH

OVERLAPPING JOINT

WOOD STAKE DETAIL
(WOOD WICKET OR USE 2x4 MATERIAL FOR STAKES

CITY OF FORT LUPTON	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	EROSION BLANKET DETAILS	EC 17
		DATE: 8/15/14

ECB



STAKING PATTERNS

SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. IF NO MANUFACTURER'S SPECIFICATION IS AVAILABLE USE THE ACCEPTABLE STAKING PATTERN (AS SHOWN ABOVE)

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
   - TYPE OF BLANKET (STRAW, STRAW-COCONUT, COCONUT, OR EXCELSIOR).
   - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL; NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE DEVELOPER SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE. NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKETS EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.
9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEEDED AND MULCHED.
10. DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM ONES SHOWN HERE

TABLE 7.1 - EROSION CONTROL BLANKET TYPE

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	NETTING MIN.
STRAW*	-	100%	-	DOUBLE/NATURAL
STRAW-COCONUT*	30% MIN.	70% MAX.	-	DOUBLE/NATURAL
COCONUT*	100%	-	-	DOUBLE/NATURAL
EXCELSIOR	-	-	100%	DOUBLE/NATURAL

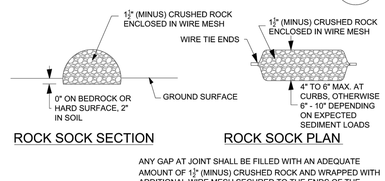
* FOR OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

EROSION CONTROL BLANKET MAINTENANCE NOTES

1. THE SWMP MANAGER SHALL INSPECT EROSION CONTROL BLANKETS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS DIRECTED TO BE REMOVED BY THE CITY.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

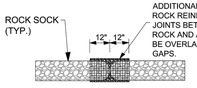
CITY OF FORT LUPTON	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	EROSION BLANKET INSTALLATION AND MAINTENANCE NOTES	EC 18
		DATE: 8/15/14

RS



ROCK SOCK SECTION

ROCK SOCK PLAN



ANY GAP AT JOINT SHALL BE FILLED WITH AN ADEQUATE AMOUNT OF 1½" (MINUS) CRUSHED ROCK AND WRAPPED WITH ADDITIONAL WIRE MESH SECURED TO THE ENDS OF THE ROCK REINFORCED SOCK. AS AN ALTERNATIVE TO FILLING JOINTS BETWEEN ADJOINING ROCK SOCKS WITH CRUSHED ROCK AND ADDITIONAL WIRE WRAPPING, ROCK SOCKS CAN BE OVERLAPPED (TYPICALLY 12 - INCH OVERLAP) TO AVOID GAPS.

ROCK SOCK JOINTING

GRADATION TABLE

SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	NO. 4
2"	100
1½"	90 - 100
1"	20 - 55
3/4"	0 - 15
3/8"	0 - 5

MATCHES SPECIFICATIONS FOR NO. 4 COARSE AGGREGATE FOR CONCRETE PER AASHTO M43. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.

ROCK SOCK INSTALLATION NOTES

1. SEE PLAN VIEW FORLOCATION OF ROCK SOCKS.
2. CRUSHED ROCK SHALL BE 11/2 " (MINUS) IN SIZE WITH A FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON THIS SHEET (11/2" MINUS).
3. WIRE MESH SHALL BE FABRICATED OD 10 GAGE POULTRY MESH OR EQUIVALENT WITH A MAXIMUM OPENING OF 1/2", RECOMMENDED MINIMUM ROLL WIDTH OF 48".
4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6" CENTERS ALONG ALL JOINTS AND AT 2" CENTERS ON ENDS OF SOCKS.

CITY OF FORT LUPTON	DESIGN STANDARDS	STANDARD DRAWING
COME PAINT YOUR FUTURE WITH US	ROCK SOCK DETAIL	EC 19
		DATE: 8/15/14

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO
CONSTRUCTION PLANS
GESC PLANS
GESC DETAILS

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW
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P.M. DJR
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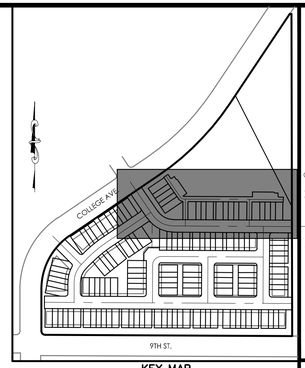
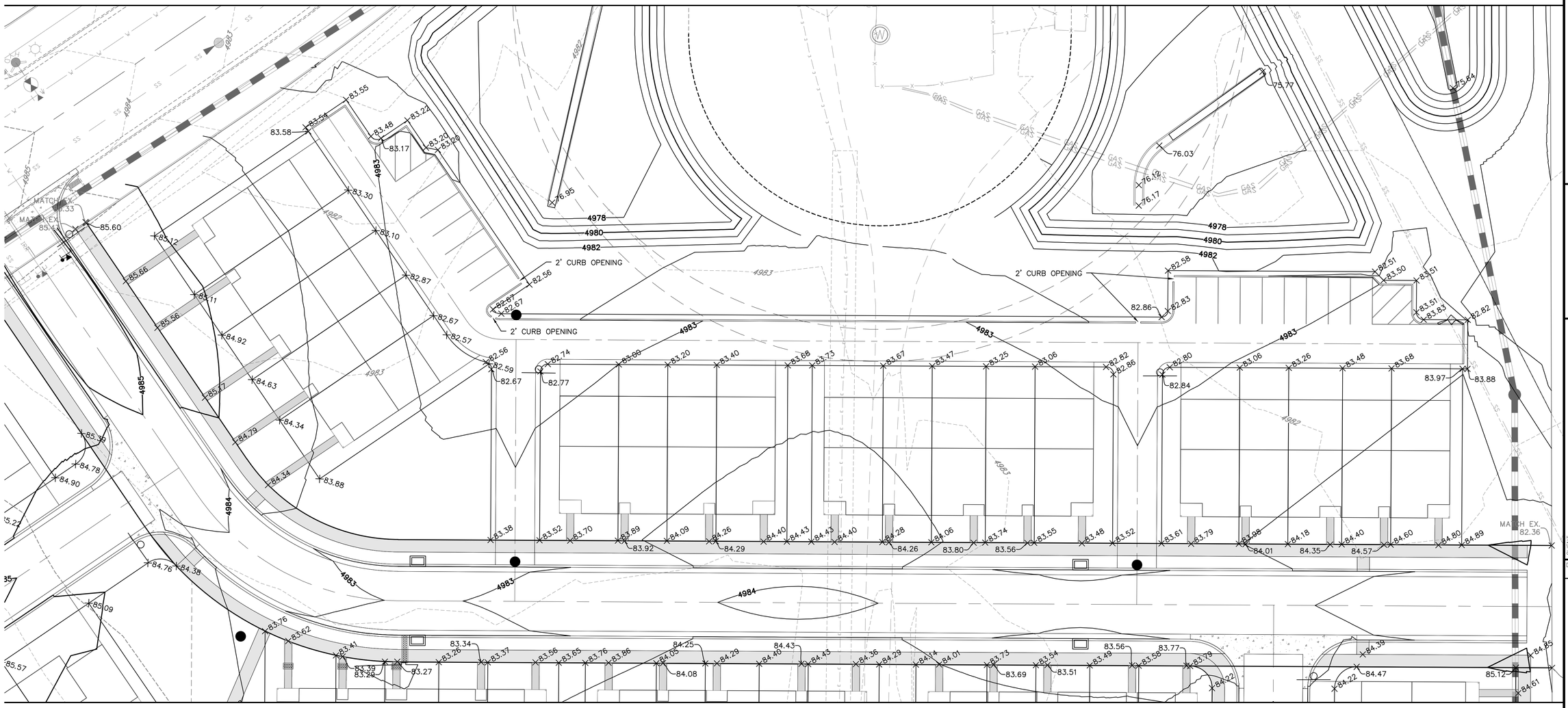


KEY MAP
N.T.S.

SEE SHEET 12



SEE SHEET 09

SEE SHEET 11

20 0 20 40
(IN FEET)
1 inch = 20 ft.

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

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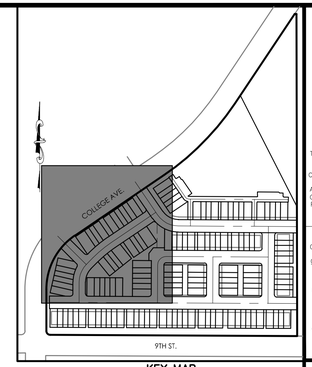

KEY MAP
N.T.S.

(IN FEET)
1 inch = 20 ft.

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

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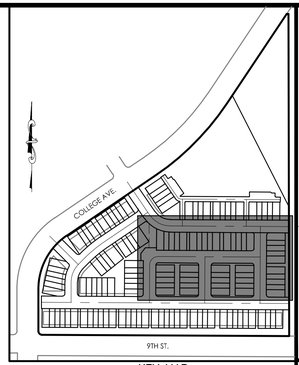

KEY MAP
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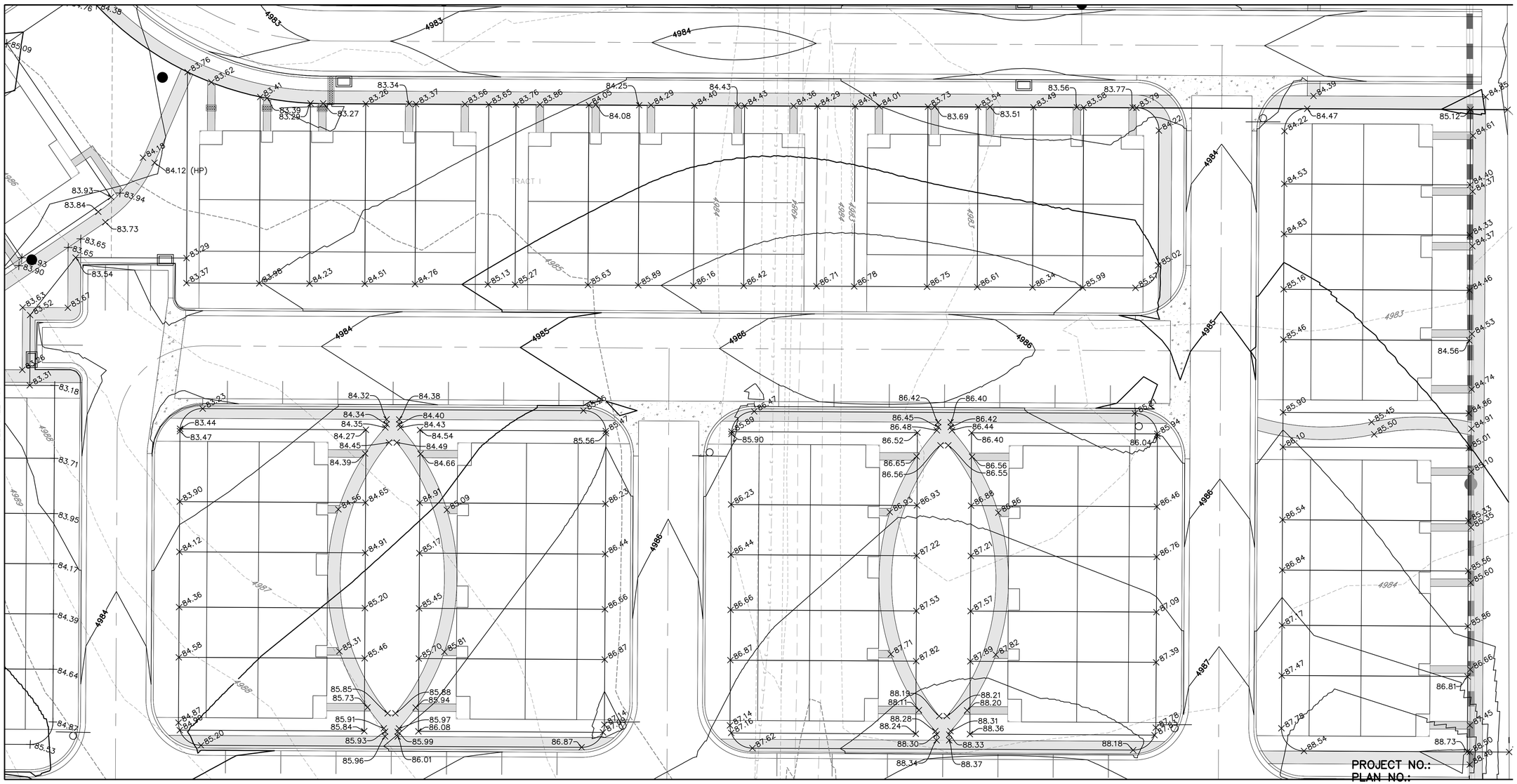
SEE SHEET 10



SEE SHEET 11

20 0 20 40
(IN FEET)
1 inch = 20 ft.

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CONSTRUCTION PLANS
DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

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PLANS UNDER REVIEW NOT FOR CONSTRUCTION

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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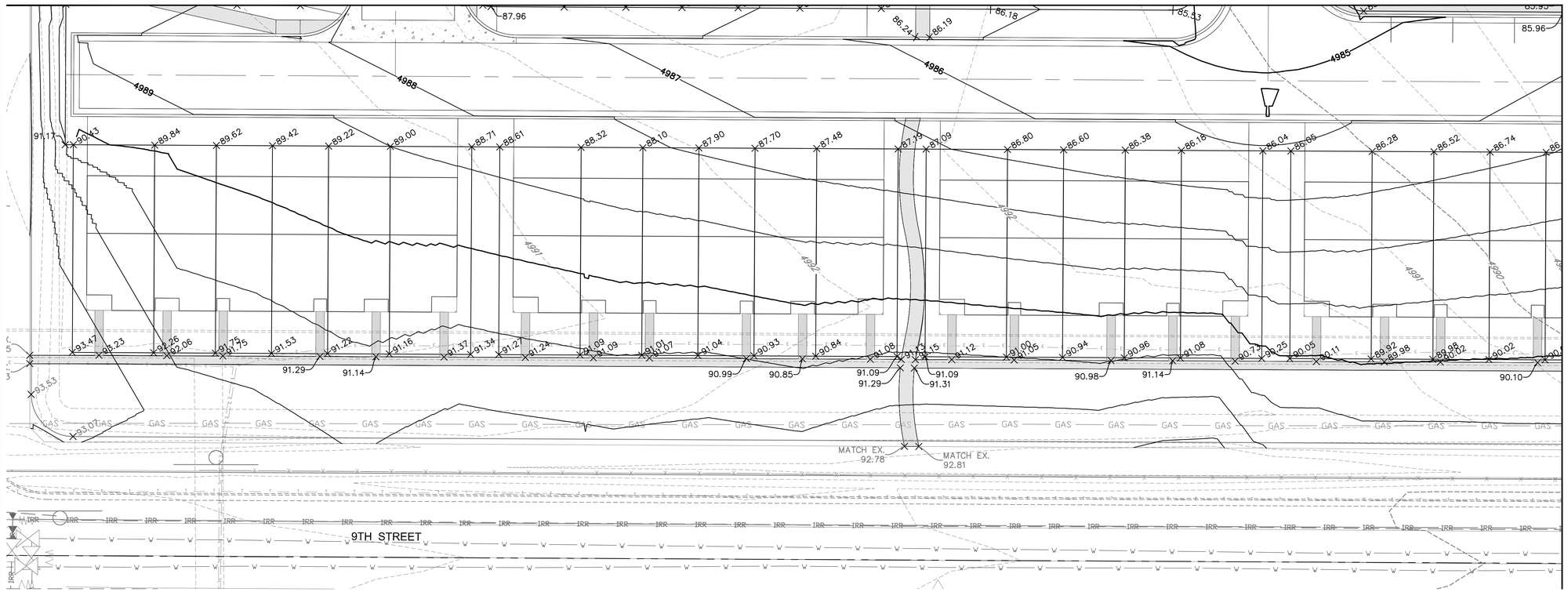

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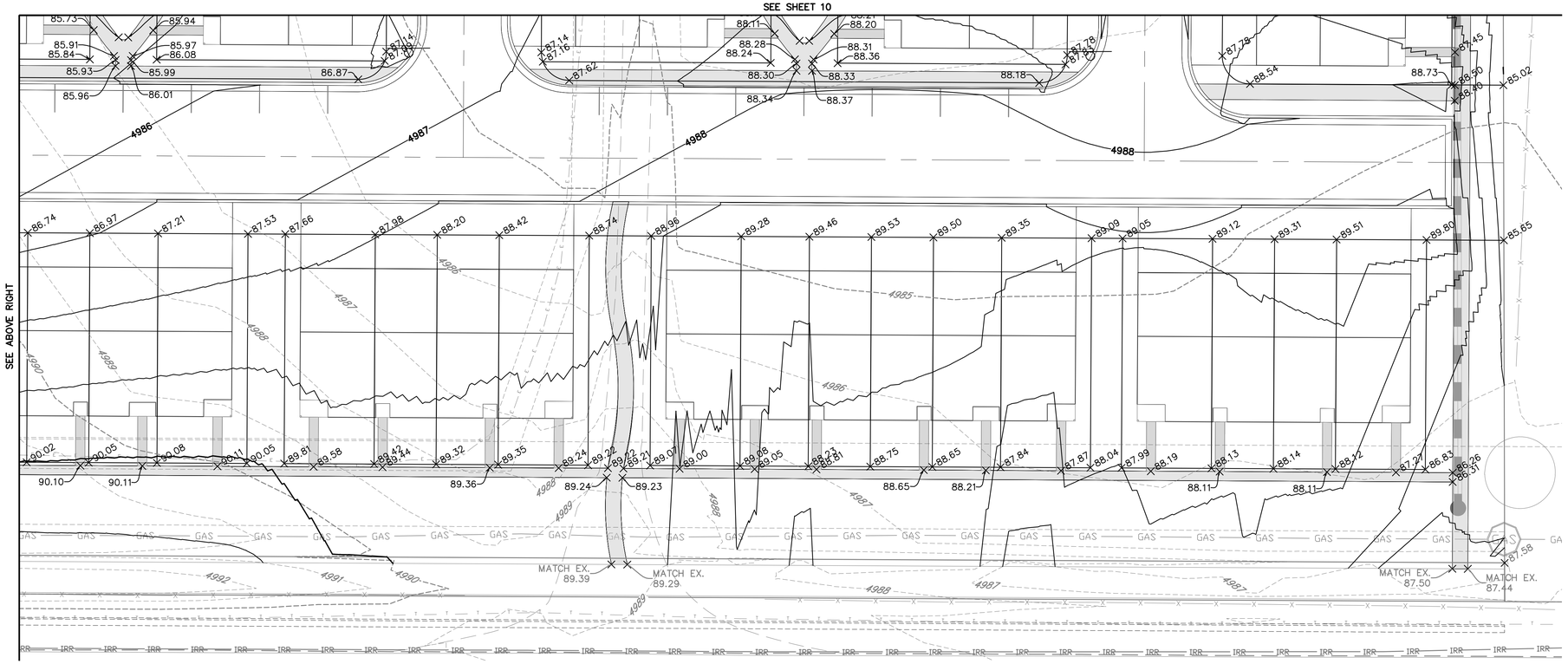

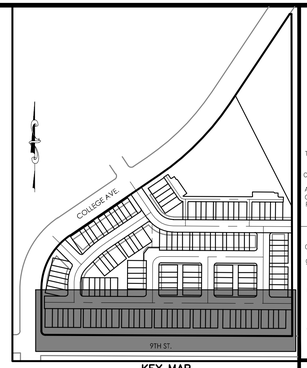

KEY MAP
N.T.S.

(IN FEET)
1 inch = 20 ft.

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

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P.M. DJR
JOB 20002948
SHEET NO. 11

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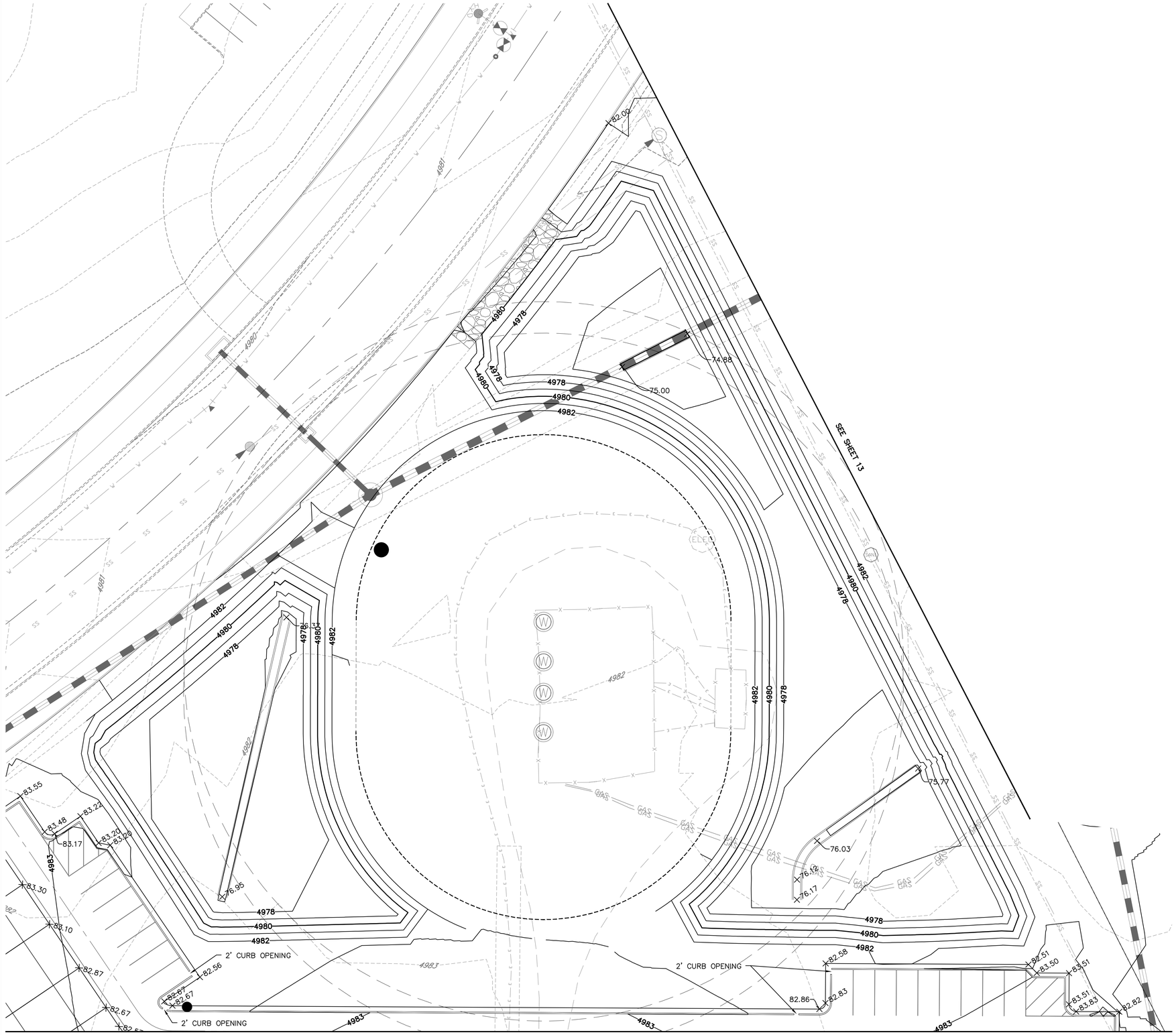

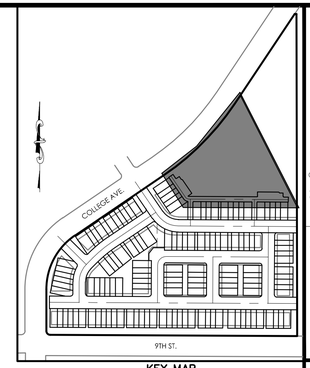

KEY MAP
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CONSTRUCTION PLANS
DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

REVISIONS

20 0 20 40
(IN FEET)
1 inch = 20 ft.

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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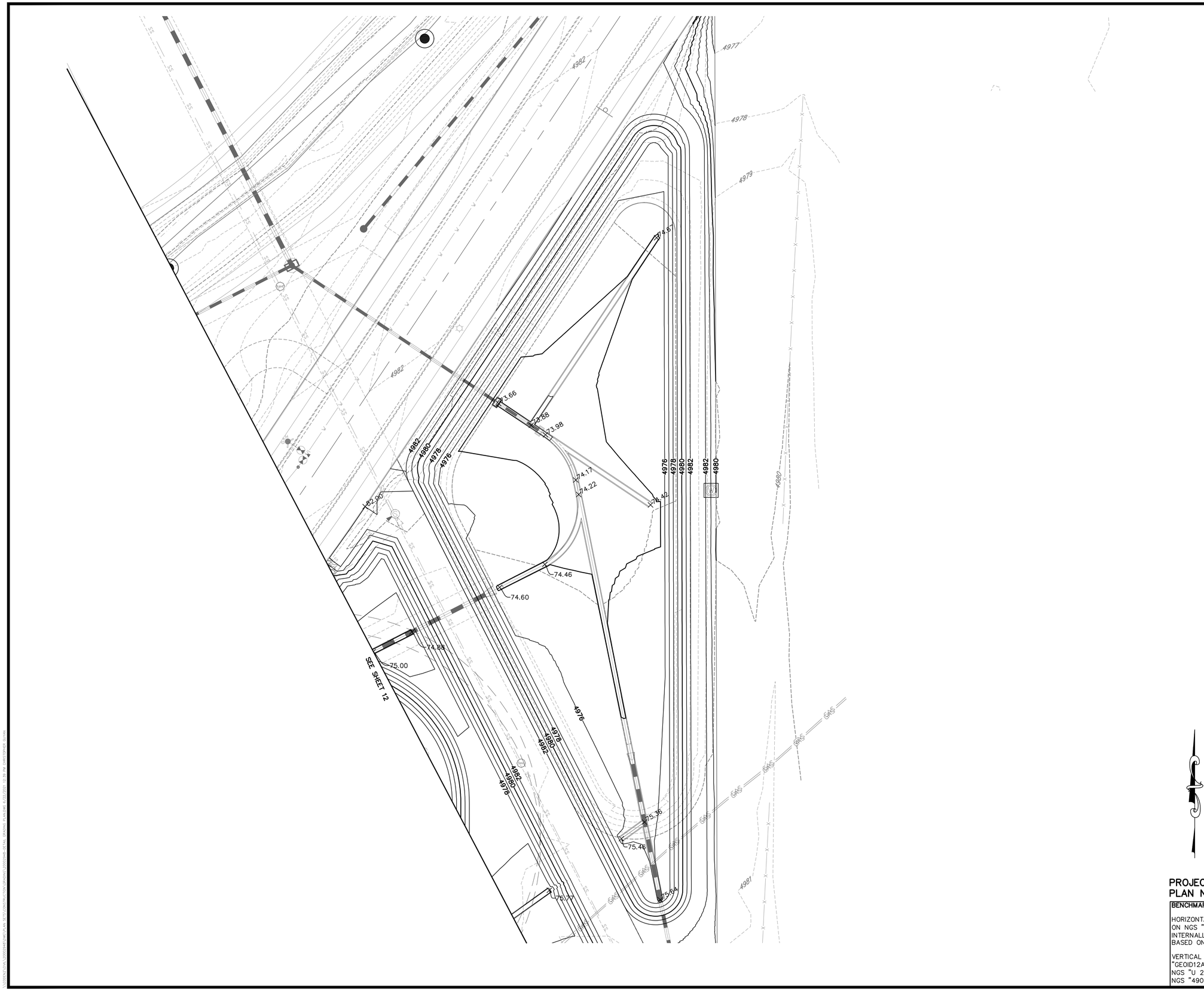

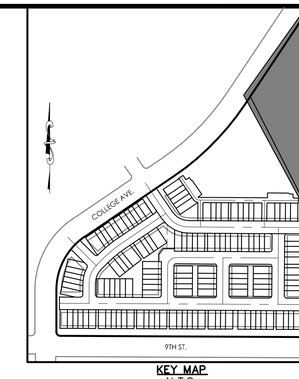

KEY MAP
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CONSTRUCTION PLANS
DETAIL GRADING
DETAIL GRADING PLAN

DATE 6/22/2021

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30 0 30 60
(IN FEET)
1 inch = 30 ft.

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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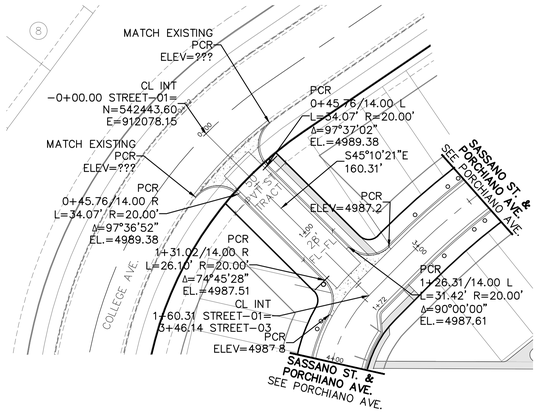

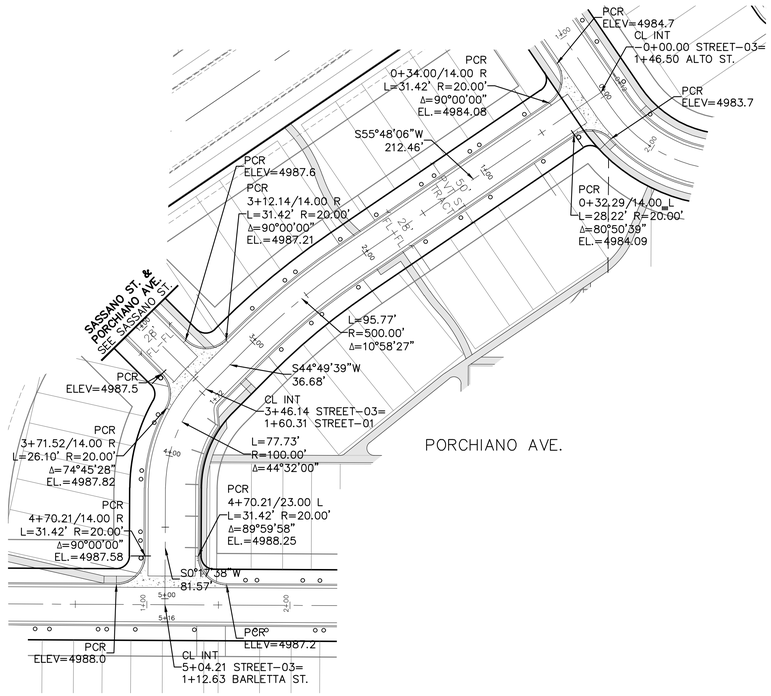

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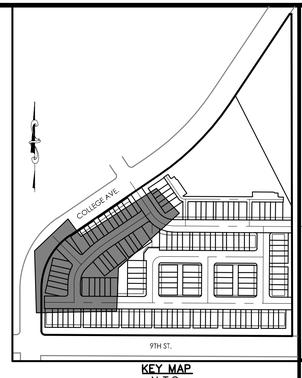

KEY MAP
N.T.S.

(IN FEET)
1 inch = 50 ft. (Horz)
1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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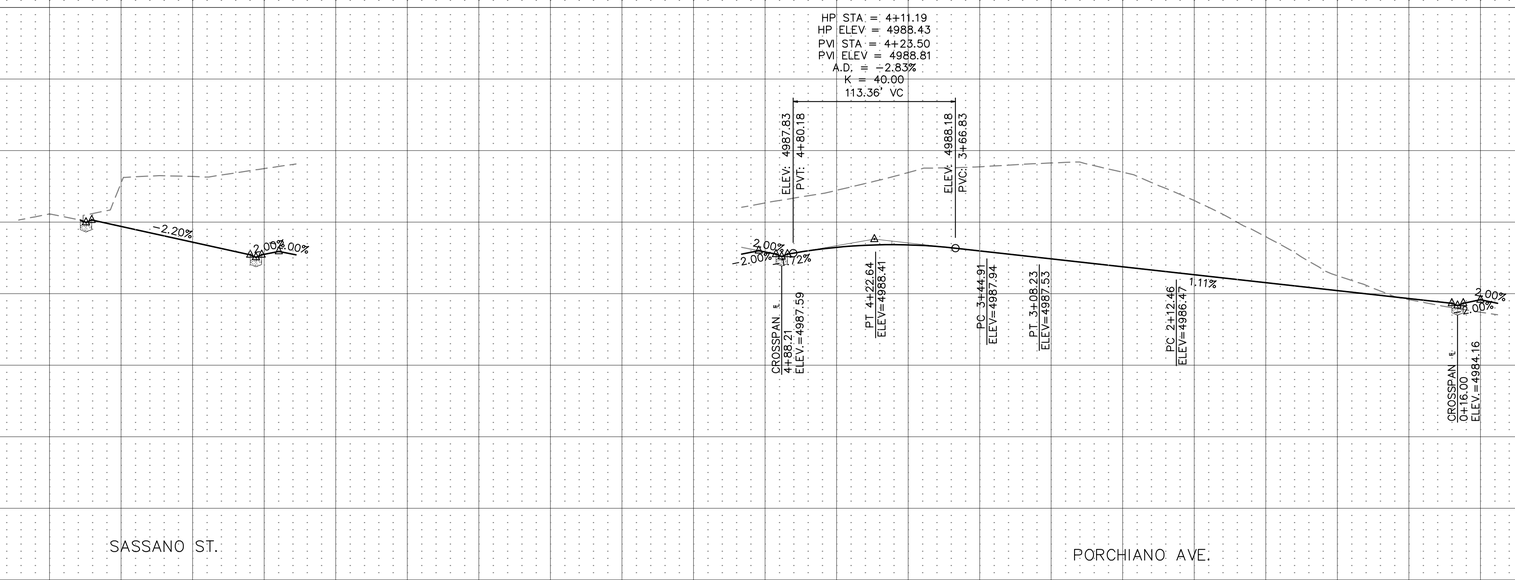

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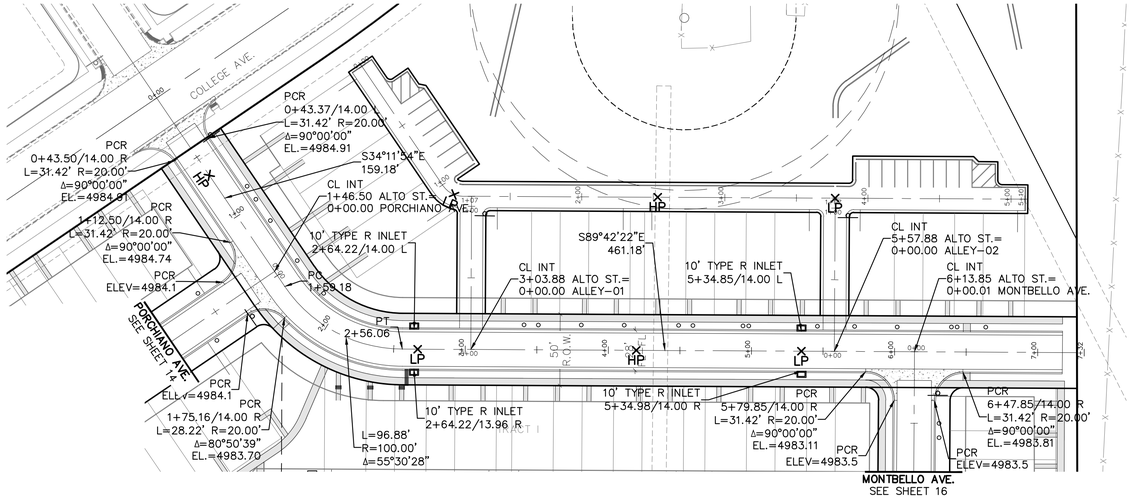

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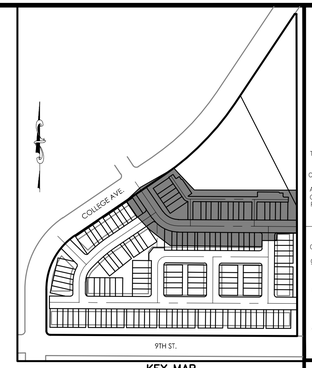

KEY MAP
N.T.S.

50 0 50 100
(IN FEET)
1 inch = 50 ft. (Horz)
1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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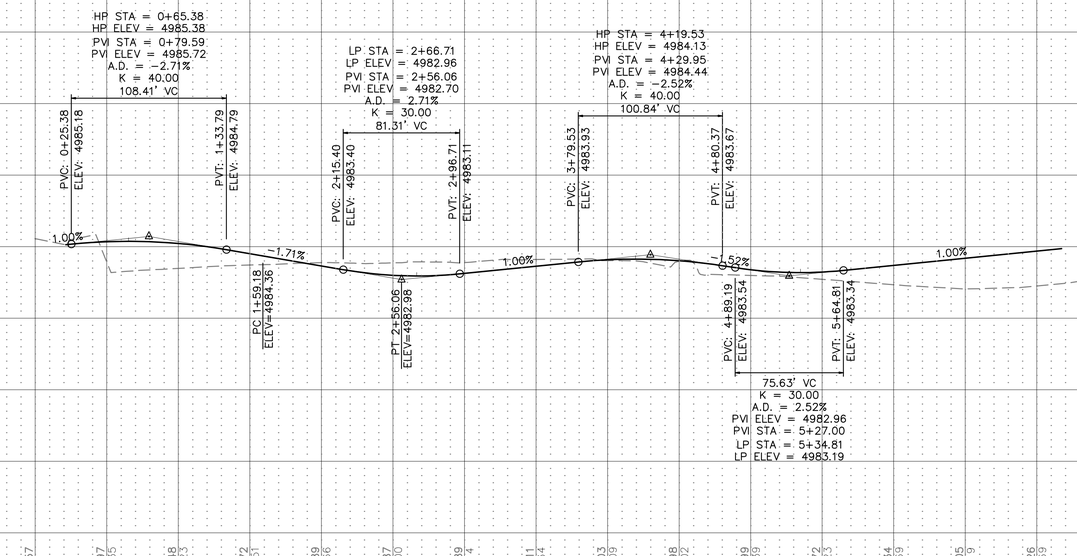

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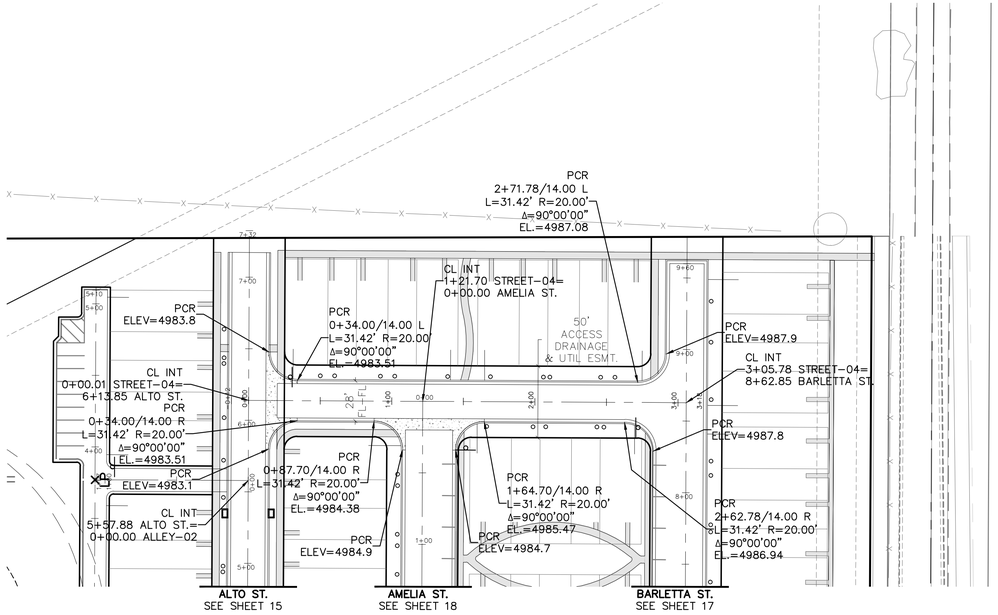

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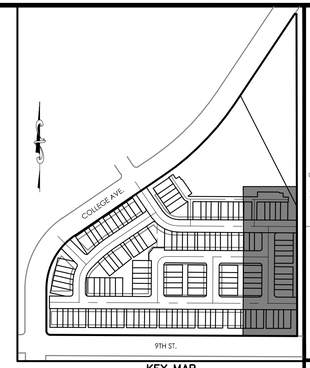

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PLAN NO.:

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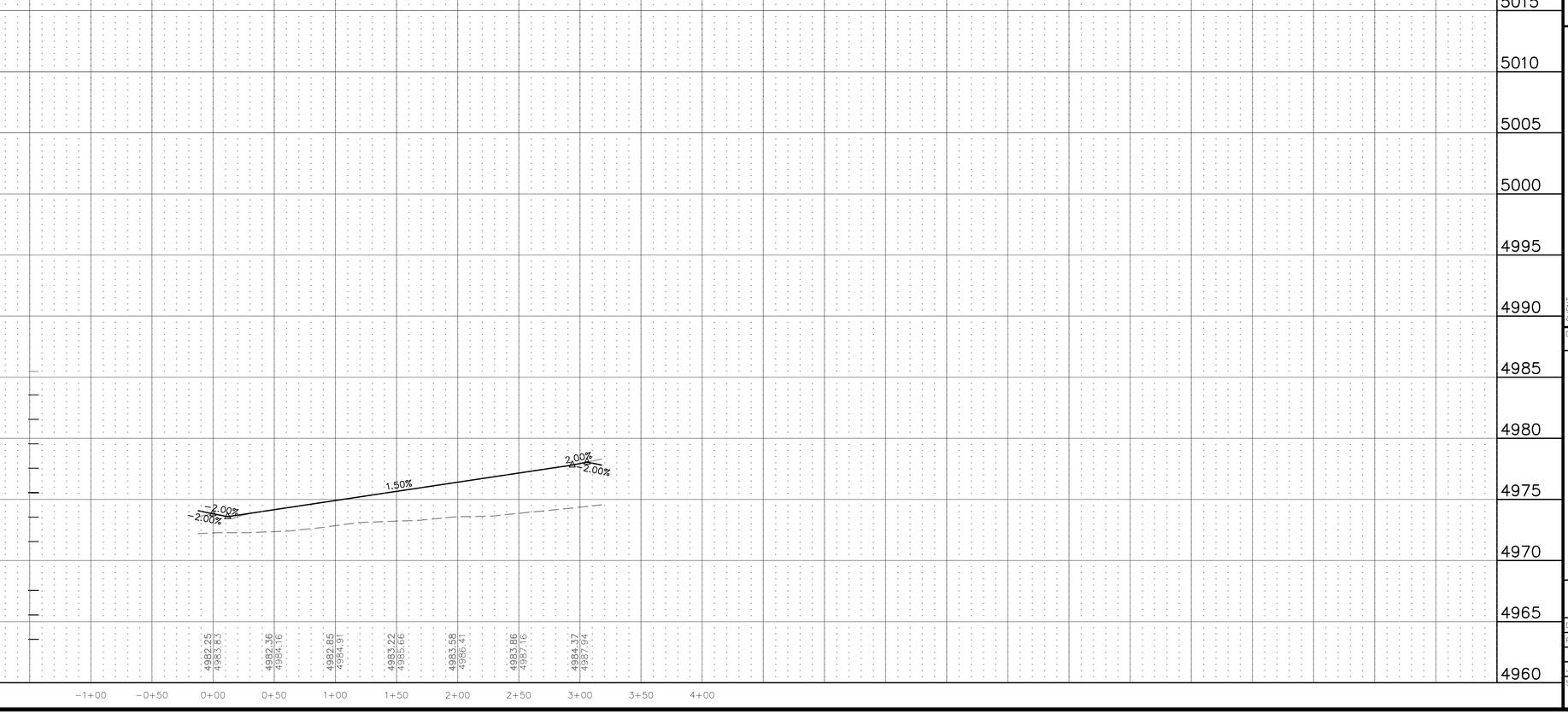

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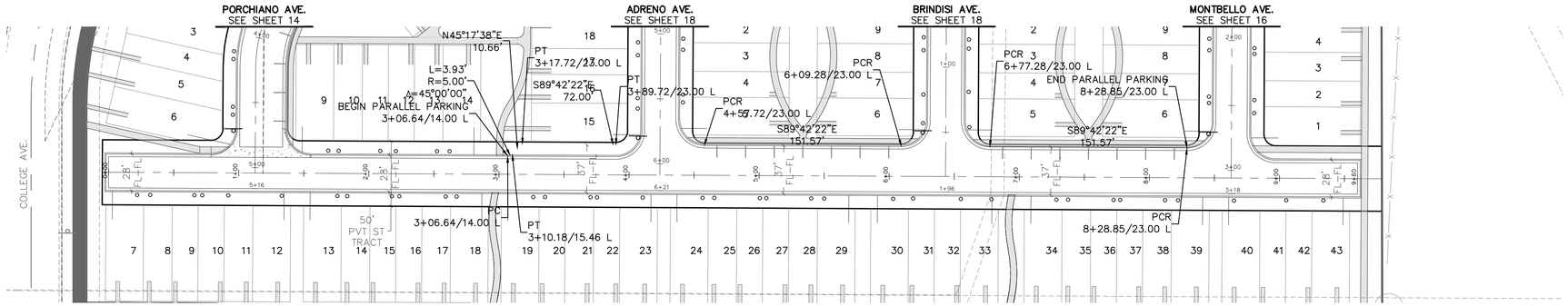

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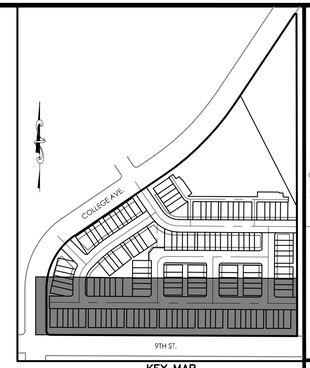

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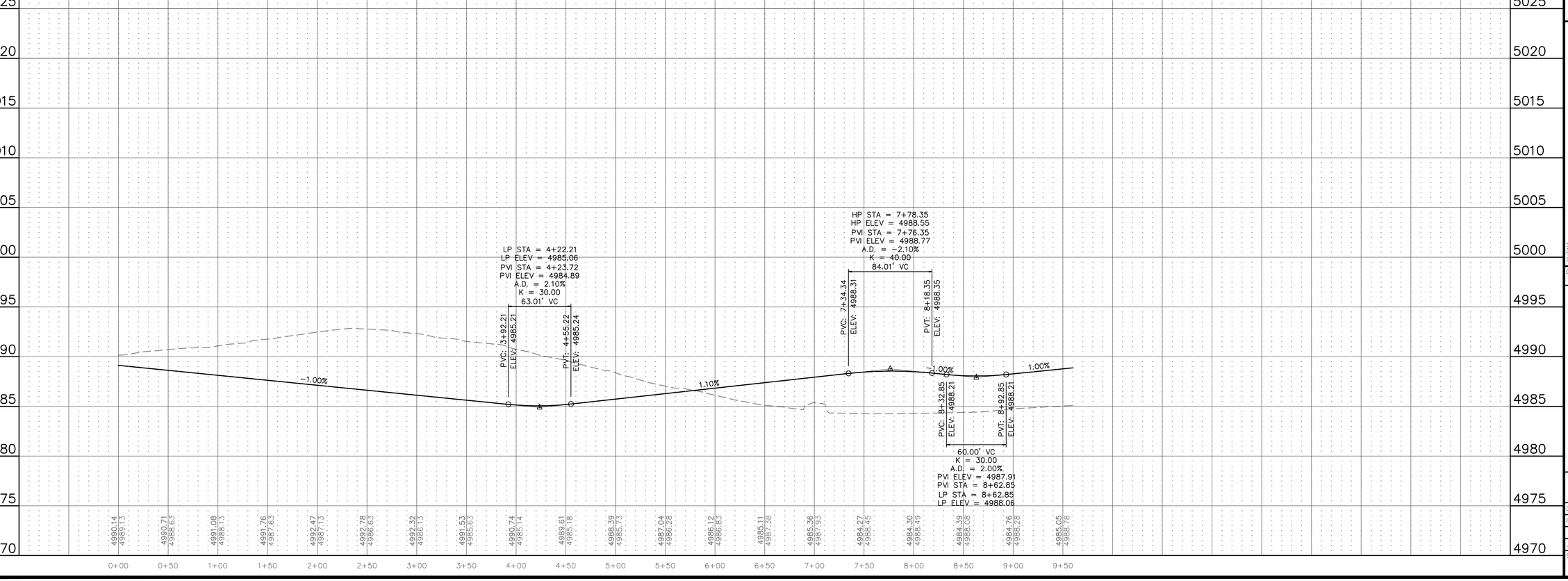

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CONSTRUCTION PLANS
STREET PLAN & PROFILE
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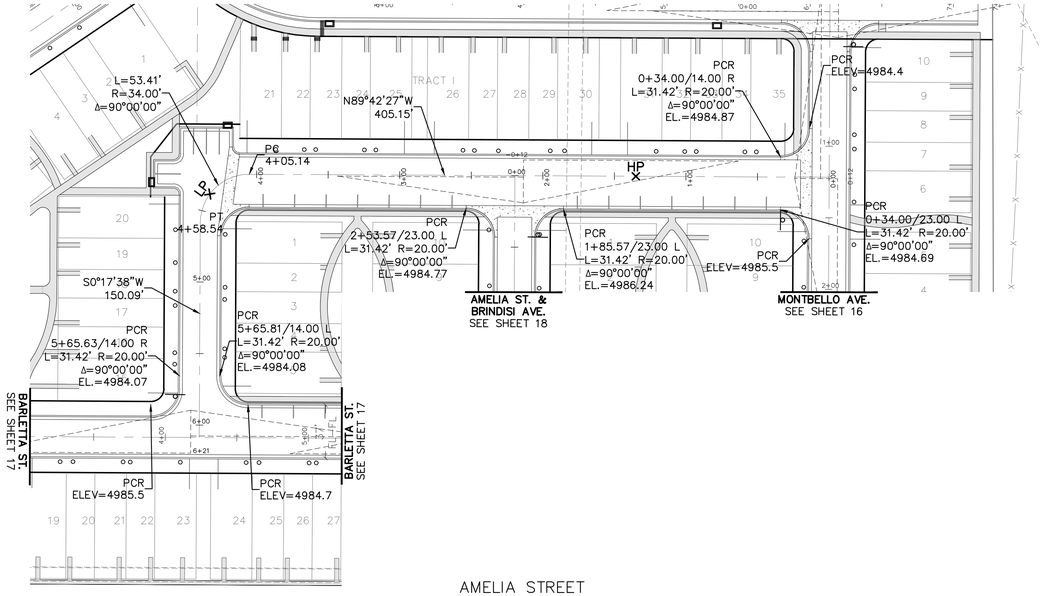
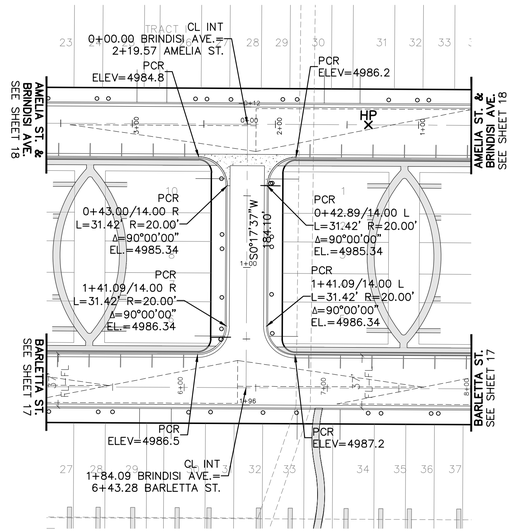
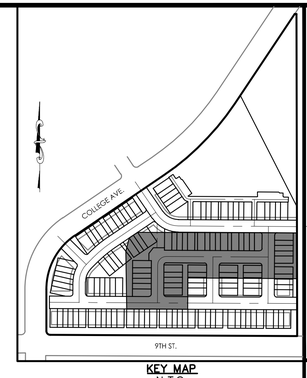


AMELIA STREET



BRINDISI AVENUE

AMELIA ST. & BRINDISI AVE.



KEY MAP
N.T.S.

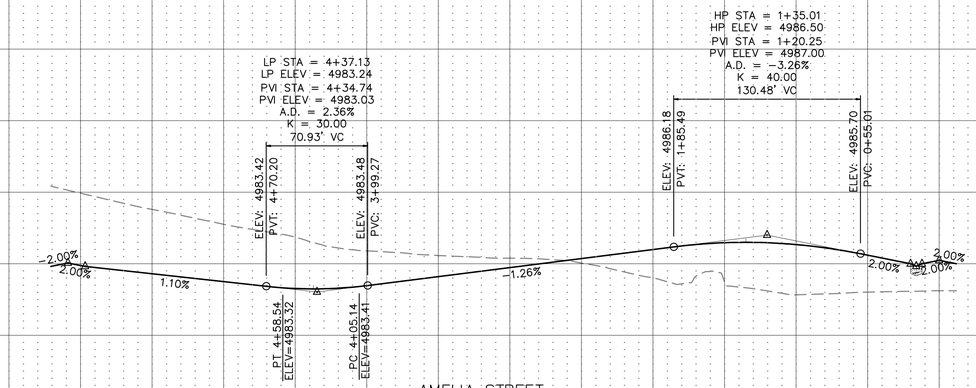
50 0 50 100
(IN FEET)
1 inch = 50 ft. (Horz)
1 inch = 5 ft. (Vert)

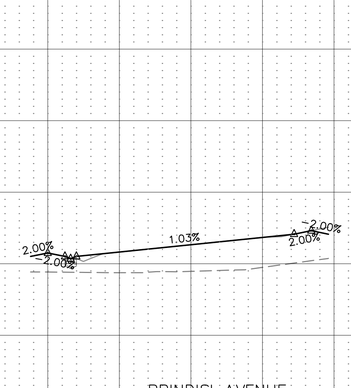
PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)





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AMELIA ST. & BRINDISI AVE.

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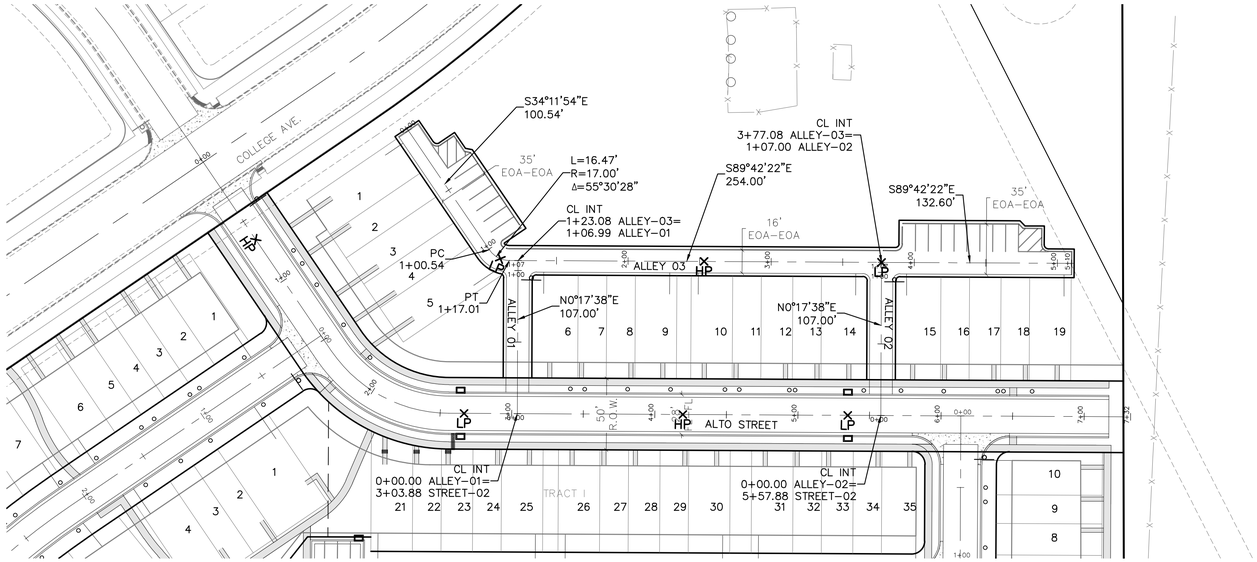

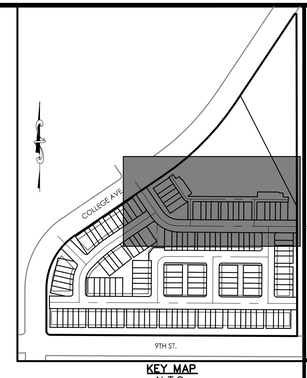

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50 0 50 100
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PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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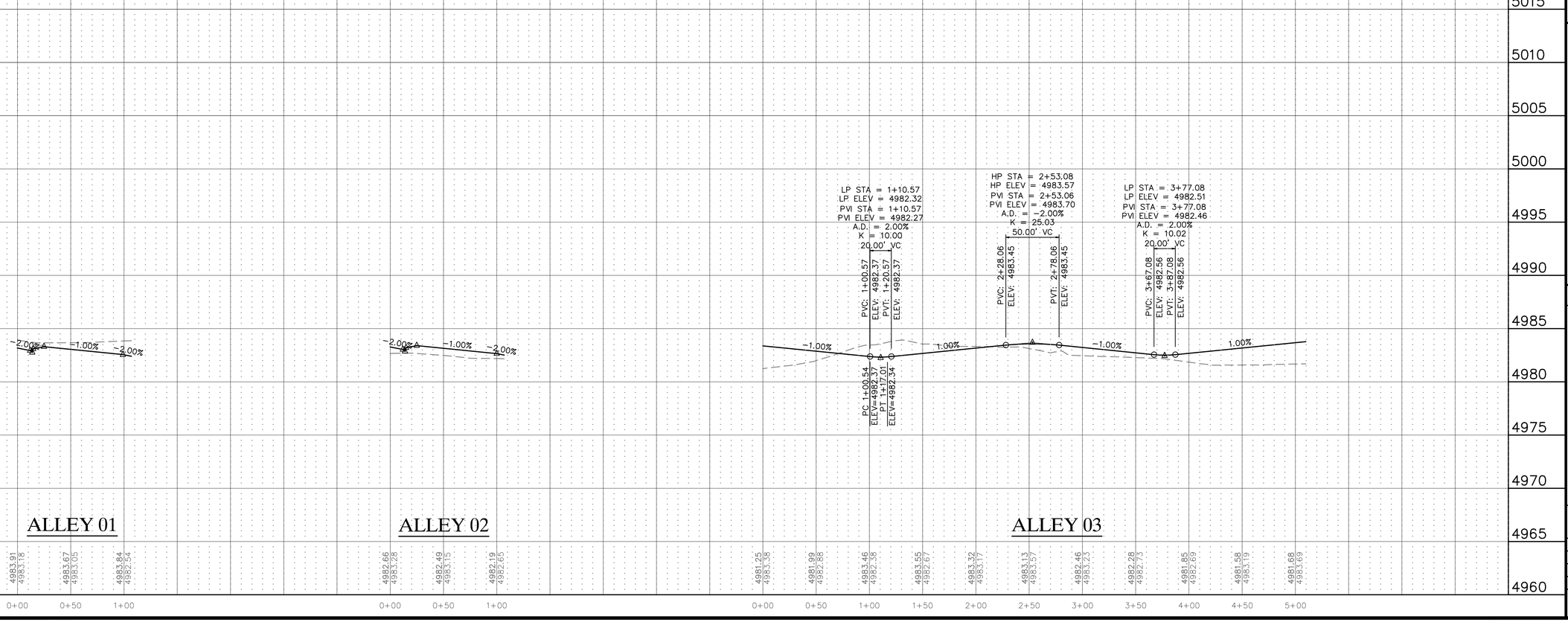
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

ALLEY 01, 02 & 03



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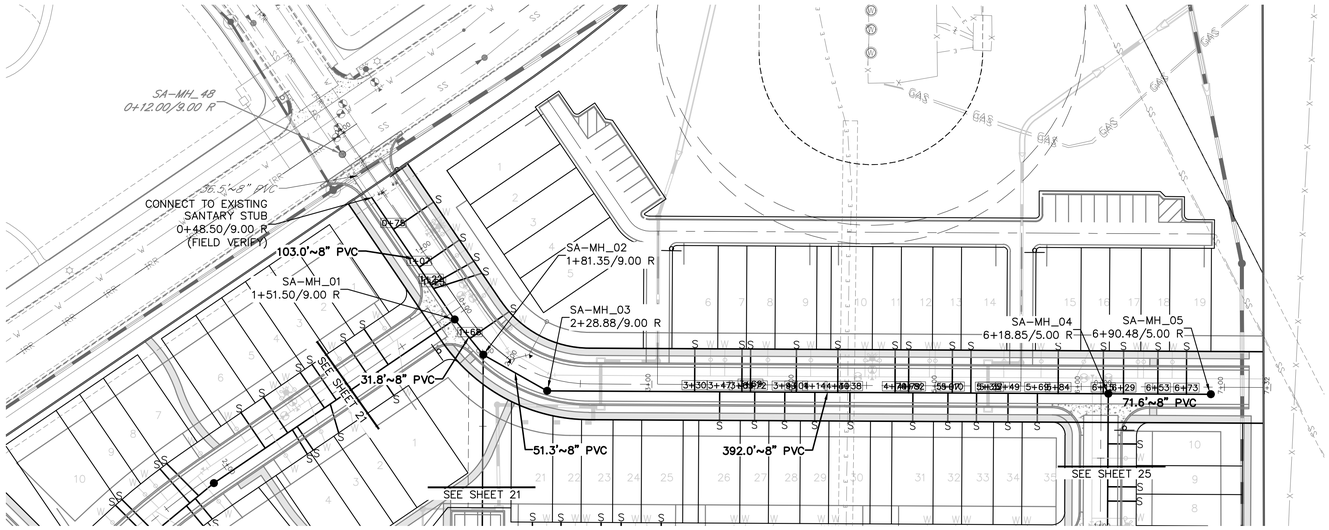

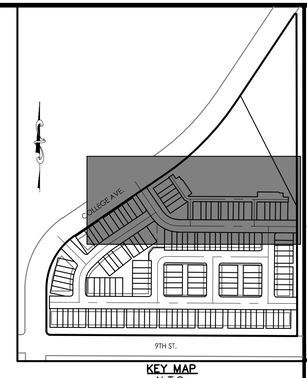

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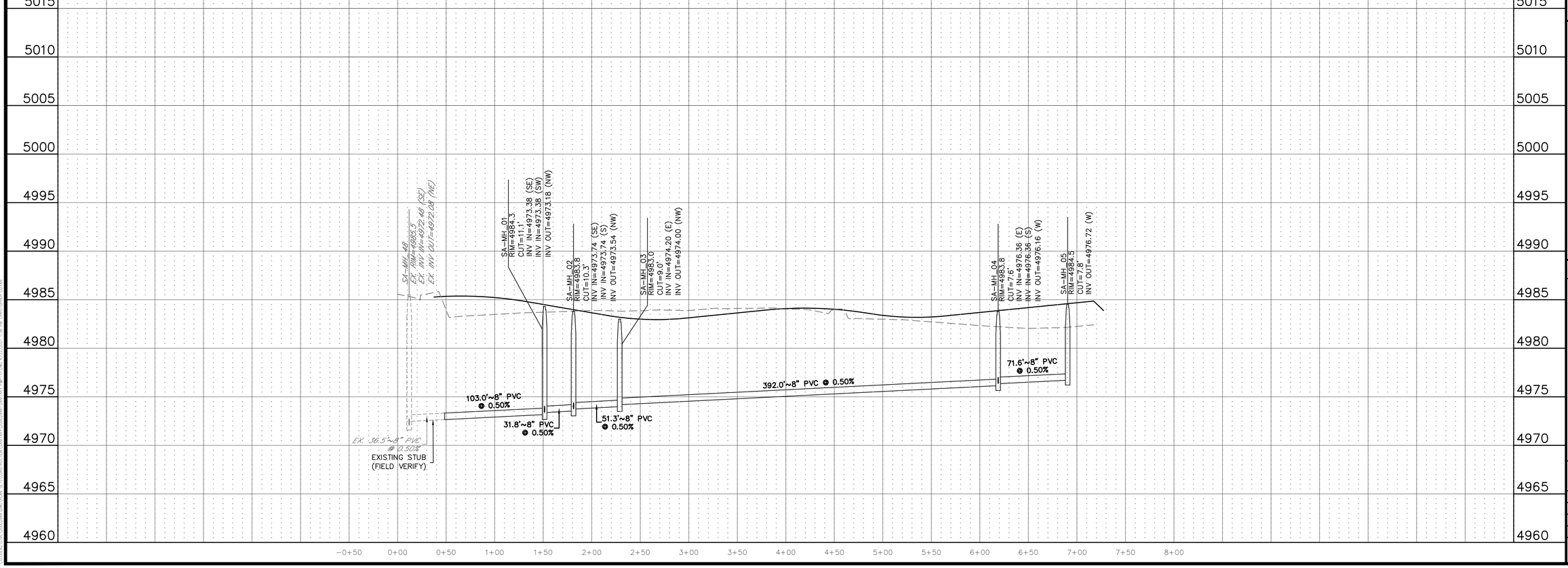

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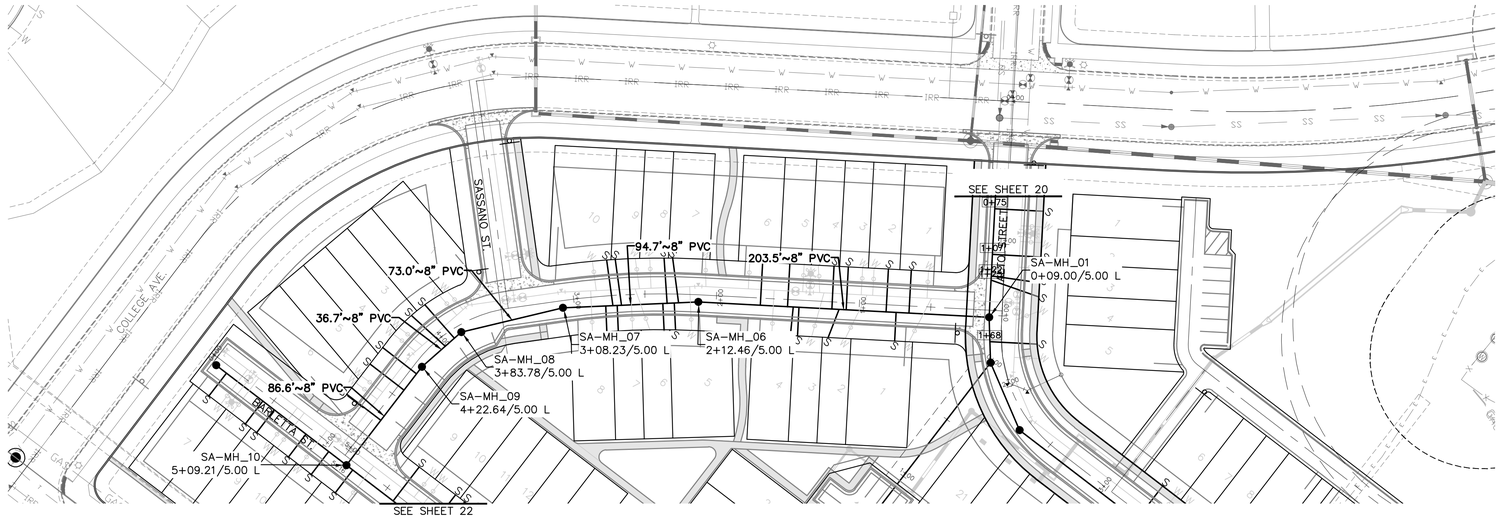

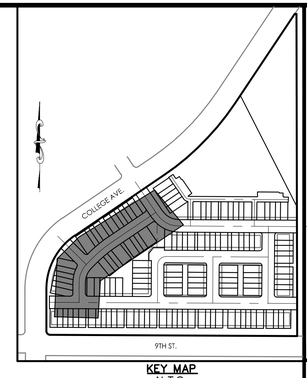

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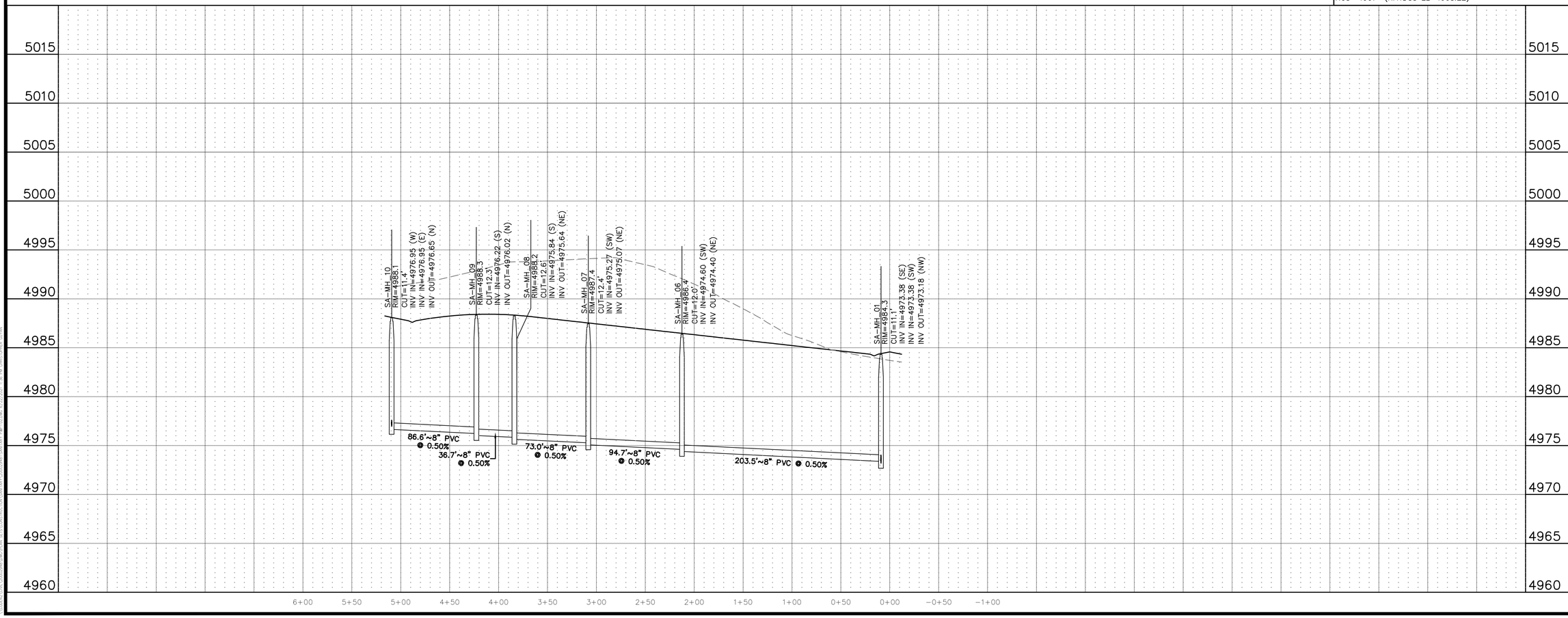
PORCHIANO AVE.



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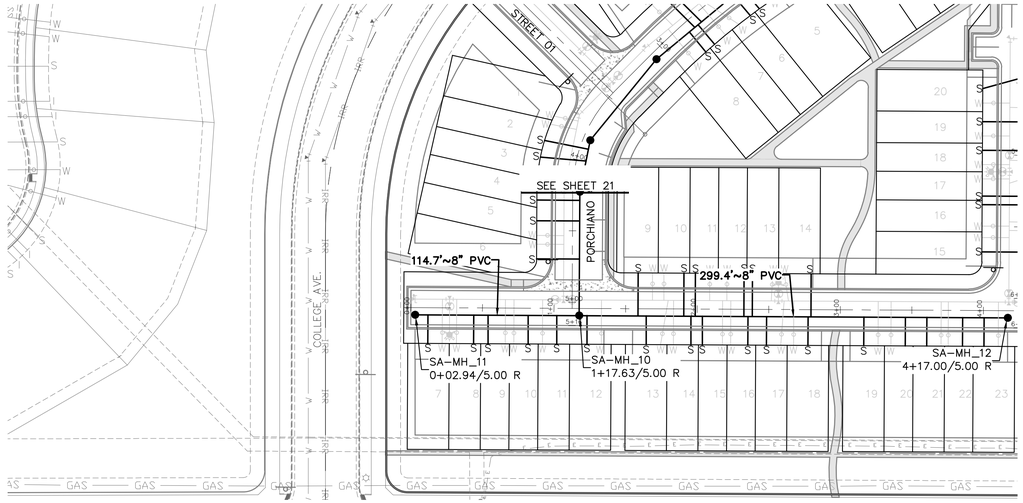
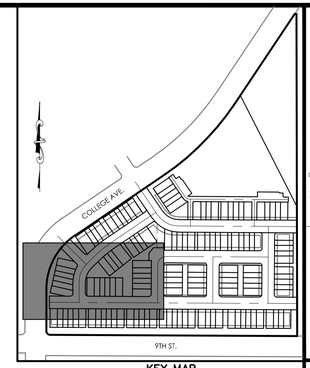


BARLETTA ST.



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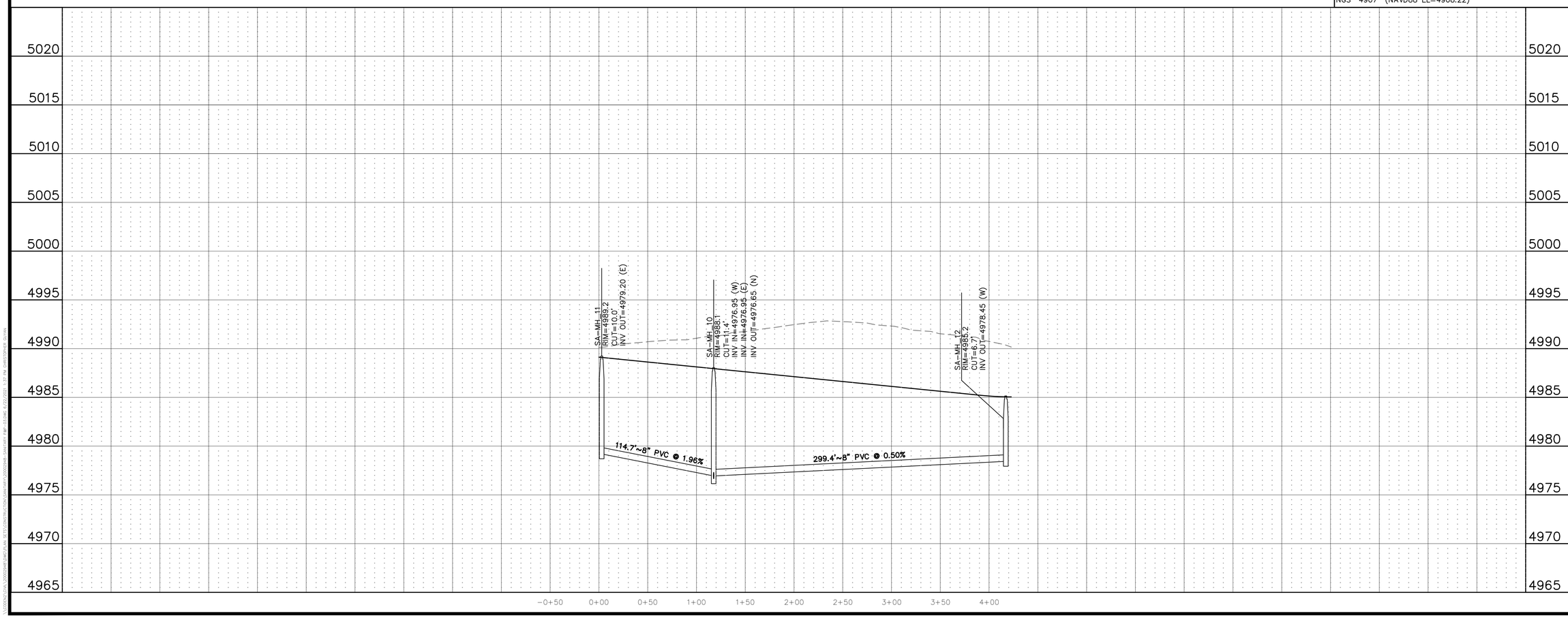

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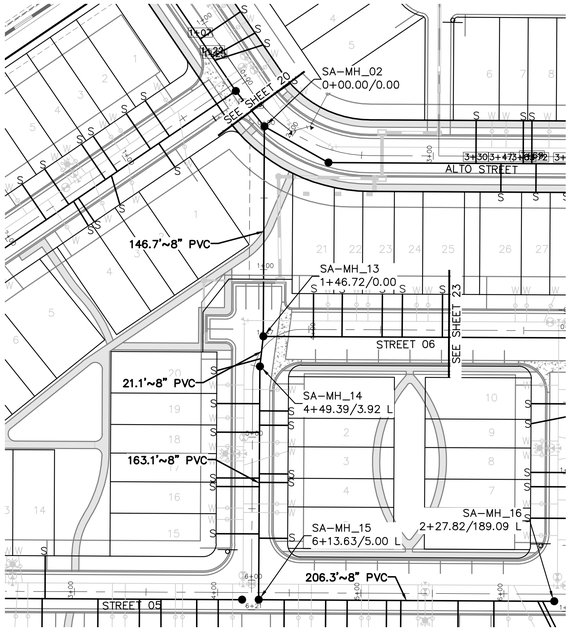
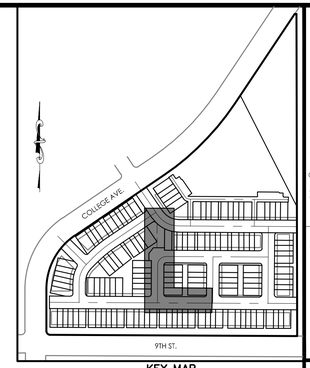


BARLETTA ST. & AMELIA ST.



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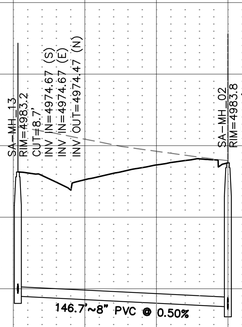

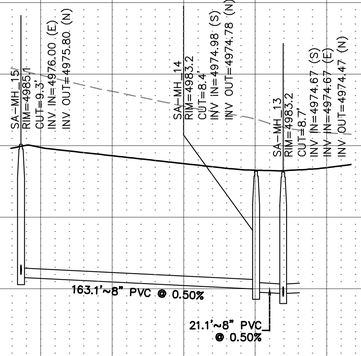

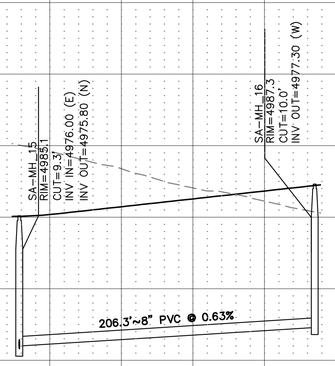

5015 5010 5005 5000 4995 4990 4985 4980 4975 4970 4965 4960

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SANITARY SEWER PLAN & PROFILE
BARLETTA ST. & AMELIA ST.

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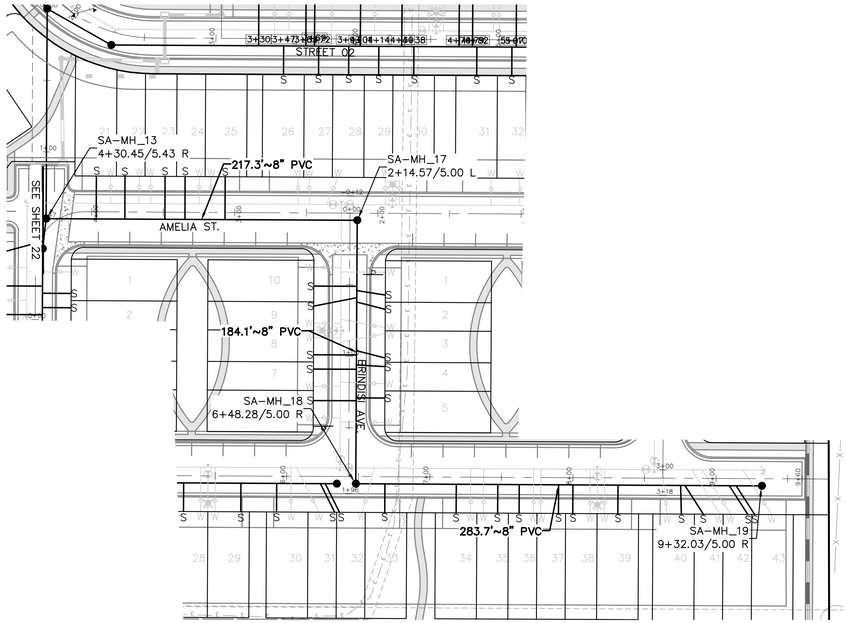
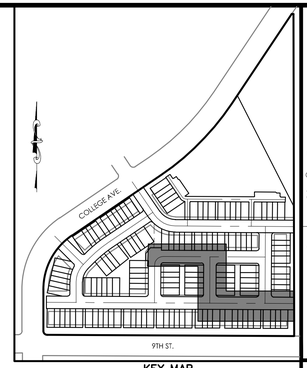


BARLETTA ST., AMELIA ST. & BRINDISI AVE.



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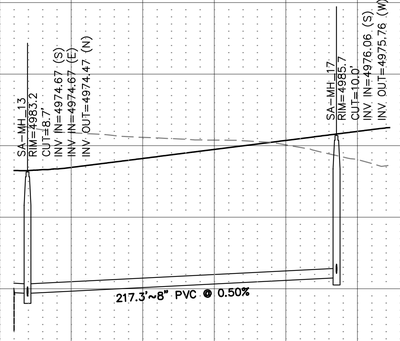

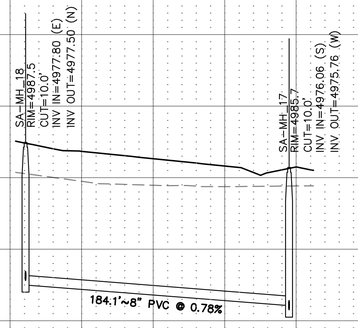

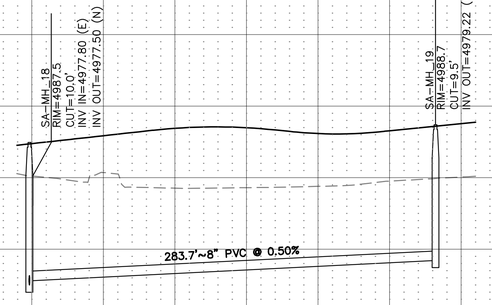

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4+00 3+50 3+00 2+50 2+00 2+00 1+50 1+00 0+50 0+00 6+50 7+00 7+50 8+00 8+50 9+00 9+50

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COTTONWOOD GREENS
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
SANITARY SEWER PLAN & PROFILE
BARLETTA ST., AMELIA ST. & BRINDISI AVE.

DATE

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PLANS UNDER REVIEW NOT FOR CONSTRUCTION

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P.M.
JOB
SHEET NO. 24

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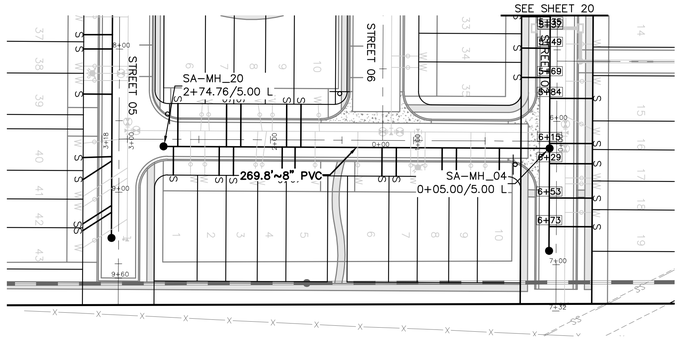

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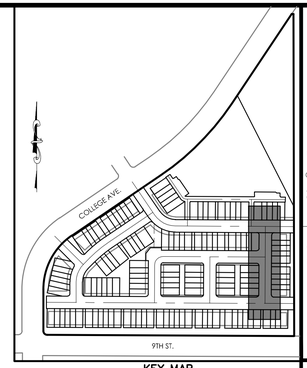

KEY MAP
N.T.S.

50 0 50 100
(IN FEET)
1 inch = 50 ft. (Horz)
1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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FORT LUPTON, COLORADO

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SANITARY SEWER PLAN & PROFILE
MONTBELLO AVE.

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SHEET NO.
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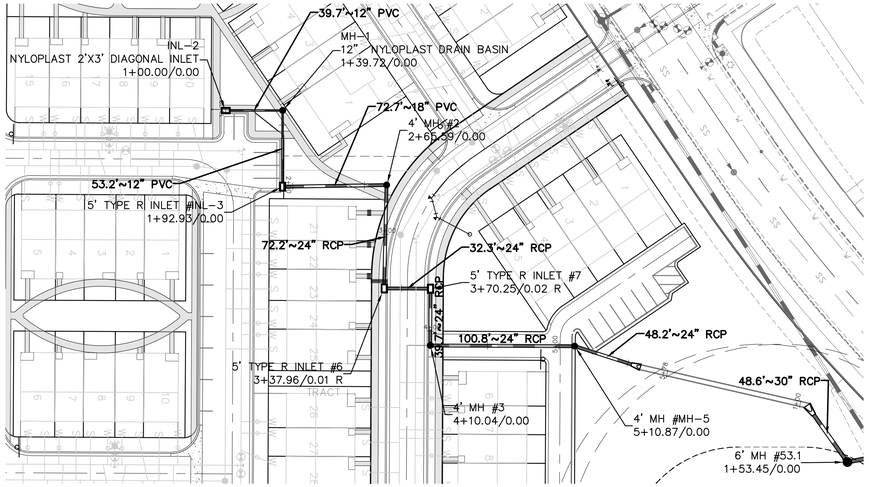
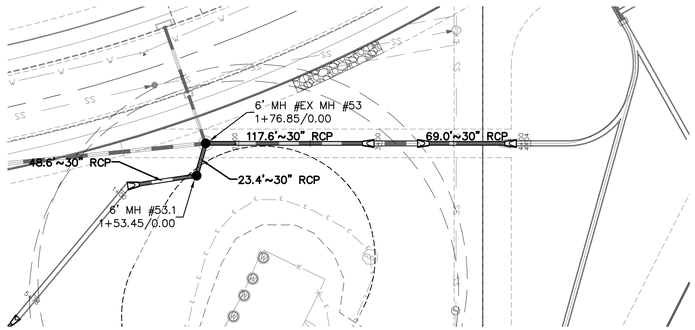
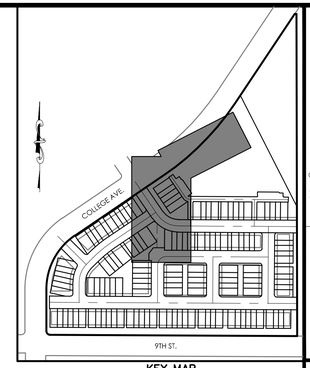


STORM RUN 1



STORM RUN 3



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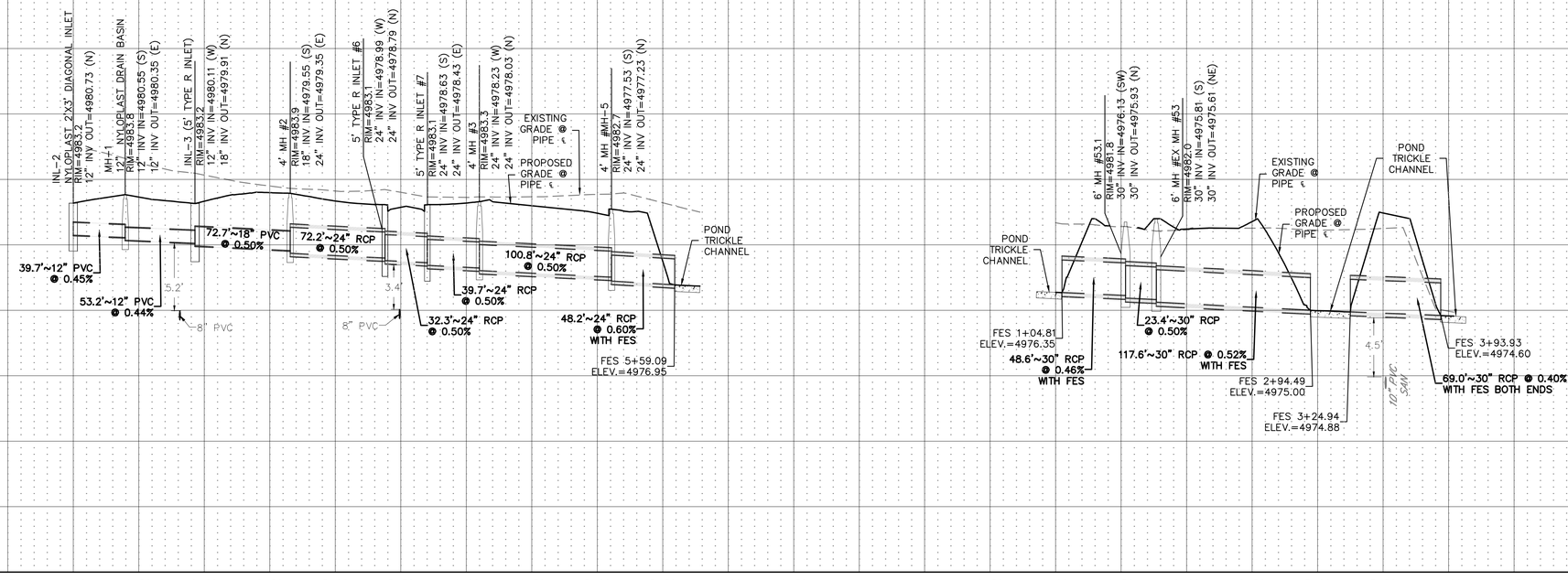

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FORT LUPTON, COLORADO
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STORM RUN 1 & 3

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JOB
SHEET NO.
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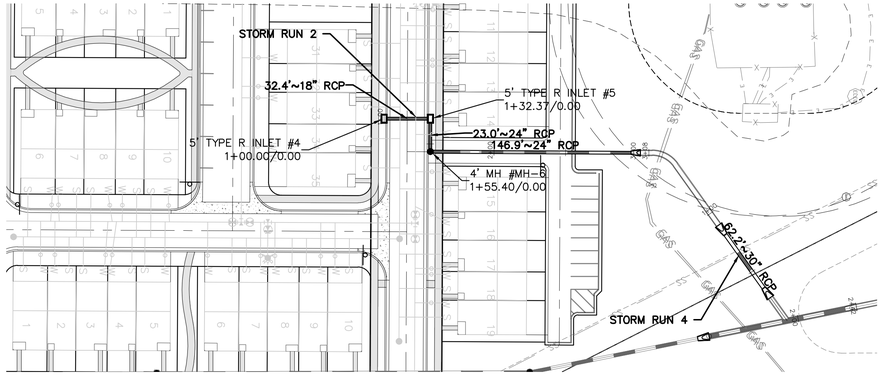
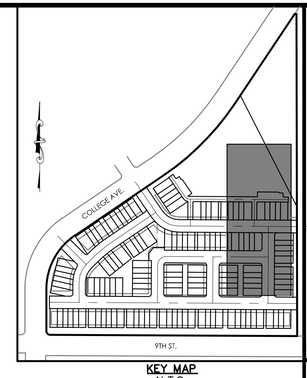


STORM RUN 2 & 4



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PLAN NO.:

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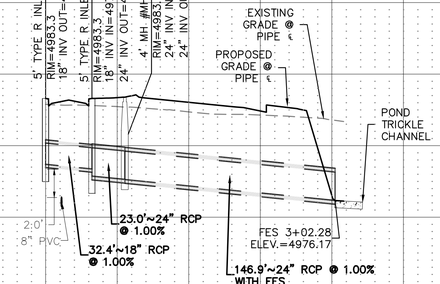

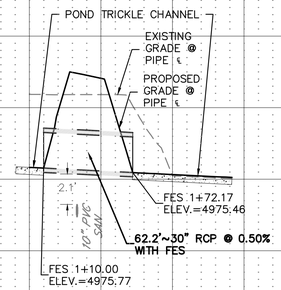

0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00
5010 5005 5000 4995 4990 4985 4980 4975 4970 4965 4960 4955

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FORT LUPTON, COLORADO
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STORM SEWER PLAN & PROFILE
STORM RUN 2 & 4

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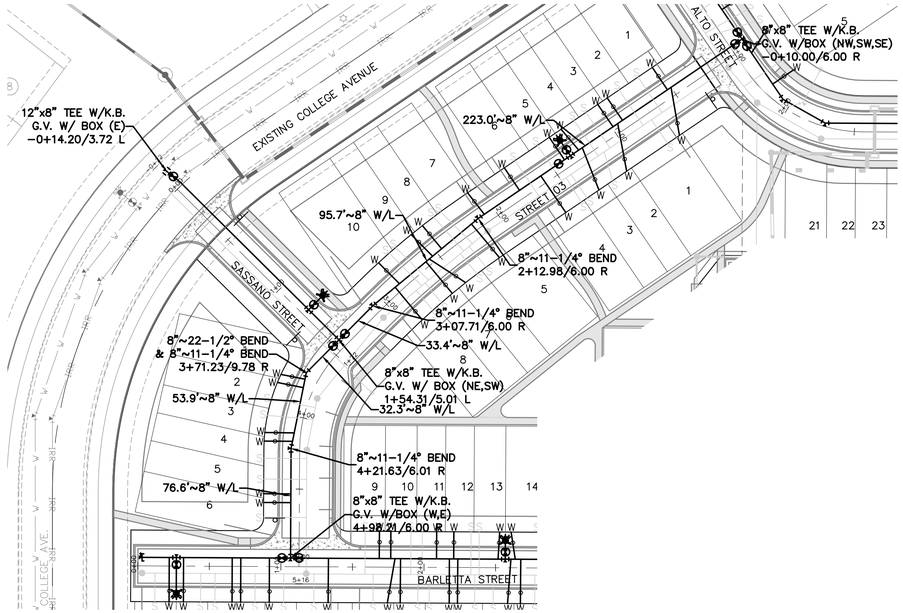

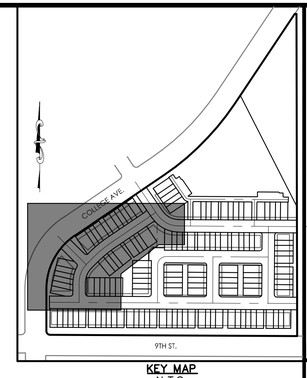

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50 0 50 100
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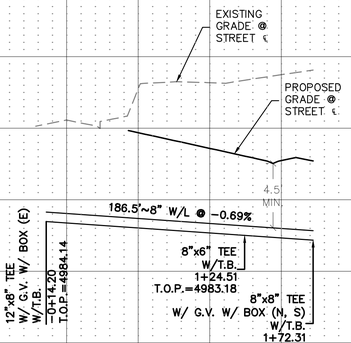

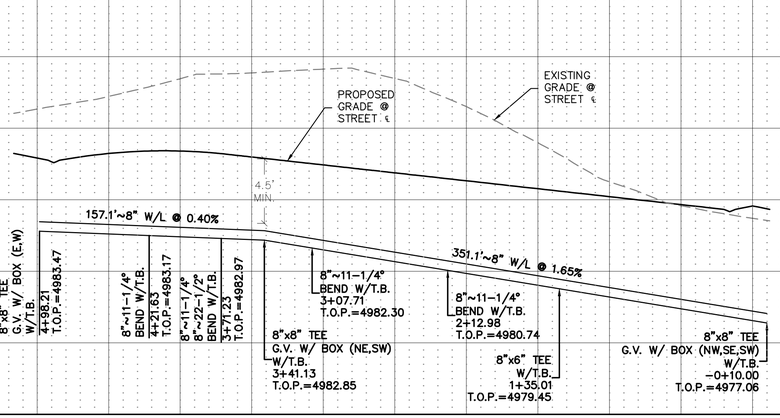

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COTTONWOOD GREENS
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
WATER PLAN & PROFILE
SASSANO ST. & PORCHIANO AVE.

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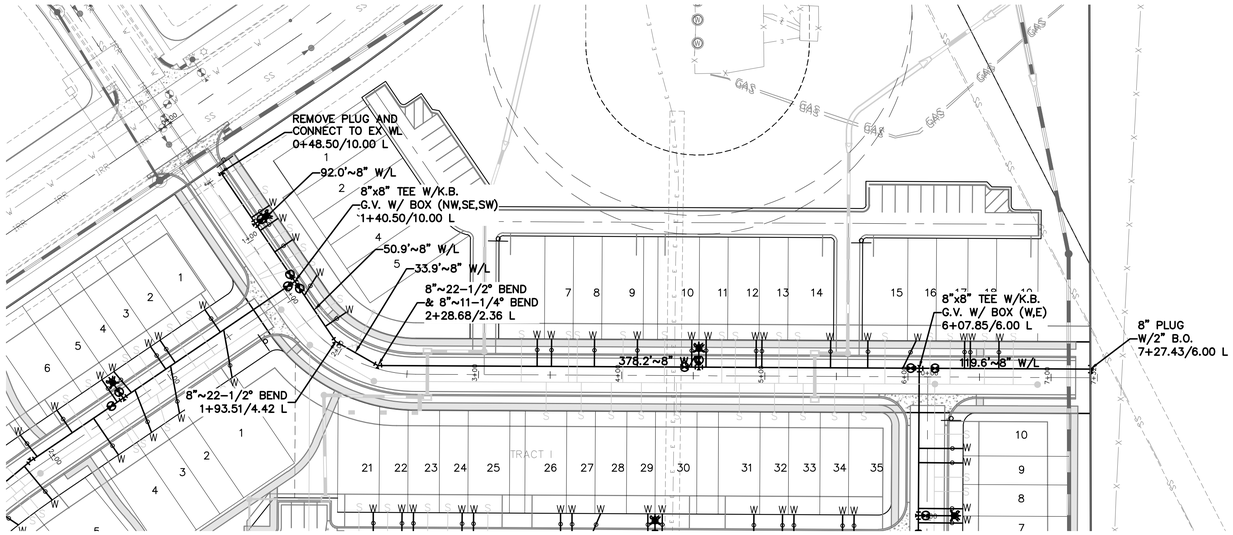

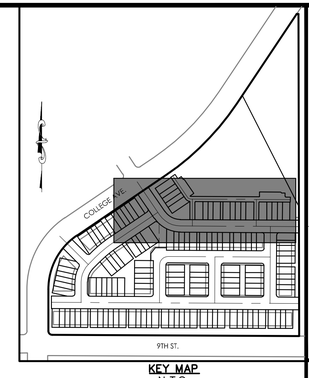

KEY MAP
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50 0 50 100
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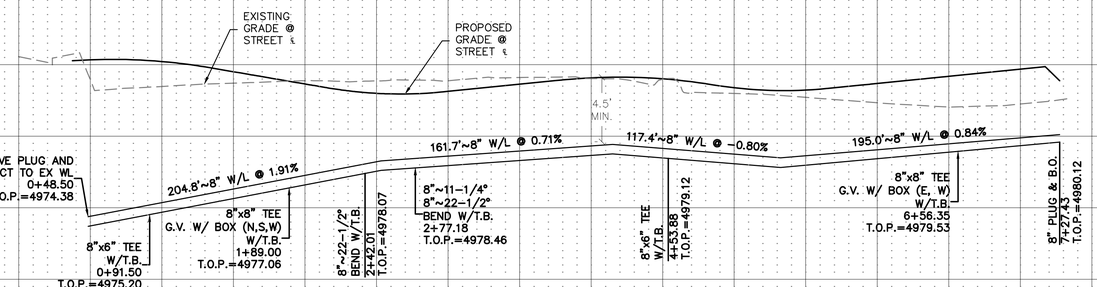

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−0+50 0+00 0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00 4+50 5+00 5+50 6+00 6+50 7+00 7+50 8+00

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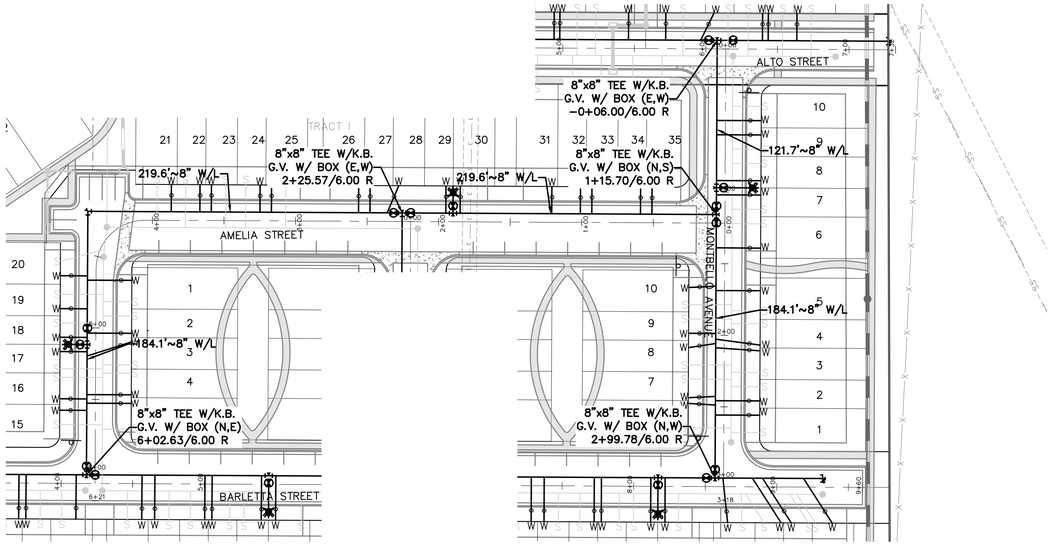

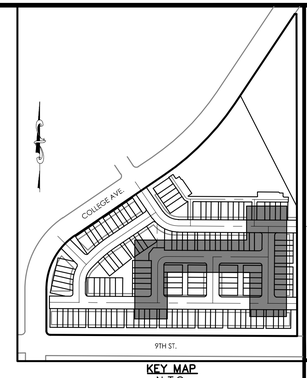

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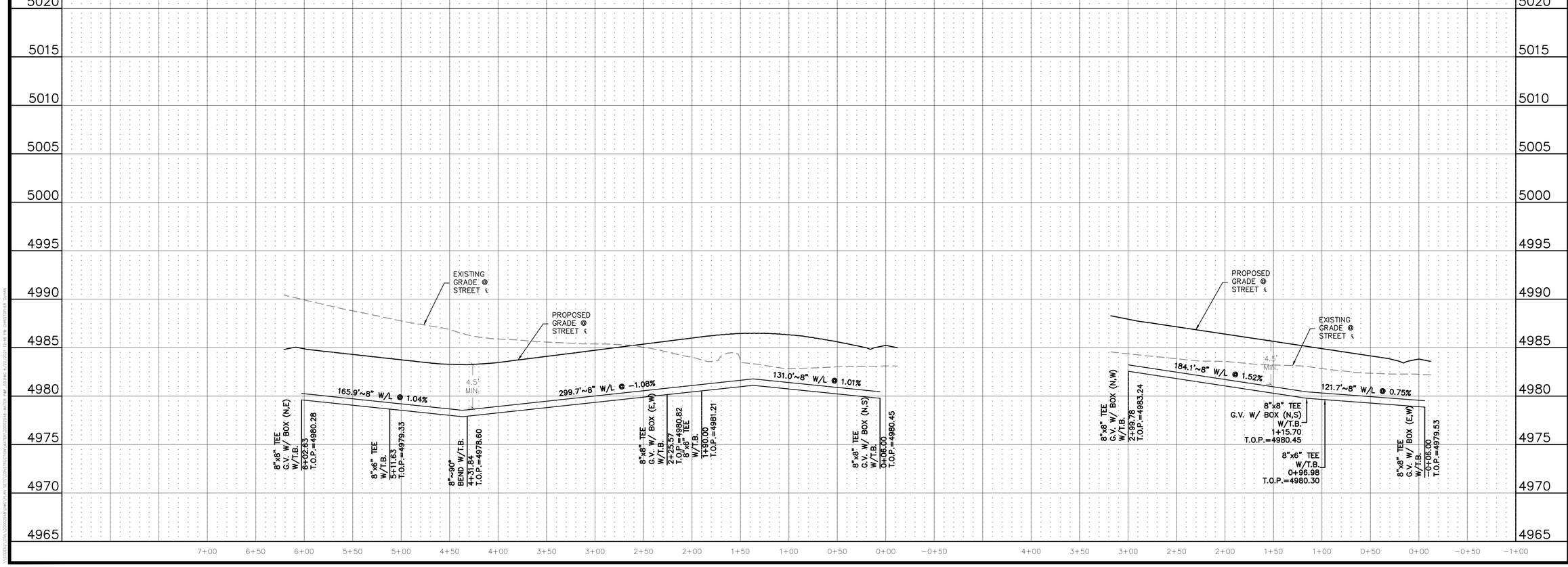

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COTTONWOOD GREENS
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
WATER PLAN & PROFILE
MONTBELO AVE. & AMELIA ST.

DATE --

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. -- CH. --
P.M. --
JOB --
SHEET NO. 30

CAD FILE: 20002948-WATER P&P_03.DWG

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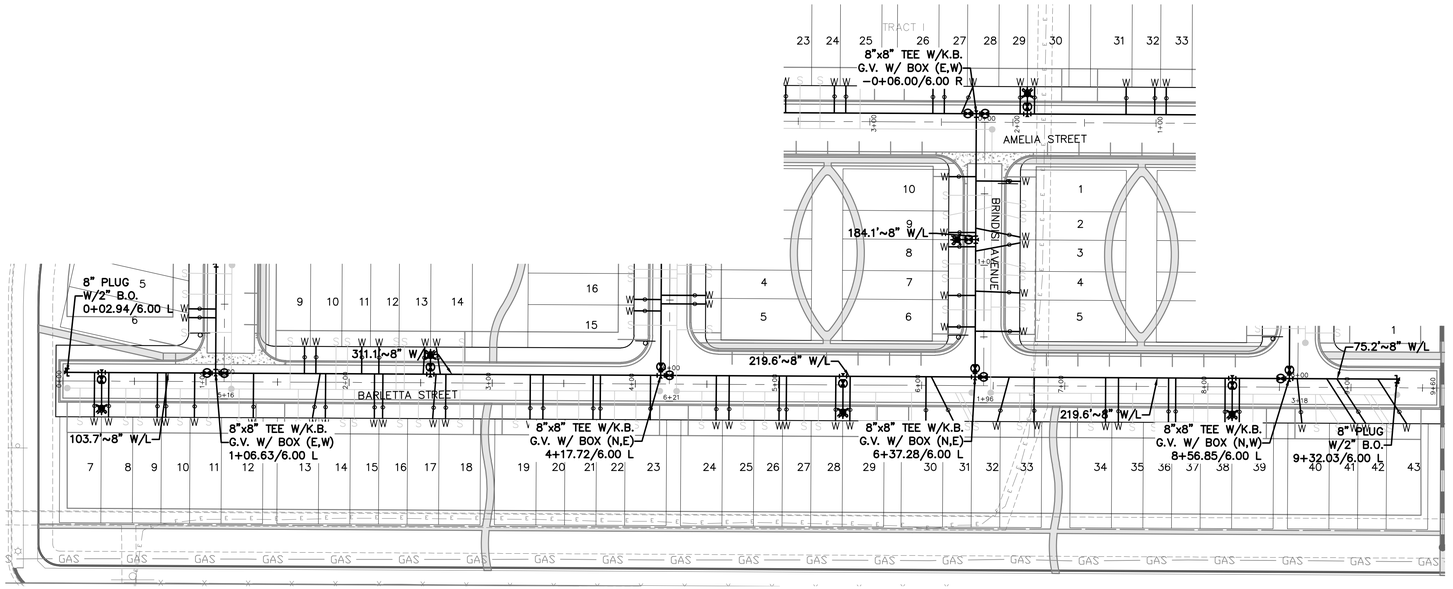
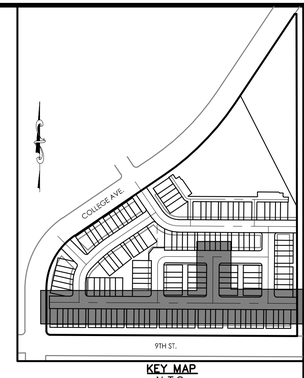




KEY MAP
N.T.S.

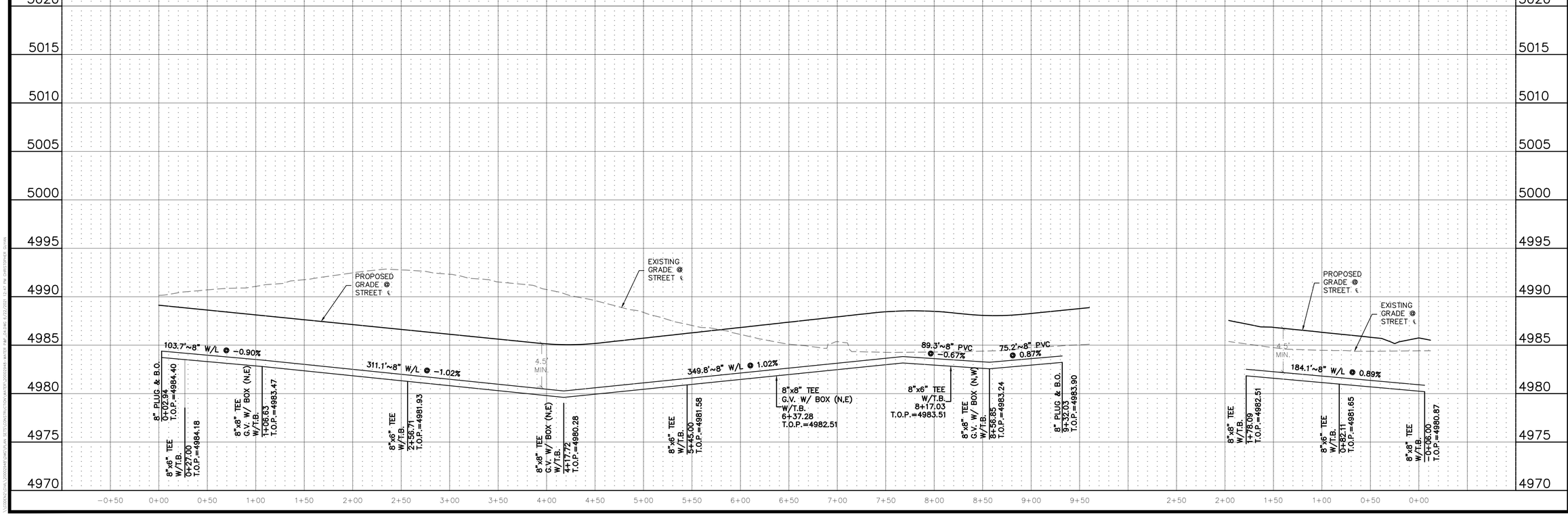
(IN FEET)
1 inch = 50 ft. (Horz)
1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)



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BARLETTA ST. & BRINDISI AVE.

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Page 800 of 1161

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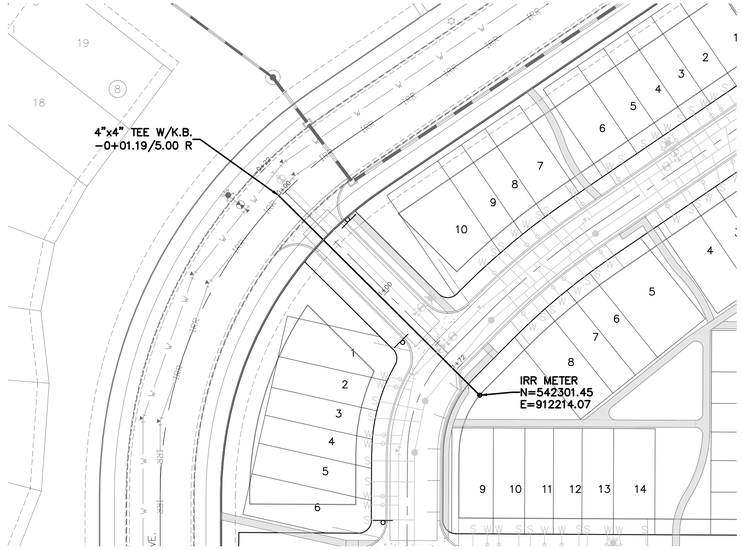

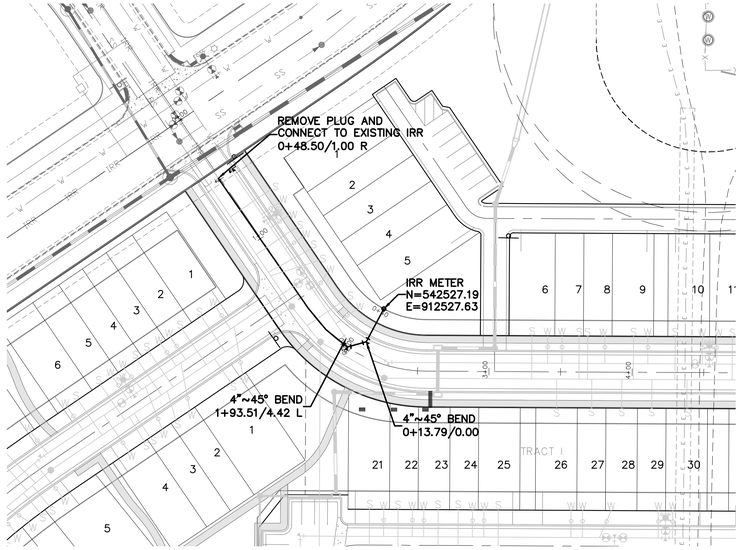

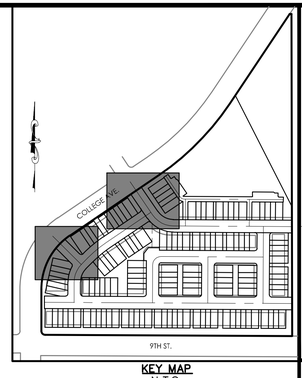

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1 inch = 5 ft. (Vert)

PROJECT NO.:
PLAN NO.:

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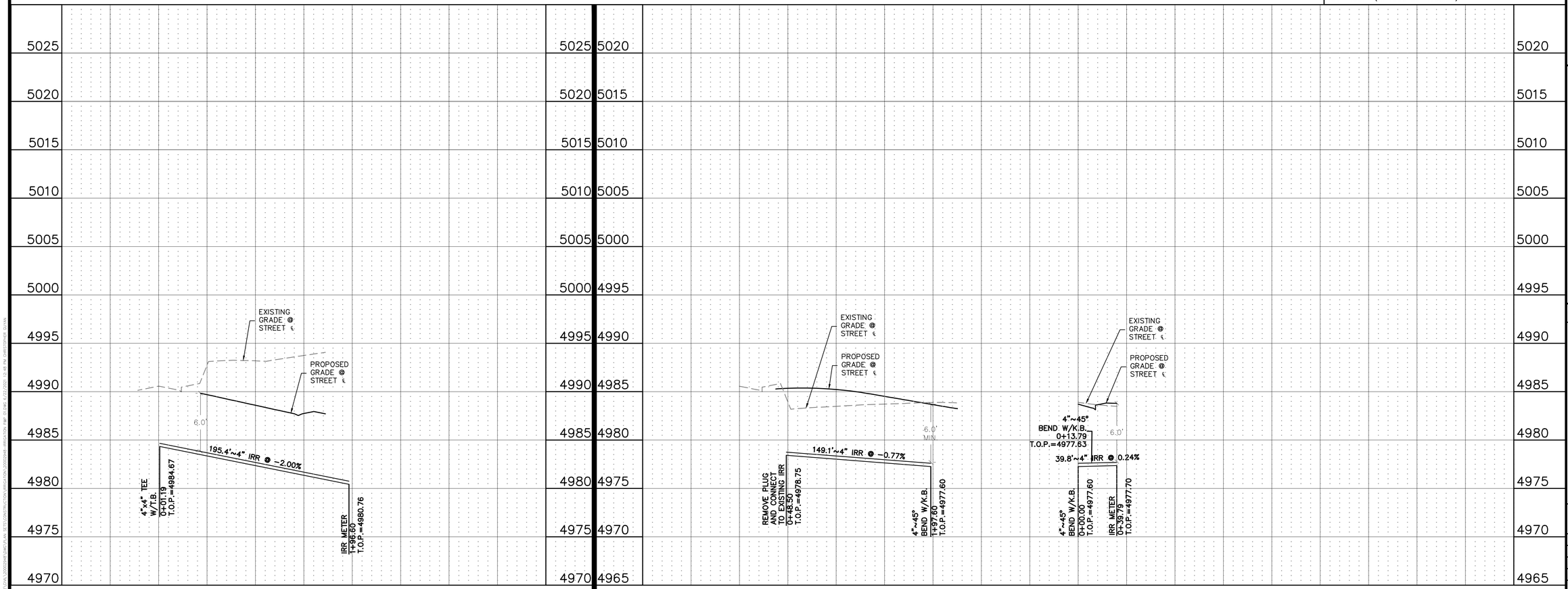

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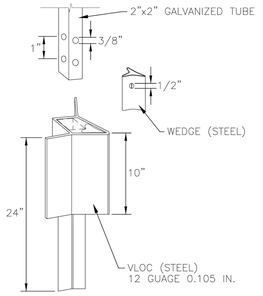
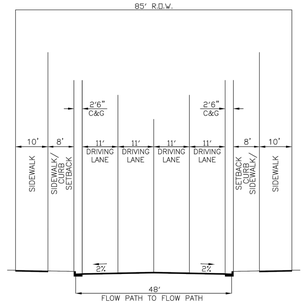


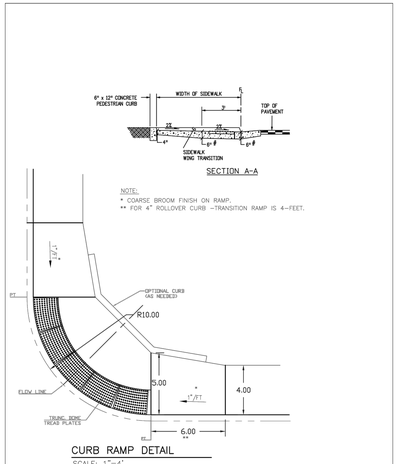
DESIGN STANDARDS	STANDARD DRAWING
TYPICAL SIGN POST ANCHOR DETAIL	T2
	DATE: 8/15/14



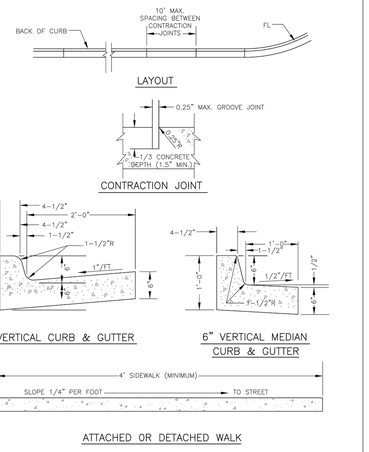
- PROVIDE WIDENING AT INTERSECTIONS FOR LEFT TURN LANES AND ACCEL/DECEL LANES RIGHT-OF-WAY WIDTH TO BE INCREASED TO 105' IN THESE AREAS.
- NO PARKING ALLOWED
- USED IN AREAS WHERE THERE IS LIMITED ACCESS AND PROJECTED TRAFFIC VOLUMES ARE GREATER THAN 10,000 VEHICLES PER DAY.

COLLECTOR PHASE III

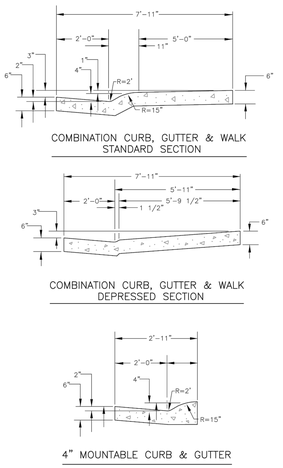
DESIGN STANDARDS	STANDARD DRAWING
COLLECTOR - PHASE 3 TYPICAL SECTION	R2-3
	DATE: 11/21/19



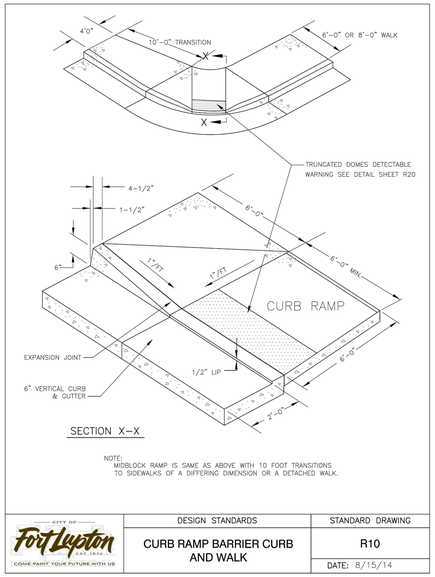
DESIGN STANDARDS	STANDARD DRAWING
CURB RAMP	R9
	DATE: 3/28/17



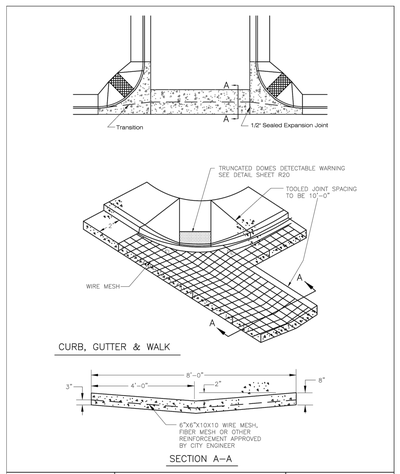
DESIGN STANDARDS	STANDARD DRAWING
VERTICAL CURB AND GUTTER	R7
	DATE: 8/15/14



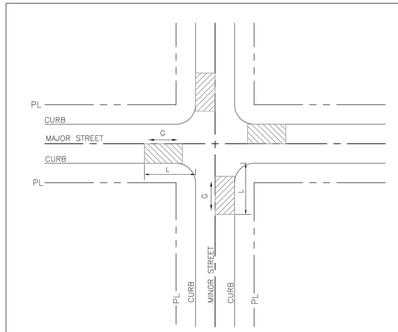
DESIGN STANDARDS	STANDARD DRAWING
COMBINATION CURB, GUTTER, AND WALK	R8
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
CURB RAMP BARRIER CURB AND WALK	R10
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
SIDEWALK RAMP WITH CROSS PAN	R11
	DATE: 3/15/17



MINOR STREET \ MAJOR STREET		LOCAL	MINOR COLLECTOR	MAJOR COLLECTOR	MINOR ARTERIAL	MAJOR ARTERIAL
LOCAL	L	95'	100'	100'	125'	125'
	G	4%	4%	4%	4%	4%
MINOR COLLECTOR	L	---	100'	120'	150'	150'
	G	---	4%	3%	3%	3%
MAJOR COLLECTOR	L	---	---	120'	150'	200'
	G	---	---	3%	3%	3%
MINOR ARTERIAL	L	---	---	---	200'	200'
	G	---	---	---	2%	2%
MAJOR ARTERIAL	L	---	---	---	---	200'
	G	---	---	---	---	2%

DESIGN STANDARDS	STANDARD DRAWING
MAXIMUM PERMISSIBLE INTERSECTION GRADE	R19
	DATE: 8/15/14

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FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAILS
STREET DETAILS

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

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JOB 20002948
SHEET NO. 33

CAD FILE: 20002948-STREET DETAILS.DWG

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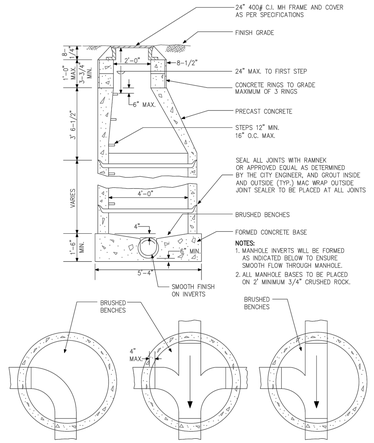
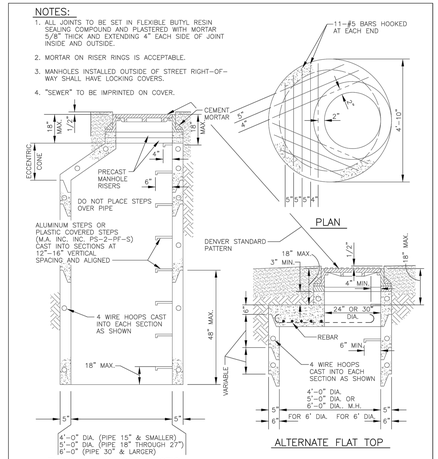
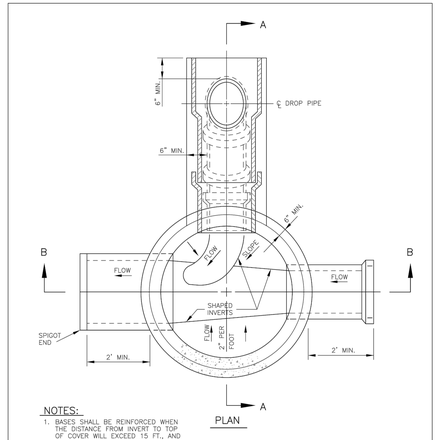


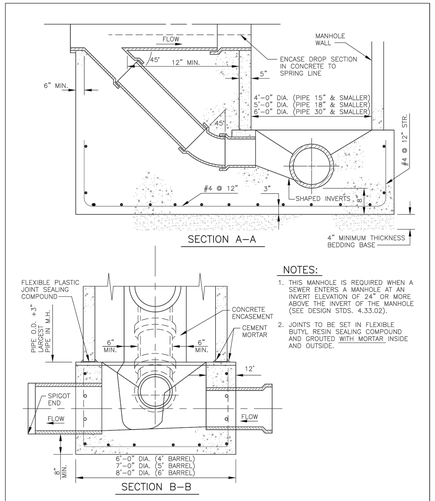
DESIGN STANDARDS	STANDARD DRAWING
SANITARY SEWER STANDARD MANHOLE	SS1
	DATE: 8/15/14



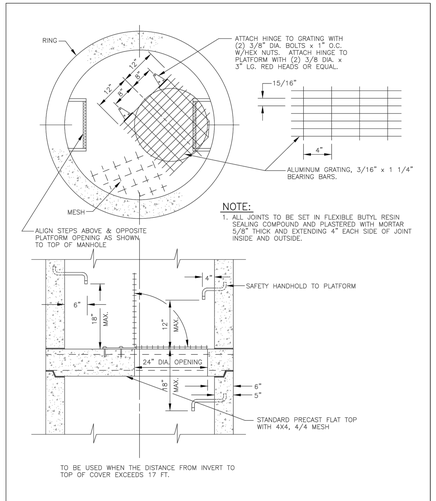
DESIGN STANDARDS	STANDARD DRAWING
MANHOLE BARRELS AND ALTERNATE TOPS	SS2
	DATE: 8/15/14



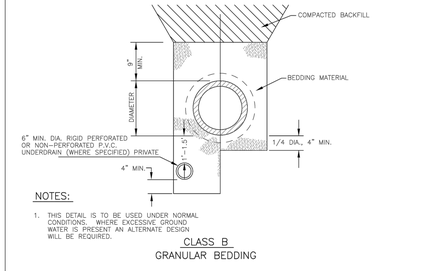
DESIGN STANDARDS	STANDARD DRAWING
MONOLITHIC BASES FOR DROP MANHOLE	SS3
	DATE: 8/15/14



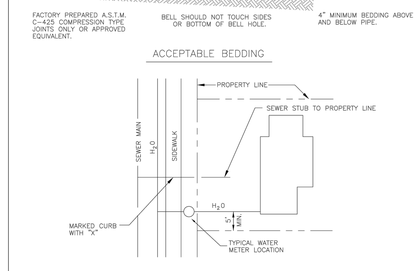
DESIGN STANDARDS	STANDARD DRAWING
DROP MANHOLE DETAIL	SS4
	DATE: 8/15/14



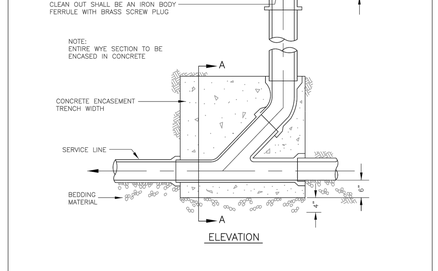
DESIGN STANDARDS	STANDARD DRAWING
INTERMEDIATE PLATFORM FOR MANHOLES 17' IN DEPTH	SS5
	DATE: 8/15/14



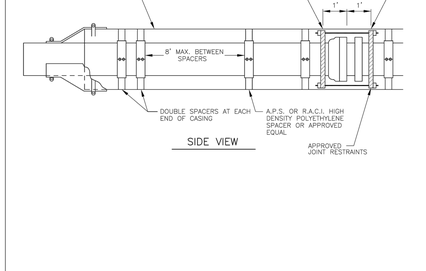
DESIGN STANDARDS	STANDARD DRAWING
TYPICAL PIPE BEDDING	SS6
	DATE: 8/15/14



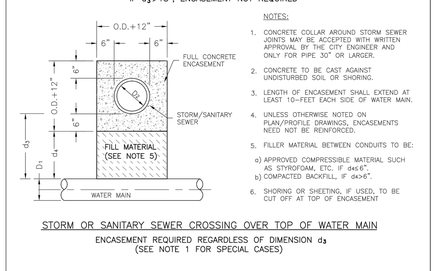
DESIGN STANDARDS	STANDARD DRAWING
TYPICAL HOUSE SERVICE LOCATION	SS7
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
STANDARD CLEAN-OUT DETAIL	SS8
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
JACKING DETAIL	SS9
	DATE: 8/15/14



DESIGN STANDARDS	STANDARD DRAWING
ENCASEMENT FOR CONDUIT CROSSING	SS11
	DATE: 8/15/14

PROJECT NO.:
PLAN NO.:

BENCHMARK:

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DETAILS
SANITARY DETAILS

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. NA | CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 34

CAD FILE: 20002948-SANITARY DETAILS.DWG

CONSTRUCTION DOCUMENTS\DETAILS\20002948-SANITARY DETAILS.DWG 6/22/2021 3:43 PM DAVID MAY

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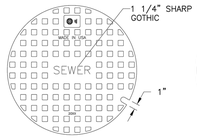
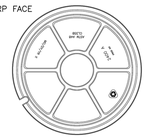
2400A Cover





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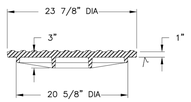

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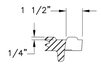

PICKSLOT DETAIL

Product Number
00340023
Design Features
-Materials
Gray Iron (CL30B)
-Design Load
Heavy Duty
-Coating
Undipped
-- - Designates Machined Surface

Certification
- ASTM A48
-Country of Origin USA

CITY OF Fort Lupton COLORADO COME PAINT YOUR FUTURE WITH US	DESIGN STANDARDS	STANDARD DRAWING
	SANITARY SEWER MANHOLE LID	SS12
		DATE: 5/04/2017

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

VERTICAL DATUM: NAVD88 USING GEOID MODEL "GEOID12A"
NGS "U 260" (NAVD88 EL=4894.42)
NGS "4907" (NAVD88 EL=4908.22)

811 Know what's **below.** **Call** before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496

CLIENT
ARBOR CAPITAL PARTNERS, LLC

COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
DETAILS
SANITARY DETAILS

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW
NOT FOR CONSTRUCTION

DR. NA | CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 35

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TURNAROUND STRIPING 4" SOLID WHITE STRIPE (TYP.)

PARKING STALL STRIPING 4" SOLID WHITE STRIPE (TYP.)

TRACT A

DRIVEWAY 01

DRIVEWAY 02

DRIVEWAY 03

ALTO STREET

PORCHIANO AVE.

SASSANO ST.

TRACT B

TRACT C

TRACT E

TRACT F

TRACT G

TRACT H

AMELIA ST.

ADRENO AVE.

BRINDISI AVE.

MONTBELLO AVE.

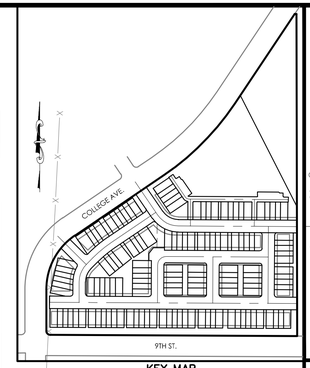
BARLETTA ST.

COLLEGE AVE.

9TH STREET

PARKING STALL STRIPING 4" SOLID WHITE STRIPE (TYP.)

PARKING STALL STRIPING 4" SOLID WHITE STRIPE (TYP.)



KEY MAP
N.T.S.

SPEED LIMIT 15
R2-1
24"x30"
NTS
(SPEED LIMIT AS NOTED ON PLAN)
4

SPEED LIMIT 25
R2-1
24"x30"
NTS
(SPEED LIMIT AS NOTED ON PLAN)
3

PORCHIANO AVE.
ALTO ST.
STREET SIGN (TYP.)
NTS
2

STOP
R1-1
30"x30"
NTS
1

40 0 40 80
(IN FEET)
1 inch = 40 ft.

PROJECT NO.:
PLAN NO.:

BENCHMARK:

HORIZONTAL DATUM: LOCAL COORDINATE SYSTEM BASED ON NGS "N 260 REST" (500000, 900000). KNOW INTERNALLY AS "BRIGHTON LOCAL". LINEAL MEASURE IS BASED ON THE U.S. SURVEY FOOT.

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ARBOR CAPITAL PARTNERS, LLC

CLIENT
ARBOR CAPITAL PARTNERS, LLC
COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO
CONSTRUCTION PLANS
SIGNAGE & STRIPING
SIGNAGE & STRIPING

DATE 6/22/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. NA | CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 36

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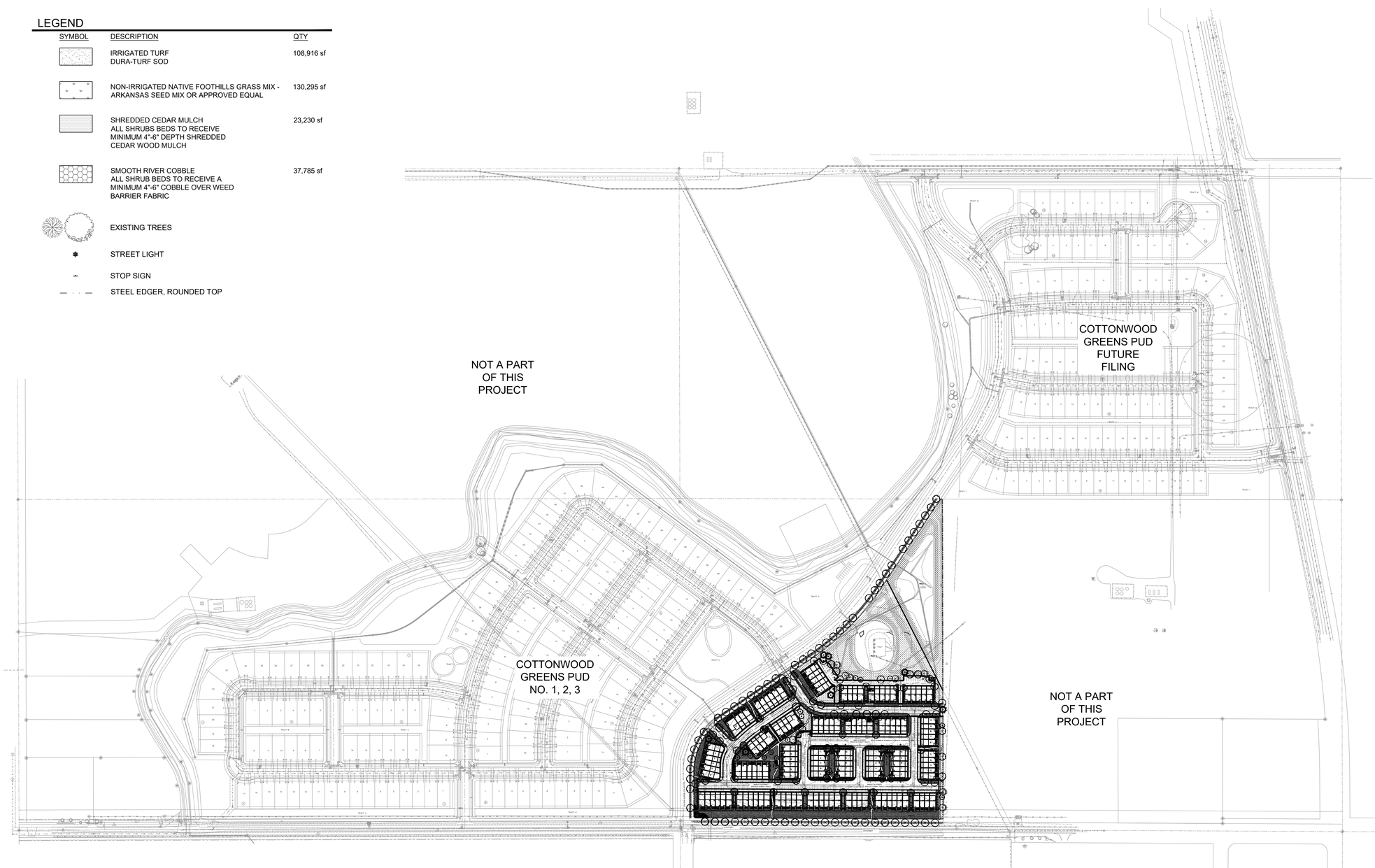
LEGEND

SYMBOL	DESCRIPTION	QTY
	IRRIGATED TURF DURA-TURF SOD	108,916 sf
	NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX - ARKANSAS SEED MIX OR APPROVED EQUAL	130,295 sf
	SHREDDED CEDAR MULCH ALL SHRUBS BEDS TO RECEIVE MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH	23,230 sf
	SMOOTH RIVER COBBLE ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" COBBLE OVER WEED BARRIER FABRIC	37,785 sf
	EXISTING TREES	
	STREET LIGHT	
	STOP SIGN	
	STEEL EDGER, ROUNDED TOP	



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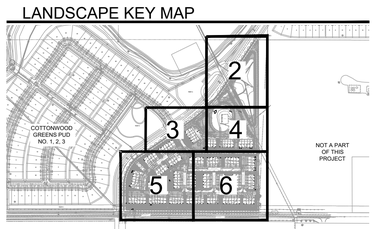
SCALE 1" = 200'-0"

LANDSCAPE KEY MAP



Sheet Index:

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LANDSCAPE PLAN	2
LANDSCAPE PLAN	3
LANDSCAPE PLAN	4
LANDSCAPE PLAN	5
LANDSCAPE PLAN	6
LANDSCAPE NOTES, DETAILS & SCHEDULES	7

TB GROUP
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TEL 970.532.5891
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SEAL

PROJECT TITLE:

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR:

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS DATE

DATE:

JUNE 21, 2021

SHEET TITLE:

Overall Landscape

SHEET INFORMATION:

Sheet Number: 1

Of: 7

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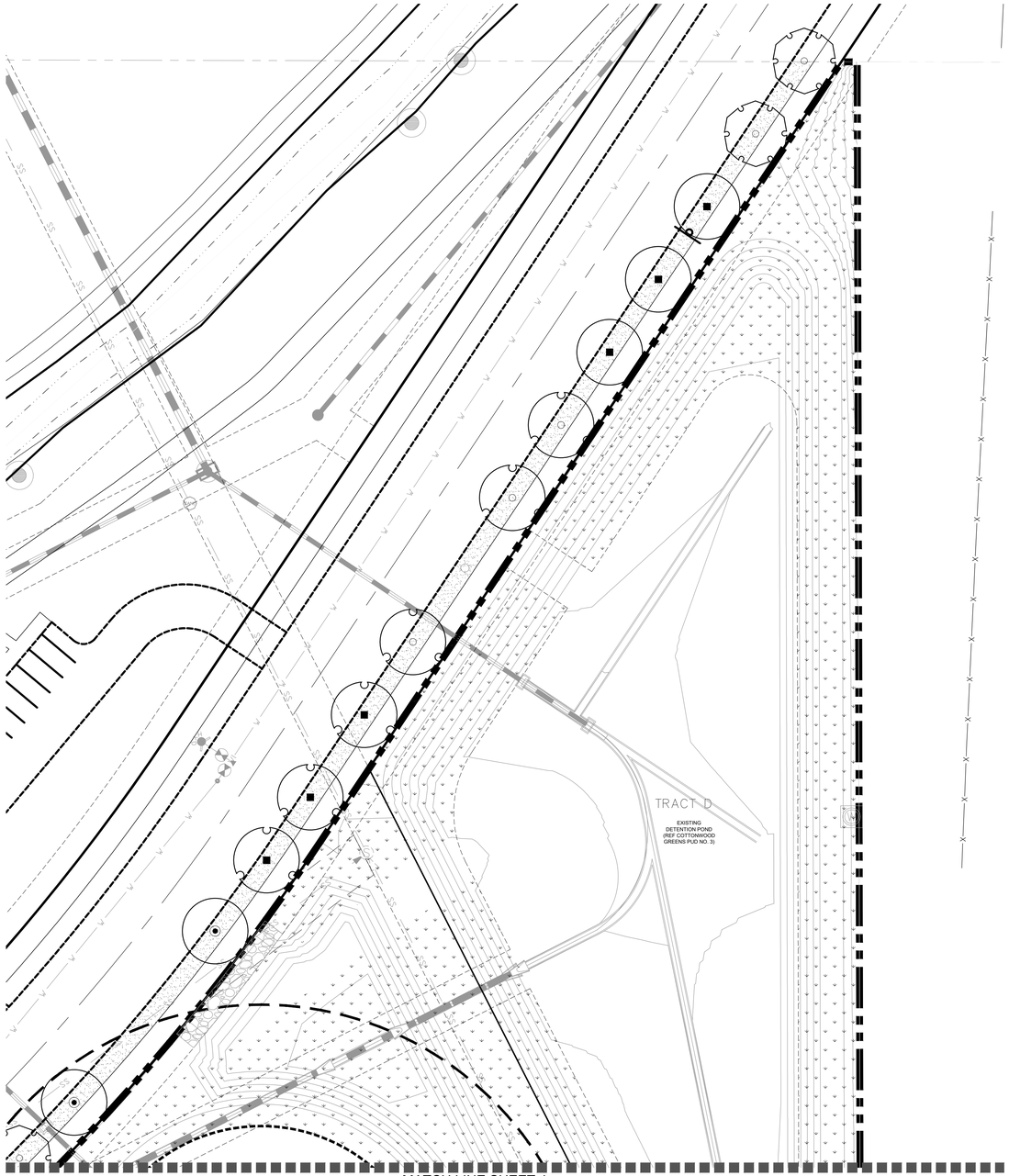


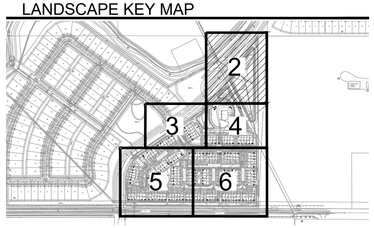
LANDSCAPE PLAN

0 30' 45' 60'

SCALE 1" = 30'-0"

NORTH

LANDSCAPE KEY MAP



PLANT LIST

DECIDUOUS TREES	QTY	BOTANICAL / COMMON NAME
	23	Celtis occidentalis Western Hackberry
	24	Gleditsia triacanthos `Skyline` Skyline Honey Locust
	26	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree
	22	Quercus buckleyi Texas Red Oak
	22	Quercus macrocarpa Burr Oak
	16	Tilia americana `Redmond` Redmond American Linden

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME
	15	Picea abies `Cupressina` Fastigiate Norway Spruce
	7	Picea pungens Colorado Spruce
	17	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine
	7	Pinus strobiformis Southwestern White Pine

ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME
	8	Acer glabrum Rocky Mountain Maple
	9	Acer tataricum `GarAnn` Hot Wings Tatarian Maple
	4	Malus x `Spring Snow` Spring Snow Crab Apple
	5	Pyrus calleryana `Chanticleer` Chanticleer Pear
	4	Syringa reticulata Japanese Tree Lilac

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME
	33	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry
	95	Buddleja davidii `Blue Chip` Dwarf Butterfly Bush
	52	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea
	65	Cornus sericea `Arctic Fire` Arctic Fire Dogwood
	59	Cornus sericea `Isanti` Isanti Dogwood
	64	Philadelphus x `Snowbell` Snowbell Mock Orange
	14	Physocarpus monogynus Mountain Ninebark
	64	Physocarpus opulifolius `Summer Wine` Summer Wine Ninebark
	47	Prunus besseyi `Pawnee Buttes` Creeping Western Sand Cherry
	51	Rhus trilobata Three-Leaf Sumac
	61	Ribes aureum Golden Currant
	27	Salix purpurea `Nana` Dwarf Arctic Willow
	63	Weigela florida Wine and Roses Wine and Roses Weigela

EVERGREEN SHRUBS	QTY	BOTANICAL / COMMON NAME
	42	Arctostaphylos uva-ursi Kinnikinnick
	29	Picea pungens `St. Mary`s Broom` St. Mary`s Broom Colorado Spruce
	49	Pinus mugo `Mops` Miniature Mugo Pine

GRASSES	QTY	BOTANICAL / COMMON NAME
	90	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass
	164	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass
	96	Helictotrichon sempervirens Blue Avena Grass
	125	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass
	31	Panicum virgatum `Shenandoah` Shenandoah Red Switch Grass

PERENNIALS	QTY	BOTANICAL / COMMON NAME
	30	Agastache rupestris `Sunset` Sunset Hyssop
	50	Echinacea purpurea Purple Coneflower
	38	Hemerocallis x `Red` Red Daylily
	45	Hemerocallis x `Stella de Oro` Stella de Oro Daylily
	53	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan

LEGEND

SYMBOL	DESCRIPTION	QTY
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	SHREDDED CEDAR MULCH ALL SHRUBS BEDS TO RECEIVE MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH	23,230 sf
	SMOOTH RIVER COBBLE ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" COBBLE OVER WEED BARRIER FABRIC	37,785 sf
	EXISTING TREES	
	STREET LIGHT	
	STOP SIGN	
	STEEL EDGER, ROUNDED TOP	

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TEL 970.532.5891
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SEAL

PROJECT TITLE

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS DATE

DATE

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LANDSCAPE PLAN

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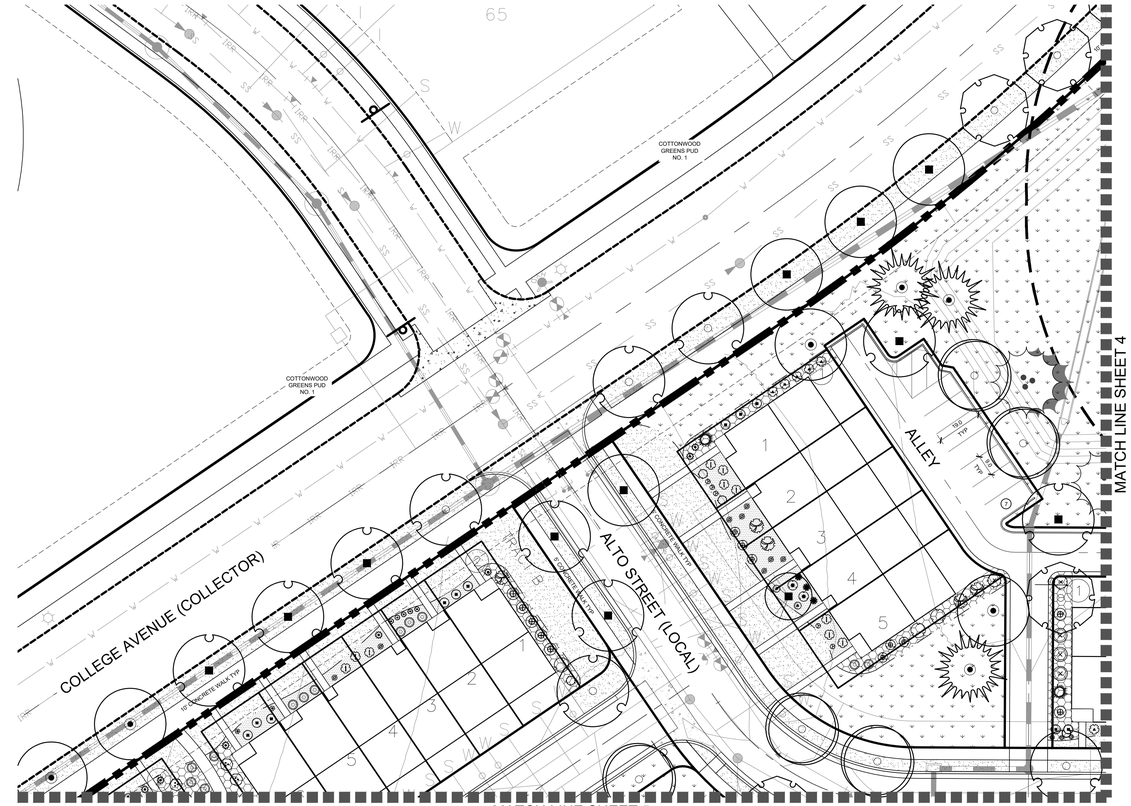


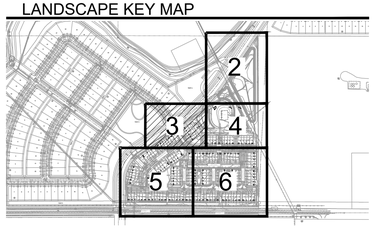
LANDSCAPE PLAN

0 30' 45' 60'

SCALE 1" = 30'-0"

NORTH

LANDSCAPE KEY MAP



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	65	Cornus sericea `Arctic Fire` Arctic Fire Dogwood
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	64	Philadelphus x `Snowbell` Snowbell Mock Orange
	14	Physocarpus monogynus Mountain Ninebark
	64	Physocarpus opulifolius `Summer Wine` Summer Wine Ninebark
	47	Prunus besseyi `Pawnee Buttes` Creeping Western Sand Cherry
	51	Rhus trilobata Three-Leaf Sumac
	61	Ribes aureum Golden Currant
	27	Salix purpurea `Nana` Dwarf Arctic Willow
	63	Weigela florida Wine and Roses Wine and Roses Weigela

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PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

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NEWPORT BEACH, CA 92660

REVISIONS DATE

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JUNE 21, 2021

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

Sheet Number: 3

Of: 7

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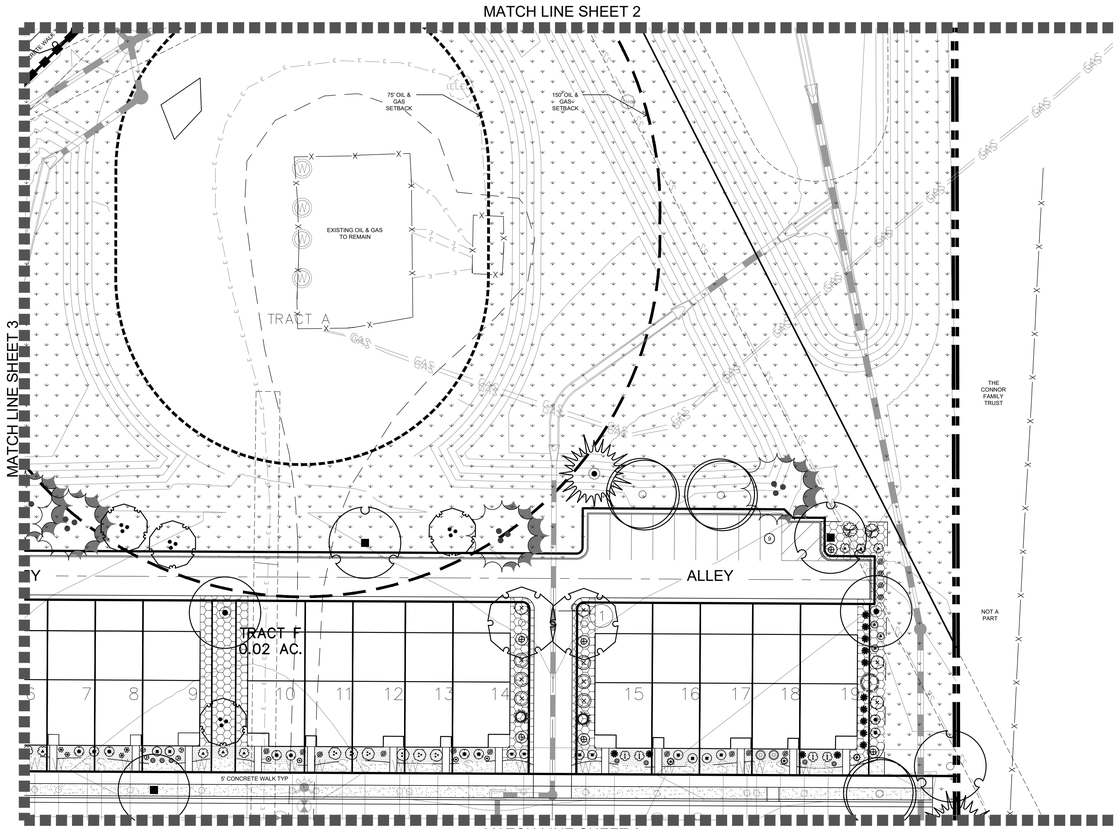

LANDSCAPE PLAN

0 30' 45' 60'

SCALE 1" = 30'-0"

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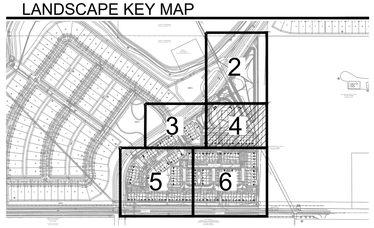

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	164	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass
	96	Helictotrichon sempervirens Blue Avena Grass
	125	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass
	31	Panicum virgatum `Shenandoah` Shenandoah Red Switch Grass

PERENNIALS	QTY	BOTANICAL / COMMON NAME
	30	Agastache rupestris `Sunset` Sunset Hyssop
	50	Echinacea purpurea Purple Coneflower
	38	Hemerocallis x `Red` Red Daylily
	45	Hemerocallis x `Stella de Oro` Stella de Oro Daylily
	53	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan

LEGEND

SYMBOL	DESCRIPTION	QTY
	IRRIGATED TURF DURA-TURF SOD	108,916 sf
	NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX - ARKANSAS SEED MIX OR APPROVED EQUAL	130,295 sf
	SHREDDED CEDAR MULCH ALL SHRUBS BEDS TO RECEIVE MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH	23,230 sf
	SMOOTH RIVER COBBLE ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" COBBLE OVER WEED BARRIER FABRIC	37,785 sf
	EXISTING TREES	
	STREET LIGHT	
	STOP SIGN	
	STEEL EDGER, ROUNDED TOP	

TB GROUP
landscape architecture | planning | illustration
444 Mountain Ave, Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS	DATE

DATE

JUNE 21, 2021

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

Sheet Number: 4

Of: 7

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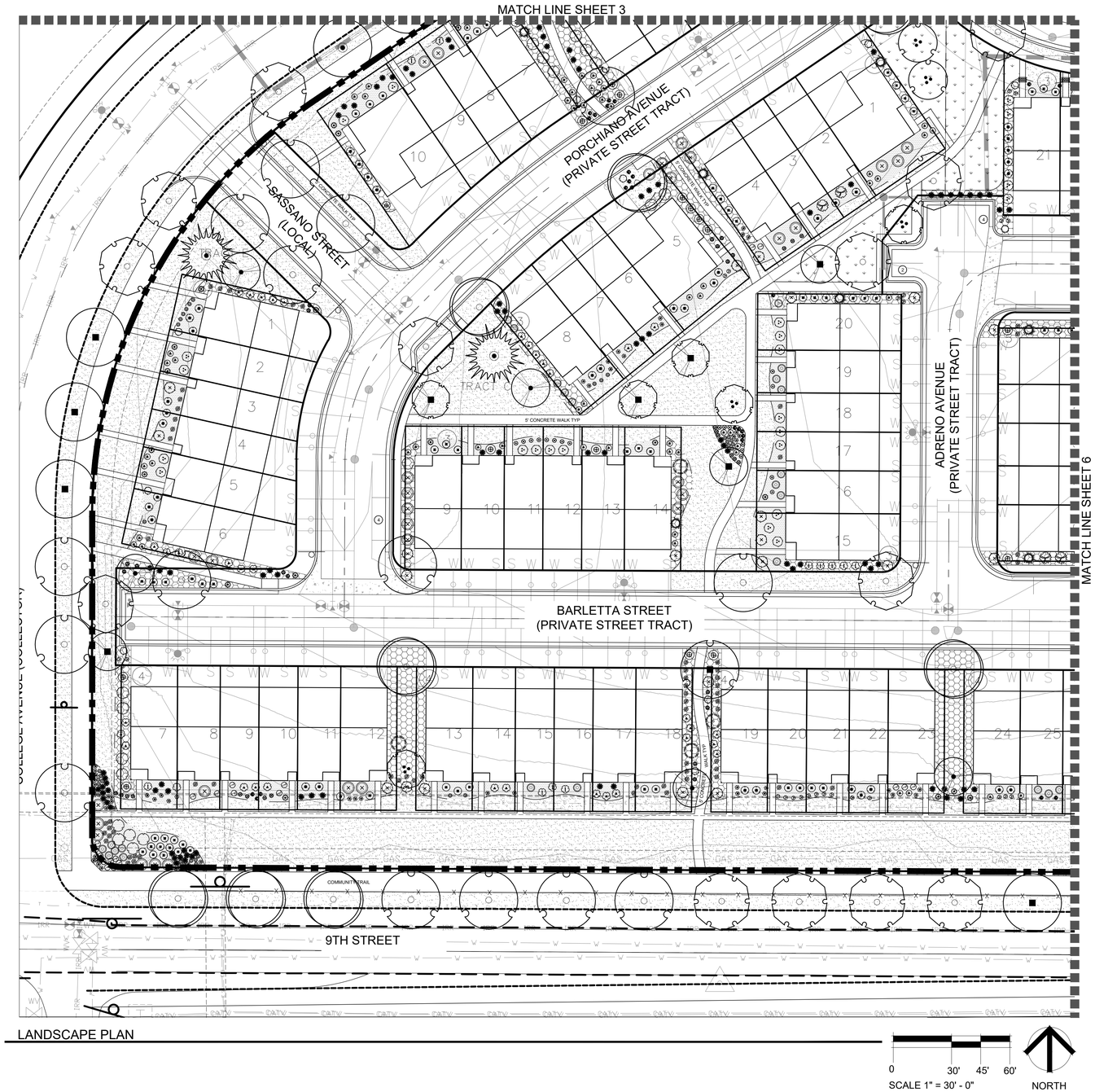


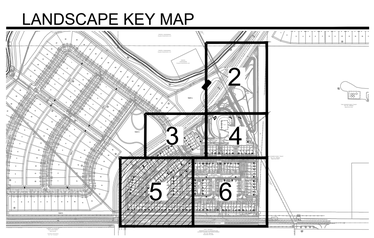
LANDSCAPE PLAN

0 30' 45' 60'

SCALE 1" = 30' - 0"

NORTH

LANDSCAPE KEY MAP



PLANT LIST

DECIDUOUS TREES	QTY	BOTANICAL / COMMON NAME
	23	Celtis occidentalis Western Hackberry
	24	Gleditsia triacanthos `Skyline` Skyline Honey Locust
	26	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree
	22	Quercus buckleyi Texas Red Oak
	22	Quercus macrocarpa Burr Oak
	16	Tilia americana `Redmond` Redmond American Linden

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME
	15	Picea abies `Cupressina` Fastigiate Norway Spruce
	7	Picea pungens Colorado Spruce
	17	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine
	7	Pinus strobiformis Southwestern White Pine

ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME
	8	Acer glabrum Rocky Mountain Maple
	9	Acer tataricum `GarAnn` Hot Wings Tatarian Maple
	4	Malus x `Spring Snow` Spring Snow Crab Apple
	5	Pyrus calleryana `Chanticleer` Chanticleer Pear
	4	Syringa reticulata Japanese Tree Lilac

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME
	33	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry
	95	Buddleja davidii `Blue Chip` Dwarf Butterfly Bush
	52	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea
	65	Cornus sericea `Arctic Fire` Arctic Fire Dogwood
	59	Cornus sericea `Isanti` Isanti Dogwood
	64	Philadelphus x `Snowbell` Snowbell Mock Orange
	14	Physocarpus monogynus Mountain Ninebark
	64	Physocarpus opulifolius `Summer Wine` Summer Wine Ninebark
	47	Prunus besseyi `Pawnee Buttes` Creeping Western Sand Cherry
	51	Rhus trilobata Three-Leaf Sumac
	61	Ribes aureum Golden Currant
	27	Salix purpurea `Nana` Dwarf Arctic Willow
	63	Weigela florida Wine and Roses Wine and Roses Weigela

EVERGREEN SHRUBS	QTY	BOTANICAL / COMMON NAME
	42	Arctostaphylos uva-ursi Kinnikinnick
	29	Picea pungens `St. Mary`s Broom` St. Mary`s Broom Colorado Spruce
	49	Pinus mugo `Mops` Miniature Mugo Pine

GRASSES	QTY	BOTANICAL / COMMON NAME
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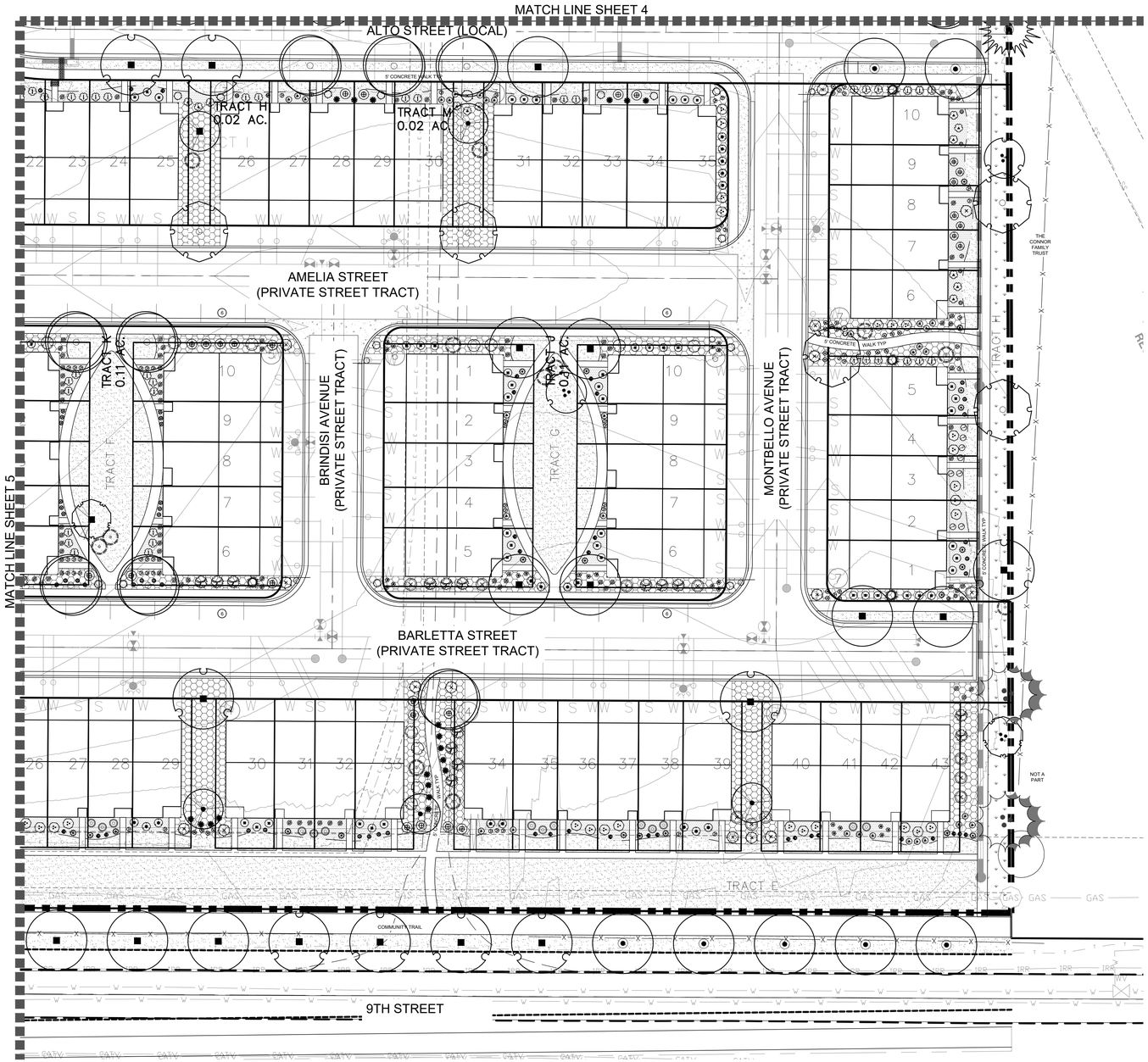

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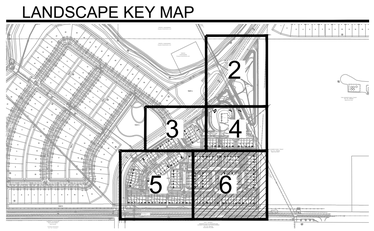

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LANDSCAPE PLAN

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Landscape Notes

1. LANDSCAPE AREAS SHALL BE MAINTAINED, INCLUDING MOWING, WATERING AND FERTILIZING BY CONTRACTOR, UP TO FINAL ACCEPTANCE. AT SUCH TIME OWNER WILL BE RESPONSIBLE FOR ALL MAINTENANCE. LANDSCAPE AND IRRIGATION WILL BE WARRANTED FOR ONE (1) FULL YEAR AFTER FINAL ACCEPTANCE.
2. ANY DISCREPANCIES WITH THE DRAWINGS AND SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH CONSTRUCTION.
3. CONTRACTOR TO VERIFY ALL FIELD CONDITIONS, EASEMENTS, PROPERTY LINES, ETC. PRIOR TO STARTING WORK. SHOULD ANY DISCREPANCIES, OMISSIONS, OR ERRORS OCCUR, NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES 48 HRS. PRIOR TO ANY EXCAVATION OR PLANTING.
5. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH PLANTING OPERATIONS.1 - NO TREES OR SHRUBS SHALL BE PLANTED WITHIN 10' FROM WATER AND SEWER LINES, 4' FROM GAS, TELEPHONE AND ELECTRIC UTILITY LINES.
6. NO SHRUBS SHALL BE PLANTED WITHIN FIVE (5) FEET OR TREES WITHIN TEN (10) FEET OF POTABLE AND NON-POTABLE WATER METERS, FIRE HYDRANTS, SANITARY SEWER MANHOLES, POTABLE WATER, SANITARY SEWER, STORM SEWER, OR NON-POTABLE IRRIGATION MAINS.
7. MINIMUM CLEARANCE OF THREE (3) FEET ON EACH SIDE OF FIRE DEPARTMENT CONNECTION (FDC). NO VEGETATION OTHER THAN TURF OR GROUND COVERS PLANTED IN FRONT OF FDC.
8. TREES SHALL BE LIMBED TO A HEIGHT OF NOT LESS THAN EIGHT (8) FEET ABOVE ANY PUBLIC STREET OR SIDEWALK. SHRUBS AND OTHER PLANT MATERIALS SHALL BE MAINTAINED AT A HEIGHT OF NOT MORE THAN THIRTY (30) INCHES, AND SAID MAINTENANCE SHALL BE CONDUCTED IN PERPETUITY.
9. IF TREES OR SHRUBS ARE LOCATED ON TOP OF FIELD VERIFIED UTILITIES, CONTRACTOR SHALL NOTIFY OWNER BEFORE ANY DIGGING HAS COMMENCED. VERIFY WITH OWNER IF AND WHICH SHRUBS/TREES SHALL BE TAKEN OUT OF PROJECT/CONTRACT.
10. TO THE MAXIMUM EXTENT FEASIBLE, TOPSOIL THAT IS REMOVED DURING CONSTRUCTION ACTIVITY SHALL BE CONSERVED FOR LATER USE ON AREAS REQUIRING REVEGETATION AND LANDSCAPING.
11. EXCAVATED MATERIAL TO BE USED AS FILL WILL HAVE ALL ROCKS, DEBRIS, WASTE MATERIAL, FROZEN MATERIAL, AND VEGETATION LARGER THAN 3" IN ANY DIMENSION REMOVED BEFORE PLACEMENT AND COMPACTION OF SOIL.
12. PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING FOUNDATIONS AND A SMOOTH TRANSITION BETWEEN ALL ADJACENT EXISTING GRADES AND PROPOSED GRADES.
13. PRIOR TO FINE GRADING, SOD AREAS AND PLANTING BEDS SHALL BE THOROUGHLY LOOSENED AND TILLED TO A 6" DEPTH. REMOVE ALL UNSUITABLE TOPSOIL, INCLUDING ALL ROCKS OR OTHER MATERIAL LARGER THAN 1 INCHES IN ANY DIRECTION, ALL CONCRETE, TRASH, DEBRIS, WEEDS, ROOTS AND OTHER WASTE MATERIALS. AFTER THAT TIME ORGANIC AMENDMENTS SHALL THEN BE THOROUGHLY TILLED AND INCORPORATED TO A MINIMUM 6" DEPTH IN THESE AREAS AT THE MINIMUM OF RATE OF 3 CU. YDS. / 1,000 SQ.FT.
14. UNIFORMLY COMPACT AND FINE GRADE THESE SOD / GRASS AREAS AND PLANTING BEDS TO A SMOOTH SURFACE, FREE FROM IRREGULAR SURFACE CHANGES. CUT OUT SOFT SPOTS, FILL IN LOW SPOTS AND TRIM HIGH SPOTS TO COMPLY WITH REQUIRED GRADE TOLERANCES.
15. ONCE COMPACTED AND FINE GRADED, ALL ROCKS, DEBRIS, WASTE MATERIAL AND VEGETATION MATERIAL LARGER THAN 1/2" WILL BE RAKED FROM THE SURFACE AND REMOVED FROM SITE.
16. SOD TO BE 100% COLORADO GROWN DURA-TURF TALL FESCUE BLEND SPECIFICALLY GROWN FOR LOW WATER LAWN APPLICATIONS WITH MINIMUM THREE (3) IMPROVED VARIETIES, HAVING A HEALTHY VIGOROUS ROOT SYSTEM. ONCE TURF IS LAID IT SHALL BE PROPERLY ROLLED, COMPACTED AND PUSHED TOGETHER TO ELIMINATE ANY GAPS BETWEEN ROLL EDGES. APPLY FERTILIZER IN THESE AREAS PER SOD FARM'S RECOMMENDATIONS.
17. ALL PLANT MATERIALS ARE SIZED AND OUTLINED IN PLANT LIST. ALL PLANTS TO BE PLANTED IN AMENDED SOIL AND STAKED AS SHOWN IN DETAILS. ALL PLANT MATERIAL SHALL MEET OR EXCEED THE CODE OF STANDARDS CURRENTLY RECOMMENDED BY THE COLORADO NURSERY ACT FOR NUMBER ONE GRADE.
18. IF PLANTS ARE IN NEED OF REPLACEMENT DUE TO DECLINING HEALTH, DISEASE, OR DEATH, THE PLANTS MUST BE REPLACED WITH THE ORIGINAL SPECIES UNLESS APPROVED BY THE CITY.
19. CHANGES IN PLANT SPECIES OF PLANT LOCATIONS FROM WHAT IS LISTED ON THE LANDSCAPE PLAN WILL REQUIRE THE APPROVAL OF THE CITY PRIOR TO INSTALLATION OF REPLACEMENT. OVERALL QUANTITY AND QUALITY TO BE CONSISTENT WITH THE APPROVED PLANS. IN THE EVENT OF CONFLICT WITH THE QUANTITIES INCLUDED IN THE PLANT LIST, SPECIES AND QUANTITIES SHALL BE PROVIDED.
20. ALL TREES AND SHRUBS TO BE BALLED AND BURLAPPED, OR CONTAINERIZED.
21. ALL PLANT MATERIAL SHALL HAVE ALL WIRE, TWINE, BASKETS, BURLAP, AND ALL OTHER NON-BIODEGRADABLE CONTAINMENT MATERIAL REMOVED FROM THE TRUNK AND/OR ROOT BALL OF THE PLANT, PRIOR TO PLANTING.
22. ALL SHRUB BEDS SHALL HAVE MINIMUM 4" DEPTH SHREDDED CEDAR MULCH OR NATURAL COLOR AND/OR WASHED SMOOTH RIVER ROCK. A CONTINUOUS LAYER OF TYPAR LANDSCAPE FABRIC OR APPROVED EQUAL SHALL BE INSTALLED IN ALL SHRUB BEDS WITH 6" OVERLAP AT SEAMS WITH 4" STAPLES 4' O.C. IN ALL DIRECTIONS.
23. EDGING BETWEEN GRASS TYPES AND SHRUB BEDS / ROCK COBBLE AND CRUSHER FINES SHALL BE 14 GA HEAVY DUTY STEEL EDGER MIN. ¼" x 4" WITH ROLLED TOP AND SHALL BE SET LEVEL WITH THE TOP OF THE ADJACENT SOD.

General Notes:

1. ALL SIGNS SHALL BE REQUIRED TO APPLY FOR A SIGN PERMIT.
2. PROPOSED GRADES SHALL MATCH OR IMPROVE EXISTING GRADES TO PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING WHILE PROVIDING A SMOOTH TRANSITION BETWEEN ALL ADJACENT UNDISTURBED GRADES AND PROPOSED GRADES.
3. JOB SITE TO BE KEPT CLEAN AT ALL TIMES AND CONSTRUCTION AREAS ARE TO BE MAINTAINED FOR SAFETY.
4. SOILS DISTURBED ADJACENT TO WORK AREA, INCLUDING AREAS OUTSIDE OF CONSTRUCTION LIMITS, DUE TO NEW CONSTRUCTION ARE TO BE REGRADED AND SURFACE CONDITIONS REPAIRED EQUIVALENT TO THAT CONDITION PRIOR TO START OF WORK.
5. PROTECT EXISTING SURFACES AND SOILS, BOTH INSIDE AND OUTSIDE OF CONSTRUCTION LIMITS, DURING CONSTRUCTION. IF GRADES, CONCRETE OR ASPHALT ARE DAMAGED DUE TO CONSTRUCTION OPERATIONS OR WEATHER THE CONTRACTOR IS RESPONSIBLE FOR REPAIR TO THAT EQUIVALENT TO EXISTING CONDITIONS AT NO EXPENSE TO THE OWNER / CITY.
6. CONTRACTOR IS RESPONSIBLE FOR SETUP OF BARRICADES, WARNING SIGNAGE, OR OTHER PROTECTIVE DEVICES IF ANY EXCAVATIONS ARE LEFT EXPOSED AFTER ON-SITE WORK HOURS.
7. THE CONTRACTOR SHALL NOT PURPOSEFULLY PROCEED WITH ANY CONSTRUCTION PER PLANS PROVIDED WHEN OBSTRUCTIONS AND/OR GRADE DIFFERENCES EXIST THAT WERE NOT CONSIDERED OR CHANGED AFTER PLANS WERE SUBMITTED. CONTRACTOR SHALL NOTIFY OWNER OR OWNER'S REPRESENTATIVE AND THE CITY OF LOVELAND IF SITUATION ARISES AND REVISIONS ARE NECESSARY.
8. THE CONTRACTOR SHALL PREVENT SEDIMENT, DEBRIS AND OTHER POLLUTANTS FROM ENTERING ANY STORM WATER SEWER SYSTEM OR, ADJACENT WATER WAYS, ETC., DURING THE DEMOLITION OR CONSTRUCTION OPERATIONS THAT ARE PART OF THIS PROJECT. THE CONTRACTOR SHALL BE HELD RESPONSIBLE AND EXPENSE FOR THE CORRECTION OF ANY ADVERSE IMPACTS TO THE STORM WATER SEWER SYSTEM OR, ADJACENT WATER WAYS, WETLANDS ETC., RESULTING FROM THE WORK DONE AS PART OF THIS PROJECT/CONTRACT.
9. THE CONTRACTOR SHALL BE RESPONSIBLE PRIOR TO BIDDING AND CONSTRUCTION, OF BECOMING AWARE OF ALL EXISTING AND PROPOSED UTILITIES, PIPES, STRUCTURES, ETC. CALL UNCC THREE DAYS BEFORE SCHEDULED WORK AT 811 OR 1-800-922-1987.

Tree Protection Notes

1. HEAVY EQUIPMENT SHOULD NOT BE ALLOWED TO COMPACT OVER THE SOIL OVER THE ROOT ZONE OF PROTECTED EXISTING TREES.
2. AVOID CUTTING SURFACE ROOTS WHEREVER POSSIBLE. SIDEWALKS AND PAVING LEVELS SHOULD BE CONTOURED SUFFICIENTLY TO AVOID DAMAGE.
3. ROOT CUTS FROM EXCAVATION SHOULD BE DONE RAPIDLY. SMOOTH FLUSH CUTS SHOULD BE MADE. BACKFILL BEFORE THE ROOTS HAVE A CHANCE TO DRY OUT AND WATER THE TREE IMMEDIATELY.
4. PRIOR TO CONSTRUCTION, ALL PROTECTED TREES SHALL HAVE ORANGE PROTECTION BARRIER FENCING ERECTED, WHICH AS A MINIMUM ARE SUPPORTED BY 1" X 1" OR SIMILAR STURDY STOCK, FOR SHIELDING OF PROTECTED TREES, NO CLOSER THAN SIX (6) FEET FROM THE TRUNK OR ONE HALF (1/2) OF THE DRIP LINE, WHICH EVER IS GREATER. WITHIN THIS PROTECTION ZONE THERE SHALL BE NO MOVEMENT OF EQUIPMENT OR STORAGE OF EQUIPMENT, MATERIALS, DEBRIS, FILL OR CUT UNLESS APPROVED BY THE CITY FORESTER.
5. WITHIN THE DRIP LINE OF ANY PROTECTED EXISTING TREE, THERE SHALL BE NO CUT OR FILL OVER A FOUR INCH DEPTH UNLESS A QUALIFIED ARBORIST OR FORESTER HAS EVALUATED AND APPROVED THE DISTURBANCE.
6. DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE APPLICANT SHALL PREVENT THE CLEANING OF EQUIPMENT OR MATERIAL OR THE STORAGE OR DISPOSAL OF WASTE MATERIAL SUCH AS PAINTS, OILS, SOLVENTS, ASPHALT, CONCRETE, MOTOR OIL OR ANY OTHER MATERIAL HARMFUL TO THE LIFE OF A TREE, WITHIN THE DRIP LINE OF ANY PROTECTED TREE OR GROUP OF TREES.
7. NO DAMAGING ATTACHMENT, WIRES, SIGNS OR PERMITS MAY BE FASTENED TO ANY PROTECTED TREE.

Native Grass Seed Mix

NATIVE GRASS - NATIVE PRAIRIE MEADOW GRASS MIX:

1. SEED SHALL BE AS MANUFACTURED BY ARKANSAS VALLEY SEED SOLUTIONS, 4625 COLORADO BOULEVARD, DENVER, CO 80216, (877) 957-3337.
2. SEED SHALL BE A MIXTURE THAT MATCHES THE FOLLOWING:

NON-IRRIGATED FOOTHILLS MIX

COMMON NAME	%
ANNUAL RYEGRASS	20%
SLENDER WHEATGRASS	15%
CRESTED WHEATGRASS	12%
MOUNTAIN BROME	10%
HARD FESCUE	10%
CANADA BLUEGRASS	10%
SIDEOATS GRAMA	6%
BIG BLUESTEM	5%
BLUE GRAMA (COATED)	5%
SAND DROPSEED	1%

3. DRILLED APPLICATION RATE: 25.0 LBS (PLS) PER ACRE (0.57 LBS / 1000 SF
4. NATIVE SEED AREAS: ADEQUATE TEMPORARY IRRIGATION OR BY WATER TRUCK WILL BE PROVIDED FOR THE ESTABLISHMENT AND MAINTENANCE FOR THESE SEEDED AREAS, AND THAT NATIVE GRASSES SHALL BE MAINTAINED IN A CONDITION OF ACCEPTABLE HEIGHT, FREE OF WEEDS, TRASH AND DEBRIS, AND SHALL NOT REPRESENT A FIRE HAZARD NOR BECOME A NUISANCE SITE FOR WATER OR WIND EROSION.

MULCH IN ALL NATIVE SEED AREAS:

1. IMMEDIATELY FOLLOWING THE RAKING OPERATION, ADD STRAW MULCH TO THE SEEDED AREAS.
2. APPLY STRAW MULCH AT A MINIMUM OF 1.5 TONS PER ACRE OF AIR DRY MATERIAL. SPREAD STRAW MULCH UNIFORMLY OVER THE AREA WITH MECHANICAL MULCH SPREADER / CRIMPER. DO NOT MULCH WHEN WIND VELOCITY EXCEEDS 10 MPH.
3. WHEREVER THE USE OF CRIMPING EQUIPMENT IS PRACTICAL, PLACE MULCH IN THE MANNER NOTED ABOVE AND ANCHOR IT INTO THE SOIL. USE A DISC SUCH AS A MULCH TILLER, WITH A FLAT SERRATED DISC AT LEAS ½ INCH IN THICKNESS, HAVING DULL EDGES, AND SPACE NO MORE THAN 9 INCHES APART, WITH DISCS OF SUFFICIENT DIAMETER TO PREVENT THE FRAME OF THE EQUIPMENT FROM DRAGGING THE MULCH. ANCHOR MULCH A MINIMUM DEPTH OF 2 INCHES AND ACROSS THE SLOPE WHERE PRACTICAL WITH NO MORE THAN TWO PASSES OF THE ANCHORING EQUIPMENT.
4. IMMEDIATELY UPON COMPLETION OF THE MULCHING AND BINDING OPERATION, THE SEEDED AREAS SHALL BE IRRIGATED, KEEPING THE TOP 2 INCHES OF SOIL EVENLY MOIST UNTIL SEED HAS UNIFORMLY GERMINATED AND GROWN TO A HEIGHT OF 2-INCHES.
5. WATERING APPLICATION SHALL BE DONE IN A MANNER WHICH WILL PROVIDE UNIFORM COVERAGE BUT WHICH WILL NOT CAUSE EROSION, MOVEMENT, OR DAMAGE TO THE FINISHED SURFACE.

Irrigation Notes

1. IRRIGATION CONTRACTOR SHALL VERIFY AVAILABLE P.S.I. AND GPM. THIS SYSTEM SHALL THEN BE VERIFIED TO MEET THE AVAILABLE P.S.I. AND GPM AND THE PROPOSED IRRIGATION SYSTEM. IF NECESSARY CONTACT THE WATER DEPARTMENT PRIOR TO BEGINNING DESIGN TO OBTAIN AVAILABLE PRESSURES.
2. ALL INDICATED SOD GRASS AREAS ARE TO BE IRRIGATED BY A PERMANENT UNDERGROUND AUTOMATIC IRRIGATION SYSTEM. TURF AREAS LESS THAN 25 FEET IN WIDTH ARE TO BE IRRIGATED WITH POP-UP SPRAY HEADS, AND AREAS GREATER THAN 25 FEET SHALL USE A ROTOR POP-UP SPRAY SYSTEM. ALL IRRIGATION SYSTEMS SHALL BE DESIGNED TO MINIMIZE OVERSPRAY.
3. ALL TREES, SHRUBS AND PERENNIALS OUTSIDE OF IRRIGATED SOD AREAS ARE TO BE IRRIGATED WITH A PERMANENT DRIP IRRIGATION SYSTEM. IRRIGATION SYSTEMS SHALL BE DESIGNED TO AVOID OVERSPRAY ONTO NON-PLANTED AND IMPERVIOUS SURFACES. IRRIGATION SYSTEMS SHALL BE MAINTAINED IN GOOD WORKING ORDER AND CHECKED TO ENSURE THAT OVERSPRAY DOES NOT OCCUR.
4. FINAL LOCATION OF IRRIGATION HEADS MUST BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO PLANTING. HEAD LOCATION SHALL BE COORDINATED IN THE FIELD WITH EXISTING SITE CONDITIONS AND PLANT MATERIAL.
5. ALL IRRIGATION TRENCHES SHALL BE PROPERLY WATERED AND COMPACTED TO AVOID FUTURE SETTLING. ANY SETTLING DURING WARRANTY PERIOD WILL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE OWNER.
6. COORDINATE ALL IRRIGATION WORK WITH EXISTING UTILITIES AND RESPECTIVE TRADES.
7. ALL IRRIGATION SLEEVING SHALL BE PROVIDED AND INSTALLED BY GENERAL CONTRACTOR. IRRIGATION CONTRACTOR SHALL COORDINATE SLEEVING LOCATIONS WITH GENERAL CONTRACTOR. ALL IRRIGATION SLEEVING TO BE STAKED IN THE FIELD OR LOCATED ON DIMENSIONED "AS-BUILT" DRAWING BY THE GENERAL CONTRACTOR TO ALLOW FUTURE USE AND LOCATION.

Plant List

DECIDUOUS TREES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	23	Celtis occidentalis Western Hackberry	2.0" cal. BB	60`	40`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	24	Gleditsia triacanthos `Skyline` Skyline Honey Locust	2.0" cal. BB	50`	30`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	26	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree	2.0" cal. BB	60`	40`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	22	Quercus buckleyi Texas Red Oak	2.0" cal. BB	40`	30`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	22	Quercus macrocarpa Burr Oak	2.0" cal. BB	80`	70`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	16	Tilia americana `Redmond` Redmond American Linden	2.0" cal. BB	50`	40`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	15	Picea abies `Cupressina` Fastigiate Norway Spruce	6`, BB	20`	6`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	7	Picea pungens Colorado Spruce	6`, BB	50`	30`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	17	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine	6`, BB	15`	8`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	7	Pinus strobiformis Southwestern White Pine	6`, BB	50`	30`	FULL SPECIMEN, EVENLY AND WELL BRANCHED

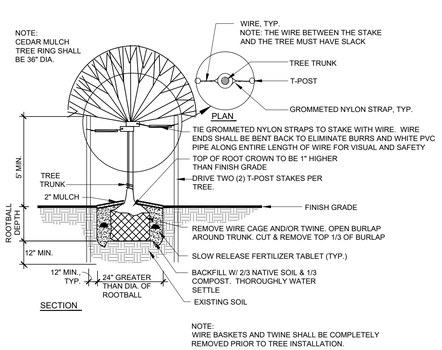
ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	8	Acer glabrum Rocky Mountain Maple	1.5" cal. BB	20`	15`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	9	Acer tataricum `GarAnn` Hot Wings Tatarian Maple	1.5" cal. BB	20`	15`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	4	Malus x `Spring Snow` Spring Snow Crab Apple	1.5" cal. BB	25`	20`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	5	Pyrus calleryana `Chanticleer` Chanticleer Pear	1.5" cal. BB	35`	25`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	4	Syringa reticulata Japanese Tree Lilac	1.5" cal. BB	25`	20`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	33	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry	5 gal.	8`	6`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	95	Buddleja davidii `Blue Chip` Dwarf Butterfly Bush	5 gal.	2`	3`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED
	52	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	65	Cornus sericea `Arctic Fire` Arctic Fire Dogwood	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	59	Cornus sericea `Isanti` Isanti Dogwood	5 gal.	5`	5`	24" (h) FULL SPECIMEN, EVENLY AN WELL BRANCHED
	64	Philadelphus x `Snowbell` Snowbell Mock Orange	5 gal.	3`	3`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	14	Physocarpus monogynus Mountain Ninebark	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	64	Physocarpus opulifolius `Summer Wine` Summer Wine Ninebark	5 gal.	4`	4`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED
	47	Prunus besseyi `Pawnee Buttes` Creeping Western Sand Cherry	5 gal.	2`	5`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED
	51	Rhus trilobata Three-Leaf Sumac	5 gal.	6`	6`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	61	Ribes aureum Golden Currant	5 gal.	4`	4`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	27	Salix purpurea `Nana` Dwarf Arctic Willow	5 gal.	6`	6`	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	63	Weigela florida Wine and Roses Wine and Roses Weigela	5 gal.	4`	4`	24" (h) FULL SPECIMEN EVENLY AND WELL BRANCHED

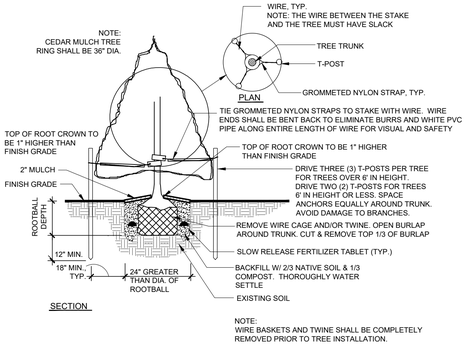
EVERGREEN SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	42	Arctostaphylos uva-ursi Kinnikinnick	5 gal.	6"	6`	12"(h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	29	Picea pungens `St. Mary`s Broom` St. Mary`s Broom Colorado Spruce	5 gal.	3`	4`	12" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	49	Pinus mugo `Mops` Miniature Mugo Pine	5 gal.	3`	3`	12"(h) FULL SPECIMEN, EVENLY AND WELL BRANCHED

GRASSES	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	90	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED
	164	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass	1 gal.	5`	2.5`	WELL ROOTED AND ESTABLISHED
	96	Helictotrichon sempervirens Blue Avena Grass	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED
	125	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass	1 gal.	4`	2`	WELL ROOTED AND ESTABLISHED
	31	Panicum virgatum `Shenandoah` Shenandoah Red Switch Grass	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED

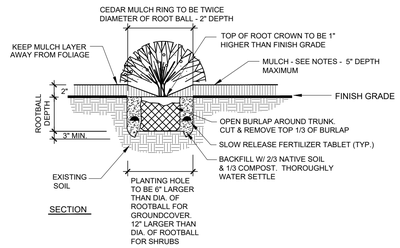
PERENNIALS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	WIDTH	REMARKS
	30	Agastache rupestris `Sunset` Sunset Hyssop	1 gal.	3`	3`	WELL ROOTED AND ESTABLISHED
	50	Echinacea purpurea Purple Coneflower	1 gal.	3`	2`	WELL ROOTED AND ESTABLISHED
	38	Hemerocallis x `Red` Red Daylily	1 gal.	2`	2`	WELL ROOTED AND ESTABLISHED
	45	Hemerocallis x `Stella de Oro` Stella de Oro Daylily	1 gal.	2`	2`	WELL ROOTED AND ESTABLISHED
	53	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan	1 gal.	2`	2`	WELL ROOTED AND ESTABLISHED



DECIDUOUS TREE PLANTING DETAIL



CONIFER TREE PLANTING DETAIL



GROUND COVER & SHRUB PLANTING DETAIL

TB GROUP
landscape architecture | planning | illustration
444 Mountain Ave.
Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

COTTONWOOD GREENS PUD FILING NO. 4

PROJECT NO: LUP2021-
PLAN NO:

FORT LUPTON, COLORADO

PREPARED FOR

ARBOR CAPITAL PARTNERS LLC
4040 MACARTHUR BLVD.,
STE. 250
NEWPORT BEACH, CA 92660

REVISIONS | DATE

DATE

JUNE 21, 2021

SHEET TITLE

Landscape Notes, Details & Schedules

SHEET INFORMATION

Sheet Number: 7

Of: 7

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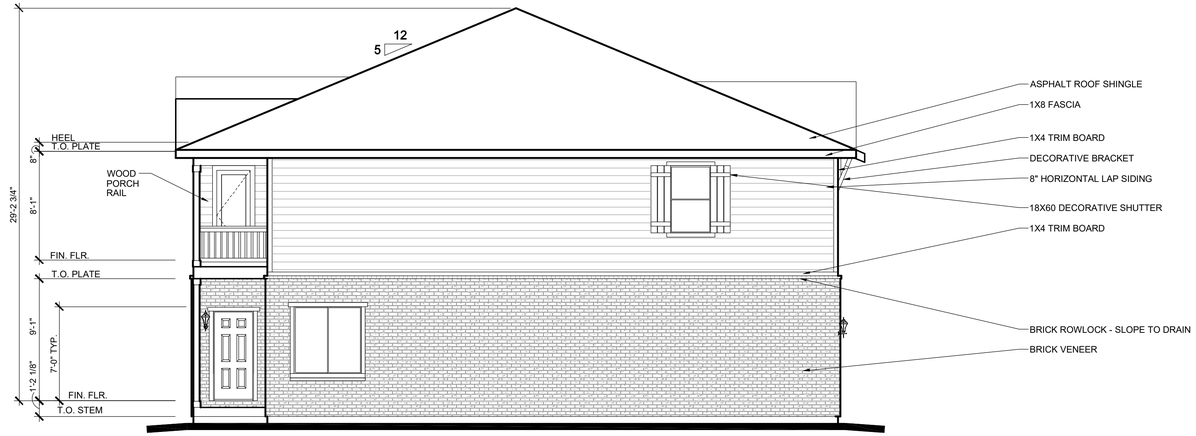

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1(LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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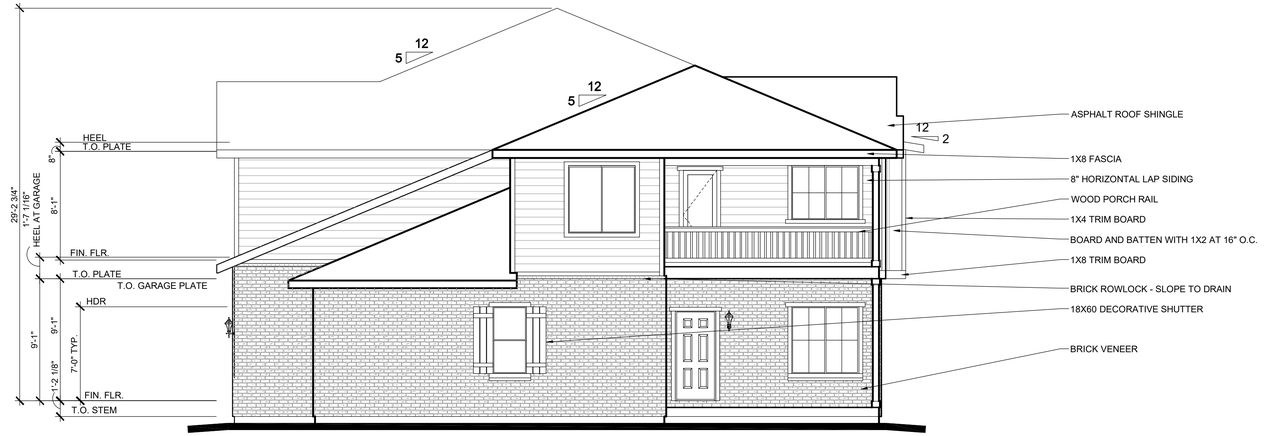

UNIT 4 (ELDORA)

LEFT ELEVATION

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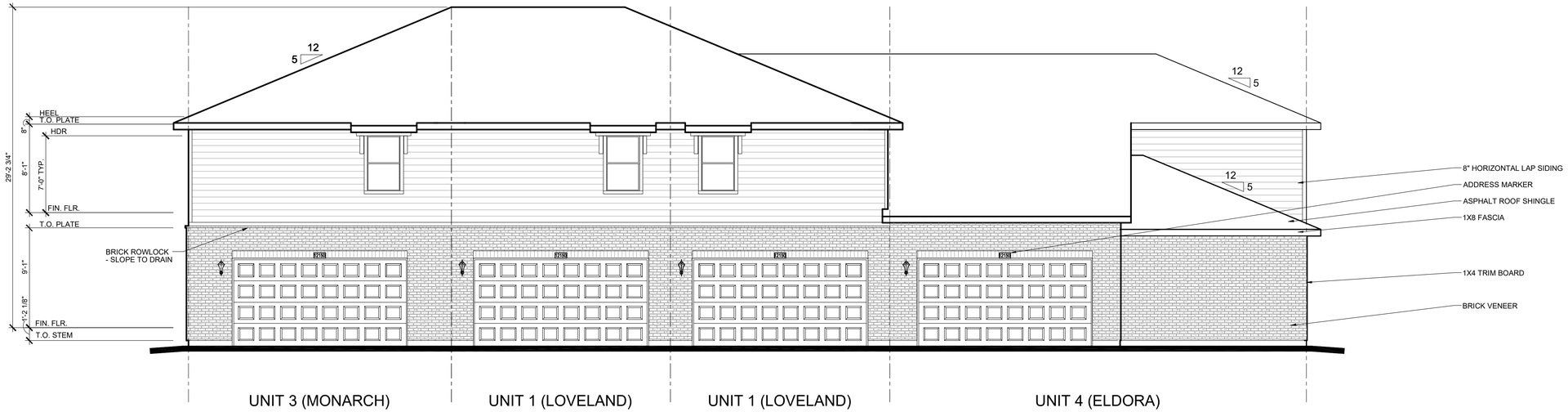

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

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UNIT 4 (ELDORA)

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FRONT ELEVATION

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UNIT 3 (MONARCH)

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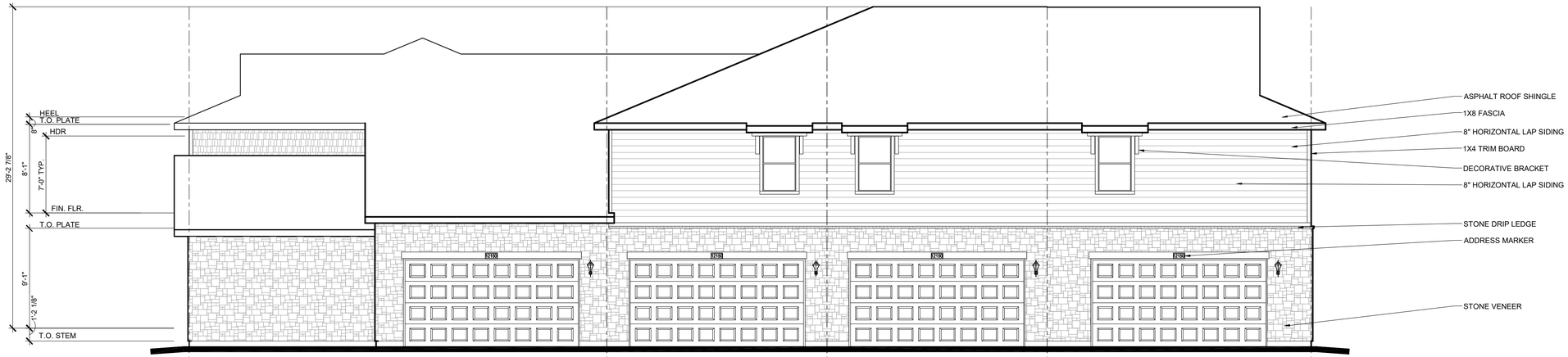

UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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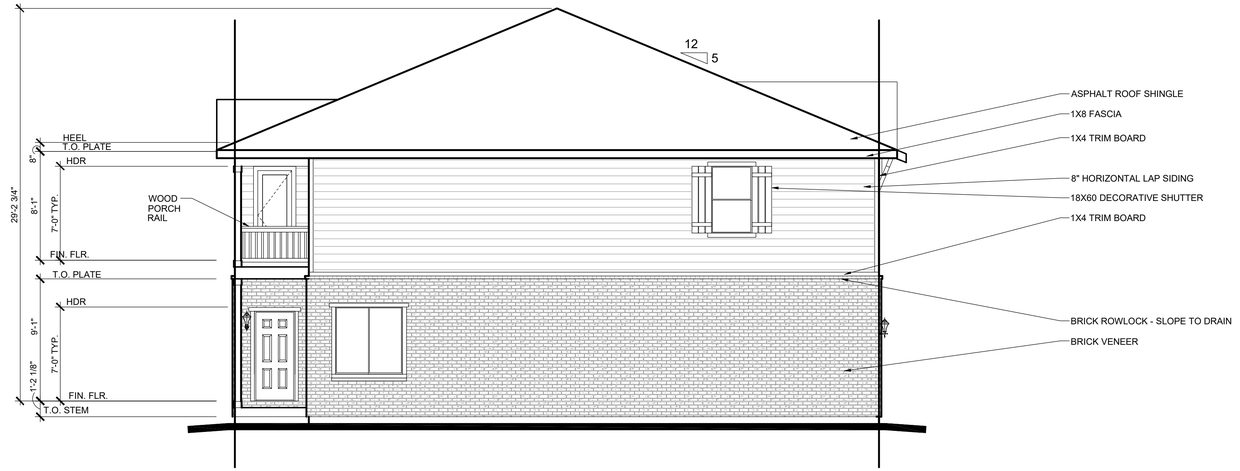

UNIT 3 (MONARCH)

RIGHT ELEVATION

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UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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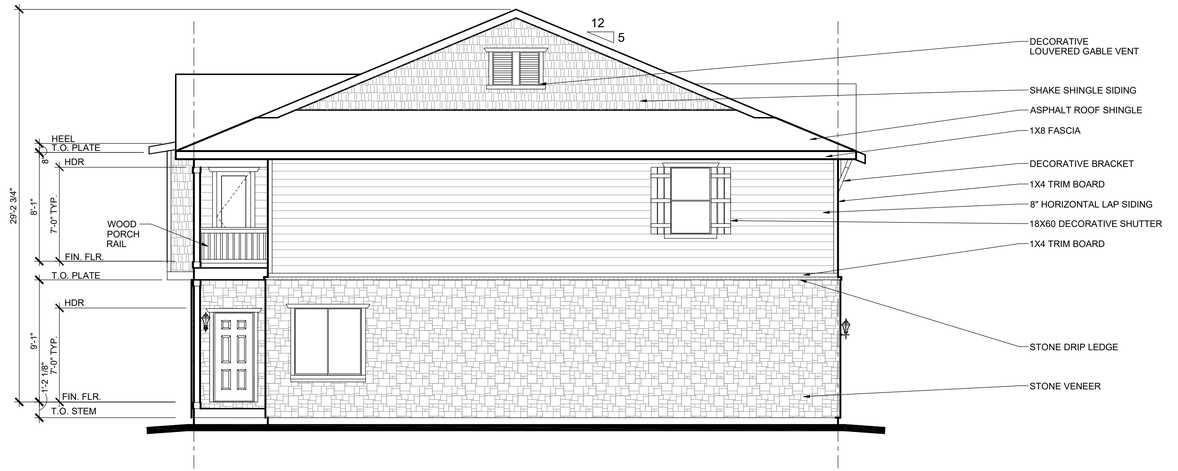

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UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

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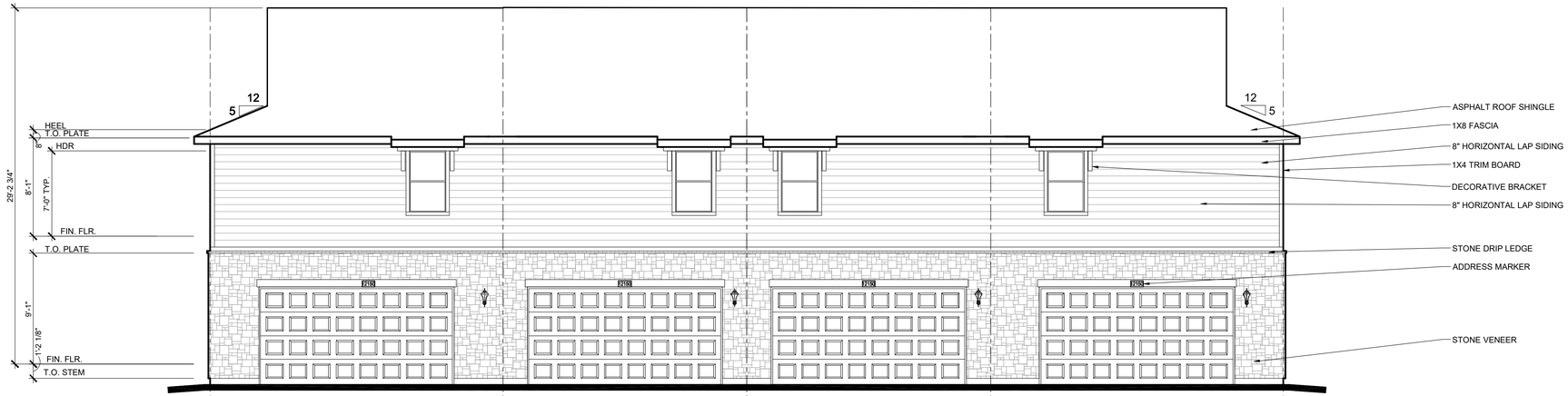

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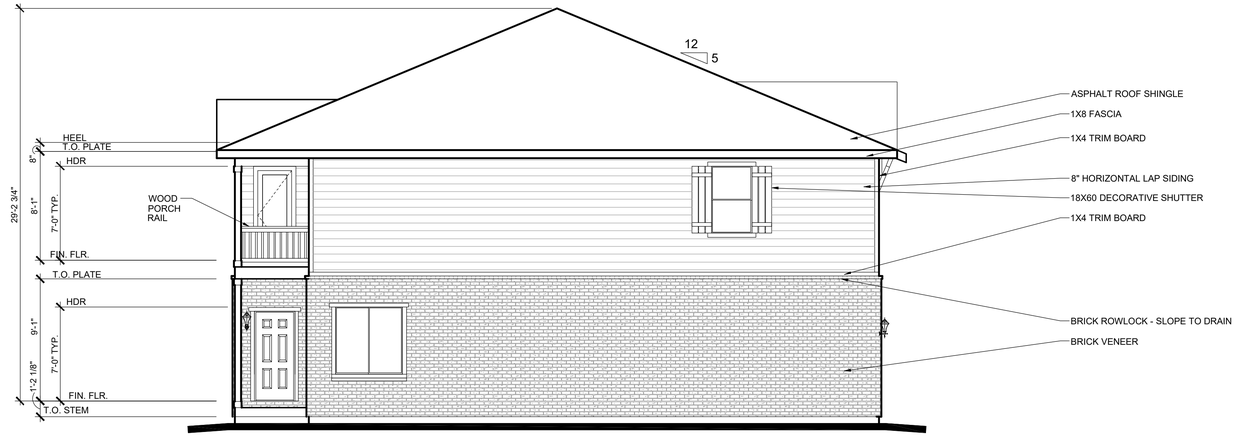

UNIT 3 (MONARCH)

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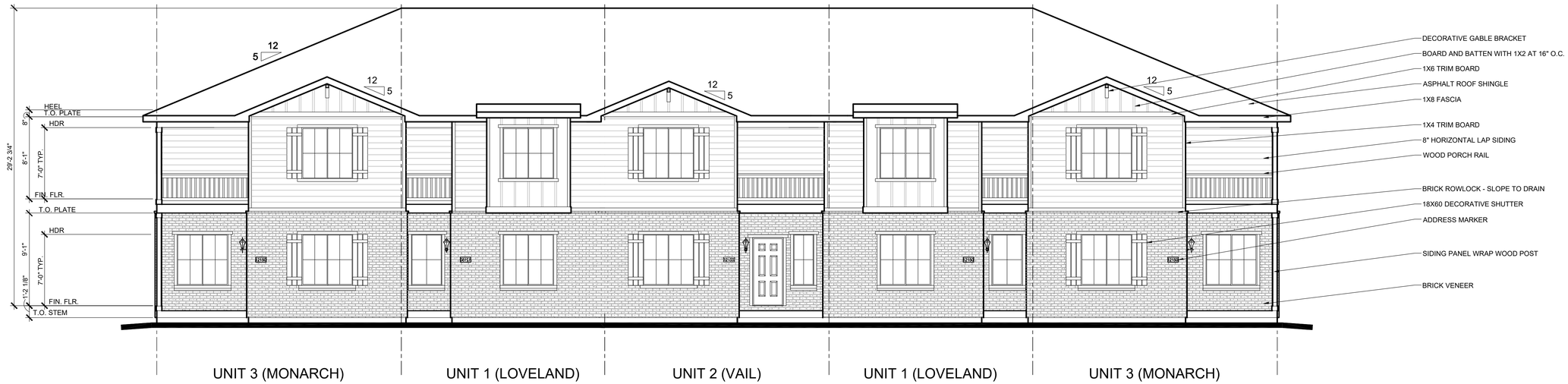

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

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UNIT 3 (MONARCH)

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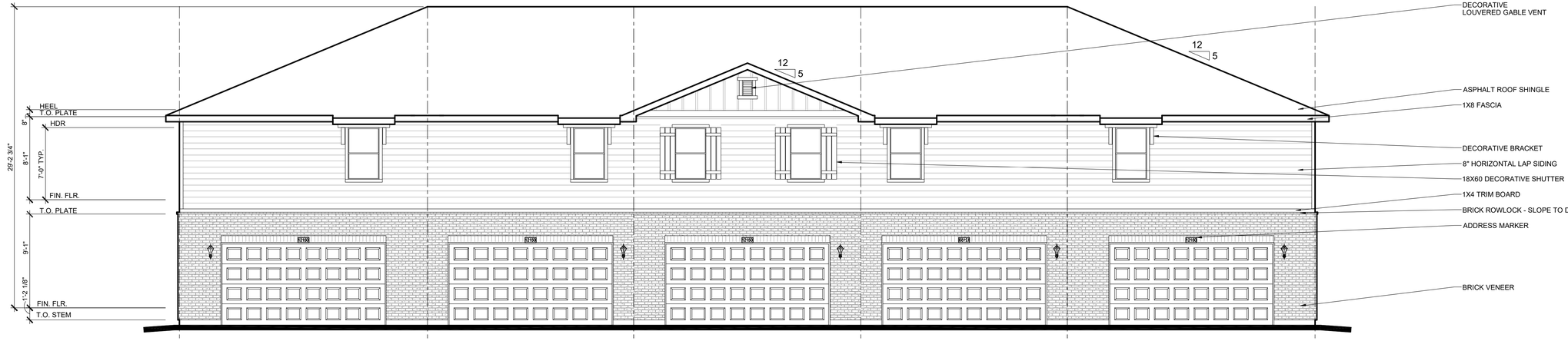

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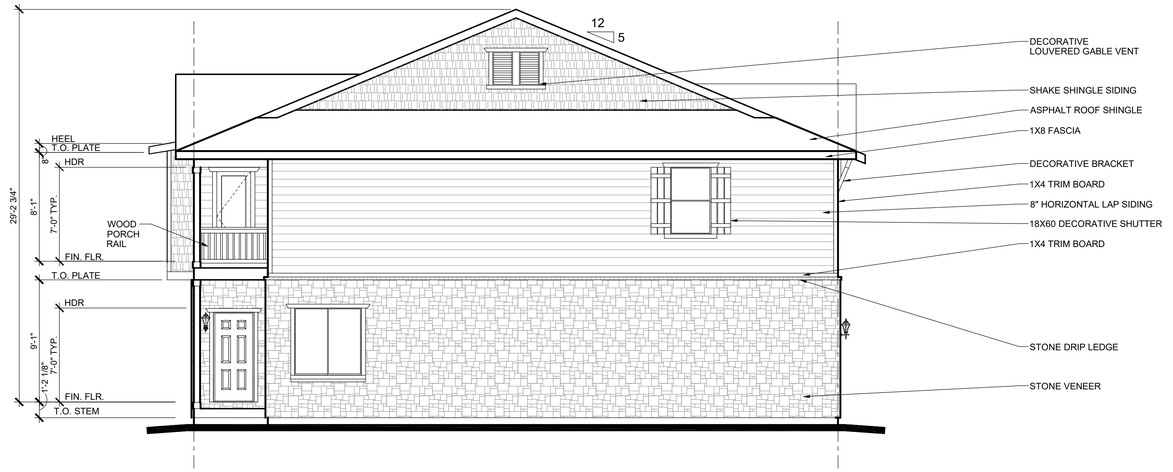

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

5 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

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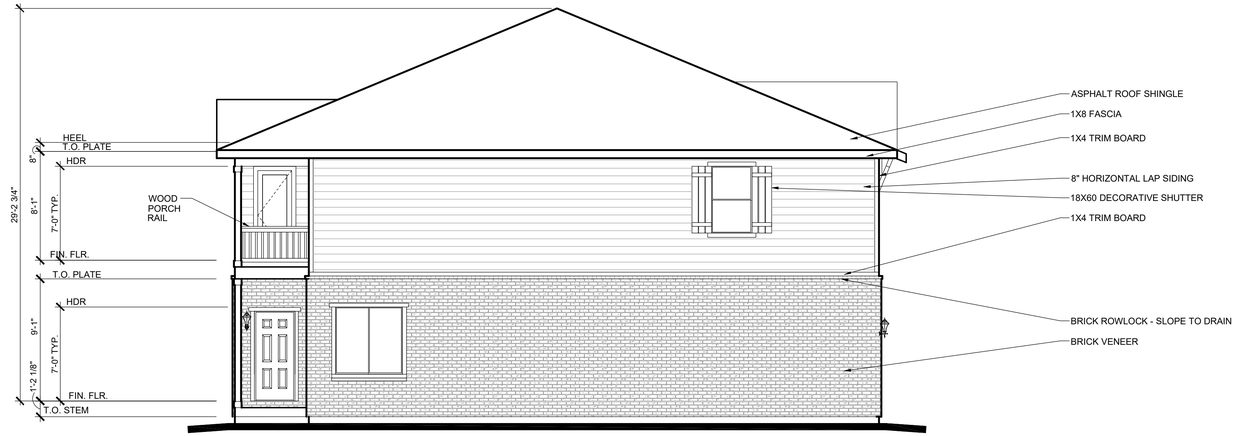

UNIT 3 (MONARCH)

RIGHT ELEVATION

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UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

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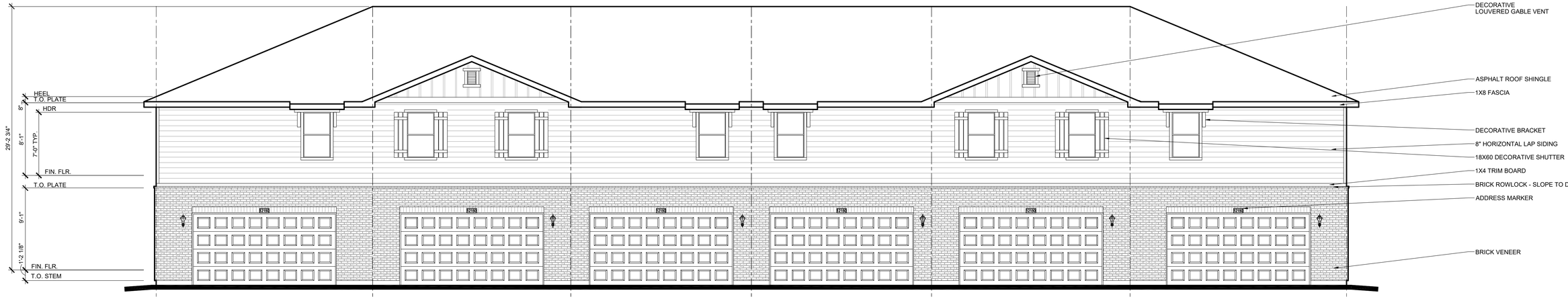
UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

6 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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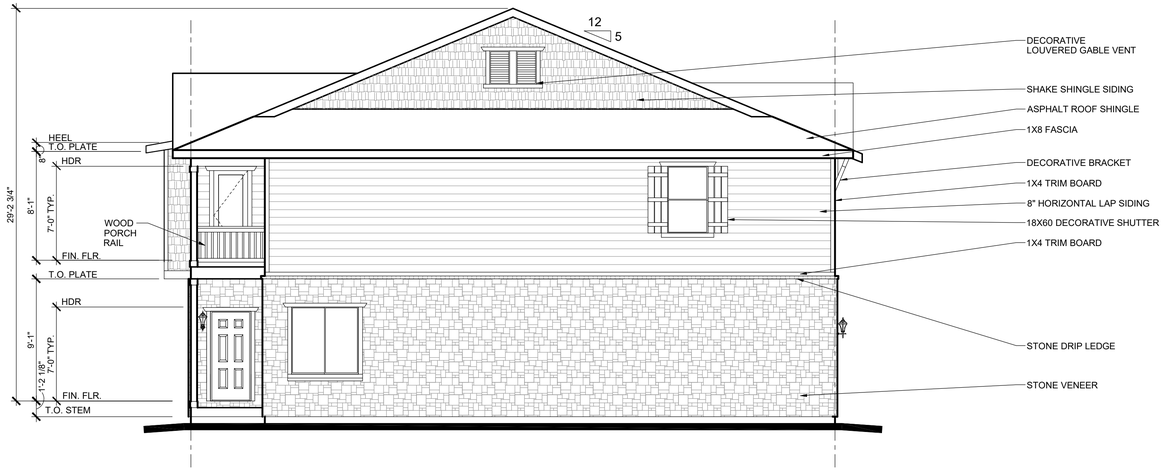

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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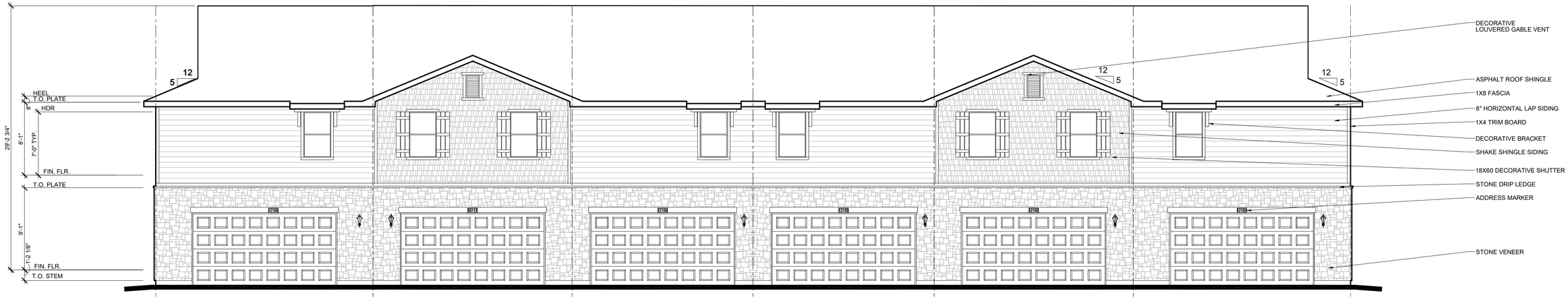

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

REAR ELEVATION

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6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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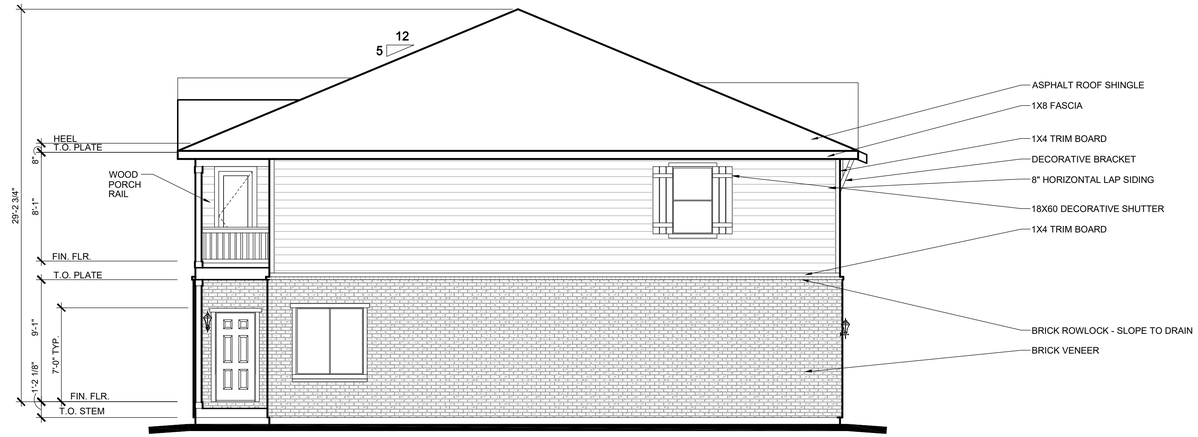

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1(LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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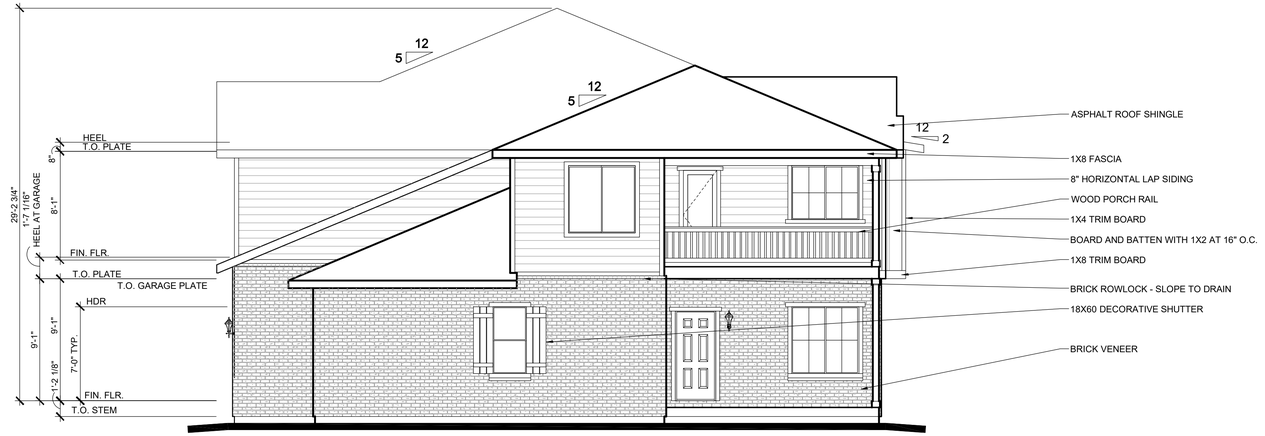
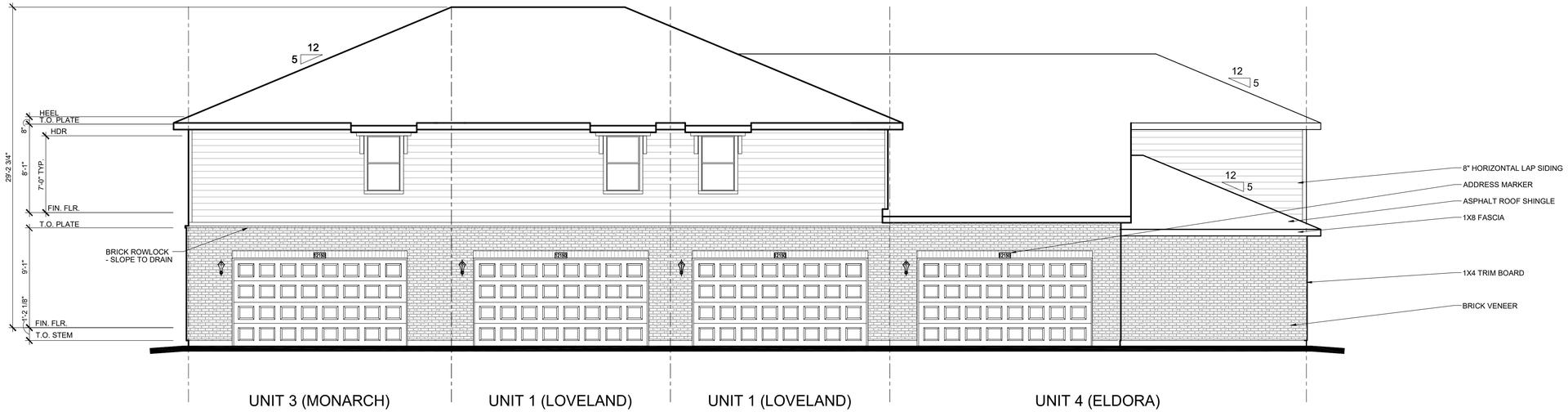


UNIT 4 (ELDORA)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 4 (ELDORA)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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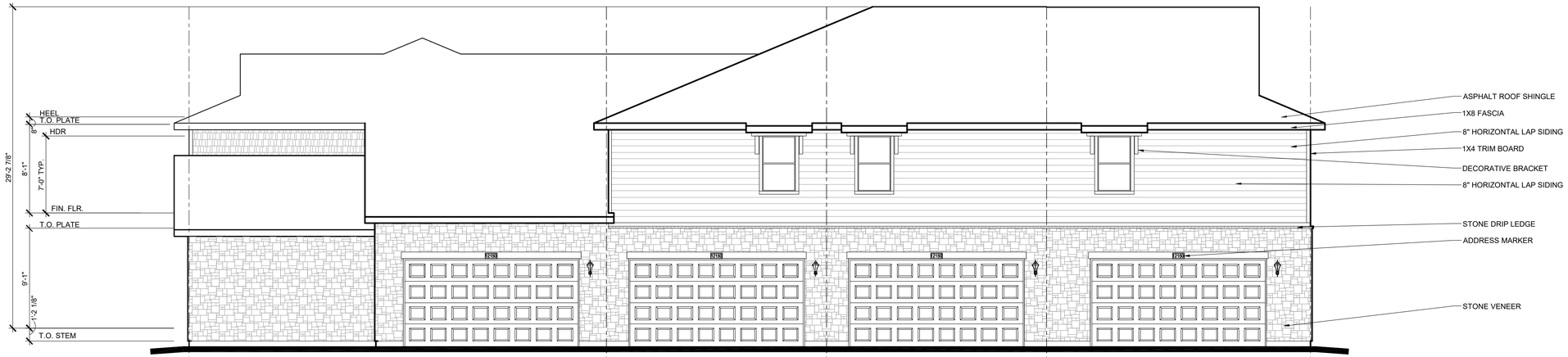
UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION B 3/16" = 1'-0"



UNIT 4 (ELDORA) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION B 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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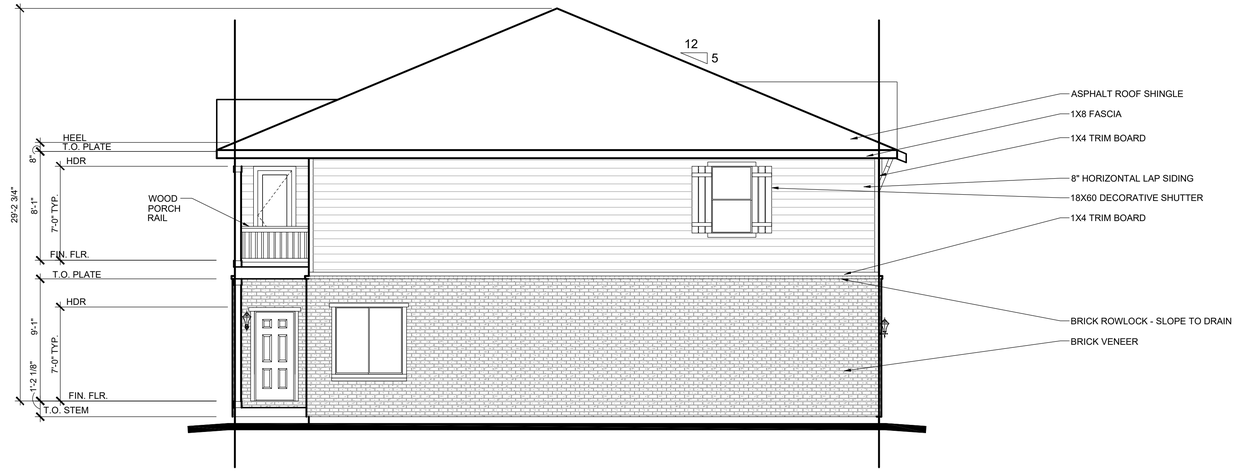

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 2 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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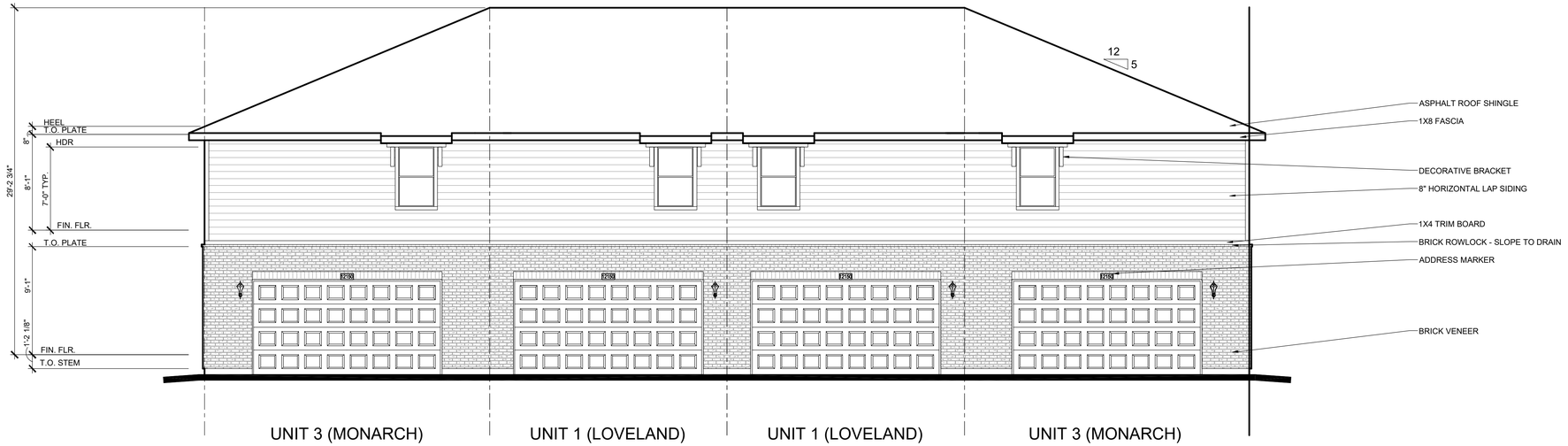

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

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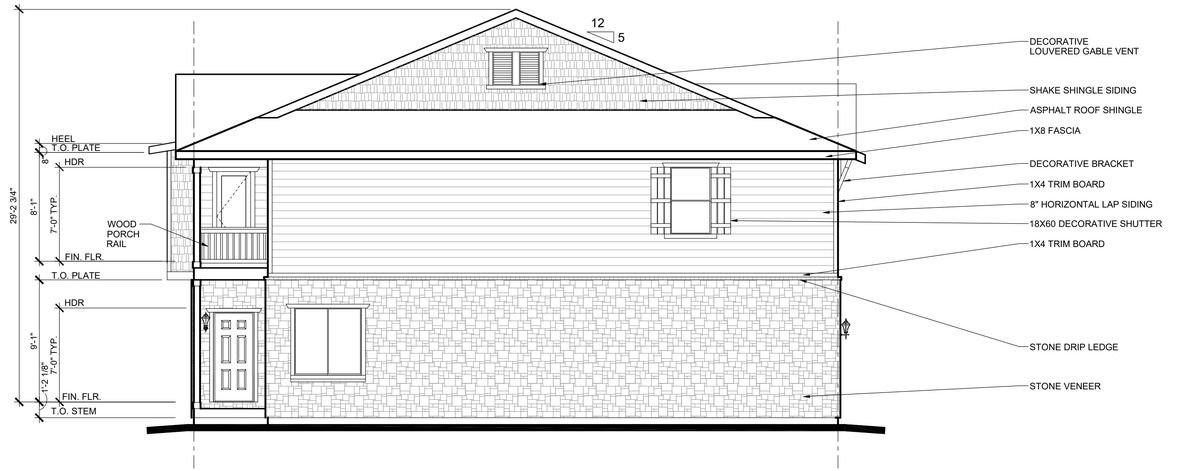

UNIT 3 (MONARCH)

RIGHT ELEVATION

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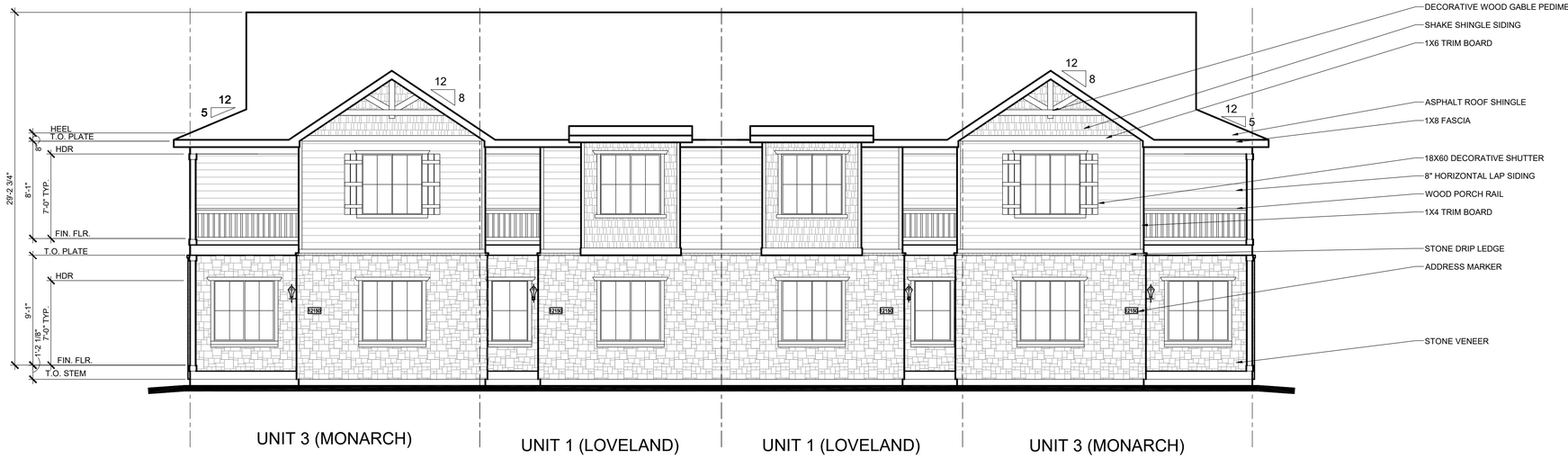

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

4 PLEX - BLDG. 2 - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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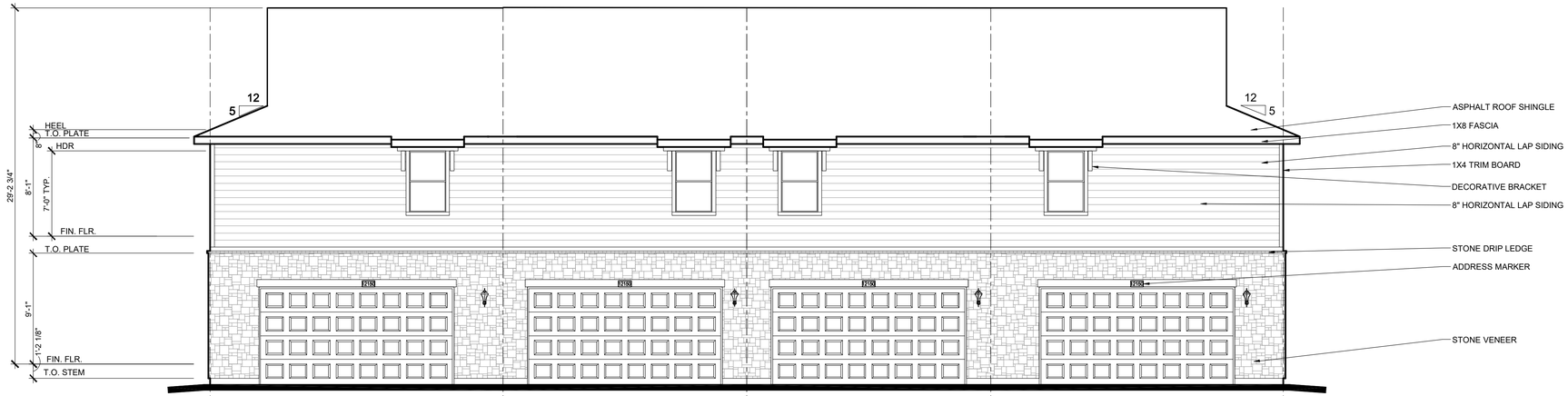

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

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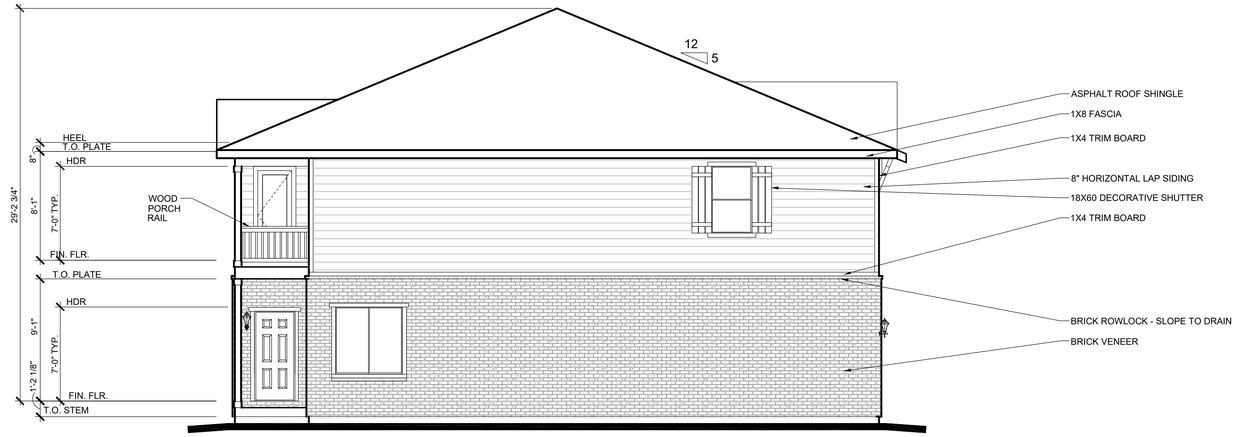
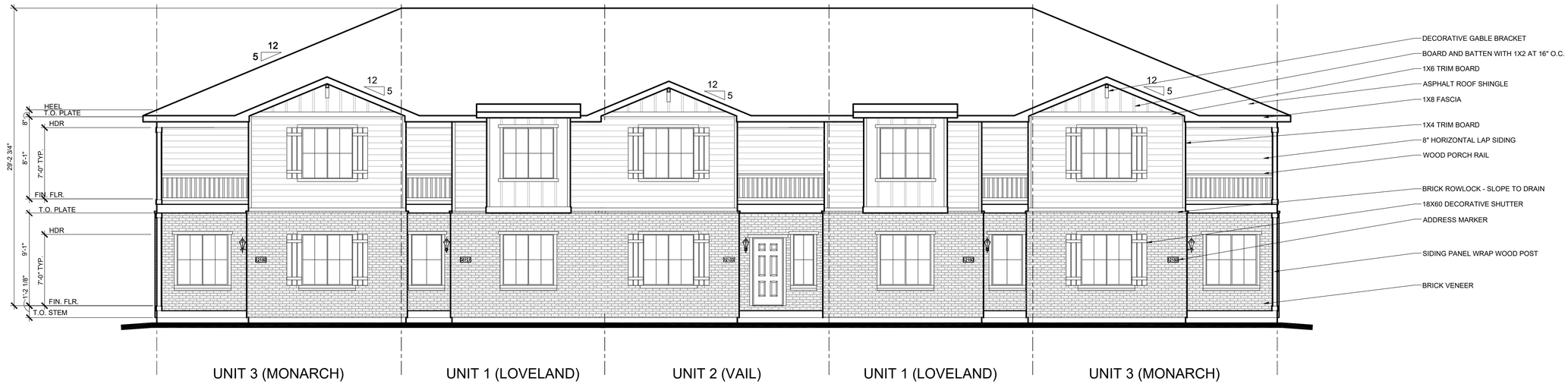


UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

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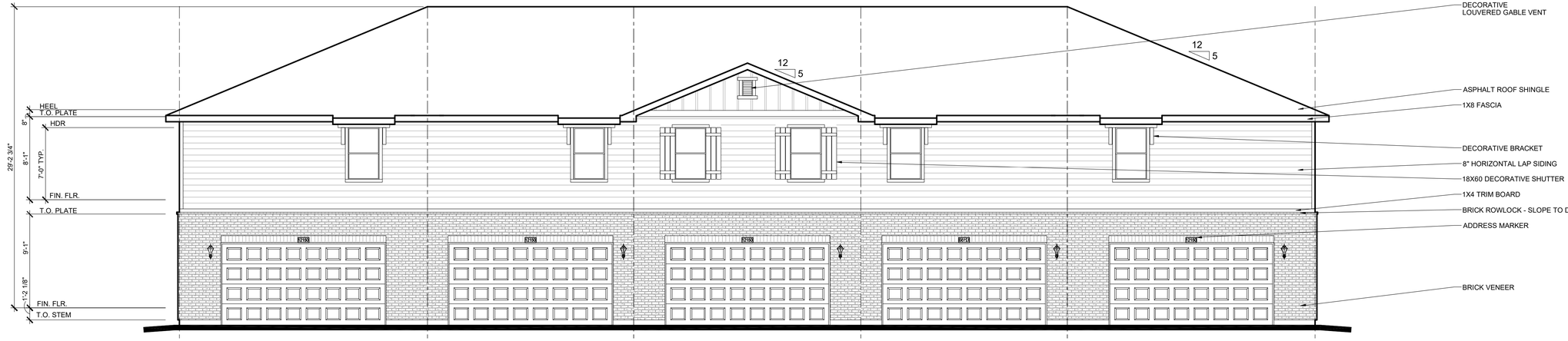
UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"



UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

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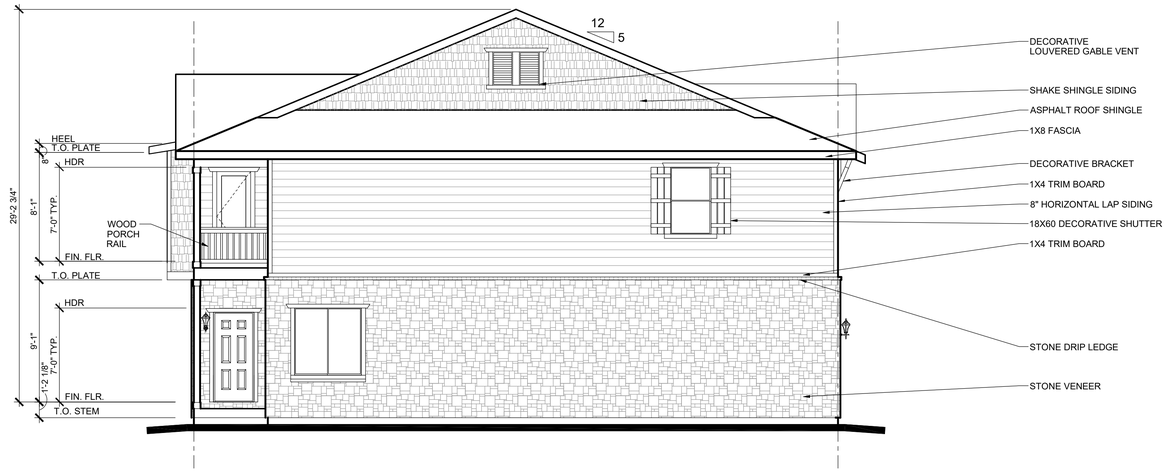

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B 3/16" = 1'-0"

5 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 3 (MONARCH)

REAR ELEVATION

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5 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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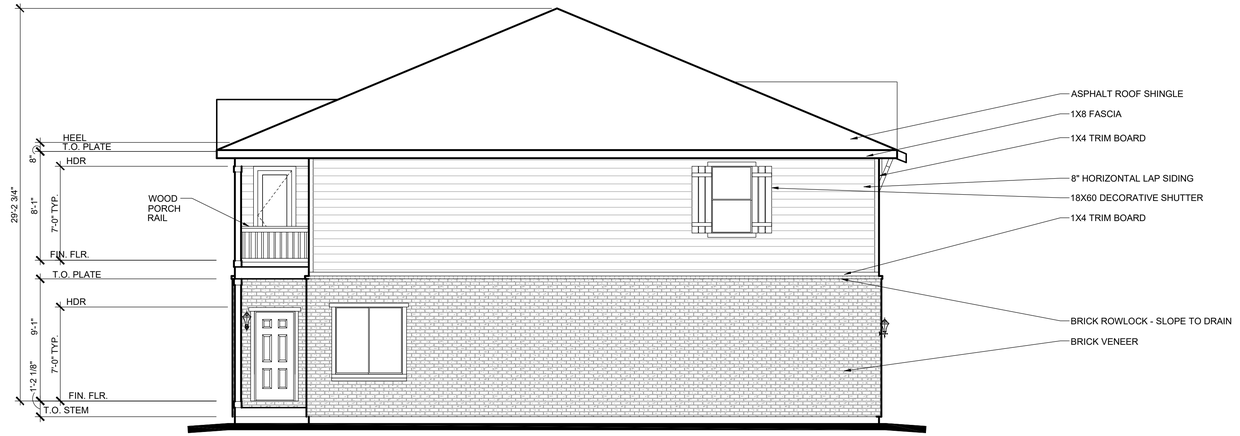

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

6 PLEX - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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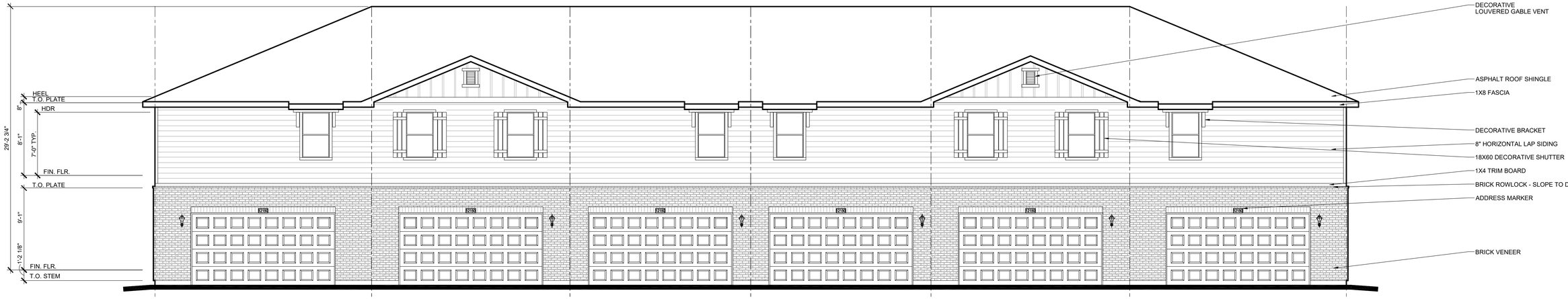

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

REAR ELEVATION

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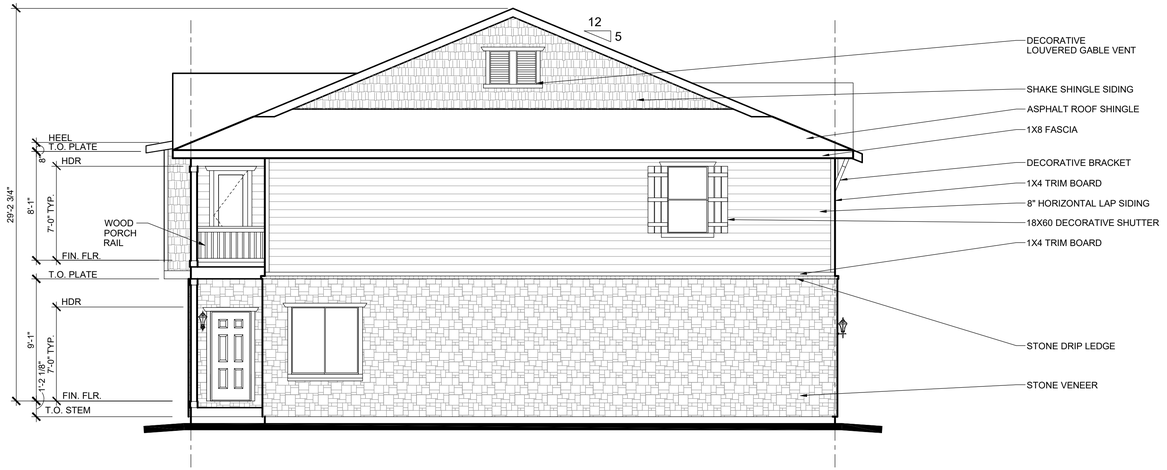

UNIT 3 (MONARCH)

RIGHT ELEVATION

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UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

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6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 3 (MONARCH)

LEFT ELEVATION

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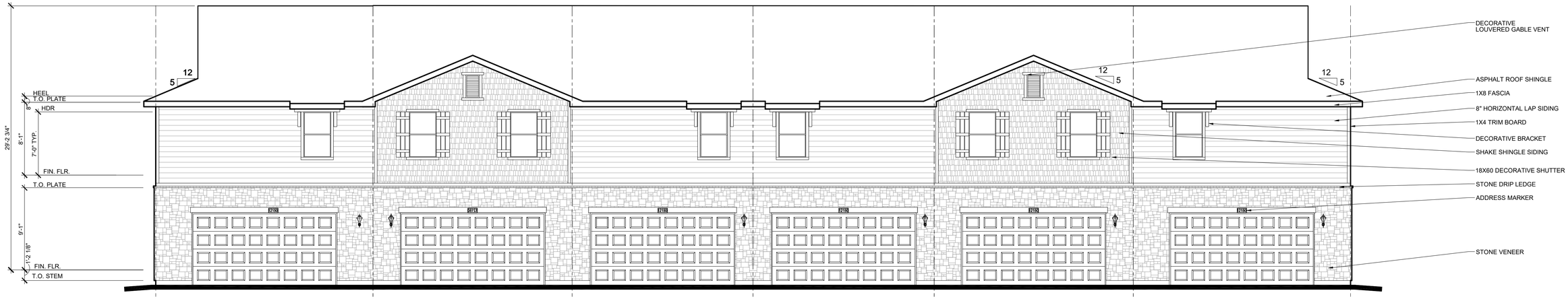

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

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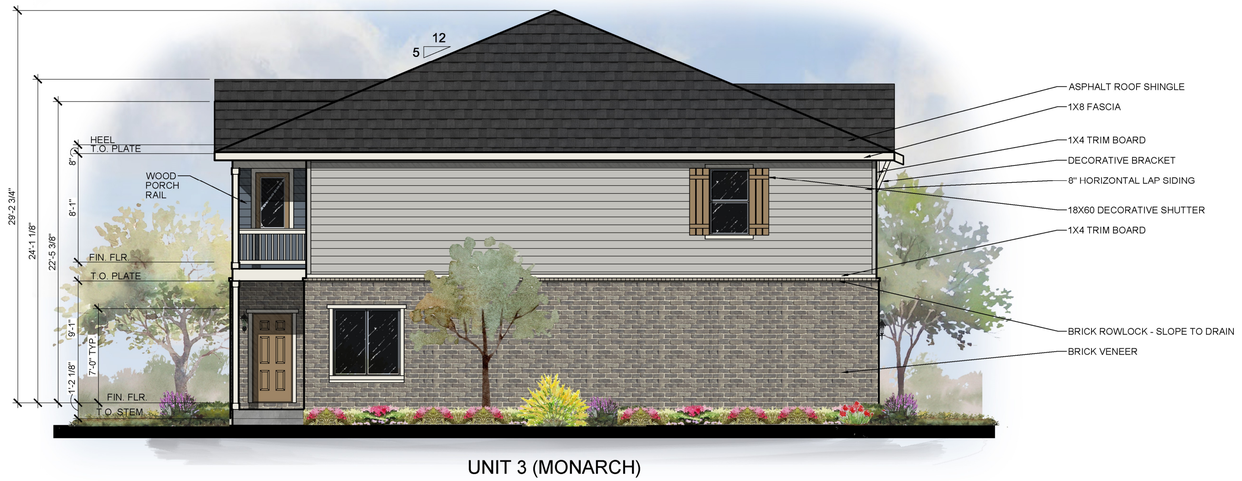

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 4 (ELDORA) | UNIT 1 (LOVELAND) | UNIT 1(LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 4 (ELDORA)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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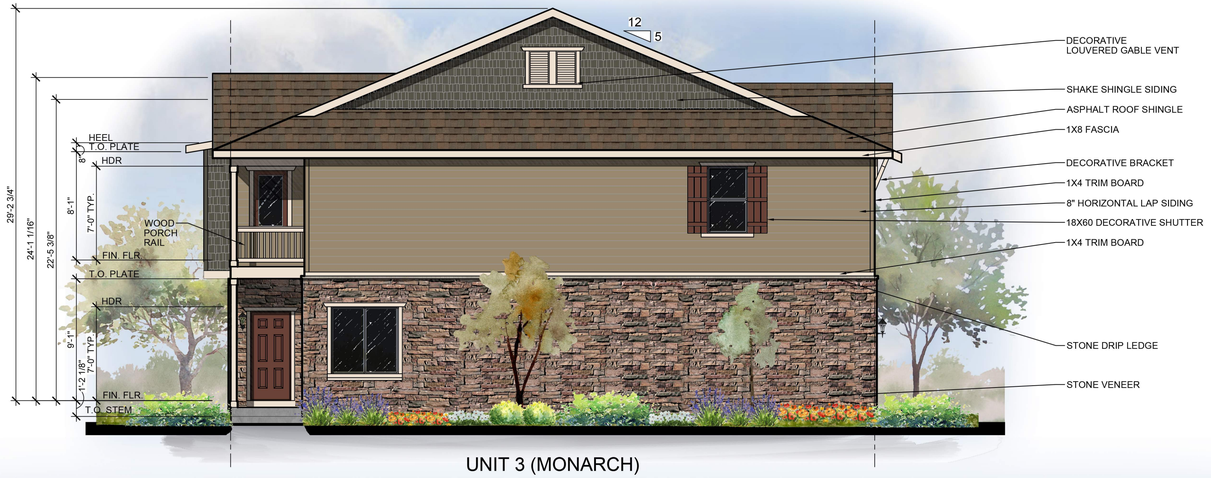

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 2 (VAIL) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 2 (VAIL) UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B ELEVATION B 3/16" = 1'-0" 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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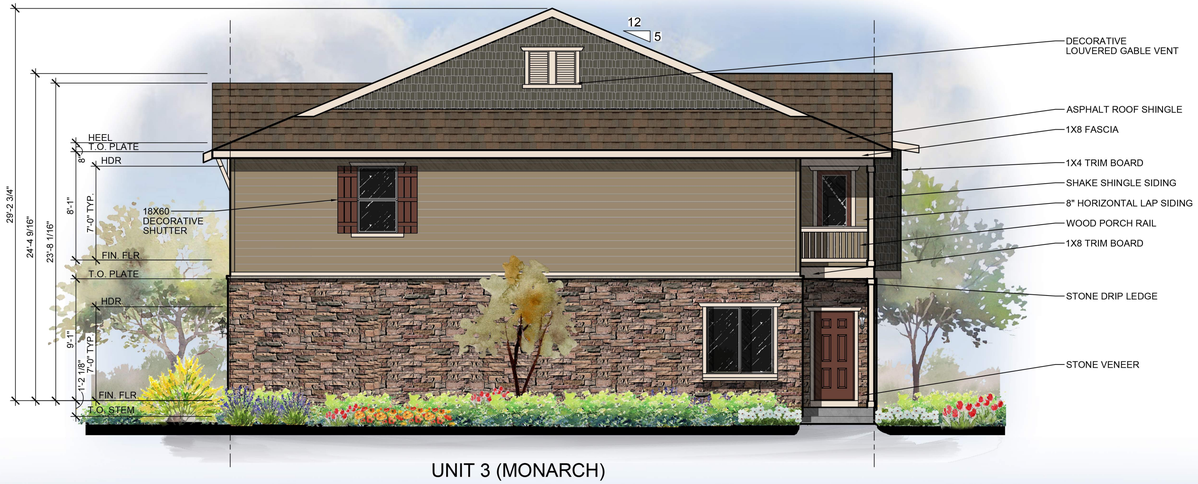
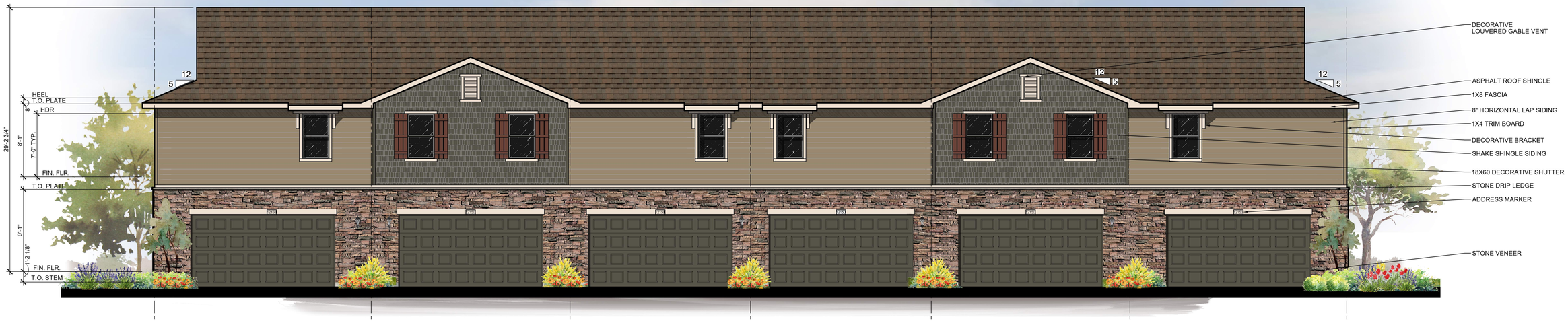


UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION B 3/16" = 1'-0"



UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION B 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

8-4-2021

LGI HOMES
3401 Quebec St. Suite 4060 Denver, CO 80207

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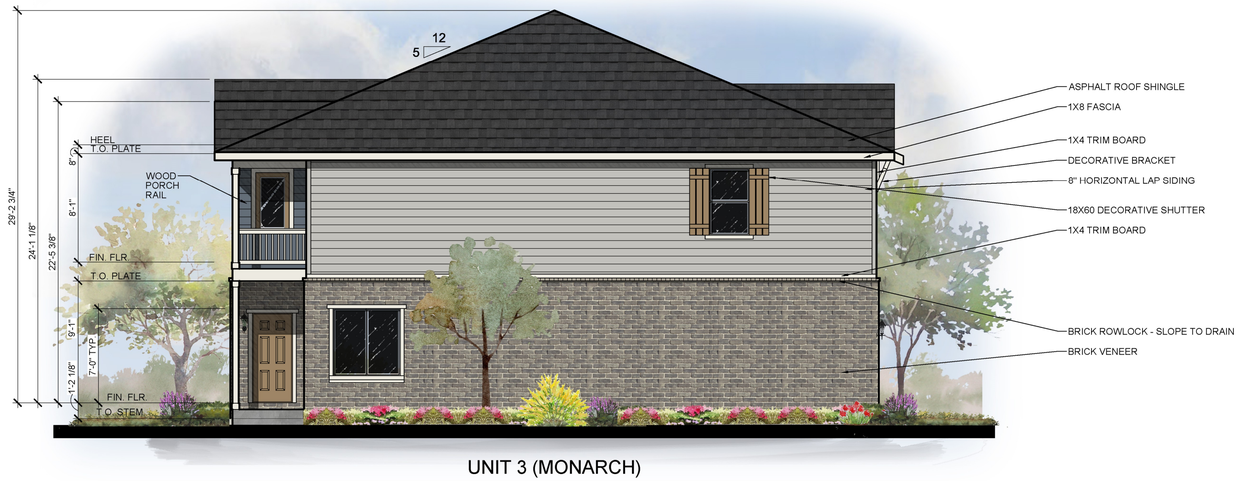

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 4 (ELDORA) | UNIT 1 (LOVELAND) | UNIT 1(LOVELAND) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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UNIT 4 (ELDORA)

LEFT ELEVATION

ELEVATION A 3/16" = 1'-0"

UNIT 3 (MONARCH) UNIT 1 (LOVELAND) UNIT 1 (LOVELAND) UNIT 4 (ELDORA)

REAR ELEVATION

ELEVATION A 3/16" = 1'-0"

4 PLEX - BLDG. 1 - ELEVATION A | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

8-4-2021

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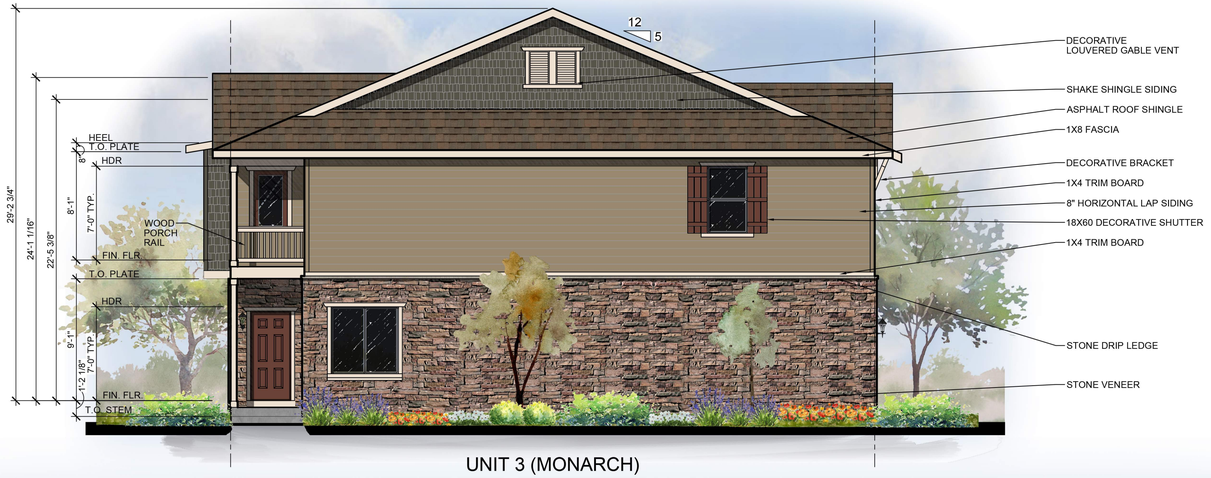

UNIT 3 (MONARCH)

RIGHT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

FRONT ELEVATION

ELEVATION B ELEVATION B 3/16" = 1'-0" 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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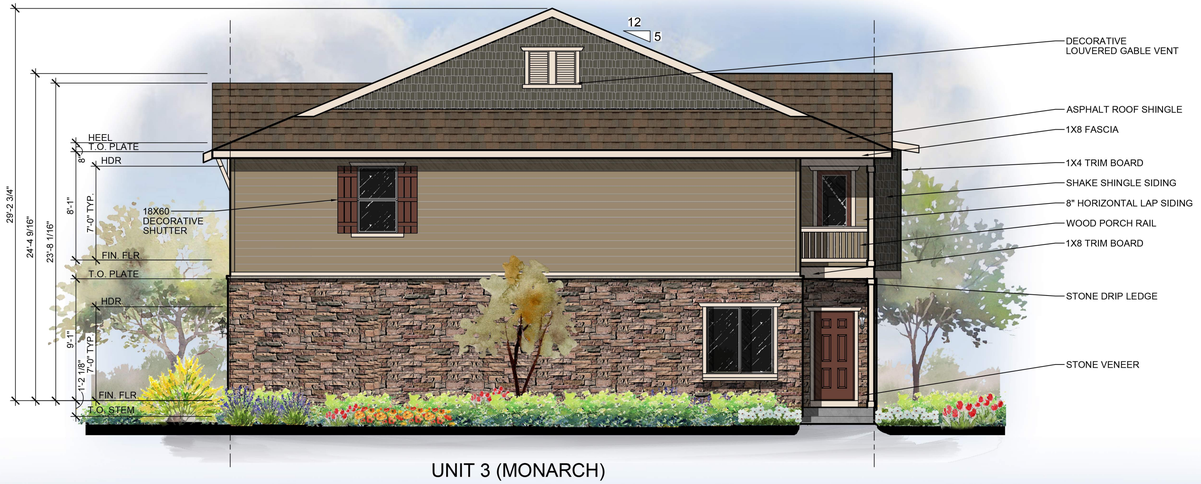

UNIT 3 (MONARCH)

LEFT ELEVATION

ELEVATION B 3/16" = 1'-0"

UNIT 3 (MONARCH) | UNIT 2 (VAIL) | UNIT 1 (LOVELAND) | UNIT 1 (LOVELAND) | UNIT 2 (VAIL) | UNIT 3 (MONARCH)

REAR ELEVATION

ELEVATION B 3/16" = 1'-0"

6 PLEX - ELEVATION B | FORT LUPTON, CO | COTTONWOOD GREENS PUD NO. 4

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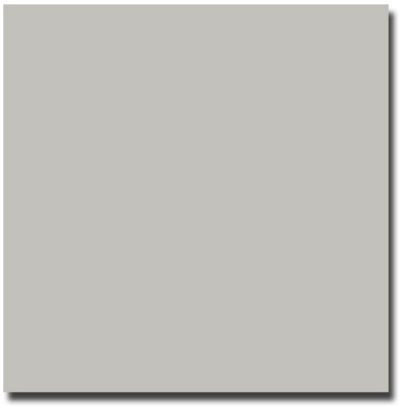
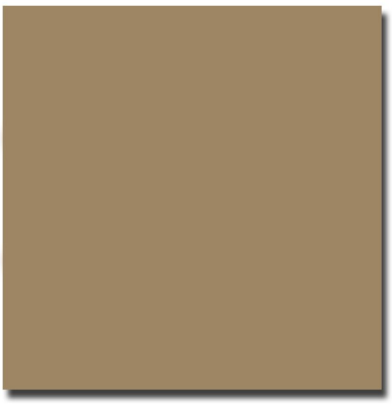
Color Scheme 1



Main Body
Light French Gray (SW 0055)
Mfg: Sherwin Williams

Accent Body
Granite Peak (SW 6250)
Mfg: Sherwin Williams

Trim
Alabaster (SW 7008)
Mfg: Sherwin Williams



Front Door
Hopsack (SW 6109)
Mfg: Sherwin Williams

Stone
TundraBrick - Ashland
Mfg: Eldorado Stone

Asphalt Shingles
Heritage Premium-Rustic Black
Mfg: Tamko

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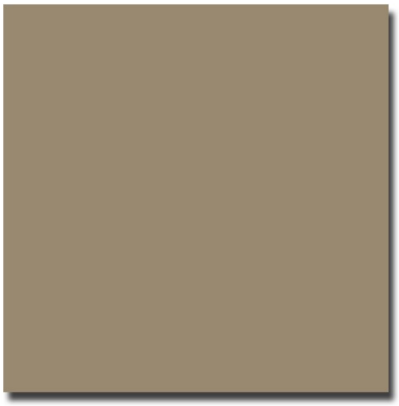
Color Scheme 2



Main Body -
Sawdust (SW 6158)
Mfg: Sherwin Williams

Accent Body -
Roycroft Bronze Green (SW 2846)
Mfg: Sherwin Williams

Trim -
Alluring White (SW 6343)
Mfg: Sherwin Williams

Front Door -
Aurora Brown (SW 2837)
Mfg: Sherwin Williams

Stone
Old Country Ledge - Chablis
Mfg: Coronado Stone

Asphalt Shingles
Heritage Premium - Mountain Slate
Mfg: Tamko

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Project: Cottonwood Townhomes (Filing 4)
Date: July 20, 2021
Client: Arbor Capital Partners

Prepared By: ARP
Job Number: 20002948

ATWELL

Cottonwood Greens
Overall: Phase 4

Storm Drainage

Item	Qty	Unit	Unit Cost	Item Cost	Description
12" Storm Sewer	93	LF	$ 40.00	$ 3,716.00	
18" Storm Sewer	105	LF	$ 50.00	$ 5,255.00	
24" Storm Sewer	463	LF	$ 60.00	$ 27,786.00	
30" Storm Sewer	321	LF	$ 75.00	$ 24,060.00	
Detention Pond	1	EA	$ 60,000.00	$ 60,000.00	Includes inlet/outlet structures, trickle channel, micropool, forebay, grading and seeding
5' Type R Inlet	6	EA	$ 5,500.00	$ 33,000.00	
Storm Sewer Manholes 4' Dia	5	EA	$ 4,500.00	$ 22,500.00	
Storm Sewer Manholes 6' Dia	2	EA	$ 7,000.00	$ 14,000.00	
Storm Total				**$ 190,317.00**	

Sanitary Sewer

Item	Qty	Unit	Unit Cost	Item Cost	Description
8" Sanitary Sewer	3,029	LF	$ 38.00	$ 115,113.40	
Sanitary Sewer Service	136	EA	$ 1,500.00	$ 204,000.00	
Sanitary Sewer Manholes 4' Dia.	20	EA	$ 4,500.00	$ 90,000.00	
Connection to Existing	1	EA	$ 5,000.00	$ 5,000.00	
Air Test	3,029	LF	$ 1.25	$ 3,786.25	
Sanitary Total				**$ 417,899.65**	

Water Distribution

Item	Qty	Unit	Unit Cost	Item Cost	Description
8" Water Line	3,900	LF	$ 38.00	$ 148,200.00	
4" Irrigation Line	384	LF	$ 3.00	$ 1,152.90	
Water Service	136	EA	$ 1,500.00	$ 204,000.00	Includes setting water meter
Connection to Existing	2	EA	$ 3,500.00	$ 7,000.00	
8" Gate Valves	34	EA	$ 1,950.00	$ 66,300.00	
Hyrdant Assemblies	11	EA	$ 4,800.00	$ 52,800.00	
Clear Water Testing	3,900	LF	$ 1.25	$ 4,875.00	
Water Total				**$ 484,327.90**	

Private Alleys

Item	Qty	Unit	Unit Cost	Item Cost	Description
Subgrade Preparation	1,575	SY	$ 2.50	$ 3,937.50	
Curb & Gutter	1,404	LF	$ 32.00	$ 44,928.00	
Asphalt	1,575	SY	$ 38.00	$ 59,850.00	
Signs	2	EA	$ 375.00	$ 750.00	
Roadway Total				**$ 109,465.50**	

Public Streets

Item	Qty	Unit	Unit Cost	Item Cost	Description
Subgrade Preparation	8,628	SY	$ 2.50	$ 21,570.00	
Curb & Gutter	5,417	LF	$ 32.00	$ 173,344.00	
Asphalt	8,093	SY	$ 38.00	$ 307,534.00	
Sidewalk	36,467	SF	$ 5.50	$ 200,568.50	
Pedestrian Ramps	26	EA	$ 3,000.00	$ 78,000.00	
Crosspan	9	EA	$ 8,000.00	$ 72,000.00	
Signs	11	EA	$ 375.00	$ 4,125.00	
Roadway Total				**$ 857,141.50**	

Soil Erosion Control

Item	Qty	Unit	Unit Cost	Item Cost	Description
Mobilization	1	EA	$ 25,000.00	$ 25,000.00	
Mulching	13	AC	$ 350.00	$ 4,647.65	
Temporary Seeding	13	AC	$ 350.00	$ 4,647.65	
Silt Fence	3,205	LF	$ 5.00	$ 16,025.00	
Permanent Seeding	13	AC	$ 600.00	$ 7,967.40	
Rock Sock	4	EA	$ 150.00	$ 600.00	
Erosion Control Blanket	5,877	SY	$ 3.25	$ 19,100.97	
Vehicle Tracking Control	1	EA	$ 3,000.00	$ 3,000.00	
Inlet/Outlet Protection	7	EA	$ 450.00	$ 3,150.00	
Concrete Washout Area	1	EA	$ 10,000.00	$ 10,000.00	
Soil Erosion Control Total				**$ 94,138.67**	

Earthwork

Item	Qty	Unit	Unit Cost	Item Cost	Description
Earthwork	69,738	CY	$ 3.00	$ 209,214.00	Includes earthwork shown on Borrow Area Plan dated 2021-04-30 (does not include soil import)
Earthwork Total				**$ 209,214.00**	

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Total

Sub-Total:	**$**	**1,505,362.72**
20% contingency:	$	301,072.54
TOTAL:	**$**	**1,806,435.27**

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Rollins Consult LLC

MEMORANDUM

To: Roy Vestal, City of Fort Lupton

From: Ruth Rollins, Rollins Consult LLC

Date: June 17, 2021

Subject: Transportation Memo Cottonwood Greens Townhomes

The following memorandum provides an evaluation of the proposed Townhomes within the Cottonwood Greens project in Fort Lupton. The original traffic study, prepared by Rollins Consult LLC for the Cottonwood Greens project is dated October 7, 2019. This study addressed the built out of 287 single family homes and 140 Townhomes. The townhomes are now being submitted for a preliminary and final development plan.

The townhomes will remain at the 140 dwellings analyzed in the October 7, 2019 study. The townhome site plan, which is shown on Figure 1, includes a roadway system that connects to the planned north/south collector street, College Avenue, within Cottonwood Greens. The internal roads within the townhome area can be designed as local streets to accommodate the townhome's projected 1,018 daily trips, as documented in the October 7, 2019 study and shown below in Table 1.

Table 1 – Estimated Trip Generation

ITE Land Use Code & Rates		Project	Project Trip Generation						
Land Use	Land Use Code	Dwelling Units	Daily	AM			PM		
				IN	Out	Total	IN	Out	Total
Single-Family Detached	210	287	2,709	53	159	212	179	105	284
Multi-Family Low Rise	220	140	1,018	15	51	66	50	29	80
TOTAL BUILDOUT			3,727	68	210	278	229	135	364

Based on ITE Trip Generation 10th Edition

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Figure 1 – Townhome Site Plan

The roadway system as proposed can accommodate the Cottonwood Greens Townhomes. Roy, let me know if you require any additional information.

Respectfully,

President, Rollins Consult LLC

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Traffic Impact Study
Cottonwood Greens

October 7, 2019

Prepared for:
Arbor Capital Partners LLC

Rollins Consult LLC

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1 INTRODUCTION

This report documents the results of a study to evaluate the potential traffic impacts of the proposed Cottonwood Greens project in the City of Fort Lupton, Colorado. Rollins Consult LLC conducted the study in support of the development application for the proposed project.

PROJECT DESCRIPTION

The Cottonwood Greens project is located in the City of Fort Lupton, west of Weld County Road (CR) 31 and north of 9th Street. The site is bounded by the Fulton Ditch and the future alignment of 14th Street. The project site is comprised of approximately 122 acres. The site is surrounded by undeveloped land to the north and east. South of the site is a golf course, and government facilities. West of the project site is a church, residential development and undeveloped land. Figure 1 illustrates the project location and study area.

The project site is depicted on Figure 2. The site was designed with numerous roadways which allow for distribution of pedestrians, bicycles and vehicles. The internal roadways were designed as a curvilinear grid. There is also a pedestrian and bicycle trail (the Man Fulton Ditch Trail) proposed that follows the alignment of the Fulton Ditch.

The project proposes the following land uses and transportation elements:

- There are 287 single family homes proposed.
- 140 townhomes would be located in the southern part of the project.
- Access to public roadways would be provided at four connections. Two access locations are proposed from 9th Street. One access is provided to CR 31. One access will be provided to 14th Street.
- The internal roadway system has been designed to accommodate the project traffic.
- The proposed pedestrian and bicycle trail along the Fulton Ditch will connect to both the planned Fort Lupton Trail and the Main Fulton Ditch Trail. The site also provides parking and access to future bike/ped trails.

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Figure 1 – Project Location

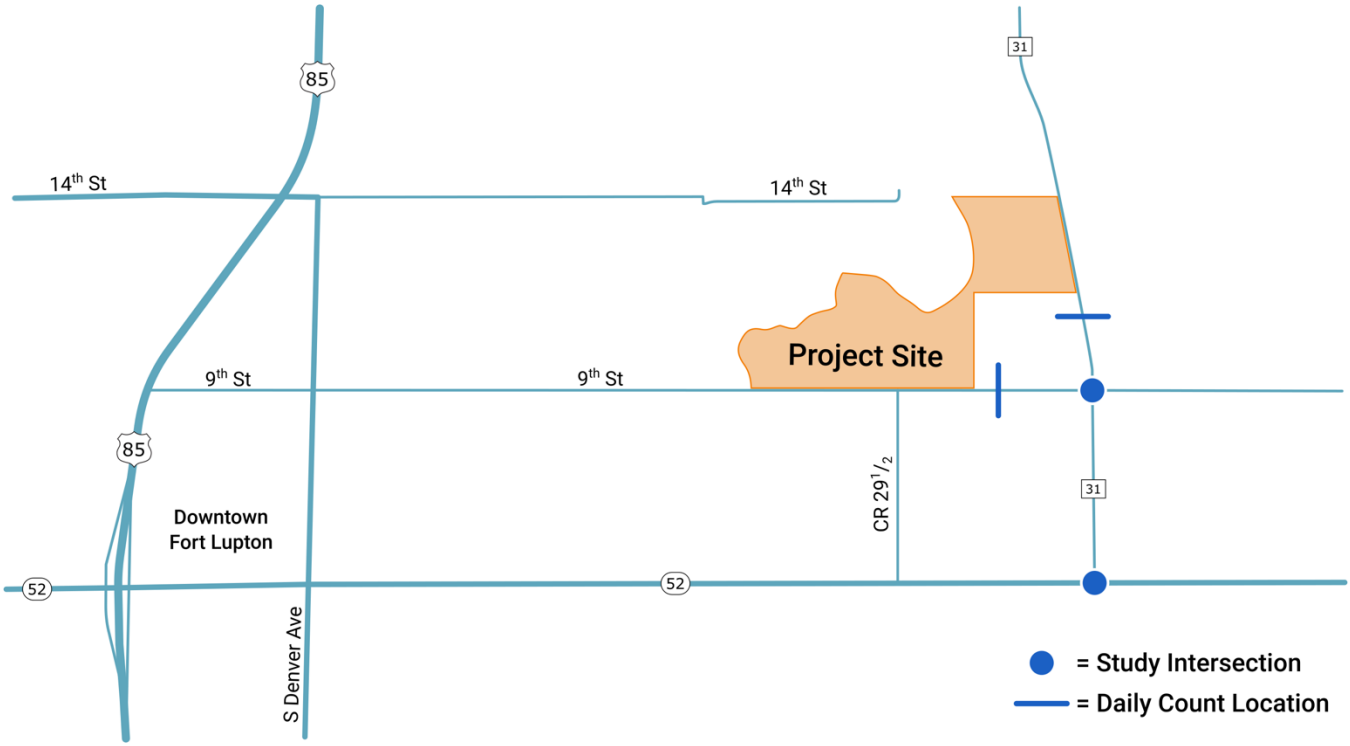

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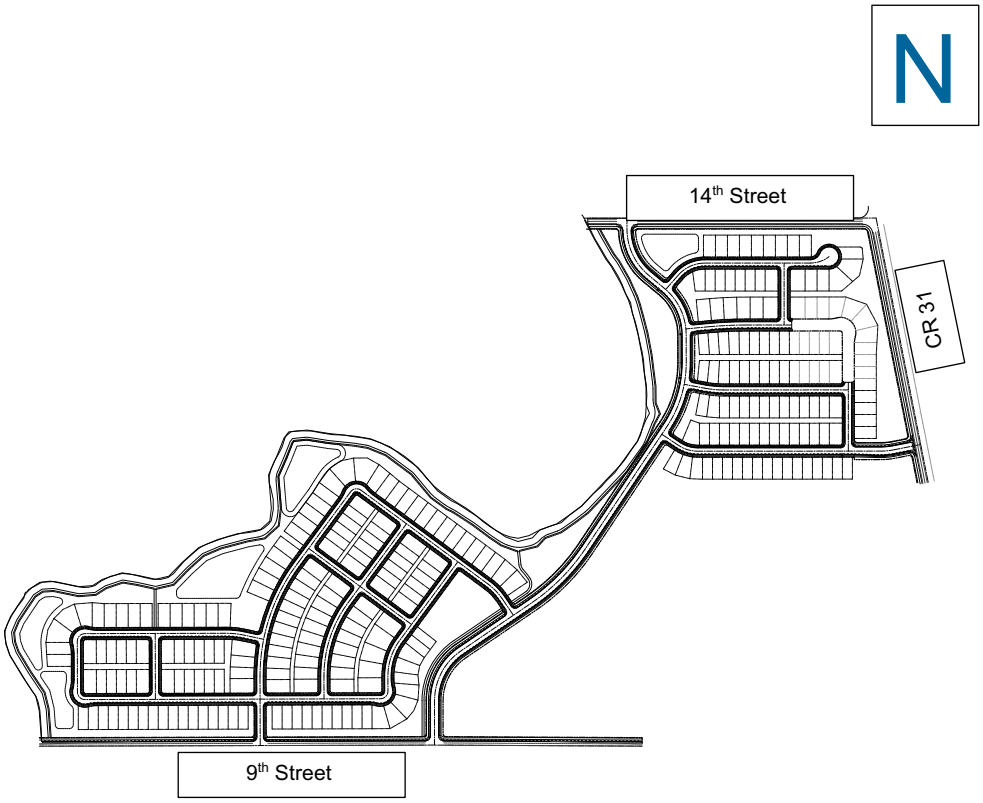
Figure 2 - Project Site Plan



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STUDY SCOPE

The scope of work for this study was developed in conjunction with the City of Fort Lupton's Public Works department. The base assumptions, technical methodologies, and geographic coverage of the study were all identified as part of the study approach. The study analyzes the potential project-generated traffic impacts on the adjacent street system.

The study evaluates the potential changes to the transportation system after completion of the proposed Cottonwood Greens residential project for two future horizon years. The analysis of future year traffic forecasts is based on projected conditions in year 2024 (short range conditions) and 2040 (long range future conditions) both with and without the addition of the project traffic. The following transportation scenarios were analyzed for the AM and PM peak hours:

- **Existing Conditions** – The analysis of existing traffic conditions provides a basis for the remainder of the study. The existing transportation system is described. Peak hour intersection operations are evaluated.
- **Project Travel Demand** – The traffic generated by the Project will be estimated, distributed, and assigned to the transportation network.
- **2024 and 2040 Background Conditions** – Future traffic conditions are projected without the proposed Project for the project buildout year 2024 and the long range future year 2040. The traffic volumes on the roadway system will be factored and analyzed to reflect conditions for 2024 and 2040. This analysis will include the addition of traffic from other potential projects.
- **Total Future Conditions** – The traffic associated with the project will be projected and added to the Background traffic. The intersection operations will be determined.

The study examined three intersections within the study area. These were identified by the City of Fort Lupton for inclusion in the study. The study intersections are shown on Figure 1 and listed below.

1. CR 31 & SH 52
2. CR 31 & 9th Street
3. Future CR 31 & 14th Street (to be connected to CR 31 by 2024)

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2 EXISTING CONDITIONS

The transportation system has numerous elements that are described in this chapter. The roadway network identified for this study is described and traffic volume information presented for the study intersections.

ADJACENT LANDUSE

The Project site is located west of CR 31 and north of 9th Street. The site is currently undeveloped land and is located to the east of downtown Fort Lupton. It is surrounded by undeveloped land, rural residential and industrial to the north and east. South of the site is a golf course, and government facilities. West of the project site is a church, residential development, and undeveloped land.

TRANSPORTATION NETWORK

The primary roadways that serve the Project site are described below. Roadway designations were provided in the *Fort Lupton Transportation Plan,* June 2018.

Roadway Network

State Highway (SH) 52 – This is a two-lane state highway that provides regional connections to Interstate 25 west of Fort Lupton, US 85 in Fort Lupton, and Interstate 76 to the east. In the study area, this is a two-lane east-west roadway with narrow paved shoulders. The speed limit is posted at 55 mph. At the intersection with CR 31 there are turn/auxiliary lanes provided.

CR 31 is a north-south two-lane roadway. The speed limit is posted at 45 mph in the study area. CR 31 has no improved shoulders. It is identified as a truck route by Fort Lupton. Currently CR 31 terminates at State Highway (SH) 52.

9th Street is a east-west two-lane roadway. Directly west of CR 31, 9th Street is a paved roadway with sidewalks. The intersection of 9th Street at CR 31 is improved for the eastbound direction. The speed limit is 40 mph. East of CR 31, 9th Street is an unpaved two-lane roadway.

CR 29 ½ is a north-south two-lane roadway that currently exists south of the Project site. Near 9th Street it is unpaved. Near SH 52 it is paved and provides access to Aims Community College. The City of Fort Lupton plans on improving CR 29 ½ by paving it from 9th Street south to its' current pavement.

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EXISTING TRAFFIC CONDITIONS

Existing intersection operations were evaluated for both the morning and evening peak hours. Intersection count data and daily counts were collected on Wednesday, April 24, 2019. **Appendix A** includes the intersection turning movement and daily count data. The resulting peak hour turning movement and daily volumes are provided on Figure 4. The current lane configurations of the study intersections are shown on Figure 5.

Intersection Level of Service Analysis Methodologies

Transportation professionals evaluate intersections to determine how they are currently operating and will operate in the future. The methods employed can be found in the Transportation Research Board's, 6th Edition, 2016 *Highway Capacity Manual* (HCM). Level of service (LOS) is based on a "graded" system from LOS A, very little to no delays, to LOS F which represents excessive delays and congestion.

The City of Fort Lupton has established a Level of Service criteria within their *Standards and Specifications for the Design and Construction of Public Improvements,* 2015. Chapter 8 – Traffic Control states: "Level of Service "C" shall be the design objective for all movements, and under no circumstances will less than level of Service "D" be accepted for site and non-site traffic, including existing traffic at Build-out of the study area." Definitions for level of service are provided for both unsignalized (existing operations) and signalized conditions.

Unsignalized Intersection

Peak hour levels of motor vehicle delay at unsignalized intersections were estimated using the method from Chapter 17 of the 2016 *Highway Capacity Manual*. The delays for the entire intersection and for each of the constrained movements are reported. Table 1 summarizes the relationship between average control delay per vehicle and LOS for unsignalized intersections.

Table 1 Unsignalized Intersection Level of Service Definitions

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	≤10.0	No delay for stop-controlled approaches.
B	10.0 and ≤15.0	Operations with minor delay.
C	>15.0 and ≤25.0	Operations with moderate delays.
D	>25.0 and ≤35.0	Operations with increasingly unacceptable delays.
E	>35.0 and ≤50.0	Operations with high delays, and long queues.
F	>50.0	Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers.

Source: Transportation Research Board, Highway Capacity Manual, 2016.

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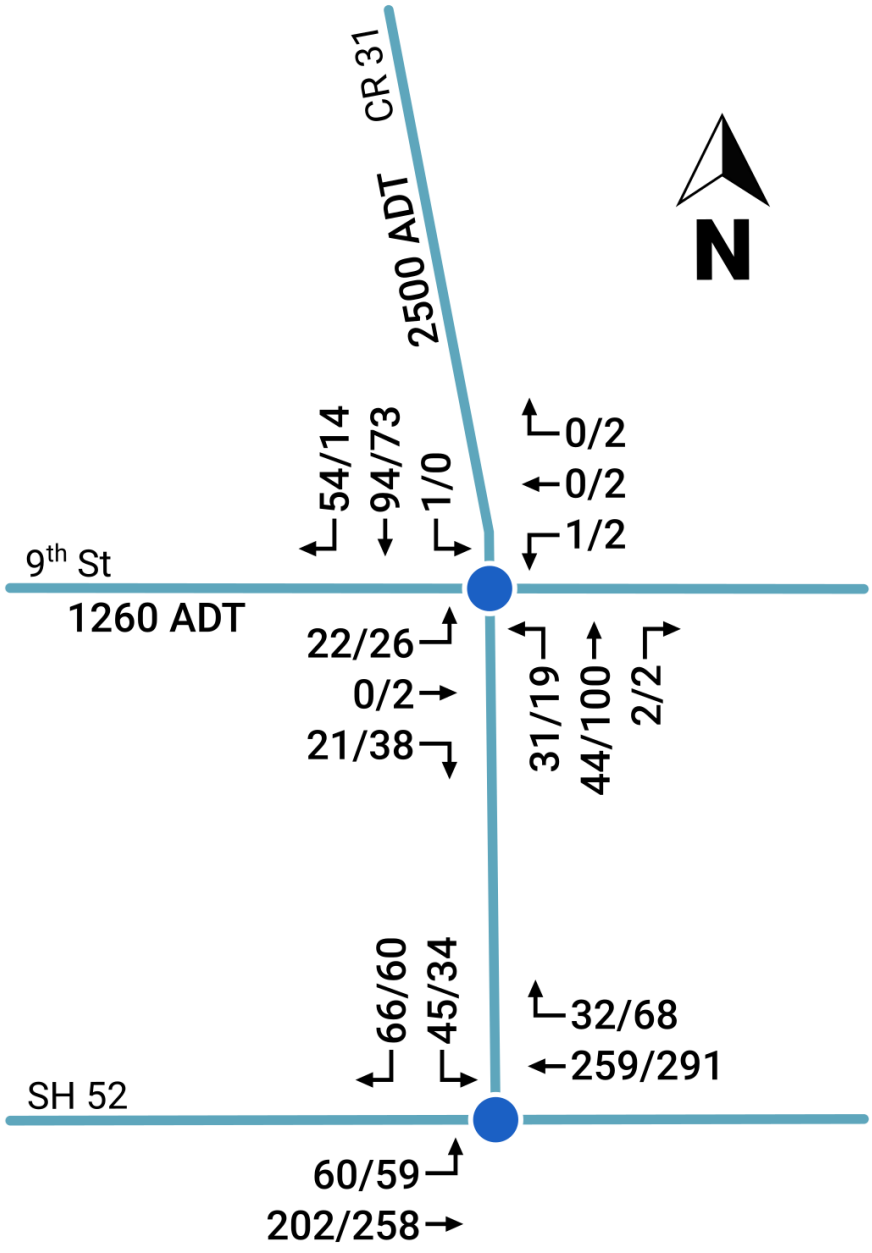
Figure 3 – Existing Peak Hour & Daily Volumes



AM/PM Peak Hour Turning Movements
ADT = Average Daily Traffic

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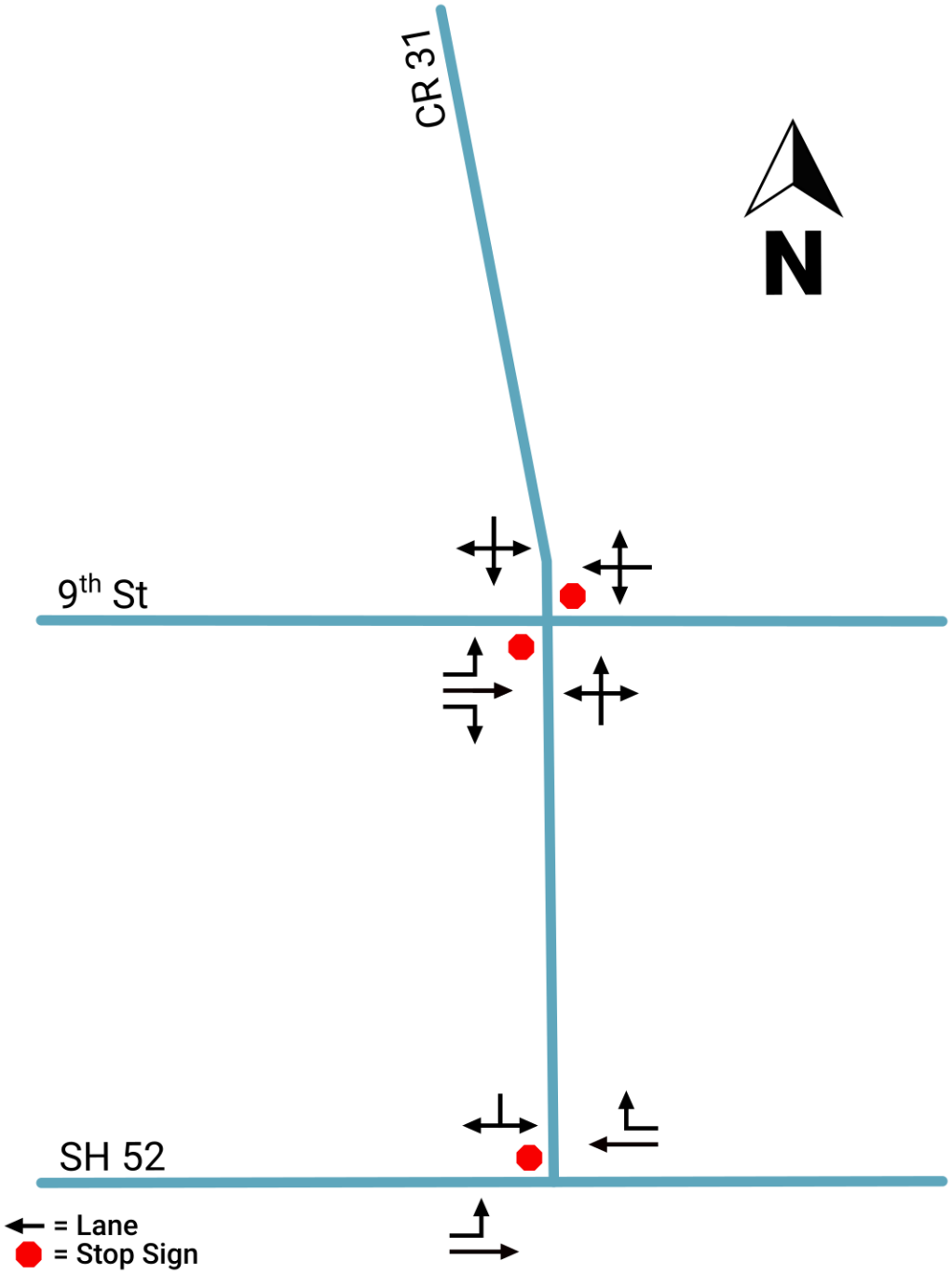
Figure 4 – Existing Lane Configurations



Signalized Intersections

Peak hour levels of motor vehicle delay at signalized intersections were estimated using methods provided in Transportation Research Board's 2010 Highway Capacity Manual. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay

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experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue Table 2 summarizes the relationship between average control delay per vehicle and LOS for signalized intersections.

Table 2 Signalized Intersection Level of Service Definitions

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	≤10.0	Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all.
B	>10.0 and ≤20.0	Stable Operation or Minimal Delays: Generally, occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized.
C	>20.0 and ≤35.0	Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted.
D	>35.0 and ≤55.0	Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays.
E	>55.0 and ≤80.0	Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
F	>80.0	Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections.

Source: Transportation Research Board, Highway Capacity Manual, 2016.

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Existing Intersection Conditions

Using the HCM methodology, the weekday AM and PM peak hour intersection operations were determined. The results are provided in Table 3. As indicated in the table, both of the study intersections are currently operating at acceptable levels of service. The detailed analysis worksheets are provided in Appendix B.

Table 3 Existing Weekday Peak-Hour Intersection Level of Service

#	Intersection	Overall Movement	AM Peak		PM Peak	
			Delay	LOS	Delay	LOS
1	CR 31 & SH 52 T Stop Control	Overall	2.9	A	2.2	A
		EB LT	8.1	A	8.3	A
		SB	13	B	13.2	B
2	CR 31 & 9th Street Two Way Stop Control	Overall	2.5	A	3	A
		NB LT	7.6	A	7.4	A
		EB LT	10.4	B	10.3	B
		EB T	0	A	10.5	B
		EB RT	9	A	8.9	A
		WB	10.5	B	10	B
		SB LT	7.3	A	0	A

Notes:
1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained /STOP-controlled movement or approach.

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3 PROJECT TRAVEL DEMAND

This chapter provides an overview of the project and a description of the travel demand methodology to estimate vehicle trip generation, distribution, and assignment of project-generated traffic along area roadways and intersections.

PROJECT CHARACTERISTICS

The proposed Cottonwood Greens project is a residential project located west of CR 31 and north of 9th Street. The project site plan was depicted on Figure 2. The project is planned on approximately 122 acres. As shown on the figure, vehicular access to the project will be from: CR 31 (one location), 9th Street (two locations) and a connection with the future 14th Street. The primary north-south project roadway will align with CR 29 ½ . The project will be developed with 287 single family and 140 townhomes. The transportation characteristics of the site includes a curvilinear grid roadway layout, a pedestrian/bicycle trail that allows for future connections to the Main Fulton Ditch Trail and the Fort Lupton Trail.

PROJECT TRIP GENERATION

The trip generation characteristics of the project were estimated using data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* 10th Edition. Table 4 provides the trip generation estimated for the project. As indicated in the table, the full buildout of the project is estimated to generate approximately 3,730 daily trips, 280 morning and 360 evening peak hour trips.

PROJECT TRIP DISTRIBUTION | ASSIGNMENT

The distribution of the project traffic onto the roadway system was based on: the existing peak hour traffic counts, the roadway network, the adjacent land use, the location of the project within the region and the City of Fort Lupton, traffic forecasts from the *Transportation Plan,* and input from the City engineer. The project trip distribution is depicted on Figure 5.

The project assigned peak hour traffic volumes for are shown on Figure 6. The City of Fort Lupton has within their *Transportation Plan* the extension of CR 31 south of SH 52 to CR 8. The projected traffic volumes on Figure 6 were modified at CR 31 and SH 52 to reflect this connection. The future year 2040 peak hour traffic volumes for this location are provided in Figure 7.

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Table 4 – Estimated Trip Generation

ITE Land Use Code & Rates		Project	Project Trip Generation						
Land Use	Land Use Code	Dwelling Units	Daily	AM			PM		
				IN	Out	Total	IN	Out	Total
Single-Family Detached	210	287	2,709	53	159	212	179	105	284
Multi-Family Low Rise	220	140	1,018	15	51	66	50	29	80
TOTAL BUILDOUT			3,727	68	210	278	229	135	364
Based on ITE Trip Generation 10th Edition									

Figure 5 – Trip Distribution

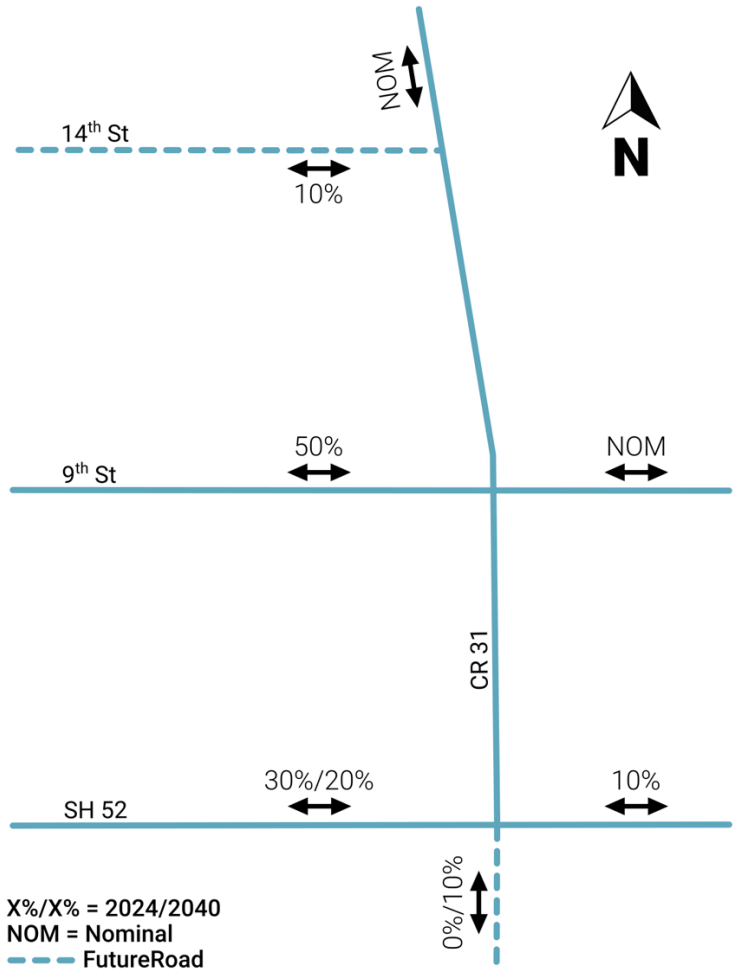

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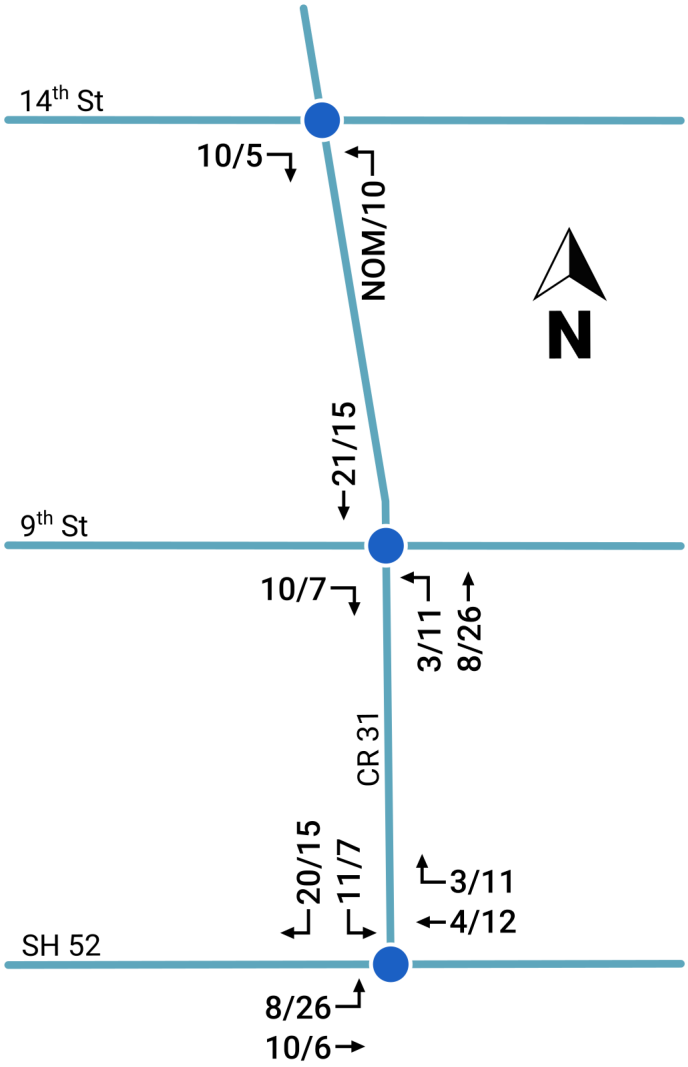
Figure 6 – Project Traffic - 2024



AM/PM Peak Hour Turning Movements

NOM = Nominal

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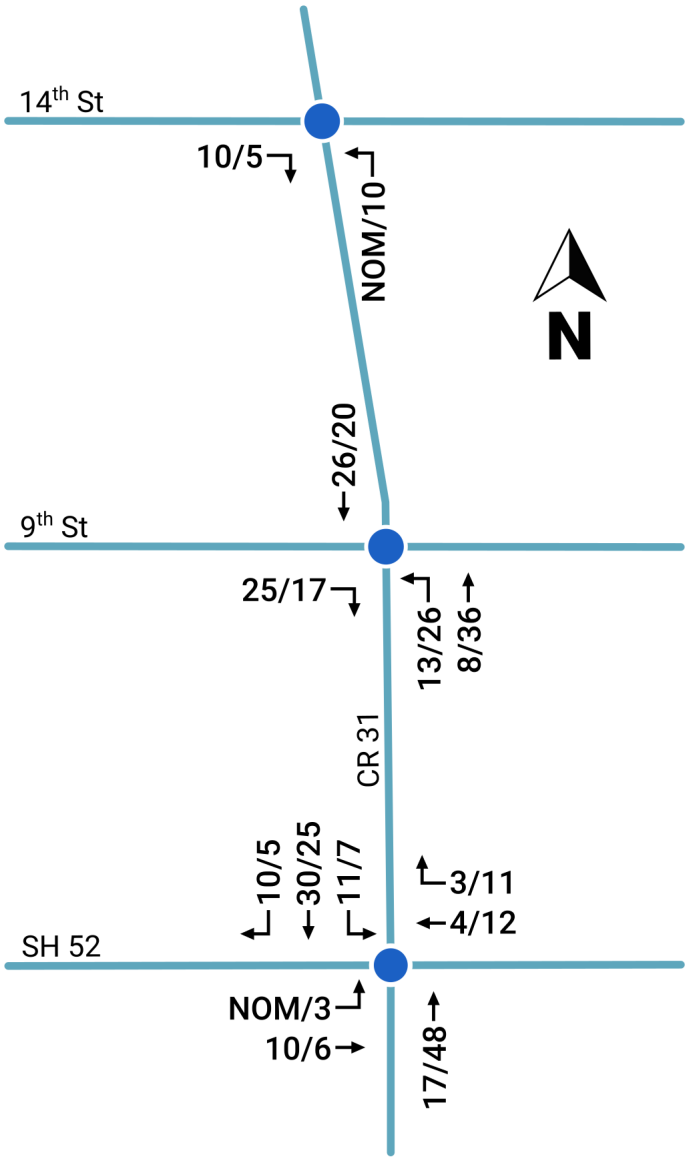
Figure 7 – Project Traffic - 2040



AM/PM Peak Hour Turning Movements

NOM = Nominal

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4 FUTURE TRAFFIC PROJECTIONS

Estimates of future traffic conditions both with and without the proposed Project were necessary to evaluate the potential impact of the Project on the local street system. The background base traffic scenario represents future traffic conditions without the addition of the Project, while the total scenario represents future traffic conditions with completion of the proposed Project. Two future years were analyzed, Year 2024 and Year 2040. The development of these future traffic scenarios is described in this chapter.

BACKGROUND 2024 TRAFFIC PROJECTIONS

The background traffic projections reflect growth in traffic from two primary sources: ambient growth in the existing traffic volumes due to regional growth both in and outside of the study area, and traffic generated by potential projects. The City requested that a project similar in size to the proposed Cottonwood Greens project be assumed for the land directly north of the project site. Additionally, the City anticipates two roadway improvements: 14th Street will be constructed to CR 31 by 2024 and CR 29 ½ will be paved and improved between 9th Street and SH 52. Each of these elements are described below.

- The **ambient growth** in traffic was determined with information from the *Fort Lupton Transportation Plan,* June 2018. Based on these projections an annual straight line growth rate of 1.7% per year was established for the short range for each roadway except SH 52. It should be noted that the future projections were adjusted to account for traffic from the proposed project. This eliminates double counting the Project traffic which is already included in the future projections in the *Transportation Plan*. The growth rate for SH 52 was 1% per year. This value will be applied to the existing counts to determine the Year 2024 volumes due to regional growth.
- It was assumed that a project similar in size and use would be built on the land north of the Cottonwood Greens project. Access to/from this future project would be from 14th Street. Traffic was estimated and assigned to the roadway system to account for this potential project.
- Based on conversations with City of Fort Lupton Public Works, 14th Street is expected to be built to CR 31 and CR 29 ½ will be paved and improved between 9th Street and SH 52..

The resulting Background 2024 traffic projections for the study intersections is provided on Figure 8.

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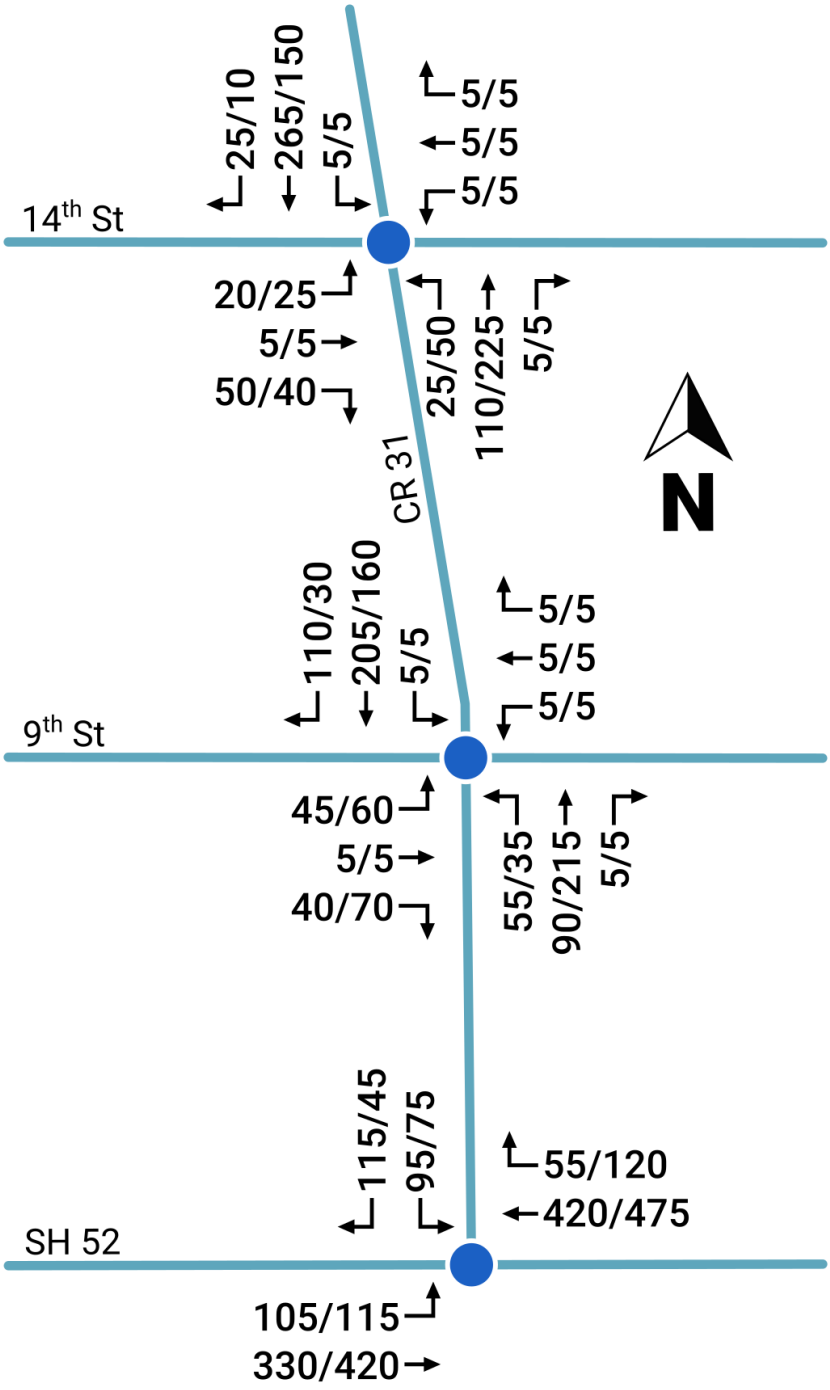
Figure 8 – Background Traffic 2024



AM/PM Peak Hour Turning Movements

Volumes Rounded to Nearest 5 Vehicles

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BACKGROUND 2040 TRAFFIC PROJECTIONS

The traffic projections for 2040 was estimated using a similar methodology as for 2024. The City of Fort Lupton has plans for roadway improvements by Year 2040. Each of these components to the 2040 projections are discussed below.

- The **ambient growth** in traffic was based on the values developed for 2024. An annual straight line growth of 1.7 % per year will be used for each roadway except for SH 52 which was 1% per year.
- Similar to 2024, it was assumed that a project similar in size and use would be built on the land north of the Cottonwood Greens project. Access to/from this future project would be from 14th Street. Traffic was estimated and assigned to the roadway system to account for this potential project.
- 14th Street was assumed to be built to CR 31 and CR 29 ½ will be paved between 9th Street and SH 52.
- The City of Fort Lupton, *Transportation Plan* plans for CR 31 is to be extended south of SH 52 to CR 8 by 2040.

The assumed intersection configurations for 2040 are illustrated on Figure 9. The resulting Background 2040 traffic projections for each of the study intersections are provided on Figure 10.

TOTAL TRAFFIC PROJECTIONS

The total traffic projections include both the background plus project traffic. Total traffic projections were developed for Year 2024 and 2040. The project-generated traffic volumes from Figure 7 were added to the Year 2024 background traffic volumes illustrated on Figure 9 to develop background plus project peak hour traffic volumes. The resulting Year 2024 total traffic is depicted on Figure 11.

The Year 2040 Total traffic projections were developed by adding the Project traffic from Figure 8, to the Year 2040 Background traffic from Figure 10. The resulting Year 2040 total traffic is illustrated on Figure 12.

INTERNAL SITE TRAFFIC

The Project site was designed to accommodate the traffic generated by the project. The City of Fort Lupton, within Chapter 6 of the *Standards and Specifications for the Design and Construction of Public Improvements,* has established that Local streets can accommodate up to 2,500 daily vehicular trips. It was estimated that the Local streets within Cottonwood Greens will accommodate between 700 and 1,500 daily trips at locations near their intersections with public roadways. The design of the internal streets as Locals is therefore appropriate.

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Figure 9 – Lane Configurations 2040

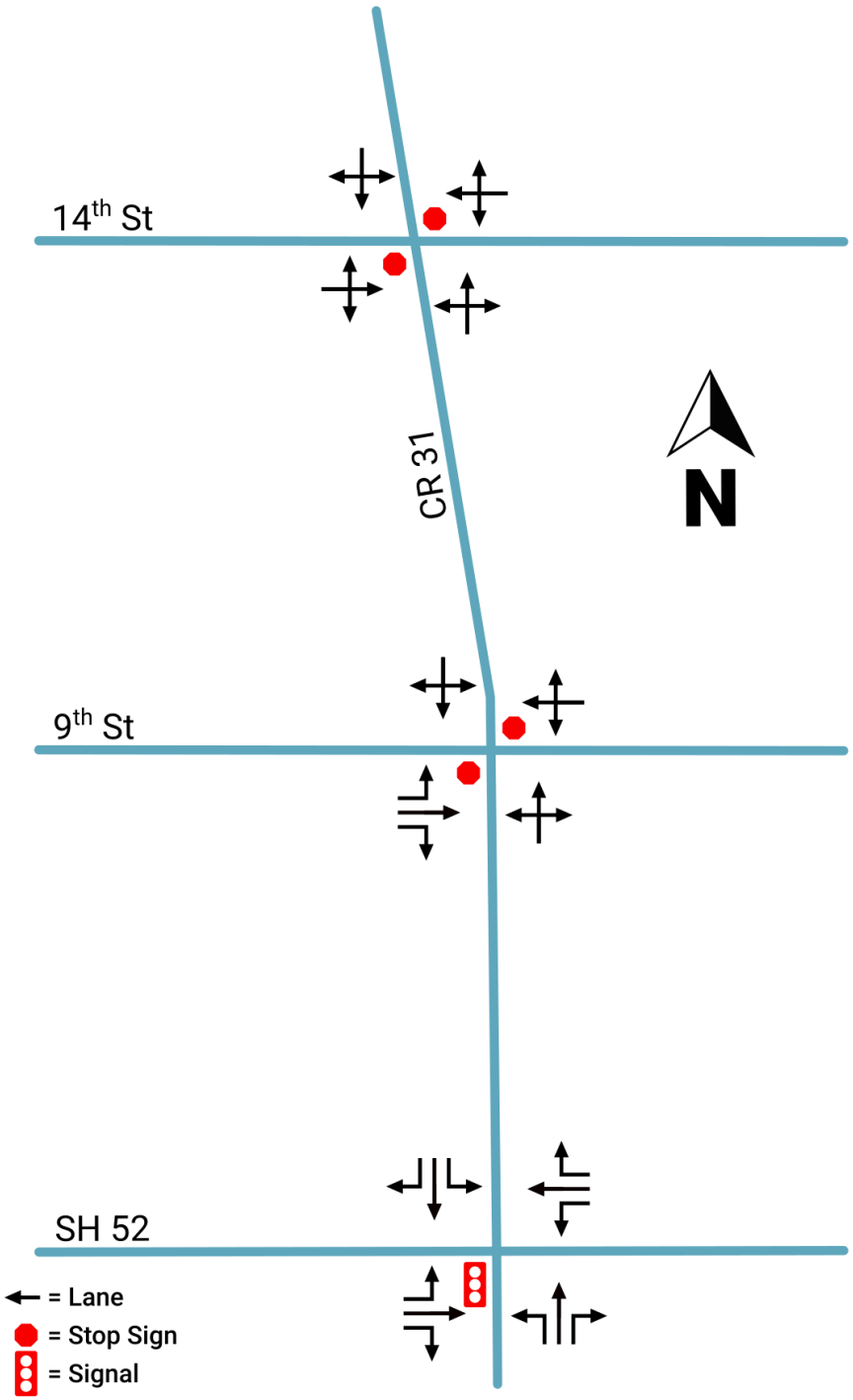

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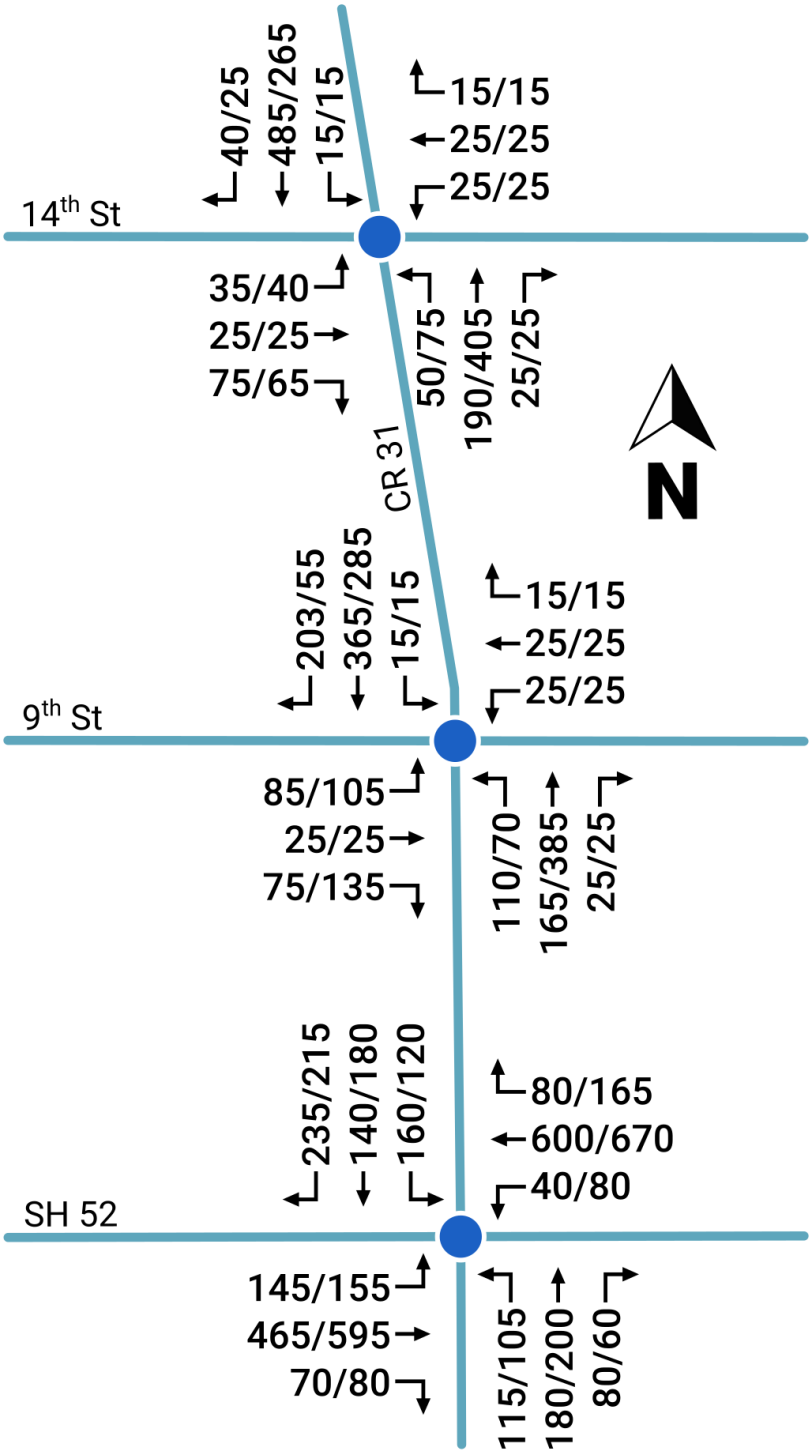
Figure 10 – Background Traffic 2040



AM/PM Peak Hour Turning Movements

Volumes Rounded to Nearest 5 Vehicles

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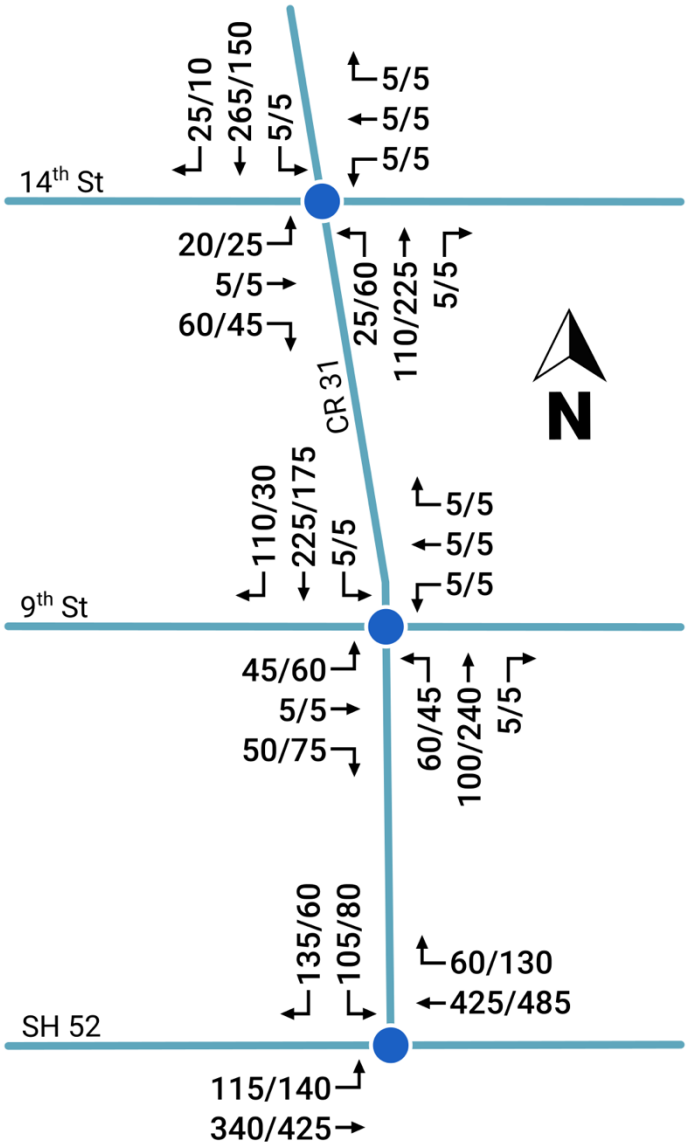
Figure 11 – Total Traffic 2024



AM/PM Peak Hour Turning Movements
Volumes Rounded to Nearest 5 Vehicles

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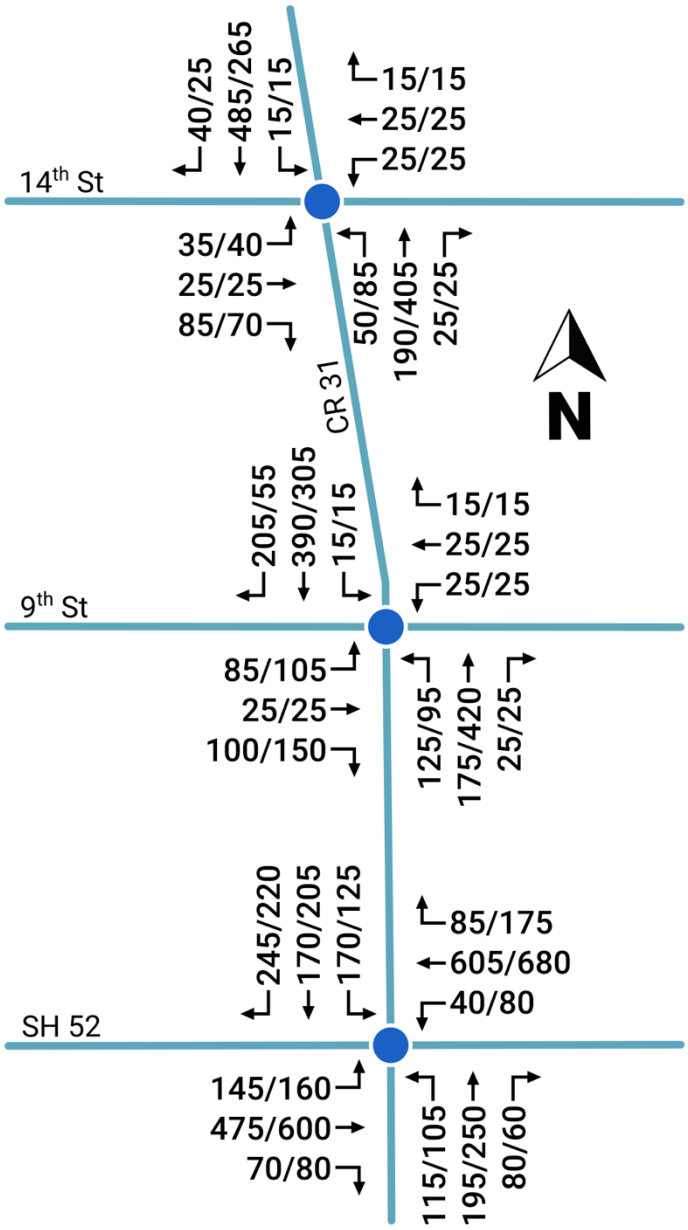
Figure 12 – Total Traffic 2040



AM/PM Peak Hour Turning Movements

Volumes Rounded to Nearest 5 Vehicles

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5 TRAFFIC IMPACT ANALYSIS

This chapter presents an analysis of the potential impacts of the traffic generated by the proposed Cottonwood Greens project on the local street system. The analysis compares the projected levels of service at each study intersection under future background and total conditions to estimate the incremental increase in the delay caused by the proposed project. This provides the information needed to assess the potential impact of the project using the significance criteria.

SIGNIFICANT TRAFFIC IMPACT CRITERIA

Threshold criteria were applied to determine if the growth in traffic due to regional growth/other projects and/or the proposed Project has a significant traffic impact at an intersection. If the future traffic projections for either Background (without Project) or Total (with Project) resulted in any portion of an intersection to exceed the LOS standards, this would be considered an impact.

As presented earlier, based on the City of Fort Lupton standards, LOS C is the design objective for all movements at an intersection. Level of service less than D is unacceptable.

FUTURE TRAFFIC CONDITIONS

The future traffic projections at the three study intersections were analyzed to determine their future operating conditions. The results for Year 2024 are provided in Table 5 for both the background and total traffic scenarios. The future operating conditions for Year 2040 are provided in Table 6.

It should be noted that under 2040 conditions, the intersection of CR 31 and SH 52 was projected to have peak hour volumes that would warrant signalization. The operational analysis for this location was performed assuming it was signalized. The need for a traffic signal is documented in the Federal Highways Administration, *Manual On Uniform Traffic Control Devices* (MUTCD), 2009. The Peak Hour - Warrant 3 is provided in Appendix C.

Note that the results provided in Tables 5 and 6 indicate both the overall delay/LOS for the intersection and the delay/LOS for the each constrained movement and/or leg. If an intersection, a movement, or leg is projected to operate at unacceptable levels it is highlighted in grey.

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Table 5 Future 2024 Intersection Level of Service

#	Intersection	Movement	AM Peak Hr				PM Peak Hr			
			Background		Total		Background		Total	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	CR 31 & SH 52 T Stop Control	Overall	7.2	A	10.2	B	4.6	A	6.6	A
		EB LT	8.8	A	8.9	A	9.4	A	9.7	A
		SB	33.9	D	45.7	E	38.8	E	52.6	F
2	CR 31 & 9th Street Two Way Stop Control	Overall	3.1	A	3.2	A	3.5	A	3.7	A
		NB LT	8.1	A	8.3	A	7.7	A	7.9	A
		EB LT	14.2	B	16.3	B	14.4	B	18.7	C
		EB T	13.3	B	14.8	B	13.2	B	15.8	C
		EB RT	10.1	B	10.8	B	9.6	A	10.1	B
		WB	12.4	B	13.9	B	12.6	B	15.1	C
		SB LT	7.4	A	7.5	A	7.7	A	7.9	A
3	CR 31 & 14th Street (To be Built) Two Way Stop Control	Overall	2.4	A	2.6	A	2.7	A	2.9	A
		NB	8	A	8	A	7.7	A	7.7	A
		EB	11.7	B	11.7	B	11.8	B	11.9	B
		WB	12	B	12	B	12.6	B	12.9	B
		SB	7.5	A	7.5	A	7.7	A	7.7	A

Notes:

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained STOP-controlled movement or approach.
3. Delays greater than 50 seconds are rounded to nearest second.
4. Grey highlighted indicates intersection operating at unacceptable LOS conditions.

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Table 6 Future 2040 Intersection Level of Service

#	Intersection	Movement	AM Peak Hr				PM Peak Hr			
			Background		Total		Background		Total	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	CR 31 & SH 52 Signalized	Overall	22.7	C	23.3	C	22.5	C	23.7	C
		EB LT	16.9	B	17.1	B	18.3	B	19.0	B
		EB T	10.4	B	10.5	B	11.3	B	11.3	B
		EB RT	7.7	A	7.7	A	7.4	A	7.3	A
		WB LT	14.5	B	14.7	B	18.9	B	18.9	B
		WB T	36.5	D	37.3	C	31.7	C	32.8	C
		WB RT	13.3	B	13.3	B	13.7	B	13.8	B
		NB LT	25.2	C	27.0	C	32.2	C	34.8	D
		NB T	19.9	B	20.5	C	24.7	C	27.4	C
		NB RT	18.0	B	18.1	B	21.1	C	21.5	C
		SB LT	29.5	C	32.0	C	33.3	C	39.8	D
		SB T	18.9	B	19.8	B	24.0	C	25.4	B
		SB RT	24.1	C	24.9	C	27.8	C	28.7	C
2	CR 31 & 9th Street Two Way Stop Control	Overall	7.8	A	10	B	8.7	A	11.9	B
		NB LT	9.3	A	9.6	A	8.2	A	8.4	A
		EB LT	47.9	E	74	F	50	F	83.2	F
		EB T	24.8	C	29.5	D	22.9	C	27.5	D
		EB RT	12.4	B	13.8	B	11.5	B	11.9	B
		WB	32.7	D	46.3	E	31.7	D	46.4	E
		SB LT	7.7	A	7.7	A	8.3	A	8.4	A
3	CR 31 & 14th Street (To be Built) Two Way Stop Control	Overall	5.5	A	5.7	A	5.8	A	6.1	A
		NB	8.8	A	8.8	A	8.1	A	8.1	A
		EB	24.4	C	24.5	C	25.2	D	26.3	D
		WB	25.5	D	26.1	D	27.4	D	29.1	D
		SB	7.7	A	7.7	A	8.3	A	8.3	A

Notes:

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. Average vehicle delay (in seconds per vehicle) is reported for both overall intersection and each constrained STOP-controlled movement, lane group (signalized) or approach.
3. Delays greater than 50 seconds are rounded to nearest second.
4. Grey highlighted indicates intersection operating at unacceptable LOS conditions.

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The study results for 2024 indicate the following:

- At the intersection of CR 31 at SH 52 under both Background and Total conditions, the southbound approach is projected to operate at LOS E/F.
- The remaining two study intersections will operate at acceptable levels of service.

The study results for 2040 indicate the following:

- At CR 31 and 9th Street the eastbound left-turn will experience long delays under both Background and Total conditions. The westbound approach will experience long delays under Total conditions.
- The intersection of CR 31 at SH 52 and CR 31 at 14th Street are expected to operate acceptably.

FUTURE YEAR 2024 IMPROVEMENT MEASURES

The future 2024 traffic volume projections and operations were evaluated at CR 31 and SH 52 to determine effective improvements. Currently the southbound direction is a shared left/right-turn lane. The addition of an exclusive right-turn lane was analyzed. The resulting intersection operations with a southbound right-turn lane and a left-turn lane are provided in Table 7. The operations of the right-turn lane improved to acceptable levels however, the left-turn lane continued to operate with long delays. It should be noted that left-turns from streets that intersect higher volume roadways such as State Highways will typically experience delays in excess of LOS D. Therefore the addition of a separate right-turn lane should be considered as an improvement to this intersection.

Signalization of this location was also considered. Under Background conditions it was determined that peak hour signal warrants, as provided in the MUTCD, would not be satisfied. Under Total conditions, Warrant 3 the Peak Hour warrant is projected to be satisfied. It should be noted that the warrant is marginally satisfied. Meeting the threshold volumes for one warrant does not always justify the installation of a signal. The City of Fort Lupton and CDOT will need to determine this based on all of the traffic engineering factors that may include: daily volumes, pedestrian activity, location of nearby schools, crash history, and geometrics. The intersection operations with signalization are provided in Table 7. As shown the LOS is projected to operate at acceptable levels. This intersection should be monitored to determine if or when a signal should be installed.

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Table 7 - Improved 2024 Intersection Level of Service

#	Intersection	Movement	AM Peak Hr		PM Peak Hr	
			Total		Total	
			Delay	LOS	Delay	LOS
1	CR 31 & SH 52 **T Stop Control**	Overall	5.9	A	5.1	A
		EB LT	8.9	A	9.7	A
		SB LT	40.2	E	57.7	F
		SB RT	12.9	B	12.4	B
1	CR 31 & SH 52 **Signalized**	Overall	16.1	B	16.7	B
		EB LT	12.7	B	13.1	B
		EB T	9.9	A	9.7	A
		WB T	23.0	C	25.5	C
		WB RT	13.8	B	13.7	B
		SB RT/LT	14.7	B	14.1	B

The Total 2024 traffic volume projections (for the AM plus PM peak hours) were evaluated to determine the relative percentage of Project and Background volumes. These are shown on Table 8.

Table 8 - 2024 Percent Contribution

#	Intersection	Total Volumes (AM + PM)	Background		Project	
			Volume	Percent	Volume	Percent
1	CR 31 & SH 52 Signalized	2500	2369	95%	135	5%

FUTURE YEAR 2040 IMPROVEMENT MEASURES

The intersection of CR 31 at 9th Street is projected to experience long delays for the eastbound left-turn and westbound approach. It is challenging to improve these delays. Additional lanes in the westbound direction could reduce delays however, multiple lanes on 9th Street at a two-way stop begins to become challenging for motorists to determine whom has the right-of-way. An all-way stop would increase overall delays at the intersection by stopping CR 31. A roundabout is another intersection control design however, it is most effective where the volumes on both of the roadways (CR 31 and 9th Street) are approximately equal which is not anticipated. The projections do not indicate that any signal warrants would be satisfied.

If the intersection of CR 31 at SH 52 is signalized, this could create gaps in CR 31 traffic which will ease the projected delays on 9th Street. Additionally, as more of the roadway network in this area of Fort Lupton is built, vehicles will have options if their delays

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become perceived as unacceptable. Finally, some traffic may shift from 9th Street to 14th Street which was assumed to be completed by 2024.

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6 AUXILIARY LANE ANALYSIS

An analysis was conducted to determine the need for auxiliary right-turn and left-turn lanes on at the Project access locations. This analysis was performed for both 2024 and 2040. The projected peak hour traffic volumes at these locations are provided in Appendix D for both 2024 and 2040. The turning volumes were analyzed based on the guidelines set forth in the Transportation Research Board's *NCHRP Report 279*, 1985 provided in Appendix D.

Using the figures shown in Appendix D, it was determined that a left-turn lane on CR 31 will most likely be warranted at the northern Project access street (Access "C")under 2024 projections. For the year 2040, the two access locations on 9th Street (Access "A" and "B") would not require auxiliary lanes. It should be noted that this analysis was performed assuming both CR 31 and 9th Street were two-lane roadways.

Right-turn lanes were not determined to be required.

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7 CONCLUSIONS

This study was undertaken to analyze the potential traffic impacts of the proposed Cottonwood Greens project in the City of Fort Lupton. The following summarizes the results of this analysis:

- The full buildout proposed Project consists of 287 single family homes and 140 multi-family dwellings.
- The Project site is located north of 9th Street and west of CR 31 on land that is undeveloped.
- The Project is expected to generate approximately 3,275 daily trips, 280 trips during the AM peak hour and 365 trips during the PM peak hour.
- Currently the study intersections on CR 31 at both SH 52 and 9th Street are operating at acceptable levels.
- For 2024 is was assumed that 14th Street would connect from its' current terminus east to CR 31 and CR 29 ½ would be paved between 9th Street to SH 52.
- Under the future 2024 conditions, the intersection of CR 31 at SH 52 is projected to operate with long delays under both Background and Total traffic conditions. It is suggested that the City and CDOT consider improvements to the southbound approach with the addition of a right-turn lane. The southbound left-turn lane will continue to experience long delays. Signalization may also be considered at this location.
- Under the future 2040 conditions it was assumed that CR 31 would be extended south of SH 52 and be signalized.
- Under 2040 projected conditions, the traffic on 9th Street at CR 31 will experience long delays. Numerous improvements were explored to mitigate these delays however it is suggested that as this area of Fort Lupton grows and the roadway network is expanded, this location be monitored and improvements developed at that time.
- Under 2024 conditions a left-turn lane would be needed on CR 31 at: 9th Street.

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APPENDICIES

- Appendix A: Intersection Turning Movement Count Data (October 11, 2018)
- Appendix B: HCM LOS Calculation Outputs
- Appendix C: Figure and Table 4C-3 Manual on Uniform Traffic Control Devices
- Appendix D: Project Access 2024 and 2040 Volumes and NCHRP Report 279

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Appendix A

Intersection Turning Movement Count Data (April 24, 2019)

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Location: WCR 31 N/O 9TH ST
Date Range: 4/24/2019 - 4/30/2019
Site Code: 01

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	4/24/2019			4/25/2019			4/26/2019			4/27/2019			4/28/2019			4/29/2019			4/30/2019			Mid-Week Average		
Time	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	3	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	4
1:00 AM	4	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	8
2:00 AM	2	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	6
3:00 AM	1	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	4
4:00 AM	7	9	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	9	16
5:00 AM	35	39	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	39	74
6:00 AM	57	50	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57	50	107
7:00 AM	67	149	216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67	149	216
8:00 AM	52	75	127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	75	127
9:00 AM	40	59	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	59	99
10:00 AM	65	67	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	67	132
11:00 AM	81	74	155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81	74	155
12:00 PM	73	82	155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73	82	155
1:00 PM	72	54	126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	54	126
2:00 PM	88	93	181	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88	93	181
3:00 PM	118	67	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118	67	185
4:00 PM	129	86	215	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	129	86	215
5:00 PM	118	90	208	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	118	90	208
6:00 PM	110	68	178	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110	68	178
7:00 PM	81	46	127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81	46	127
8:00 PM	53	43	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	43	96
9:00 PM	32	14	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	14	46
10:00 PM	21	6	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	6	27
11:00 PM	7	2	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	2	9
Total	**1,316**	**1,185**	**2,501**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1,316**	**1,185**	**2,501**
Percent	**53%**	**47%**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**53%**	**47%**	-

1. Mid-week average includes data between Tuesday and Thursday.

Mark Skaggs:425-250-0777
mark.skaggs@idaxdata.com

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Location: 9TH ST W/O WCR 31
Date Range: 4/24/2019 - 4/30/2019
Site Code: 02

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	4/24/2019			4/25/2019			4/26/2019			4/27/2019			4/28/2019			4/29/2019			4/30/2019			Mid-Week Average		
Time	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00 AM	1	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1
1:00 AM	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
2:00 AM	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
3:00 AM	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
4:00 AM	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3
5:00 AM	28	8	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	8	36
6:00 AM	37	18	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	18	55
7:00 AM	44	86	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44	86	130
8:00 AM	28	46	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	46	74
9:00 AM	37	46	83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	46	83
10:00 AM	45	41	86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	41	86
11:00 AM	52	35	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	35	87
12:00 PM	44	32	76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44	32	76
1:00 PM	32	41	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	41	73
2:00 PM	50	52	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	52	102
3:00 PM	66	41	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66	41	107
4:00 PM	67	34	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67	34	101
5:00 PM	40	41	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	41	81
6:00 PM	28	34	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	34	62
7:00 PM	19	19	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	19	38
8:00 PM	13	11	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	11	24
9:00 PM	6	8	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	14
10:00 PM	14	4	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	4	18
11:00 PM	3	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	5
Total	**659**	**603**	**1,262**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**659**	**603**	**1,262**
Percent	**52%**	**48%**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**52%**	**48%**	-

1. Mid-week average includes data between Tuesday and Thursday.

Mark Skaggs:425-250-0777
mark.skaggs@idaxdata.com

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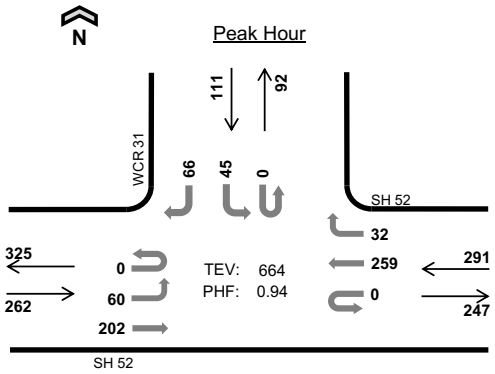
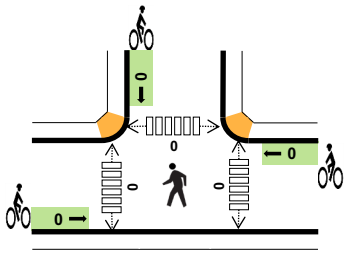
WCR 31
SH 52

Peak Hour



Date: Wed, Apr 24, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	11.1%	0.85
WB	15.8%	0.93
NB	-	-
SB	5.4%	0.79
TOTAL	12.2%	0.94

Two-Hour Count Summaries

Interval Start	SH 52 Eastbound				SH 52 Westbound				0 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	5	51	0	0	0	56	11	0	0	0	0	0	14	0	9	146	0
7:15 AM	**0**	**11**	**49**	**0**	**0**	**0**	**71**	**4**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**14**	**160**	0
7:30 AM	**0**	**6**	**49**	**0**	**0**	**0**	**66**	**12**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**23**	**168**	0
7:45 AM	**0**	**21**	**49**	**0**	**0**	**0**	**67**	**6**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**20**	**176**	650
8:00 AM	**0**	**22**	**55**	**0**	**0**	**0**	**55**	**10**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**9**	**160**	**664**
8:15 AM	0	11	31	0	0	0	59	5	0	0	0	0	0	9	0	14	129	633
8:30 AM	0	10	44	0	0	0	62	7	0	0	0	0	0	5	0	12	140	605
8:45 AM	0	10	50	0	0	0	49	7	0	0	0	0	0	5	0	13	134	563
Count Total	0	96	378	0	0	0	485	62	0	0	0	0	0	78	0	114	1,213	0
Peak Hour	**0**	**60**	**202**	**0**	**0**	**0**	**259**	**32**	**0**	**0**	**0**	**0**	**0**	**45**	**0**	**66**	**664**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	7	13	0	2	*22*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**8**	**7**	**0**	**0**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**4**	**12**	**0**	**1**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**11**	**10**	**0**	**4**	***25***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**6**	**17**	**0**	**1**	***24***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	5	9	0	1	*15*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	17	7	0	2	*26*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	10	8	0	1	*19*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	68	83	0	12	*163*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**29**	**46**	**0**	**6**	***81***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

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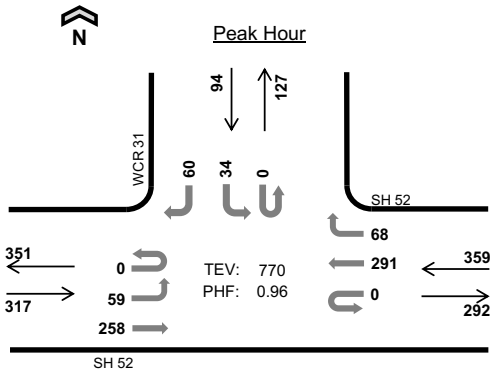
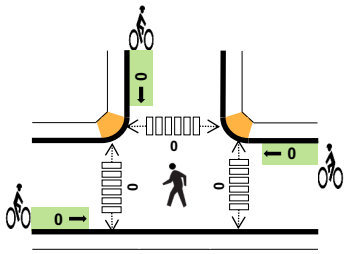
WCR 31
SH 52

Peak Hour



Date: Wed, Apr 24, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	7.6%	0.89
WB	7.0%	0.99
NB	-	-
SB	1.1%	0.78
TOTAL	6.5%	0.96

Two-Hour Count Summaries

Interval Start	SH 52 Eastbound				SH 52 Westbound				0 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	21	59	0	0	0	60	9	0	0	0	0	0	10	0	18	177	0
4:15 PM	0	12	72	0	0	0	49	13	0	0	0	0	0	7	0	17	170	0
4:30 PM	0	15	71	0	0	0	52	13	0	0	0	0	0	10	0	19	180	0
4:45 PM	0	23	64	0	0	0	57	11	0	0	0	0	0	10	0	22	187	714
5:00 PM	**0**	**18**	**71**	**0**	**0**	**0**	**79**	**12**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**10**	**200**	737
5:15 PM	**0**	**17**	**62**	**0**	**0**	**0**	**73**	**16**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**15**	**191**	758
5:30 PM	**0**	**10**	**60**	**0**	**0**	**0**	**71**	**19**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**21**	**190**	768
5:45 PM	**0**	**14**	**65**	**0**	**0**	**0**	**68**	**21**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**14**	**189**	**770**
Count Total	0	130	524	0	0	0	509	114	0	0	0	0	0	71	0	136	1,484	0
Peak Hour	**0**	**59**	**258**	**0**	**0**	**0**	**291**	**68**	**0**	**0**	**0**	**0**	**0**	**34**	**0**	**60**	**770**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	8	4	0	1	*13*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	11	5	0	2	*18*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	6	9	0	0	*15*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	3	5	0	2	*10*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**8**	**10**	**0**	**0**	***18***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**6**	**4**	**0**	**0**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**4**	**3**	**0**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**6**	**8**	**0**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	52	48	0	6	*106*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**24**	**25**	**0**	**1**	***50***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

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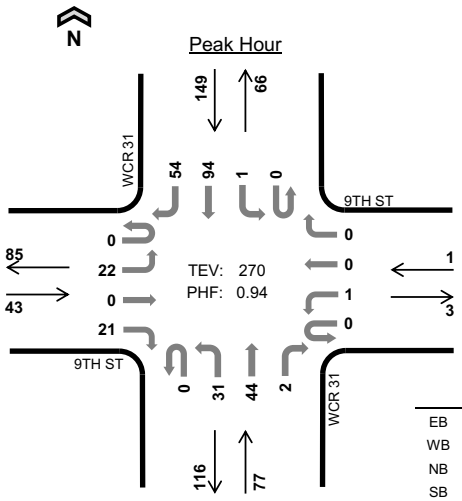
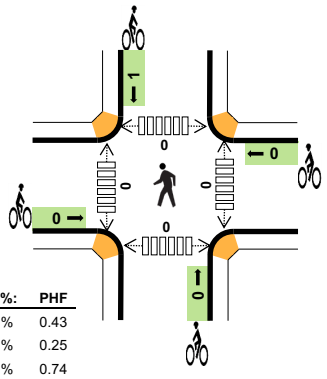
WCR 31
9TH ST



Date: Wed, Apr 24, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	2.3%	0.43
WB	0.0%	0.25
NB	2.6%	0.74
SB	7.4%	0.89
TOTAL	5.2%	0.94

Two-Hour Count Summaries

Interval Start	9TH ST Eastbound				9TH ST Westbound				WCR 31 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**2**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**7**	**8**	**1**	**0**	**0**	**19**	**18**	**58**	0
7:15 AM	**0**	**16**	**0**	**9**	**0**	**1**	**0**	**0**	**0**	**5**	**10**	**0**	**0**	**0**	**15**	**16**	**72**	0
7:30 AM	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**9**	**11**	**0**	**0**	**1**	**31**	**10**	**68**	0
7:45 AM	**0**	**2**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**10**	**15**	**1**	**0**	**0**	**29**	**10**	**72**	**270**
8:00 AM	0	1	1	1	0	1	0	0	0	11	19	0	0	0	16	2	52	264
8:15 AM	0	4	0	7	0	1	0	0	0	9	7	3	0	0	14	2	47	239
8:30 AM	0	2	1	3	0	0	0	2	0	4	9	0	0	2	15	6	44	215
8:45 AM	0	0	0	6	0	0	0	0	0	9	10	2	0	1	12	4	44	187
Count Total	0	29	2	38	0	3	0	2	0	64	89	7	0	4	151	68	457	0
Peak Hour	**0**	**22**	**0**	**21**	**0**	**1**	**0**	**0**	**0**	**31**	**44**	**2**	**0**	**1**	**94**	**54**	**270**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	**0**	**0**	**1**	**5**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:15 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**0**	**4**	***4***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***
8:00 AM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
8:15 AM	0	0	4	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	1	1	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	2	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	1	10	16	*28*	0	0	0	1	*1*	0	0	0	0	*0*
Peak Hour	**1**	**0**	**2**	**11**	***14***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***

Nathan Warren: (720) 646-1008 nathan.warren@idaxdata.com

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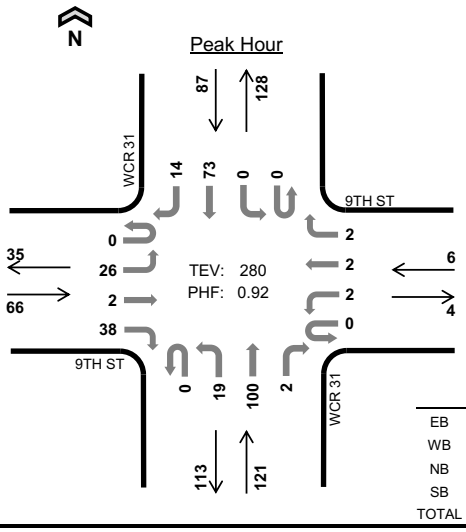
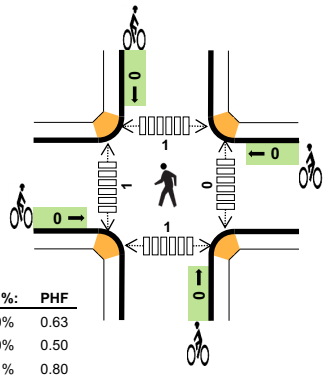
WCR 31
9TH ST



Date: Wed, Apr 24, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	3.0%	0.63
WB	0.0%	0.50
NB	4.1%	0.80
SB	6.9%	0.91
TOTAL	4.6%	0.92

Two-Hour Count Summaries

Interval Start	9TH ST Eastbound				9TH ST Westbound				WCR 31 Northbound				WCR 31 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**5**	**1**	**7**	**0**	**0**	**0**	**0**	**0**	**5**	**26**	**0**	**0**	**0**	**19**	**5**	**68**	0
4:15 PM	**0**	**6**	**1**	**10**	**0**	**0**	**1**	**1**	**0**	**5**	**21**	**0**	**0**	**0**	**14**	**4**	**63**	0
4:30 PM	**0**	**13**	**0**	**13**	**0**	**1**	**1**	**1**	**0**	**5**	**19**	**2**	**0**	**0**	**16**	**5**	**76**	0
4:45 PM	**0**	**2**	**0**	**8**	**0**	**1**	**0**	**0**	**0**	**4**	**34**	**0**	**0**	**0**	**24**	**0**	**73**	**280**
5:00 PM	0	5	0	7	0	1	0	0	0	4	25	0	0	0	12	4	58	270
5:15 PM	0	3	0	5	0	1	0	0	0	5	26	0	0	0	19	7	66	273
5:30 PM	0	6	0	6	0	0	0	1	0	8	21	0	0	0	22	6	70	267
5:45 PM	0	2	2	2	0	0	0	0	0	7	30	0	0	0	19	1	63	257
Count Total	0	42	4	58	0	4	2	3	0	43	202	2	0	0	145	32	537	0
Peak Hour	**0**	**26**	**2**	**38**	**0**	**2**	**2**	**2**	**0**	**19**	**100**	**2**	**0**	**0**	**73**	**14**	**280**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**1**	**0**	**3**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**0**	*2*
4:45 PM	**1**	**0**	**2**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
5:00 PM	0	0	3	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	6	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	2	0	14	7	*23*	0	0	0	0	*0*	0	1	1	1	*3*
Peak Hour	**2**	**0**	**5**	**6**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**1**	***3***

Nathan Warren: (720) 646-1008 nathan.warren@idaxdata.com

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Appendix B
Level of Service Worksheets

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EXISTING

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Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	202	259	32	45	66
Future Vol, veh/h	60	202	259	32	45	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	220	282	35	49	72

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	317	0	-	0	632	282
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	350	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1243	-	-	-	444	757
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	713	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1243	-	-	-	421	757
Mov Cap-2 Maneuver	-	-	-	-	421	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	713	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1243	-	-	-	572
HCM Lane V/C Ratio	0.052	-	-	-	0.211
HCM Control Delay (s)	8.1	-	-	-	13
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8

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Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	258	291	68	34	60
Future Vol, veh/h	59	258	291	68	34	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized		None		None		None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #		0	0	-	0	-
Grade, %		0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	280	316	74	37	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	390	0	-	0	724	316
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	408	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1169	-	-	-	393	724
Stage 1	-	-	-	-	739	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1169	-	-	-	371	724
Mov Cap-2 Maneuver	-	-	-	-	371	-
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	671	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1169	-	-	-	539
HCM Lane V/C Ratio	0.055	-	-	-	0.19
HCM Control Delay (s)	8.3	-	-	-	13.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

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Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	0	21	1	0	0	31	44	2	1	94	54
Future Vol, veh/h	22	0	21	1	0	0	31	44	2	1	94	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	0	23	1	0	0	34	48	2	1	102	59

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	251	252	132	262	280	49	161	0	0	50	0	0
Stage 1	134	134	-	117	117	-	-	-	-	-	-	-
Stage 2	117	118	-	145	163	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	702	651	917	691	628	1020	1418	-	-	1557	-	-
Stage 1	869	785	-	888	799	-	-	-	-	-	-	-
Stage 2	888	798	-	858	763	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	688	634	917	661	612	1020	1418	-	-	1557	-	-
Mov Cap-2 Maneuver	688	634	-	661	612	-	-	-	-	-	-	-
Stage 1	847	784	-	866	779	-	-	-	-	-	-	-
Stage 2	866	778	-	836	762	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	10.5	3.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1418	-	-	688	-	917	661	1557	-	-
HCM Lane V/C Ratio	0.024	-	-	0.035	-	0.025	0.002	0.001	-	-
HCM Control Delay (s)	7.6	0	-	10.4	0	9	10.5	7.3	0	-
HCM Lane LOS	A	A	-	B	A	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	0.1	0	0	-	-

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Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	2	38	2	2	2	19	100	2	0	73	14
Future Vol, veh/h	26	2	38	2	2	2	19	100	2	0	73	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	2	41	2	2	2	21	109	2	0	79	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	241	240	87	260	246	110	94	0	0	111	0	0
Stage 1	87	87	-	152	152	-	-	-	-	-	-	-
Stage 2	154	153	-	108	94	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	713	661	971	693	656	943	1500	-	-	1479	-	-
Stage 1	921	823	-	850	772	-	-	-	-	-	-	-
Stage 2	848	771	-	897	817	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	702	651	971	654	646	943	1500	-	-	1479	-	-
Mov Cap-2 Maneuver	702	651	-	654	646	-	-	-	-	-	-	-
Stage 1	907	823	-	837	760	-	-	-	-	-	-	-
Stage 2	831	759	-	857	817	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10	1.2	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1500	-	-	702	651	971	725	1479	-	-
HCM Lane V/C Ratio	0.014	-	-	0.04	0.003	0.043	0.009	-	-	-
HCM Control Delay (s)	7.4	0	-	10.3	10.5	8.9	10	0	-	-
HCM Lane LOS	A	A	-	B	B	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.1	0	0	-	-

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BACKGROUND 2024

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Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	105	330	420	55	95	115
Future Vol, veh/h	105	330	420	55	95	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	114	359	457	60	103	125

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	517	0	-	0	1044	457
Stage 1	-	-	-	-	457	-
Stage 2	-	-	-	-	587	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1049	-	-	-	254	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1049	-	-	-	226	604
Mov Cap-2 Maneuver	-	-	-	-	226	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	556	-

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	33.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1049	-	-	-	344
HCM Lane V/C Ratio	0.109	-	-	-	0.664
HCM Control Delay (s)	8.8	-	-	-	33.9
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.4	-	-	-	4.5

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Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	420	475	120	75	45
Future Vol, veh/h	115	420	475	120	75	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	457	516	130	82	49

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	646	0	-	0	1223	516
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	707	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	939	-	-	-	198	559
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	489	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	939	-	-	-	172	559
Mov Cap-2 Maneuver	-	-	-	-	172	-
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	489	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	38.8
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	939	-	-	-	232
HCM Lane V/C Ratio	0.133	-	-	-	0.562
HCM Control Delay (s)	9.4	-	-	-	38.8
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0.5	-	-	-	3.1

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Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	5	40	5	5	5	55	90	5	5	205	110
Future Vol, veh/h	45	5	40	5	5	5	55	90	5	5	205	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	5	43	5	5	5	60	98	5	5	223	120

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	519	516	283	538	574	101	343	0	0	103	0	0
Stage 1	293	293	-	221	221	-	-	-	-	-	-	-
Stage 2	226	223	-	317	353	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	467	463	756	454	429	954	1216	-	-	1489	-	-
Stage 1	715	670	-	781	720	-	-	-	-	-	-	-
Stage 2	777	719	-	694	631	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	440	437	756	406	405	954	1216	-	-	1489	-	-
Mov Cap-2 Maneuver	440	437	-	406	405	-	-	-	-	-	-	-
Stage 1	678	667	-	740	683	-	-	-	-	-	-	-
Stage 2	727	682	-	646	628	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	12.4	3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1216	-	-	440	437	756	502	1489	-	-
HCM Lane V/C Ratio	0.049	-	-	0.111	0.012	0.058	0.032	0.004	-	-
HCM Control Delay (s)	8.1	0	-	14.2	13.3	10.1	12.4	7.4	0	-
HCM Lane LOS	A	A	-	B	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0	0.2	0.1	0	-	-

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Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	70	5	5	5	35	215	5	5	160	30
Future Vol, veh/h	60	5	70	5	5	5	35	215	5	5	160	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	5	76	5	5	5	38	234	5	5	174	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	519	516	191	554	530	237	207	0	0	239	0	0
Stage 1	201	201	-	313	313	-	-	-	-	-	-	-
Stage 2	318	315	-	241	217	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	467	463	851	443	455	802	1364	-	-	1328	-	-
Stage 1	801	735	-	698	657	-	-	-	-	-	-	-
Stage 2	693	656	-	762	723	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	447	446	851	389	439	802	1364	-	-	1328	-	-
Mov Cap-2 Maneuver	447	446	-	389	439	-	-	-	-	-	-	-
Stage 1	775	732	-	676	636	-	-	-	-	-	-	-
Stage 2	661	635	-	686	720	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	12.6	1.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1364	-	-	447	446	851	492	1328	-	-
HCM Lane V/C Ratio	0.028	-	-	0.146	0.012	0.089	0.033	0.004	-	-
HCM Control Delay (s)	7.7	0	-	14.4	13.2	9.6	12.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0	0.3	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	5	50	5	5	5	25	110	5	5	265	25
Future Vol, veh/h	20	5	50	5	5	5	25	110	5	5	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	54	5	5	5	27	120	5	5	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	494	491	302	518	502	123	315	0	0	125	0	0
Stage 1	312	312	-	177	177	-	-	-	-	-	-	-
Stage 2	182	179	-	341	325	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	486	478	738	468	471	928	1245	-	-	1462	-	-
Stage 1	699	658	-	825	753	-	-	-	-	-	-	-
Stage 2	820	751	-	674	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	469	465	738	421	458	928	1245	-	-	1462	-	-
Mov Cap-2 Maneuver	469	465	-	421	458	-	-	-	-	-	-	-
Stage 1	683	655	-	806	736	-	-	-	-	-	-	-
Stage 2	791	734	-	617	646	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	12	1.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	619	532	1462	-	-
HCM Lane V/C Ratio	0.022	-	-	0.132	0.031	0.004	-	-
HCM Control Delay (s)	8	0	-	11.7	12	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	5	40	5	5	5	50	225	5	5	150	10
Future Vol, veh/h	25	5	40	5	5	5	50	225	5	5	150	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	5	43	5	5	5	54	245	5	5	163	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	540	537	169	559	540	248	174	0	0	250	0	0
Stage 1	179	179	-	356	356	-	-	-	-	-	-	-
Stage 2	361	358	-	203	184	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	453	450	875	440	449	791	1403	-	-	1316	-	-
Stage 1	823	751	-	661	629	-	-	-	-	-	-	-
Stage 2	657	628	-	799	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	429	428	875	399	427	791	1403	-	-	1316	-	-
Mov Cap-2 Maneuver	429	428	-	399	427	-	-	-	-	-	-	-
Stage 1	786	748	-	631	601	-	-	-	-	-	-	-
Stage 2	617	600	-	751	744	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.6	1.4	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	605	491	1316	-	-
HCM Lane V/C Ratio	0.039	-	-	0.126	0.033	0.004	-	-
HCM Control Delay (s)	7.7	0	-	11.8	12.6	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-	-

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Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	340	425	60	105	135
Future Vol, veh/h	115	340	425	60	105	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	370	462	65	114	147

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1082	462
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1040	-	-	-	241	600
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1040	-	-	-	212	600
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	45.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1040	-	-	-	333
HCM Lane V/C Ratio	0.12	-	-	-	0.783
HCM Control Delay (s)	8.9	-	-	-	45.7
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0.4	-	-	-	6.4

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Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	140	425	485	130	80	60
Future Vol, veh/h	140	425	485	130	80	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	462	527	141	87	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	1293	527
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	766	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	922	-	-	-	180	551
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	922	-	-	-	150	551
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	459	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	52.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	922	-	-	-	218
HCM Lane V/C Ratio	0.165	-	-	-	0.698
HCM Control Delay (s)	9.7	-	-	-	52.6
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	4.5

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Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	5	50	5	5	5	60	100	5	5	225	110
Future Vol, veh/h	45	5	50	5	5	5	60	100	5	5	225	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	5	54	5	5	5	65	109	5	5	245	120

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	562	559	305	587	617	112	365	0	0	114	0	0
Stage 1	315	315	-	242	242	-	-	-	-	-	-	-
Stage 2	247	244	-	345	375	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	438	438	735	421	405	941	1194	-	-	1475	-	-
Stage 1	696	656	-	762	705	-	-	-	-	-	-	-
Stage 2	757	704	-	671	617	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	410	411	735	368	380	941	1194	-	-	1475	-	-
Mov Cap-2 Maneuver	410	411	-	368	380	-	-	-	-	-	-	-
Stage 1	656	653	-	718	664	-	-	-	-	-	-	-
Stage 2	703	663	-	614	615	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	13	3	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	410	411	735	468	1475	-	-
HCM Lane V/C Ratio	0.055	-	-	0.119	0.013	0.074	0.035	0.004	-	-
HCM Control Delay (s)	8.2	0	-	15	13.9	10.3	13	7.5	0	-
HCM Lane LOS	A	A	-	C	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0	0.2	0.1	0	-	-

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Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	75	5	5	5	45	240	5	5	175	30
Future Vol, veh/h	60	5	75	5	5	5	45	240	5	5	175	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	5	82	5	5	5	49	261	5	5	190	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	584	581	207	622	595	264	223	0	0	266	0	0
Stage 1	217	217	-	362	362	-	-	-	-	-	-	-
Stage 2	367	364	-	260	233	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	423	425	833	399	417	775	1346	-	-	1298	-	-
Stage 1	785	723	-	657	625	-	-	-	-	-	-	-
Stage 2	653	624	-	745	712	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	401	405	833	344	397	775	1346	-	-	1298	-	-
Mov Cap-2 Maneuver	401	405	-	344	397	-	-	-	-	-	-	-
Stage 1	751	720	-	629	598	-	-	-	-	-	-	-
Stage 2	615	597	-	664	709	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	13.4	1.2	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	401	405	833	447	1298	-	-
HCM Lane V/C Ratio	0.036	-	-	0.163	0.013	0.098	0.036	0.004	-	-
HCM Control Delay (s)	7.8	0	-	15.7	14	9.8	13.4	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0	0.3	0.1	0	-	-

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Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	5	60	5	5	5	25	110	5	5	265	25
Future Vol, veh/h	20	5	60	5	5	5	25	110	5	5	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	65	5	5	5	27	120	5	5	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	494	491	302	524	502	123	315	0	0	125	0	0
Stage 1	312	312	-	177	177	-	-	-	-	-	-	-
Stage 2	182	179	-	347	325	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	486	478	738	464	471	928	1245	-	-	1462	-	-
Stage 1	699	658	-	825	753	-	-	-	-	-	-	-
Stage 2	820	751	-	669	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	469	465	738	411	458	928	1245	-	-	1462	-	-
Mov Cap-2 Maneuver	469	465	-	411	458	-	-	-	-	-	-	-
Stage 1	683	655	-	806	736	-	-	-	-	-	-	-
Stage 2	791	734	-	602	646	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	12	1.4	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	631	527	1462	-	-
HCM Lane V/C Ratio	0.022	-	-	0.146	0.031	0.004	-	-
HCM Control Delay (s)	8	0	-	11.7	12	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

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Intersection												
Int Delay, s/veh	2.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	5	45	5	5	5	60	225	5	5	150	10
Future Vol, veh/h	25	5	45	5	5	5	60	225	5	5	150	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	5	49	5	5	5	65	245	5	5	163	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	562	559	169	584	562	248	174	0	0	250	0	0
Stage 1	179	179	-	378	378	-	-	-	-	-	-	-
Stage 2	383	380	-	206	184	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	438	438	875	423	436	791	1403	-	-	1316	-	-
Stage 1	823	751	-	644	615	-	-	-	-	-	-	-
Stage 2	640	614	-	796	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	412	413	875	378	411	791	1403	-	-	1316	-	-
Mov Cap-2 Maneuver	412	413	-	378	411	-	-	-	-	-	-	-
Stage 1	779	748	-	609	582	-	-	-	-	-	-	-
Stage 2	596	581	-	743	744	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	12.9	1.6	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	604	473	1316	-	-
HCM Lane V/C Ratio	0.046	-	-	0.135	0.034	0.004	-	-
HCM Control Delay (s)	7.7	0	-	11.9	12.9	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

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2024 With Improvements

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Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	340	425	60	105	135
Future Vol, veh/h	115	340	425	60	105	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	370	462	65	114	147

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1082	462
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1040	-	-	-	241	600
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1040	-	-	-	212	600
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	24.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1040	-	-	-	212	600
HCM Lane V/C Ratio	0.12	-	-	-	0.538	0.245
HCM Control Delay (s)	8.9	-	-	-	40.2	12.9
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.4	-	-	-	2.8	1

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Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	140	425	485	130	80	60
Future Vol, veh/h	140	425	485	130	80	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	462	527	141	87	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	1293	527
Stage 1	-	-	-	-	527	-
Stage 2	-	-	-	-	766	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	922	-	-	-	180	551
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	922	-	-	-	150	551
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	459	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	38.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	922	-	-	-	150	551
HCM Lane V/C Ratio	0.165	-	-	-	0.58	0.118
HCM Control Delay (s)	9.7	-	-	-	57.7	12.4
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.6	-	-	-	3	0.4

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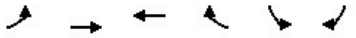
HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	340	425	60	105	135
Future Volume (veh/h)	115	340	425	60	105	135
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	125	370	462	65	114	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	336	864	557	472	267	344
Arrive On Green	0.08	0.46	0.30	0.30	0.37	0.37
Sat Flow, veh/h	1781	1870	1870	1585	725	935
Grp Volume(v), veh/h	125	370	462	65	262	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1666	0
Q Serve(g_s), s	2.3	7.0	12.2	1.6	6.2	0.0
Cycle Q Clear(g_c), s	2.3	7.0	12.2	1.6	6.2	0.0
Prop In Lane	1.00			1.00	0.44	0.56
Lane Grp Cap(c), veh/h	336	864	557	472	613	0
V/C Ratio(X)	0.37	0.43	0.83	0.14	0.43	0.00
Avail Cap(c_a), veh/h	380	1112	759	643	613	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.0	9.6	17.4	13.6	12.6	0.0
Incr Delay (d2), s/veh	0.7	0.3	5.7	0.1	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.9	4.8	0.4	2.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	9.9	23.0	13.8	14.7	0.0
LnGrp LOS	B	A	C	B	B	A
Approach Vol, veh/h		495	527		262	
Approach Delay, s/veh		10.6	21.9		14.7	
Approach LOS		B	C		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			29.0		24.0	8.7	20.3
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			31.5		19.5	5.5	21.5
Max Q Clear Time (g_c+I1), s			9.0		8.2	4.3	14.2
Green Ext Time (p_c), s			1.8		0.6	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

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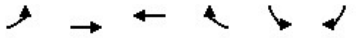
HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	140	425	485	130	80	60
Future Volume (veh/h)	140	425	485	130	80	60
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	152	462	527	141	87	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	330	925	615	521	327	245
Arrive On Green	0.08	0.49	0.33	0.33	0.34	0.34
Sat Flow, veh/h	1781	1870	1870	1585	963	719
Grp Volume(v), veh/h	152	462	527	141	153	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1693	0
Q Serve(g_s), s	2.8	9.0	14.3	3.6	3.6	0.0
Cycle Q Clear(g_c), s	2.8	9.0	14.3	3.6	3.6	0.0
Prop In Lane	1.00			1.00	0.57	0.42
Lane Grp Cap(c), veh/h	330	925	615	521	576	0
V/C Ratio(X)	0.46	0.50	0.86	0.27	0.27	0.00
Avail Cap(c_a), veh/h	396	1118	739	627	576	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.1	9.2	17.0	13.4	13.0	0.0
Incr Delay (d2), s/veh	1.0	0.4	8.5	0.3	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.3	5.9	1.0	1.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.1	9.7	25.5	13.7	14.1	0.0
LnGrp LOS	B	A	C	B	B	A
Approach Vol, veh/h		614	668		153	
Approach Delay, s/veh		10.5	23.0		14.1	
Approach LOS		B	C		B	

Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			31.4		23.0	9.0	22.4
Change Period (Y+Rc), s			4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s			32.5		18.5	6.5	21.5
Max Q Clear Time (g_c+I1), s			11.0		5.6	4.8	16.3
Green Ext Time (p_c), s			2.4		0.3	0.1	1.6

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

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BACKGROUND 2040

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 09/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	465	70	40	600	80	115	180	80	160	140	235
Future Volume (veh/h)	145	465	70	40	600	80	115	180	80	160	140	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	505	76	43	652	87	125	196	87	174	152	255
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	979	830	402	704	597	334	541	458	338	541	458
Arrive On Green	0.08	0.52	0.52	0.38	0.38	0.38	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	833	1870	1585	978	1870	1585	1096	1870	1585
Grp Volume(v), veh/h	158	505	76	43	652	87	125	196	87	174	152	255
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	833	1870	1585	978	1870	1585	1096	1870	1585
Q Serve(g_s), s	3.2	11.3	1.5	2.3	21.4	2.3	7.3	5.3	2.6	9.6	4.0	8.7
Cycle Q Clear(g_c), s	3.2	11.3	1.5	4.2	21.4	2.3	11.3	5.3	2.6	14.9	4.0	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	280	979	830	402	704	597	334	541	458	338	541	458
V/C Ratio(X)	0.56	0.52	0.09	0.11	0.93	0.15	0.37	0.36	0.19	0.51	0.28	0.56
Avail Cap(c_a), veh/h	283	1008	855	414	731	619	334	541	458	338	541	458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	10.0	7.6	14.4	19.1	13.2	22.0	18.1	17.1	24.0	17.6	19.3
Incr Delay (d2), s/veh	2.5	0.4	0.0	0.1	17.4	0.1	3.2	1.9	0.9	5.5	1.3	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.2	0.4	0.4	10.5	0.7	1.9	2.4	1.0	2.8	1.8	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	10.4	7.7	14.5	36.5	13.3	25.2	19.9	18.0	29.5	18.9	24.1
LnGrp LOS	B	B	A	B	D	B	C	B	B	C	B	C
Approach Vol, veh/h		739			782			408			581	
Approach Delay, s/veh		11.5			32.7			21.1			24.3	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	24.5	39.5	24.5	9.4	30.1
Change Period (Y+Rc), s	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	18.5	34.5	18.5	5.0	25.0
Max Q Clear Time (g_c+I1), s	13.3	13.3	16.9	5.2	23.4
Green Ext Time (p_c), s	0.9	2.9	0.5	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 09/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	595	80	80	670	165	105	200	60	120	180	215
Future Volume (veh/h)	155	595	80	80	670	165	105	200	60	120	180	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	647	87	87	728	179	114	217	65	130	196	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	1058	896	341	804	681	276	508	430	291	508	430
Arrive On Green	0.07	0.57	0.57	0.43	0.43	0.43	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	723	1870	1585	958	1870	1585	1097	1870	1585
Grp Volume(v), veh/h	168	647	87	87	728	179	114	217	65	130	196	234
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	723	1870	1585	958	1870	1585	1097	1870	1585
Q Serve(g_s), s	3.6	16.9	1.9	6.7	26.8	5.3	8.1	7.0	2.3	8.2	6.3	9.3
Cycle Q Clear(g_c), s	3.6	16.9	1.9	13.6	26.8	5.3	14.4	7.0	2.3	15.2	6.3	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	272	1058	896	341	804	681	276	508	430	291	508	430
V/C Ratio(X)	0.62	0.61	0.10	0.26	0.91	0.26	0.41	0.43	0.15	0.45	0.39	0.54
Avail Cap(c_a), veh/h	344	1219	1033	373	889	753	276	508	430	291	508	430
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	10.6	7.4	18.5	19.6	13.5	27.7	22.1	20.4	28.4	21.8	22.9
Incr Delay (d2), s/veh	2.3	0.7	0.0	0.4	12.0	0.2	4.5	2.6	0.7	4.9	2.2	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.0	0.5	1.0	11.8	1.6	2.1	3.3	0.9	2.5	2.9	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	11.3	7.4	18.9	31.7	13.7	32.2	24.7	21.1	33.3	24.0	27.8
LnGrp LOS	B	B	A	B	C	B	C	C	C	C	C	C
Approach Vol, veh/h		902			994			396			560	
Approach Delay, s/veh		12.3			27.3			26.3			27.8	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	2	4	6	7	8
Phs Duration (G+Y+Rc), s	26.0	47.7	26.0	10.0	37.6
Change Period (Y+Rc), s	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	20.0	48.0	20.0	8.5	35.0
Max Q Clear Time (g_c+I1), s	16.4	18.9	17.2	5.6	28.8
Green Ext Time (p_c), s	0.7	4.2	0.8	0.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

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Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	85	25	75	25	25	15	110	165	25	15	365	203
Future Vol, veh/h	85	25	75	25	25	15	110	165	25	15	365	203
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	92	27	82	27	27	16	120	179	27	16	397	221

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	994	986	508	1027	1083	193	618	0	0	206	0	0
Stage 1	540	540	-	433	433	-	-	-	-	-	-	-
Stage 2	454	446	-	594	650	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	224	248	565	213	217	849	962	-	-	1365	-	-
Stage 1	526	521	-	601	582	-	-	-	-	-	-	-
Stage 2	586	574	-	491	465	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	209	565	145	183	849	962	-	-	1365	-	-
Mov Cap-2 Maneuver	172	209	-	145	183	-	-	-	-	-	-	-
Stage 1	452	511	-	516	500	-	-	-	-	-	-	-
Stage 2	467	493	-	390	456	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.4	32.7	3.4	0.2
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	962	-	-	172	209	565	199	1365	-	-
HCM Lane V/C Ratio	0.124	-	-	0.537	0.13	0.144	0.355	0.012	-	-
HCM Control Delay (s)	9.3	0	-	47.9	24.8	12.4	32.7	7.7	0	-
HCM Lane LOS	A	A	-	E	C	B	D	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	2.7	0.4	0.5	1.5	0	-	-

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Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	25	135	25	25	15	70	385	25	15	285	55
Future Vol, veh/h	105	25	135	25	25	15	70	385	25	15	285	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	114	27	147	27	27	16	76	418	27	16	310	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	977	969	340	1043	986	432	370	0	0	445	0	0
Stage 1	372	372	-	584	584	-	-	-	-	-	-	-
Stage 2	605	597	-	459	402	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	230	254	702	207	248	624	1189	-	-	1115	-	-
Stage 1	648	619	-	498	498	-	-	-	-	-	-	-
Stage 2	485	491	-	582	600	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	188	228	702	137	223	624	1189	-	-	1115	-	-
Mov Cap-2 Maneuver	188	228	-	137	223	-	-	-	-	-	-	-
Stage 1	593	608	-	456	456	-	-	-	-	-	-	-
Stage 2	406	449	-	432	589	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.8	31.7	1.2	0.3
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1189	-	-	188	228	702	204	1115	-	-
HCM Lane V/C Ratio	0.064	-	-	0.607	0.119	0.209	0.346	0.015	-	-
HCM Control Delay (s)	8.2	0	-	50	22.9	11.5	31.7	8.3	0	-
HCM Lane LOS	A	A	-	F	C	B	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.4	0.4	0.8	1.5	0	-	-

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Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	25	75	25	25	15	50	190	25	15	485	40
Future Vol, veh/h	35	25	75	25	25	15	50	190	25	15	485	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	27	82	27	27	16	54	207	27	16	527	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	931	923	549	964	931	221	570	0	0	234	0	0
Stage 1	581	581	-	329	329	-	-	-	-	-	-	-
Stage 2	350	342	-	635	602	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	247	270	535	235	267	819	1002	-	-	1333	-	-
Stage 1	499	500	-	684	646	-	-	-	-	-	-	-
Stage 2	666	638	-	467	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	208	249	535	172	246	819	1002	-	-	1333	-	-
Mov Cap-2 Maneuver	208	249	-	172	246	-	-	-	-	-	-	-
Stage 1	468	491	-	642	606	-	-	-	-	-	-	-
Stage 2	585	598	-	367	480	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.4	25.5	1.7	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1002	-	-	330	245	1333	-	-
HCM Lane V/C Ratio	0.054	-	-	0.445	0.288	0.012	-	-
HCM Control Delay (s)	8.8	0	-	24.4	25.5	7.7	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.2	1.2	0	-	-

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Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	25	65	25	25	15	75	405	25	15	265	25
Future Vol, veh/h	40	25	65	25	25	15	75	405	25	15	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	27	71	27	27	16	82	440	27	16	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	973	965	302	1001	965	454	315	0	0	467	0	0
Stage 1	334	334	-	618	618	-	-	-	-	-	-	-
Stage 2	639	631	-	383	347	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	231	255	738	222	255	606	1245	-	-	1094	-	-
Stage 1	680	643	-	477	481	-	-	-	-	-	-	-
Stage 2	464	474	-	640	635	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	188	228	738	168	228	606	1245	-	-	1094	-	-
Mov Cap-2 Maneuver	188	228	-	168	228	-	-	-	-	-	-	-
Stage 1	619	631	-	435	438	-	-	-	-	-	-	-
Stage 2	386	432	-	544	624	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.2	27.4	1.2	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	317	230	1094	-	-
HCM Lane V/C Ratio	0.065	-	-	0.446	0.307	0.015	-	-
HCM Control Delay (s)	8.1	0	-	25.2	27.4	8.3	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.2	1.3	0	-	-

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TOTAL 2040

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	475	70	40	605	85	115	195	80	170	170	245
Future Volume (veh/h)	145	475	70	40	605	85	115	195	80	170	170	245
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	158	516	76	43	658	92	125	212	87	185	185	266
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	982	832	396	708	600	310	539	457	325	539	457
Arrive On Green	0.08	0.52	0.52	0.38	0.38	0.38	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	825	1870	1585	940	1870	1585	1080	1870	1585
Grp Volume(v), veh/h	158	516	76	43	658	92	125	212	87	185	185	266
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	825	1870	1585	940	1870	1585	1080	1870	1585
Q Serve(g_s), s	3.2	11.6	1.5	2.3	21.7	2.5	7.8	5.8	2.7	10.6	5.0	9.2
Cycle Q Clear(g_c), s	3.2	11.6	1.5	4.5	21.7	2.5	12.8	5.8	2.7	16.5	5.0	9.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	982	832	396	708	600	310	539	457	325	539	457
V/C Ratio(X)	0.57	0.53	0.09	0.11	0.93	0.15	0.40	0.39	0.19	0.57	0.34	0.58
Avail Cap(c_a), veh/h	280	1005	852	405	729	617	310	539	457	325	539	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.4	10.0	7.6	14.6	19.1	13.2	23.1	18.3	17.2	25.0	18.0	19.5
Incr Delay (d2), s/veh	2.7	0.5	0.0	0.1	18.2	0.1	3.9	2.1	0.9	7.0	1.7	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.3	0.4	0.4	10.8	0.7	1.9	2.7	1.0	3.2	2.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	10.5	7.7	14.7	37.3	13.3	27.0	20.5	18.1	32.0	19.8	24.9
LnGrp LOS	B	B	A	B	D	B	C	C	B	C	B	C
Approach Vol, veh/h		750			793			424			636	
Approach Delay, s/veh		11.6			33.3			21.9			25.5	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		24.5		39.7		24.5	9.4	30.3				
Change Period (Y+Rc), s		6.0		6.0		6.0	4.5	6.0				
Max Green Setting (Gmax), s		18.5		34.5		18.5	5.0	25.0				
Max Q Clear Time (g_c+I1), s		14.8		13.6		18.5	5.2	23.7				
Green Ext Time (p_c), s		0.8		2.9		0.0	0.0	0.6				

Intersection Summary		
HCM 6th Ctrl Delay		23.3
HCM 6th LOS		C

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HCM 6th Signalized Intersection Summary
1: SH 52 & CR 31 10/03/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	600	80	80	680	175	105	250	60	125	205	220
Future Volume (veh/h)	160	600	80	80	680	175	105	250	60	125	205	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	652	87	87	739	190	114	272	65	136	223	239
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	1066	903	341	810	686	255	503	426	248	503	426
Arrive On Green	0.08	0.57	0.57	0.43	0.43	0.43	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	720	1870	1585	930	1870	1585	1043	1870	1585
Grp Volume(v), veh/h	174	652	87	87	739	190	114	272	65	136	223	239
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	720	1870	1585	930	1870	1585	1043	1870	1585
Q Serve(g_s), s	3.7	17.1	1.9	6.8	27.6	5.7	8.6	9.3	2.3	9.5	7.4	9.7
Cycle Q Clear(g_c), s	3.7	17.1	1.9	13.7	27.6	5.7	16.0	9.3	2.3	18.8	7.4	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	1066	903	341	810	686	255	503	426	248	503	426
V/C Ratio(X)	0.64	0.61	0.10	0.26	0.91	0.28	0.45	0.54	0.15	0.55	0.44	0.56
Avail Cap(c_a), veh/h	338	1207	1023	368	880	746	255	503	426	248	503	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	10.6	7.3	18.5	19.8	13.6	29.2	23.3	20.7	31.3	22.6	23.4
Incr Delay (d2), s/veh	2.8	0.7	0.0	0.4	13.1	0.2	5.6	4.1	0.8	8.5	2.8	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	5.1	0.5	1.0	12.3	1.7	2.2	4.5	0.9	2.9	3.5	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	11.3	7.3	18.8	32.8	13.8	34.8	27.4	21.5	39.8	25.4	28.7
LnGrp LOS	B	B	A	B	C	B	C	C	C	D	C	C
Approach Vol, veh/h		913			1016			451			598	
Approach Delay, s/veh		12.4			28.1			28.4			30.0	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.0		48.4		26.0	10.2	38.2				
Change Period (Y+Rc), s		6.0		6.0		6.0	4.5	6.0				
Max Green Setting (Gmax), s		20.0		48.0		20.0	8.5	35.0				
Max Q Clear Time (g_c+I1), s		18.0		19.1		20.8	5.7	29.6				
Green Ext Time (p_c), s		0.5		4.3		0.0	0.1	2.6				

Intersection Summary		
HCM 6th Ctrl Delay		23.7
HCM 6th LOS		C

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Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	85	25	100	25	25	15	125	175	25	15	390	205
Future Vol, veh/h	85	25	100	25	25	15	125	175	25	15	390	205
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	92	27	109	27	27	16	136	190	27	16	424	223

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1065	1057	536	1112	1155	204	647	0	0	217	0	0
Stage 1	568	568	-	476	476	-	-	-	-	-	-	-
Stage 2	497	489	-	636	679	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	200	225	545	186	197	837	939	-	-	1353	-	-
Stage 1	508	506	-	570	557	-	-	-	-	-	-	-
Stage 2	555	549	-	466	451	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	184	545	114	161	837	939	-	-	1353	-	-
Mov Cap-2 Maneuver	148	184	-	114	161	-	-	-	-	-	-	-
Stage 1	424	496	-	476	465	-	-	-	-	-	-	-
Stage 2	428	458	-	346	442	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.1	41.9	3.6	0.2
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	939	-	-	148	184	545	166	1353	-	-
HCM Lane V/C Ratio	0.145	-	-	0.624	0.148	0.199	0.426	0.012	-	-
HCM Control Delay (s)	9.5	0	-	63	27.9	13.2	41.9	7.7	0	-
HCM Lane LOS	A	A	-	F	D	B	E	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	3.4	0.5	0.7	1.9	0	-	-

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Intersection	
Int Delay, s/veh	11.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	25	150	25	25	15	95	420	25	15	305	55
Future Vol, veh/h	105	25	150	25	25	15	95	420	25	15	305	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	114	27	163	27	27	16	103	457	27	16	332	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1092	1084	362	1166	1101	471	392	0	0	484	0	0
Stage 1	394	394	-	677	677	-	-	-	-	-	-	-
Stage 2	698	690	-	489	424	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	192	217	683	171	212	593	1167	-	-	1079	-	-
Stage 1	631	605	-	443	452	-	-	-	-	-	-	-
Stage 2	431	446	-	561	587	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	187	683	104	183	593	1167	-	-	1079	-	-
Mov Cap-2 Maneuver	148	187	-	104	183	-	-	-	-	-	-	-
Stage 1	555	594	-	389	397	-	-	-	-	-	-	-
Stage 2	343	392	-	400	576	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	40	43.4	1.5	0.3
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	148	187	683	162	1079	-	-
HCM Lane V/C Ratio	0.088	-	-	0.771	0.145	0.239	0.436	0.015	-	-
HCM Control Delay (s)	8.4	0	-	83.2	27.5	11.9	43.4	8.4	0	-
HCM Lane LOS	A	A	-	F	D	B	E	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	4.8	0.5	0.9	2	0	-	-

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Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	25	85	25	25	15	50	190	25	15	485	40
Future Vol, veh/h	35	25	85	25	25	15	50	190	25	15	485	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,#	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	27	92	27	27	16	54	207	27	16	527	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	931	923	549	969	931	221	570	0	0	234	0	0
Stage 1	581	581	-	329	329	-	-	-	-	-	-	-
Stage 2	350	342	-	640	602	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	247	270	535	233	267	819	1002	-	-	1333	-	-
Stage 1	499	500	-	684	646	-	-	-	-	-	-	-
Stage 2	666	638	-	464	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	208	249	535	166	246	819	1002	-	-	1333	-	-
Mov Cap-2 Maneuver	208	249	-	166	246	-	-	-	-	-	-	-
Stage 1	468	491	-	642	606	-	-	-	-	-	-	-
Stage 2	585	598	-	356	480	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	26.1	1.7	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1002	-	-	339	240	1333	-	-
HCM Lane V/C Ratio	0.054	-	-	0.465	0.294	0.012	-	-
HCM Control Delay (s)	8.8	0	-	24.5	26.1	7.7	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.4	1.2	0	-	-

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Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	25	70	25	25	15	85	405	25	15	265	25
Future Vol, veh/h	40	25	70	25	25	15	85	405	25	15	265	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,-#		0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	27	76	27	27	16	92	440	27	16	288	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	993	985	302	1023	985	454	315	0	0	467	0	0
Stage 1	334	334	-	638	638	-	-	-	-	-	-	-
Stage 2	659	651	-	385	347	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	224	248	738	214	248	606	1245	-	-	1094	-	-
Stage 1	680	643	-	465	471	-	-	-	-	-	-	-
Stage 2	453	465	-	638	635	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	180	219	738	159	219	606	1245	-	-	1094	-	-
Mov Cap-2 Maneuver	180	219	-	159	219	-	-	-	-	-	-	-
Stage 1	612	631	-	419	424	-	-	-	-	-	-	-
Stage 2	371	419	-	538	624	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.3	29.1	1.3	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	313	219	1094	-	-
HCM Lane V/C Ratio	0.074	-	-	0.469	0.323	0.015	-	-
HCM Control Delay (s)	8.1	0	-	26.3	29.1	8.3	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.4	1.3	0	-	-

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Appendix C

Figure and Table 4C-3 Manual on Uniform Traffic Control Devices

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Excerpt from the Federal Highway Administration's, "Manual on Uniform Traffic Control Devices" (MUTCD), 2009

2009 EDITION PART 4 FIGURE 4C-3. WARRANT 3, PEAK HOUR

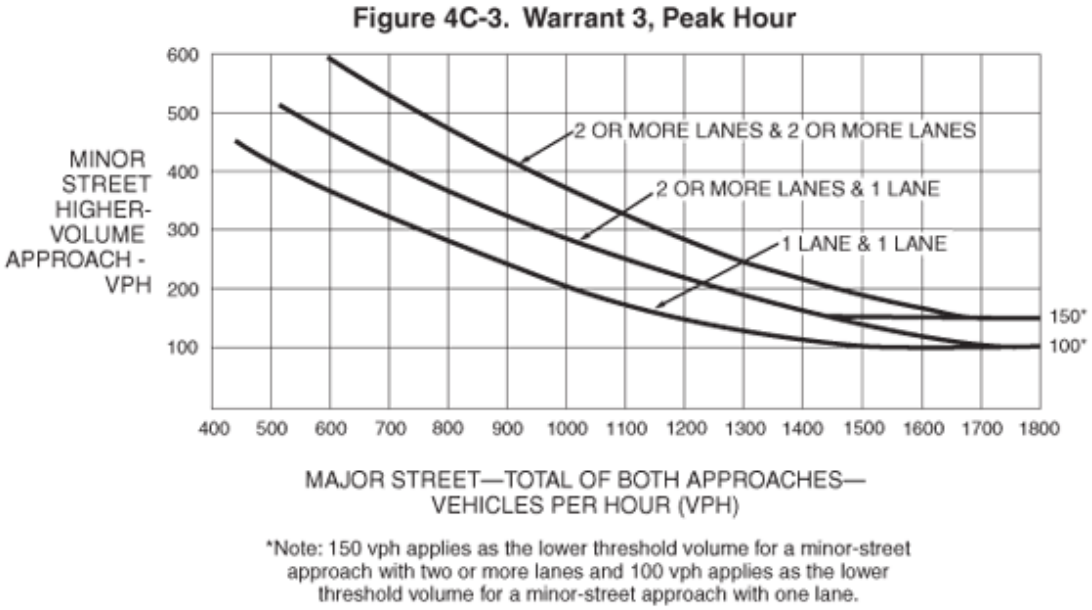

Figure 4C-3. Warrant 3, Peak Hour

This figure shows a graph depicting numerical values for Warrant 3, Peak Hour (see Section 4C.04 for further details). The figure displays three curves—one for each existing combination of approach lanes: one lane and one lane, two or more lanes and one lane, and two or more lanes and two or more lanes.

The table below shows the approximate VPH on the major street and corresponding VPH on the minor street for each combination of approach lanes.

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Table for Figure 4C-3					
One lane and one lane		**Two or more lanes and one lane**		**Two or more lanes and two or more lanes**	
VPH on the major street (Total of both approaches)	**VPH on the minor street (Higher volume approach)**	**VPH on the major street (Total of both approaches)**	**VPH on the minor street (Higher volume approach)**	**VPH on the major street (Total of both approaches)**	**VPH on the minor street (Higher volume approach)**
1800	100	1800	100 or 150*	1800	150
1700	100	1700	100 or 150*	1700	150
1600	100	1600	120 or 150*	1600	170
1500	100	1500	145 or 150*	1500	180
1400	120	1400	155	1400	220
1300	130	1300	190	1300	250
1200	150	1200	220	1200	285
1100	175	1100	250	1100	340
1000	200	1000	285	1000	370
900	245	900	325	900	425
800	285	800	360	800	475
700	325	700	420	700	540
600	360	600	460	600	590
500	420	500	Not available	500	Not available

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: Federal Highway Administration’s on-line “Manual on Uniform Traffic Control Devices” (MUTCD) 2009

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Appendix D

Project Access 2024 and 2040 Volumes and NCHRP REPORT 279

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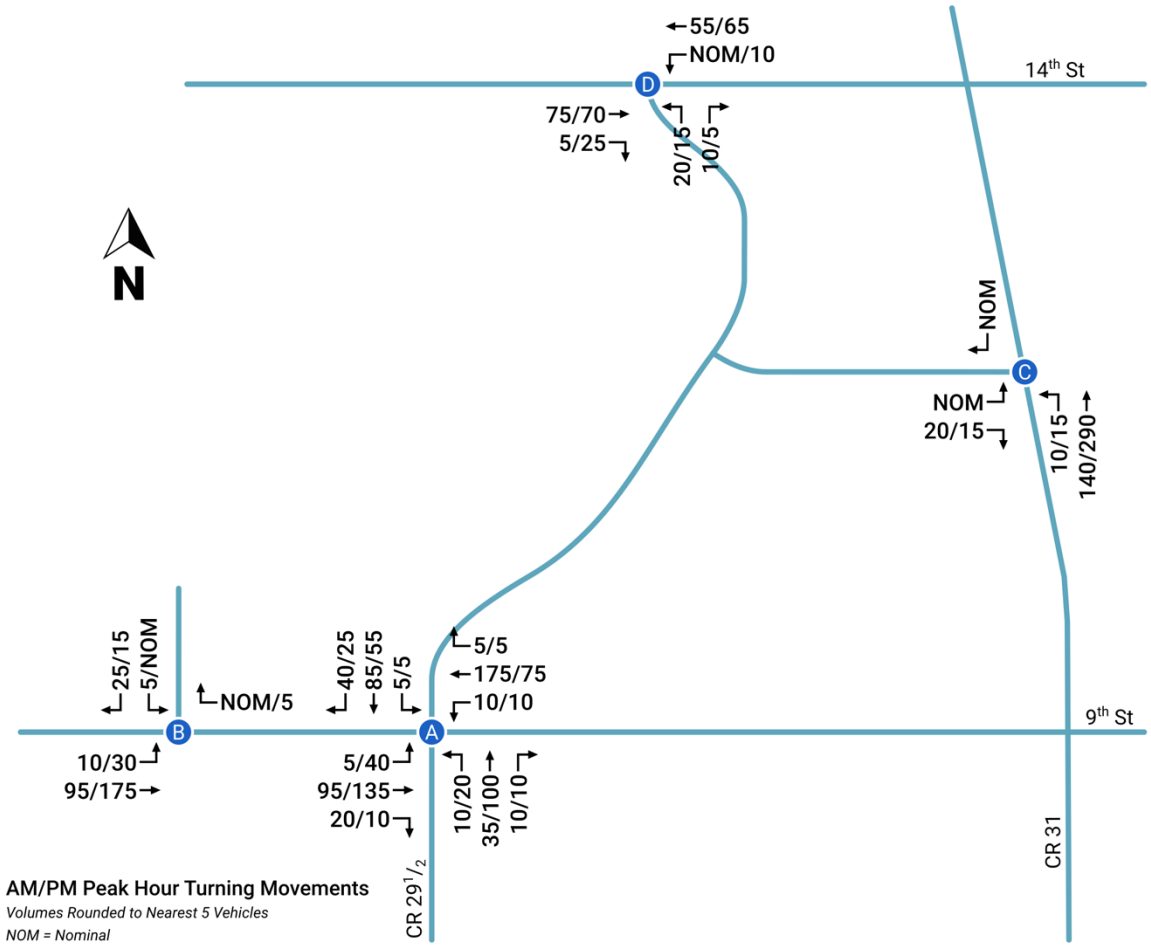
Project Access 2024 Peak Hour Volumes



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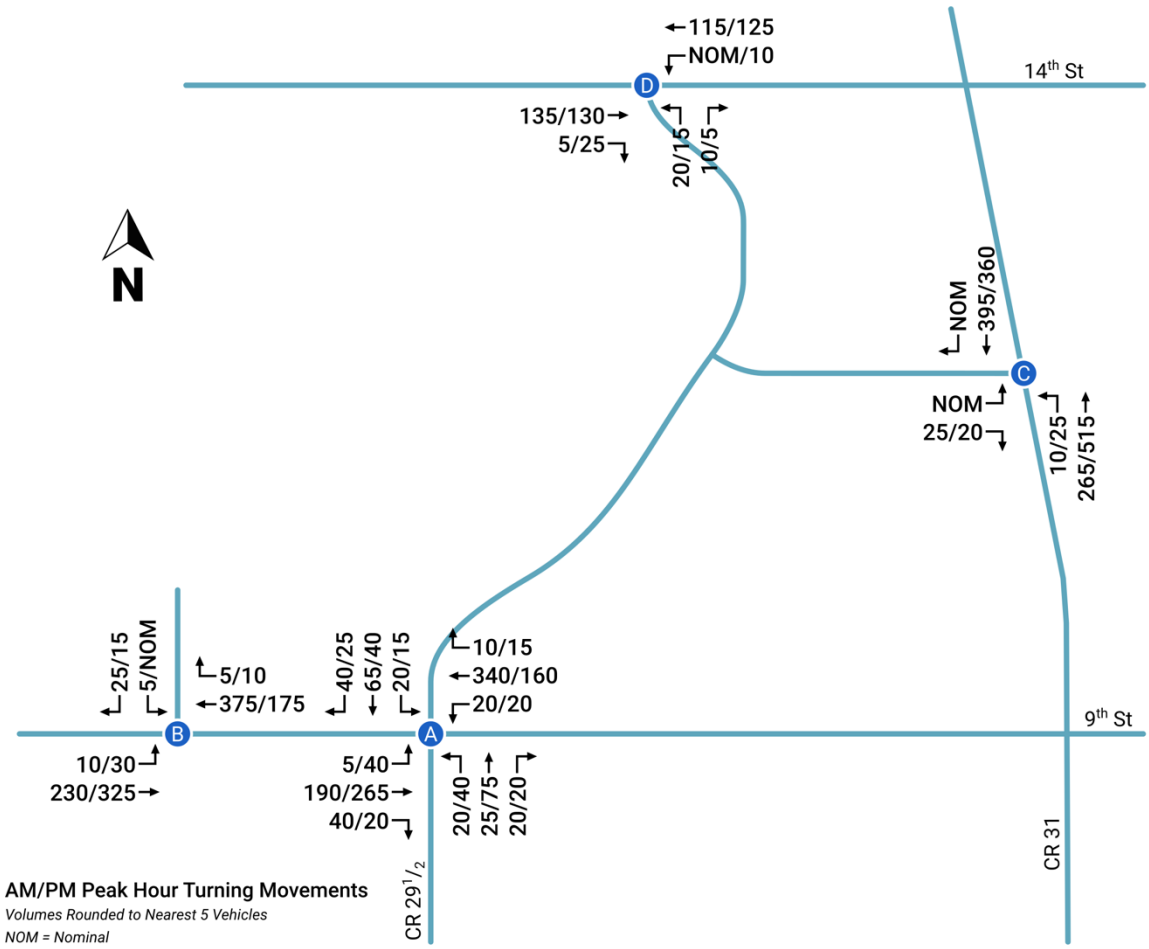
Project Access 2040 Peak Hour Volumes



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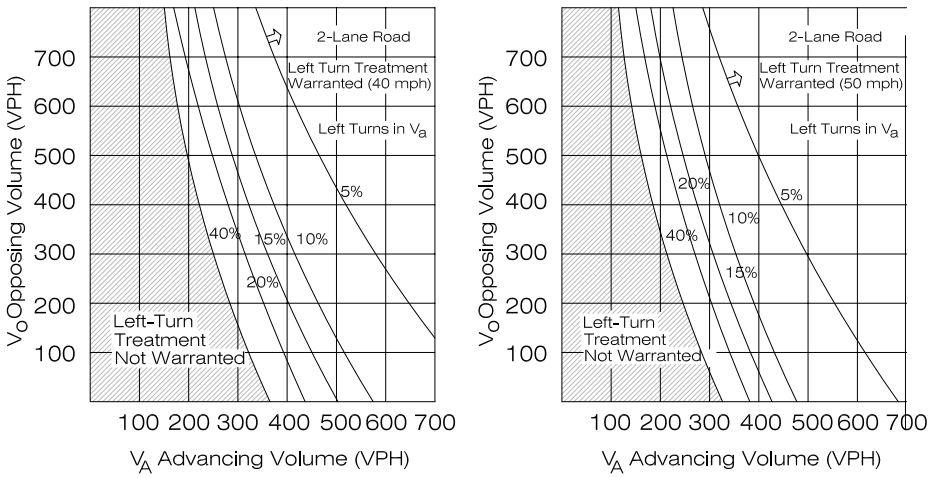
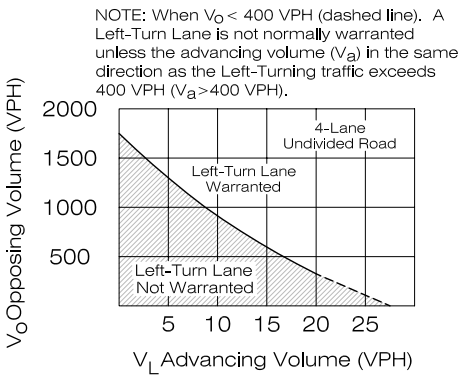
Based on Transportation Research Board's, *NCHRP – Report 279*, 1985





Notes: 1. Left turn lanes are required at all intersections and all-movement accesses on arterial roadways except where roundabouts are provided.

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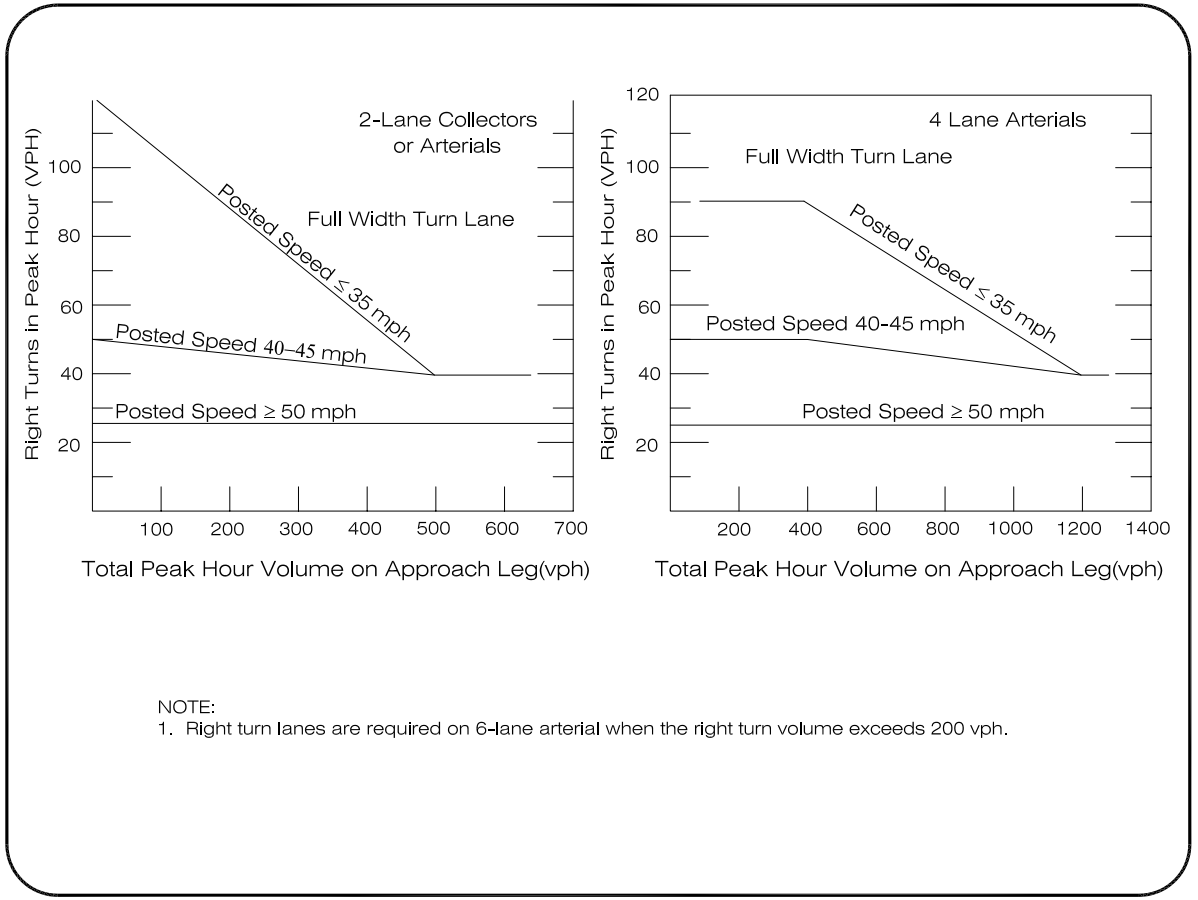
Based on Transportation Research Board's, *NCHRP – Report 279*, 1985



NOTE:
1. Right turn lanes are required on 6-lane arterial when the right turn volume exceeds 200 vph.

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Phase III Drainage Report

Cottonwood Greens Filing No. 4

A part of the Cottonwood Greens Subdivision

A Tract of land in the South Half of Section 33, Township 2 North, Range 66 West of the Sixth Principal Meridian, City of Fort Lupton, County of Weld, State of Colorado

Owner/Developer
Arbor Capital Partners, LLC
4040 MacArthur Drive, Suite 250
Newport Beach, California 92660
Contact: Mr. Jim Righeimer

Engineer
143 Union Boulevard
Suite 700
Lakewood, CO 80228
Tel: 303.462.1100
Contact: Daniel Rodriguez, PE

Atwell Project Number
20002948

City of Fort Lupton Project Number
T.B.D.

Submittal Date
June 2021

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ATWELL

Signature Page

Engineer's Statement:

"I hereby affirm that this report and plan for the Phase III drainage design of the development, Cottonwood Greens Filing No. 4, was prepared by me (or under my direct supervision) in accordance with the provisions of the City of Fort Lupton Storm Drainage Design and Technical Criteria for the owners thereof. I understand that the City of Fort Lupton does not and will not assume liability for facilities designed by others. I am also aware of the provisions of the City CODE as it pertains to the City's review."

SEAL & SIGNATURE: _____

Daniel Rodriguez, PE Date

Registered Professional Engineer State of Colorado No. 48683

Developer's Statement:

"Arbor Capital Partners, LLC hereby affirms that the drainage facilities for the development, Cottonwood Greens Filing No. 4, shall be constructed according to the design presented in this report. I understand that the City of Fort Lupton does not and will not assume liability for drainage facilities designed and/or certified by my engineer. I understand that the City of Fort Lupton reviews drainage plans but cannot, on behalf of Arbor Capital Partners, LLC and/or their successors and/or assigns assume future liability for improper design. I am also aware of the provisions of the City CODE as it pertains to the City's review."

_____

Authorized Signature Date

_____

Printed Name

_____

Title

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ATWELL

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General Location and Description

Location

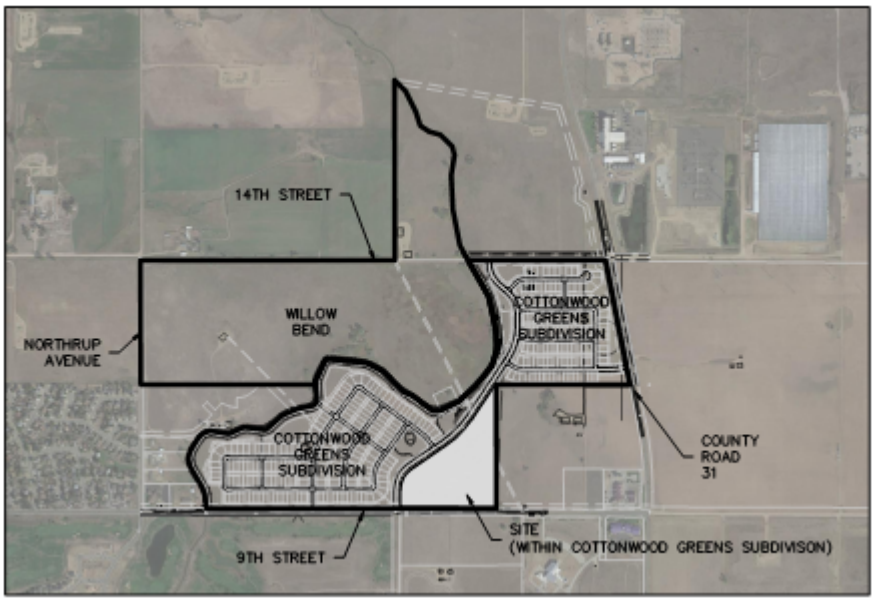

Figure 1 – Project Location

The Cottonwood Greens Filing No. 4 project site is a tract of land within the Cottonwood Greens Subdivision and is situated in the south half of Section 33, Township 2 North, Range 66 West of the Sixth Principal Meridian, City of Fort Lupton, County of Weld, State of Colorado. The site is bounded by Cottonwood Greens Filing No. 1-3 to the West, Fulton Ditch to the Northwest, Future Cottonwood Greens to the North, undeveloped land to the East, and 9th Street to the South. 9th Street is being improved with the College Ave/9th St Reconstruction Project by Wohnrade Civil Engineers for the City of Fort Lupton.

To the North, across the Fulton Ditch to 14th Street is the rest of the Cottonwood Greens P.U.D., soon to be developed as Willow Bend. To the South, across 9th Street, is Coyote Creek Golf Course, a Colorado Army National Guard Station, and a Weld County Facility. The Fort Lupton Fire Department is located at the Northwest corner of 9th Street and County Road 31. Further to the West is undeveloped land zoned R-1, and further to the East (across County Road 31) is also undeveloped land zoned R-1.

Description of Property

The proposed 16.2-acre Filing No. 4 development consists of 137 townhouse residential units in 27 buildings with on-site open spaces and detention. The site is part of the Cottonwood Greens PUD, recorded April 13th, 2006, and is currently undeveloped land used for farming, and houses gas facilities. An earlier Filing No. 1-3 of Cottonwood Greens proposed 291 single-family lots on 120 acres (including the Filing No. 4 property). The Filing No. 1-3 Cottonwood Greens Drainage Report assumed information

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for this area of the site within their report. This Filing No. 4 Drainage Report will re-analyze the initial Report with updated information and confirm assumptions made.

The site's topography generally slopes from the southeast to northwest with the slopes ranging between 3 percent and 9 percent. An onsite soil report for the site is illustrated in the Web Soil Survey from the National Resource Conservation Service (NRCS) website. The soil report indicates that 95% of the site is Valent Sand with the remainder being loamy sands and clay loam. The site consists of mainly Hydrologic Soil Group A soils. A soil report has been included in Appendix A.

Existing condition plans show all easements within and surrounding the subject property and can be found in the construction drawings.

Historic Drainage Basin

The existing topography shows sheet flow from southeast to northwest with flows entering Fulton Ditch for the entirety of the site. Improvements constructed with College Avenue/9th Street Reconstruction and the Cottonwood Greens Subdivision Filing No. 1-3 will reduce the tributary area draining to Fulton Ditch. Detention Pond 3 proposed with Cottonwood Greens Subdivision Filing No. 1-3 Construction Plans, will be the outfall point for the Filing No. 4 site. The downstream outfall for this pond is to the Willow Bend site and ultimately to the existing Golden Pond, located at the southeast corner of Pacific Court and 14th Street. The ultimate outfall for Golden Pond is the South Platte River. For more information on the Golden Pond and Cottonwood Greens Subdivision Detention Pond 3, please see the Drainage Report for the Cottonwood Greens Subdivision Filing No. 1-3.

The project area is not within a FEMA regulated floodplain as shown on FEMA Map No. 08123C2110E in Appendix C. As illustrated, the project site lies within Zone X - determined to be outside of the FEMA 100 and 500-year floodplains.

Proposed Drainage Basins

Drainage Basins

This Filing No. 4 site contains 11 onsite drainage basins plus drainage basins from Cottonwood Green Filing 1-3, 9th Street improvements by others, and offsite undeveloped land. All basins drain to Detention Pond 3 that will be constructed as part of Cottonwood Greens Subdivision Filing No. 1-3. The Filing No. 4 project proposes an expansion to this pond for additional volume. These small detention areas will be hydraulically connected to Detention Pond 3.

A Drainage Basin Map has been included in Appendix B of this Report to graphically depict the drainage basins for this Site.

Sub-basin A1 is 0.68 acres comprised of College Avenue and lot drainage from the Townhome site. Runoff flows down College Avenue to design point 1, where is collected by an on-grade inlet. Bypass from this inlet will continue northeast on College Avenue where it will combine with flows at design point 11. This inlet will be existing and is to be built with Filing No. 1-3.

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Sub-basin A2 is 3.85 acres comprised of residential lot areas and landscape areas. Runoff sheet flows from lots and into curb and gutter where it is conveyed to a sump inlet at design point 2.

Sub-basin A3 is 1.73 acres comprised of residential lots and landscaping. Runoff sheet flows to curb and gutter where it is conveyed to design point 3 where it enters a sump inlet.

Sub-basin A4 is 2.47 acres comprised of residential lots and landscaping. Runoff sheet flows to curb and gutter where it is conveyed to design point 4 and is collected in a sump inlet.

Sub-basin A5 is 0.42 acres comprised of residential lots. Runoff sheet flows to curb and gutter where it is conveyed to Design point 5 and is collected in a sump inlet.

Sub-basin A6 is 1.57 acres comprised of residential lots and landscaping. Runoff sheet flows to curb and gutter where it is conveyed to Design point 6 and is collected in a sump inlet.

Sub-basin A7 is 0.53 acres comprised of residential lots. Runoff sheets flows to curb and gutter where it collects at design point 7 and is collected in a sump inlet.

Sub-basin A8 is 1.10 acres comprised of residential lots and landscaping. This basin includes the pond expansion that is hydraulically linked to Detention Pond 3. An abandoned oil and gas well site makes up a part of this basin area. Runoff sheet flows to the Pond 3 expansion where it is conveyed to design point 8. A culvert connects this pond with the other portions of Pond 3.

Sub-basin A9 is 1.30 acres comprised of residential lots and landscaping. This basin includes the pond expansion that is hydraulically linked to Detention Pond 3. An abandoned oil and gas well site makes up a part of this basin area. Runoff sheet flows to the Pond 3 expansion where it is conveyed to design point 9. A culvert connects this pond with the other portions of Pond 3.

Sub-basin A10 is 0.70 acres comprised of landscaping. This basin includes the pond expansion that is hydraulically linked to Detention Pond 3. An abandoned oil and gas well site makes up a part of this basin area. Runoff sheet flows to the Pond 3 expansion where it is conveyed to design point 10. A culvert connects this pond with the other portions of Pond 3.

Sub-basin A11 is 1.40 acres comprised of pavement area from College Avenue and residential lot area. Runoff sheet flows overland to curb and gutter where it is conveyed to design point 11 and is collected in a sump inlet. This inlet will be existing and is to be built with Filing No. 1-3.

Drainage Design Criteria

The site drainage system has been designed per the City of Fort Lupton's criteria and discussions with the City of Fort Lupton. The storm system for this site has been designed to convey the 100-year event. Ponding area extensions have been proposed which are to be hydraulically linked to Detention Pond 3. This will provide additional capacity beyond what was provided with Filing No. 1-3. Please refer to the Cottonwood Greens Subdivision Filing No. 1-3 Construction Plans and Drainage Report for information pertaining to Detention Pond 3. Their Report included information that their ponds had been sized to

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over-detain, beyond the 100-year event, and release at less than the historic rate. The system had been intended to pass the historic flow through from off-site basins. Once these upstream basins are developed, on-site detention (likely over-detention) will be required of them as well.

Hydrological Criteria

Rational Method calculations were run using spreadsheets provided by the Mile High Flood Control District and can be found in Appendix C.

Hydraulic Criteria

In order to prevent flooding downstream, outlet structures will need to release detained storm water based on the agreed upon release rate. This was determined by Filing No. 1-3 and included within their Report. The Filing No. 1-3 Report also includes information on Ponds 1 and 2 that are offsite from Filing No. 4, but must be considered in relation to the release rates of Pond 3. Per this agreement, the entire Cottonwood Greens property cannot release more than 1 cfs in the Minor (5-year) Storm and 47.5 cfs in the Major (100-year) Storm. Using these release rates, downstream drainage facilities will not be impacted for storms up to and including the 100-year storm.

Using the Modified FAA Method, required storage volumes were determined for both the minor and major storm events. This method uses a runoff hydrograph calculated using basin characteristics and an outflow hydrograph based on a specified release rate. All calculations can be found in Appendix E.

Table 1 shows Pond Release Rates that was included within the Cottonwood Greens Filing No. 1-3 Drainage Report. The Filing No. 4 Report further studied the future ponds to determine the ultimate sizing of Pond 3 at full build-out. It was decided that Pond 3 would be allowed additional release rates to better size the volume for future development. See Table 2 below for the updated Pond Release Rates.

Pond	5-yr Release Rate (cfs)	100-yr Release Rate (cfs)	Minor Storage Volume Req'd (ac-ft)	Major Storage Volume Req'd (ac-ft)	Proposed Storage (ac-ft)
Pond 1+2	0.1	4.75	4.038	5.043	14.538
Pond 3	0.29	13.77	2.940	3.041	3.048
Total	0.39	18.52	6.978	8.084	17.586
Remaining for Future Phases	0.61	28.98	–	–	–

Table 1 – Pond Release Rates and Storage Volumes from Cottonwood Greens

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Pond	5-yr Release Rate (cfs)	100-yr Release Rate (cfs)	Minor Storage Volume Req'd (ac-ft)	Major Storage Volume Req'd (ac-ft)	Proposed Storage (ac-ft)
Pond 1+2	0.1	4.75	4.038	5.043	14.538
Updated Pond 3	0.73	33.00	3.615	11.279	Future
Future Pond 4+5	0.17	8.33	2.773	3.357	Future
Total	1.00	46.08	6.978	8.084	17.586
Remaining for Future Phases	0.00	1.42	–	–	–

Table 2 – Updated Pond Release Rates and Storage Volumes

For the calculation of the WQCV, the traditional UDFCD method was used, as follows:

WQCV Calculation:

$$WQCV = a(0.91I^3 - 1.19I^2 + 0.78I) \qquad Design\ Volume = 1.2\left(\frac{WQCV}{12}\right)A$$

Where:

a = 1.0 for a 40-hour release rate, per UDFDC Manual Volume 3

Using the calculations shown in above, the required volumes were calculated and shown below in Table 3:

Pond	Volume Required (Ac-Ft)		
	WQCV	5-year	100-year
1+2	0.79	4.038	5.043
3	0.69	2.940	3.041
4+5	Future	Future	Future

Table 3 – WQCV Pond Volume Requirements

All pond calculations, including outlet structure calculations, can be found in Appendix E of this report or within Filing No. 1-3 Drainage Report.

The natural drainage path leads to an irrigation ditch that cannot accept any additional runoff to prevent flooding of land downstream, so all pipes and inlets have been sized for the 100-Year Major Storm. This development will not increase runoff to the Fulton Ditch. Inlet and Street Capacity calculations can be found in Appendix D. Street Capacity is confirmed throughout the Site.

The final outfall for Pond 3 will combine the flows from Pond 1 and 2 outlets from Filing No. 1-3 and take them under Fulton Ditch, through an easement on the adjacent property (Willow Bend Development) to the Northwest. See Filing No. 1-3 for additional details on this outfall.

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Summary

As shown in this report, adequate detention has been provided, and the combined release rate for rainfall events up to and including the 100-Year storm will be released below the historic release rates for the Site. The outfall shown with Filing No. 1-3 will convey drainage through Willow Bend and eventually to Golden's Pond. Additional flow from potential upstream development, not mentioned as part of this analysis, may trigger regional upgrades.

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References

1) Storm Drainage Utility Plan, City of Fort Lupton; Adopted March 2015.
2) City of Fort Lupton Storm Drainage Design and Technical Criteria Manual; City of Fort Lupton
3) Drainage Criteria Manual, Volumes 1, 2, &3, Mile High Flood Control District; Volumes 1 & 2 – Originally Published September 1969, Updated January 2016; Volume 3 – Originally Published September 1992, Updated November 2010.
4) Construction Drawings for Cottonwood Greens Development, Atwell, LLC; November 2020.
5) Flood Insurance Rate Map of Weld County Colorado: Map No. 08123C2110E, Federal Emergency Management Agency; September 30, 2019.
6) USDA – NRCS – Web Soil Survey.

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APPENDIX A – Existing Conditions

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GOLDEN POND

Willow Bend

Future Cottonwood Greens

POND 3

FILING NO. 4 SITE

East Property, OS3

Cottonwood Greens Filing No. 1-3

Pond 3 Design Basin

9th Street and College Avenue Improvements (By Others)

South Property, OS4

Major Basin - 14th Street Basin

14TH STREET

9TH STREET

1ST STREET

WELD COUNTY RD 4 1/2

COUNTY RD 31

COUNTY RD 29 1/2

COLORADO STATE HIGHWAY 52

US HIGHWAY NO. 85

UNION PACIFIC RAILROAD

SHORTLINE DITCH

CEMETERY ROAD

WELD COUNTY RD 12

MATCHLINE SHEET 2

LEGEND
- STORM SEWER LINE
- STORM MANHOLE
- STORM INLET
- CITY LIMITS
- RAILROAD – UNION PACIFIC
- DRAINAGE BASIN

400 200 0 400 800 1200
SCALE IN FEET

J&T Consulting, Inc.
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Fort Lupton, CO 80621
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South Utility Extensions

Storm Sewer System Map

City of Ft. Lupton

No.	Date	By	Chk	Description
REVISIONS				

Job #	10106
Date	6/14/10
Drawn By	TPY/WSS
Designed By	TPY
Checked By	JCY
File	JT-storm
Scale	1" = 400'
Sheet:	Of:

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APPENDIX B – Proposed Drainage Plans

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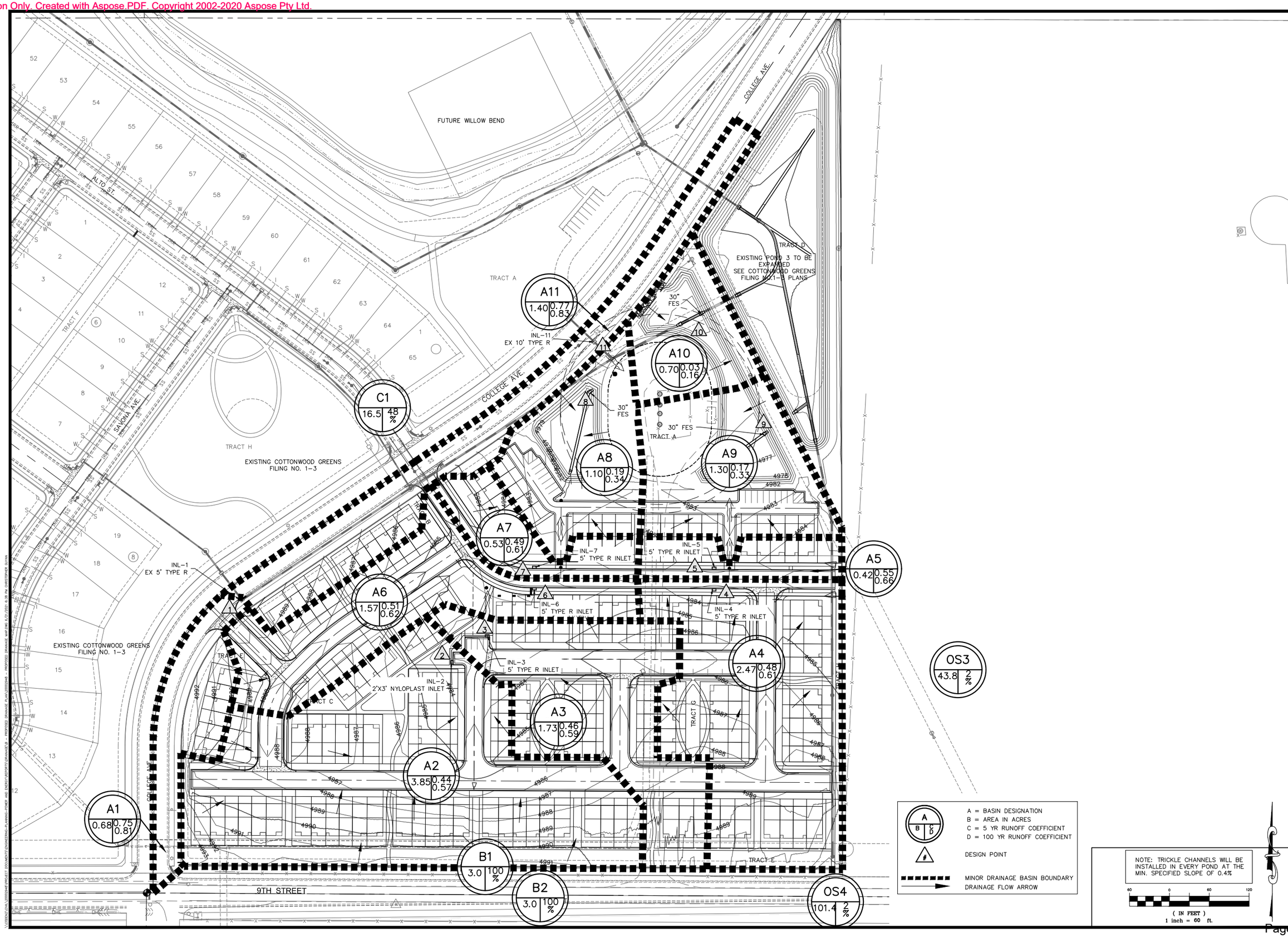

811 Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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888.850.4200 www.atwell-group.com
143 UNION BLVD, SUITE 700
LAKEWOOD, CO 80228
303.462.1100

DEVELOPER
4040 MacARTHUR BLVD.
SUITE 250
NEWPORT BEACH, CA 92660
303-905-3496
ARBOR CAPITAL PARTNERS, LLC

CLIENT
ARBOR CAPITAL PARTNERS, LLC
COTTONWOOD GREENS FILING NO. 4
FORT LUPTON, COLORADO

CONSTRUCTION PLANS
PROPOSED DRAINAGE BASIN MAP

DATE 6/21/2021

REVISIONS

PLANS UNDER REVIEW NOT FOR CONSTRUCTION

DR. NA | CH. CJG
P.M. DJR
JOB 20002948
SHEET NO. 1 OF 1

CAD FILE: 20002948 - PROPOSED DRAINAGE MAP.DWG

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APPENDIX C – Rational Method Calculations

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PERCENT IMPERVIOUS CALCULATION

PROJECT MANE: Cottonwood Greens Filing No. 4
PROJECT NO: 20002948
LOCATION: Fort Lupton, Colorado

*Calculations on this sheet come from Figure 603: Fort Lupton Drainage Manual

NRCS Hydrologic Soil Group:	A
Single Family	45% Impervious
Multi-Unit (attached)	70% Impervious
Parks, cemeteries	7% Impervious
Paved	100% Impervious
Drive and walks	96% Impervious
Lawns, clayey soil	7% Impervious
Historic flow analysis	2% Impervious

PROPOSED DRAINAGE AREA

BASIN ID	Notes	A_{total} (ft^2)	Single Family (ft^2)	Multi-Unit (attached) (ft^2)	Parks, cemeteries (ft^2)	Paved (ft^2)	Drive and walks (ft^2)	Lawns, clayey soil (ft^2)	Historic flow analysis (ft^2)	A_{total} (Ac)	Percent Impervious
A1		29772	0	10438	0	19334	0	0	0	0.68	89%
A2		167766	0	137594	30172	0	0	0	0	3.85	59%
A3		75285	0	65200	10085	0	0	0	0	1.73	62%
A4		107475	0	96584	10891	0	0	0	0	2.47	64%
A5		18212	0	18212	0	0	0	0	0	0.42	70%
A6		68252	0	63999	4253	0	0	0	0	1.57	66%
A7		22872	0	20733	2139	0	0	0	0	0.53	64%
A8		48078	0	17588	30490	0	0	0	0	1.10	30%
A9		56742	0	19187	37555	0	0	0	0	1.30	28%
A10		30696	0	0	30696	0	0	0	0	0.70	7%
A11		61039	0	16221	0	44818	0	0	0	1.40	92%
B1	from 9th Street	130680	0	0	0	130680	0	0	0	3.00	100%
B2	from 9th Street	130680	0	0	0	130680	0	0	0	3.00	100%
C1	from Cottonwood Greens F1-3	717832	245491	0	0	162602	59241	250498	0	16.48	48%
OS-3	East Property	1906345	0	0	0	0	0	0	1906345	43.76	2%
OS-4	South Property	4414806	0	0	0	0	0	0	4414806	101.35	2%
Subtotals:		7,986,532	245,491	465,756	156,281	488,114	59,241	250,498	6,321,151		14%

Drainage Area= 183.35

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Calculation of Peak Runoff using Rational Method

Designer:
Company: Atwell, LLC
Date: 6/21/2021
Project: Cottonwood Greens Filing No. 4
Location: Fort Lupton, Colorado

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum} = 5$ (urban)
$t_{minimum} = 10$ (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.83	1.09	1.33	1.69	1.99	2.31	3.14
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A1	0.68	A	89.5	0.73	0.75	0.76	0.78	0.79	0.81	0.83	10.00			0.020	1.60	433.00			0.010	20	2.00	3.61	5.21	14.14	5.21	2.77	3.66	4.46	5.67	6.68	7.75	10.53	1.37	1.87	2.32	3.02	3.60	4.27	5.98
A2	3.85	A	58.7	0.42	0.44	0.45	0.49	0.53	0.57	0.63	121.00			0.020	10.49	510.00			0.015	20	2.45	3.47	13.96	20.06	13.96	1.94	2.56	3.12	3.97	4.67	5.42	7.37	3.13	4.30	5.44	7.42	9.46	11.84	17.95
A3	1.73	A	61.6	0.45	0.46	0.48	0.51	0.55	0.59	0.65	118.00			0.020	9.93	458.00			0.011	20	2.10	3.64	13.57	19.67	13.57	1.96	2.59	3.16	4.02	4.73	5.49	7.47	1.51	2.08	2.62	3.56	4.50	5.60	8.40
A4	2.47	A	63.6	0.47	0.48	0.50	0.53	0.57	0.61	0.66	117.00			0.020	9.58	403.00			0.015	20	2.45	2.74	12.32	18.25	12.32	2.05	2.71	3.30	4.19	4.94	5.73	7.79	2.35	3.23	4.07	5.50	6.92	8.57	12.77
A5	0.42	A	70.0	0.53	0.55	0.56	0.59	0.62	0.66	0.71	50.00			0.020	5.62	154.00			0.010	20	2.00	1.28	6.91	15.47	6.91	2.55	3.37	4.11	5.22	6.14	7.13	9.69	0.56	0.77	0.97	1.29	1.60	1.95	2.86
A6	1.57	A	66.1	0.49	0.51	0.52	0.55	0.59	0.62	0.68	45.00			0.020	5.71	490.00			0.020	20	2.83	2.89	8.60	17.93	8.60	2.36	3.12	3.81	4.84	5.70	6.62	8.99	1.81	2.48	3.13	4.21	5.26	6.48	9.59
A7	0.53	A	64.1	0.47	0.49	0.50	0.54	0.57	0.61	0.67	75.00			0.020	7.61	141.00			0.017	20	2.61	0.90	8.51	16.10	8.51	2.37	3.13	3.82	4.86	5.72	6.64	9.03	0.59	0.80	1.01	1.37	1.72	2.13	3.16
A8	1.10	A	30.0	0.18	0.19	0.20	0.23	0.28	0.34	0.45	35.00			0.010	9.77	190.00			0.070	7	1.85	1.71	11.48	21.80	11.48	2.11	2.79	3.40	4.32	5.09	5.91	8.03	0.41	0.57	0.75	1.09	1.58	2.24	3.97
A9	1.30	A	28.3	0.16	0.17	0.18	0.21	0.27	0.33	0.44	32.00			0.010	9.48	226.00			0.060	20	4.90	0.77	10.25	22.37	10.25	2.21	2.92	3.56	4.53	5.33	6.19	8.41	0.47	0.65	0.86	1.26	1.85	2.66	4.78
A10	0.70	A	7.0	0.03	0.03	0.03	0.04	0.08	0.16	0.30	121.00			0.070	11.19	1.00			0.010	7	0.70	0.02	11.22	24.83	11.22	2.13	2.82	3.44	4.36	5.14	5.97	8.11	0.04	0.06	0.08	0.14	0.31	0.69	1.71
A11	1.40	A	92.0	0.75	0.77	0.79	0.81	0.81	0.83	0.85	20.00			0.020	2.09	655.00			0.010	20	2.00	5.46	7.55	15.34	7.55	2.47	3.27	3.99	5.07	5.97	6.93	9.41	2.61	3.55	4.40	5.72	6.78	8.02	11.18

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APPENDIX D – Inlet and Street Capacity Calculations

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	INL-1	INL-2	INL-3
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.7	2.6	2.6
Major Q_{Known} (cfs)	7.7	5.4	5.5

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.7**	**2.6**	**2.6**
Major Total Design Peak Flow, Q (cfs)	**7.7**	**5.4**	**5.5**
Minor Flow Bypassed Downstream, Q_b (cfs)	1.2	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	4.3	N/A	N/A

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	INL-4	INL-5	INL-6
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	2.7	3.4	3.1
Major Q_{Known} (cfs)	5.7	7.1	6.6

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**2.7**	**3.4**	**3.1**
Major Total Design Peak Flow, Q (cfs)	**5.7**	**7.1**	**6.6**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	INL-7	INL-11
Site Type (Urban or Rural)	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.1	3.3
Major Q_{Known} (cfs)	6.6	6.9

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	INL-1
Minor Bypass Flow Received, Q_b (cfs)	0.0	1.2
Major Bypass Flow Received, Q_b (cfs)	0.0	4.3

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

Overland Slope (ft/ft)		
Overland Length (ft)		
Channel Slope (ft/ft)		
Channel Length (ft)		

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.1**	**4.5**
Major Total Design Peak Flow, Q (cfs)	**6.6**	**11.3**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A

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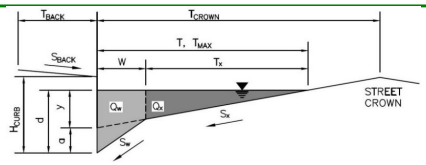
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-1**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	23.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	23.5	23.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	**13.8**	**124.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

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INLET ON A CONTINUOUS GRADE

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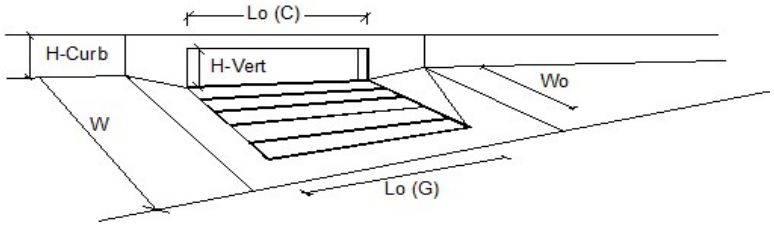

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.4**	**3.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.2**	**4.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**66**	**44**	**%**

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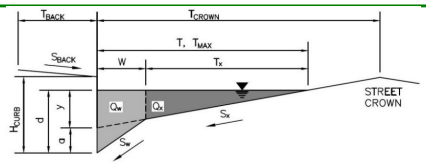
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-2**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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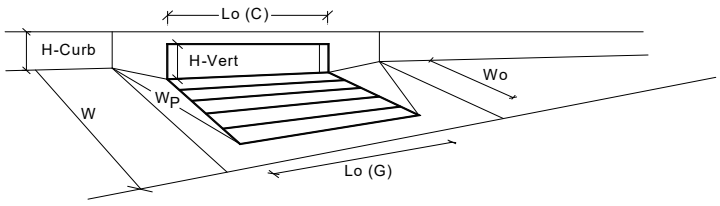

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.6	5.4	cfs

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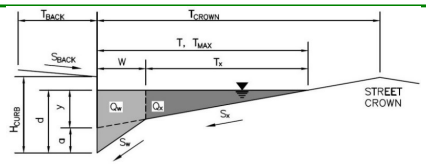
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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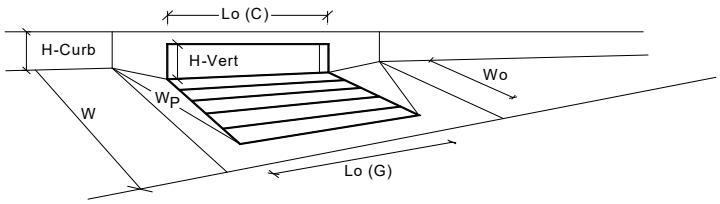

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.6	5.5	cfs

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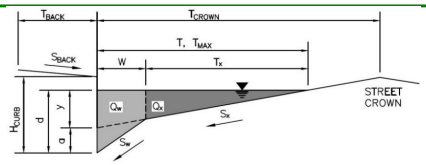
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-4**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
Q_{allow} =		**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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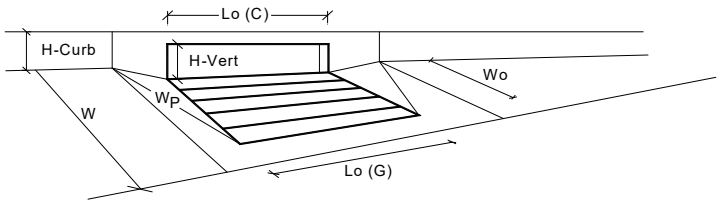

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.7	5.7	cfs

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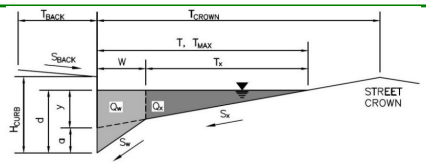
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-5**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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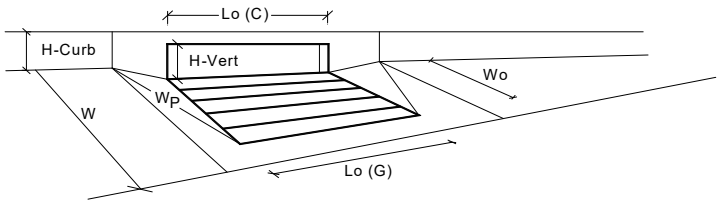

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.4	7.1	cfs

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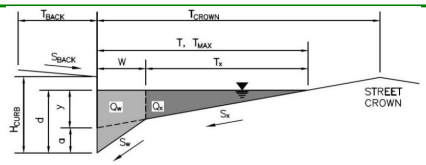
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-6**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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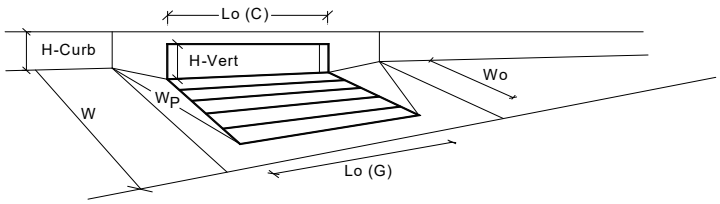

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.1	6.6	cfs

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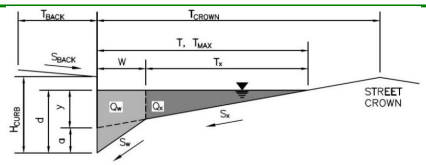
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-7**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

	Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion			
MAJOR STORM Allowable Capacity is based on Depth Criterion			
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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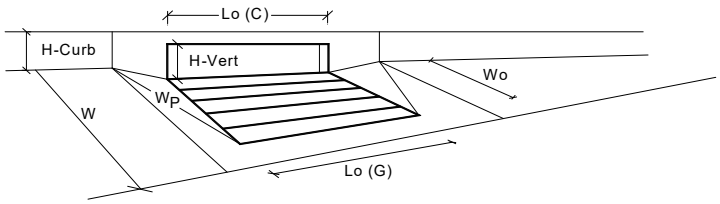

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.1	6.6	cfs

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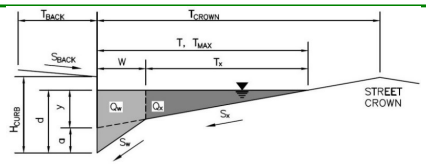
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Cottonwood Greens Townhomes**
Inlet ID: **INL-11**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	23.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	23.5	23.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion				
	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

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INLET IN A SUMP OR SAG LOCATION

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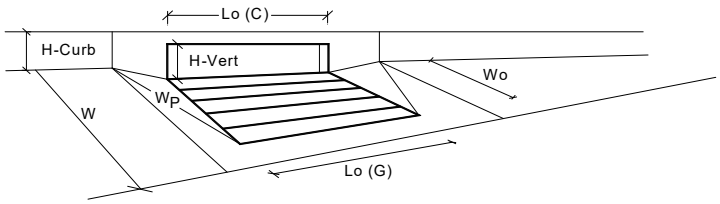

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	7.2	inches
Grate Information		MINOR	MAJOR	Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.43	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	0.67	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	0.99	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.3**	**12.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.5	11.3	cfs

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Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	2'x3' Curb Inlet Diagonal
Head (ft)	0.5

Properties	
Orifice Flow Area (in)	**331.50**
Orifice Flow Area (ft)	**2.30**
Weir Flow Perimeter (in)	**124.20**
Weir Flow Perimeter (ft)	**10.35**

Solution	
Capacity (cfs)	**7.83**
Capacity (gpm)	**3516.18**

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33\ Weir\ Discharge\ Coefficient$

$L = Perimeter\ of\ Grate\ Opening\ (ft)$

$H = Flow\ Height\ of\ Water\ Surface\ Above\ Weir\ (ft)$

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60\ Orifice\ Discharge\ Coefficient$

$A = Area\ of\ the\ Orifice\ (ft^2)$

$g = Gravitational\ Constant\ \left(32.2\frac{ft}{s^2}\right)$

$H = Depth\ of\ Water\ Above\ Center\ of\ Orifice\ (ft)$

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APPENDIX E – Pond Calculations

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Table 1401

DETENTION VOLUME BY THE MODIFIED FAA METHOD
(See USDCM Volume 2 Storage Chapter for description of method)

Project: Cottonwood Greens Filing No. 4

Basin ID: Pond 3

(For catchments less than 160 acres only. For larger catchments, use hydrograph routing method)

Warning: This worksheet is not intended for catchments larger than 160 acres.

Determination of MINOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	14.00	percent	
Catchment Drainage Area WARNING->	A =	183.350	acres	<-WARNING
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D	
Return Period for Detention Control	T =	5	years (2, 5, 10, 25, 50, or 100)	
Time of Concentration of Watershed	Tc =	70	minutes	
Allowable Unit Release Rate	q =	0.0040	cfs/acre	
One-hour Precipitation	P_1 =	1.42	inches	
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$				
Coefficient One	C_1 =	28.50		
Coefficient Two	C_2 =	10		
Coefficient Three	C_3 =	0.786		

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.09	
Inflow Peak Runoff	Qp-in =	21.32	cfs
Allowable Peak Outflow Rate	Qp-out =	0.73	cfs
	Mod. FAA Minor Storage Volume =	157,455	cubic feet
	Mod. FAA Minor Storage Volume =	3.615	acre-ft

150 <- Enter Rainfall Duration Incremental Increase Value Here (e.g. 5 for 5-Minutes)

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	4.82	23,844	1.00	0.73	220	23,623
155	0.73	112,253	0.73	0.53	4,950	107,302
305	0.44	132,873	0.61	0.45	8,251	124,622
455	0.32	145,949	0.58	0.42	11,551	134,398
605	0.26	155,778	0.56	0.41	14,851	140,927
755	0.22	163,756	0.55	0.40	18,152	145,604
905	0.19	170,522	0.54	0.40	21,452	149,070
1055	0.17	176,426	0.53	0.39	24,752	151,674
1205	0.15	181,685	0.53	0.39	28,053	153,632
1355	0.14	186,437	0.53	0.39	31,353	155,084
1505	0.13	190,783	0.52	0.38	34,653	156,130
1655	0.12	194,793	0.52	0.38	37,953	156,840
1805	0.11	198,522	0.52	0.38	41,254	157,268
1955	0.10	202,009	0.52	0.38	44,554	157,455
2105	0.10	205,289	0.52	0.38	47,854	157,435
2255	0.09	208,387	0.52	0.38	51,155	157,232
2405	0.09	211,325	0.51	0.38	54,455	156,870
2555	0.08	214,119	0.51	0.38	57,755	156,364
2705	0.08	216,786	0.51	0.38	61,056	155,731
2855	0.08	219,338	0.51	0.38	64,356	154,982
3005	0.07	221,785	0.51	0.38	67,656	154,129
3155	0.07	224,137	0.51	0.37	70,956	153,181
3305	0.07	226,401	0.51	0.37	74,257	152,145
3455	0.07	228,586	0.51	0.37	77,557	151,029
3605	0.06	230,696	0.51	0.37	80,857	149,839
3755	0.06	232,738	0.51	0.37	84,158	148,580
3905	0.06	234,715	0.51	0.37	87,458	147,258
4055	0.06	236,634	0.51	0.37	90,758	145,876
4205	0.06	238,497	0.51	0.37	94,059	144,438
4355	0.06	240,308	0.51	0.37	97,359	142,949
4505	0.05	242,070	0.51	0.37	100,659	141,411
4655	0.05	243,787	0.51	0.37	103,959	139,827
4805	0.05	245,460	0.51	0.37	107,260	138,200
4955	0.05	247,092	0.51	0.37	110,560	136,532
5105	0.05	248,686	0.51	0.37	113,860	134,825
5255	0.05	250,243	0.51	0.37	117,161	133,082
5405	0.05	251,765	0.51	0.37	120,461	131,304
5555	0.05	253,254	0.51	0.37	123,761	129,493
5705	0.05	254,712	0.51	0.37	127,062	127,650
5855	0.04	256,139	0.51	0.37	130,362	125,777
6005	0.04	257,538	0.51	0.37	133,662	123,876
6155	0.04	258,910	0.51	0.37	136,962	121,947
6305	0.04	260,255	0.51	0.37	140,263	119,993
6455	0.04	261,576	0.51	0.37	143,563	118,013
6605	0.04	262,872	0.51	0.37	146,863	116,009
6755	0.04	264,145	0.51	0.37	150,164	113,982
6905	0.04	265,396	0.51	0.37	153,464	111,932
7055	0.04	266,626	0.50	0.37	156,764	109,862
7205	0.04	267,835	0.50	0.37	160,065	107,771
7355	0.04	269,025	0.50	0.37	163,365	105,660
7505	0.04	270,196	0.50	0.37	166,665	103,531
7655	0.04	271,348	0.50	0.37	169,965	101,382
7805	0.04	272,482	0.50	0.37	173,266	99,217
7955	0.03	273,600	0.50	0.37	176,566	97,034
8105	0.03	274,701	0.50	0.37	179,866	94,835
8255	0.03	275,786	0.50	0.37	183,167	92,619
8405	0.03	276,855	0.50	0.37	186,467	90,388
8555	0.03	277,910	0.50	0.37	189,767	88,143
8705	0.03	278,950	0.50	0.37	193,068	85,883
8855	0.03	279,976	0.50	0.37	196,368	83,608
9005	0.03	280,988	0.50	0.37	199,668	81,320

Mod. FAA Minor Storage Volume (cubic ft.) = 157,455

Mod. FAA Minor Storage Volume (acre-ft.) = 3.6147

Determination of MAJOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	14.00	percent	
Catchment Drainage Area	A =	183.350	acres	
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D	
Return Period for Detention Control	T =	100	years (2, 5, 10, 25, 50, or 100)	
Time of Concentration of Watershed	Tc =	70	minutes	
Allowable Unit Release Rate	q =	0.18	cfs/acre	
One-hour Precipitation	P_1 =	2.71	inches	
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$				
Coefficient One	C_1 =	28.50		
Coefficient Two	C_2 =	10		
Coefficient Three	C_3 =	0.786		

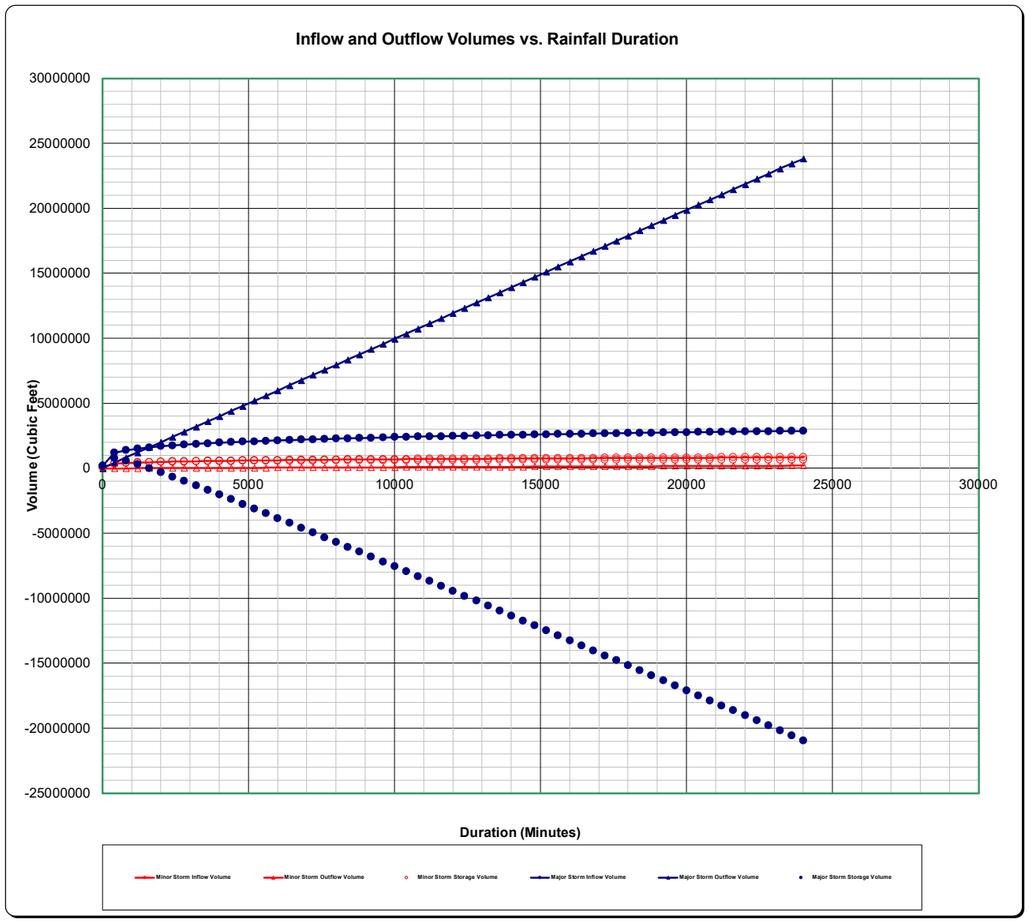
Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.30	
Inflow Peak Runoff	Qp-in =	135.64	cfs
Allowable Peak Outflow Rate	Qp-out =	33.00	cfs
	Mod. FAA Major Storage Volume =	491,326	cubic feet
	Mod. FAA Major Storage Volume =	11.279	acre-ft

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	9.19	151,681	1.00	33.00	9,901	141,780
155	1.40	714,096	0.73	23.95	222,770	491,326
305	0.84	845,270	0.61	20.29	371,284	473,986
455	0.62	928,455	0.58	19.04	519,797	408,658
605	0.50	990,985	0.56	18.41	668,311	322,674
755	0.42	1,041,734	0.55	18.03	816,824	224,909
905	0.36	1,084,774	0.54	17.78	965,338	119,436
1055	0.32	1,122,337	0.53	17.60	1,113,851	8,486
1205	0.29	1,155,787	0.53	17.46	1,262,365	-106,578
1355	0.27	1,186,022	0.53	17.35	1,410,878	-224,857
1505	0.24	1,213,668	0.52	17.27	1,559,392	-345,724
1655	0.23	1,239,179	0.52	17.20	1,707,905	-468,726
1805	0.21	1,262,896	0.52	17.14	1,856,419	-593,522
1955	0.20	1,285,084	0.52	17.09	2,004,932	-719,849
2105	0.19	1,305,947	0.52	17.05	2,153,446	-847,498
2255	0.18	1,325,655	0.52	17.01	2,301,959	-976,304
2405	0.17	1,344,342	0.51	16.98	2,450,473	-1,106,131
2555	0.16	1,362,121	0.51	16.95	2,598,986	-1,236,865
2705	0.15	1,379,087	0.51	16.93	2,747,500	-1,368,412
2855	0.15	1,395,320	0.51	16.91	2,896,013	-1,500,694
3005	0.14	1,410,887	0.51	16.89	3,044,527	-1,633,640
3155	0.14	1,425,848	0.51	16.87	3,193,040	-1,767,192
3305	0.13	1,440,254	0.51	16.85	3,341,554	-1,901,300
3455	0.13	1,454,149	0.51	16.84	3,490,067	-2,035,918
3605	0.12	1,467,573	0.51	16.82	3,638,581	-2,171,008
3755	0.12	1,480,561	0.51	16.81	3,787,094	-2,306,533
3905	0.12	1,493,143	0.51	16.80	3,935,608	-2,442,465
4055	0.11	1,505,348	0.51	16.79	4,084,121	-2,578,774
4205	0.11	1,517,199	0.51	16.78	4,232,635	-2,715,435
4355	0.11	1,528,721	0.51	16.77	4,381,148	-2,852,428
4505	0.10	1,539,931	0.51	16.76	4,529,662	-2,989,730
4655	0.10	1,550,850	0.51	16.75	4,678,175	-3,127,325
4805	0.10	1,561,494	0.51	16.74	4,826,689	-3,265,195
4955	0.10	1,571,877	0.51	16.73	4,975,202	-3,403,325
5105	0.09	1,582,015	0.51	16.73	5,123,716	-3,541,701
5255	0.09	1,591,920	0.51	16.72	5,272,229	-3,680,310
5405	0.09	1,601,603	0.51	16.72	5,420,743	-3,819,140
5555	0.09	1,611,076	0.51	16.71	5,569,256	-3,958,180
5705	0.09	1,620,349	0.51	16.70	5,717,770	-4,097,421
5855	0.08	1,629,430	0.51	16.70	5,866,283	-4,236,853
6005	0.08	1,638,330	0.51	16.69	6,014,797	-4,376,467
6155	0.08	1,647,055	0.51	16.69	6,163,310	-4,516,255
6305	0.08	1,655,614	0.51	16.68	6,311,824	-4,656,209
6455	0.08	1,664,014	0.51	16.68	6,460,337	-4,796,323
6605	0.08	1,672,260	0.51	16.68	6,608,851	-4,936,590
6755	0.08	1,680,360	0.51	16.67	6,757,364	-5,077,004
6905	0.07	1,688,319	0.51	16.67	6,905,878	-5,217,558
7055	0.07	1,696,143	0.50	16.67	7,054,391	-5,358,248
7205	0.07	1,703,836	0.50	16.66	7,202,905	-5,499,069
7355	0.07	1,711,404	0.50	16.66	7,351,418	-5,640,015
7505	0.07	1,718,850	0.50	16.66	7,499,932	-5,781,081
7655	0.07	1,726,181	0.50	16.65	7,648,445	-5,922,265
7805	0.07	1,733,398	0.50	16.65	7,796,959	-6,063,561
7955	0.07	1,740,507	0.50	16.65	7,945,472	-6,204,965
8105	0.07	1,747,511	0.50	16.64	8,093,986	-6,346,475
8255	0.06	1,754,413	0.50	16.64	8,242,499	-6,488,087
8405	0.06	1,761,217	0.50	16.64	8,391,013	-6,629,796
8555	0.06	1,767,925	0.50	16.64	8,539,526	-6,771,601
8705	0.06	1,774,542	0.50	16.63	8,688,040	-6,913,498
8855	0.06	1,781,069	0.50	16.63	8,836,553	-7,055,485
9005	0.06	1,787,509	0.50	16.63	8,985,067	-7,197,558

Mod. FAA Major Storage Volume (cubic ft.) = 491,326

Mod. FAA Major Storage Volume (acre-ft.) = 11.2793



UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.3, Released March 2012

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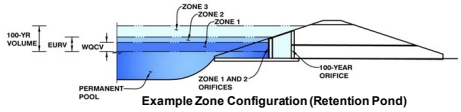
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: Cottonwood Greens Filing No. 4

Basin ID: Pond 3 ~ Stage 0=4973



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB		Note: L / W Ratio < 1
Watershed Area =	183.35	acres	L / W Ratio = 0.38
Watershed Length =	1,747	ft	
Watershed Length to Centroid =	874	ft	
Watershed Slope =	0.014	ft/ft	
Watershed Imperviousness =	14.00%	percent	
Percentage Hydrologic Soil Group A =	100.0%	percent	
Percentage Hydrologic Soil Group B =	0.0%	percent	
Percentage Hydrologic Soil Groups C/D =	0.0%	percent	
Target WQCV Drain Time =	40.0	hours	
Location for 1-hr Rainfall Depths =	User Input		

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.350	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	2.072	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1 in.) =		acre-feet	1.00	inches
5-yr Runoff Volume (P1 = 1.42 in.) =		acre-feet	1.42	inches
10-yr Runoff Volume (P1 = 1.68 in.) =		acre-feet	1.68	inches
25-yr Runoff Volume (P1 = 1.69 in.) =		acre-feet		inches
50-yr Runoff Volume (P1 = 1.99 in.) =		acre-feet		inches
100-yr Runoff Volume (P1 = 2.71 in.) =		acre-feet	2.71	inches
500-yr Runoff Volume (P1 = 3.14 in.) =		acre-feet		inches
Approximate 2-yr Detention Volume =		acre-feet		
Approximate 5-yr Detention Volume =		acre-feet		
Approximate 10-yr Detention Volume =		acre-feet		
Approximate 25-yr Detention Volume =		acre-feet		
Approximate 50-yr Detention Volume =		acre-feet		
Approximate 100-yr Detention Volume =		acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
4974	--	1.00	--	--	--	223	0.005	112	0.003
4975	--	2.00	--	--	--	13,535	0.311	6,990	0.160
4976	--	3.00	--	--	--	43,090	0.989	35,302	0.810
4977	--	4.00	--	--	--	58,580	1.345	86,137	1.977
4978	--	5.00	--	--	--	74,540	1.711	152,697	3.505
4979	--	6.00	--	--	--	83,334	1.913	231,634	5.318
4980	--	7.00	--	--	--	91,496	2.100	319,049	7.324
4981	--	8.00	--	--	--	99,913	2.294	414,754	9.521
4982	--	9.00	--	--	--	108,878	2.499	519,149	11.918

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Table 1401

DETENTION VOLUME BY THE MODIFIED FAA METHOD
(See USDCM Volume 2 Storage Chapter for description of method)

Project: Cottonwood Greens Filing No. 4

Basin ID: Pond 4+5 (Future)

(For catchments less than 160 acres only. For larger catchments, use hydrograph routing method)
(NOTE: for catchments larger than 90 acres, CUHP hydrograph and routing are recommended)

Determination of MINOR Detention Volume Using Modified FAA Method

Design Information (Input):

Catchment Drainage Imperviousness	I_a =	48.00	percent
Catchment Drainage Area	A =	33.320	acres
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D
Return Period for Detention Control	T =	5	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	22	minutes
Allowable Unit Release Rate	q =	0.0050	cfs/acre
One-hour Precipitation	P_1 =	1.42	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.29	
Inflow Peak Runoff	Qp-in =	25.98	cfs
Allowable Peak Outflow Rate	Qp-out =	0.17	cfs
Mod. FAA Minor Storage Volume =		120,811	**cubic feet**
Mod. FAA Minor Storage Volume =		2.773	**acre-ft**

150 <- Enter Rainfall Duration Incremental Increase Value Here (e.g. 5 for 5-Minutes)

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	4.82	13,962	1.00	0.17	50	13,912
155	0.73	65,732	0.57	0.09	882	64,850
305	0.44	77,806	0.54	0.09	1,632	76,175
455	0.32	85,464	0.52	0.09	2,382	83,082
605	0.26	91,219	0.52	0.09	3,131	88,088
755	0.22	95,891	0.51	0.09	3,881	92,010
905	0.19	99,853	0.51	0.09	4,631	95,222
1055	0.17	103,310	0.51	0.08	5,380	97,930
1205	0.15	106,389	0.51	0.08	6,130	100,259
1355	0.14	109,172	0.51	0.08	6,880	102,293
1505	0.13	111,717	0.51	0.08	7,629	104,088
1655	0.12	114,065	0.51	0.08	8,379	105,686
1805	0.11	116,249	0.51	0.08	9,129	107,120
1955	0.10	118,291	0.51	0.08	9,879	108,412
2105	0.10	120,211	0.51	0.08	10,628	109,583
2255	0.09	122,025	0.50	0.08	11,378	110,647
2405	0.09	123,746	0.50	0.08	12,128	111,618
2555	0.08	125,382	0.50	0.08	12,877	112,505
2705	0.08	126,944	0.50	0.08	13,627	113,317
2855	0.08	128,438	0.50	0.08	14,377	114,061
3005	0.07	129,871	0.50	0.08	15,126	114,745
3155	0.07	131,248	0.50	0.08	15,876	115,372
3305	0.07	132,574	0.50	0.08	16,626	115,948
3455	0.07	133,853	0.50	0.08	17,376	116,478
3605	0.06	135,089	0.50	0.08	18,125	116,964
3755	0.06	136,284	0.50	0.08	18,875	117,409
3905	0.06	137,443	0.50	0.08	19,625	117,818
4055	0.06	138,566	0.50	0.08	20,374	118,192
4205	0.06	139,657	0.50	0.08	21,124	118,533
4355	0.06	140,717	0.50	0.08	21,874	118,844
4505	0.05	141,749	0.50	0.08	22,623	119,126
4655	0.05	142,754	0.50	0.08	23,373	119,381
4805	0.05	143,734	0.50	0.08	24,123	119,611
4955	0.05	144,690	0.50	0.08	24,873	119,817
5105	0.05	145,623	0.50	0.08	25,622	120,001
5255	0.05	146,535	0.50	0.08	26,372	120,163
5405	0.05	147,426	0.50	0.08	27,122	120,305
5555	0.05	148,298	0.50	0.08	27,871	120,427
5705	0.05	149,152	0.50	0.08	28,621	120,531
5855	0.04	149,988	0.50	0.08	29,371	120,617
6005	0.04	150,807	0.50	0.08	30,120	120,686
6155	0.04	151,610	0.50	0.08	30,870	120,740
6305	0.04	152,398	0.50	0.08	31,620	120,778
6455	0.04	153,171	0.50	0.08	32,370	120,802
6605	0.04	153,930	0.50	0.08	33,119	120,811
6755	0.04	154,676	0.50	0.08	33,869	120,807
6905	0.04	155,408	0.50	0.08	34,619	120,790
7055	0.04	156,129	0.50	0.08	35,368	120,760
7205	0.04	156,837	0.50	0.08	36,118	120,719
7355	0.04	157,533	0.50	0.08	36,868	120,666
7505	0.04	158,219	0.50	0.08	37,617	120,601
7655	0.04	158,893	0.50	0.08	38,367	120,526
7805	0.04	159,558	0.50	0.08	39,117	120,441
7955	0.03	160,212	0.50	0.08	39,867	120,346
8105	0.03	160,857	0.50	0.08	40,616	120,241
8255	0.03	161,492	0.50	0.08	41,366	120,126
8405	0.03	162,119	0.50	0.08	42,116	120,003
8555	0.03	162,736	0.50	0.08	42,865	119,871
8705	0.03	163,345	0.50	0.08	43,615	119,730
8855	0.03	163,946	0.50	0.08	44,365	119,581
9005	0.03	164,539	0.50	0.08	45,114	119,424

Mod. FAA Minor Storage Volume (cubic ft.) = 120,811
Mod. FAA Minor Storage Volume (acre-ft.) = 2.7734

Determination of MAJOR Detention Volume Using Modified FAA Method

Design Information (Input):

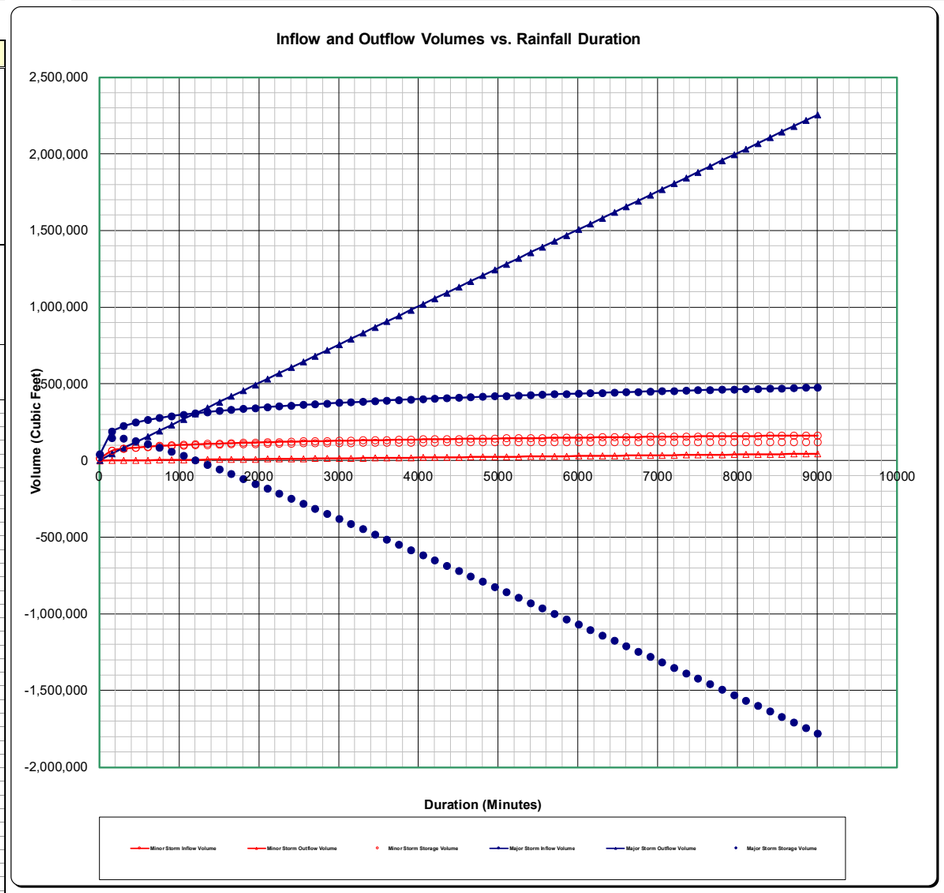
Catchment Drainage Imperviousness	I_a =	48.00	percent
Catchment Drainage Area	A =	33.320	acres
Predevelopment NRCS Soil Group	Type =	A	A, B, C, or D
Return Period for Detention Control	T =	100	years (2, 5, 10, 25, 50, or 100)
Time of Concentration of Watershed	Tc =	22	minutes
Allowable Unit Release Rate	q =	0.25	cfs/acre
One-hour Precipitation	P_1 =	2.71	inches
Design Rainfall IDF Formula $i = C_1 * P_1/(C_2+T_c)^{C_3}$			
Coefficient One	C_1 =	28.50	
Coefficient Two	C_2 =	10	
Coefficient Three	C_3 =	0.786	

Determination of Average Outflow from the Basin (Calculated):

Runoff Coefficient	C =	0.44	
Inflow Peak Runoff	Qp-in =	75.21	cfs
Allowable Peak Outflow Rate	Qp-out =	8.33	cfs
Mod. FAA Major Storage Volume =		146,225	**cubic feet**
Mod. FAA Major Storage Volume =		3.357	**acre-ft**

Rainfall Duration minutes (input)	Rainfall Intensity inches / hr (output)	Inflow Volume cubic feet (output)	Adjustment Factor "m" (output)	Average Outflow cfs (output)	Outflow Volume cubic feet (output)	Storage Volume cubic feet (output)
5	9.19	40,428	1.00	8.33	2,499	37,929
155	1.40	190,332	0.57	4.74	44,107	146,225
305	0.84	225,295	0.54	4.46	81,592	143,702
455	0.62	247,467	0.52	4.36	119,077	128,389
605	0.50	264,133	0.52	4.31	156,562	107,571
755	0.42	277,659	0.51	4.28	194,047	83,612
905	0.36	289,131	0.51	4.26	231,532	57,599
1055	0.32	299,143	0.51	4.25	269,017	30,126
1205	0.29	308,058	0.51	4.24	306,502	1,556
1355	0.27	316,117	0.51	4.23	343,987	-27,870
1505	0.24	323,486	0.51	4.22	381,472	-57,987
1655	0.23	330,285	0.51	4.22	418,957	-88,672
1805	0.21	336,607	0.51	4.21	456,442	-119,835
1955	0.20	342,521	0.51	4.21	493,927	-151,407
2105	0.19	348,082	0.51	4.21	531,412	-183,331
2255	0.18	353,334	0.50	4.20	568,897	-215,563
2405	0.17	358,315	0.50	4.20	606,382	-248,067
2555	0.16	363,054	0.50	4.20	643,867	-280,813
2705	0.15	367,576	0.50	4.20	681,352	-313,776
2855	0.15	371,903	0.50	4.20	718,837	-346,935
3005	0.14	376,052	0.50	4.19	756,322	-380,271
3155	0.14	380,039	0.50	4.19	793,807	-413,768
3305	0.13	383,879	0.50	4.19	831,292	-447,413
3455	0.13	387,583	0.50	4.19	868,777	-481,195
3605	0.12	391,161	0.50	4.19	906,262	-515,102
3755	0.12	394,622	0.50	4.19	943,747	-549,125
3905	0.12	397,976	0.50	4.19	981,232	-583,256
4055	0.11	401,229	0.50	4.19	1,018,717	-617,488
4205	0.11	404,388	0.50	4.19	1,056,202	-651,814
4355	0.11	407,459	0.50	4.19	1,093,687	-686,229
4505	0.10	410,447	0.50	4.18	1,131,172	-720,726
4655	0.10	413,357	0.50	4.18	1,168,657	-755,300
4805	0.10	416,194	0.50	4.18	1,206,142	-789,948
4955	0.10	418,962	0.50	4.18	1,243,627	-824,666
5105	0.09	421,664	0.50	4.18	1,281,112	-859,449
5255	0.09	424,304	0.50	4.18	1,318,597	-894,294
5405	0.09	426,884	0.50	4.18	1,356,082	-929,198
5555	0.09	429,409	0.50	4.18	1,393,567	-964,158
5705	0.09	431,881	0.50	4.18	1,431,052	-999,171
5855	0.08	434,301	0.50	4.18	1,468,537	-1,034,236
6005	0.08	436,674	0.50	4.18	1,506,022	-1,069,349
6155	0.08	438,999	0.50	4.18	1,543,507	-1,104,508
6305	0.08	441,280	0.50	4.18	1,580,992	-1,139,712
6455	0.08	443,519	0.50	4.18	1,618,477	-1,174,958
6605	0.08	445,717	0.50	4.18	1,655,962	-1,210,245
6755	0.08	447,876	0.50	4.18	1,693,447	-1,245,571
6905	0.07	449,997	0.50	4.18	1,730,932	-1,280,935
7055	0.07	452,083	0.50	4.18	1,768,417	-1,316,335
7205	0.07	454,133	0.50	4.18	1,805,902	-1,351,769
7355	0.07	456,150	0.50	4.18	1,843,387	-1,387,237
7505	0.07	458,135	0.50	4.18	1,880,872	-1,422,737
7655	0.07	460,089	0.50	4.18	1,918,357	-1,458,269
7805	0.07	462,013	0.50	4.18	1,955,842	-1,493,830
7955	0.07	463,907	0.50	4.18	1,993,327	-1,529,420
8105	0.07	465,774	0.50	4.18	2,030,812	-1,565,038
8255	0.06	467,614	0.50	4.18	2,068,297	-1,600,684
8405	0.06	469,427	0.50	4.18	2,105,782	-1,636,355
8555	0.06	471,215	0.50	4.18	2,143,267	-1,672,052
8705	0.06	472,979	0.50	4.18	2,180,752	-1,707,774
8855	0.06	474,718	0.50	4.18	2,218,237	-1,743,519
9005	0.06	476,435	0.50	4.17	2,255,722	-1,779,287

Mod. FAA Major Storage Volume (cubic ft.) = 146,225
Mod. FAA Major Storage Volume (acre-ft.) = 3.3569



UDFCD DETENTION BASIN VOLUME ESTIMATING WORKBOOK Version 2.3, Released March 2012

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APPENDIX G – Referenced Material

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National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- **SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) *Zone A, V, A99*
  - With BFE or Depth *Zone AE, AO, AH, VE, AR*
  - Regulatory Floodway
- **OTHER AREAS OF FLOOD HAZARD**
  - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
  - Future Conditions 1% Annual Chance Flood Hazard *Zone X*
  - Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
  - Area with Flood Risk due to Levee *Zone D*
- **OTHER AREAS**
  - NO SCREEN Area of Minimal Flood Hazard *Zone X*
  - Effective LOMRs
  - Area of Undetermined Flood Hazard *Zone D*
- **GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
- **OTHER FEATURES**
  - 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
  - Coastal Transect
  - 513 Base Flood Elevation Line (BFE)
  - Limit of Study
  - Jurisdiction Boundary
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
- **MAP PANELS**
  - Digital Data Available
  - No Digital Data Available
  - Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/24/2019 at 2:38:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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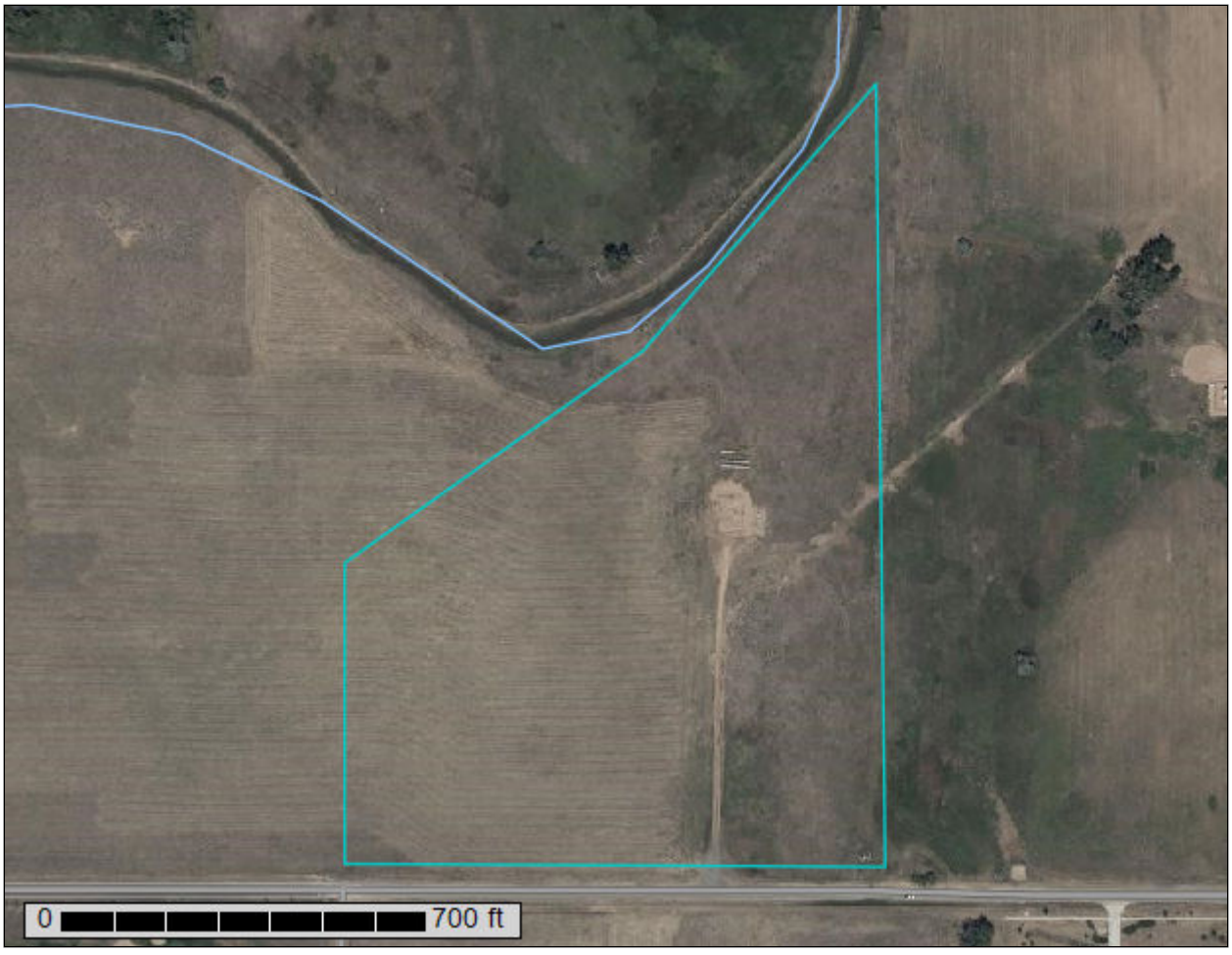
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Weld County, Colorado, Southern Part



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Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Custom Soil Resource Report
Soil Map

Map Scale: 1:2,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
35	Loup-Boel loamy sands, 0 to 3 percent slopes	0.4	1.8%
56	Renohill clay loam, 0 to 3 percent slopes	0.6	2.7%
69	Valent sand, 0 to 3 percent slopes	14.2	60.6%
70	Valent sand, 3 to 9 percent slopes	8.1	34.4%
72	Vona loamy sand, 0 to 3 percent slopes	0.1	0.5%
Totals for Area of Interest		**23.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

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Weld County, Colorado, Southern Part

35—Loup-Boel loamy sands, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 362f
Elevation: 4,550 to 4,750 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 130 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Loup and similar soils: 55 percent
Boel and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loup

Setting

Landform: Swales, drainageways, streams
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

H1 - 0 to 16 inches: loamy sand
H2 - 16 to 40 inches: loamy sand
H3 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: R067BY029CO - Sandy Meadow
Hydric soil rating: Yes

Description of Boel

Setting

Landform: Swales, drainageways, streams
Down-slope shape: Linear

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Across-slope shape: Linear
Parent material: Stratified sandy alluvium

Typical profile
H1 - 0 to 14 inches: loamy sand
H2 - 14 to 60 inches: loamy sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A
Ecological site: R067BY029CO - Sandy Meadow
Hydric soil rating: No

Minor Components

Osgood
Percent of map unit: 5 percent
Hydric soil rating: No

Valent
Percent of map unit: 5 percent
Hydric soil rating: No

56—Renohill clay loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 3635
Elevation: 4,850 to 5,200 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Renohill and similar soils: 85 percent
Minor components: 15 percent

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Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Renohill

Setting

Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 9 inches: clay loam
H2 - 9 to 32 inches: clay loam
H3 - 32 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Ulm

Percent of map unit: 10 percent
Hydric soil rating: No

Shingle

Percent of map unit: 5 percent
Hydric soil rating: No

69—Valent sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tczd
Elevation: 3,000 to 5,210 feet
Mean annual precipitation: 13 to 20 inches
Mean annual air temperature: 48 to 52 degrees F

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Frost-free period: 130 to 166 days
Farmland classification: Farmland of local importance

Map Unit Composition

Valent and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valent

Setting

Landform: Interdunes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Noncalcareous eolian sands

Typical profile

A - 0 to 5 inches: sand
AC - 5 to 12 inches: sand
C1 - 12 to 30 inches: sand
C2 - 30 to 80 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.9 mmhos/cm)
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R067BY015CO - Deep Sand, R072XA021KS - Sands (North) (PE 16-20)
Hydric soil rating: No

Minor Components

Julesburg

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)

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Hydric soil rating: No

Dailey

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY015CO - Deep Sand, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)
Hydric soil rating: No

70—Valent sand, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2tczf
Elevation: 3,050 to 5,150 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 130 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Valent and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Valent

Setting

Landform: Hills, dunes
Landform position (two-dimensional): Backslope, shoulder, footslope, summit
Landform position (three-dimensional): Side slope, head slope, nose slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Noncalcareous eolian sands

Typical profile

A - 0 to 5 inches: sand

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AC - 5 to 12 inches: sand
C1 - 12 to 30 inches: sand
C2 - 30 to 80 inches: sand

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R067BY015CO - Deep Sand, R072XY109KS - Rolling Sands
Hydric soil rating: No

Minor Components

Dailey

Percent of map unit: 10 percent
Landform: Interdunes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R067BY015CO - Deep Sand, R072XA021KS - Sands (North) (PE 16-20)
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope, backslope, shoulder
Landform position (three-dimensional): Side slope, head slope, nose slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains, R072XA022KS - Sandy (North) Draft (April 2010) (PE 16-20)
Hydric soil rating: No

Haxtun

Percent of map unit: 5 percent
Landform: Interdunes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave

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Ecological site: R067BY024CO - Sandy Plains, R072XY111KS - Sandy Plains
Hydric soil rating: No

72—Vona loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 363r
Elevation: 4,600 to 5,200 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Farmland of local importance

Map Unit Composition

Vona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vona

Setting

Landform: Plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Typical profile

H1 - 0 to 6 inches: loamy sand
H2 - 6 to 28 inches: fine sandy loam
H3 - 28 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

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Minor Components

Remmit

Percent of map unit: 10 percent
Hydric soil rating: No

Valent

Percent of map unit: 5 percent
Hydric soil rating: No

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Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

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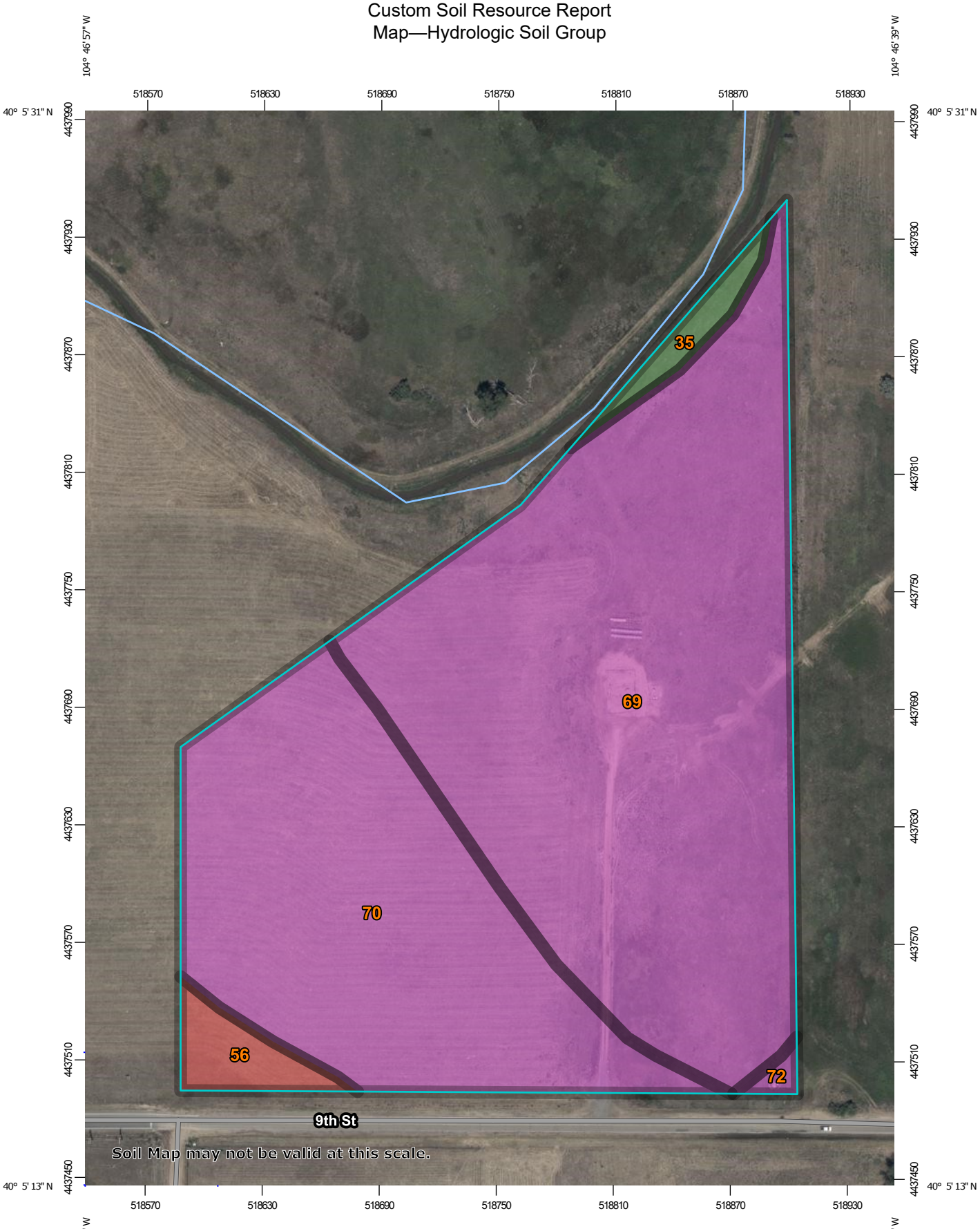
Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:2,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Weld County, Colorado, Southern Part
Survey Area Data: Version 19, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Aug 10, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
35	Loup-Boel loamy sands, 0 to 3 percent slopes	A/D	0.4	1.8%
56	Renohill clay loam, 0 to 3 percent slopes	D	0.6	2.7%
69	Valent sand, 0 to 3 percent slopes	A	14.2	60.6%
70	Valent sand, 3 to 9 percent slopes	A	8.1	34.4%
72	Vona loamy sand, 0 to 3 percent slopes	A	0.1	0.5%
Totals for Area of Interest			**23.4**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Magaly Morales-Tejada

From: Kristen Thompson
Sent: Wednesday, October 13, 2021 10:04 AM
To: Magaly Morales-Tejada
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: RE: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

Magaly,

I am not sure if I responded to this referral. We do not have any comments.

Thank you
Kris

Kristen Thompson | Inclusion Specialist
220 Water Ave | Berthoud, CO 80513
Direct: (970) 622-2237
Main: 800-369-RAIN (7246)
www.northernwater.org
Facebook | Twitter | Instagram | LinkedIn
Disclaimer Notice: An allotment of Colorado-Big Thompson water is subject to the Water Conservancy Act, C.R.S 37-45-101 et seq, the authority of the Board of Directors of the Northern Colorado Water Conservancy District, and other relevant laws and regulations. The information provided in this email is not binding on Northern Water because the legal rights to Colorado-Big Thompson Project Allotments are subject to the continuing discretion of the Board of Directors of Northern Water and other legal limitations and requirements. Northern Water staff and counsel cannot provide you with legal advice, and you are advised to seek legal counsel with respect to the subject matter of this email. You also have an independent obligation to review and confirm the accuracy and completeness of any information provided to you by Northern Water, and to supplement or correct the records of Northern Water with respect to any errors or omissions.

From: Magaly Morales-Tejada
Sent: Monday, September 13, 2021 11:03 AM
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

External Message - Please be cautious when replying or opening links or attachments in this email

Good Morning,

The documentation located at the following link is submitted to you for review and recommendation for a preliminary and final plat being reviewed by the City of Fort Lupton. The application documents can be reviewed at the following link: https://www.fortlupton.org/DocumentCenter/Index/622.

Any comments you consider relevant to this request would be appreciated. Please reply by **October 4, 2021**, so that we may give full consideration to your recommendation. Any response not received before or on this date may be deemed to be a favorable response to the Planning & Building Department.

The Public Hearings for this matter are scheduled for:

- Planning Commission: Thursday, October 14, 2021 at 6:00 PM; and
- City Council: Tuesday, November 2, 2021 at 7:00 PM

Your time in this matter is greatly appreciated!

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CITY OF
Fort Lupton
EST 1836

Public Works

130 S. McKinley Avenue
Fort Lupton, CO 80621
Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

MEMO

To: Todd Hodges
Alyssa Knutson

From: Roy Vestal

Date: October 7, 2021

Subject: Cottonwood Greens Townhomes (LUP2021-0019)
Public Works Review

Public Works has reviewed the submitted documents for the above referenced development project with the following comments for inclusion with the Final Plat submittal. Be advised, review of construction drawings is for general compliance with city standards. There may be additional concerns as this design develops.

1. **PUD/Plat**
    a. Please coordinate with the Filing 1-3 revisions to the ROW of College Avenue. Changes were required from southern most curve to intersection of 9th Avenue.
    b. The lots along the eastern property line will require a drainage easement as shown. Option to relocate the storm sewer from 9th Street to be in the middle of the space of lots and property line.
    c. I think you want Alto Street to be designated as ROW.

2. **Drainage**
    a. Final Drainage Study as submitted is acceptable. Please convey one copy signed and sealed to Public Works.
    b. On-site storm sewer will be considered private.
    c. Coordination with 9th Street storm is required.
    d. Participation with current staff planning for this basin is required.
        i. Future storm line in 14th Street in coordination with Tri-State, Willow Bend and other basin properties from the east.

3. **Transportation**
    a. Traffic memorandum as submitted is acceptable. This development does comply with original Traffic Study.

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4. **Landscape / Grading** - *Chapter 2 Design Standards*
    a. A SWMP and Stormwater Discharge permit must be acquired from CDPH&E. Please submit proof of prior to receiving construction permits. Please provide copy of permit from CDPH&E.

5. **Utilities**
    a. Water - Chapter 3
        i. Section 3.21.00 Water service lines shall be located a minimum of 10 feet away from all sewer services and a minimum of 5 feet away from all fire protection service lines (measured horizontally). All service lines shall be constructed perpendicular to the front property line of the property they are going to serve and not less than 5 feet from the side of a front property line.
        ii. Include City standard detail W2. Specify "Red Mueller Super Centurion" hydrants in final construction drawings.

    b. Non Potable Irrigation
        i. Are all areas of landscape to be irrigated with the nonpotable system? I need to see intended irrigation scheme from the 2 meter locations.

    c. Sanitary Sewer - Chapter 4
        i. Section 4.18.00 Services. All service lines shall be constructed perpendicular to the property line of the property they are going to serve and not less than five feet from the side property line.

    d. Storm Sewer - Chapter 5
        i. The area on the eastern property line is not adequate for the storm sewer alignment. Easement requirements are the same as the sanitary sewer.
            4.16.00 EASEMENTS *All sanitary sewer mains shall be in an easement which has a width of at least two times the depth to the pipe invert. The minimum easement shall be 20 feet in width for one utility, 30 feet in width for two utilities and 40 feet in width for three utilities. Site specific circumstances may dictate the need for wider easements. The main shall be located a minimum of ten feet from and parallel to the edge of the easement.*

    e. Roadway - Chapter 6
        i. Designation of Private streets and Public is needed. I think we discussed City ownership and maintenance of Alto Street?
        ii. Preliminary Soils Report indicates presence of swelling soils, collapsible soils and shallow groundwater.

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iii. *Section 6.33.00* A Pavement Design Report is required prior to roadway paving. City preferred pavement section is a composite section of asphalt surface with Class VI base.
iv. *Section 6.18.02* At the intersection of two public streets or a private driveway and a public street, sight distance shall be evaluated across a "sight distance triangle" where obstructions are restricted according to the following criteria.
v. Do not use Standard detail R10. The ADA requirements will not be met. Detail R11 is good for the cross pan, but not the ramp. I do not think you have any ramps that match with our R9. You do not need the R2-3 detail
vi. Coordination on participation of 9th Street Improvements with City project will be required. Costs associated with the property frontage on 9th Street is $149,248.30.

6. **Public Improvement Agreement** – A Subdivision Improvements Agreement will be required for the construction of roadways, water, sewer and nonpotable water systems. See attached template.

7. A Geotechnical report for final pavement design will be required prior to paving public roads.

There may be additional concerns as this design develops.

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Magaly Morales-Tejada

From: John Fryar
Sent: Monday, September 13, 2021 11:27 AM
To: Magaly Morales-Tejada
Subject: RE: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

No LE issues.

Chief John Fryar

From: Magaly Morales-Tejada
Sent: Monday, September 13, 2021 11:03 AM
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

Good Morning,

The documentation located at the following link is submitted to you for review and recommendation for a preliminary and final plat being reviewed by the City of Fort Lupton. The application documents can be reviewed at the following link: https://www.fortlupton.org/DocumentCenter/Index/622.

Any comments you consider relevant to this request would be appreciated. Please reply by **October 4, 2021**, so that we may give full consideration to your recommendation. Any response not received before or on this date may be deemed to be a favorable response to the Planning & Building Department.

The Public Hearings for this matter are scheduled for:

- Planning Commission: Thursday, October 14, 2021 at 6:00 PM; and
- City Council: Tuesday, November 2, 2021 at 7:00 PM

Your time in this matter is greatly appreciated!

Magaly Morales-Tejada
Planning assistant
130 S. McKinley Ave.
Fort Lupton, CO 80621
Direct: 720-466-6111

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Magaly Morales-Tejada

From: Jonathan Gesick
Sent: Monday, September 13, 2021 4:50 PM
To: Magaly Morales-Tejada
Cc: Alyssa Knutson; Todd Hodges; Maria Lancto
Subject: RE: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

Good Afternoon.

Building has no concerns at this time.

Jonathan Gesick
Certified Building Official
(970) 305-3161
www.procodeinc.net

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From: Magaly Morales-Tejada
Sent: Monday, September 13, 2021 11:03 AM
Cc: Alyssa Knutson; Todd Hodges ; Maria Lancto
Subject: Referral Response Request: Cottonwood Greens Townhomes (LUP2021-0019)

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Your time in this matter is greatly appreciated!

Magaly Morales-Tejada
Planning assistant
130 S. McKinley Ave.
Fort Lupton, CO 80621
Direct: 720-466-6111

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October 6, 2021

Fort Lupton Planning Department
130 S. McKinley Avenue
Fort Lupton, CO 80621
www.fortlupton.org

Re: Cottonwood Greens Preliminary and Final PUD Plat; Project No. LUP2021-0019; Plan No. PUD2021-0002; PPL2021-0004 FPL2020-0004

Dear Mr. Hodges and Ms. Knutson:

On behalf of United Power, Inc., thank you for inviting us to review and comment on the Cottonwood Greens Preliminary and Final PUD Plat. After review of the information, we have the following comments:

- **Front or Rear Lot Distribution** – United Power requires continuous dry utility easements for reliable electric facility installation. This allows us to install electric facilities in a continuous manner for our loop feed which provides reliability. We prefer the separation of gas and electric. Typically, with electric in the rear of the subdivision lots. We will need 8' to 10' wide dry utility easements in the rear of all lots. These utility easements will need to be on sides of lots abutting roads, and across tracts. If gas and electric will be sharing front lot distribution, we will need a 10' to 15' wide dry utility easements in the front of all lots. These utility easements will need to be on sides of lots abutting roads, and across tracts as well.

- Easements utilized by United Power cannot be encumbered by any hard surfaces such as streets or sidewalks. Although the roadways/tracts on the plat are dedicated to utilities, we have above ground equipment that cannot be placed within these areas. In addition, sidewalks take away from the use of the easement & reduces the area, limiting where our equipment can be placed.

- **Tracts/Open Space/Parks** – United Power prefers dedicated blanket utility easement use within tracts as this gives us the opportunity to set above ground equipment, coordinated with the developer, and limit the impact to home lots. If Blanket utility easement(s) cannot be given, we will need a 10' to 12' wide dry utility easements along the perimeter of all tracts, along perimeter of tracts abutting roads, and through tracts between lots.

- **Streetlights** – When streetlight locations are identified in a subdivision, we need a 5' wide dry utility easement along one side of the lot closest to the streetlight location. All streetlight locations must be approved and signed off by the city/town, etc. Please note, if we do not get these through the platting process, we will have to get individual ones during the design which will slow United Power's ability to start construction significantly.

Please have the property owner/developer/contractor submit an application for new electric service, any modification to existing facilities including relocation and/or removal along with CAD data via https://www.unitedpower.com/construction. United Power would like to work with these persons early in the construction process on getting an electric design prepared so that we can request any additional easements needed and hopefully have those easements dedicated on the plat rather than obtaining separate instrument. Obtaining easements via a separate instrument can be time consuming and could cause delays.

As a Reminder: No permanent structures are acceptable within the dry utility easement(s); such as, window wells, wing walls, retaining walls, basement walls, roof overhang, anything affixed to the house like decks, etc. United Power considers any structure that impedes the access, maintenance, and safety of our facilities a permanent structure. No exceptions will be allowed, and any encroachments could result in penalties.

Service will be provided according to the rules, regulations, and policies in effect by United Power at the time service is requested. We would like to remind the developer to call the Utility Notification Center by dialing 811 to have all utilities located prior to construction. We look forward to safely and efficiently providing reliable electric power and outstanding service.

Thank you,

Amber Mendoza

Amber Mendoza, RWA
ROW Agent
720.249.9315 | platreferral@unitedpower.com

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Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: **303.571.3306**
Facsimile: 303. 571.3284
donna.l.george@xcelenergy.com

September 29, 2021

City of Fort Lupton Planning Department
130 South McKinley Avenue
Fort Lupton, CO 80621

Attn: Alyssa Knutson and Todd Hodges

Re: Cottonwood Greens Townhomes PUD Filing No. 4, Case # LUP2021-0019

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has determined **there is a conflict** with **Cottonwood Greens Townhomes PUD F4** in that there are no utility easements dedicated for natural gas distribution facilities. Will the gas meters potentially be banked?

Please note that natural gas distribution utilities require minimum 6-foot wide utility easements *within each residential lot* on the side of the lot that is drivable pavement (minimum 8-feet wide, 6-inches thick) with space for service truck access and plowing in snowy conditions with a minimum 5-foot clearance from any structure.

PSCo also requests that Tracts E and L are dedicated for utility use, particularly for crossing and connectivity throughout the development.

The property owner/developer/contractor must complete the application process for any new natural gas service via xcelenergy.com/InstallAndConnect. It is then the responsibility of the developer to contact the Designer assigned to the project for approval of design details.

If additional easements need to be acquired by separate PSCo document, a Right-of-Way Agent will need to be contacted.

Donna George
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-571-3306 – Email: donna.l.george@xcelenergy.com

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Fort Lupton Fire Protection District
1121 Denver Avenue • Fort Lupton, Colorado 80621
Office: (303)857-4603 • Fax: (303)857-6619 • Website: www.fortluptonfire.org

Date: 10/22/2021
Project name: Cottonwood Greens PUD Filing #4
Project address: Parcel: 130933416019, Fort Lupton, CO 80621
FLFPD Project # R2021-0035
Plan reviewer: Taw Tamlin, Fire Marshal

The Fire District has reviewed the submittal for **Cottonwood Greens PUD Filing #4** located at **Parcel: 130933416019,** Fort Lupton, CO 80621. The submittal was reviewed for compliance with *2012 International Fire Code (IFC)* and National Fire Protection Association (*NFPA)* standards as adopted by the Fort Lupton Fire Protection District, the City Council of Fort Lupton and the Weld County Commissioners. The following specific requirements and conditions shall be met prior to operations.

Specific Requirements

1. Any property owner or authorized agent who intends to conduct an operation or business, or install or modify systems and equipment which is regulated by this code, or to cause any such work to be done, shall first make application to the fire code official and obtain the required permit. *2012 IFC, 105.1.1*

2. Application for a permit required by this code shall be made to the fire code official in such form and detail as prescribed by the fire code official. Applications for permits shall be accompanied by such plans as prescribed by the fire code official. *2012 IFC, 105.2*

    a. *The plan review, Fee Schedule, and Plan Review Application can be found at https://fortluptonfire.org/contractors/*

    b. *All documents shall be electronic and sent to ttamlin@ftluptonfire.com*

3. The following items shall be submitted for review prior to construction.
    a. Site Plan showing,
        i. Width of fire department access roads
        ii. Hydrant Locations & Distancing
        iii. Street lengths to dead end
        iv. Describe how Section D107.1 below has been met.

4. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103.1). 2012 IFC, D103.1

5. The minimum turning radius shall be determined by the fire code official. 2012 IFC, D103.3
    a. See attached document showing the minimum turning radius needed.

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6. The minimum fire-flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5m2) shall not be less than that specified in Table B105.1. 2012 IFC, B105.1

    a. Exception: A reduction in required fire-flow of 50 percent, as approved, is allowed when the building is equipped with an approved automatic sprinkler system.

7. The minimum number of fire hydrants available to a building shall not be less than that listed in Table C105.1. The number of fire hydrants available to a complex or subdivision shall not be less than that determined by spacing requirements listed in Table C105.1 when applied to fire apparatus access roads and perimeter public streets from which fire operations could be conducted. 2012 IFC, C103.1

8. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads and shall meet the requirements of Section D104.3. *2012 IFC, D107.1*

Exceptions:

    1. Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the International Fire Code, access from two directions shall not be required.

    2. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

9. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses. *2012 IFC, 104.3*

10. Where the vertical distance between the grade plane and the highest roof surface exceeds 30 feet (9144 mm), approved aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater. *2012 IFC, D105.1*

11. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Where required by the fire code official, address numbers shall be provided in additional approved locations to facilitate emergency response. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (101.6 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Where access is by means of a private road and the building

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cannot be viewed from the public way a monument, pole or other sign or means shall be used to identify the structure. Address numbers shall be maintained. *2021 IFC, 505.1*

Please contact Fire Marshal, Taw Tamlin at 303-857-4603 or ttamlin@ftluptonfire.com if you have questions or need further assistance.

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CITY OF
Fort Lupton
EST 1836
COME PAINT YOUR FUTURE WITH US

Planning Department

130 S. McKinley Avenue
Fort Lupton, CO 80621

Phone: 303.857.6694
Fax: 303.857.0351
www.fortluptonco.gov

Affidavit of Mineral Notice

CERTIFICATION OF NOTICE PURSUANT TO C.R.S. 24-65.5-103

Cottonwood Greens PUD Filing No. 4

The undersigned applicant, **Cottonwood Development Partners LLC**, hereby certifies:

(a) To the best of his or her knowledge, the attached list is a true and accurate list of the names and addresses of all mineral owners and lessees of mineral owners on or under the parcel of land being considered pursuant to C.R.S. 24-65.5-103(1)(a).

(b) Notice was sent to mineral estate owner(s) by certified mail, return receipt requested, or by a nationally recognized overnight courier not less than 30 days prior to the date scheduled for the initial public hearing by the City of Fort Lupton;

(c) Notice contained the time and place of the initial public hearing, the nature of the hearing, the location and legal description by section, township, and range of the property that is subject of the hearing, and the name of the applicant. A copy of the notice sent is attached hereto.

_____
Signature of Owner or Owner's Representative

The foregoing instrument was acknowledged before me by JAMES M. RIGHEIMER this 16th day of JUNE, 2021. Witness my hand and seal.

My commission expires 8/9/21.

_____
Notary Public

(SEAL)

JAMES KRETZSCHMAR
Notary Public - California
Orange County
Commission # 2204956
My Comm. Expires Aug 9, 2021

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-171

APPROVING THE AGREEMENT FOR MUNICIPAL PLANNING SERVICES WITH TODD HODGES DESIGN, LLC AS THE PLANNER FOR THE CITY OF FORT LUPTON FOR A TWO (2) YEAR TERM

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: a. Agreement for Municipal Planning Services

III. Summary Statement:

Todd Hodges Design has been providing Interim Planning Director services for the City of Fort Lupton since March of 2010. This action is an amendment to allow for planning services through Todd Hodges Design, LLC and defines compensation for the principal and associates. Todd Hodges Design, LLC has been critical in directing the planning and building department through growth periods and has assisted in the economic development of the City.

IV. Submitted by: _____
City Administrator

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed Approved Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

Todd Hodges Design, LLC has been providing Interim Planning Director services for the City of Fort Lupton since March of 2010. This action is an amendment with a two year extension to November 2, 2023. The agreement defines compensation for Todd Hodges Design, LLC Principal and Associate billing rates.

X. Legal/Political Considerations:

With the anticipated growth and development in the City and surrounding areas, it is essential that the City of Fort Lupton have a qualified and experienced Planner available at all times.

XI. Alternatives/Options:

Decide on a different method of filling the vacancy of Planner within the City such as advertising for a full-time position.

XII. Financial Considerations:

The planning services under this agreement is covered in the existing budget. Annual budget/appropriation is also included in the agreement.

XIII. Staff Recommendation:

Approve the consultant contract with Todd Hodges Design, LLC as contract city planner to November 2, 2023.

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AGREEMENT FOR MUNICIPAL PLANNING SERVICES

THIS AGREEMENT ("Agreement") is made this 2th day of November, 2021, by and between TODD HODGES DESIGN, LLC and the CITY OF FORT LUPTON, a municipal corporation of the State of Colorado (the "City").

RECITALS AND REPRESENTATIONS

WHEREAS, the City desires to contract with TODD HODGES DESIGN, LLC to serve as the
City Planner for the City of Fort Lupton on the terms established in this Agreement; and

WHEREAS, TODD HODGES DESIGN, LLC desires to serve as the City Planner for the City of Fort Lupton.

NOW, THEREFORE, in consideration of the mutual undertakings set forth in this Agreement, the City and TODD HODGES DESIGN, LLC agree as follows:

1. PLANNER COMPENSATION. TODD HODGES DESIGN, LLC'S compensation shall be paid at the rate of one hundred and twenty-five dollars ($125) per hour for Todd Hodges and eighty dollars ($80) an hour for any associate planner retained by TODD HODGES DESIGN, LLC to perform planning services for the City of Fort Lupton. TODD HODGES DESIGN, LLC shall perform all planning associated duties including but not limited to those described in Paragraph 2 of this Agreement. TODD HODGES DESIGN, LLC shall submit an invoice for the planning services every two weeks.

2. PLANNER SCOPE OF SERVICES. TODD HODGES DESIGN, LLC shall be responsible for all facets of planning for the City, including administration of the Planning and Building Department as set forth in the Fort Lupton Municipal Code, section 2-68, and may also be required to attend meetings and conferences with City staff, as necessary.

TODD HODGES DESIGN, LLC. shall at all times during the term of this Agreement comply with the constitutions and applicable laws of the United States and the State of Colorado, and the Ordinances, Resolutions and Regulations of the City. The Planner shall consult with the City Administrator as needed, including attending meetings as requested, to support the City in the ongoing development and planning of the City. All planners working for TODD HODGES DESIGN, LLC shall be considered independent contractors of TODD HODGES DESIGN, LLC, shall be in good standing in Colorado, and where needed, appropriately licensed.

3. PLANNER REPORTING. TODD HODGES DESIGNS, LLC shall keep the City Administrator informed of any unusual or noteworthy events, cases, submittals or developments.

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4. ANNUAL BUDGET/APPROPRIATION. Notwithstanding any provision of this Agreement to the contrary, the City is not obligated by this Agreement to make any payments in any fiscal year beyond the fiscal year for which funds are appropriated for the payment thereof or to make payments from any funds of the City other than funds appropriated for the payment of current expenditures. All payment obligations of the City under this Agreement are from year to year only and do not constitute a multiple-fiscal year direct or indirect debt or other financial obligation of the City.

5. INDEPENDENT CONTRACTOR. This Agreement is one for independent contractor services. TODD HODGES DESIGN, LLC and its associated planners and employees are independent contractors to the City and shall not be considered employees of the City for purposes of any federal or state law. The City shall not be obligated to secure and shall not provide any employment benefits of any kind or type to or for TODD HODGES DESIGN, LLC or its independent contractors, including but not limited to worker's compensation, disability insurance, errors and omissions insurance, vacation or sick leave, retirement contributions, or other benefits. TODD HODGES DESIGN, LLC. and its associated planners and employees shall be responsible for any federal and state income tax withholding on moneys earned pursuant to this Agreement. The services provided hereunder shall be supervised by the City Administrator.

6. INSURANCE. TODD HODGES DESIGN, LLC shall maintain professional liability insurance with minimum combined single limits of one million dollars ($1,000,000.00). The City shall also provide TODD HODGES DESIGN, LLC with such additional professional liability coverage as the parties mutually agree if appropriate.

7. EXPENSES AND MATERIALS. TODD HODGES DESIGN, LLC will be reimbursed for any incidental expenses incurred by TODD HODGES DESIGN, LLC in the performance of planning services for the City.

8. EFFECTIVE DATE. This Agreement becomes binding and effective as of the date of approval by the City Council and is executed by the parties and shall continue for a two-year term.

9. TERMINATION WITHOUT CAUSE OR REASON. This Agreement may be terminated by either party without cause or reason at any time by giving thirty (30) days written notice to the other party. In such event of termination, TODD HODGES DESIGN, LLC shall continue performing planning services during such thirty-day period and shall reasonably assist the City in the transfer of planning services to a new planner.

10. ENTIRE AGREEMENT/TERMINATION OF PRIOR AGREEMENTS. This Agreement shall constitute the entire agreement between the parties, is binding upon, and inures to the benefit of TODD HODGES DESIGN, LLC its successors, heirs at law

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and executors. This Agreement supersedes any and all prior agreements between the parties.

11. SEVERABILITY. If any provision, or any portion thereof, contained in this Agreement is held unconstitutional, invalid, or unenforceable, the remainder of this Agreement shall be deemed severable, shall not be affected, and shall remain in full force and effect.

12. AMENDMENTS. The terms and conditions of this Agreement may be modified only by the mutual written consent of TODD HODGES DESIGN, LLC and the City Council.

13. GOVERNING LAW AND VENUE. This Agreement shall be governed by and interpreted according to the law of the State of Colorado. Venue for any action arising under this Agreement shall be in the appropriate court for Weld County, Colorado.

14. NO WAIVER. A waiver by any party to this Agreement of the breach of any term or provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach by either party.

15. NO WAIVER OF GOVERNMENTAL IMMUNITY. Nothing in this Agreement shall be construed to waive, limit, or otherwise modify any governmental immunity that may be available by law to the City, its officials, employees, contractors, or agents, or any other person acting on behalf of the City and, in particular, governmental immunity afforded or available pursuant to the Colorado Governmental Immunity Act, Title 24, Article 10, Part 1 of the Colorado Revised Statutes.

16. PARAGRAPH CAPTIONS. The captions of the paragraphs are set forth only for the convenience and reference of the parties and are not intended in any way to define, limit or describe the scope or intent of this Agreement.

IN WITNESS WHEREOF, the City has caused this Agreement to be signed and executed on its behalf and TODD HODGES DESIGN, LLC has signed and executed this Agreement, both in duplicate, as of the day and year first above written.

CITY OF FT. LUPTON

By: _____
Zo Stieber, Mayor

TODD HODGES DESIGN, LLC

By: _____
Todd A. Hodges, Principal Manager

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ATTEST:

By: _____
Maricela Peña, City Clerk

APPROVED AS TO FORM:

By: _____
J. Andrew Ausmus, City Attorney

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald , Ward 3

AM 2021-173

APPROVE THE PURCHASE AND INSTALLATION OF A HVAC UNIT FOR THE AQUATICS AREA OF THE RECREATION CENTER FROM INNOVATIVE MECHANICAL SOLUTIONS FOR AN AMOUNT NOT TO EXCEED $285,717.00.

I. Agenda Date: Council Meeting – Nov. 2, 2021

II. Attachments:

1. Proposal of Services
2. Picture 1
3. Picture 2

III. Summary Statement:

This is a proposal to purchase and install a HVAC unit for the aquatic area of the Recreation Center.

IV. Submitted by: Monty Schuman

(Monty Schuman Recreation Director)

V. Finance Reviewed

Finance Director

VI. Approved for Presentation:

City Administrator

VII. Attorney Reviewed Approved

VIII. Certification of Council Approval:

City Clerk Date

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IX. Detail of Issue/Request:

The HVAC Unit (an Innovative) above the pool, for a number of years has required a considerable number of repairs. We have budgeted for this replacement for the past four years. A number of years ago, the unit had a cracked heat exchanger and we were able to pull it out and have it welded and repaired. At that time, we were told that they had no idea how long it would last but when or if it broke again it would not be fixable. Our internal maintenance department as well as our outside HVAC group that works on our units indicated to us that it looks like we are working on borrowed time. We are looking to replace this unit with the same type of system as it is compatible with our aquatic area. This is a very specialized system as pools have extremely difficult environments. The mechanical design of our pool was designed to work with this system. If we bring in another system it would require a complete overhaul of the mechanical systems in the pool area. Our pool environment has been very good. Many outside vendors that have come into our aquatics area, constantly comment on how good our air quality is. This unit delivers the same air quality and works with all of our current controls. It also allows for a quicker turn around and a minimal shut down of the pool would be required as it will utilize the existing foot print and connections. Even if we are able to order the unit today there is an 18 to 20 week turn around on the getting the unit here. Also, steel prices are constantly rising and the quoted price is only good until the end of November. Innovative Mechanical Solutions is a sole supplier of this unit in our area.

X. Legal/Political Considerations:

None expected.

XI. Alternatives/Options:

Deny the proposal and direct staff to research other HVAC units.

XII. Financial Considerations:

The Recreation Center Fund has $250,000 budgeted in 2021 for the HVAC. A supplemental budget resolution will be need to for the $35,717 in 2021. If the HVAC is delivered and installed in 2022 a supplemental budget resolution will be needed to appropriate the $287,717.

XIII. Staff Recommendation:

Staff recommends to approve the purchase and installation of the HVAC Unit from Innovative Mechanical Solutions for the aquatics area of the Recreation Center for an amount not to exceed $285,717.00.

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innovative
mechanical solutions

7-20-21

Ft. Lupton Rec Center Pool unit replacement
203 S. Harrison Ave.
Ft Lupton, CO 80621
Attn, Monty Schuman

Good Afternoon,

Innovative Mechanical Solutions is please to present a proposal for the above mentioned project. Our pricing is based on the HVAC equipment that is currently installed and a site walk we made in 2018. The unit quoted is a 50% outside air unit as requested. Our pricing and equipment is subject to change with the issue of new drawings. The current proposal includes the provision and installation of the following.

- Demo of existing Innovent pool unit
- Refrigerant recovery
- Install New direct replacement Innovent pool unit
- Reconnect electrical
- Reconnect gas piping
- Reconnect drain piping
- Reconnect existing controller
- Factory start up
- Crane and hauling
- Air balancing
- one year warranty on new materials and workmanship

TOTAL PRICE $ 285,717.00

Project Specific Exclusions

- ***If Specifications incorporate master contract, contract subject to review***
- **Minimum of two week notice for mobilization requests**
- **Textura fees- if required add .22%**
- **Fees and interest for material or equipment 30 days past invoice date**
- **Equipment pads**
- **Structural steel, repairs or installation for equipment**
- **Fire protection**

Commercial/Industrial HVAC
9669 Havana St. •Commerce City, CO 80640 • Phone: 720-890-1080 • Fax: 303-993-3270 • Email: Info@innmech.com
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- **Engineering**
- **Permit fees**
- **Taxes**
- **Roofing**
- **Ceiling removal and replacement**
- **Electrical (disconnect and reconnect only included)**
- **Painting**
- **Plumbing**
- **Hydronic piping**
- **DDC Controls System**
- **Access panels/doors**
- **Dumpsters**
- **X-ray**
- **Core drilling or concrete saw cutting**
- **Repairs to existing equipment**
- **Temporary heating or cooling**
- **Construction filters**
- **Pricing subject to adjust for insurance requirements**
- **Quick shipping or expedited production of equipment or materials**
- **Accelerated costs due to tariff increases**
- **Accelerated prevailing wage increases due to contract date renewal**
- **Warranty on existing equipment**
- **Filters**
- **Plumbing, drain and gas piping**
- **Bond**
- **Commissioning**
- **BIM Coordination**
- **provision of sanitary services**
- **water or gas meters**
- **BIM Coordination**
- **Engineering**
- **Patching**
- **Asbestos abatement**
- **Asbestos training**
- **After hours work**
- **Holidays**
- **Price increases from date of bid to project completion**
- **Confined space work**
- **Fireplace installation and flues**
- **Storage containers**
- **Liquidated damages**
- **Expedited production**
- **Quick shipping**
- **Weekly subcontractor meetings prior to mobilization**
- **Site specific training**
- **Road closure permits**
- **Barricades**
- **Tie off points on roof**

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- **Any and all mechanical items or equipment not shown or clearly referenced on mechanical drawings**
- **Anything not listed as included**
- **Additional fees of $350.00 per trip may be charged if scheduled to do start up or balancing and job is not ready because of others**
- **Pricing good for 30 days**

Terms, Conditions and Exclusions

The following terms, conditions, and exclusions are automatically incorporated into every proposal, request for proposal and contract involving products and services provided by Innovative Mechanical Solutions (IMS). The prices quoted by IMS reflect and depend upon the applicability of these terms and conditions. No offer, acceptance or otherwise is binding on IMS unless signed by a company principle or president in writing. The signing of this document shall be deemed to constitute acceptance by the customer of all these terms and conditions.

Standard exclusions- the following items are standard Innovative Mechanical Solutions exclusions and will not be provided by IMS. Fire Protection, formed concrete pads, Structural repairs for equipment, warranty on any existing equipment, repairs to existing equipment, recycling of materials, ceiling removal and replacement, Painting, x-ray, provision of dumpsters, provision of sanitary services, water or gas meters, BIM Coordination, engineering, patching, asbestos abatement, asbestos training, saw cutting or core drilling, electrical, roofing, after hours work, holidays, price increases from date of bid to project completion, confined space work, fireplace installation and flues, storage containers, drywall access panels, liquidated damages, expedited production, quick shipping, weekly subcontractor meetings prior to mobilization, site specific training, road closure permits, barricades, tie off points on roof, any and all mechanical items or equipment not shown or clearly referenced on mechanical drawings, and anything not listed as included.

Exclusions from Work. Innovative Mechanical Solutions obligation is limited to the work as defined and does not include any modifications to the work site under the Americans with Disabilities Act or any other law or building code(s). In no event shall IMS be required to perform work that we reasonably believes is outside of the defined work without a written change order signed by Customer and IMS.

Performance. IMS shall perform the work in accordance with industry standards generally applicable in the area under similar circumstances as of the time IMS performs the work. The customer will provide without charge all water and utilities required for IMS to perform its scope of work. Innovative Mechanical Solutions may refuse to perform any work where working conditions could endanger property or put at risk the safety of persons. Unless otherwise agreed to by Customer and IMS, at Customer's expense and before the work begins, Customer will provide any necessary access platforms, catwalks to safely perform the work in compliance with OSHA or state industrial safety regulations.

Access. Innovative Mechanical Solutions and its subcontractors shall be provided access to the work site during regular business hours, or such other hours as may be requested by IMS and acceptable to the work site' owner or tenant for the performance of the work, including sufficient areas for staging, mobilization, and storage. IMS's access to correct any emergency condition shall not be restricted. Customer grants to IMS the right to remotely connect (via phone modem, internet or other agreed upon means) to Customer's building automation system (BAS) and or HVAC equipment to view, extract, or otherwise collect and retain data from the BAS, HVAC equipment, or other building systems, and to diagnose and remotely make repairs at Customer's request.

Time for Completion. Except to the extent otherwise expressly agreed in writing signed by an authorized representative of IMS, all dates provided by IMS or its representatives for commencement, progress or completion are estimates only. While IMS shall use commercially reasonable efforts to meet such estimated dates, Innovative Mechanical Solutions shall not be responsible for any damages for its failure to do so.

Risk of Loss - All merchandise shall be shipped at the customer's risk, Innovative Mechanical Solutions shall not be liable for loss or damage to merchandise after delivery to the Project site. It shall be the responsibility of the customer to file claim with the insurance company for any loss or damages while in storage.

Force Majeure - IMS will at all times attempt to supply the best possible estimates of shipping and delivery dates, but IMS shall not be liable for delays or defaults in shipping merchandise pursuant if such delays or defaults are due to acts of God or the public enemy; acts of the government of the United States or any state or political subdivision thereof; fires, floods, explosion or other catastrophes; epidemics or

Quarantines; strikes, slowdowns or other labor trouble; freight embargoes; unusually severe weather; or other causes beyond the control and without the fault or negligence of IMS.

Errors - Stenographic, clerical, illustrations and specification errors contained in any quotations are subject to correction and modification.

Mobilization- Innovative mechanical Solutions requires that a schedule be provided as soon as possible. IMS also requests a two week notice prior to mobilization. IMS will provide attendance to kick off meetings prior to mobilization to the project. Two weeks prior to IMS

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commencing work on the project the project foreman will attend weekly subcontractor or construction (coordination) meetings for one (1) hour per week. Any additional time will be billed at a time and material rate for the project. Any requests for management or the owners of IMS to attend a weekly meeting may also have additional cost included.

Returns – Much of the merchandise is project specific and for that reason may not be returnable. There is a small opportunity to cancel production once an order is placed. Once an order has entered into production it can no longer be cancelled or refunded. If equipment or other products are not needed due to changes after the item has been shipped by the manufacturer, it becomes the responsibility of the customer. IMS has no obligation to dispose of, haul, store or sell any items not used on the project. If these items are being stored at the IMS facility or a subcontracted storage yard, the customer will be charged a storage fee, accrued weekly, until these items are removed from the property.

Specifications and Substitutions – Innovative Mechanical Solutions makes every effort to supply product and/or accessories to meet specifications. When products are not called out by brand name, and substitutions are made, they are offered as an unsolicited alternate that is designed to meet SMACNA standard but without guarantee of acceptance by the specifying authority or ultimate end-user.

Limitations on Warranties and Liabilities
(a) Innovative Mechanical Solutions shall ensure that the customer is eligible for the standard manufacturer's warranty on every product sold. Complete information regarding this coverage is included with the product and Close out documents or is available from IMS upon request. The customer shall not be eligible for any warranty coverage, however, if the customer's account is delinquent.

(b) THE FOREGOING WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Greater warranty protection may be available from the manufacturer at extra cost, if requested by the customer. The customer is responsible for understanding and complying with any environmental laws and regulations applicable to the products sold.

(c) The customer's remedies against IMS, if any, shall be limited to repair or replacement of any defective or non-conforming products. IN NO EVENT SHALL INNOVATIVE MECHANICAL SOLUTIONS BE LIABLE FOR PERSONAL INJURIES, PROPERTY DAMAGE, OR ANY INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES ARISING IN CONNECTION WITH THE USE, MISUSE OR INABILITY TO USE ANY PRODUCT. The exclusions apply regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory. Should IMS nevertheless be found liable for any damages, they shall be limited to the price of the products purchased.

*In an effort reduce cost and paper usage, IMS chooses to provide electronic copies of all required submittals, redlines, and any other close out documents requested. If hard copies of any of such documents are requested, additional fees may be added.

Innovative Mechanical Solutions is doing its best to hold pricing but our steel market at this time is volatile and fluctuating. Due to this we are unable to guarantee any pricing for more than 30 days. Pricing changes during construction could also be possible.

If you have any questions, please give us a call. Thank you for the opportunity to present this proposal and your consideration!

Sincerely,

Jeffrey A. Kinder
Lead Estimator
Innovative Mechanical Solutions

Approved and accepted this ____day of

_____, 2021.

_____
(Signature)

By: _____Title_____

Commercial/Industrial HVAC
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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-174

AWARD CONTRACT TO BURNS & MCDONNELL ENGINEERING COMPANY, INC., FOR $1,897,540.00 FOR DESIGN AND PERMITTING OF METRO LIFT STATION AND PIPELINE PROJECT FROM THE UTILITY FUND

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:
a. Public Works Contract Agreement
b. Force Main and Lift Station Project Cost Estimate

III. Summary Statement:

Award of contract to Burns & McDonnell Engineering Company, Inc. for Wastewater Facilities Improvements Project design and permitting services for not to exceed $1,897,540.00 from Utility Fund.

IV. Submitted by: _____
Public Works Director

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed Approved Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

The City received an extension to June 2024 of our Colorado Water Quality Control Act discharge permit for the Wastewater Treatment Plant.

Council approved pursuit of the METRO connection option on April 20, 2021 with AM2021-066. The City has determined that entering into an agreement with the Metro Wastewater Reclamation District's (MWRD) Regional Northern Treatment Plant may be a preferred alternative to expanding the City's Wastewater Treatment Plant (WWTP). The Metro District Board of Director's Resolution NO. 0721-B7.f was approved on July 20, 2021, which determined that the District could feasibly serve the City.

The request for Qualifications (RFQ) was advertised on August 13, 2021. A Pre-proposal meeting was held at City Hall on August 27, 2021. The proposal deadline for submittal was September 10, 2021. Five firms submitted qualifications. The selection committee included Leann Perino, Jake Freier, Jon Mays, Brad Schutt, and Al Paquet. All submittals were graded by each committee member based on the selection criteria and weighted per the proposed criteria. Each member's firm ranking was also tallied by score preference of 1 to 5. Phone interviews were conducted by our Jacobs (CH2M) representatives and scored. Burns and McDonnell was selected as the most qualified firm.

Work is scheduled to begin immediately. This agreement covers all requirements to evaluate, design and receive permitting compliance with CPH&E.

X. Legal/Political Considerations:

Regulation 22 and the City's current WWTP Discharge Permit compliance schedule requires the City WWTP to meet discharge limits on Total Inorganic Nitrogen and Total Phosphorous by 06/30/2024.

XI. Alternatives/Options:

- *Approve Contract Agreement with Burns & McDonnel*
- *Do not approve the Contract*

XII. Financial Considerations:

The 2022 Utility Fund budget has $2,500,000 budgeted in the wastewater treatment plant for engineering services.

XIII. Staff Recommendation:

Staff recommends awarding contract to Burns & McDonnell Engineering Company, Inc. for Lift Station and Pipeline Project design and permitting services for not to exceed $1,897,540.00 from Utility Fund.

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City of Fort Lupton, Colorado

Public Works Department

Public Works Agreement

This PUBLIC WORKS Agreement is entered into by and between the **City of Fort Lupton**, Colorado (hereinafter "City") and **Burns & McDonnell Engineering Company, Inc.** (hereinafter "CONSULTANT").

WHEREAS, the parties hereto agree in consideration of the covenants, payments and agreements set forth herein as follows:

1. **SCOPE OF SERVICES.** Consultant shall perform the services included in the scope of work set forth and incorporated herein as **Exhibit A**. Consultant confirms it possesses all necessary professional licenses and is in good standing with the State of Colorado. Further, Consultant states it possesses professional liability insurance.

2. **CONTRACT DOCUMENTS.** This Agreement consists of and includes this Agreement and the scope of work set forth in the Consultant's Scope of Work attached hereto as **Exhibit A**. In the event of any conflict between any of these documents, this document shall control.

3. **PERIOD OF SERVICE AND SCHEDULE.** The provisions of this Agreement have been agreed to in anticipation of the orderly and continuous progress of the Project through completion of the services stated in the Proposal. Consultant's obligation to render services hereunder will extend for a period that may reasonably be required for the completion of said services. Consultant shall make reasonable efforts to comply with deliverable schedules and consistent with Consultant's professional responsibility.

4. **CONTRACT SUM.** The City shall pay to the Consultant for performance and completion of the work encompassed by this Agreement, and the Consultant will accept as full compensation therefore the sum of not to exceed **One Million, Eight Hundred Ninety Seven Thousand, Five Hundred Forty Dollars $ 1,897,540.00**, as set forth in the Work Breakdown Structure and Fee Schedule attached hereto as **Exhibit B**, and subject to confirmation by the City of completion of the scope of work in accordance with the contract documents attached hereto. Said amounts to be paid upon review and acceptance of the work by the City, in its sole discretion, including completion by the Consultant of any review corrections as determined by the City.

5. **CONTRACT APPROPRIATIONS/NO CHANGE ORDERS.** The City states that the amount of money appropriated for this Agreement is equal to or in excess of the contract amount. No change order to this Agreement requiring additional compensable work to be

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performed, which work causes the aggregate amount payable under this Agreement to exceed the amount appropriated for the original contract shall be issued by the City unless the City notifies the Consultant in writing, that lawful appropriations to cover the costs of this additional work has been made and the change order is approved by the City in its sole discretion in writing. City shall have the right to make changes within the general scope of Consultant's services, with an appropriate change in compensation and schedule, upon execution of a mutually acceptable amendment or change order signed by authorized representatives of City and Consultant.

6. AMENDMENT/NO ASSIGNMENT. No modification or amendment of this Agreement shall be valid unless in writing and signed by all parties to this Agreement. Consultant's services will be performed solely for the benefit of City and not for the benefit of any other persons or entities. Neither City nor Consultant shall assign or transfer interest in this Agreement without the written consent of the other.

7. COMPLETE AGREEMENT. This Agreement, and the exhibits hereto, shall constitute the entire agreement between the parties with respect to the subject matter hereof and there are no agreements, representations or warranties other than as set forth herein.

8. COMPUTER PROGRAMS OR MODELS. Any use, development, modification, or integration by Consultant of computer software modeling programs does not constitute ownership or a license to City to use or modify such computer software modeling programs.

9. ELECTRONIC MEDIA AND DATA TRANSMISSIONS.

A. Any electronic media (computer disks, tapes, etc.) or data transmissions furnished (including Project Web Sites or CAD file transmissions) are for City information and convenience only. Such media or transmissions are not to be considered part of Consultant's instruments of service. Consultant, at its option, may remove all indicia of its ownership and involvement from each electronic display.

B. Consultant shall not be liable for loss or damage directly or indirectly, arising out of City's use of electronic media or data transmissions.

10. DOCUMENTS. All documents prepared by Consultant pursuant to this Agreement are instruments of service in respect of the Project specified herein. They are not intended or represented to be suitable for reuse by City or others in extensions of the Project beyond that now contemplated or on any other Project. Any reuse, extension, or completion by City or others without written verification, adaptation, and permission by Consultant for the specific purpose intended will be at City's sole risk and without liability or legal exposure to Consultant.

In the event that Consultant is to reuse, copy or adapt all or portions of reports, plans, or specifications prepared by others, City represents that City either possesses or will obtain permission and necessary rights in copyright, patents, or other proprietary rights and will

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be responsible for any infringement claims by others. Consultant will use professional judgement and analysis related to any documents produce by others for the City, for which Consultant shall rely on to perform and complete its services.

11. ESTIMATES, SCHEDULES, FORECASTS, AND PROJECTIONS. Estimates, schedules, forecasts, and projections prepared by Consultant relating to loads, interest rates and other financial analysis parameters, construction costs and schedules, operation and maintenance costs, equipment characteristics and performance, and operating results are opinions based on Consultant's experience, qualifications, and judgment as a professional. Since Consultant has no control over weather, cost and availability of labor, cost and availability of material and equipment, cost of fuel or other utilities, labor productivity, construction contractor's procedures and methods, unavoidable delays, construction contractor's methods of determining prices, economic conditions, government regulations and laws (including the interpretation thereof), competitive bidding or market conditions, and other factors affecting such estimates or projections, Consultant does not guarantee that actual rates, costs, quantities, performance, schedules, etc., will not vary significantly from estimates and projections prepared by Consultant.

12. POLLUTION. In view of the uncertainty involved in investigating and recommending solutions to environmental problems and the abnormal degree of risk of claims imposed upon Consultant in performing such services, to the maximum extent allowed by law, City agrees to release, defend, indemnify and hold harmless Consultant and its officers, directors, employees, agents, consultants and subcontractors from all liability, claims, demands, damages, losses, and expenses including, but not limited to, claims of City and other persons and organizations, reasonable fees and expenses of attorneys and consultants, and court costs, except where there has been a final adjudication that the damages were caused by Consultant's willful disregard of its obligations under this Agreement. Such indemnification includes claims arising out of, or in any way relating to, the actual, alleged, or threatened dispersal, escape, or release of, or failure to detect or contain, chemicals, wastes, liquids, gases, or any other material, irritant, contaminant, or pollutant.

13. ON-SITE SERVICES.

A. Project site visits by Consultant during investigation, observation, construction or equipment installation, or the furnishing of Project representatives shall not make Consultant responsible for construction means, methods, techniques, sequences, or procedures; for construction safety precautions or programs; or for any construction contractor(s') failure to perform its work in accordance with the contract documents.

B. City shall disclose to Consultant the location and types of any known or suspected toxic, hazardous, or chemical materials or wastes existing on or near the premises upon which work is to be performed by Consultant's employees or subcontractors. If any hazardous wastes not identified by City are discovered after a Project is undertaken, City and Consultant agree that the scope of services, schedule, and compensation may be adjusted

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accordingly. City agrees to release Consultant from all damages related to any pre-existing pollutant, contaminant, toxic, or hazardous substance at the site

14. TERMINATION. Services may be terminated by City or Consultant by seven (7) days' written notice in the event of substantial failure to perform in accordance with the terms hereof by the other party through no fault of the terminating party. If so terminated, City shall pay Consultant all amounts due for all services properly rendered and accepted by the City.

15. SEVERABILITY. In the event any portion of this Agreement is held to be unenforceable, the unenforceable portion of this Agreement will be deleted and the remaining provisions of the Agreement shall continue in full force and effect.

16. GOVERNING LAW. This Agreement shall be governed by the laws of the State of Colorado. All parties agree that any dispute regarding enforcement of this Agreement shall be filed in Weld County District Court after first attempting in good faith to submit the dispute to mediation. Submission of any dispute to mediation shall be a condition precedent to filing litigation in this matter, other than the request for injunctive relief.

17. OSHA REQUIREMENTS. Consultant agrees that it alone bears the responsibility for providing a safe and healthy work environment and shall provide its employees with adequate orientation and training to safely perform the scope of work set forth in this contract. Consultant shall at all times comply with the safety and health regulations of the Occupational Safety and Health Act of 1970 (29 CFR 1926) including all amendments and modifications thereto. In the event there is a conflict between the safety and health provisions of federal, state or local regulations, the more stringent provision shall prevail. Consultant acknowledges and agrees that with respect to the scope of work under this contract, it shall comply with all obligations and assume all responsibilities for its actions regarding all OSHA rules and regulations.

18. NO WAIVER OF GOVERNMENTAL IMMUNITY. The City, its elected officials, officers and employees are relying upon, and do not waive or intent to waive by any provision of this Agreement, the monetary limitations or any other rights, immunities and protections provided by the Colorado Governmental Immunity Act, C.R.S. Sec. 24-10-101 et seq. as amended or otherwise available to the City. Nothing herein shall operate as a waiver of any right the City has of governmental immunity under Colorado law which is specifically herein reserved.

19. INDEPENDENT CONTRACTOR. Consultant is a separate, legal entity from the City and the parties make this Agreement accordingly with the understanding that Consultant at all times is acting as an independent contractor and not an employee or agent of the City. All persons retained by Consultant to perform services pursuant to this Agreement shall be employees or independent contractors of Consultant and are not employees, contractors or agents of the City. Consultant does not have the authority to bind the City by contract or otherwise.

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20. FORCE MAJEURE. Neither party shall be liable or responsible to the other party nor be deemed to have defaulted under or breached this Agreement for failure or delay in fulfilling or performing any obligation under this Agreement when such failure or delay is caused by or results from causes beyond the reasonable control of the affected party, including but not limited to fire, floods, embargoes, pandemics, wars, acts of war (whether war is declared or not), insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, instances affecting public health including pandemics, acts of God or acts, omission, or delays in acting by any governmental authority. Provided, however, that the party so affected shall use reasonable efforts to avoid or remove such causes of non-performance, and shall continue performance hereunder with reasonable dispatch whenever such causes are removed. Either party shall provide the other party with prompt written notice of any delay or failure to perform that occurs by reason of force majeure. The parties shall mutually seek a resolution of the delay or the failure to perform as noted above.

21. INDEMNIFICATION BY CONSULTANT. Consultant shall defend, indemnify and hold the City harmless from any damages caused by negligence, including but not limited loss, liability, expenses, suit or claim, or claim for injury to persons or damage to property arising out of the activities of Consultant or its subconsultants pursuant to this Agreement. Expenses shall include all out of pocket expenses, attorney fees, expert costs and related litigation fees. To the extent allowed by law, City will require all construction contractors to indemnify, defend, and hold harmless City and Consultant from any and all loss where loss is caused or alleged to be caused in whole or in part by the construction contractors, their employees, agents, subcontractors or suppliers.

22. STANDARD OF CARE.

a. The standard of care for all services performed or furnished by Consultant under this Agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality. Consultant makes no warranties, under this Agreement, in connection with Engineer's services. Subject to the foregoing standard of care, Engineer and its consultants may use or rely upon design elements and information ordinarily or customarily furnished by others, including, but not limited to, specialty contractors, manufacturers, suppliers, and the publishers of technical standards.

b. Re-performance of services that fail to meet the standard of care shall be Engineer's sole obligation.

23. LIABILITY INSURANCE

1. Comprehensive General Liability

a. The Consultant shall purchase and maintain a Comprehensive General Liability Insurance Policy and such other insurance that is appropriate for the work being performed and furnished and shall provide protection from claims set forth hereinbelow which may arise out of or result from the Consultant's performance and furnishing of the

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work and the Consultant's other obligations under the Contract Documents, whether performed or furnished by the Consultant, by any Subconsultant, by anyone directly or indirectly employed by any of them to perform or furnish any of the work, or by anyone for whose acts any of them may be liable:

i. Claims under workers' compensation, disability benefits, and other similar employee benefit acts;

ii. Claims for damages because of bodily injury, occupational sickness or disease, or death of the Consultant's employees;

iii. Claims for damages because of bodily injury, sickness or disease, or the death of any person other than the Consultant's employees;

iv. Claims for damages insured by personal injury liability coverage which are sustained:

a) by any person as a result of an offense directly or indirectly related to the employment of such person by the Consultant; or

b) by any other person for any other reason;

i. Claims for damages, other than to the Work itself, because of injury to or the destruction of tangible property wherever located, including the loss of use resulting therefrom;

ii. Claims for damages because of bodily injury or the death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

(a) The insurance required shall include the specific coverages, and be written for not less than the limits of liability and coverages specified or required by Colorado Law, whichever is greater.

i. Workers' Compensation and related coverages:

a)	State of Colorado	Statutory
b)	Applicable Federal	Statutory
c)	Employer's Liability	$ 100,000 each accident
		$ 500,000 disease, policy limit
		$ 100,000 disease, each employee

(b) The Consultant's Comprehensive General Liability Insurance Policy shall include:

i.	General Aggregate	$ 1,000,000	
ii.	Personal and Advertising Injury	$ 500,000	
iii.	Each Occurrence (Bodily Injury and Property Damage)		$ 500,000
iv.	Excess or Umbrella Liability Bodily Injury and Property Damage		$ 2,000,000
		Retention	$ 10,000

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2. Automobile Liability
Combined Single Limit of $ 2,000,000

3. Professional Liability
Limits of Liability:

Aggregate	$ 4,000,000
Per Claim	$ 1,000,000

24. **APPROVAL REQUIRED.** This Agreement is subject to the final approval of the Fort Lupton City Council and signature by the Mayor of Fort Lupton.

EXECUTED THIS _____ DAY OF **NOVEMBER 2021**.

CITY OF FORT LUPTON, COLORADO

_____

BY:_____

TITLE: **Mayor**

BURNS & McDONNELL ENGINEERING COMPANY, INC.:

_____

BY:_____

TITLE:_____

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EXHIBIT A

Scope of Services

10/25/2021

PROJECT NAME:
Forcemain and Lift Station Design Project

Project Understanding

The Forcemain and Lift Station Design project is required by the City of Fort Lupton to deliver wastewater flows from the City's current wastewater treatment plant to Metro Wastewater's regional wastewater facility. In order to deliver flows to Metro, a lift station is required at the current wastewater treatment plant to deliver the required flows and pumping head. After installation of the forcemain and lift station, 100% of the wastewater flows to the current WWTP will be transferred to Metro for treatment. Some parts of the existing wastewater treatment plant can be abandoned as they will no longer be required. It's possible that certain portions of the existing wastewater treatment plant can be retrofit/reused as part of the new lift station and/or flow equalization. For the purposes of our scope and fee, we have assumed that only one (1) lift station (at the WWTP) is required to deliver flows to Metro.

Several alternative alignment options exist for the forcemain. There are generally two (2) primary alignments to consider. Alignment alternatives will be studied in the initial phase of the design in order to determine the "highest" value alternative. Currently, we expect that the forcemain will be approximately 8.5 miles in length and be approximately 20-inches in diameter. Design will be inclusive of required accessories including air/vacuum valves, shutoff valves, etc. Design will also include waterline material selection, routing, cathodic protection, other necessary design for a complete pipeline and lift station.

The work generally includes:

1. Develop alignment alternative and recommend the highest value route
2. Engineer's Opinions of Probable Construction Costs (forcemain and lift station)
3. Schedule support
4. Design of ~ 6.0 to 8.5 miles (depending on alignment) of 20-inch diameter forcemain
5. Conduct pipeline material option analysis, pipeline material recommendations
6. Design connections of the new forcemain to existing infrastructure
7. Permitting support
8. Lift Station Design of ~ 5 MGD average flow rate
9. Civil, mechanical, structural, electrical, and I+C design of the new lift station
10. Easement negotiations and acquisition including development of legal descriptions/exhibits, title commitments, and land appraisals
11. Forcemain appurtenance design including valving, air/vacuum valves, etc.
12. Erosion, and Sediment Control Drawings

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13. Bidding Assistance including document distribution and addendum

The general forcemain alignments are indicated in in Figure 1. It's likely either the green or the red line will be the selected route (small deviations are expected).

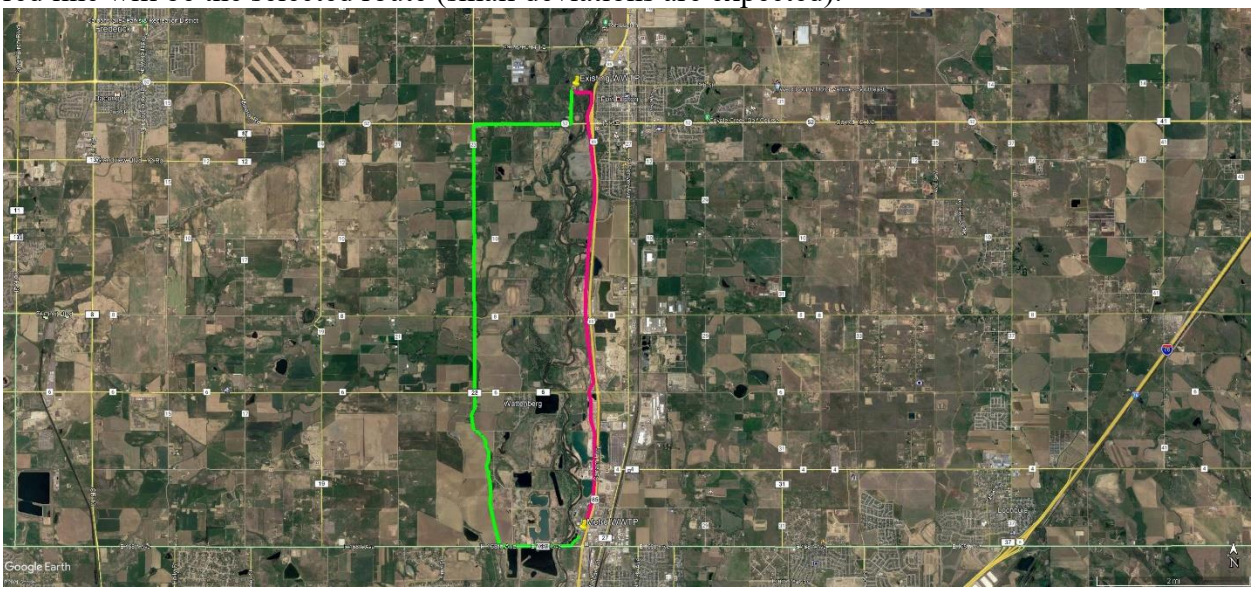

Figure 1
Approximate Forcemain Routing Options ~ 6.0 to 8.5 miles

Scope of Services

The Scope of Services proposed for the Forcemain and Lift Station Design Project will generally follow the design programs that we have used successfully on our past projects for this kind of design. Our team will work as an extension of your staff, and we are open to scope revisions that the City might desire. The outline below is not intended to include all the tasks we will perform on this project, but describes some of the major tasks that will be involved. The major scoping tasks that we propose are as follows:

TASK SERIES 100 – PRELIMINARY ANALYSIS AND ROUTE SELECTION

Task 101 – Conduct Project Kickoff Meeting:
Burns & McDonnell will attend a project kick-off meeting to be held with staff. The meeting shall include discussion of pertinent items for the project such as:

- Present project background and overview.
- Introduce key staff involved in the project including personnel who are to provide information/services.
- Determine lines of communication and project contacts (contact list to be developed).
- Identify available existing data and exchange.
- Discuss key issues and goals.
- Review the project schedule and milestones.
- Define sub-consultants and their roles.
- Outline possible community concerns, neighboring residents, businesses, easements, etc.

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- Discuss the geotechnical needs for the project.
- Discuss considerations for connections to the existing system.
- Discuss methods of construction that will be considered.
- Discuss agency coordination such as Weld County, CDPHE, Ditch Companies, in addition to future developments in the area.

A meeting agenda and subsequent meeting minutes will be distributed to all meeting participants

Task 102 – Develop and Maintain a Project Schedule:
Burns & McDonnell will develop and maintain the project schedule (in Microsoft Project) that will include relevant tasks/subtasks, milestones, critical path designation and a schedule for key progress meetings. Our schedule will also outline likely construction durations and start/finish dates.

Task 103 – Data Collection and Review of Background Information:
Burns & McDonnell will review available information provided by the City including:

- As-built record drawings
- GIS mapping
- Utility maps including Key Maps
- Aerial photography
- Existing easement documents
- Existing details
- Flow rate information

Task 104 – Conduct Bi-Weekly Progress Meetings:
Burns & McDonnell will conduct bi-weekly team coordination meetings via telephone conference and/or utilize Microsoft Teams to discuss the status of the report and project topics. For the purposes of this proposal, Burns & McDonnell has assumed that the Preliminary Analysis design phase will take approximately three (3) months to complete. As such, our scope and fee includes hours to host four (4) coordination meetings (does not include kick-off) via telephone or LiveMeeting. These meetings are in addition to kickoff meeting and other in-person meetings. A meeting agenda and subsequent meeting minutes will be distributed to all meeting participants.

Task 105 – Develop Alternative Forcemain Alignments:
Burns and McDonnell will develop up to three (3) different forcemain alignments for additional analysis, study, and recommendation. We will work with your team to develop primary alignments (and sub-alignments) that make sense based on project goals including minimizing public/environmental impacts and reducing cost.

Task 106 – Create Map Books Showing Alignment and Critical Route Impacts:
Burns and McDonnell will take the alignments determined in Task 105 and create map books showing each alignment in greater detail. We will start to incorporate free and available data including (but not limited to): aerial photography, GIS layers, existing utility data, property lines, etc. The intent of the map books is to better understand the potential “rocks in the road” that

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could challenge the alignment and that are critical to the success of the project. Key objectives, considerations, and challenges will be noted in the mapbooks.

Task 107 – Prepare Exhibit Showing Property Lines and Land Ownership Information and Easements:
Burns & McDonnell will prepare an exhibit of property line boundaries and ownership information along the considered alignments. We will prepare tables showing the required easements for each alignment including landowner name and approximate easement length.

Task 108 – Paired Comparison Analysis to Evaluate Forcemain Alignments:
Burns and McDonnell will evaluate the forcemain alignment options (Task 105, 106) and submit a paired comparison and a technical memorandum to communicate findings and recommendations. The paired comparison will focus on evaluating the technical, environmental, and social impacts for the alternative locations of the forcemain. The technical memorandum will include analysis and dialogue in regard to the paired comparison and evaluation of the associated costs. The selected forcemain alignment option will be clearly communicated and once agreed upon.

Task 109 – Initial Hydraulic Analysis – Lift Station Sizing and Diameter Determination:
Burns & McDonnell will evaluate hydraulics to verify pipeline and lift station design requirements. We will identify system pressures: cold working pressure, hydraulic grade lines, and evaluate forcemain diameters for various flow rates. Burns & McDonnell has developed a tool which makes evaluation of different pipeline, flow rates, diameter, and material selection easy to identify and evaluate. Our “on the fly” tool allows us to make changes to the pipeline hydraulics with immediate feedback relating to pipeline pressures, required pipeline pressure class (thickness), number of pipelines, energy costs, and potential impact to project costs.

Task 110 – Develop Engineer’s Opinion of Probable Construction Cost for Each Alignment:
Based on the map book exhibits, our project team will prepare the engineer’s opinion of probable cost for each alignment. This estimate will be compared against the other alignments to determine a overall “best value” solution. Our estimate will be based on recent bid tabulation information, historical cost data, and discussions with local suppliers and contractors. Relevant and significant assumptions will be included for reference. This estimate will include a 25% contingency.

Task 111 – Develop Preliminary Design Report for Forcemain and Lift Station:
Burns & McDonnell will compile all gathered information and prepare Preliminary Design Plans, supplemental reports, and a basis-of-design report. Preliminary Design will include recommended alignment of the pipe, location and general configuration of the lift station, and location and design/configuration of the tie-in locations on the northern and southern ends of the pipeline. Recommendations for pumps and necessary plant retrofit for pump installation shall also be included.

Task 112 – Desktop Environmental Review – Biological Survey and Threatened & Endangered Species:

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Burns & McDonnell will complete a desktop evaluation regarding protected species and a habitat assessment to determine if areas that would be disturbed during Project construction could include potential habitat for state- or federally protected species.

Task 113 – Desktop Environmental Review – Wetland Delineation:
Burns & McDonnell will conduct a desktop evaluation of the Project Area for wetlands using publicly available data.

Task 114 – Desktop Environmental Review – Historical and Cultural:
Burns & McDonnell will conduct a desktop evaluation of the Project Area for cultural and historic resources using records and database review from common sources. Based on the results of the desktop review, a cultural resources specialist will visit the site and evaluate the route and expected contractor working areas for potential impact to historical and cultural sites. This field visit will verify any previous findings or discoveries through desktop analysis. The findings of this evaluation will be documented in a brief memorandum. Historical and/or cultural sites, when present, will be delineated with a hand-held GPS. These GPS limits will be included into our construction drawings. Burns & McDonnell will make recommendations with regards to future permitting based on the required construction, number, size, location, and importance of historical and/or cultural finds. If the work triggers a federal permit, this will be specifically communicated to the City.

Task 115 – Desktop Environmental Review – Jurisdictional Determinations:
Burns & McDonnell will develop initial jurisdiction determinations of the potential USACOE controlled waterbodies.

Task 116 – Desktop Environmental Review – Raptors and Birds:
Burns & McDonnell complete a desktop habitat assessment of protected raptors/nesting birds to determine if areas that would be disturbed during Project.

Task 117 – Final Recommendation of Alignment and Letter to Council:
Burns & McDonnell provide a formal and concise recommendation to Council via a letter. The letter will be supported by the preliminary design report and paired comparison analysis.

Task 118 – Present Alignment Selection, Sche3dule, and Engineer's Opinion of Construction Cost to Council:
Our project team will attend one (1) City Council meeting to describe the project and to outline the expected project direction, cost, and schedule. We will provide a presentation via PowerPoint showing key project elements and summarizing the Task Series 100 findings.

TASK SERIES 200 – DESIGN

Task 201 - Conduct Bi-Weekly Progress Meetings:
Burns & McDonnell will conduct bi-weekly team coordination meetings via telephone conference and/or utilize Microsoft Teams to discuss the status of the report and project topics. For the purposes of this proposal, Burns & McDonnell has assumed that the Design phase will

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take approximately one year to complete. As such, our scope and fee includes hours to host twenty (20) coordination meetings via telephone or LiveMeeting. These meeting are in addition to design progress meetings and other in-person meetings. A meeting agenda and subsequent meeting minutes will be distributed to all meeting participants.

Task 202 - Private Utility Locates and One-Calls:
King Surveying (King) will gather available existing utility mapping from individual utility companies and the City for the construction area. King will designate existing utilities along the work area utilizing a private utility designation firm. Utility marks provided by Colorado One-Call (811) and the surveyor's private utility company will be included in the topographical survey base mapping. Every attempt will be made to achieve SUE level B designation in accordance with ASCE 38-02 and SB 18-167. Utilities that are not field designated will be shown as mapped lines.

Task 203 - Field Topographic Survey:
Topographical survey work will be provided by our subconsultant, King Surveying.

A detailed topographical survey will be provided along the construction area. Survey will locate existing surface features (i.e. curb, gutter, edge of pavement, sidewalk, significant trees, fire hydrants, valve boxes, meter pits, manhole covers, fences, cross pans and walks and culverts, irrigation ditches and/or pipelines, signs, power poles, etc.).

Survey will locate and confirm horizontally existing located utilities (see Task 202). Utility locator markings and visible property corners along the route will be surveyed along the proposed alignment.

Task 204 - Utility Potholing:
Our test hole subconsultant (Kantex Industries) will perform SUE Level A locates of known existing utilities that will be crossed or connected to by the proposed construction to determine their location, elevation, size, material, and alignment. For the purposes of this scope, we have included fifty (50) test holes. Generally, test holes can be performed for $1100/each. If the alignment requires more utility test holes than the amount set in this scope, additional scope and fee should be included through amendment.

Task 205 - Utility Potholing Report:
Utilizing information from Tasks 202 and 203, Burns & McDonnell will develop a Utility Potholing Report summarizing the findings. Utility mapping and coordination with existing utilities will be provided in this report in addition to the pot holing results. This report will be provided to the City in PDF format.

Task 206 - Geotechnical Field Investigations and Geotechnical Reports:

Task – 1: Subsurface Investigation
Our subconsultant, Lithos, will perform a subsurface investigation for the lift station site, and both the conventional excavation, as well as the potential tunnel crossing locations. For the lift station site, Lithos will complete the following:

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- Conduct a total 2 borings within the lift station footprint.
- Extend borings to a depth of 40 feet or 20 feet into bedrock (whichever is deeper).
- Collect and test soil samples at 5-foot intervals for natural moisture content, density, grain size distribution, Atterberg limits, unconfined compressive strength, sulfates, and swell/consolidation tests, as appropriate to fully classify soil type, and to help determine bearing pressure, settlement potential, and other geotechnical conditions.

For the conventional excavation, direct bury pipeline alignment, Lithos will:

- Conduct a total 45 borings, distributed along the pipeline alignment at 1,000-foot intervals.
- Extend borings to a depth of 15 feet.
- Collect and test soil samples at 5-foot intervals for natural moisture content, grain size distribution, Atterberg limits, density, unconfined compressive strength, corrosion suite (15 samples), and swell/consolidation tests, as appropriate to fully classify soil type, and to help determine geotechnical conditions.

For the proposed trenchless crossings, Lithos will:

- Conduct a total of two borings at each crossing location for a total of 16 borings.
- The total number of crossings will be determined when the final alignment is determined. For the purposes of this proposal, eight (8) crossings are assumed, including the following locations. The final number and type of crossings can be adjusted after the final alignment is determined.
    1. South Platte River – 1 crossing
    2. Hwy 85 (CDOT ROW) – 1 crossing
    3. Weld County ROW – 4 crossings
    4. Lupton Bottom irrigation ditch – 1 crossing
    5. Brighton irrigation ditch – 1 crossing

- Conduct sampling on approximately 5-foot depth intervals using the Standard Penetration Test (SPT), the California Sampler, and collect samples at 2-foot intervals from one tunnel diameter above the anticipated tunnel crown to one tunnel diameter below the anticipated tunnel invert.
- Use rock coring techniques for eight borings (one for each tunnel) to obtain information necessary for tunneling contractors to accurately bid the work.
- Perform borehole permeability (slug) tests in the monitoring wells if ground conditions are favorable.
- Upon completion of drilling, install groundwater observation wells near each shaft location. Measure the groundwater level at the time of completion of the observation well and monthly for up to 12 months. Obtain temporary observation well permits from the State of Colorado. The State of Colorado Division of Water Resources requires that the wells be abandoned and that well abandonment reports be submitted within 18 months of installation. Lithos assumes the well abandonment and reporting will be performed by the owner.
- Test soil samples for natural moisture content, grain size distribution, Atterberg limits and swell/consolidation tests, as appropriate to fully classify soil type and other

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geotechnical conditions, including Cerchar Abrasivity testing, unconfined compressive strength and hydrometer analyses.

For all proposed borings, Lithos will perform or assume the following:

- Lithos will call UNCC utility locates for each boring location. Utility locate meet is not required.
- Standard auger and coring drilling techniques will be utilized, and the drilling work will be subcontracted to a qualified, local drilling subcontractor.
- Lithos will provide full-time oversight of drilling operations
- Lithos will measure groundwater depth at completion of drilling (if encountered).
- Lithos will obtain right-of-way permits from CDOT, and Weld County.
- Lithos will submit selected samples to a qualified laboratory for geotechnical testing.
- Burns & McDonnell will provide maps and drawings that allow Lithos to locate the pipeline alignment and tunnel locations in the field to facilitate the geotechnical borings.
- Burns & McDonnell will survey the locations of the borings after drilling and provide their locations on the drawings.
- Contaminated soil and groundwater will not be encountered. Handling and disposing of contaminated materials is not included in this scope of work.
- Coordination with an environmental subcontractor regarding environmental sampling will not be required.
- Pavement design will not be required.
- Burns & McDonnell will coordinate with private landowners for right-of-entry and any required permitting.
- Geotechnical boring locations can be accessed with a truck mounted drill rig.
- Weather will not delay site activities.
- Soil and rock samples collected during the exploratory drilling will be retained for a period of 60 days after completion of the final report and will then be disposed.
- Private utilities in the area of the proposed borings will be identified and marked by others prior to commencing our subsurface investigation. Potholing of existing utilities are excluded from our budget estimate.
- For the purpose of this proposal, 30 borings are assumed to need shoulder work traffic control.

Task – 2: Geotechnical Design Memorandum (GDM)

Lithos, Burns & McDonnell's geotechnical subconsultant, will issue a Geotechnical Design Memorandum (GDM) for the project including the following:

- Design criteria including but not limited to:
    - Appropriate foundation type, allowable bearing capacity, and sliding coefficient
    - Lateral earth pressures including active, at-rest, and passive earth pressures
    - Pipeline design recommendations
    - Subgrade conditions, excavation and preparation
- Provide construction recommendations including:
    - Temporary excavations
    - Pipe bedding
    - Construction dewatering recommendations

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- Unstable subgrade mitigation
- Bedrock or oversized material excavation
- Compaction requirements and structural backfill types
- Surface and subsurface drainage during and after construction

Task – 3: Geotechnical Data Report (GDR)

Lithos will issue a Geotechnical Data Report (GDR) for the project. The GDR will contain a summary of the field work performed, provide a Site Vicinity Map and Boring Location Plan, the boring logs, laboratory test results, groundwater elevations, data summaries, and other relevant data compiled during design. Lithos will submit a draft version of the GDR to the design team and revise once based on any comments received from the design team. The GDR becomes a contract document and is a single location for all relevant data for use by the contractor and the project team. The GDR is limited to presenting the factual results of the geologic information collected and does not contain interpretations or construction recommendations.

Task - 4: Trenchless Feasibility and EOPCC

Lithos will provide trenchless feasibility input for the potential pipeline alignments for the project including an Engineering opinion of probable construction costs (EOPCC) based on collected geotechnical data, allowable trenchless crossing methods, and our experience with projects of similar scope and complexity. The total number of crossings will be determined when the final alignment is determined. For the purposes of this proposal, eight (8) crossings are assumed, including the following locations. The final number and type of crossings can be adjusted after the final alignment is determined.

- South Platte River – 1 crossing
- Hwy 85 (CDOT ROW) – 1 crossing
- Weld County ROW – 4 crossings
- Lupton Bottom irrigation ditch – 1 crossing
- Brighton irrigation ditch – 1 crossing

Task - 5: Geotechnical Baseline Report (GBR)

Lithos will prepare a Geotechnical Baseline Report (GBR) for the project including all trenchless crossing locations. The total number of crossings will be determined when the final alignment is determined. For the purposes of this proposal, eight (8) crossings are assumed, including the following locations. The final number and type of crossings can be adjusted after the final alignment is determined.

- South Platte River – 1 crossing
- Hwy 85 (CDOT ROW) – 1 crossing
- Weld County ROW – 4 crossings
- Lupton Bottom irrigation ditch – 1 crossing
- Brighton irrigation ditch – 1 crossing

The GBR will include the following tasks:

- Prepare a single GBR that includes all project tunnels in general accordance with the 2007 guidelines published by ASCE
- Reference in the report the results of field explorations and laboratory testing
- Provide a geologic profile for each tunnel

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- Evaluate ground classification and anticipated ground behavior with respect to shaft, tunnel and trenchless technology excavation using the Tunnelmans' Classification System
- Recommend approximate staging area dimensions for shafts
- Provide a feasible tunnel construction approach for the alignment
- Baseline groundwater elevations and anticipated permeabilities/inflows (if necessary)
- Identify third party impacts and provide design and construction considerations for each shaft and tunnel

Task 207 - Forcemain Material Options Analysis and Technical Memorandum:
Burns & McDonnell will evaluate the forcemain so that pipeline material and pipe class (wall thickness) is appropriate for all portions along the pipeline. This is an important step because reducing wall thickness will greatly impact the raw pipe cost which is the single most expensive cost associated with this project. Our specification will provide tables indicating various sections of the pipeline, allowable pipeline materials, and minimum required pipe class (thickness). We will coordinate allowable pipeline materials with the City. It is expected that this pipeline would be constructed of PVC pipe (C-900), HDPE, or a combination of materials. We will work with the City and make recommendations based on design condition, lifecycle, and meeting the preferences of the City. This analysis will be presented in a Technical Memorandum.

Task 208 - Environmental Studies and Reports – Biological Survey and Threatened & Endangered Species:
Based on the results of the desktop habitat assessment, a Burns & McDonnell environmental scientist will visit the site and complete a protected species habitat assessment field survey of the route and expected contractor working areas. The findings of this evaluation will be documented in a brief letter report that would be suitable to submitting to the agencies.
If threatened/endangered species habitats are identified, the habitat limits and recommendations for future additional study will be recommended. Please note that our proposal does not include any presence/absence surveys, special status trapping, counts, etc. These services could be added through amendment as required. Pinyon will make recommendations with regards to future permitting based on the required construction and discovery of protected species habitats. If this work triggers a federal permit, this will be specifically communicated to the City.

Task 209 - Environmental Studies and Reports – Wetland Delineation:
Based on the results of the desktop review, a wetland specialist will visit the site and evaluate the route and expected contractor working areas for wetlands and other waterbodies. This field visit will verify any previous findings or discoveries through desktop analysis. The findings of this evaluation will be documented in a letter report. Wetlands and other waterbodies, when present, will be delineated with a sub-meter-accurate GPS. These GPS limits will be included into our construction drawings. Pinyon will make recommendations with regards to future permitting based on the required construction, and location of wetlands and other waterbodies. If the work triggers a federal permit, this will be specifically communicated to the City.

Task 210 - Environmental Studies and Reports – Historical and Cultural:
Based on the results of the desktop review, a cultural resources specialist will visit the site and evaluate the route and expected contractor working areas for potential impact to historical and

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cultural sites. This field visit will verify any previous findings or discoveries through desktop analysis. The findings of this evaluation will be documented in a brief memorandum. Historical and/or cultural sites, when present, will be delineated with a hand-held GPS. These GPS limits will be included into our construction drawings. Burns & McDonnell will make recommendations with regards to future permitting based on the required construction, number, size, location, and importance of historical and/or cultural finds. If the work triggers a federal permit, this will be specifically communicated to the City.

Task 211 - Environmental Studies and Reports – Jurisdictional Determinations:
Burns & McDonnell, in conjunction with Task 209 and 210, will develop jurisdiction determination requests and submit to the USACOE.

Task 212 - Environmental Studies and Reports – Raptors and Birds:
Based on the results of the desktop habitat assessment, our team will visit the site and complete a raptor/nesting bird habitat assessment field survey of the route and expected contractor working areas. The findings of this evaluation will be documented in a brief letter report that would be suitable to submitting to the agencies. If threatened/endangered species habitats are identified, the habitat limits and recommendations for future additional study will be recommended. Please note that our proposal does not include any presence/absence surveys, special status trapping, counts, etc. These services could be added through amendment as required. Pinyon will make recommendations with regards to future permitting based on the required construction and discovery of protected bird habitats. If this work triggers a federal permit, this will be specifically communicated to the City.

Task 213 - Coordination and Permitting with Jurisdictional Authorities:
There will be different agencies and jurisdictional authorities that need coordinated and with which to communicate. For the purposes of this proposal, the number of agencies and meetings is difficult to predict. For the purposes of this proposal, we have included one-hundred hours for various phone calls, meetings, etc. with interested project stakeholders.

Task 214 - CDPHE Site Application of Lift Station and Forcemains:
Burns & McDonnell will coordinate the new lift station and forcemains with the CDPHE. Our team will submit the Site Application and Basis of Design Report to the State for their review and approval. The City of Fort Lupton is responsible for the CDPHE permit fee.

Task 215 - 1041 Permitting with Weld County:
The Burns & McDonnell design and Environmental/Permitting team will work together to aggregate the information, studies, and reports required to apply for the 1041 Weld Permit. We will submit our project to the County for their approval of the project under areas and interests of the State. Our scope and fee does support the pre-application meeting, one (1) public open house meetings, and the two (2) required public hearings.

Our fee does not include:

- Drainage report
- Traffic study
- Nuisance abatement plan

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- Landscape and screening plan
- Decommissioning plan
- Emergency plan
- Noise study
- Soil report
- Application fees/costs are not included and will be paid by the City

Task 216 - 60% Forcemain and Lift Station Design Drawings:
Drawings shall be provided by Burns & McDonnell to the 60% design level. The 60% Documents shall include the following:

- Technical Specifications
- Drawings Design brought to 60% completion
  - Pipe horizontal alignment shown (plan views)
  - Pipe profiles and ground elevation will be shown
  - Property Lines Shown
  - Lift Station Civil Drawings
  - Lift Station Process Drawings
  - Lift Station Electrical +I+C Drawings
  - Lift Station Mechanical drawings
- Additional Detail drawings that are needed for final design.

Task 217 - 60% Erosion and Sediment Control Drawings:
Our team will provide 60% design level ESC drawings for the project which shall include Weld County's requirements relating to sediment and pollution controls. This will include the installation, quantity, and alignment of site-specific BMP's including inlet protection, rock socks, erosion control fence, construction fence, seeding, etc.

Task 218 - Prepare 60% Technical Specifications:
Burns and McDonnell will prepare the 60% technical specifications to describe the elements of work proposed. The technical specifications will be as detailed as possible for work to be performed, and to meet the Project Team's expectations.

Task 219 - 60% Engineer's Opinion of Probable Construction Cost:
Based on the 60% design drawings, our project team will prepare the engineer's opinion of probable construction cost and update the overall project schedule. Our cost estimate and schedule update will be submitted along with the design documents for review and comment by the City. Our estimate will be based on recent bid tabulation information, historical cost data, and discussions with local suppliers and contractors. Significant assumptions will be included for reference.

Task 220 - 60% Quality Control Reviews:
Our team will perform quality control for the plans and specifications in accordance with the Burns & McDonnell procedures. Burns & McDonnell has an established, formalized quality control program that is mandatory on all projects. A copy of our formal quality control procedures manual is available upon request.

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Task 221 - Submit 60% Design Documents:
Burns & McDonnell will finalize and formally submit 60% design documents for the City review and comment.

The Project Team will be given two weeks to review the plans and specifications prior to holding the 60% Design Review Meeting. Five half size copies of the plans will be provided to the City for review

Task 222 - 60% Design Review Meeting:
Burns & McDonnell will prepare for, attend, and conduct a design review meeting to be held with the Project Team. The 60% design shall be presented by the Consultant and reviewed in detail with the Project Team. Burns & McDonnell will provide meeting minutes with a decision log and a list of action items. Meeting minutes will be distributed via e-mail.

Task 223 - 90% Forcemain and Lift Station Design Drawings:
Plans and specifications shall be provided by Burns & McDonnell at the 90% design level. The 90% Plans shall include, at a minimum, refinement of the plans and specifications. Utility pothole information shall be incorporated into the design at this level (if not available prior to the 60% deliverable) to identify conflicting utilities. Temporary and permanent easements information, land ownership information and all design related appurtenances shall be included.

Task 224 - 90% Temporary Erosion and Sediment Control Drawings:
Our team will provide 90% design level erosion and sediment control drawings for the project which shall include Weld County's requirements relating to sediment and pollution controls. This will include the installation, quantity, and alignment of site-specific BMP's including inlet protection, rock socks, erosion control fence, construction fence, seeding, etc.

Task 225 - 90% Technical Specifications:
Burns and McDonnell will prepare the 90% technical specifications to describe the elements of work proposed. The technical specifications will be as detailed as possible for work to be performed, and to meet the Project Team's expectations. Technical specifications will be coordinated with the City's General and Special Conditions, which will be provided by the Client.

Task 226 - 90% Engineer's Opinion of Probable Construction Cost:
Based on the 90% design drawings, our project team will prepare the engineer's opinion of probable construction cost and update the overall project schedule. Our cost opinion and schedule update will be submitted along with the design documents for review and comment by the City. Our estimate will be based on recent bid tabulation information, historical cost data, and discussions with local suppliers and contractors. Significant assumptions will be included for reference.

Task 227 - 90% Quality Control Reviews:
Our team will perform quality control for the plans and specifications in accordance with the Burns & McDonnell procedures. Burns & McDonnell has an established, formalized quality

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control program that is mandatory on all projects. A copy of our formal quality control procedures manual is available upon request.

Task 228 - Submit 90% Design Documents:
Burns & McDonnell will finalize and formally submit 90% design documents to the City for review.

The Project Team will be given at least two weeks to review the plans and specifications prior to holding the 90% Design Review Meeting. Five half size copies of the plans will be provided to the City for review

Task 229 - 90% Design Review Meeting:
Burns & McDonnell will prepare for, attend, and conduct a design review meeting to be held with the Project Team. The 90% design shall be presented by the Consultant and reviewed in detail with the Project Team. Burns & McDonnell will provide meeting minutes with a decision log and a list of action items. Meeting minutes will be distributed via e-mail

Task 230 - Final Design / Bid Ready Documents:
Plans and specifications shall be completed by Burns & McDonnell at the 100% design level. Burns & McDonnell will provide the Project Team with two (2) full sized drawings, three (3) half sized drawings, and five (5) copies of the final specifications. Final documents shall also be provided in AutoCAD (version 2018 or later), Microsoft Word, and Adobe Acrobat (.pdf) formats.

Task 231 - Final Engineer's Opinion of Probable Construction Cost:
Based on the 100% design drawings, our project team will prepare the engineer's opinion of probable cost for the project. This estimate will be submitted along with the design documents for review and comment by the Project Team. Our estimate will be based on recent bid tabulation information, historical cost data, and discussions with local suppliers and contractors. Relevant and significant assumptions will be included for reference. This estimate will include a 10% contingency.

Task 232 - Easement Discussion with Property Owners:
Burns & McDonnell will work the City to identify if additional land right-of-way is needed in support of the project. The additional land would include new permanent and temporary construction easements. For the purposes of our proposal, we have included discussions with three (3) different property owners.

Our land team understands that the acquisition process can sometimes be confusing and emotional for landowners. Our team will advance landowner contacts in the spirit of good faith negotiations throughout the process. Our land team will maintain comprehensive files including daily log notes of contacts and attempted contacts with all contacted landowners.

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Task 233 - Easement Legal Descriptions and Exhibits:
Burns and McDonnell's surveying subconsultant, King Surveying, will complete up to three (3) legal descriptions for easements identified in Task 232. Legal descriptions will include the written description and be supported by an exhibit (map). Additional legal descriptions/exhibits can be provided at $900 for each.

Task 234 - Title Commitments and Land Appraisals:
Burns & McDonnell will work with a title company to procure appraisals for up to three (3) parcels along the preferred alignment. Burns & McDonnell will procure the appraisals and will pay for the reports and pass the cost through to the City in a Burns & McDonnell invoice

Task 235 - Easement Negotiations:
Burns & McDonnell's land group will conduct landowner negotiations in person whenever practicable. Our team will serve as a bridge between the City and the affected landowners and will work to address landowner questions and concerns to reach a timely settlement, agreeable to both parties. For landowners unable or unwilling to meet in person, contacts will be advanced through phone, online, or via FedEx (signature required). For the purposes of our fee, we have included easement negotiations for three (3) parcels along the preferred alignment.

Task 236 - Easement Recordings:
Burns and McDonnell will record up to three (3) legal descriptions with Weld County. Recording and title fees will be passed through to the City through a Burns & McDonnell invoice.

TASK SERIES 300 – BID PHASE SERVICES

Task 301 - Distribute Bid Documents and Keep Bidders List:
Burns and McDonnell will coordinate with the City on how the advertisement should be provided to likely Bidders/Contractors. Burns and McDonnell will then distribute the IFB Document sets to prospective contractors at the City's request. Burns and McDonnell will keep an updated plan holders list as part of this process. The plan holders list will be used to deliver addenda, send out important notices, and to support interested suppliers and subcontractors.

Task 302 - Address Bidder Questions:
Burns and McDonnell will respond to questions from Contractors during the bidding process via addendum.

Task 303 - Draft and Distribute Addenda:
Burns and McDonnell will assemble and transmit addenda information as necessary during the bidding process. The addenda will be incorporated into the Contract Documents. Based upon comments, questions, and feedback from Contractors during the bidding process, the issuance of multiple addenda may be required.

Task 304 - Prepare Agenda and Host Pre-Bid Conference:

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Burns and McDonnell will host and attend pre-bid conference to assist the Project Team in answering questions concerning the design of the project. The meeting agendas will cover important and noteworthy conditions or requirements associated with the bid and the work. We will also provide an exhibit of the overall project to present to the contractors and a meeting sign-in sheet and meeting minutes. Meeting minutes will be distributed to meeting attendees and prospective bidders.

Task 305 - Attend Bid Opening:

Burns and McDonnell will attend bid opening and assist the Project Team with the bid opening. Bid conditions including discrepancies and irregularities will be documented. Our team can help manage the collection of bidding documents.

Task 306 - Validate Bid Document for Responsiveness:

Burns & McDonnell will collect the submitted bids and evaluate each bid for conformance, completeness, and costs. Irregularities will be documented.

Task 307 - Bid Tabulation Summary:

Burns and McDonnell will compile an overall bid tabulation showing the provided bid costs in a single spreadsheet. This bid tab will help identify computational errors and uncertainties in the bid process. Irregularities will be documented.

Task 308 - Provide Recommendation for Contract Award:

Burns and McDonnell will provide formal, written Contractor recommendation for Award, which can be presented to City Council. Our recommendations will consider Contractor's qualifications, bid irregularities, value to the City, experience/reference checks, and other important considerations.

Task 309 - Deliver Conforming Drawings & Specification (IFC Documents):

Burns and McDonnell will make final revisions to the Contract Documents based on addenda issued during the Bid Phase. Burns and McDonnell will submit the "Issued For Construction" (IFC) documents to the successful contractor for use during the Construction Phase.

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City of Fort Lupton

Metro Connection - Forcemain and Lift Station Design

Work Breakdown Structure and Fee Schedule

EXHIBIT B

Activity	Project Manager		Forcemain Design		Lift Station Lead and Process		Lift Station Civil, Structural, Elect, Mechanical		Lift Station CAD and 3D Modeling		Hydraulic Analysis		Waterline CADD 1		Waterline CADD 2		Environmental		QA/QC		BMcD Total Labor		Expenses	Sub-Consultants				Total Cost
	Mike Lehrburger, PE		Mitch Bailey, EIT Kate Henske, PE		Andrew Waddoups, PE		John Kienholz, PE Nick Tessitore, PE Vamsi Patwari, PE David Olsen, PE		Kody Ellis Aryan Naweed		Nikole Rachelson, PE		Kristie Weiss		Swapnil Andhare		Angie Woehler Bob Rowe		Jason Schaefer, PE					Topographical Surveying	Geotechnical	Easements and Land Agent	Utility Potholing	
	Rate Hours	$254 Cost	Rate Hours	$192 Cost	Rate Hours	$254 Cost	Rate Hours	$198 Cost	Rate Hours	$157 Cost	Rate Hours	$252 Cost	Rate Hours	$198 Cost	Rate Hours	$131 Cost	Rate Hours	$179 Cost	Rate Hours	$254 Cost	Hours	Cost	Direct	Cost	Cost		Cost	
TASK SERIES 100 - PRELIMINARY ANALYSIS AND ROUTE SELECTION																												
101 - Conduct Project Kickoff Meeting	4	$1,016	4	$767	4	$1,016	8	$1,584		$0		$0		$0		$0		$0		$0	20	$4,383	$275					$4,659
102 - Develop and Maintain a Project Schedule	4	$1,016	4	$767	2	$508		$0		$0		$0		$0		$0		$0		$0	10	$2,291	$92					$2,383
103 - Data Collection and Review of Background Information	2	$508	4	$767		$0	2	$396		$0		$0		$0		$0		$0		$0	8	$1,671	$67					$1,738
104 - Conduct Bi-Weekly Progress Meetings (x4 Meetings)	12	$3,048	16	$3,070		$0		$0		$0		$0		$0		$0		$0		$0	28	$6,118	$445					$6,562
105 - Develop Alternative Forcemain Alignments	4	$1,016	12	$2,302		$0		$0		$0		$0	12	$2,376	10	$1,310		$0		$0	38	$7,004	$280					$7,284
106 - Create "Map Books" Showing Alignment and Critical Route Impacts	12	$3,048	40	$7,674		$0		$0		$0		$0	30	$5,940	30	$3,930		$0		$0	112	$20,592	$824					$21,416
107 - Prepare Exhibit Showing Property Lines and Land Ownership Information and Easements	2	$508	2	$384		$0		$0		$0		$0	4	$792		$0		$0		$0	8	$1,684	$67					$1,751
108 - "Paired Comparison Analysis" to Evaluate Forcemain Alignments	8	$2,032	50	$9,593		$0		$0		$0		$0		$0	10	$1,310		$0		$0	68	$12,935	$517					$13,452
109 - Initial Hydraulic Analysis - Lift Station Sizing and Diameter Selection	2	$508	2	$384		$0	2	$396		$0	30	$7,560		$0		$0		$0		$0	36	$8,848	$354					$9,202
110 - Develop Engineer's Opinion of Probable Construction Cost for Each Alignment	2	$508	4	$767	4	$1,016		$0		$0		$0		$0	10	$1,310		$0		$0	20	$3,601	$144					$3,745
111 - Develop Preliminary Design Report for Forcemain and Lift Station	8	$2,032	40	$7,674	20	$5,080	40	$7,920	20	$3,140	2	$504	4	$792	10	$1,310	2	$358	2	$508	148	$29,318	$1,173					$30,491
112 - Desktop Environmental Review - Biological Survey + Threatened and Endangered Species	2	$508	1	$192		$0		$0		$0		$0		$0		$0	8	$1,432		$0	11	$2,132	$85					$2,217
113 - Desktop Environmental Review - Wetland Delineation	2	$508	1	$192		$0		$0		$0		$0		$0		$0	8	$1,432		$0	11	$2,132	$85					$2,217
114 - Desktop Environmental Review - Historical and Cultural	2	$508	2	$384		$0		$0		$0		$0		$0		$0	8	$1,432		$0	12	$2,324	$93					$2,417
115 - Desktop Environmental Review - Jurisdictional Determinations	2	$508	1	$192		$0		$0		$0		$0		$0		$0	8	$1,432		$0	11	$2,132	$85					$2,217
116 - Desktop Environmental Review - Raptors and Birds	2	$508	1	$192		$0		$0		$0		$0		$0		$0	8	$1,432		$0	11	$2,132	$85					$2,217
117 - Final Recommendation of Alignment and Letter to Council	2	$508	2	$384	2	$508		$0		$0		$0		$0		$0		$0		$0	6	$1,400	$56					$1,456
118 - Present Alignment Selection, Schedule, Engineer's Opinion of Construction Cost to Council	4	$1,016	8	$1,535	4	$1,016	8	$1,584		$0		$0		$0		$0		$0		$0	24	$5,151	$606					$5,757
Sub-Total Series 600	**76**	**$19,304**	**194**	**$37,219**	**36**	**$9,144**	**60**	**$11,880**	**20**	**$3,140**	**32**	**$8,064**	**50**	**$9,900**	**70**	**$9,170**	**42**	**$7,518**	**2**	**$508**	**582**	**$115,847**	**$5,334**	**$0**	**$0**		**$0**	**$121,181**
TASK SERIES 200 - DESIGN																												
201 - Conduct Bi-Weekly Progress Meetings (x20 Meetings)	30	$7,620	40	$7,674	20	$5,080	40	$7,920		$0		$0		$0		$0		$0	4	$1,016	134	$29,310	$1,172					$30,482
202 - Private Utility Locates and One-Calls		$0	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	2	$384	$15	$14,300				$14,699
203 - Field Topographic Survey	2	$508	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	4	$892	$36	$144,320				$145,247
204 - Utility Potholing (x50 potholes) **(1)**	2	$508	6	$1,151		$0		$0		$0		$0		$0		$0		$0		$0	8	$1,659	$66				$60,500	$62,225
205 - Utility Potholing Report	2	$508	40	$7,674		$0		$0		$0		$0		$0		$0		$0		$0	42	$8,182	$327					$8,509
206 - Geotechnical Field Investigations and Geotechnical Reports	2	$508	2	$384	2	$508	2	$396		$0		$0		$0		$0		$0		$0	8	$1,796	$72		$192,500			$194,368
207 - Forcemain Material Options Analysis and Technical Memorandum	2	$508	18	$3,453		$0		$0		$0		$0		$0		$0		$0		$0	20	$3,961	$158					$4,120
208 - Environmental Studies and Reports - Biological Survey + Threatened and Endangered Species	1	$254	2	$384		$0		$0		$0		$0		$0		$0	300	$53,700		$0	303	$54,338	$2,174					$56,511
209 - Environmental Studies and Reports - Wetland Delineation	1	$254	2	$384		$0		$0		$0		$0		$0		$0	60	$10,740		$0	63	$11,378	$455					$11,833
210 - Environmental Studies and Reports - Historical and Cultural **(9)**	1	$254	2	$384		$0		$0		$0		$0		$0		$0	170	$30,430		$0	173	$31,068	$1,243					$32,310
211 - Environmental Studies and Reports - Jurisdictional Determinations **(9)**	1	$254	2	$384		$0		$0		$0		$0		$0		$0	50	$8,950		$0	53	$9,588	$384					$9,971
212 - Environmental Studies and Reports - Raptors and Birds	1	$254	2	$384		$0		$0		$0		$0		$0		$0	20	$3,580		$0	23	$4,218	$169					$4,386
213 - Coordination and Permitting with Jurisdictional Agencies (County, Etc.)	6	$1,524	30	$5,756	12	$3,048	8	$1,584		$0		$0		$0		$0	44	$7,876		$0	100	$19,788	$792					$20,579
214 - CDPHE Site Application for Lift Station and Force Mains **(E2)**	4	$1,016		$0	100	$25,400	90	$17,820		$0		$0		$0		$0		$0		$0	194	$44,236	$3,769					$48,005
215 - 1041 Permitting with County	4	$1,016	30	$5,756		$0		$0		$0		$0		$0		$0	920	$164,680		$0	954	$171,452	$8,858					$180,310
216 - 60% Forcemain and Lift Station Design Drawings	80	$20,320	360	$69,066	140	$35,560	560	$110,880	180	$28,260		$0	340	$67,320	100	$13,100		$0		$0	1760	$344,506	$13,780					$358,286
217 - 60% Temporary Erosion and Sediment Control Drawings	6	$1,524	30	$5,756		$0		$0		$0		$0	40	$7,920	28	$3,668		$0		$0	104	$18,868	$755					$19,622
218 - 60% Technical Specifications	12	$3,048	40	$7,674	20	$5,080	60	$11,880		$0		$0		$0		$0	10	$1,790		$0	142	$29,472	$1,179					$30,651
219 - 60% Engineer's Opinion of Probable Construction Cost	2	$508	4	$767	4	$1,016	6	$1,188		$0		$0		$0		$0		$0	2	$508	18	$3,987	$159					$4,147
220 - 60% Quality Control Reviews	2	$508		$0	6	$1,524	6	$1,188		$0		$0		$0		$0		$0	20	$5,080	34	$8,300	$332					$8,632
221 - Submit 60% Design Documents		$0	2	$384		$0	2	$396	2	$314		$0	2	$396		$0		$0		$0	8	$1,490	$60					$1,549
222 - 60% Design Review Meeting	4	$1,016	4	$767	4	$1,016	12	$2,376		$0		$0		$0		$0		$0		$0	24	$5,175	$257					$5,432
223 - 90% Forcemain and Lift Station Design Drawings	80	$20,320	260	$49,881	120	$30,480	560	$110,880		$0		$0	320	$63,360	100	$13,100		$0		$0	1440	$288,021	$11,521					$299,542
224 - 90% Temporary Erosion and Sediment Control Drawings	2	$508	16	$3,070		$0	4	$792		$0		$0	24	$4,752	12	$1,572		$0		$0	58	$10,694	$428					$11,121
225 - 90% Technical Specifications	10	$2,540	20	$3,837		$0	30	$5,940		$0		$0		$0		$0	10	$1,790		$0	70	$14,107	$564					$14,671
226 - 90% Engineer's Opinion of Probable Construction Cost	2	$508	2	$384		$0	4	$792		$0		$0		$0		$0		$0		$0	8	$1,684	$67					$1,751
227 - 90% Quality Control Reviews		$0	2	$384		$0	12	$2,376		$0		$0		$0		$0		$0	20	$5,080	34	$7,840	$314					$8,153
228 - Submit 90% Design Documents		$0	2	$384		$0	4	$792		$0		$0	4	$792		$0		$0		$0	10	$1,968	$427					$2,394
229 - 90% Design Review Meeting	4	$1,016	4	$767		$0	12	$2,376		$0		$0		$0		$0		$0		$0	20	$4,159	$166					$4,326
230 - Final Design / Bid Ready Documents	6	$1,524	80	$15,348	30	$7,620	200	$39,600		$0		$0	80	$15,840	60	$7,860		$0		$0	456	$87,792	$2,809					$90,601
231 - Final Engineer's Opinion of Probable Construction Cost	1	$254	1	$192		$0		$0		$0		$0		$0		$0		$0		$0	2	$446	$18					$464
232 - Easement Discussion with Property Owners (x3 easements)	1	$254	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	3	$638	$26					$10,563
233 - Easement Legal Descriptions and Exhibits (x3 easements)	1	$254	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	3	$638	$26					$9,243
234 - Title Commitments and Land Appraisals (x3 easements)	1	$254	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	3	$638	$26					$18,863
235 - Easement Negotiations (x3 easements)	1	$254	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	3	$638	$26					$13,863
236 - Easement Exhibits and Descriptions (only) (x3 easements)	1	$254	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	3	$638	$26	$5,610				$7,208
232 - Easement Recordings (x3 easements)	1	$254	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	3	$638	$26					$3,963
Sub-Total Series 700	**276**	**$70,104**	**1019**	**$195,495**	**458**	**$116,332**	**1612**	**$319,176**	**182**	**$28,574**	**0**	**$0**	**810**	**$160,380**	**300**	**$39,300**	**1584**	**$283,536**	**46**	**$11,684**	**6287**	**$1,224,581**	**$52,678**	**$164,230**	**$192,500**		**$54,115**	**$60,500**	**$1,748,604**
TASK SERIES 300 - BID PHASE SERVICES																												
301 - Distribute Bid Documents and Keep Bidders List		$0	2	$384		$0	2	$396		$0		$0		$0		$0		$0		$0	4	$780	$31					$811
302 - Address Bidder Questions	2	$508	32	$6,139		$0	30	$5,940		$0		$0		$0		$0		$0		$0	64	$12,587	$503					$13,091
303 - Draft and Distribute Addenda		$0	2	$384		$0	4	$792	10	$1,570		$0	20	$3,960		$0		$0		$0	36	$6,706	$268					$6,974
304 - Prepare Agenda and Host Pre Bid Conference	2	$508	4	$767		$0	6	$1,188		$0		$0		$0		$0		$0		$0	12	$2,463	$99					$2,562
305 - Attend Bid Opening	2	$508		$0		$0	2	$396		$0		$0		$0		$0		$0		$0	4	$904	$136					$1,040
306 - Validate Bid Document for Responsiveness	2	$508	1	$192		$0	2	$396		$0		$0		$0		$0		$0		$0	5	$1,096	$44					$1,140
307 - Bid Tabulation Summary		$0	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	2	$384	$15					$399
308 - Provide Recommendation for Contract Award	2	$508	2	$384		$0		$0		$0		$0		$0		$0		$0		$0	4	$892	$36					$927
309 - Deliver Conforming Drawings & Specification (IFC Documents)		$0	2	$384		$0		$0		$0		$0	2	$396		$0		$0		$0	4	$780	$31					$811
Sub-Total Series 300	**10**	**$2,540**	**47**	**$9,017**	**0**	**$0**	**46**	**$9,108**	**10**	**$1,570**	**0**	**$0**	**22**	**$4,356**	**0**	**$0**	**0**	**$0**	**0**	**$0**	**135**	**$26,591**	**$1,164**	**$0**	**$0**		**$0**	**$27,755**
Project Total	**362**	**$91,948**	**1260**	**$241,731**	**494**	**$125,476**	**1718**	**$340,164**	**212**	**$33,284**	**32**	**$8,064**	**882**	**$174,636**	**370**	**$48,470**	**1626**	**$291,054**	**48**	**$12,192**	**7004**	**$1,367,019**	**$59,176**	**$164,230**	**$192,500**	**$54,115**	**$60,500**	**$1,897,540**

Notes:

1. Our fee includes the potholing of 50 existing utilities. Additional potholes can be provided for $1100 each.
2. All subconsultant work will be marked up 10% on our direct costs. These markups are already included in our presented fee.
3. The services of contract/agency and/or any personnel of a Burns & McDonnell subsidiary or affiliate shall be billed to Owner according to the rate sheet as if such personnel is a direct employee of Burns & McDonnell.
4. The rates shown above are effective for services through December 31, 2022, and are subject to revision thereafter.

Exclusions:

E1. Our fee does not include any cathodic protection because we expect that the force main(s) will be constructed of PVC or HDPE (non metallic).

E2. The City of Fort Lupton is responsible for direct payment of the CDPHE Review Fee.

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Force Main and Lift Station
Conceptual Design Estimate
25-Oct-21

Project Component	Engineer's Opinion of Probable Construction Cost
20" Forcemain ~ 8 Miles	$21,908,200
Lift Station (Retrofit at Existing WWTP)	$2,992,262
Various Demolition at Existing WWTP	$200,000
Total	**$25,100,462**

“Burns & McDonnell’s estimates, analyses, and recommendations contained in this EOPCC are based on professional experience, qualifications, and judgment. Burns & McDonnell has no control over weather; cost and availability of labor, material, and equipment; labor productivity; energy or commodity pricing; demand or usage; population demographics; market conditions; changes in technology; and other economic or political factors affecting such estimates, analyses, and recommendations. Therefore, Burns & McDonnell makes no guarantee or warranty (actual, expressed, or implied) that actual results will not vary, perhaps significantly, from the estimates, analyses, and recommendations contained herein.”

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City of Fort Lupton

Force Main (based on an alignment along County Road 23 ~8.3 miles)

ENGINEER'S PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST (EOPCC)

0% Design - Conceptual EOPCC

Description	Unit	Quantity	Unit Cost	Total Cost
DIVISION 1 - GENERAL REQUIREMENTS				
General Requirements				
Mobilization (1)	LS	1	$473,700	$473,700
Contract Bonds and Insurance (2)	LS	1	$315,800	$315,800
Traffic Control (3)	LS	1	$789,500	$789,500
Conformance with Sediment and Erosion Control (5)	LS	1	$157,900	$157,900
			Subtotal Division 1	**$1,736,900**
DIVISION 31 - EARTHWORK				
Trenching and Backfilling for Utilities				
CLSM Cut Off Wall (6)	EA	44	$2,500	$110,000
Trench Stabilization Material (7)	TON	830	$80	$66,400
Dewatering (8)	LS	1	$140,400	$140,400
CLSM as Backfill Material (9)	CY	120	$120	$14,400
Underground Utility Line Crossing (10)	EA	84	$1,000	$84,100
			Subtotal Division 31	**$415,300**
DIVISION 32 - EXTERIOR IMPROVEMENTS				
Surface Restoration				
Asphalt Surface Restoration (11)	TON	4,700	$250	$1,175,000
Pavement Markings (12)	LS	1	$23,600	$23,600
Concrete Surface Restoration (13)	SF	0	$17	$0
Seeding and Surface Restoration (14)	LS	1	$140,000	$140,000
			Subtotal Division 32	**$1,338,600**
DIVISION 33 - UTILITIES				
Open Cut Installations				
20-inch Restrained PVC Force Main (15)	LF	14,948	$290	$4,335,000
20-inch Unrestrained PVC Force Main	LF	29,116	$240	$6,987,900
Trenchless Installations				
36-inch Casing via Auger Bore at Critical Crossings (16)	LF	780	$1,900	$1,482,000
Utility Valves and Accessories				
Combination Air/Vacuum Valve and Vault (17)	EA	18	$17,500	$315,000
20-inch Plug Valve with cleanouts in Vault (18)	EA	9	$65,000	$585,000
Marker Post Test Station (19)	EA	116	$850	$98,600
Connections				
Connection to Lift Station Piping	LS	1	$25,000	$25,000
Connection to Piping at Metro	LS	1	$75,000	$75,000
Testing, Startup, and Commissioning				
Filling, Hydrostatic Testing, and Commissioning	LF	44,064	$3	$132,200
			Subtotal Division 33	**$14,035,700**
Construction Subtotal				**$17,526,500**
Contingency (25%)				$4,381,700
Estimated Construction Cost				**$21,908,200**

Notes and Assumptions:

(1) Mobilization is indicated at 3.0% of the Division 31, 32 and 33 Subtotals.

(2) Bonds and Insurance is indicated at 2.0% of the Division 31, 32, and 33 Subtotals.

(3) Traffic Control is indicated at 5.0% of the Division 31, 32, and 33 Subtotals.

(4) Rock is not expected to be encountered. As such, no costs for rock removal and handling is included in this estimate.

(5) Conformance with Sediment and Erosion Control is indicated at 1.0% of the Division 31, 32, and 33 Subtotals.

(6) A CLSM Cut Off Wall is indicated for every 1,000-LF of force main.

(7) Trench Stabilization Material is based on installing 6-inches of rock for 10% of the total open cut force main footage for a 5 foot (average) trench width. Stabilization material is assumed to weigh 150 lb/CF.

(8) Dewatering is assumed at 1.0% of the Division 33 Subtotal.

(9) CLSM as Backfill Material is indicated at 1.0% of open cut force main installation within the roadway (6-feet in width, 8-feet in depth).

(10) Underground Utility Line Crossings assumed to be 10 per mile.

(11) Asphalt Surface Restoration based on a width of 6-feet and depth of 12-inches for all disturbed asphalt pavement. Asphalt paving material is assumed to weigh 145 lb/CF. It is assumed that one quarter of the alignment will require asphalt surface restoration.

(12) Pavement Markings are based at 2.0% of the Asphalt Surface Restoration and total costs.

(13) Concrete Surface Restoration is from slab-to-slab at a width of 10-feet.

(14) Seeding and Surface Restoration is 1.0% of the Division 33 Subtotal.

(15) 20-inch Restrained PVC Force Main is assumed to be 33.3% of total 20-inch force main.

(16) 36-inch Traditional Auger Bore is assumed for crossing South Platte River, Weld County Roads (6), Ditches(2), and Dry Creek

(17) Combination Air/Vacuum Valve and Vault is assumed for every 2,500-LF of open cut installation.

(18) 20-inch Plug Valve with clean out in Vault is assumed for every 5,200-LF of open cut installation.

(19) Marker Post Test Station is assumed for every 500-LF of open cut installation and each utility valve and accessory.

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City of Fort Lupton

Lift Station from WWTP to Metro (Retrofit existing WWTP Site)

ENGINEER'S PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST (EOPCC)

0% Design - Conceptual EOPCC

Description	Unit	Quantity	Unit Cost	Total Cost	Subtotal
GENERAL					
Testing	LS	1	$ 15,000	$ 15,000	
Asphalt Paving Repair	LS	1	$ 30,000	$ 30,000	
Incidental Site Work	LS	1	$ 100,000	$ 100,000	
Landscape/Seeding/Sodding	LS	1	$ 5,000	$ 5,000	
Subtotal					**$ 150,000**
WET WELL RETROFIT					
Gates	EA	4	$ 7,000	$ 28,000	
Piping	LS	1	$ 50,000	$ 50,000	
Demolition	LS	1	$ 50,000	$ 50,000	
Concrete	LS	1	$ 200,000	$ 200,000	
Pipe Hangars & Supports	LS	1	$ 15,000	$ 15,000	
Miscellaneous Metals	LS	1	$ 5,000	$ 5,000	
General Rough Carpentry	LS	1	$ 5,000	$ 5,000	
Caulking/Sealant	LS	1	$ 5,000	$ 5,000	
Subtotal					**$ 358,000**
INFLUENT LIFT STATION BUILDING					
Pumps	EA	4	$ 60,000	$ 240,000	
Valves	EA	12	$ 8,000	$ 96,000	
Flow Meter	EA	1	$ 25,000	$ 25,000	
Piping	LS	1	$ 200,000	$ 200,000	
Demolition	LS	1	$ 50,000	$ 50,000	
Concrete	LS	1	$ 100,000	$ 100,000	
Pipe Hangars & Supports	LS	1	$ 20,000	$ 20,000	
Miscellaneous Metals	LS	1	$ 10,000	$ 10,000	
General Rough Carpentry	LS	1	$ 40,000	$ 40,000	
Sheet Metal Flashing and Trim	LS	1	$ 8,000	$ 8,000	
Caulking/Sealant	LS	1	$ 6,000	$ 6,000	
Painting	LS	1	$ 20,000	$ 20,000	
Subtotal					**$ 815,000**
DIVISION 15					
Mechanical					
Mechanical - (HVAC, Plumbing, Fire Protection)	LS	1	$ 100,000	$ 100,000	
Subtotal					**$ 100,000**
DIVISION 16					
Electrical					
General Electrical and Instrumentation Equipment	%		25.00%	$ 444,688	
Backup Generator	LS	1	$ 100,000	$ 100,000	
Subtotal					**$ 544,688**
Materials & Labor Subtotal				$ 1,967,688	**$ 1,967,688**
General Conditions (11%)			11.00%		$ 216,446
Subtotal					$ 2,184,133
Contractors Fee (12%)			12.00%		$ 262,096
Contingency/Unaccounted for items (25%)			25.00%		$ 546,033
Total					**$ 2,992,262**

Notes:

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-176

APPROVE CHANGES TO EMPLOYEE BENEFIT PLANS FOR A TOTAL COST OF $1,108,124.55 PER YEAR

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments:
a. GBS January 2022 Effective City of Fort Lupton Comparison of Benefits
b. Cost share alternatives

III. Summary Statement:

The following employee insurance benefits are currently on a policy year that runs from January 1st to December 31st. The various benefits up for renewal are

- *Medical*
- *Health Reimbursement Arrangement (HRA)*
- *Vision*
- *Employee Assistance Program (EAP)*
- *Dental*
- *Flexible Spending Accounts*
- *COBRA Administration*

The following benefits are not up for renewal:

- *Group life and accidental death and dismemberment (AD&D)*
- *Voluntary life and accidental death and dismemberment (AD&D)*
- *Group long-term disability (LTD)*
- *Voluntary short-term disability (STD)*

Costs for all benefits have been included in the totals at the end.

IV. Submitted by: _____
Laura Howe, HR Director

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed _____ Approved _____ Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

The City marketed the medical benefit for the 2022 plan year through our benefits broker, GBS Benefits. The City received quotes from our current provider, Humana, and several insurance carriers for different types of products, fully insured options and level funded options.

After negotiating options, Humana has offered a 9.5% total increase. Staff is recommending that the City stay with Humana for several reasons including, 1) the option that is less expensive does not offer the same benefits, 2) the disruption associated with changing carriers is significant and 3) the other options do not include a robust wellness program like we currently have. In staying with the Humana, the medical benefits will remain the same.

The health plan represents the majority of the benefit costs for the City. Based on current enrollment, the total cost for the plan will be $994,179.36 for 2022, an increase of $86,289.72 over 2021 costs, based on current enrollment.

Staff is proposing that Council consider a benefit enhancement in increasing the cost share percentage for the employee and dependent premiums. This will help to make Fort Lupton's benefits more competitive compared to other governmental entities, which will aid in employee retention and recruitment.

The premium cost share for the PPO plan:

	City portion	***Employee portion***
Employee only	*85%*	*15%*
Dependents	*50%*	*50%*

The premium cost share for the HDHP/HSA plan is as follows:

	City portion	***Employee portion***
Employee only	*85% + $50*	*15% - $50 discount*
Dependents	*50% + $75*	*50% - $75 discount*

It is important to distinguish that HDHP/HSA plan participants often have higher out of pocket expenses, so they are not necessarily receiving a richer benefit than PPO plan participants. In addition to the premium share, the City contributes $100 per month to the employee's HSA and $150 per month to the HSA if they are covering dependents

Staff is proposing a change as follows:

	City portion	***Employee portion***
Employee only	*87%*	*13%*
Dependents	*55%*	*55%*

The premium cost share for the HDHP/HSA plan is as follows:

	City portion	***Employee portion***
Employee only	*87% + $50*	*13% - $50 discount*
Dependents	*55% + $75*	*55% - $75 discount*

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Staff is not proposing any change to the HSA contribution.

Based on the new premiums for 2022, by tier this is equivalent to the following:

	City portion	Monthly cost	Employee portion	Monthly cost
Employee only	87.00%	$561.62	13.00%	$ 83.92
Employee + spouse	71.40%	$899.26	28.60%	$360.18
Employee + child(ren)	72.35%	$861.27	27.65%	$329.10
Employee + family	66.45%	$1,198.93	33.55%	$605.34

By tier, this is equivalent to the following:

	City portion	Monthly cost	Employee portion	Monthly cost
Employee only	95.14%	$ 584.63	4.86%	$ 29.88
Employee + spouse	77.66%	$ 931.04	22.34%	$267.86
Employee + child(ren)	78.97%	$ 894.87	21.03%	$238.28
Employee + family	70.82%	$1,216.30	29.18%	$501.24

The result of these changes is that the City will be absorbing the entirety of the cost increase for 2022 plus $6,829.71 for a total of $93,119.43. More detail on this change is illustrated in the cost share alternatives attachment.

HEALTH REIMBURSEMENT ARRANGEMENT – NATIONAL BENEFIT SERVICES (NBS):
NBS has not increased the rates for the administration of the plan. The cost will continue to be $3.05 per covered employee per month. Based on current enrollment, the total estimated cost for the plan will be $3,220.80 for 2022. This does not include the cost of HRA reimbursements. The benefits will remain the same.

HUMANA – VISION INSURANCE:
The City marketed the vision benefit for the 2022 plan year through our benefits broker, GBS Benefits. The City received quotes from our current provider, Humana, and several insurance carriers. After evaluating the options, staff is recommending that the City change carriers to Ameritas. They are offering a 7.36% decrease over our current rates. Based on current enrollment, the total estimated cost for the plan will be $9,336.00 for 2022. There is a benefit enhancement to lower the copay for vision exams in 2022.

HUMANA – EMPLOYEE ASSISTANCE PROGRAM:
There is an increase from Humana for the EAP rates. This benefit is available to all full-time and part-time employees. The cost is changing from $0.66 per employee per month to $0.70 per employee per month, an increase of 6.06%. The total annual cost, based on current enrollment, is equivalent to $739.20 per year. There are no changes to the benefits for 2022. The City did review other options, but staff is recommending staying with Humana since this benefit often pairs with the medical plan and the cost is modest.

HUMANA – DENTAL INSURANCE:
The City marketed the vision benefit for the 2022 plan year through our benefits broker, GBS Benefits. The City received quotes from our current provider, Humana, and several insurance carriers. After evaluating the options, staff is recommending that the City change carriers to Ameritas. They are offering a 9.99% decrease over our current rates. They also offer a larger network of providers. Based on current enrollment, the total estimated cost for the plan will be $65,100.48 for 2022. There are no changes to the benefits for 2022.

FLEXIBLE SPENDING ACCOUNTS (FSA) – NATIONAL BENEFIT SERVICES (NBS):

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NBS has not increased the rates for the administration of the plans. The administrative costs for the FSA plans have not changed. The cost will be $3.05 per covered employee per month plus monthly and annual fees for the use of flexible spending account cards. Based on current enrollment, the total estimated cost for the plan will be $928.20 for 2022. The benefits will remain the same.

COBRA ADMINISTRATION – GBS BENEFITS
There are no administrative costs for COBRA Administration, as this is handled as a value-added service by our employee benefits broker, GBS Benefits.

X. Legal/Political Considerations:

None.

XI. Alternatives/Options:

1. *Approve or not approve the renewals for health, health reimbursement arrangement, employee assistance program (EAP), flexible spending accounts, and COBRA administration.*
2. *Approve or not approve the cost share changes for the medical benefit*
3. *Approve or not approve the change of insurance carrier for the vision and dental benefits.*

XII. Financial Considerations:

The following is a summary of the financial impact changes for each Plan:

	% increase	Annual cost change	Total monthly cost	Annual cost
Medical	9.50%	$ 86,289.72	$ 82,848.28	$ 994,179.36
Cost share change		$ 6,829.71	$ 569.14	$ 6,829.71
HRA	0.00%	$ -	$ 268.40	$ 3,220.80
Vision	-7.36%	$ (742.08)	$ 778.00	$ 9,336.00
EAP	6.06%	$ 42.24	$ 61.60	$ 739.20
Dental	-9.99%	$ (7,229.28)	$ 5,425.04	$ 65,100.48
FSA	0.00%	$ -	$ 51.85	$ 928.20
COBRA	0.00%	$ -	$ -	$ -
Gr Life & ADD	0.00%	$ -	$ 1,116.00	$ 13,392.00
Group LTD	0.00%	$ (2,215.00)	$ 1,199.90	$ 14,398.80
Total:		**$ 82,975.31**	**$ 92,318.21**	**$ 1,108,124.55**

Voluntary Life & Accidental Death and Dismemberment and Voluntary Short Term Disability costs have not been included in the total. These benefits are 100% employee paid.

These costs changes are based on current enrolment and will change as head counts or participation increases or decreases.

XIII. Staff Recommendation:

Staff recommends approving all options as described in Alternatives/Options above.

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GBS
A Leavitt Group Company

January 2022 Effective

City of Fort Lupton

Comparison of Benefits

Elizabeth Fineberg
Benefits Consultant
elizabeth.fineberg@gbsbenefits.com
(720) 864-1892

Kaye Pyle
Account Manager
kaye.pyle@gbsbenefits.com
(720) 864-1890

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Comparison of Benefits

Medical

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City of Fort Lupton

Medical Summary

Carrier	Plan	Monthly Premium	Annual Premium	Annual Increase	Percent of Increase
Humana FI	TOTAL CURRENT	$75,657.47	$907,889.64	–	–
Humana FI	TOTAL RENEWAL	$91,374.96	$1,096,499.52	$188,609.88	20.77%
Humana FI	TOTAL APPEALED RENEWAL	$82,848.28	$994,179.36	$86,289.72	9.50%
Humana FI	CURRENT HSA	$45,587.85	$547,054.20		
Humana FI	CURRENT COPAY	$30,069.62	$360,835.44		
Anthem LF	ABF ANTHEM HSA PPO	$50,935.04	$611,220.48	$64,166.28	11.73%
Anthem LF	ABF ANTHEM PPO COPAY	$37,481.38	$449,776.56	$88,941.12	24.65%
Kaiser FI	KAISER HSA	$40,232.84	$482,794.08	-$64,260.12	-11.75%
Kaiser FI	KAISER COPAY	$28,619.16	$343,429.92	-$17,405.52	-4.82%
Anthem FI	ANTHEM HSA 6350	$45,016.73	$540,200.76	-$6,853.44	-1.25%
Anthem FI	ANTHEM COPAY 5000	$36,969.68	$443,636.16	$82,800.72	22.95%
Cigna LF - DTQ					
Cigna FI - DTQ					
Aetna LF - DTQ					
Aetna FI - DTQ					
UHC FI - DTQ					
UHC LF - DTQ					
GBS Captive - NE					

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City of Fort Lupton

Medical Comparison

		Humana				Humana				Humana			
		NPOS 16 80% 5000		NPOS 16 100% 5000 HDHP		NPOS 16 80% 5000		NPOS 16 100% 5000 HDHP		NPOS 16 80% 5000		NPOS 16 100% 5000 HDHP	
		In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network
Individual Deductible		$5,000	$15,000	$5,000	$15,000	$5,000	$15,000	$5,000	$15,000	$5,000	$15,000	$5,000	$15,000
Family Deductible		$10,000	$30,000	$10,000	$30,000	$10,000	$30,000	$10,000	$30,000	$10,000	$30,000	$10,000	$30,000
Individual Out-of-Pocket Max		$6,500	$19,500	$5,000	$17,500	$6,500	$19,500	$5,000	$17,500	$6,500	$19,500	$5,000	$17,500
Family Out-of-Pocket Max		$13,000	$39,000	$10,000	$35,000	$13,000	$39,000	$10,000	$35,000	$13,000	$39,000	$10,000	$35,000
Deductible / Out-of-Pocket Embedded		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coinsurance		80%	50%	100%	70%	80%	50%	100%	70%	80%	50%	100%	70%
Physician Services													
Office Visits	Office Visits PCP	$30	50% AD	0% AD	30% AD	$30	50% AD	0% AD	30% AD	$30	50% AD	0% AD	30% AD
	Specialists	$55	50% AD	0% AD	30% AD	$55	50% AD	0% AD	30% AD	$55	50% AD	0% AD	30% AD
	Preventive Care	No Charge	50% AD	0% AD	30% AD	No Charge	50% AD	0% AD	30% AD	No Charge	50% AD	0% AD	30% AD
	Diagnostic Lab / X-Ray	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD
	Imaging (MRI, CT, PET Scans)	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD
Hospital Services													
	Inpatient Hospital Services	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD
	Outpatient Surgery in Hospital	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD	20% AD	50% AD	0% AD	30% AD
Emergency Services													
	Emergency Room	$250		0% AD		$250		0% AD		$250		0% AD	
	Urgent Care	$75	50% AD	0% AD	30% AD	$75	50% AD	0% AD	30% AD	$75	50% AD	0% AD	30% AD
Prescription Drugs													
Retail	Deductible	None		Medical Deductible Applies		None		Medical Deductible Applies		None		Medical Deductible Applies	
	Tier 1	$10		0% AD		$10		0% AD		$10		0% AD	
	Tier 2	$40		0% AD		$40		0% AD		$40		0% AD	
	Tier 3	$70		0% AD		$70		0% AD		$70		0% AD	
	Tier 4	25% AD		0% AD		25% AD		0% AD		25% AD		0% AD	
Monthly Rates		CURRENT				RENEWAL				APPEALED RENEWAL			
51	Employee	17	$589.51	34	$561.17	17	$711.98	34	$677.75	17	$645.54	34	$614.51
15	Employee + Spouse	6	$1,150.13	9	$1,094.85	6	$1,389.07	9	$1,322.29	6	$1,259.44	9	$1,198.90
10	Employee + Child(ren)	3	$1,087.05	7	$1,034.80	3	$1,312.88	7	$1,249.77	3	$1,190.37	7	$1,133.15
12	Family	6	$1,647.67	6	$1,568.47	6	$1,989.97	6	$1,894.32	6	$1,804.27	6	$1,717.54
88	**TOTAL BY PLAN**	32	$30,069.62	56	$45,587.85	32	$36,316.54	56	$55,058.42	32	$32,927.55	56	$49,920.73
TOTAL MONTHLY ALL EMPLOYEES		$75,657.47				$91,374.96				$82,848.28			
ANNUAL ALL EMPLOYEES		$907,889.64				$1,096,499.52				$994,179.36			
TOTAL COST PER EMPLOYEE PER YEAR		$10,316.93				$12,460.22				$11,297.49			
Percent of Increase						**20.77%**				**9.50%**			

Benefits illustrated in summary for comparison purposes only. Please refer to the carrier plan document for further plan details.

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City of Fort Lupton

Medical Comparison

		Humana		Anthem Level Funded		Humana		Anthem Level Funded	
		NPOS 16 100% 5000 HDHP		ABF HSA HDHP 24E		NPOS 16 80% 5000		Blue Classic PPO BC28	
		In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network
	Individual Deductible	$5,000	$15,000	$5,000	$5,000	$5,000	$15,000	$5,000	$15,000
	Family Deductible	$10,000	$30,000	$10,000	$10,000	$10,000	$30,000	$10,000	$30,000
	Individual Out-of-Pocket Max	$5,000	$17,500	$5,000	$15,000	$6,500	$19,500	$7,000	$21,000
	Family Out-of-Pocket Max	$10,000	$35,000	$10,000	$30,000	$13,000	$39,000	$14,000	$42,000
	Deductible / Out-of-Pocket Embedded	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Coinsurance	100%	70%	100%	70%	80%	50%	70%	50%
Physician Services									
Office Visits	Office Visits PCP	0% AD	30% AD	0% AD	30% AD	$30	50% AD	$30	50% AD
Office Visits	Specialists	0% AD	30% AD	0% AD	30% AD	$55	50% AD	$60	50% AD
Office Visits	Preventive Care	No Charge	30% AD	No Charge	30% AD	No Charge	50% AD	No Charge	50% AD
	Diagnostic Lab / X-Ray	0% AD	30% AD	0% AD	30% AD	20% AD	50% AD	No Charge	50% AD
	Imaging (MRI, CT, PET Scans)	0% AD	30% AD	0% AD	30% AD	20% AD	50% AD	30% AD	50% AD
Hospital Services									
	Inpatient Hospital Services	0% AD	30% AD	0% AD	30% AD	20% AD	50% AD	30% AD	50% AD
	Outpatient Surgery in Hospital	0% AD	30% AD	0% AD	30% AD	20% AD	50% AD	30% AD	50% AD
Emergency Services									
	Emergency Room	0% AD		0% AD		$250		$250 copay then 20% AD	
	Urgent Care	0% AD	30% AD	0% AD	30% AD	$75 copay	50% AD	$60 copay	50% AD
Prescription Drugs									
Retail	Deductible	Medical Deductible Applies		Medical Deductible Applies		None		None	
Retail	Tier 1	0% AD		0% AD	Not Covered	$10		Tier 1: $15 / Tier 2: $25	Not Covered
Retail	Tier 2	0% AD		0% AD	Not Covered	$40		Tier 1: $50 Tier 2: 85	Not Covered
Retail	Tier 3	0% AD		0% AD	Not Covered	$70		Tier 1: $75 Tier 2: 85	Not Covered
Retail	Tier 4	0% AD		0% AD	Not Covered	25% AD		30% AD	Not Covered

	Monthly Rates	CURRENT		ANTHEM OPTION		CURRENT		ANTHEM OPTION	
51	Employee	34	$561.17	34	$627.50	17	$589.51	17	$735.50
15	Employee + Spouse	9	$1,094.85	9	$1,223.66	6	$1,150.13	6	$1,434.24
10	Employee + Child(ren)	7	$1,034.80	7	$1,154.64	3	$1,087.05	3	$1,353.34
12	Family	6	$1,568.47	6	$1,750.77	6	$1,647.67	6	$2,052.07
88	**TOTAL BY PLAN**	56	$45,587.85	56	$50,935.04	32	$30,069.62	32	$37,481.38
TOTAL MONTHLY ALL EMPLOYEES			$45,587.85		$50,935.04		$30,069.62		$37,481.38
ANNUAL ALL EMPLOYEES			$547,054.20		$611,220.48		$360,835.44		$449,776.56
TOTAL COST PER EMPLOYEE PER YEAR			$6,216.53		$6,945.69		$4,100.40		$5,111.10
Percent of Increase					**11.73%**				**24.65%**

75K ISL **50/50 Surplus** **Anthem LF** **16.86% overall**

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City of Fort Lupton

Medical Comparison

		Humana		Kaiser		Humana		Kaiser	
		NPOS 16 100% 5000 HDHP		HDHP 5000 0%		NPOS 16 80% 5000		DHMO 5000 20 Plus	
		In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network
	Individual Deductible	$5,000	$15,000	$5,000		$5,000	$15,000	$5,000	
	Family Deductible	$10,000	$30,000	$10,000		$10,000	$30,000	$10,000	
	Individual Out-of-Pocket Max	$5,000	$17,500	$5,500		$6,500	$19,500	$6,600	
	Family Out-of-Pocket Max	$10,000	$35,000	$11,000		$13,000	$39,000	$13,200	
	Deductible / Out-of-Pocket Embedded	Yes	Yes	Yes		Yes	Yes	Yes	
	Coinsurance	100%	70%	100%		80%	50%	80%	
	Physician Services								
Office Visits	Office Visits PCP	0% AD	30% AD	0% AD		$30 copay	50% AD	$30 copay	
Office Visits	Specialists	0% AD	30% AD	0% AD		$55 copay	50% AD	$50 copay	
Office Visits	Preventive Care	0% AD	30% AD	0% AD		No Charge	50% AD	No Charge	
Office Visits	Diagnostic Lab / X-Ray	0% AD	30% AD	0% AD		20% AD	50% AD	No Charge	
Office Visits	Imaging (MRI, CT, PET Scans)	0% AD	30% AD	0% AD		20% AD	50% AD	20% AD	
	Hospital Services								
	Inpatient Hospital Services	0% AD	30% AD	0% AD		20% AD	50% AD	20% AD	
	Outpatient Surgery in Hospital	0% AD	30% AD	0% AD		20% AD	50% AD	20% AD	
	Emergency Services								
	Emergency Room	0% AD		0% AD		$250		$250	
	Urgent Care	0% AD	30% AD	0% AD		$75 copay	50% AD	$75 copay	
	Prescription Drugs								
Retail	Deductible	Medical Deductible Applies		Medical Deductible Applies		None			
Retail	Tier 1	0% AD		0% AD		$10		$10 copay	
Retail	Tier 2	0% AD		0% AD		$40		$40 copay	
Retail	Tier 3	0% AD		0% AD		$70		$75 copay	
Retail	Tier 4	0% AD		NA		25% AD		NA	
	Monthly Rates	CURRENT		KAISER OPTION		CURRENT		KAISER OPTION	
51	Employee	34	$561.17	34	$494.87	17	$589.51	17	$560.61
15	Employee + Spouse	9	$1,094.85	9	$964.99	6	$1,150.13	6	$1,093.19
10	Employee + Child(ren)	7	$1,034.80	7	$915.51	3	$1,087.05	3	$1,037.13
12	Family	6	$1,568.47	6	$1,385.63	6	$1,647.67	6	$1,569.71
88	**TOTAL BY PLAN**	56	$45,587.85	56	$40,232.84	32	$30,069.62	32	$28,619.16
TOTAL MONTHLY ALL EMPLOYEES		$45,587.85		$40,232.84		$30,069.62		$28,619.16	
ANNUAL ALL EMPLOYEES		$547,054.20		$482,794.08		$360,835.44		$343,429.92	
TOTAL COST PER EMPLOYEE PER YEAR		$6,216.53		$5,486.30		$4,100.40		$3,902.61	
Percent of Increase				**-11.75%**				**-4.82%**	

Kaiser **8.99% decrease**

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City of Fort Lupton

Medical Comparison

		Humana		Anthem Fully Insured		Humana		Anthem Fully Insured	
		NPOS 16 100% 5000 HDHP		HSA PPO Plan 28E 0%		NPOS 16 80% 5000		BlueClassic PPO 28	
		In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network
Individual Deductible		$5,000	$15,000	$6,350	$10,000	$5,000	$15,000	$5,000	$15,000
Family Deductible		$10,000	$30,000	$12,700	$20,000	$10,000	$30,000	$10,000	$30,000
Individual Out-of-Pocket Max		$5,000	$17,500	$6,350	$19,050	$6,500	$19,500	$7,000	$21,000
Family Out-of-Pocket Max		$10,000	$35,000	$12,700	$38,100	$13,000	$39,000	$14,000	$42,000
Deductible / Out-of-Pocket Embedded		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coinsurance		100%	70%	100%	50%	80%	50%	70%	50%
Physician Services									
Office Visits	Office Visits PCP	0% AD	30% AD	0% AD	50% AD	$30 copay	50% AD	$30 copay	50% AD
	Specialists	0% AD	30% AD	0% AD	50% AD	$55 copay	50% AD	$60 copay	50% AD
	Preventive Care	No Charge	30% AD	No Charge	50% AD	No Charge	50% AD	No Charge	50% AD
	Diagnostic Lab / X-Ray	0% AD	30% AD	0% AD	50% AD	20% AD	50% AD	30% AD	50% AD
	Imaging (MRI, CT, PET Scans)	0% AD	30% AD	0% AD	50% AD	20% AD	50% AD	30% AD	50% AD
Hospital Services									
	Inpatient Hospital Services	0% AD	30% AD	0% AD	50% AD	20% AD	50% AD	30% AD	50% AD
	Outpatient Surgery in Hospital	0% AD	30% AD	0% AD	50% AD	20% AD	50% AD	30% AD	50% AD
Emergency Services									
	Emergency Room	0% AD		0% AD		$250 copay		$250 copay	
	Urgent Care	0% AD	30% AD	0% AD	50% AD	$75 copay	50% AD	$60 copay	50% AD
Prescription Drugs									
Retail	Deductible	Medical Deductible Applies		Medical Deductible Applies		None		None	
	Tier 1	0% AD		0% AD		$10		$15	
	Tier 2	0% AD		0% AD		$40		$50	
	Tier 3	0% AD		0% AD		$70		$75	
	Tier 4	0% AD		0% AD		25% AD		30% AD to $350	
Monthly Rates		CURRENT		ANTHEM OPTION		CURRENT		ANTHEM OPTION	
51	Employee	34	$561.17	34	$554.14	17	$589.51	17	$724.78
15	Employee + Spouse	9	$1,094.85	9	$1,081.13	6	$1,150.13	6	$1,414.06
10	Employee + Child(ren)	7	$1,034.80	7	$1,021.84	3	$1,087.05	3	$1,336.50
12	Family	6	$1,568.47	6	$1,548.82	6	$1,647.67	6	$2,025.76
88	**TOTAL BY PLAN**	56	$45,587.85	56	$45,016.73	32	$30,069.62	32	$36,969.68
TOTAL MONTHLY ALL EMPLOYEES		$45,587.85		$45,016.73		$30,069.62		$36,969.68	
ANNUAL ALL EMPLOYEES		$547,054.20		$540,200.76		$360,835.44		$443,636.16	
TOTAL COST PER EMPLOYEE PER YEAR		$6,216.53		$6,138.65		$4,100.40		$5,041.32	
Percent of Increase				-1.25%				22.95%	
								Anthem FI	**8.4% Increase**

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Comparison of Benefits

Dental

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City of Fort Lupton

Dental Comparison

	Humana		Ameritas		Delta Dental - PPO		Delta Dental - PPO		Standard		Anthem		Aetna	
	Preferred 14		Passivc PPO Plan 1		Delta Dental - PPO		With Right Start 4 Kids		Standard 50/1500		Essential Choice and Complete		Fully Insured PPOD	
	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network
Individual Deductible	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50
Family Deductible	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150
Annual Maximum	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$2,000	$2,000	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Deductible Waived for Preventive	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Preventive / Diagnostic	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Basic	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Major	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Oral Surgery	Basic		Basic		Basic		Basic		Basic		Basic		Basic	
Periodontics	Basic		Basic		Basic		Basic		Basic		Basic		Basic	
Endodontics	Basic		Basic		Basic		Basic		Basic		Basic		Basic	
Implants	Major		Major		Major		Major		Major		Major		Major	
Orthodontics														
Deductible	None		None		None		None		None		None		None	
Lifetime Maximum	$1,500		$1,500		$1,500		$1,500		$1,500		$1,500		$1,500	
Child (under 19)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Adult	Not Covered	Not Covered	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waiting Periods														
Preventive Basic Major Orthodontics	None		None		None		None		None		None		None	
UCR Percentile	90th		80th						90th		90th		95th	
Number of CO Providers	8,944		9,222+		2,505		2,505		2,827		7,535		NA	
Number of National Providers	100,093		460,558		386,547		386,547		460,567		122,000+		336,000	
Provider Directory Website	www.humanadental.com		www.ameritasgroup.com		www.deltadentalins.com		www.deltadentalins.com		www.standard.com		https://www.anthem.com/provider/dental/		www.aetna.com	
Administrative Fees	None													
Voluntary / Employer Paid	Employer Paid		Employer Paid		Employer Paid		Employer Paid		Employer Paid		Employer Paid		Employer Paid	
Participation Requirements	75%		All Eligible EEs		Contributory		Contributory		Non-Contributory		85%		90%	
Rate Guarantee	1 Year		1 Year		1 Year		1 Year		2 Years		2 Years		3 Years	
Monthly Rates	CURRENT	RENEWAL												
47 Employee	$33.39	$36.70	$29.96		$32.87		$36.77		$30.81		$30.58		$32.96	
21 Employee + Spouse	$66.78	$73.39	$59.92		$65.73		$73.55		$62.91		$61.17		$65.92	
9 Employee + Children	$94.39	$103.73	$85.36		$92.91		$103.95		$83.07		$86.46		$93.17	
17 Family	$129.78	$142.63	$117.08		$127.75		$142.93		$115.17		$118.87		$128.10	
94 **TOTAL MONTHLY**	$6,027.48	$6,624.37	$5,425.04		$5,933.16		$6,638.10		$5,474.70		$5,520.76		$5,949.67	
TOTAL ANNUALLY	$72,329.76	$79,492.44	$65,100.48		$71,197.92		$79,657.20		$65,696.40		$66,249.12		$71,396.04	
TOTAL COST PER EMPLOYEE PER YEAR	$769.47	$845.66	$692.56		$757.42		$847.42		$698.90		$704.78		$759.53	
Percent of Increase		9.90%	-9.99%		-1.56%		10.13%		-9.17%		-8.41%		-1.29%	

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Comparison of Benefits

Vision

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City of Fort Lupton

Vision Comparison

	Humana		VSP		Ameritas		Ameritas		Standard		Aetna		Anthem	
	Vision 130		VSP Vision		Plan 1 ViewPointe Plan H		Plan 1 ViewPointe Plan H		Balanced Care Vision II Plan H		Aetna Vision		Blue View Vision	
	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network	In-Network	Out-of-Network
Eye Examination	$10 Copay	Up to $30	$10 Copay	Up to $45	$10 Copay	Up to $30	$10 Copay	Up to $30	$10 Copay	Up to $35	$10 copay	Up to $32	$10 copay	Up to $42
Standard Plastic Lenses														
Single Vision	$15 Copay	Up to $24	$25 Copay	Up to $30	$20 Copay	Up to $25	$10 copay	Up to $25	$10 Copay	Up to $25	$10 copay	Up to $25	$15 Copay	Up to $40
Bifocal		Up to $40		Up to $50		Up to $40		Up to $40		Up to $40		Up to $40		Up to $60
Trifocal		Up to $60		Up to $65		Up to $60		Up to $55		Up to $55		Up to $64		Up to $80
Frames*	Up to $130 allowance then 20% off	Up to $65	$25 Copay/ Up to $130 allowance	Up to $70	Up to $130 allowance then 20% off	Up to $65	Up to $130 allowance then 20% off	Up to $65	Up to $130 allowance	Up to $65	Up to $130 allowance then 20% off	Up to $104	Up to $130 allowance	Up to $45
Contact Lenses*					Exam: Up to $40	No Benefit	Exam: Up to $40	No Benefit	Exam: Up to $40	No Benefit				
Conventional	Up to $130 then 15% off	Up to $104	Up to $130 allowance	Up to $105	Up to $130 then 15% off	Up to $104	Up to $130 then 15% off	Up to $104	Up to $130 allowance	Up to $104	Up to $130 allowance then 15% off	Up to $104	Up to $130 allowance	Up to $105
Disposable	Up to $130	Up to $104		Up to $105						Up to $104	Up to $130 allowance	Up to $104	Up to $130 allowance	Up to $105
Medically Necessary	Covered in Full	Up to $200	Covered in Full	Up to $210	Covered in Full	Up to $200	Covered in Full	Up to $200	Covered in Full	Up to $200	Covered in Full	Up to $200	Covered in Full	Up to $
*Either Frames -or- Contact Lenses														
Frequency														
Exams	12 Months		12 Months		12 Months		12 Months		12 Months		12 Months		12 Months	
Lenses	12 Months		12 Months		12 Months		12 Months		12 Months		12 Months		12 Months	
Frames	24 Months		24 Months		24 Months		24 Months		24 Months		24 Months		24 Months	
Contacts	12 Months		12 Months		12 Months		12 Months		12 Months		12 Months		12 Months	
Voluntary / Employer Paid	Employer Paid		Employer Paid		Non-Contributory		Non-Contributory		Non-Contributory		Employer Paid		Non Voluntary	
Participation Requirements	75%		75% or more Dependent Voluntary		All Eligible EEs		All Eligible EEs		All Eligible EEs		90%		Voluntary: 69.9% or lower Non Voluntary: 70% or higher	
Rate Guarantee	RG until 1/1/2023		2 Years		2 Years		2 Years		2 Years		2 Years		3 Years	
Monthly Rates	CURRENT		VSP OPTION		AMERITAS OPTION 1		AMERITAS OPTION 2		STANDARD OPTION		AETNA OPTION		ANTHEM OPTION	
47 Employee	$5.42		$7.81		$4.76		$5.00		$5.18		$6.16		$5.18	
21 Employee + Spouse	$10.84		$12.49		$9.52		$10.04		$10.66		$11.71		$10.37	
8 Employee + Children	$10.30		$12.75		$9.08		$9.56		$9.28		$12.32		$9.85	
17 Family	$16.18		$20.56		$14.24		$15.04		$14.75		$18.12		$15.47	
93 **TOTAL**	$839.84		$1,080.88		$738.36		$778.00		$792.31		$942.03		$803.02	
Percent of Increase			28.70%		-12.08%		-7.36%		-5.66%		12.17%		-4.38%	

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Comparison of Benefits

Life, AD&D, and Dependent Life

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City of Fort Lupton

Basic Life, AD&D and Dependent Life Comparison

		The Standard
		Basic Life and AD&D
Eligibility	All Full-Time	X
	All Full-Time Who Elect	
	Management	
Number of Eligible Employees		93
Rate Guarantee		3 Years
Benefit		
	Life Insurance	$100,000
	AD&D Insurance	$100,000
	Conversion	Included
	Portability	Included
Monthly Rates		CURRENT
	Basic Life (per $1,000)	$0.100
	AD&D (per $1,000)	$0.020
MONTHLY TOTAL		$1,116.00
ANNUAL TOTAL		$13,392.00

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City of Fort Lupton

Supplemental Life

	The Standard	
	Supplemental Life	
Employee Benefit		
Increments	$10,000	
Minimum Benefit	$10,000	
Maximum Benefit	$500,000	
Spouse Benefit		
Increments	$5,000	
Minimum Benefit	$50,000	
Maximum Benefit	$250,000	
Child Benefit		
Increments	$10,000	
Minimum Benefit		
-Live Birth - 14 Days	$10,000	
-14 Days to 6 Months	$10,000	
-6 Months to FT Student	$10,000	
Maximum Benefit	$10,000	
Guarantee Issue		
Employee	$100,000	
Spouse	$25,000	
Additional Benefits		
Waiver of Premium	Included	
Conversion	Included	
Portability	Included	
Participation Required	20%	
Rate Guarantee	3 Years	
Rates Per $1,000	CURRENT	
	Employee	Spouse
<25	$0.090	$0.090
25-29	$0.090	$0.090
30-34	$0.100	$0.100
35-39	$0.120	$0.120
40-44	$0.180	$0.180
45-49	$0.290	$0.290
50-54	$0.450	$0.450
55-59	$0.720	$0.720
60-64	$0.840	$0.840
65-69	$1.600	$1.600
70-74	$2.630	$2.630
75+	$2.630	$2.630

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Comparison of Benefits

Disability

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City of Fort Lupton

Long Term Disability

		The Standard
		LTD
Eligibility	All Full-Time	X
	All Full-Time Who Elect	
	Management	
Number of Eligible Employees		103
Monthly Covered Payroll		$461,500
Benefit		
Elimination Period		90 Days
Benefit Percentage		60%
Maximum Monthly Benefit		$5,000
Tax Benefit		No
Duration of Benefit		SSFRA
Definition of Disability		3 Years Own Occupation
Employer Contribution		100%
Participation Required		100%
Rate Guarantee		3 Years
Rates		CURRENT
Per $100 of Covered Payroll		$0.26
MONTHLY TOTAL		$1,199.90
ANNUAL TOTAL		$14,398.80

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City of Fort Lupton

Short Term Disability

		The Standard
		STD
Eligibility	All Full-Time	X
	All Full-Time Who Elect	
	Management	
Number of Eligible Employees		103
Covered Volume		$19,825
Benefit		
Elimination Period		
	Injury	7 Days
	Illness	7 Days
Benefit Percentage		60%
Weekly Benefit		$1,000
Duration of Benefits		12 Weeks
Definition of Disability		Own Occupation
Rate Guarantee		3 Years
Rates		CURRENT
	per $10 of Weekly Benefit	$0.39
MONTHLY TOTAL		$773.18
ANNUAL TOTAL		$9,278.10

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Comparison of Benefits

Flexible Spending Account

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City of Fort Lupton

Account Comparison

	National Benefit Service CURRENT
Monthly Participant Fee	3.05 PEPM ($50 Minimum)
Card Option	$18/yr/participant
New Plan Document	Included ($150 Form 5500, if required)
Monthly Billing Charge	None
Annual Renewal Fee	None

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Comparison of Benefits

EAP

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City of Fort Lupton

Employee Assistance Program Comparison

	Humana	Humana	Anthem	Anthem	Anthem	Magellan	Magellan	CuraLinc	CuraLinc	CuraLinc
	6 Sessions	6 Sessions	Basic 3 Sessions	Enhanced 4 Sessions	Enhanced 5 Sessions	3 Sessions	6 Sessions	3 Sessions	5 Sessions	6 Sessions
In-Person EAP Sessions	6 Sessions	6 Sessions	3 Sessions	4 Sessions	5 Sessions	3 Sessions	6 Sessions	3 Sessions	5 Sessions	6 Sessions
Worksite Services	Included	Included	Included	Included	Included	Included	Included	$265/hour	$265/hour	$265/hour
Financial Counseling	Free 30-min. consult. Then 25% discount	Free 30-min. consult. Then 25% discount	Included	Included	Included	Included	Included	Included	Included	Included
Telephone Consultations	Included	Included	Unlimited	Unlimited	Unlimited	Included	Included	Included	Included	Included
First Responder Assistance	A team specializes in 1st Responder Assistance. Call normal EAP line	A team specializes in 1st Responder Assistance. Call normal EAP line	Providers specialize and trainings available	Providers specialize and trainings available	Providers specialize and trainings available	Provider Network is trained in trauma and counseling	Provider Network is trained in trauma and counseling	Online Toolkit. Clinical model: licensed counselor 24/7	Online Toolkit. Clinical model: licensed counselor 24/7	Online Toolkit. Clinical model: licensed counselor 24/7
Participation Requirements	None	None	None	None	None	10 Lives	10 Lives	None	None	None
Rate Guarantee	1 Year	1 Year	1 Year	1 Year	1 Year	3 Years	3 Years	3 Years	3 Years	3 Years
Monthly Rates	**CURRENT**	**RENEWAL**								
Per Employee	$0.66	$0.70	$0.47	$1.20	$1.69	$2,921 per year	$3,377 per year	$2.11	$2.43	$2.68

Humana: No First Responder Assistance marketing materials and they are not going to create any in the near future.

CuraLinc Online Kit: https://www.eaptoolkit.com/firstresponder

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2021 - 85/50 cost share

HEALTH INSURANCE - HUMANA	EC cost share data		Employee Cost Per Pay Period	Per month	Annual	Subcribers	All Employees Annual Cost	Employer Cost Per Month	Employer cost for all subscribers Per month	Annual	Total Monthly Premium	Total cost for all subscribers Per month	Annual
Copay Plan	13%	Employee Only	$44.22	$ 88.44	$ 1,061.28	17	$ 18,041.76	$ 501.07	$ 6,012.84	$ 102,218.44	$ 589.51	$ 10,021.67	$ 120,260.04
	21%	Employee + Spouse	$184.38	$ 368.76	$ 4,425.12	6	$ 26,550.72	$ 781.37	$ 9,376.44	$ 56,258.64	$ 1,150.13	$ 6,900.78	$ 82,809.36
	19%	Employee + Child(ren)	$168.61	$ 337.22	$ 4,046.64	3	$ 12,139.92	$ 749.83	$ 8,997.96	$ 26,993.88	$ 1,087.05	$ 3,261.15	$ 39,133.80
	35%	Employee + Family	$308.76	$ 617.52	$ 7,410.24	6	$ 44,461.44	$ 1,030.15	$ 12,361.80	$ 74,170.80	$ 1,647.67	$ 9,886.02	$ 118,632.24
	EC cost share data												
H.S.A.	9%	Employee Only	$17.09	$ 34.18	$ 410.16	34	$ 13,945.44	$ 526.99	$ 6,323.88	$ 215,011.92	$ 561.17	$ 19,079.78	$ 228,957.36
	17%	Employee + Spouse	$138.01	$ 276.02	$ 3,312.24	9	$ 29,810.16	$ 818.83	$ 9,825.96	$ 88,433.64	$ 1,094.85	$ 9,853.65	$ 118,243.80
	15%	Employee + Child(ren)	$123.00	$ 246.00	$ 2,952.00	7	$ 20,664.00	$ 788.80	$ 9,465.60	$ 66,259.20	$ 1,034.80	$ 7,243.60	$ 86,923.20
	28%	Employee + Family	$256.42	$ 512.84	$ 6,154.08	6	$ 36,924.48	$ 1,055.63	$ 12,667.56	$ 76,005.36	$ 1,568.47	$ 9,410.82	$ 112,929.84
					Employee total		$ 202,537.92		City total	$ 705,351.72		$ 75,657.47	$ 907,889.64

2022 - 85/50 cost share

HEALTH INSURANCE - HUMANA	Difference from EC avg	Ee % cost share	Per paycheck Change from 2021	Employee Cost Per Pay Period	Per month	Annual	Subcribers	Total	Employer Cost Per Month	Employer cost for all subscribers Per month	Annual	Total Monthly Premium	Total cost for all subscribers Per month	Annual
Copay Plan	2.00%	15.00%	$ 4.20	$ 48.42	$ 96.84	$ 1,162.09	17	$ 19,755.56	$ 548.70	$ 6,584.39	$ 111,934.60	$ 645.54	$ 10,974.18	$ 131,690.16
	11.06%	32.06%	$ 17.52	$ 201.90	$ 403.79	$ 4,845.49	6	$ 29,072.95	$ 855.65	$ 10,267.79	$ 61,606.73	$ 1,259.44	$ 7,556.64	$ 90,679.68
	12.02%	31.02%	$ 16.02	$ 184.63	$ 369.26	$ 4,431.07	3	$ 13,293.22	$ 821.11	$ 9,853.37	$ 29,560.10	$ 1,190.37	$ 3,571.11	$ 42,853.32
	2.48%	37.48%	$ 29.35	$ 338.11	$ 676.22	$ 8,114.59	6	$ 48,687.55	$ 1,128.05	$ 13,536.65	$ 81,219.89	$ 1,804.27	$ 10,825.62	$ 129,907.44
	Difference from EC avg	Ee % cost share	Change from 2021											
H.S.A.	-2.14%	6.86%	$ 4.00	$ 21.09	$ 42.18	$ 506.12	34	$ 17,208.01	$ 572.33	$ 6,868.00	$ 233,512.07	$ 614.51	$ 20,893.34	$ 250,720.08
	8.81%	25.81%	$ 16.68	$ 154.69	$ 309.38	$ 3,712.58	9	$ 33,413.20	$ 889.52	$ 10,674.22	$ 96,068.00	$ 1,198.90	$ 10,790.10	$ 129,481.20
	9.40%	24.40%	$ 15.25	$ 138.25	$ 276.50	$ 3,317.96	7	$ 23,225.71	$ 856.65	$ 10,279.84	$ 71,958.89	$ 1,133.15	$ 7,932.05	$ 95,184.60
	5.11%	33.11%	$ 27.93	$ 284.35	$ 568.70	$ 6,824.42	6	$ 40,946.51	$ 1,148.84	$ 13,786.06	$ 82,716.37	$ 1,717.54	$ 10,305.24	$ 123,662.88
						Employee total		$ 225,602.71		City total	$ 768,576.65		$ 82,848.28	$ 994,179.36
						Employee cost change		$23,064.79		City cost increase	$63,224.93	Total cost increase	$86,289.72	

2022 - 87/55 cost share

HEALTH INSURANCE - HUMANA	Difference from EC avg	Ee % cost share	Per paycheck Change from current cost share structure	Change from 2021	Employee Cost Per Pay Period	Per month	Annual	Subcribers	Total	Employer Cost Per Month	Employer cost for all subscribers Per month	Annual	Total Monthly Premium	Total cost for all subscribers Per month	Annual
Copay Plan	0.00%	13.00%	$ (6.46)	$ (2.26)	$ 41.96	$ 83.92	$ 1,007.04	17	$ 17,119.72	$ 561.62	$ 6,739.44	$ 114,570.44	$ 645.54	$ 10,974.18	$ 131,690.16
	7.60%	28.60%	$ (21.81)	$ (4.29)	$ 180.09	$ 360.18	$ 4,322.10	6	$ 25,932.61	$ 899.26	$ 10,791.18	$ 64,747.07	$ 1,259.44	$ 7,556.64	$ 90,679.68
	8.65%	27.65%	$ (20.08)	$ (4.06)	$ 164.55	$ 329.10	$ 3,949.24	3	$ 11,847.73	$ 861.27	$ 10,335.20	$ 31,005.59	$ 1,190.37	$ 3,571.11	$ 42,853.32
	-1.45%	33.55%	$ (35.44)	$ (6.09)	$ 302.67	$ 605.34	$ 7,264.06	6	$ 43,584.39	$ 1,198.93	$ 14,387.18	$ 86,323.05	$ 1,804.27	$ 10,825.62	$ 129,907.44
	Difference from EC avg		Change from current cost share structure	Change from 2021											
H.S.A.	-4.14%	4.86%	$ (6.15)	$ (2.15)	$ 14.94	$ 29.88	$ 358.52	34	$ 12,189.53	$ 584.63	$ 7,015.60	$ 238,530.55	$ 614.51	$ 20,893.34	$ 250,720.08
	5.34%	22.34%	$ (20.76)	$ (4.08)	$ 133.93	$ 267.86	$ 3,214.34	9	$ 28,929.07	$ 931.04	$ 11,172.46	$ 100,552.13	$ 1,198.90	$ 10,790.10	$ 129,481.20
	6.03%	21.03%	$ (19.11)	$ (3.86)	$ 119.14	$ 238.28	$ 2,859.41	7	$ 20,015.88	$ 894.87	$ 10,738.39	$ 75,168.72	$ 1,133.15	$ 7,932.05	$ 95,184.60
	1.18%	29.18%	$ (33.73)	$ (5.80)	$ 250.62	$ 501.24	$ 6,014.88	6	$ 36,089.27	$ 1,216.30	$ 14,595.60	$ 87,573.61	$ 1,717.54	$ 10,305.24	$ 123,662.88
							Employee total		$ 195,708.21		City total	$ 798,471.15		$ 82,848.28	$ 994,179.36
							Employee cost change		-$6,829.71		City cost increase	$93,119.43	Total cost increase	$86,289.72	

Total cost of renewal increase: $86,289.72
Total cost to City of cost share increase: $93,119.43

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald , Ward 3

AM 2021-179

AUTHORIZE THE CITY ADMINISTRATOR TO ACCEPT A PROPSAL FROM DIG DEEP TO PROVIDE GRANT SEEKING SERVICES FOR THE CITY OF FORT LUPTON FOR AN AMOUNT OF $5,000.00 PER MONTH.

I. **Agenda Date:** Council Meeting – November 2, 2021

II. **Attachments:**

1. RFQ
2. City of Fort Lupton Professional Services Agreement
3. Proposal of services
    a. Dig Deep
    b. Clear Communications
    c. Public Advisory Group

III. **Summary Statement:**

This would be an agreement between the City of Fort Lupton and Dig Deep for grant seeking services on a month to month bases.

IV. **Submitted by:** Monty Schuman

(Monty Schuman Recreation Director)

V. **Finance Reviewed**

Finance Director

VI. **Approved for Presentation:**

City Administrator

VII. **Attorney Reviewed** **Approved** _____

VIII. **Certification of Council Approval:**

City Clerk Date

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IX. Detail of Issue/Request:

Dig Deep has presented a proposal for services for grant seeking efforts that would provide opportunities for the city to secure additional funding sources for major projects. The City placed a RFP and received 3 proposals. A committee of four staff reviewed the proposals. The top proposal from the committee was Dig Deep and they outscored the other two proposals on the following criteria:

1. Thoroughness, quality and conciseness of submittal.
2. Project understanding and approach for accomplishing the City's objectives.
3. Qualification of project manager and project team, and proven ability to complete projects of similar scope.
4. Proposed cost of services.
5. References from past and present clients.

The purpose for this RFQ was to find companies that could assist the city in securing and finding grants/loan interest loans. Dig Deep has helped numerous municipalities in these endeavors. They do specialize in major capital projects including water, public works and park projects.

The scoring by the majority of the committee was:
Dig Deep 90
Public Advisory Group 75
Clear Communications Services 55

X. Legal/Political Considerations:

None expected.

XI. Alternatives/Options:

Deny the RFP and direct staff to research other agencies.
Deny the agreement and direct staff to provide grant seeking efforts services internally.

XII. Financial Considerations:

All costs should be offset with securing additional funding sources.

XIII. Staff Recommendation:

The committee and staff recommend to approve the proposal with Dig Deep and direct the City Administrator to sign an agreement for grant seeking services.

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City of Fort Lupton

RFP # FTL202106

130 S. McKinley Avenue
Fort Lupton, Colorado 80621
www.FortLuptonCO.gov

Office: 303-857-6694
Fax: 303-857-0351

REQUEST FOR PROPOSAL FOR GRANT CONSULTING SERVICES
Grant Consultant of Record (Price Agreement)
Issued September 15, 2021

DEADLINE FOR RECEIPT OF PROPOSAL: September 29, 2021 by 5:00 P.M.

PROPOSAL MUST BE RECEIVED BY THE CITY BY THE DEADLINE

PROPOSAL MAY BE MAILED, PHYSICALLY DELIVERED OR EMAILED TO
Bids@FortLuptonCO.gov

SUBMIT MAILED PROPOSAL TO: Leann Perino / Finance Director
City of Fort Lupton
130 S McKinley Avenue
Fort Lupton, CO 80621

DELIVER PROPOSAL TO: City of Fort Lupton
130 S McKinley Avenue
Fort Lupton, CO 80621

INFORMATION CONTACT: Leann Perino / Finance Director
Bids@FortLuptonCO.gov

This request for proposal may be canceled or any or all proposals may be rejected for failure to comply with procedures or requirements or if the City determines it is in the public interest to do so.

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SECTION 1 – INTRODUCTION

INTRODUCTION

The City of Fort Lupton, CO (City) is located on the northern Colorado 35 miles north of Denver. The City has over 8000permanent residents.

The City owns and operates a number of public facilities including:

1. 5 MGD water treatment plant and distribution system including 1 water booster stations and 3 water storage tanks
2. 3 MGD wastewater collection, treatment, and disposal system including 1 pump stations
3. Transportation system including roadways, sidewalks, bridges, trails, etc.
4. Stormwater system including catch basins, culverts, outfalls, etc.
5. Recreation Center
6. Municipal Golf Course
7. Public & School Library

The City requires the services of a professional grants consultant to assist City staff in identifying and procuring grants for various municipal projects. The emphasis of the grant assistance will focus on capital improvement projects; however, assistance in procuring funding for parks, police, fire or other essential City services and functions may be occasionally required.

Each year, the City updates its 6-year Capital Improvement Plan, which forecasts and prioritizes needed public works improvements.

RFP SCHEDULE

Proposals must be received by the City no later than September 29, 2021 by 5:00 P.M. Proposals that are delivered to the City on the last day for submittal may be physically received at the City Hall: City of Fort Lupton, 130 S McKinley Ave, Fort Lupton, CO 80621 by 5:00 pm. Electronic submittals will be accepted by email at Bids@FortLuptonCO.gov. Electronic submittals must have the phrase **"I waive my right to a sealed bid"** in the body of the email.

Physically delivered bids shall submit four copies of its proposal. The proposal shall list the firm's capabilities and ability to meet the needs of the City as described in this solicitation.

The outside of the envelope containing the proposal shall be clearly marked "Grants Consultant of Record Proposal" and addressed to:

Leann Perino / Finance Director
130 S McKinley Ave
Fort Lupton, CO 80621

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The approximate schedule for the RFP is as follows:

Advertisement of RFP	Friday, September 15, 2021
RFP Available online	Friday, September 15, 2021
Proposals due	Friday, September 29, 2021
Notice of Intent to Award	Wednesday, October 6, 2021

The selection committee will review proposals and recommend a firm for the award. A notice of award shall be issued after the Council decision.

Any amendments to this RFP will be issued on BidDirect.com. No proposal will be considered if it is not responsive to any issued amendments.

REIMBURSEMENT

All costs for preparing proposals, attending interviews (if applicable), and other efforts in pursuit of this RFP are the proposer's responsibility.

FURTHER INFORMATION

Additional information may be obtained from:

Leann Perino / Finance Director
Bids@FortLuptonCO.gov

PROPOSAL WITHDRAWAL

Any firm may withdraw its proposal prior to the final deadline for submission by providing the City with a written request stating the desire to withdraw. Withdrawal of a proposal will not prejudice the right of a firm to file a new proposal before the deadline.

REJECTION OR ACCEPTANCE OF PROPOSAL

The City expressly reserves the right to:

1. Reject any or all proposals.

2. To assign any work to any Consultant that it enters into a price agreement with based on the City's discretionary determination as to which contractor is best suited for the particular work, considering capability, capacity, and price.

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3. Engage consultants in projects less than $5,000 without formal advertising as defined within the City's procurement policy.

Publishing this RFP does not commit the City to any contract, project award, or financial obligation to any of the respondents. The City reserves the right to use whatever means it considers appropriate and prudent when determining which Consultant to select.

PROTESTS

Protests are subject to and must comply with the City's Public Contracting Rules.

PUBLIC RECORDS

Any information submitted through this RFP process shall be a public record. However, during the evaluation period, the proposal shall be considered as confidential information. If any proposal contains information that is considered a trade secret under each sheet containing proprietary, information should be marked as follows:

"*This data constitutes a trade secret and shall not be disclosed except in accordance with C.R.S. 24-72-204 Colorado Open Records*

The City accepts no liability for the inadvertent or unavoidable release of any confidential information submitted, and claims arising out of any public record request for such information shall be at the consultant's expense.

Identifying the proposal in whole as a trade secret is not acceptable. Failure to identify a portion of the proposal as a trade secret shall be deemed a waiver of any future claim of that information as a trade secret.

LOCAL/STATE/FEDERAL REQUIREMENTS

The selected Consultant shall comply with all federal, state and local laws, regulations, executive orders and ordinances applicable to the work under this contract, including, without limitation, the provisions of (1) Title VI of the Civil Rights Act of 1964; (ii) Section V of the Rehabilitation Act of 1973; (iii) the Americans with Disabilities Act of 1991 (iv) all regulations and administrative rules established pursuant to the foregoing laws; and (v) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules, and regulations

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SECTION 2 – SCOPE OF WORK

PROJECT OVERVIEW

The City of Fort Lupton requires assistance in identifying and securing government grants to fund future capital improvement projects. The work will build upon strategic planning activities the City conducted between 2019. The City regularly increases utility rates to upgrade and replace the City's aging infrastructure systems. In 2021, the City imposed a Reg85 Fee on water/sewer bills to pay future debt payments on the Colorado Department of Public Health and Environment required wastewater treatment plant upgrades.

The rate increases have placed a significant strain on the budgets of the residents and businesses of the community, making it increasingly important to identify new sources of external funding to help pay for expensive capital and infrastructure improvements. The purpose of selecting a Grant Consultant of Record is to regularly identify and monitor additional funding sources to supplement the revenue created by rates, and to potentially offset some of the rate increases for future fiscal years necessitated by capital improvement needs.

DRAFT SCOPE OF WORK

This draft scope of work represents the City's best estimate of the work needed to accomplish the objectives of this project. The City is open to alternative approaches that may deviate from this scope to better meet project objectives.

A. Project Kick-off.

Staff will provide Consultant with relevant background information in an electronic format, where available. This may include, but is not limited to:

1. 6-year Capital Improvement Plan
2. Utility Plan

Consultant shall review the background materials and arrange a conference call with City staff to clarify objectives and goals, confirm background information that could inform the work, and any other issues necessary to clarify the scope and schedule. Following this meeting, Consultant will prepare a memo documenting the decisions and any refinements to the scope and schedule.

Product: Memo documenting meeting outcomes and final scope of work.

B. Monthly Research, Project Management and Reporting (Retainer)

Consultant shall conduct research for applicable grants, corresponding timelines, and grant criteria on a monthly basis. This information shall be compiled in a written report and submitted to the designated City contact monthly. Consultant and the City shall hold a regular progress meeting/conference call the following week to discuss report details and specific opportunities that may exist. This conference call shall also serve as the opportunity for the City to update the Consultant on revisions to the CIP and/or upcoming projects that may be added to the scope of work. This task shall be performed on a monthly retainer basis.

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Deliverables:

- Monthly Grant Report
- Monthly Progress Meeting/Conference Call

C. **Project Specific Grant Services (Task Order Basis)**
As specific grant opportunities are identified as part of the monthly retainer services, the City may require assistance in writing and/or procurement of the grant based upon City staff workloads and the complexity of the grant application process. If so directed, Consultant shall prepare a scope of work that may be adopted as a specific task order to provide the services required for the specific grant writing/procurement. The City shall provide engineering and administrative support as necessary and as identified within the project specific scope of work.

Deliverables:

- Project Specific Scope of Work and Cost Schedule (as applicable)

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SECTION 3 – PROPOSAL CONTENT REQUIREMENTS

Proposals should be organized in the following format:

A. Cover Letter
Provide a cover letter, signed by a duly constituted official legally authorized to bind the firm to both its proposal and cost estimate. The cover letter must include the name, address, and telephone number of the firm submitting the proposal and the name, title, address, telephone number, fax number, and email address of the person, or persons, to contact who are authorized to represent the consultant and to whom correspondence should be directed.

B. Project Approach and Understanding
Provide a detailed description of the Consultant's proposed approach demonstrating how the City's objectives will be accomplished as outlined in the above draft Scope of Work. Clearly describe and explain the reason for any proposed modifications to the methods, tasks, and products identified in the draft Scope of Work outlined in Section 2 of this RFP.

C. Project Organization and Team Qualifications
Identification of all services to be provided by the principal firm and those proposed to be provided by subcontractors and information regarding the firm(s) assigned to the project including the size of firm(s) and overall capabilities of each as considered relevant to this project. Provide information regarding all personnel assigned as team members to this project including names, prior experience, position, role and level of responsibility in the project. The City reserves the right to reject any proposed firm(s) or team member or to request their reassignment. The project manager shall be identified by name and shall not be changed without written approval by the City. The principal consulting firm must assume responsibility for any sub-consultant work and shall be responsible for the day-to-day management and direction of the project.

D. Project Timeline
Proposed timeline for accomplishing the project, including critical paths and milestones, and specific consulting staff by task based on the draft Scope of Work.

E. Project Coordination and Monitoring
Describe the process for ensuring effective communication between the Consultant and the City, and for monitoring progress to ensure compliance with approved timeline, budget, staffing, and deliverables.

F. Proposed Cost of Services

- *Monthly Research and Reporting (Retainer)*
  Provide a budget summary broken down by task, time, personnel, and hourly rate, the number of hours and cost for each team member including those employed by subcontractors. It is expected that the

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monthly services will be performed on a fixed monthly retainer basis. Fee information should be formatted to correspond to tasks identified in this RFP; however, this format may be modified to suit the Consultant's approach to this project. The summary shall include a budget for reimbursable expenses. The final cost of consulting services may be based on a negotiated detailed scope of work. The budget summary shall also include all required materials and other direct costs, administrative support, overhead and profit that will apply.

- *Project Specific Grant Services (Task Order Basis)*
  Provide a 2021 fee schedule outlining a list of the commonly recommended key personnel, staff categories, individuals, or sub-consultants making up the project team. Include a forecasted 2022 listing of individual billing rates that would be used for the 2022 calendar year. The City understands that annual increases are expected. The proposal should describe how annual fee adjustments are to occur.

G. Similar Project Experience
Specific examples of comparable work that best demonstrate the qualifications and ability of the team to accomplish the overall goals of the project within the financial and time constraints. Provide names, addresses and telephone numbers of clients associated with each of these projects. Through submission of a proposal, all respondents specifically agree to and release the City of Newport to solicit, secure and confirm information provided.

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SECTION 4 - SELECTION OF PROPOSALS

Proposals will be evaluated based on the following criteria:

Thoroughness, quality and conciseness of submittal.	20 pts.
Project understanding and approach for accomplishing the City's objectives.	20 pts.
Qualifications of the project manager and project team, and proven ability to complete projects of similar scope.	20 pts.
Proposed cost of services.	20 pts.
References from past and present clients.	20 pts.
Total	100 pts.

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Services Agreement

This agreement is made as of the ____ day of _____, 2021, by and between Dig Deep Research, LLC, a Colorado limited liability corporation ("Consultant"), and City of Fort Lupton ("Client").

Whereas, the Client intends that Consultant shall perform services for the Client relating to identification and application for grants and other infrastructure funding opportunities for capital improvement projects; and

Whereas, Consultant represents that it has the present capacity, is experienced and qualified to perform the services for the Client as hereinafter provided in this Agreement;

NOW, THEREFORE, in consideration of the promises and mutual covenants and obligations set forth herein, the Parties mutually agree as follows:

TERMS OF AGREEMENT

Section 1 - Scope of Work

A. Consultant agrees to provide the services as stated in the Scope of Work specified in ***Attachment A***, attached hereto and incorporated into this Agreement.

B. Nothing in this Agreement shall be construed as placing any obligation on the Client to proceed with any tasks beyond those which have been specifically authorized in writing by the Client.

C. The Client may, from time to time and in its sole discretion, require changes in the scope of the services of the Consultant to be performed herein. Changes may include, but not be limited to, the type and scope of services provided by Consultant. Such changes, which are mutually agreed upon between the Client and Consultant, shall be incorporated in written change orders, amendments, additional Scopes, or extensions to this Agreement.

Section 2 - Authority

A. Leann Perino, City Finance Director ("Project Manager") shall be the Client's Project Manager and the Client's authorized representative. The Project Manager is responsible

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for authorizing and approving all Work performed under this Agreement. The Project Manager is authorized to make decisions on behalf of the Client related to the Work.

B. Cheryl L. Kester ("Consultant's Representative") is Consultant's representative for the work. Consultant's Representative shall have sufficient authority to represent and bind Consultant in those instances when such authority is necessary to carry out Consultant's responsibilities and obligations under the terms of this Agreement.

Section 3 - Schedule

A. This Agreement shall go into effect upon the last date of execution by the Parties below, with work commencing on the date identified in Scope of Work specified in ***Attachment A***, or after final execution of this Agreement, whichever is later; and completing 12 months after date of commencing unless terminated prior thereto.

B. Client acknowledges Time shall be of the essence in Client's duty to respond to Consultant's requests for information or provision of documents, to make invoice payments and expense reimbursements, and to comply with any written notice of failure to cooperate. Failure to provide requested information or documentation by the date set by Consultant may impede progress of the Services. Similarly, Time is of the essence for Consultant to perform the Services.

Section 4 - Compensation

A. The compensation to be paid Consultant under this Agreement, as provided hereinafter, covers the entire cost of the Services under this Agreement. The initial compensation of this Agreement shall not exceed sixty-thousand and 00/100 dollars ($60,000) as more fully set forth in ***Attachment A***, attached hereto and incorporated into this Agreement. The Client may, from time to time and in its sole discretion, appropriate additional amounts to extend this Agreement and or add additional and/or continuing scope(s) of work.

B. The Client shall pay Consultant in accordance with the terms of this Agreement as reflected in the Fee Schedule set forth in ***Attachment A.***

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C. Consultant shall submit monthly invoices to be approved by the Client's Project Manager. Consultant shall submit monthly invoices no later than the fifth (5th) calendar day of the month after which the work was performed; provided, however, that if that day falls on a weekend or holiday, then monthly invoices shall be submitted no later than close of business on the next regular business day of the month. Invoices shall paid within thirty (30) days of submission.

D. Client shall be responsible to reimburse Consultant for any Client-requested travel (at applicable Federal per diem and mileage rates) and any additional expenses incurred by Consultant at the request of Client. Any such expenses are in addition to the monthly retainer fee and shall be included in the subsequent invoice. Any such travel and other expenses shall be approved in advance by Client.

Section 5 – Staffing and Subcontractors

A. Consultant shall insure the quality, timeliness, and continuity of services are maintained through the duration of the project. Consultant shall avoid changes to key project personnel to the extent possible.

B. Consultant shall be responsible for any Work performed under this Agreement, including any portion of the Work performed by other individuals or firms. Nothing contained herein shall create any contractual relationship between any additional persons and/or firm(s) and the Client.

Section 6 - Client's Responsibilities

A. The Client shall:

1. Provide available information to Consultant that Consultant deems necessary to perform the Work;

2. Give prompt notice to Consultant whenever the Client observes or otherwise becomes aware of any deficiencies or discrepancies in the Services provided;

3. Furnish, or direct Consultant to provide, at the Client's expense, any necessary additional services, but only if approved by Client;

4. Examine all documents submitted by Consultant, and, if requested by Consultant, provide comments and decisions in a timely manner in order to allow the

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Consultant's work to proceed.

5. Prepare, assemble, and submit any funding applications not covered by a Specific Task Order. Any decision by the Client not to submit a proposal for funding will not affect the terms of this contract.

B. Consultant shall not be liable for delays in performing the Work when such delays are caused by the Client, the Client's other Consultants, or by events which are outside of the control of the Parties and which events could not be avoided by the exercise of due care.

Section 7 – Mutual Obligations

A. This Agreement does not guarantee to Consultant any additional or future work except as expressly authorized herein.

B. This Agreement does not create or imply an exclusive agreement between Consultant and the Client.

C. The Services and any and all interests contemplated under this Agreement shall not be assigned or otherwise transferred except with the written consent of the Client.

D. All documents of any nature prepared by Consultant in connection with the Services provided by Consultant under the terms of this Agreement shall become the property of the Client.

Section 8 - Termination

A. Either party may terminate this Agreement upon written notice to the Project Manager or Consultant’s Representative (as applicable). Electronic mail shall be considered adequate written notice.

B. In the event of termination by either party prior to completion of the Scope of Services described in ***Attachment A***, Consultant shall submit a final invoice for the applicable month which the termination notice is given consistent with the monthly payment schedule amount set forth in Attachment A, section A.3.A below. Client shall not be responsible for payment of any other amounts after a termination notice is given except for the applicable monthly retainer invoice due for the month in which the termination is

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given. The amount of the final invoice shall include all unpaid invoices and authorized expenses incurred up to the date of the termination notice.

C. Ownership of Work Product. In the event of termination, all finished and unfinished Project deliverables prepared by Consultant pursuant to this Agreement shall become the sole property of the Client, provided Consultant is compensated in accordance with this Agreement for all work performed in accordance with this Agreement up to the effective date of termination. Consultant shall not be liable with respect to the Client's subsequent use of any incomplete work product, provided Consultant has notified the Client in writing of the incomplete status of such work product.

Section 9 - General Provisions

A. Consultant will treat all information gained from Client as confidential and proprietary to Client.

B. Independent Contractor – The relationship of the Consultant to the Client shall be that of an independent contractor and not of an officer, employee, or agent of the Client. Nothing herein shall operate as a waiver of Client's rights under the Colorado Governmental Immunity Act. All such rights are reserved herein.

C. Integration – This Agreement (including ***Attachment A***) sets forth all of the terms and conditions of the consulting relationship between Consultant and Client. This Agreement may be modified only in writing signed by both parties.

D. Client understands that the Consultant will work diligently and zealously on their behalf, within the bounds of the Consultant's ethical obligations. Consultant cannot guarantee the outcome of any pursuit.

Section 10 - Indemnification

A. Consultant shall defend, indemnify and hold harmless the Client, its officers, directors, agents and employees, from any claims by a third party, including attorneys' fees, arising out of acts or omissions of Consultant in connection with work performed pursuant to this Agreement.

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Section 11 – Severability

A. The provisions of this Agreement are severable; if any provision is held invalid or unenforceable, the Agreement shall be enforced to the maximum extent permissible and the remaining provisions will continue in full force and effect. Any modification of this Agreement will be effective only if in writing and signed by both Client and Consultant which explicitly states its intention to modify this Agreement.

Section 12 - Choice of Law and Choice of Forum

A. This Agreement shall be governed by the laws of the State of Colorado. In the event of any dispute arising from this Agreement, parties prefer to resolve without resorting to litigation. Any lawsuit arising from this Agreement shall be filed in the District Court of Weld County, Colorado.

Each of the undersigned has read and agrees to the foregoing terms and conditions:

Consultant: Dig Deep Research, LLC

By: _____ Date: _____

Tia A. Cavender, CEO

Client: City of Fort Lupton

By: _____ Date: _____

[Name and Title]

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ATTACHMENT A:
SCOPE OF WORK FOR RETAINER SERVICES

Section A.1 – Background

This Scope of Work describes the activities, schedule and cost for monthly retainer services planned for the performance period of November 3, 2021 through November 2, 2022.

Section A.2 - Approach and Scope of Work

A. ***Project Kick-Off:*** Upon engagement, Consultant shall request completion of a Client Intake and Readiness Assessment and the provision of key background materials (such as Capital Improvement Plan). Consultant will host a conference call with Client to clarify objectives and goals, collaborate to identify priority projects, and map out the monthly work plan for the engagement.

Deliverables from Project Kick-off:

- Client readiness assessment checklist
- Memo documenting meeting outcomes

B. ***Research & Analysis*:** Consultant will collaborate with Client to identify Client's most fundable capital improvement projects and produce an action plan for pursuing the most likely funding prospects in 2022 and 2023.

Deliverable from Research & Analysis: Two-year grants calendar and action plan

C. ***Consulting and Capacity-Building:*** Consultant will hold monthly conference calls to identify and address any potential gaps in grant-readiness and provide clear guidance on next steps to prepare to pursue grants. Consultant's services and deliverables will be customized based on Client needs, usually consisting of a combination of the following:

- Administering a government grants readiness assessment and making recommendations to improve readiness and competitiveness.
- Planning and facilitating meetings with state or federal funding agencies.

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- Assisting with registrations in federal grants application and management systems (Grants.gov and the System for Award Management (SAM)).
- Obtaining standard federal Certifications and Assurances in preparation for submitting federal proposals.
- Providing Board and/or staff training in grant-seeking for capital projects.
- Using an objective matrix to assess funding notices for a go/no-go pursuit decision.
- Evaluating competitiveness for specific federal grants.
- Recommending ways to re-package or re-design projects to be more "fundable" to funding agencies.
- Designing the pursuit strategy for one or more top funding opportunities. The pursuit strategy consists of important planning, design, and budgeting work prior to beginning a funding application.
- Sharing best practices in grant-seeking and grants office management.
- Helping improve staff capacity to advance grant-seeking efforts.
- Facilitating funder cultivation events to targeted funding agencies.

Deliverables from Monthly Meetings:

- Post-meeting memo documenting meeting outcomes and action items

Section A.3 - Cost and Terms

A. The fee for a 12-month engagement to provide the Work described in this Scope is $5,000 per month, for a total not to exceed $60,000 per annum, not including reimbursable expenses.

B. If Client opts to pre-pay the annual retainer fee, a 3% reduction ($1,800) will be applied to the annual fee.

C. Client-requested travel shall be reimbursed to Consultant at applicable Federal per diem and mileage rates. Any such expenses are in addition to the monthly retainer fee and shall be included in the subsequent invoice.

Section A.4 - Project Specific Grant Services (Task Order Basis)

A. As specific grant opportunities are identified as part of the monthly retainer services, if Client requires additional assistance in preparing funding applications that is not

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otherwise part of the standard scope of work of this Agreement, Consultant may prepare a Scope of Work that may be adopted as a specific task order to provide the services required for the specific grant writing/procurement. Any such additional task order must be approved in writing by both parties hereto in order to be effective. Client shall provide engineering and administrative support as necessary and as identified within the project specific Scope of Work.

Deliverables for New Task Orders:

- Narrative Scope and cost estimate per specific grant pursuit

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DIG DEEP

September 29, 2021

Ms. Leann Perino, Finance Director
City of Fort Lupton
130 S. McKinley Avenue
Fort Lupton, CO 80621

RE: Dig Deep's Response to RFP #FTL202106 for Grant Consulting Services

Dear Ms. Perino:

Thank you for the opportunity to submit a proposal to the City of Fort Lupton for grant consulting services in support of the City's municipal projects.

Please accept this letter as Dig Deep's formal commitment to this proposal and cost estimate.

Firm Name:	Dig Deep Research, LLC
Contact:	Tia Cavender, CEO
Business and Contact Address:	1010 S. Joliet St. Suite 207 Aurora, CO 80012
Phone:	(720) 785-4155
FAX:	(720) 785-4155
Email:	Tia@GoDigDeep.com

As the attached proposal describes, Dig Deep is well qualified to guide grant-seeking efforts for the City because of our specialization in helping municipalities identify and secure outside funding for critical capital projects. Because of our investment in our proprietary database of government funding opportunities available in Colorado, Dig Deep can rapidly produce results for the City.

Our team applauds the City's commitment to reducing the burden of rate increases on its residents and businesses by seeking external funding for infrastructure projects. We would be thrilled to help the City find and secure external funding for these purposes.

Sincerely,

Tia Cavender
CEO & Founder

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RESPONSE TO REQUEST FOR PROPOSAL RFP# FTL202106 GRANT CONSULTING SERVICES FOR CITY OF FORT LUPTON SEPTEMBER 2021

The City of Fort Lupton, Colorado needs to identify and secure external funding for future capital improvement projects so that it can avoid or postpone subsequent utility rate increases. Dig Deep Research, LLC is a leading cultivator of funding solutions for cities seeking federal and state funding for capital projects. Our purpose is to help communities leverage external funding to meet their needs and better serve their residents. Because we specialize in municipal capital projects, Dig Deep can immediately produce results, saving the City precious time it would need to expend to bring lesser experienced consulting teams up to speed on the basics.

A. Cover Letter – Please see previous page.

B. Project Approach and Understanding

Project Kick-Off: Dig Deep's team has years of experience collaborating with cities to review funding priorities linked to Capital Improvement Plans (CIP), utility plans, and similar documents. The kick-off meeting as described in the RFP is an essential first step to inform our research. Upon contract execution, Dig Deep will send our City contact a brief client intake form that will help guide our discussion during the kick-off meeting.

Informed by all of the planning documents and the intake form, Dig Deep's team will ask City staff questions about priority projects to help us identify project features that may some projects more competitive to certain funders and clarify project timelines. We will also describe the process and calendar for implementing the next phase.

Deliverable from Project Kick-off:

- Client readiness assessment checklist
- Memo documenting meeting outcomes
- Final scope of work

Monthly Research, Project Management and Reporting: While research will be constantly updated, Dig Deep will prepare a comprehensive list of applicable grant opportunities and timelines within two months of the kick-off call. New opportunities will continue to be added to this list as they are announced. Dig Deep will provide this list in a format to allow City staff to sort or filter the results by category (e.g. parks projects vs the planning department vs water projects).

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When presenting the comprehensive list, Dig Deep will recommend the top priority funding prospects linked to the most fundable CIP projects. Dig Deep's team of experts reviews planned capital improvements and advises clients on which projects are most likely to be competitive for grant funding. The team also makes recommendations about which projects need essential ground-work completed before they will be grant-ready and projects that may benefit from alternative funding (such as low-interest loans). Our team will prepare several ***deliverables***:

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Dig Deep's proprietary database is already populated with Colorado and federal infrastructure grants and is continually updated. This will enable the City to target grants to pursue immediately upon engagement.

- a calendar of grant deadlines
- recommended steps to take to prepare for those deadlines (what Dig Deep calls a "funding pursuit strategy")
- a narrative summary of each top prospect
- most recent grant criteria or other application materials available for that grant program

During regular conference calls, the Dig Deep team advises City staff on and assists with implementing the action steps of the pursuit strategies. The pursuit strategies will position the City to be prepared to either a) execute a Scope of Work for grant writing services, or b) prepare the application itself.

Deliverables:

- Monthly conference calls
- Grant reports (real-time and/or monthly)
- Technical assistance/cultivation meetings with priority funding agencies
- Fundability/competitiveness assessments of CIP projects for funding opportunities
- Written recommendations regarding project phase(s) and recommended budget amounts for specific funding opportunities
- Recommendations on project phasing and stacking funding opportunities
- Recommendations regarding funding pursuits that free up revenues for re-allocation to other priority projects
- Identifying creative funding solutions for projects lacking grant options

These deliverables will achieve the outcome of increasing the City's readiness and competitiveness for government grants. Furthermore, these Strategic Grants Planning

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services will increase the capacity of City staff to pursue and maintain grant funding to decrease future reliance on consultants.

Rationale for Comprehensive Research Performed Early in the Engagement: Dig Deep recommends accelerating the City's planned research schedule in order to rapidly begin to prepare for priority funding opportunities.

Dig Deep Research has built and constantly updates its proprietary database of state and federal funding opportunities for infrastructure projects in the Western U.S., including Colorado. Dig Deep also closely monitors federal budget activity and rules/policy making as it relates to water infrastructure, such as the impact of future infrastructure bills and Covid relief funds. The result is that our team is always aware of the most current state and federal funding opportunities for capital infrastructure projects. Dig Deep makes recommendations about which projects to take to which grant programs and why. Sometimes the most important advice is which grant to not pursue. Only firms with in-depth knowledge of infrastructure funding mechanisms will have the insight to provide such advice.

Project Specific Grant Services: If the City requires assistance in preparing government funding applications, Dig Deep proposes to provide a project specific scope of work and cost schedule on a task order basis.

Deliverable(s): Project Specific Scope of Work including Fee

- Recommendations regarding funding pursuits that free up revenues for re-allocation to other priority projects.
- Identifying creative funding solutions for projects lacking grant options.

C. Project Organization and Team Qualifications

Services to Be Provided by the Principal Firm and any Subcontractors

Dig Deep Research will perform the services described in this response. There are no plans to engage sub-consultants at this time. However, Dig Deep does have established relationships with engineering firms, federal advocacy firms, public outreach firms, and designers, if there arises a need to call upon one of these. Dig Deep also has relationships with Subject Matter Experts with specialties, such as with U.S. Bureau of Reclamation programs or completing FEMA's required Benefit Cost Analysis. Dig Deep may elect to engage Subject Matter Experts as part of its Scope for Retainer services or may indicate them as Sub-consultants in a Project Specific Grant Writing Scope.

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Team Qualifications and Experience as a Whole

Dig Deep's grant-writing team has won more than $203 million in government grants. Through its focus on infrastructure projects for municipalities and other local government entities, Dig Deep has particular expertise with the Bureau of Reclamation and other major state and federal agencies. We are also skilled in helping communities respond rapidly to post-disaster funding opportunities from FEMA. Dig Deep manages the entire application process from start to finish.

Unlike most consultants who come in to write one grant and then move on, Dig Deep understands that complex capital projects can take years to fund. Our team of expert strategists focuses on developing long-term, data-driven plans to enable communities to fund crucial capital projects while reducing reliance on tax revenues. This approach enables our clients to plan their grant pursuits strategically over several years, allowing time to complete planning documents, develop funder relationships, and budget for proposal preparation.

Deep focuses on the Western U.S., with extensive understanding of the unique needs and opportunities facing municipal water projects in this resource-limited region.

Dig Deep's team includes researchers, grant professionals, technical writers, civil engineers, former public works directors, graphic designers, videographers, and marketing professionals.

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With engineers on our bench and on call, the Dig Deep team can complete initial project designs for grant applications or advise your engineers in the unique aspects of project design for grants.

Dig Deep's core competencies include the following:

- Researching, analyzing, and monitoring funding opportunities
- Developing multi-year strategic funding pursuit plans
- Identifying and planning unique funding approaches
- Providing technical assistance to clients
- Assisting with project planning to improve the competitiveness of projects
- Leveraging opportunities to minimize out-of-pocket project expenses
- Planning for meeting matching fund obligations
- Establishing and helping maintain relationships with crucial stakeholders and partners

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- Promoting projects within the community and to funders
- Building relationships between funders and clients
- Building capacity within municipalities to plan, develop, implement and secure funding for projects
- Federal and state grant writing
- Grants management and reporting

Key Personnel Assigned as Team Members to this Project

Project Lead: Cheryl Kester, M.A. | Operations Manager and Senior Grants Strategist

Role on Project: Project manager, client contact, chief strategist, grant writer

Summary Bio: Specializing in securing federal funding, Cheryl has raised more than $170 million in grants and contracts, including large capital and multi-year projects. With more than 20 years of experience, Cheryl is a gifted educator, author, and grants professional. She is a national board member for the Grant Professionals Association (GPA) and a GPA-Approved Trainer. She co-authored *Writing to Win Federal* Grants and *Writing to Win Federal Grants: The Workbook*, published by CharityChannel Press. Cheryl holds a master's degree from Georgetown University and has earned the Grant Professional Certified (GPC) and Certified Fundraising Executive (CRFE) credentials.

Tia A. Cavender, M.A. | Chief Executive Officer

Role on Project: Senior Consultant on strategy, competitiveness and engaging funders

Summary Bio: As the lead strategist for Dig Deep Research with more than 20 years of experience, Tia advises local government agencies, developers, and engineers on securing external funding. A frequent conference presenter and author, Tia is known as a national expert on capital grants and government grant-seeking. She is tireless in her thoughtful structuring of each project and searching for long-term solutions that meet the needs of the communities she serves. Tia holds two master's degrees from the University of Colorado.

Timothy Gross, PE | Sr. Engineering Advisor

Role on Project: Subject matter expert (SME) on CIP, design; interfaces with engineers

Summary Bio: Timothy served more than a decade as Director of Public Works and municipal City Engineer. He managed a $12 million annual operating budget and a $32 million annual Capital Improvement Plan. He has honed his ability to

Dig Deep Distinctive

With a former public works director and engineer on our team, Dig Deep speaks the language of municipalities and the agencies who fund them.

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translate engineering documents into fundable grant proposals. Timothy specializes in financing, designing, estimating, and managing the construction of public infrastructure.

Fernando Gonzalez, MBA | IT Manager

Role on Project: Database manager, researcher, administrative services

Summary Bio: Fernando is an Oracle Certified professional with a range of knowledge in technologies and leadership practices. With 20 years of experience leading database and GIS software development teams in the utilities industry in South America, Spain and the U.S., this multilingual software engineer improves Dig Deep's database of grant funding opportunities for capital improvement projects and keeps Dig Deep's internal tools running. Fernando holds a B.S. in computer science and an MBA.

Cindy Dewitt, M.A. | Grants Strategist

Role on Project: Researcher, report writer, grant writer

Summary Bio: Cindy has 20 years of experience in strategic planning, grants management, program evaluation, and sustainability. She has written, administered, and reported on grant funding in the federal, state, and private foundation sectors. A Grant Professional Certified (GPC), she is dedicated to the grants profession to support organizations to make positive changes in the communities that Dig Deep serves. Cindy earned a master's degree in Community and Economic Development.

D. Project Timeline

Consultant's Approach

Dig Deep Research will assist Fort Lupton with researching, identifying and pursuing funding opportunities to assist with financing capital projects. As the RFP has requested, Monthly Retainer Services (research, management and reporting) are addressed in this response separately from Project Specific Grant Services. Dig Deep is prepared and well-positioned to offer both simultaneously.

Monthly Research, Management and Reporting

The proposed timetable for delivering monthly retainer services is summarized in this table:

Strategic Grants Planning Approach and Timetable	
Activity	**Timeframe**
Kick-Off Meeting	Within two weeks of executed contract
Memo documenting meeting outcomes Final Scope of Work	Within five business days of meeting
Perform funding opportunity research, produce opportunities list; update monthly	Months 1-2 and on-going throughout engagement

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Narrow funding opportunities to top prospects	Month 2
Develop funding pursuit action calendar	Month 2
Ongoing - Begin monthly meetings to execute funding pursuit action steps	Month 2 and on-going throughout engagement
Ongoing - Perform competitiveness assessments of projects for funding Top Prospects	Months 3-5 and on-going as needed
Engage in funder cultivation & technical assistance activities with City	Months 4-12
Identify leverage opportunities	On-going throughout engagement
Advise on new and time-sensitive funding opportunities	On-going throughout engagement

Project Specific Grant Services

Dig Deep's approach to preparing grant applications has been honed over more than two decades of experience assisting diverse teams win grants. Completing a government grant application requires project management skills and tools and intense attention to detail. Dig Deep leads this process, which is summarized in the table below.

Approach to Preparing Grant Applications
ACTIVITY
Review guidelines and FOA; perform competitiveness assessment* (*prior to executing Scope)
Develop application preparation timeline and assignments for content, drawings, budget, etc.
Attend Technical Assistance webinars from funder
Meet with City staff, engineers of record and other stakeholders to obtain and confirm project description and content
Dig Deep Sr. Engineering Advisor prepares initial design, budget, and project timeframe for grant* (*Upon request from City; otherwise liaises with City engineer or firm of record)
Prepare drafts of narrative content, put budget into federal template, prepare attachments
Send all forms, certifications, and assurances to City Contact to obtain signatures
Collect, organize and prepare for submission all attachments, including letters of support
Prepare and upload final versions of application package
Submit to Client Word, Excel and PDF versions of all final documents as submitted

E. Project Coordination and Monitoring

Dig Deep's project coordination and monitoring tools and processes are time-tested and effective at ensuring all key collaborators have a clear understanding of timelines, action steps, and vital deliverables. Monthly meetings will allow us to monitor progress on grant pursuit strategies, share new funding opportunities, and discuss current or upcoming projects. Unless an in-person meeting is specifically requested by the Client (on a reimbursement basis), meetings will take place virtually or by phone. Dig Deep employs a

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6. Similar Project Experience

Clear Communications Services is a new business founded in 2020 and will only be able to provide one professional reference at this time. Both founders have extensive careers and clients both in the commercial and public sector and made the decision to branch out at the end of 2020. Our recent company formation does not speak to the depth and breadth of our business management knowledge and successful project track record. Our principals have extensive references (attached) and we would be happy to furnish full contact information and context for the administrative, secretarial and transcription services as applicable upon request.

Professional Reference: Alpine Investment Partners

Alpine Investment Partners	
Scope of Work	Provide on-going proposal support and consulting services on an as needed basis. Support entails reading active solicitations and evaluating criteria against win analysis. For any opportunities with a positive win analysis full proposal support is required through bid submission. Proposal Support includes but is not limited to: ▪ Proposal Management: creating a customizable response that meets the customer's needs and is delivered on time ▪ Writing Support: creating a compelling response that highlights client's win themes and value ▪ Additional Support: graphic design, desktop publishing, schedule coordination, contractual support
Period of Performance	12/1/2020 – Current
Contract Value	Confidential
Reference Contact Info	Can be provided upon request

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project management tool (Monday) to manage and execute it work on behalf of clients. Upon request, Dig Deep can grant Client access to the constantly updated, real-time funding opportunity list. Dig Deep also utilizes communication and task-management tools such as email, shared calendars, and virtual workspaces to ensure efficiency and coordination with Clients.

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Dig Deep is rooted in and deeply committed to Colorado. Our knowledge of Colorado funding agencies is unsurpassed, and we have strong relationships with federal and state funders of capital projects.

F. Proposed Cost of Services

Monthly Research and Reporting Services (Retainer)

As the RFP notes, these services will be paid as a monthly retainer. Dig Deep's flat fee for this monthly retainer is $5,000 per month. Dig Deep's staff are not compensated on a per task or an hourly basis. Dig Deep works only on a flat-fee basis, which is inclusive of all deliverables named in this proposal, administrative support, overhead, and profit. We anticipate no additional administrative or other materials costs.

Project Specific Grant Services

For grant proposals, Dig Deep works on a flat fee basis. The fee is set at the time of entering into the Scope. Fee amounts are influenced by many variables, such as time to deadline, the funding agency, complexity of proposal, number of partners, size of project, need for engineering services or support, and need for other Subject Matter Experts. Sample fees recently charged for grant applications include the following:

- Oregon Regional Solutions Regional Infrastructure Fund - $12,000
- Oregon Water Resources Department Feasibility Study Grant - $32,000
- FEMA Advance Assistance Post-Fire - $50,000
- U.S. Bureau of Reclamation Water SMART Water & Energy Efficiency - $50,000
- Business Oregon Seismic Retrofit - $50,000

This list is not an offer or bid for an actual grant pursuit on behalf of the City of Fort Lupton

G. Similar Project Experience

Dig Deep has been performing comparable work for municipalities since its founding in 2010. We include here a representative sample of recent or on-going client engagements that will demonstrate our team's ability and qualifications to accomplish the overall project goals within the financial and time constraints. These clients and former clients have agreed to be included as references on behalf of Dig Deep.

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CITY OF NEWPORT, OR | STRATEGIC GRANTS RESEARCH AND PLANNING, GRANT WRITING

DEAN SAWYER, MAYOR
530 E MAIN ST. 169 SW COAST HIGHWAY, NEWPORT, OR 97365 | (541) 574-0645
D.SAWYER@NEWPORTOREGON.GOV

Since 2011 to today, Dig Deep has served as the City's grant consultant of record to raise capital funds for public works capital improvement projects, including but not limited to water projects, building renovations, and parks and recreation. Dig Deep monitors funding opportunities, advising the City on the most strategic way to pursue funding and meet its financial goals. Recently, Dig Deep has focused entirely on developing and implementing a long-term funding strategy for the City's $80 million, 10-year dam remediation project.

Outcomes:

- $55 million generated in grants, low interest loans and interest savings
- at least 15 state and federal grants won
- average annual ROI of 6:1 for the past seven year

COUNTY OF HAWAII WASTEWATER DIVISION | RESEARCH PLANNING, GRANT REPORTING

BRENDA IOKEPA-MOSES, DEPUTY DIRECTOR, DEPT. OF ENVIRONMENTAL MANAGEMENT
345 KEKUANAO'A STREET, SUITE 41, HILO, HI 96720 | (808) 961-7178
BRENDA.IOKEPA-MOSES@HAWAIICOUNTY.GOV

In 2020 and 2021, Dig Deep researched, analyzed and prepared a top funding prospects list and Strategic Funding Plan for priority capital improvement projects. Dig Deep also assisted in submitting grant reports to the U.S. Bureau of Reclamation, advised the County on maximizing future funding requests, and met monthly with Division staff to guide the implementation of the funding strategy.

Outcomes:

- Identified priority federal grants to pursue with funding potential exceeding $6.5 million
- Identified loan forgiveness opportunities for green projects under the SRF loan program
- County is pursuing two federal grants, has won one state grant, and is pursuing two USDA low-interest loans for which Dig Deep identified eligibility

SEAL ROCK WATER DISTRICT, SEAL ROCK, OR | STRATEGIC PLANNING

ADAM DENLINGER, DISTRICT MANAGER
1037 NW GREBE STREET, SEAL ROCK, OR 97376 | (541) 563-4447 | ADENLINGER@SRWD.ORG

Engaged in 2015 and again from 2018 to 2020, Dig Deep created a strategic funding plan to help Seal Rock Water District identify and secure grant funding for its capital and infrastructure projects.

Outcomes:

- Helped cultivate relationships with targeted funding agencies
- Identified funding opportunities including $10 million in low-interest loans and $3 million in grants
- Helped develop a comprehensive funding pursuit strategy for a new water treatment plant

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CITY OF AURORA WATER DEPARTMENT | STRATEGIC GRANTS RESEARCH AND PLANNING
JO ANN GIDDINGS, DEPUTY DIRECTOR
15151 E. ALAMEDA AVE. SUITE 4600, AURORA, CO 80012 | (303) 739-7320

In 2021, Dig Deep researched and identified multiple state and federal grant and loan opportunities, linking these opportunities to the Department's five-year CIP. Dig Deep's analysis included an assessment of the impact of the Covid 19 pandemic on funds available to award

Outcomes:

- Identified at least $6.9 million in federal grants and several million in state funding to pursue
- Provided actionable recommendations to enable the City to pursue state and federal funding

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GRANT CONSULTING SERVICES

City of Fort Lupton

RFP# FTL202106

September 29, 2021

Submitted to:
City of Fort Lupton
130 S McKinley Avenue
Fort Lupton, CO 80621
Bids@FortLuptonCO.gov

Submitted by:
Clear Communications Services
22303 Anasazi Way
Golden, CO 80401
720-688-1940

CLEAR
COMMUNICATIONS SERVICES

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CLEAR
COMMUNICATIONS SERVICES

September 29, 2021

City of Fort Lupton
130 S McKinley Avenue
Fort Lupton, CO 80621
Bids@FortLuptonCO.gov

Subject: Response to Grant Consulting Services

Reference: RFP# FTL202106

Clear Communications Services is pleased to submit the enclosed quote in response to RFP# FTL202106 for Grant Consulting Services. Our team has extensive direct experience in this field that will be a great asset to your project. Clear Communications Services is dedicated to providing the best services to our clients by first understanding their needs and then creating a unique and tailored solution to address those needs.

Clear Communications Services understands takes no exceptions with the terms or conditions presented. Below is the contact information for both representatives able to answer any questions or concerns on behalf of Clear Communications Services. We look forward to sharing how we can best meet your needs.

Contact Information:

Brittany Dillon, CEO
bdillon@clearcommservices.com
703-727-3696

Chris Wolohan, General Manager
cwolohan@clearcommservices.com
214-931-8860

Sincerely,

Britany Dillon, CEO
22303 Anasazi Way
Golden, CO 80401
720-688-1940

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1. PROJECT APPROACH AND UNDERSTANDING

Clear Communications Services has direct experience in the type of work needed by the City of Forth Lupton. We understand and appreciate the need to expand sources of revenue by taking advantage of Grants that could help offset rate increases on residents. Clear Communications Services understands the scope of work needed by the city and has designed a strategy that we believe will offer you the most benefits and flexibility to fit your needs.

1.1 Project Kick-off

Upon award, a Project Kick-off call will be scheduled between the city staff and Clear Communications Services. The purpose of this meeting is to ensure the goals, objectives and background information is clearly communicated to our team. To ensure no details are missed we will request that the call be recorded and will use it internally to brief any staff that will be working on this project. Clear Communications Services uses Microsoft products internally to organize information. Upon award, an internal SharePoint site will be created to keep record of all notes, calls and information related to this project. We know clear and effective communication between all staff ensures the job is done accurately and efficiently. Following the kick off, Clear Communications Services will deliver a memo documenting meeting outcomes and the final scope of work.

Figure 1. Project Kick-Off Deliverables.

Product	Required By	Timeline
SharePoint Site Created	Internal Requirement	Within 48 hours of award
Project Kick Off Memo	City Requirement	Within 24 hours of kick off
Updated Schedules or SOW (if needed as a result of kick off)	Internal Requirement	Within 48 hours of kick off

1.2 Monthly Research, Project Management and Reporting

On a monthly basis, Clear Communications Services will conduct research building a report that identifies potential grants. This report will be built out to show deadlines, important details, source of information and priority level. Following the kickoff, Clear Communications Services will build a report in the desired format of the city to approve. The city will ensure all intended information is displayed in a way that will helpful and informative. Any changes or updates that are needed will be made by Clear Communications Services and a base template will be stored on the SharePoint site. Clear Communication Services will present the Grant Report to the city on a monthly basis through a conference call. Internally, we will review the report weekly as a quality assurance check. During the internal weekly review, if anything in the report is deemed time sensitive or critical the city will be given information immediately.

Figure 2. Monthly Research, Project Management and Reporting Deliverables.

Product	Required By	Timeline
Monthly Grant Report	City Requirement	First Monday of Each Month
Monthly Progress Meeting/ Conference Call	City Requirement	Monthly Basis (Dates TBD)
Weekly Quality Review	Internal Requirement	Friday on a Weekly Basis

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1.3 Project Specific Grant Services

Clear Communications Services understand the city might need additional Grant Services based on opportunities that are identified. We will provide a Scope of Work and Cost Schedule as directed by the city to support these efforts. Within the Scope of Work we will outline a schedule and resources the city deems necessary to complete writing the Grant.

Figure 3. Project Specific Grant Services Deliverables.

Product	Required By	Timeline
Project Specific Scope of Work and Cost Schedule	City Requirement	As needed basis

2. PROJECT ORGANIZATION AND TEAM QUALIFICATIONS

The approach our company will take highlights our expertise in managing resources and ensuring quality work is delivered. Our team will be led by the founders of Clear Communications Services to ensure quality work is delivered and to have direct interface with the city. Clear Communications Services understands the importance of communicating expectations and roles in a project setting. For that reason, we feel it is necessary to be the primary point of contact with the city. We will work contractors who will research and compile the Grant Report for our internal review. We will hold internal status call multiple times throughout the week to check on progress and ensure the overall direction of the project meets all milestones.

Figure 3. Roles and Responsibilities.

Roles	Responsibilities
Project Manager Brittany Dillon	▪ Be the primary POC between Clear Communication Services and the City ▪ Organize and run monthly meetings with the city ▪ Review and approve Grant Report prior to meeting ▪ Attend internal status calls
Quality Assurance Lead Chris Wolohan	▪ Attend monthly Grant Progress Conference calls ▪ Run and organize internal status calls and Quality Assurance calls ▪ Review Grant Report on a weekly basis and provide notes and feedback
Contract Analyst TBD	▪ Research and compile Grant Report ▪ Attend and take notes on monthly Grant Progress Conference calls ▪ Attend all internal status calls and Quality Assurance calls ▪ Amend and review Grant Report based on Quality Assurance calls

Experience

Brittany Dillon will be the designated Project Manager for this effort. With ten years of experience managing large and complex federal proposals, she has the skills and capabilities to successfully lead this project. She has years of experience reading through requests for proposals (RFPs), request for quotes (RFQs) and statements of work (SOWs) and outlining requirements for a complaint proposal response. She has led large and small teams with various roles and responsibilities to ensure an on time product is delivered.

Chris Wolohan is proposed as the Quality Assurance Lead. Chris has over twenty years of experience in a variety of progressively more senior finance roles spanning the fields of public accounting, investment banking, corporate development and serving as a Chief Financial Officer with responsibility for funding operations and holding profit-and-loss responsibility for multiple

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organizations. While running corporate development at Primoris the full-service mergers and acquisitions function responsible for completing approximately one acquisition every calendar quarter during Mr. Wolohan's tenure), Mr. Wolohan led reviews of a variety of infrastructure firms and contracting organizations. In finding, evaluating and completing these deals, Mr. Wolohan made many, many connections within the infrastructure world including among operating executives and financing sources. Tapping into this network in support of this initiative will be a vital ingredient for success. Similarly, familiarity with financing sources and past experience successfully positioning project-based businesses and initiatives for successful capital campaigns is a necessary skill in performing the Grant Consulting Services here. In tandem with Brittany Dillon's extensive background working in the field of public grant sourcing, the Clear Communications Services team is well-positioned to provide significant value.

3. PROJECT TIMELINE

The project timeline will be a living document that we will continue to update and modify as needed. Below are the initial deliverables with a projected timeline that were outline in *Section 1* above.

Figure 4. Project Timeline.

Product	Required By	Timeline
SharePoint Site Created	Internal Requirement	Within 48 hours of award
Project Kick Off Memo	City Requirement	Within 24 hours of kick off
Updated Schedules or SOW (if needed as a result of kick off)	Internal Requirement	Within 48 hours of kick off
Monthly Grant Report	City Requirement	First Monday of Each Month
Monthly Progress Meeting/ Conference Call	City Requirement	Monthly Basis (Dates TBD)
Weekly Quality Review	Internal Requirement	Friday on a Weekly Basis
Status Calls	Internal Requirement	Multiple weekly calls
Project Specific Scope of Work and Cost Schedule	City Requirement	As needed basis

4. PROJECT COORDINATION AND MONITORING

To ensure effective communication, the Project Manager will act as the sole POC to the city. This keeps communication streamlined and effective. The Project Manager will pull in additional resources for meetings with the City that might be necessary. The Project Manager will be responsible for progress, staffing, budget and deliverables. Clear Communications Services will handle these things internally through status calls and an organized SharePoint site to make sure information in readily accessible and up to date.

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5. Proposed Cost of Services

5.1 Monthly Research and Reporting (Retainer)

We have included a breakdown of monthly research and reporting roles on a not-to-exceed basis.

In the event of the passage of significant legislation (such as that presently contemplated by Congress), project scope limitations may necessitate an orderly prioritization of available grants. Clear Communications Services anticipates client engagement and assistance in affirming the prioritization of available grants, including both timing and grant size considerations, to enable an efficient scoring and ordering of grants as they become available. With this approach, Clear Communications Services is confident we can preserve client budget integrity while maximizing grant opportunities.

Figure 5. Breakdown of Monthly Research and Reporting.

CCS - Grant Consulting Services Monthly Retainer Breakdown

Monthly Grant Search & Reporting

	Hours	Hourly Rate	Extended Price
Project Manager	12	$ 125.00	$ 1,500
Quality Assurance Lead	25	$ 95.00	$ 2,375
Contract Analyst	25	$ 50.00	$ 1,250
Total	62		$ 5,125

Notes:

1. Travel, if required, will be billed using the GSA per diem rates then in effect with no markup or administrative fees of any kind
2. Pricing is presented on a not-to-exceed basis; additional services available upon request

5.2 Project Specific Grant Services (Task Order Basis)

While Project Manager and Quality Assurance Lead roles need not change, the nature of a specific grant will dictate the expert(s) we may seek to add to our project-specific efforts and the seniority/experience of any/all experts as well as the level of their involvement.

We can provide specific examples of the Clear Communications Services network of subject matter experts who may consult on a given project specific grant services opportunity upon request.

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PUBLIC ADVISORY GROUP

PROPOSAL FOR

GRANT CONSULTING SERVICES

(RFP #: FTL202106)

SUBMITTED SEPTEMBER 29, 2021, TO:

LEANN PERINO, FINANCE DIRECTOR

CITY OF FORT LUPTON

130 SOUTH MCKINLEY AVENUE

FORT LUPTON, CO 80621

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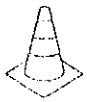

SIMILAR PROJECT EXPERIENCE 11

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COVER LETTER

PUBLIC ADVISORY GROUP

September 29, 2021

Leann Perino, Finance Director
City of Fort Lupton
130 South McKinley Avenue
Fort Lupton, CO 80621

Subject: Cover Letter

Regarding: Request for Proposal FTL202106 for Grant Consulting Services

Director Perino,

I am pleased to submit the following proposal in response to the above noted City of Fort Lupton request for proposals on behalf of my firm, Public Advisory Group. As our owner, I hereby bind Public Advisory Group to this proposal and its contents for the duration of the City's procurement process.

For this engagement, Public Advisory Group's proposed project manager is Grant Gager. Grant recently joined the firm after serving as the City of Ketchum Idaho's Director of Finance and Internal Services where he was responsible for the City's finance and administration functions, including grant pursuit and administration. Earlier in his career, Grant managed capital program formulation and delivery for public agencies with a focus on project funding. Helping public agencies fund projects is the work that Grant most enjoys!

Public Advisory Group was formed in February 2021. But, while the firm is young, our team has successfully managed grant pursuit programs for other entities. To learn more about Public Advisory Group, or to schedule a follow-up conversation, please contact proposed project manager Advisor Grant Gager at (208) 725-3259 or Grant@PublicAdvisoryGroup.com.

Respectfully submitted,

Chloe Berier
Owner

235 DREDGE CAMP ROAD • STANLEY, IDAHO 83278

(208) 725-3259 • Info@PublicAdvisoryGroup.com

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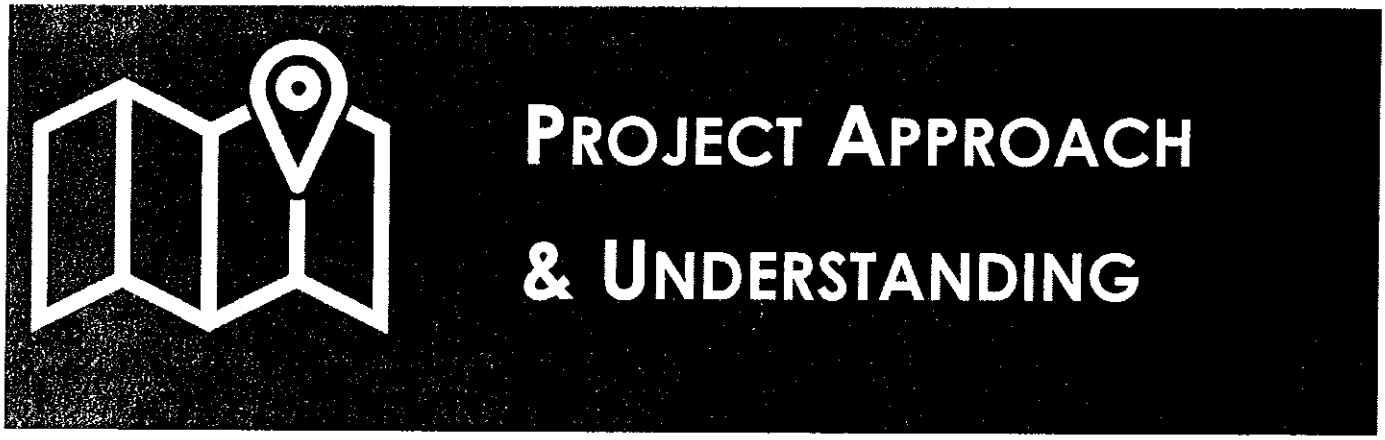

PROJECT APPROACH & UNDERSTANDING

Public Advisory Group's core values of communication, hard-work and integrity lead our approach to each engagement. Guided by **our "The Client Decides" motto**, we undertake each project with an intent to exceed our client's expectations. At Public Advisory Group, we understand the importance of funding capital programs. Our experienced team is immediately prepared to support the City of Fort Lupton as it implements a grant pursuit program. Based upon the scope of services in the request for proposal, our team is proposing the following process to support the City.

PHASE 1: UNDERSTAND CITY PROJECTS AND FUNDING NEEDS

If awarded the project, Public Advisory Group will work to quickly schedule a kick-off meeting with the City's project manager. In addition to clarifying goals and objectives with the City to guide the team, the kick-off meeting is also a time to **establish project protocols including:**

- **Channels of Communication**
- **Data Sharing Standards**
- **Meeting Schedules**

The Public Advisory Group team will also use this kick-off meeting to reconfirm certain aspects of:

- **The City Capital Improvement Plan**
- **Upcoming Projects**
- **Identified Funding Needs**

The proposed project manager will meet with the City project manager with the goal of understanding the City's full spectrum of needs and opportunities. **At the conclusion of the kick-off meeting, our team will provide a memorandum to the City documenting the meeting outcomes and final scope of work.**

Our team will also compile all relevant project information into a City-specific database to track both needs and opportunities as the project progresses. The database will identify relative priorities of the City, as well. Our team will use this database to target likely grant funding opportunities for each project or category of projects. Understanding that there are two types of grant cycles and awards, annual and unique, our team will begin to match certain projects or equipment acquisitions with known and likely grant opportunities. This will enable the **creation of a workplan that contemplates both annual grant appropriation cycles and unique opportunities** that arise.

Almost as importantly, this database will also enable **monthly status reporting for the City throughout the project to ensure alignment of expectations and information** as the project moves forward.

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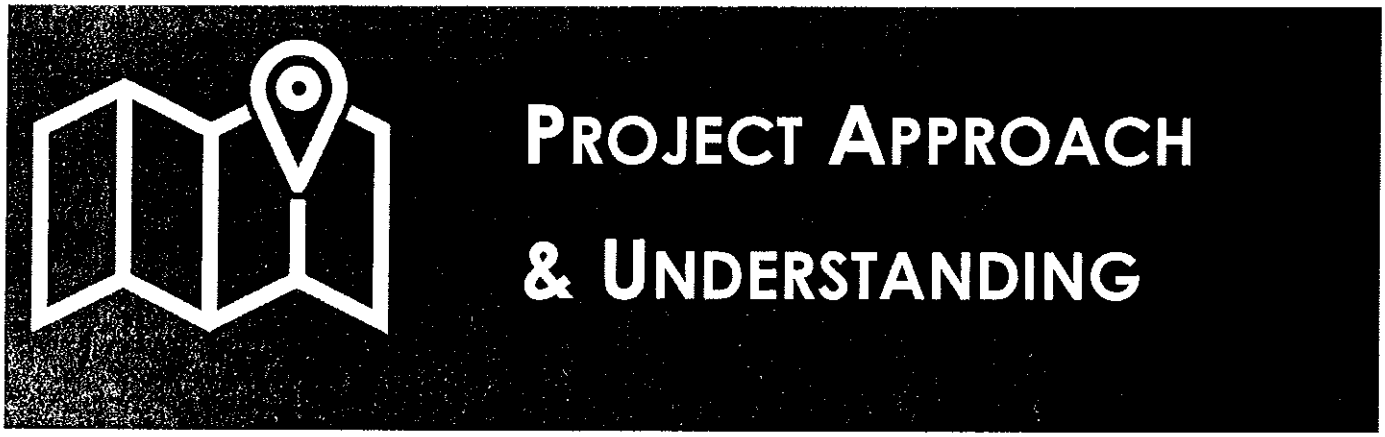

PHASE 2: IDENTIFY APPROPRIATE GRANT FUNDING OPPORTUNITIES

Our team has already reviewed the City's capital plan and has identified possible areas of focus. Once we have a deeper understanding of the City, its projects and funding needs, Public Advisory Group will work to identify appropriate grant funding opportunities for the projects and initiatives identified as high priorities by the City; we assume that this will most likely be driven by project timing. Guided by projects that have been identified by the City as funding priorities, Public Advisory Group will identify annual grant appropriation cycles appropriate for certain priorities. For funding needs that do not fit into routine annual grant cycles **our team will review publicly listed unique funding opportunities at sites including, but not limited to:**

- **Colorado Department of Local Affairs**
- **Grants.gov**
- **GrantWatch**
- **Community Foundation of Northern Colorado**

These sites, and similar public databases, are foundational to the grant search process and provide insight into one-time programs like the American Rescue Plan Act and similar appropriations. For certain items identified in the capital plan related to recreation and human service programs, Public Advisory Group will also review grant funding opportunities available from private and non-profit foundations.

Public Advisory Group also monitors state and federal legislative meetings to keep abreast of newly available grant opportunities and will incorporate that into our process as well. **We expect that the federal infrastructure and budget reconciliation bills currently under consideration by the US Congress will be significant funding opportunities for the City**. Our team has been monitoring these bills and will continue to do so as they move to passage.

At Public Advisory Group, we know that it is critical to ensure alignment between the City's funding need and available opportunities. So, as we evaluate funding opportunities, we also evaluate their level of appropriateness for the project. **Each month, our team will review project progress and the status of identified grants with the City's project manager during a conference call.** Public Advisory Group will utilize the database created earlier in the project to facilitate such reporting.

This phase of work constitutes the monthly retainer program sought by the City. If appropriate funding opportunities are identified and the City requests assistance in the application process, the work plan on the following page will be initiated.

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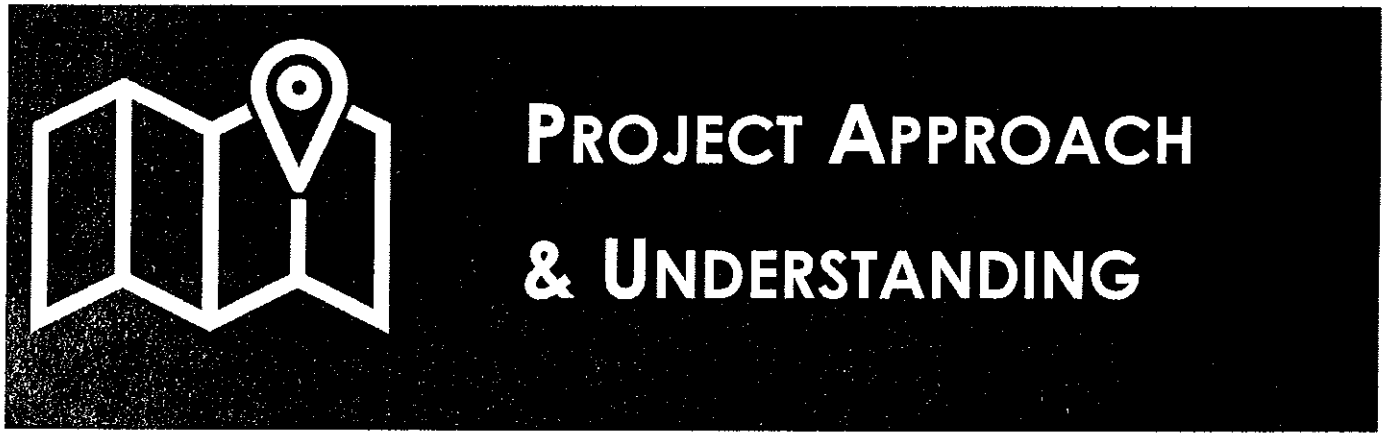

PHASE 3: PREPARE GRANT APPLICATIONS

Once the Public Advisory Group team has identified a potential grant funding opportunity, we will work with the City project manager to confirm that it is appropriate for an identified project (or program of projects) within the City's portfolio. If there is determined to be a fit between the need and opportunity, Public Advisory Group's project manager will initiate preparation of a scope of work and budget proposal at the City's direction.

If the City engages Public Advisory Group on a task order, we will partner with the City team to gather project data and information specific to the application. Our team has found that incorporating relevant data and statistics in an application package provides funding entities metrics to assess an application and the underlying project. Therefore, **we encourage the City to provide as much relevant data as possible to support each application**.

PHASE 4: SUPPORT THE CITY

Once a grant application has been submitted, Public Advisory Group will support the City team as desired through the application review process. Whether responding to questions or submitting supplemental information, our team will lead any efforts requested by the City for grant applications that we have been retained to formulate.

And, at Public Advisory Group we recognize that be awarded a grant is only the first step in a long process. Therefore, **we are able to support the City post-award with:**

- **Accounting and Budgeting**
- **Grant Administration and Compliance (including on SAM.gov)**
- **Procurement Support**
- **Close-out Reports**

Public Advisory Group recognizes that the City of Fort Lupton will achieve success in its grant pursuit efforts if this is an on-going process. Therefore, **the project team will be continuously monitoring grant funding opportunities** as described in Phase 2 of the Project Approach and Understanding. Project phases 3 through 4 will be repeated at the discretion and direction of the City only for certain identified projects.

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PUBLIC ADVISORY GROUP

PROJECT OGANIZTATION & TEAM QUALIFICATIONS

ABOUT US

Public Advisory Group is a woman-owned company that was formed to provide local government entities cost-effective access to high-quality professional services. The company's practice is aligned in three service areas: advisory, advocacy and assistance. **Our advocacy line of business provides support to organizations seeking to raise awareness and advance projects**. Included in the advocacy line of business are grant pursuit services, like the City of Fort Lupton is seeking. While we are headquartered in Idaho, **Public Advisory Group is currently registered in good standing with the Secretary of State in Colorado** to serve our clients there (see next page). Additionally, Public Advisory Group maintains adequate professional liability and commercial automobile insurance to perform the required services; at least $1 million per occurrence of each coverage.

For this project, Public Advisory Group will not utilize any subconsultants and will self-perform all tasks described in the Project Approach and Understand section of this proposal.

ADVOCACY: GRANT CONSULTING SERVICES

Public Advisory Group's advocacy line of business supports organizations as they seek to raise awareness of an issue or advance a project. Grant consulting services are core support services that we offer organizations because raising awareness and **moving projects forward often begins with obtaining funding**. Whether a client is seeking to advance an infrastructure project, obtain critical equipment or launch a new program, grant funding can play a critical role.

In order for a project to move from concept to reality, it is important for the project sponsor to identify a path from conceptualization through scoping and funding to delivery. In doing so, **it is important for entities to be strategic in their pursuit of external funding sources**. Too often, we have seen entities identify a grant opportunity and pursue funding before the project scope, budget and funding sources are fully understood. To avoid this common outcome, Public Advisory Group partners with cities to understand their projects and funding needs. Our team takes a holistic approach to understanding each project (or program of projects) and its course through the project delivery lifecycle. Doing so helps enable success and avoid project pitfalls such as the "expensive money" trap that occurs when a funding source has negative impacts that outweigh the positive contributions to the project, such as high monitoring or administration costs. **Public Advisory Group's experience can help municipalities ensure that a project funding opportunity appropriately matches the project need** without being cumbersome to the scope, schedule and budget...or administrative personnel!

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PUBLIC ADVISORY GROUP

PROJECT OGANIZTATION & TEAM QUALIFICATIONS

OFFICE OF THE SECRETARY OF STATE
OF THE STATE OF COLORADO

CERTIFICATE OF FACT OF GOOD STANDING

I, Jena Griswold, as the Secretary of State of the State of Colorado, hereby certify that, according to the records of this office,

public advisory group llc

is an entity formed or registered under the law of Idaho has complied with all applicable requirements of this office, and is in good standing with this office. This entity has been assigned entity identification number 20211790054.

This certificate reflects facts established or disclosed by documents delivered to this office on paper through 07/30/2021 that have been posted, and by documents delivered to this office electronically through 08/03/2021 @ 11:31:09.

I have affixed hereto the Great Seal of the State of Colorado and duly generated, executed, and issued this official certificate at Denver, Colorado on 08/03/2021 @ 11:31:09 in accordance with applicable law. This certificate is assigned Confirmation Number 13343998.

Jena Griswold

Secretary of State of the State of Colorado

End of Certificate

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PUBLIC ADVISORY GROUP

PROJECT OGANIZTATION & TEAM QUALIFICATIONS

Public Advisory Group is proposing two employees for this engagement: Grant Gager (project manager) and Chloe Berier (project support). The nature of the specified work in this engagement will not produce a capacity constraint for either proposed employee, if awarded to Public Advisory Group. A brief description of the proposed team's experience and education follows.

GRANT GAGER

- Pennsylvania State University, Master of Business Administration, 2010.
- University of Rochester, Bachelor of Arts, Economics, 2003.

Prior to joining Public Advisory Group, Grant Gager served as the City of Ketchum Idaho's Director of Finance and Internal Services from November 2016 to February 2021. In that role, Grant oversaw the implementation and management of large strategic initiatives of the City including a city hall purchase and fire station bond and construction. As City Treasurer, Grant was also responsible for all accounting and finance functions, including grant management. During his time with the City, **Grant Gager managed the application and administration processes for grants or loans from:**

- **FEMA Public Assistance and SAFER Programs**
- **Idaho Commission on the Arts**
- **Idaho Community Foundation**
- **Idaho Department of Environmental Quality**
- **Idaho Local Highway Technical Assistance Council**

In addition, Grant has managed capital program funding for public agencies in California, Connecticut, Idaho and New York where he pursued and managed grants from state and federal entities, including the US Department of Transportation and FEMA. Grant's experience pursuing state and federal grants provides unique insight into grant pursuit that will help Fort Lupton succeed!

CHLOE BERIER

- Montana State University, Bachelor of Science, Marketing, 2003.

Chloe Berier started Public Advisory Group after a career in marketing and corporate communications. Chloe has managed a diverse portfolio of business relationships in industries as diverse as broadcasting, consumer products, financial services and human services. Chloe's diverse experience supports the project manager's government-influenced approach. But, most importantly, as a former Weld County resident, Chloe brings an awareness of the local community and environment to the project team. And, she's always eager to get back to Fort Lupton to see old favorites and also what is new!

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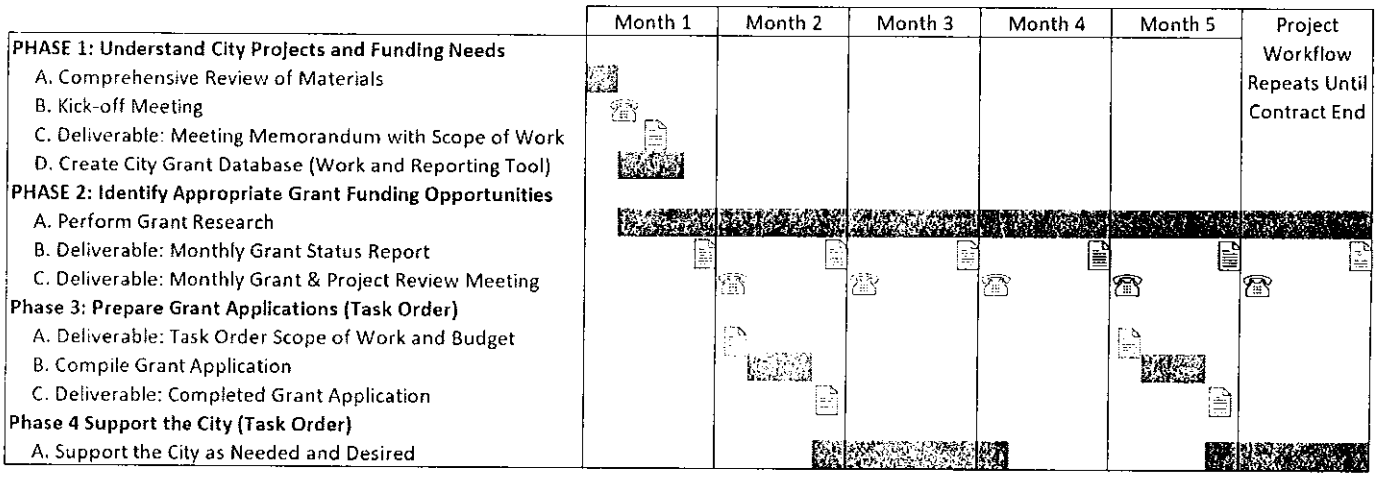
PROJECT TIMELINE

Public Advisory Group is pleased to provide the below proposed project timeline showing the project tasks, deliverables and meetings. This is a proposed schedule and Public Advisory Group will develop a project schedule and timeline to the City's satisfaction during the initial phase of the project.



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PROJECT COORDINATION & MONITORING

As we noted earlier, Public Advisory Group's core values of communication, hard-work and integrity lead our approach to each engagement. We undertake each project with an intent to exceed our client's expectations. To accomplish that goal, the Public Advisory Group is committed to our values and our clients while always focusing on the project scope, schedule and budget!

COMMUNICATION –

The Public Advisory Group team understands that effective communication is the key to success in any arena. But, for communication to be effective, it needs to be both well-structured and well-composed. Coming from a capital infrastructure background, Public Advisory Group's project manager is adept at creating and maintaining tracking matrices. The database of projects that the team will create early in the project will flow from the City's capital plan document and be the source of status reporting during the engagement. Each project, or program of projects, will be represented and linked to grant funding opportunities and action items. **During each monthly review meeting, the project manager will lead the team through a line-by-line review of open and active items.** Each meeting will also include a review of the project budget and schedule. Public Advisory Group typically conducts such meetings through a teleconference software such as Teams or Zoom to enable screen-sharing.

Outside of the regular monthly meetings, the Public Advisory Group team is available to work with the City to address opportunities as they arise. Or, simply to talk shop and evaluate ideas!

HARD-WORK –

At Public Advisory Group, we recognize that opportunity does not work regular 8am-5pm hours and so we are constantly researching and evaluating ideas and opportunities. But, our work is focused on research and research takes time. That is why we dedicate several hours each day to researching project funding mechanisms and opportunities. Our disciplined and detailed search process uses both paid and publicly available grant databases to locate funding opportunities soon after they arise. Our team's **commitment to hard-work and putting the hours in** enables Public Advisory Group to exceed client expectations!

INTEGRITY –

Integrity is critical to everything we do. That is why we don't compete our clients against each other. Unlike some grant consulting firms, we do not take on multiple clients for the same services. While Public Advisory Group currently provides grant consulting services to non-profit and government entities in Michigan and Idaho, we do not do so for capital infrastructure projects. And, if engaged by the City, we will not take on other Colorado municipal grant assignments. So, **the City of Fort Lupton can know that Public Advisory Group is not helping its competitors!**

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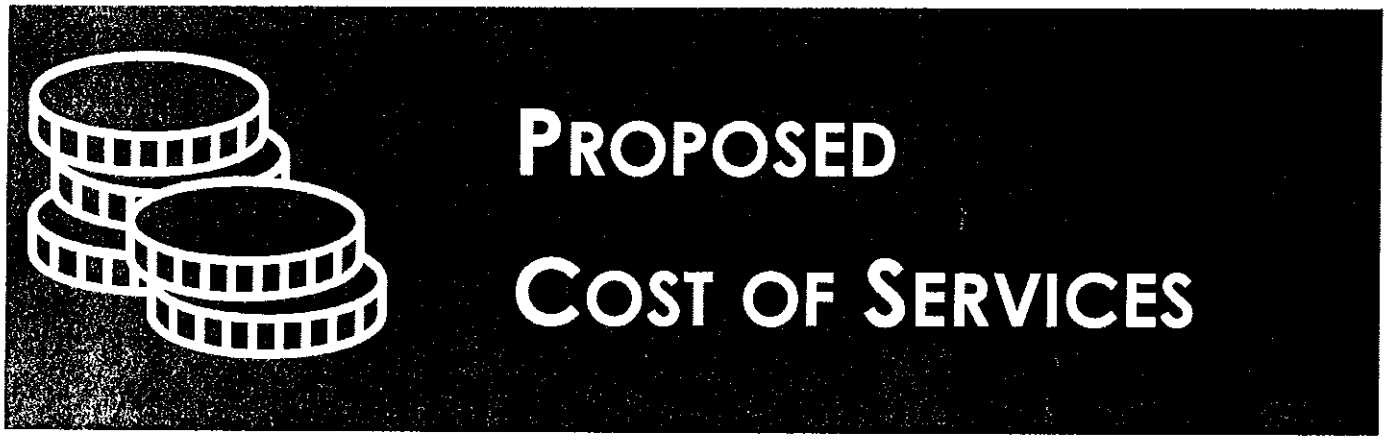

PROPOSED COST OF SERVICES

Public Advisory Group is pleased to provide the following price proposal for the City of Fort Lupton's review and hope that it offers an economical way for the City to create an effective grant pursuit program.

Public Advisory Group recommends 40 project manager hours and 7 project support hours to be used for researching and evaluating grants each month. For this level of service, **Public Advisory Group's proposed fee is $1,815 per month and represents a 20% discount** to the firm's fully-burdened hourly rates. Please note that we have included project set-up expenses (Phase 1) free of charge to the City. And, **any unused hours are rolled forward each month!** Public Advisory Group has also estimated allowances for certain project expenses to be used at the City's discretion.

	Project Manager Grant Gager ($52/hour)		Project Support Chloe Berier ($27/hour)	
	Hours	$	Hours	$
PHASE 1: Understand City Projects and Funding Needs				
A. Comprehensive Review of Materials	4	$ 208	2	$ 54
B. Kick-off Meeting	2	$ 104	1	$ 27
C. Deliverable: Meeting Memorandum with Scope of Work	1	$ 52	0.5	$ 14
D. Create City Grant Database (Work and Reporting Tool)	5	$ 260	3	$ 81
Total Phase 1 Cost	**Included in Project Adminstration**			
PHASE 2: Identify Appropriate Grant Funding Opportunities				
A. Perform Grant Research	36	$ 1,872	5	$ 135
B. Deliverable: Monthly Grant Status Report	1.5	$ 78	1	$ 27
C. Deliverable: Monthly Grant & Project Review Meeting	2.5	$ 130	1	$ 27
Total Phase 2 Cost	40	$ 2,080	7	$ 189

Proposed 2021 Monthly Retainer (includes 20% discount) **$1,815 per month**

2021 Fully-burdened Hourly Rates	$52 per Hour	$27 per Hour
2022 Fully-burdened Hourly Rates*	$54 per Hour	$28 per Hour

* 2022 Hourly Rates are Based on Expected Benefit and Administrative Cost Increases
Fully Burdened Rates Include All Company Profit and Overhead

Project Allowances (to be used with City consent)

Consultant Travel	$1,000
Printing and Mailing	$500

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SIMILAR PROJECT EXPERIENCE

Because Public Advisory Group was formed in February 2021, the entity has limited grant search and grant writing engagement in a manner consistent with this Request for Proposal. However, project manager Grant Gager has led grant programs for publicly funded entities during his time with the City of Ketchum, as detailed below. References may be contacted as follows:

☑ **MOUNTAIN RIDES TRANSPORTATION AUTHORITY**

Grant Gager served on the Authority's board of directors from January 2017 to February 2021. During that time, Grant chaired the Authority's Finance and Performance Committee that worked with staff to identify and pursue grant funding opportunities to support the electrification of the revenue-service fleet. The Authority put its first electric bus into service in July 2021 and will electrify the entire fleet by 2024, with supporting charging infrastructure. Grant drove the long-term planning process to target certain grants including US DOT, private industry and legal settlement funds (Volkswagen).

Executive Director Wally Morgus, Wally@mountainrides.org
(208) 733-7433

☑ **CITY OF KETCHUM**

From November 2016 to February 2021, Grant Gager managed the City's grant pursuit program. During this time, Ketchum received funds from the federal and state governments as well as private foundations.

Mayor Neil Bradshaw, NBradshaw@ketchumidaho.org
Treasurer Shellie Rubel, SRubel@ketchumidaho.org
(208) 726-3841

☑ **KETCHUM URBAN RENEWAL AGENCY**

Grant Gager served as the Treasurer responsible for all aspects of the Agency's financial management on a contract for service arrangement. As part of this program, Grant helped manage the Agency's infrastructure grant making program. Grant helped applicants understand the program and submit applications for review by the Board of Commissioners.

Chair Edward Johnson, EJohnson@KetchumURA.org

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City of Ketchum

August 14, 2020

Subject: Grant Gager

To Whom it May Concern,

As I prepare to step down from my role as City Administrator with the City of Ketchum, it is with great pleasure that I write this letter of recommendation for Grant Gager. With approval from both the Mayor and City Council, I hired Grant to be the City of Ketchum's Director of Finance & Internal Service in November 2016; a position that was newly created to provide oversight of the City's administrative functions. Since he joined the City, Grant has become an integral member of our leadership team along with the Mayor and me. In that role over the past four years, Grant has shown an ability to thoughtfully consider complex issues from many perspectives while challenging assumptions. Running a complex multi-function department in the City of Ketchum is not an easy task, but Grant has consistently shown that he understands how to analyze and respond to the many unexpected situations we face each day.

Over the past four years, I have entrusted Grant with responsibility for some the City's more complex projects. Grant has arranged financing packages to fund new capital equipment and projects, including a voter-approved fire station. Not only did he execute the financing of that new station, but Grant has served as our internal project manager for both the design and construction phases of the project. This follows the success he had early in his tenure leading the roll-out of paid parking; a program that included investments in both physical infrastructure as well as the supporting information technology ecosystem. I have been impressed with Grant's ability to successfully manage such important and visible City projects in a schedule and budget conscious way.

While Grant has proven himself to be a capable project manager, I am similarly impressed by his ability to manage people. Whether it is the finance staff in the office or the code enforcement staff walking the streets, Grant has a great rapport with his teams. He has not only raised his employees' performance level, but they genuinely seem to enjoy working for him. Grant's interactions with the City Council and members of the public have drawn similar respect. Grant is able to explain complex financial issues, including the City budget, with ease and in a way that is easily understandable. More importantly, his door is always open, and he is an engaged listener always ready to help and offer solutions.

I do expect Grant to be a long-time employee of the City of Ketchum. But, as I prepare to leave, I want to document my appreciation and recognition for his contributions to the City. I have thoroughly enjoyed working alongside Grant and know that he will bring success to any organization he may choose to join in the future. We've been lucky to have him here in Ketchum!

Thank you,

Suzanne Frick
City Administrator

480 East Ave N ★ P.O. Box 2315 ★ Ketchum, ID 83340 ★ main (208) 726-3841 ★ fax (208) 726-8234
facebook.com/CityofKetchum ★ twitter.com/Ketchum_Idaho ★ www.ketchumidaho.org

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Public Advisory Group's proposed project manager Grant Gager managed the following grant applications and awards during his time as the City of Ketchum's Director of Finance and Internal Services.

CITY OF KETCHUM

- **FEMA SAFER Program**: Helped the Fire Department secure grants for a new laryngoscope, extrication equipment, CPR training equipment and backcountry rescue equipment through the annual FEMA grant cycle that assists in equipment procurement. Total funding exceeded $100,000.
- **FEMA Public Assistance Program**: Managed the application and administration of three public assistance grants in response to a federal disaster declaration in 2017. Funds provided for repair of infrastructure and reimbursement of expenditures during the disaster. Total funding exceeded $250,000.
- **Idaho Department of Environmental Quality**: Managed the administration of a low-interest loan to support City water infrastructure development. Loan value was $255,000.
- **Idaho Commission on the Arts**: Helped the Ketchum Arts Commission obtain annual grants to support the provision of public art in the City. Grants included support for both performance and physical art pieces. Total funding exceeded $3,000.
- **Idaho Community Foundation**: Managed grant application and receipt for grants to support the provision of discounted public transportation passes for underprivileged community members. Total funding exceeded $7,500.
- **Idaho Local Highway Technical Assistance Council**: Managed grant application process for sidewalk improvement projects in the downtown core. Total funding exceeded $50,000.

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Public Advisory Group's proposed project manager Grant Gager currently provides executive advisory services to the following clients related to grant management.

THE ARGYROS THEATER

- **Shuttered Venue Operator Program**: Provides executive advisory services to the organization's leadership including operational support to the theater for its inclusion in the shuttered venue operator grant program administered by the US Small Business Administration. Grant value is $200,000.

THE ENVIRONMENTAL RESOURCE CENTER

- **Recycling Grant Program**: Provides executive advisory services to the organization's leadership concerning a grant program that assists local communities in recycling programs.

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Michael Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

AM 2021-185

APRROVING RESOLUTION 2021Rxxx ESTABLISHING THE FEE SCHEDULE FOR REGULATED MARIJUANA

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: a. Resolution 2021-Rxx.

III. Summary Statement:

The Ordinance for regulated marijuana will go into effect on November 12, 2021. Pursuant to Section 6-360 of the Ordinance the following fees shall be set by Resolution: "In addition to application, renewal and an annual operating fee, the city shall impose administrative fees for services, which include the transfer of ownership, background investigations, change of business manager, modification of premises, change of location, change of corporate structure, change of financier, zoning verification, duplicate license, temporary permit, change of trade name, change of class of license, with all such fees to be established by resolution of city council."

IV. Submitted by: _____
City Clerk

V. Finance Reviewed _____
Finance Director

VI. Approved for Presentation: _____
City Administrator

VII. Attorney Reviewed Approved Pending Approval

VIII. Certification of Council Approval: _____ _____
City Clerk Date

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IX. Detail of Issue/Request:

The Ordinance for regulated marijuana will go into effect on November 12, 2021. Pursuant to Section 6-360 of the Ordinance the following fees shall be set by Resolution: "In addition to application, renewal and an annual operating fee, the city shall impose administrative fees for services, which include the transfer of ownership, background investigations, change of business manager, modification of premises, change of location, change of corporate structure, change of financier, zoning verification, duplicate license, temporary permit, change of trade name, change of class of license, with all such fees to be established by resolution of city council."

The fees are necessary due to staff time in review of applications and enforcement actions for marijuana businesses and to assure the costs associated with protecting the health, safety, order, comfort, convenience and general welfare of the residents.

X. Legal/Political Considerations:

XI. Alternatives/Options:

XII. Financial Considerations:

XIII. Staff Recommendation:

Staff recommends the approval of Resolution 2012-Rxx.

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RESOLUTION NO. 2021R0xx

A RESOLUTION OF THE CITY COUNCIL OF FORT LUPTON APPROVING THE FEES SCHEDULE FOR REGULATED MARIJUANA

WHEREAS, on September 7, 2021, the Fort Lupton City Council approved Ordinance 2021-1127; and

WHEREAS, the second reading of the ordinance was approved by title only on October 13, 2021; and

WHEREAS, the ordinance is set to get into effect on November 12, 2021; and

WHEREAS, pursuant to section 6-360 of the Ordinance, the City is authorized to impose renewal and annual operating fees for the costs of processing licensing applications and any other costs related to implementation, administration and enforcement.

NOW THEREFORE BE IT RESOLVED that the Fort Lupton City Council has reviewed the fees and establishes a fee schedule as follows:

Item	Amount
Application Fee	$2,500.00
Renewal and Annual Operating Fee	$5,000.00
Transfer of Ownership	$3,000.00
Background Investigation – Per Applicant, Officer(s), Director(s), Member(s), Stockholder(s), and Owner (s)	$ 200.00
Change of Business Manager	$ 200.00
Modification of Premises	$1,500.00
Change of Location	$1,500.00
Change of Corporate Structure	$1,000.00
Change of Financier	$1,500.00
Zoning Verification, Duplicate License, Change of Trade Name	$ 100.00
Temporary Permit	$2,500.00
Change of Class of License	$ 200.00

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APPROVED AND PASSED BY A MAJORITY VOTE OF THOSE ELECTED TO THE CITY COUNCIL THIS 12th DAY OF NOVEMBER 2021.

City of Fort Lupton, Colorado

_____

Zo Stieber, Mayor

Attest:

_____

Maricela Peña, City Clerk

Approved as to form:

_____

Andy Ausmus, City Attorney

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Mike Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

IM 2021-005

COMPLETE AN EMPLOYEE OPINION SURVEY FOR THE COST OF $2,900.00-4,600.00

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: None

III. Issue/Request:

When the City created its 2019-2020 Strategic Plan, one of the sections stated the following:

> Recruitment and retention of great staff goes a long way in keeping the City at its best. Training is a critical piece of this philosophy. The evaluation of conditions will be accomplished with employee surveys. This survey input will also help in the plan development of key areas of compensation, staffing levels and succession planning.

The operational challenges of COVID-19 caused staff to postpone the completion of an employee survey in 2020. There has been some activity in 2021, however.

The Police Department completed an employee survey in Spring 2021. The survey provided excellent feedback and has motivated the staff to carefully review the department's challenges and implement solutions. Completing the employee opinion survey Citywide will help the staff focus on employee retention and improving the employee experience, which will serve the mission of providing municipal services that build an exceptional community.

Human Resources received three proposals at the following costs:

Vendor	*Price*
Employers Council	*$2,590*
Newmeasures	*$8,750*
Gallup	*$7,565*

Employers Council is less expensive, in part, because the City did a survey with them in 2021 and they have offered a discount because the City did a survey with them this year. Employers Council did a good job in compiling the results and educating staff on the results.

Since the total expense is less than $5,000, under the City's Purchasing Policy, this item is not required to come before Council. The cost will be covered under the contractual services budget for the Human Resources Department and City Administrator's budget.

Staff will provide a summary of results to Council after the survey is completed.

IV. Legal/Political Considerations:

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None

V. Alternatives/Options:

Select a more expensive vendor.

VI. Financial Considerations:

The general fund has $26,188 remaining of the $40,000 budgeted in miscellaneous services to cover the cost of the survey.

VII. Submitted by:

Director of Human Resources

VIII. Approved for Presentation:

City Administrator

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Mike Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

IM 2021-006

INCREASE PROCESSING FEES ASSESSED ON ALL COURT CREDIT CARD PAYMENTS

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: a. None

III. Issue/Request:

November 2019 the Fort Lupton City Council approved AM 2019-221 amending the agreement with Tyler Technologies. The AM authorized Global Payments to be the credit/debit card processor for court payments made online and in-person. Global Payments' compensation is from the processing fees made by the customers. The City's responsibility is for equipment maintenance costs.

December 2020 Council approved AM 2020-194 changing the responsibility for the online portal fee of $2.50 per transaction from the customer to the City. There was no change of responsibility of the card-processing fees.

An analysis in 2019 set the fee at 3.21%, administratively. From January to September 2020, the Court processed $95,436.85 in fines, costs and card fees. For the same timeframe in 2021, the Court has processed $191,294.65; a 49.5% increase in usage. Based upon updated analysis, the processing fee is rising from 3.21% to 3.95%. The primary reasons for increase is due to usage and soaring processing fees.

IV. Legal/Political Considerations:

V. Alternatives/Options:

VI. Financial Considerations:

VII. Submitted by: _____
Court Administrator

VIII. Approved for Presentation: _____
City Administrator

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CITY OF FORT LUPTON
CITY COUNCIL

Zo Stieber, Mayor

Shannon Rhoda, Ward 1
Chris Ceretto, Ward 2
Mike Sanchez, Ward 3

David Crespin, Ward 1
Tommy Holton, Ward 2
Bruce Fitzgerald, Ward 3

IM 2021-007

INCREASE OF NEW PUBLIC LIBRARY FACILITY BUDGET

I. Agenda Date: Council Meeting – November 2, 2021

II. Attachments: None

III. Issue/Request:

Approval of an increase to the new public library facility budget of $750,000. This will increase the Capital Request in the 2022 budget "New Library Building" from 7,100,000 to 7,850,000 and total cost of the new library facility from 8,850,000 to 9,600,000. This increase in the budget will come exclusively from the Library's budget reserves and will not affect future operating costs. A contract with the construction company with a set construction budget will come to City Council at a later date once the design process is completed and approved.

IV. Legal/Political Considerations:

None

V. Alternatives/Options:

Reject the increase

VI. Financial Considerations:

We have an already approved budget for this project of 8,850,000 and this increase will bring total budget for the project to 9,600,000. This increase in the budget will come exclusively from the Library's budget reserves and will not affect future operating costs.

VII. Submitted by: _____
Director of The Fort Lupton Public and School Library

VIII. Approved for Presentation: _____
City Administrator

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CITY OF
Fort Lupton
EST 1836

Upcoming Events

November 5-19, 2021	Art Show at the Library
November 9, 2021	Town Hall Meeting, 130 S. McKinley Ave. 6:30 p.m.
November 10-13, 2021	Field of Honor, Pearson Park 11 a.m. - 7p.m.
November 11, 2021	City Hall Closed in Observance of Veteran's Day
November 13, 2021	Field of Honor Formal Ceremony, Pearson Park 1:00 p.m.
November 16, 2021	City Council Meeting, 130 S. McKinley Ave. 7:00 p.m.
November 23, 2021	Town Hall Meeting, 130 S. McKinley Ave. 6:30 p.m.
November 27, 2021	Small Business Saturday