

COMMISSION

Mike Simone, Chairperson
Bushrod White, Vice-Chairperson
Thomas Holton
Kathy Kvasnicka
Thomas Meyers
Paul Weber

**Planning Commission Agenda
Regular Meeting
Fort Lupton City Hall – 130 S. McKinley Ave.*
Thursday, January 13, 2022
6:00 P.M.**

(Order & Contents Subject to Change by Action of the Commission)

** Login information on how to attend this meeting virtually (optional) is on the second page of this Agenda.*

Call to Order – Roll Call

Approval of Agenda

Consent Agenda – Consent Agenda items are considered routine and will be enacted by one motion and vote. There will be no separate discussion of Consent Agenda items unless a Commission member so requests, in which case the item may be removed from the Consent Agenda and considered at the end of the Consent Agenda.

- a. Approval of the Minutes of the January 6, 2022 Meeting

Public Comment – This portion of the Agenda is provided to allow members of the audience to present comments to the Planning Commission related to items not otherwise listed on the Agenda.

Action Items

- a. **P2022-002 Coyote Creek PUD Filing No. 4 Preliminary Plat**
- b. **Continuance of Sagebrush Apartments Site Plan**
- c. **Withdrawal of SB Weakland Investments Amended Site Plan**

Discussion Items

- a. Review of Meeting Discussion
- b. Development Code Update

Future Business

- a. Planning Commission Meeting on Thursday, February 10, 2022 at 6:00 PM

Adjourn

Virtual Meeting Instructions

Please join my meeting from your computer, tablet or smartphone.

<https://global.gotomeeting.com/join/247460885>

You can also dial in using your phone.

United States (Toll Free): [1 877 309 2073](tel:18773092073)

United States: [+1 \(312\) 757-3129](tel:+13127573129)

Access Code: 247-460-885

New to GoToMeeting? Get the app now and be ready when your first meeting starts:

<https://global.gotomeeting.com/install/247460885>

If you would like to participate remotely, we encourage you to test the phone number and links provided above prior to the start of the meeting, as each device requires initial adjustment. It is also recommended to log into the meeting early, and if you encounter any issues to call 303-304-4498 or email PlanningDept@fortluptonco.gov immediately.

When calling in, please be sure to mute your microphone on your computer, phone or tablet. Planning staff and/or the Chairman of the Planning Commission will provide instructions on when and how comments can be made by the public virtually.

RESOLUTION NO. P2022-002

A RESOLUTION OF THE PLANNING COMMISSION OF FORT LUPTON RECOMMENDING TO CITY COUNCIL APPROVAL OF THE COYOTE CREEK PUD FILING NO. 4 PRELIMINARY PUD PLAT LOCATED IN THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO.

WHEREAS, Rowley Downs Land Company and JR Engineering (“Applicants”) have applied for approval of the Coyote Creek PUD Filing No. 4 Preliminary Plat for 59 single family detached residential lots (the “Application”); and

WHEREAS, the Planning Commission held a public meeting on January 13, 2022 for the purpose of reviewing the Coyote Creek PUD Filing No. 4 Preliminary Plat; 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 Coyote Creek PUD Filing No. 4 Preliminary Plat 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 Coyote Creek PUD Filing No. 4 Preliminary Plat for a planned unit development located in the northeast quarter of section 5, Township 1 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 PUD Plat shall include the Project No.: LUP2021-0032 & Plan No.: PPL2021-0005.
 - B. The Applicant shall update the Preliminary Plat with any redlined changes provided by staff.
 - C. The Applicant shall work with City staff to finalize the street names within the development.

D. Applicant shall adequately address the comments from United Power.

II. As part of the Final Plat Application:

- A. Applicant shall adequately address the comments from the Fort Lupton Fire Protection District.
- B. Applicant shall work with the Golf Course manager to adequately address their concerns.
- C. Applicant shall adequately address the comments from Public Works including finalizing a subdivision improvements agreement.
- D. Applicant shall adequately address the comments from Xcel Energy.

DONE THIS 13th DAY OF JANUARY, 2022, BY THE PLANNING COMMISSION FOR THE CITY OF FORT LUPTON, COLORADO.

Chairman

ATTEST:

Planning Director

**COYOTE CREEK PUD FILING NO. 4 PRELIMINARY PLAT & PRELIMINARY PUD PLAN
STAFF REPORT
LUP2021-0032 & PPL2021-0005**

PROJECT DESCRIPTION

Project Nos.: LUP2021-0032 & PPL2021-0005

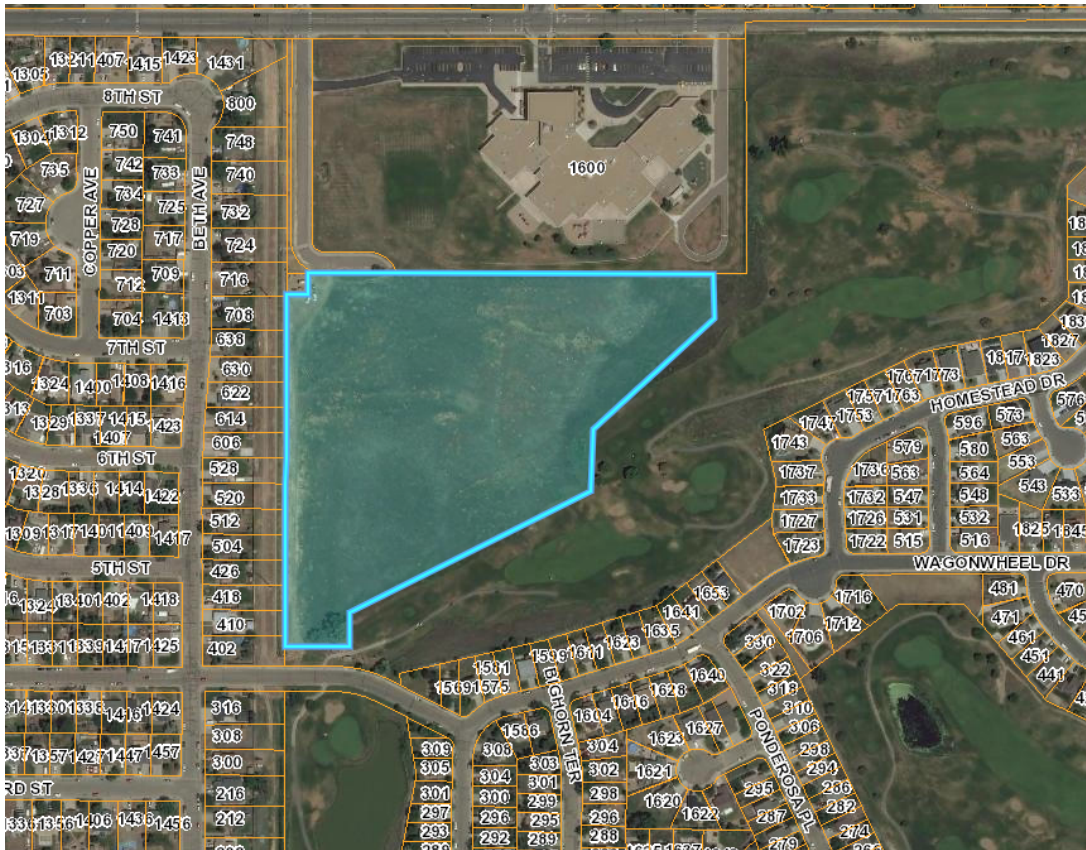
Project Name: Coyote Creek PUD Filing No. 4 Preliminary Plat & Preliminary PUD Plan

Owner's Name: James Nicholson with Rowley Downs Land Company

Representative's Name: Kenneth Merritt with JR Engineering

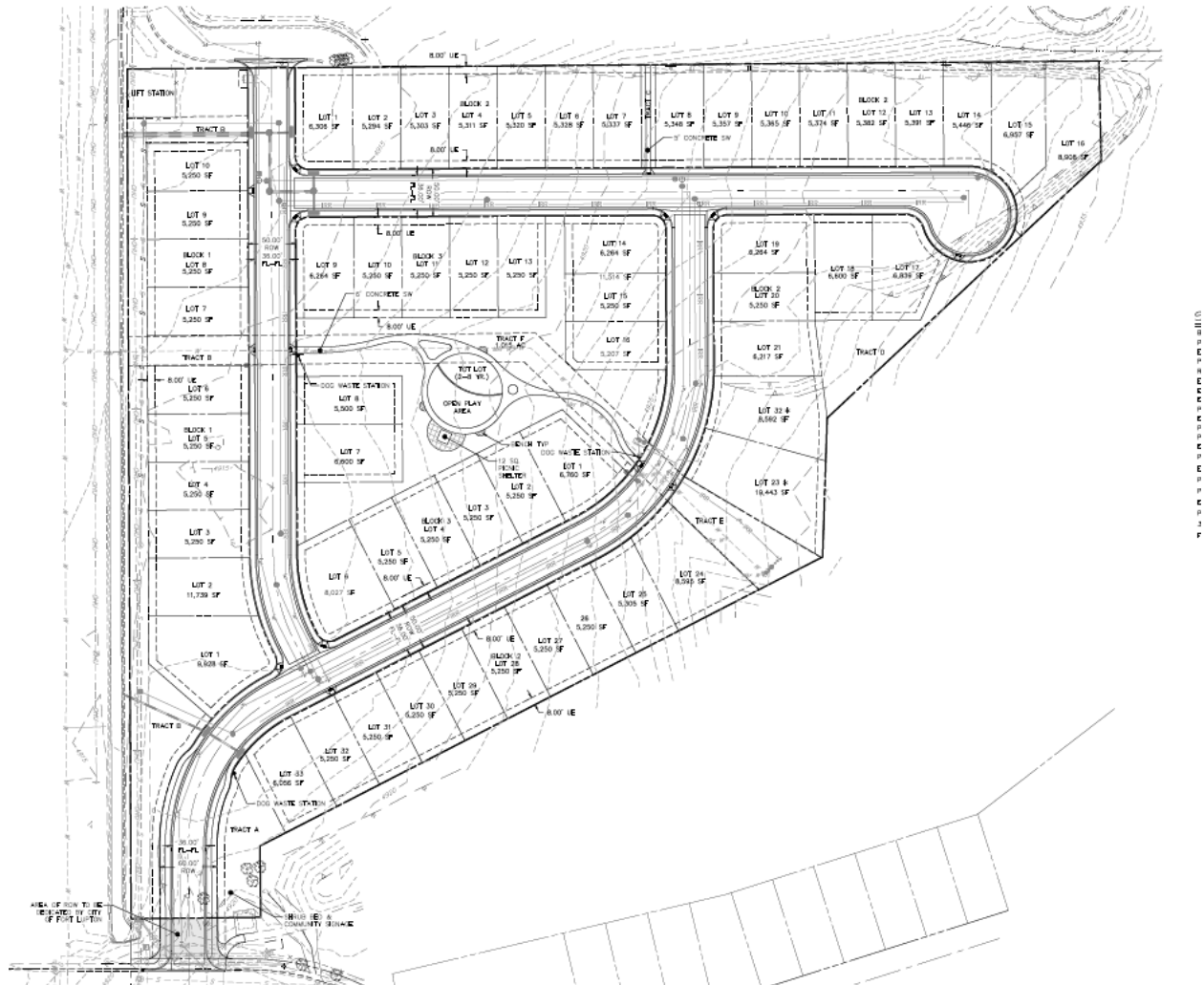
Location of Request:

The site consists of land located approximately 200 feet (0.04 miles) east of Beth Avenue and approximately 45 feet (0.01 miles) north of 4th Street, and is situated directly south of Twombly Elementary School (the "Property"). The Property is located in the Northeast Quarter of Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton., County of Weld, State of Colorado.



Nature of Request:

The Applicant has submitted a request for a preliminary plat and preliminary PUD plan for 59 single family detached residential lots, and will include a central open space area with tot lot.



Site Size: 13.21 acres, more or less.

Zone District: PUD Planned Unit Development.

Proposed Use: Residential uses to include 59 single family detached residential lots, including open space amenity area.

Existing Use: Vacant.

Hearing Dates: Planning Commission – January 13, 2022 at 6:00 PM; and
City Council – February 1, 2022 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

This property was originally annexed in 1994 with a larger area that was known as the Twombly Annexation. The Coyote Creek Development Plan from 1996 serves as the master PUD plan for this property. This piece is considered the fourth filing of the Coyote Creek development.

APPLICATION PROCESS

The Applicant is requesting approval of a preliminary plat and preliminary PUD plan for a residential subdivision that will include 59 single family detached homes, including open space amenity area.

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. 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 December 29, 2021.

Notice of the public hearings were posted on the Property on December 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 December 22, 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 is for a residential subdivision to include 59 single family detached residential lots, including common areas and interconnecting trails. The Applicant has submitted the required documents pursuant to the Code.

The PUD plan was previously approved.

CONFORMANCE WITH THE COMPREHENSIVE PLAN

The Future Land Use Map designates this area for Single-Family Attached land uses. This designation allows for single family attached homes in formal, planned developments. These provide higher density and more affordable housing options to complement traditional single family detached neighborhoods. Opportunities for new single family attached will help increase housing diversity and attract a wide range of potential residents

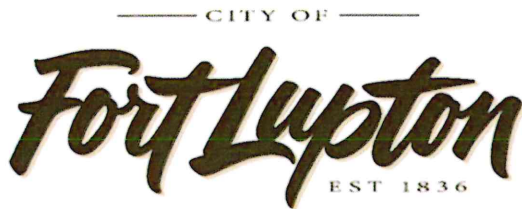
The proposed development plans for single family detached homes within Filing No. 4. The Master Planned Coyote Creek Development originally proposed multi-family housing at this location, however did provide for the ability to develop single family attached or detached housing. The application also shows smaller lots creating a higher density neighborhood.

REFERRALS

Referrals were provided to the list below. Any comments received are enclosed with the Planning Commission packet.

Building Inspector	City Attorney	GIS Specialist
Police Chie	Public Works Director	Golf Course Manager
Fort Lupton Fire Protection District	CDOT	Colorado Parks and Wildlife
Unite Power	Comcast	CenturyLink
Xcel Energy	Postmaster	Weld County School District RE-8
Weld County GIS	NCWCD	

***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.***



Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621

Phone: 303.857.6694
Fax: 303.857.0351

www.fortluptonco.gov

Project No. _____

Land Use Application Form

A. CONTACT INFORMATION

- 1) Property Owner Name: James Nicholson
 Company: Rowley Downs Land Company
 Phone: 703-317-7080 Email: _____
 Address: 260 Krameria Street Denver, CO 80220
 Preferred method of contact? Email: ☒ Phone: ☒ Mail: ☐
- 2) Representative Name: Kenneth Merritt APA, RLA
 Company: JR Engineering
 Phone: 970-305-6754 Email: kmerritt@jrengineering.com
 Address: 2900 South College Ave. Fort COLLINS, CO 80525
 Preferred method of contact? Email: ☒ Phone: ☒ Mail: ☐
- 3) Billing Contact (where invoices should be directed to): Bob Quinette
 Billing Company: Lupton Land, LLC
 Phone: 303-587-1966 Email: bob.quinette@gmail.com
 Address: 10221 Prestwick Trail Lone Tree , CO 80124

B. SITE DESCRIPTION

Site Address: TBD
 Parcel Number: 147105100053
 Existing Zone Classification: PUD ☐ Proposed Zone Classification: PUD ☐
 Water Type: Municipal ☐ Name: _____
 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 | |

D. PROJECT DESCRIPTIONProject Name: Coyote Creek Filing 4

Please provide a short description of the proposed project in the space provided below:

Coyote Creek Filing 4 is generally located in the northwest corner of the approved Coyote Creek PUD Master Development Plan and is designated as Parcel A being approximately 13 acres in size. Parcel A is currently identified on the approved PUD Master Development Plan as Multi-Family and allows for up to 193 Multi-Family Dwelling Units with an allowed Density of 14.9 Dwelling Unit per Acre. Coyote Creek Filing 4 is proposing to modify the current approved Land Use from Multi-Family to Single Family Detached Residential which if approved would allowing for 59 Single Family Detached Residential Lots on 13.35 Acres with a Gross Density of 4.42 Dwelling Units per Acres.

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: Ken Witt Date: 11/17/21

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: C. Van Munching Date: 11/17/21
CCI as Agent for Rowley Downs Land Company

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: _____

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.

Coyote Creek Filing No. 4 - Development Narrative

Coyote Creek Filing 4 is generally located in the northwest corner of the approved Coyote Creek PUD Master Development Plan and is designated as Parcel A being approximately 13 acres in size. Parcel A is currently identified on the approved PUD Master Development Plan as Multi-Family and allows for up to 193 Multi-Family Dwelling Units with an allowed Density of 14.9 Dwelling Unit per Acre. Coyote Creek Filing 4 is proposing to modify the current approved Land Use from Multi-Family to Single Family Detached Residential which if approved would allow for 59 Single Family Detached Residential Lots on 13.35 Acres with a Gross Density of 4.42 Dwelling Units per Acres.

Also included as part of Coyote Creek Filing 4 Development is 2.84 Acres of Public Street Right-of-Way Dedication (21.3% of Total Site Area), 1.47 Acres of Common Open Space (11.0% of Total Site Area) to be owned and maintained by the Coyote Creek Filing 4 Home Owners Association (HOA) and 1.01 Acres of Park Public Land Dedication (7.7% of Total Site Area) to also be owned and maintained by the Coyote Creek Filing 4 (HOA). When approved by the City the Developers of Coyote Creek Filing 4 will also be responsible to construct all necessary Public Roads, Water, Sanitary Sewer, Storm Sewer and Gray Water Irrigation infrastructure needed to support the proposed Single Family Residential Development.

TWOMBLY ELEMENTARY SCHOOL
SCHOOL DISTRICT RE-8
301 REYNOLDS ST.
FORT LUPTON, CO 80621
PARCEL # 147105100056

**BLOCK 2
LOTS 1-33**

LOGAN WAY

**BLOCK 3
LOTS 1-16**

**BLOCK 1
LOTS 1-10**

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF WELD, STATE OF COLORADO, AND IS DESCRIBED AS FOLLOWS:
A PORTION OF GOVERNMENT LOTS 1 AND 2 OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH
P.M. BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SAID NORTHEAST QUARTER OF SECTION 5, WHENCE THE SOUTHEAST CORNER OF SAID
NORTHEAST QUARTER BEARS NORTH 89°39'49" EAST A DISTANCE OF 2637.72 FEET;
THENCE NORTH 00°16'07" WEST ALONG THE WESTERLY LINE OF SAID NORTHEAST QUARTER A DISTANCE OF 883.49 FEET;
THENCE NORTH 89°32'09" EAST ALONG THE SOUTHERLY LINE OF THE PARCEL OF LAND DESCRIBED IN BOOK 990, RECEPTION NUMBERS
1919362 THROUGH 1919366, WELD COUNTY CLERK AND RECORDER'S OFFICE, A DISTANCE OF 1011.94 FEET;
THENCE SOUTH 01°20'50" EAST A DISTANCE OF 103.52 FEET;
THENCE SOUTH 46°50'18" WEST A DISTANCE OF 391.20 FEET;
THENCE SOUTH 01°54'09" WEST A DISTANCE OF 144.44 FEET;
THENCE SOUTH 62°50'48" WEST A DISTANCE OF 658.46 FEET;
THENCE SOUTH 00°38'00" EAST A DISTANCE OF 74.18 FEET;
THENCE SOUTH 89°20'49" WEST A DISTANCE OF 135 FEET TO THE POINT OF BEGINNING.
EXCEPT THAT CERTAIN PARCEL OF LAND (LIFT STATION SITE) AS CONVEYED TO THE CITY OF FORT LUPTON IN WARRANTY DEED RECORDED JULY
29, 1997 IN BOOK 1618 AT RECEPTION NO. 2560260,
COUNTY OF WELD, STATE OF COLORADO.

LAND SUMMARY CHART

TYPE	AREA (SF)	AREA (AC)
RESIDENTIAL LOTS	349,334	8.0196
TRACTS	103,820	2.3834
PUBLIC ROW	123,866	2.8436
TOTAL	577,020	13.2466

UNTIL SUCH TIME AS
THESE DRAWINGS ARE
APPROVED BY THE
APPROPRIATE ENGINEERING
AGENCIES, OR ENGINEERING
APPROVES THEIR USES
DESIGNATED BY WRITTEN
AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
303-587-1966

J.R. ENGINEERING
A Western Company

Central 303-740-9383 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	No.	REVISION	BY	DATE
1"=50'	1"=X'	11/17/21	ANI	ANI					
COYOTE CREEK FILING NO. 4									
PRELIMINARY PLAT									
SHEET 2 OF 27									
JOB NO. 16093.00									

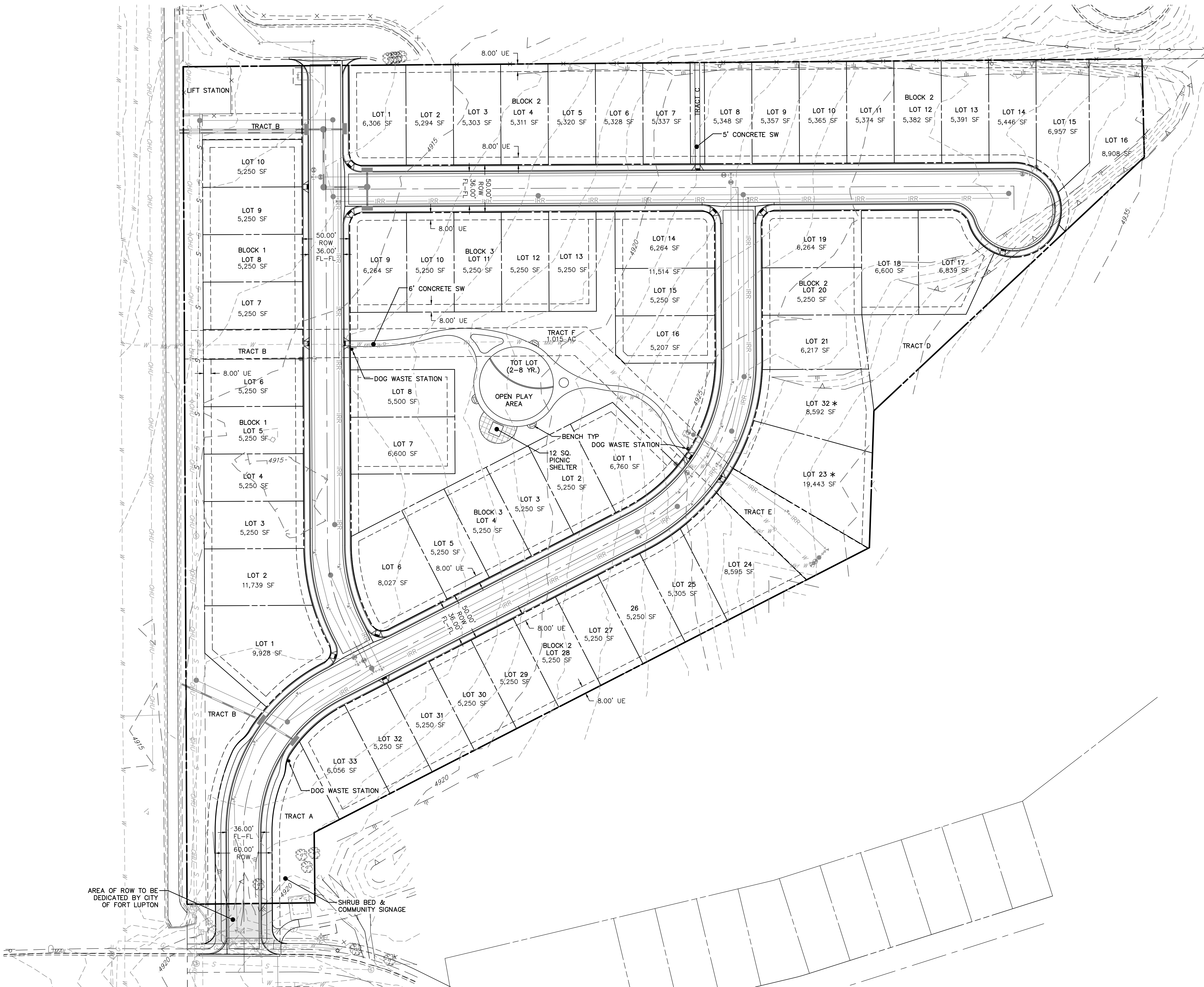
50 25 0 50 100
ORIGINAL SCALE: 1" = 50'



Know what's below.
Call before you dig.

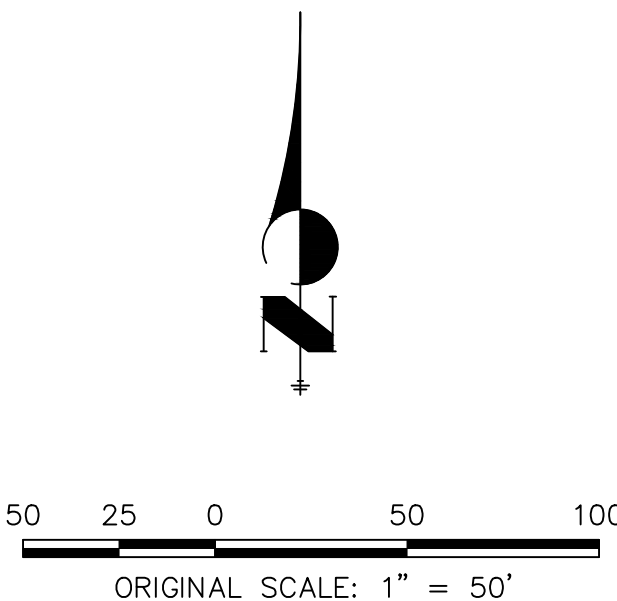
E 1/4 COR. SEC 5
T1N, R66W, 6TH PM
3.25" ALUMINUM CAMP
STAMPED "LS13155"
IN A RANGE BOX

COYOTE CREEK FILING NO. 4



SITE LEGEND

BOUNDARY LINE	---
PROPERTY LINE	---
EXISTING EASEMENT LINE	---
PROPOSED EASEMENT LINE	---
RIGHT OF WAY	---
EXISTING WOODEN FENCE	--- X --- X
EXISTING GAS MAIN	--- G --- G
EXISTING SANITARY SEWER	--- S --- S
PROPOSED SANITARY SEWER	--- W --- W
EXISTING WATER MAIN	---
PROPOSED WATER MAIN	---
PROPOSED ELECTRIC	--- E --- E
EXISTING STORM DRAIN	---
PROPOSED STORM DRAIN	---
EXISTING CURB AND GUTTER	=====
PROPOSED SIGN	---
PROPOSED CURB AND GUTTER	=====
EXISTING STREET LIGHTS	• • •
PROPOSED STREET LIGHT	• • •
3/4" METER VAULTS	• • •
FIRE HYDRANT	• • •



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THESE DRAWINGS ARE
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AGENCIES, OR ENGINEERING
APPROVES THEIR USE,
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A Western Company

Central 303-740-9888 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	1"=50'
V-SCALE	1"=X'
DATE	11/17/21
DESIGNED BY	AJH
DRAWN BY	XXX
CHECKED BY	

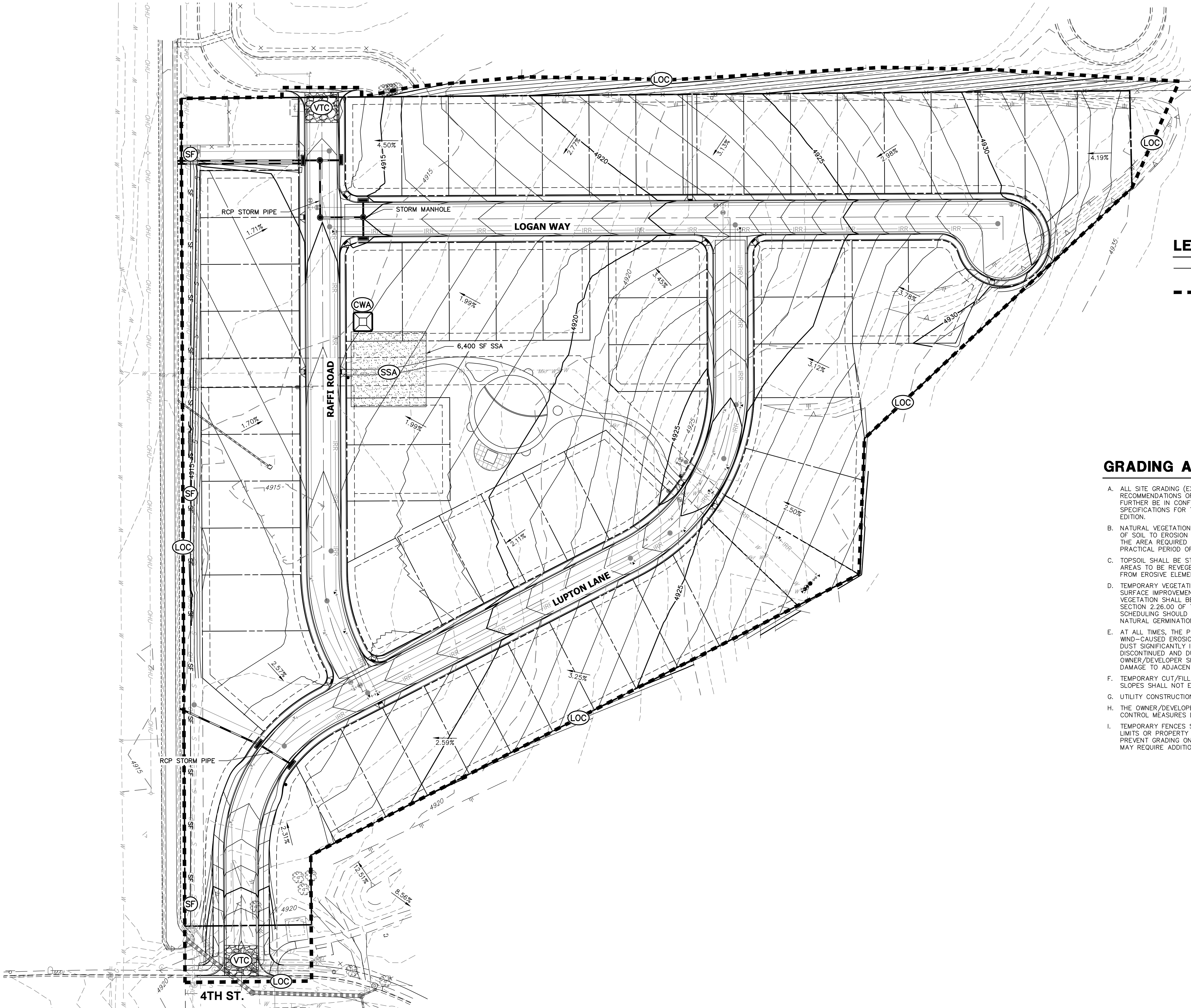
COYOTE CREEK FILING NO. 4

PRELIMINARY SITE PLAN

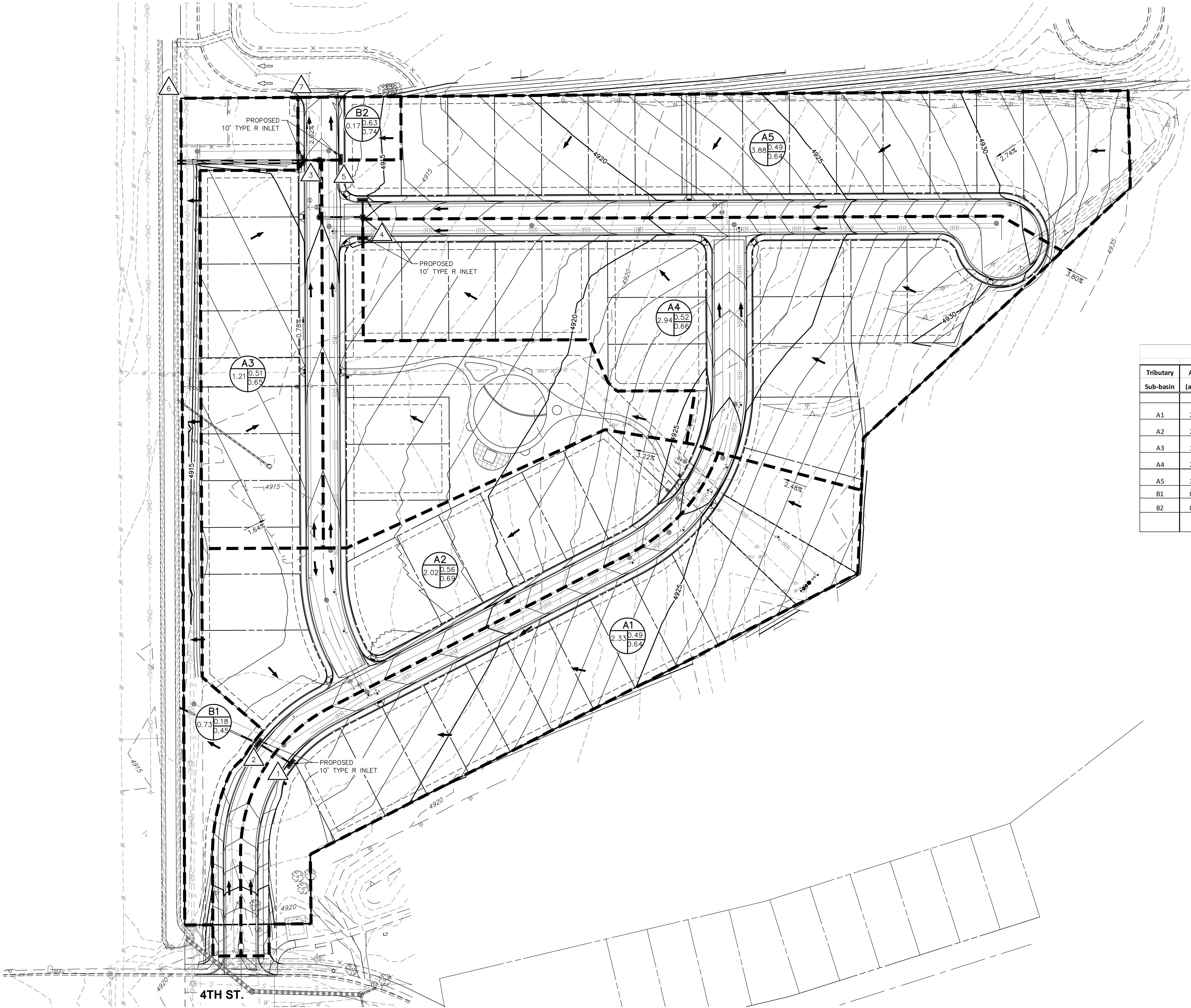
SHEET 3 OF 27

JOB NO. 16093.00

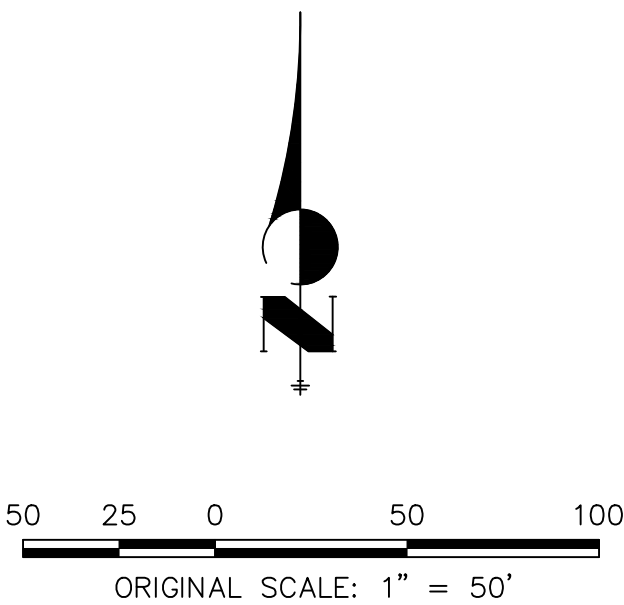
COYOTE CREEK FILING NO. 4



COYOTE CREEK FILING NO. 4



BASIN SUMMARY TABLE							
Tributary	Area	Percent			t _c	Q _s	Q ₁₀₀
Sub-basin	(acres)	Impervious	C _s	C ₁₀₀	(min)	(cfs)	(cfs)
A1	2.33	52%	0.49	0.64	13.0	3.9	9.8
A2	2.02	61%	0.56	0.69	11.6	4.1	9.7
A3	1.21	56%	0.51	0.65	12.0	2.2	5.4
A4	2.94	56%	0.52	0.66	11.1	5.7	13.8
A5	3.88	51%	0.49	0.64	13.7	6.4	16.1
B1	0.73	7%	0.18	0.45	13.8	0.4	2.1
B2	0.17	69%	0.63	0.74	5.0	0.5	1.2



UNTIL SUCH TIME AS
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AGENCIES, OR ENGINEERING
APPROVES THEIR USE,
THESE DRAWINGS ARE NOT TO BE
DESIGNATED BY WRITTEN
AUTHORIZATION.

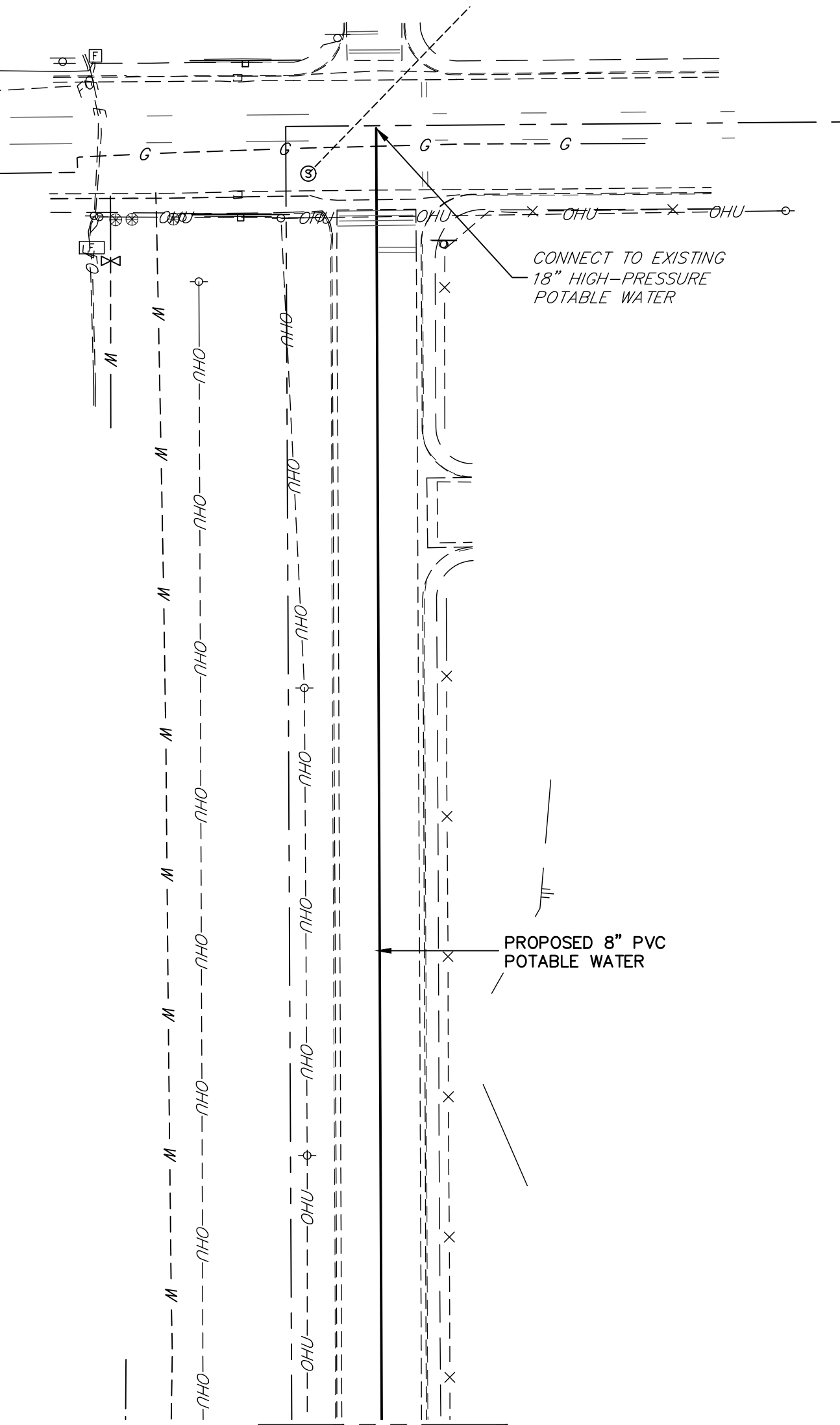
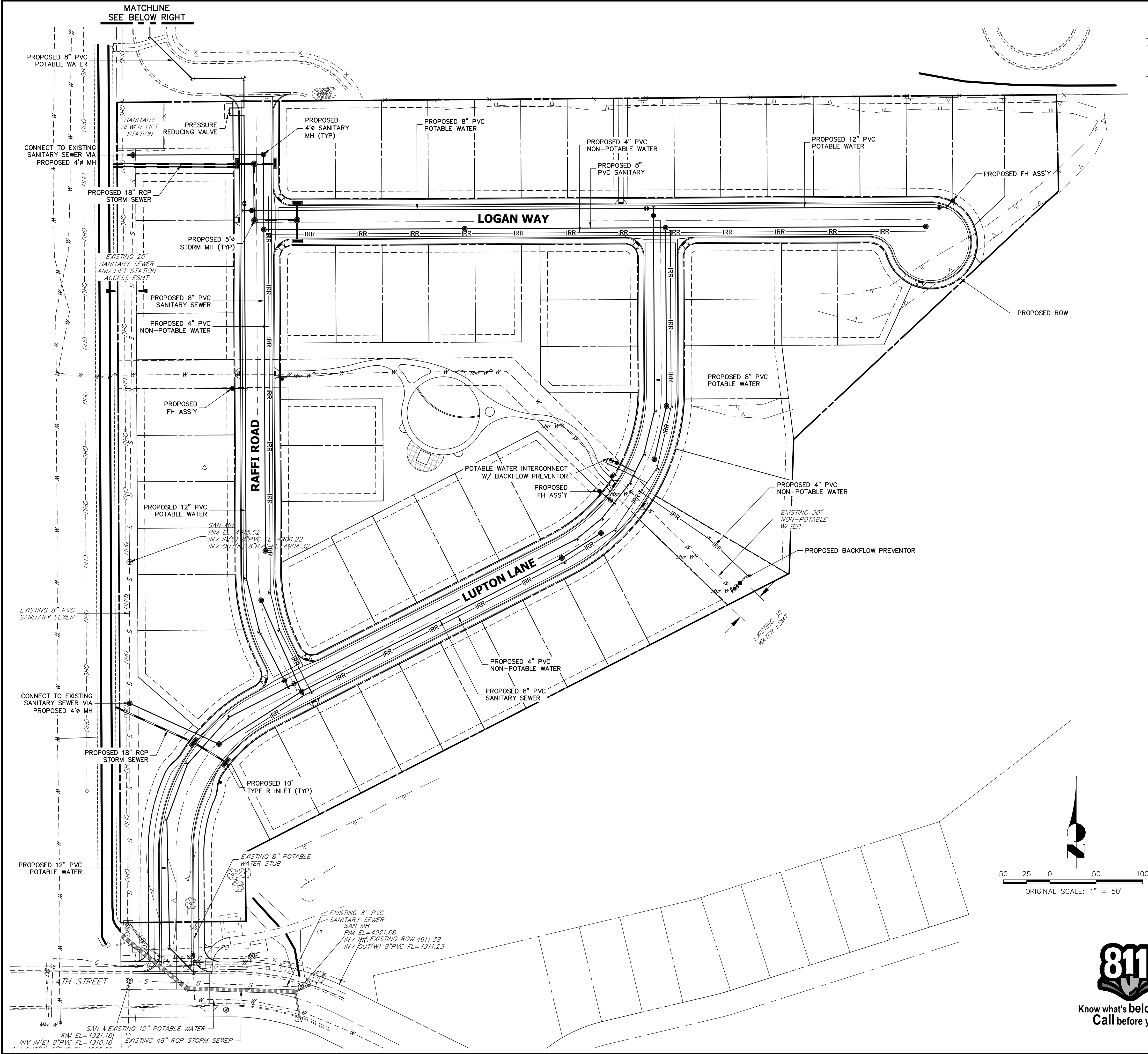
PREPARED FOR
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Central 303-740-9383 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	No.	REVISION	BY	DATE
1"=50'	1"=X'	11/17/21	AJH	XXX					

COYOTE CREEK FILING NO. 4	SHEET 5 OF 27
PRELIMINARY DRAINAGE PLAN	JOB NO. 16093.00

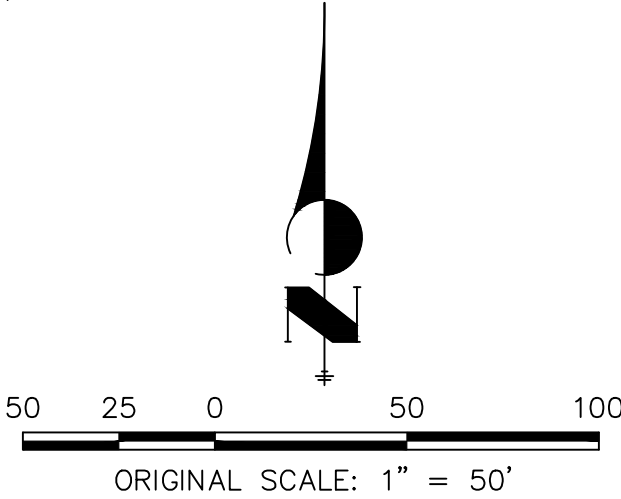


LAYER LINETYPE LEGEND

	EXISTING	PROPOSED
SECTION LINE	---	---
BOUNDARY LINE	---	---
PROPERTY LINE	---	---
EASEMENT LINE	---	---
RIGHT OF WAY	---	---
CENTERLINE	---	---
CABLE TV	---	TV
ELECTRIC	E	E
FIBER OPTIC	FO	FO
GAS MAIN	G	G
IRRIGATION MAIN	IRR	IRR
OVERHEAD UTILITY	OHU	OHU
SANITARY SEWER	S	S
STORM DRAIN	---	---
TELEPHONE	T	T
WATER MAIN	W	W
TOP OF SLOPE	---	---
TOE OF SLOPE	---	---

UTILITIES LEGEND

	EXISTING	PROPOSED
STORM SEWER		
MANHOLE	⊙	●
STORM INLET		■
FLARED END SECTION	▷	▷
SANITARY SEWER		
MANHOLE	⊙	●
WATER LINE		
LINE MARKER	Mkr W ⁰	
FIRE HYDRANT	⊙	⊙
BEND	⊙	⊙
METER	⊙	⊙
VALVE	⊙	⊙
TEE	⊙	⊙
DRY UTILITIES		
UTILITY POLE	⊙	⊙



Know what's below.
Call before you dig.

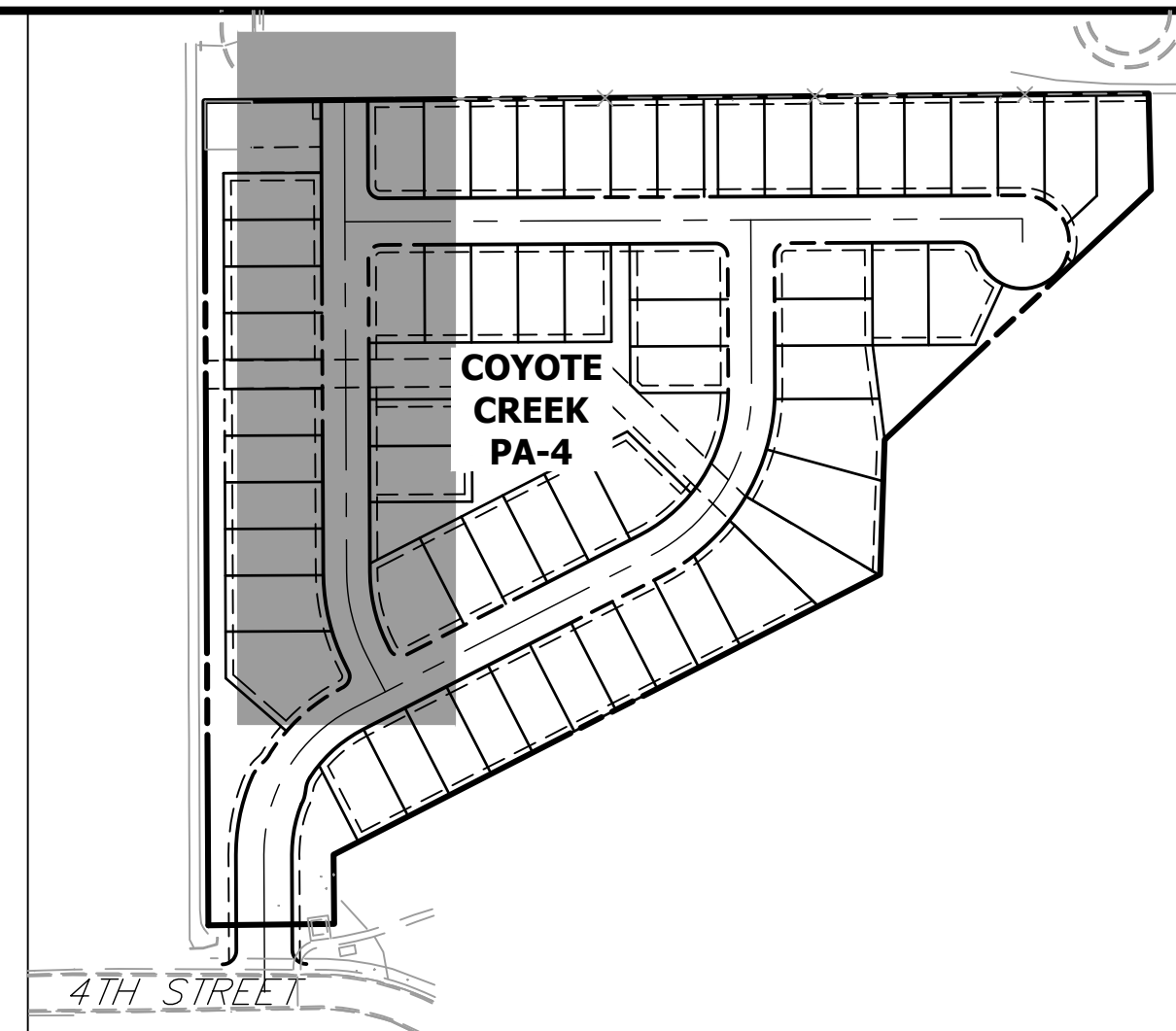
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PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
303-587-1966

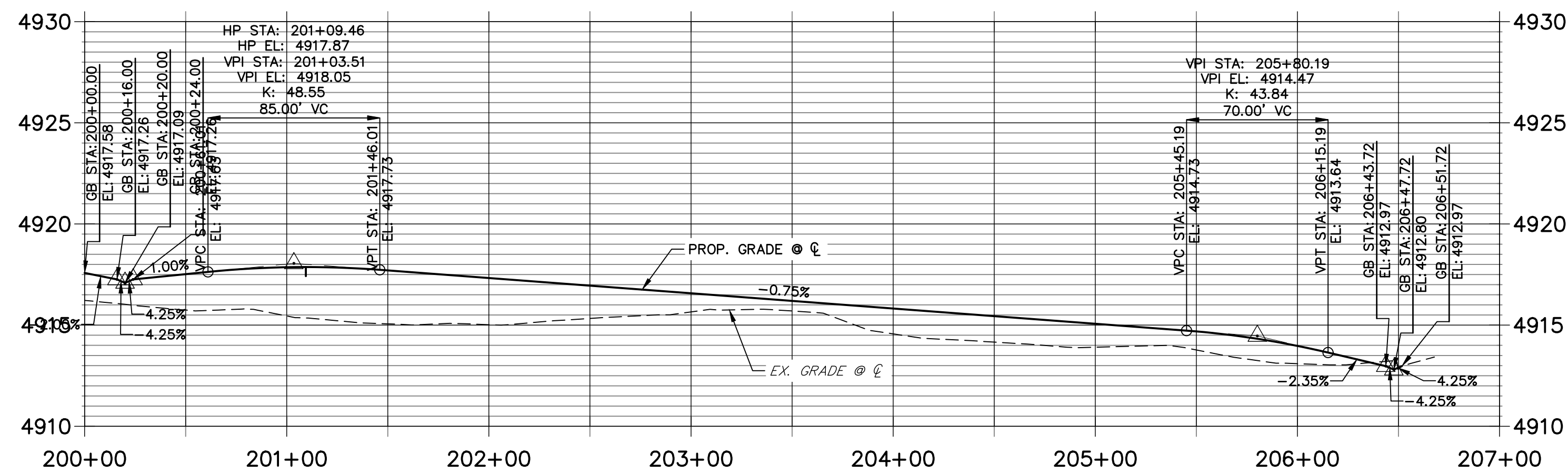
J.R. ENGINEERING
A Westman Company

Central 303-740-9383 • Colorado Springs 719-583-2593
Fort Collins 970-491-9888 • www.jrengineering.com

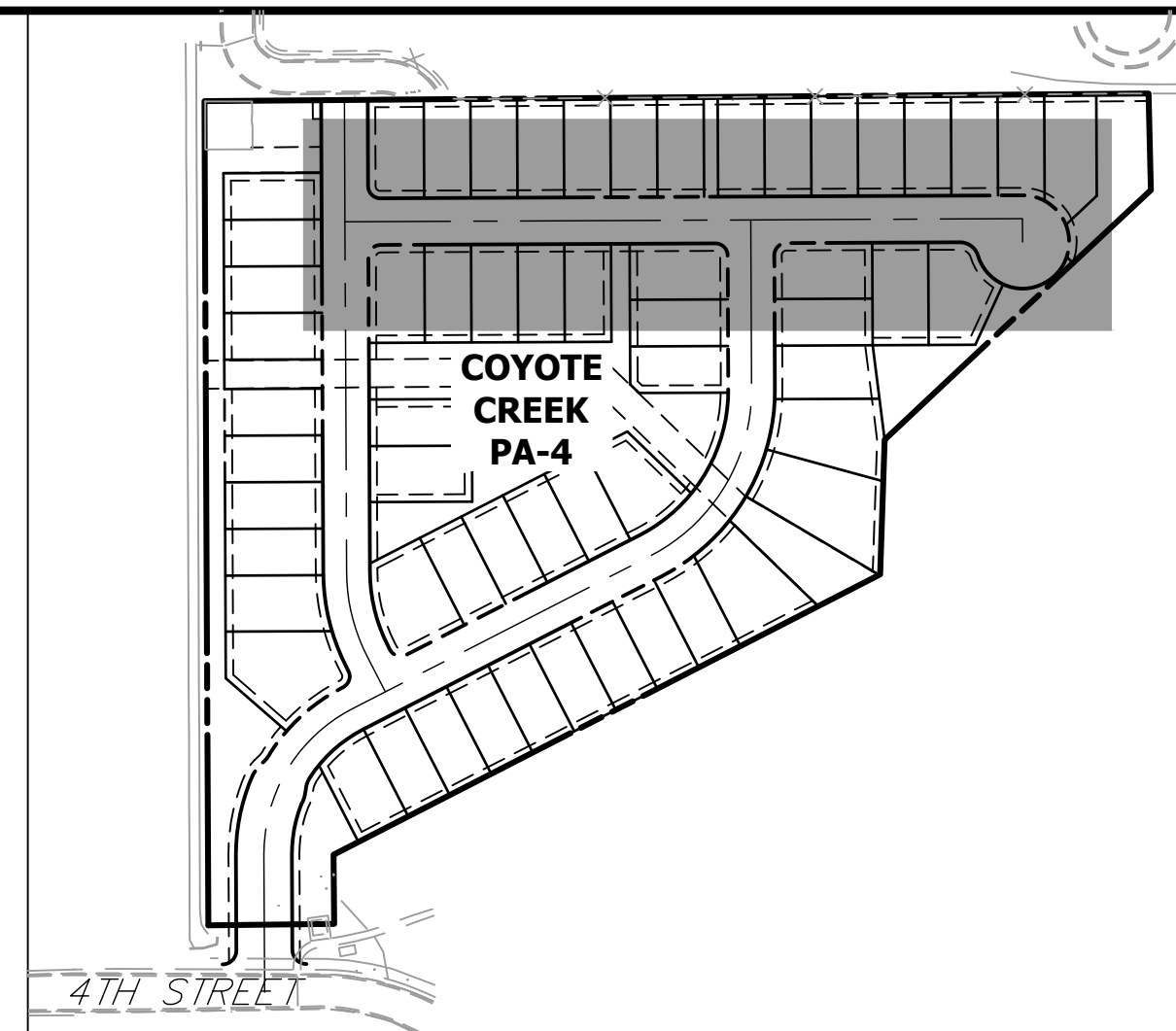
COYOTE CREEK FILING NO. 4	BY	DATE	No.	REVISION	1"=50'	H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
PRELIMINARY UTILITY PLAN											
SHEET 6 OF 27											
JOB NO.	16093.00										



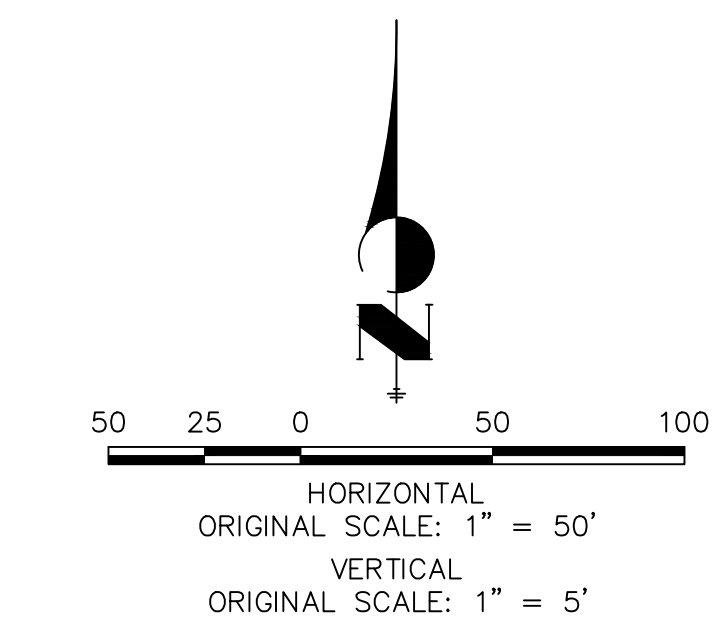
PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966



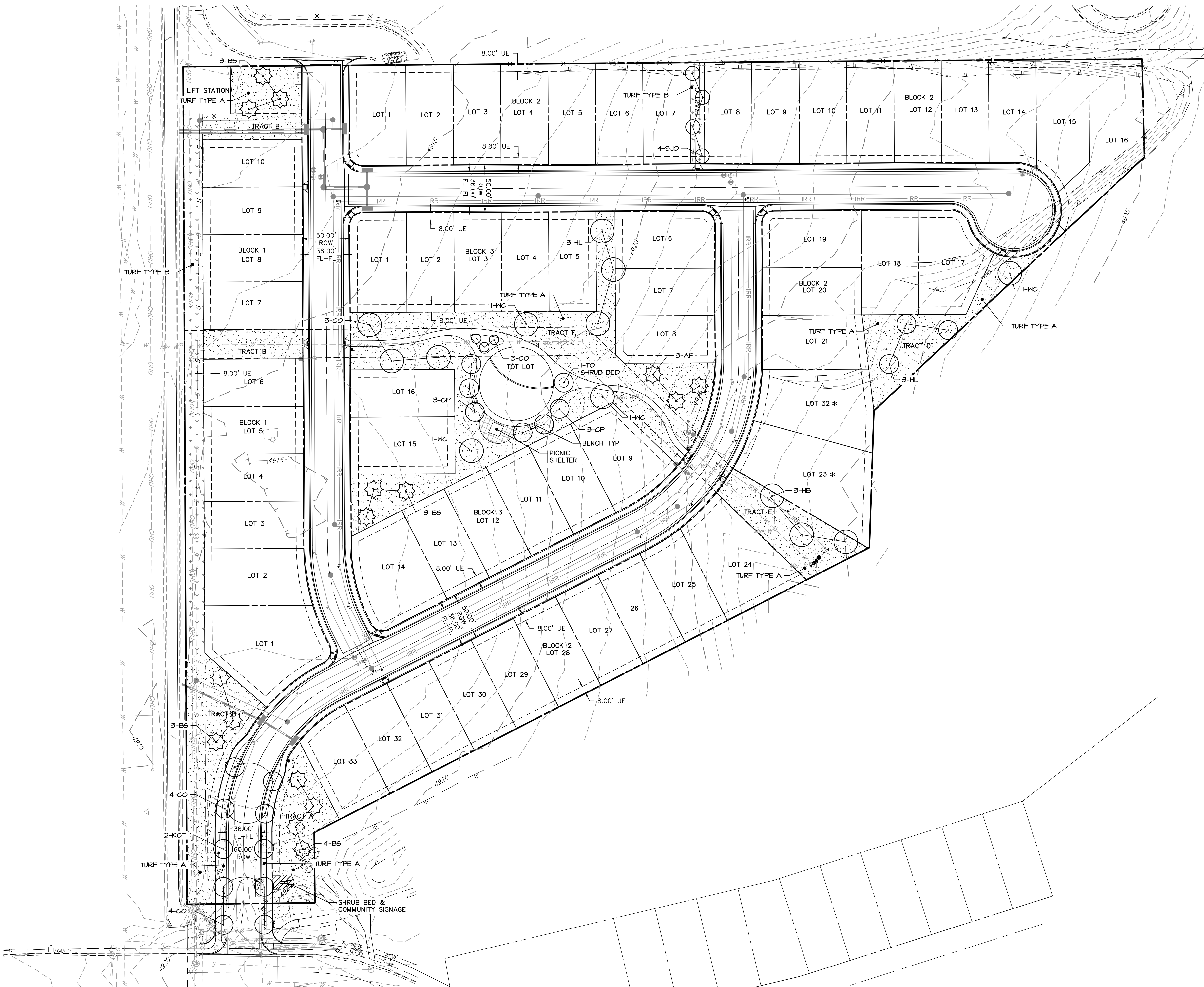
SHEET 8 OF 27		COYOTE CREEK FILING NO 4		H-SCALE 1"=50'		No.		REVISION		BY		DATE	
				V-SCALE 1"=5'									
		PRELIMINARY STREET PLAN AND PROFILE		DATE 11/17/21									
				DESIGNED BY AJH									
				DRAWN BY CRB									
				CHECKED BY									



PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

Page 21 of 483

COYOTE CREEK FILING NO. 4

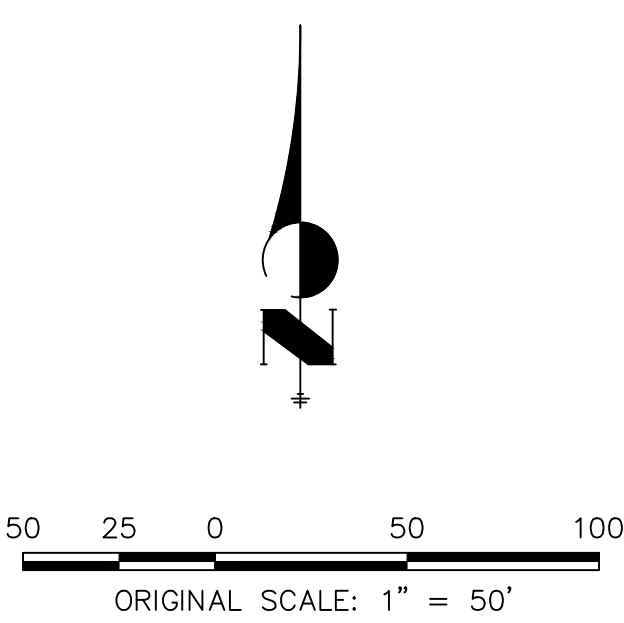


LANDSCAPE LEGEND

- EXISTING CONIFEROUS TREE TO BE PRESERVED
- EXISTING DECIDUOUS TREE TO BE PRESERVED
- PROPOSED MINOR/1' CONTOUR
- PROPOSED MAJOR/5' CONTOUR
- STEEL HEADER
- TURF TYPE A: IRRIGATED HYBRID KENTUCKY X TEXAS BLUE GRASS SOD, TURF MASTER ENVIROTURF OR APPROVED EQUAL
- TURF TYPE B: DROUGHT TOLERANT IRRIGATED TURF SEED MIX
- CONIFEROUS TREE 6' HGT
- DECIDUOUS STREET/ SHADE TREE, 2" CALIPER
- ORNAMENTAL TREE, 1 1/2" CALIPER SIZE
- STOP SIGN OR PARKING SIGN
- FIRE HYDRANT

SITE LEGEND

- BOUNDARY LINE
- PROPERTY LINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- RIGHT OF WAY
- EXISTING WOODEN FENCE
- EXISTING GAS MAIN
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- PROPOSED ELECTRIC
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- EXISTING CURB AND GUTTER
- PROPOSED SIGN
- PROPOSED CURB AND GUTTER
- EXISTING STREET LIGHTS
- PROPOSED STREET LIGHT
- 3/4" METER VAULTS
- FIRE HYDRANT



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No.	REVISION	BY	DATE	1"=50'		1"=X'		DESIGNED BY	DRAWN BY	CHECKED BY
				H-SCALE	V-SCALE	DATE	11/17/21			
								AUH	XXX	

COYOTE CREEK FILING NO. 4

LANDSCAPE PLAN

SHEET 10 OF 27

JOB NO. 16093.00

100%

SCALE: NTS



No.	REVISION	BY	DATE
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H-SCALE	N/A
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COYOTE CREEK FILING NO. 4

LANDSCAPE DETAILS

SHEET 11 OF 27

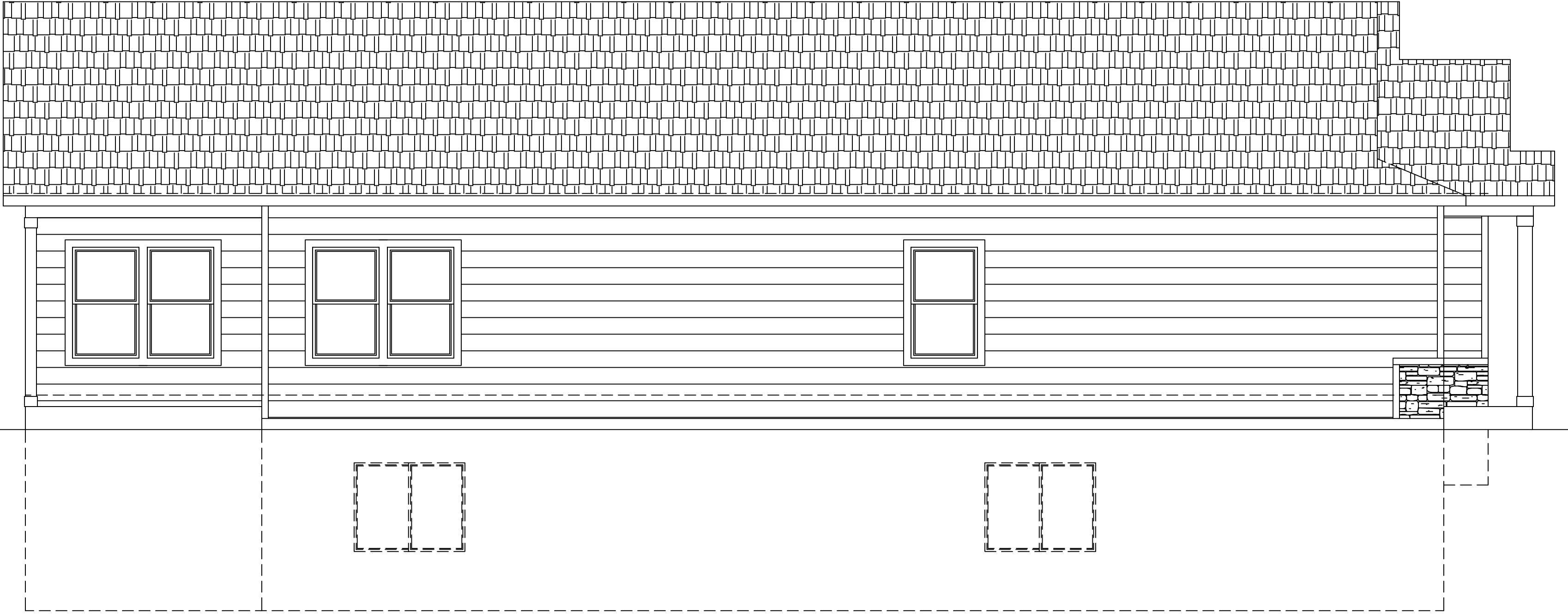
JOB NO. 16093.OC



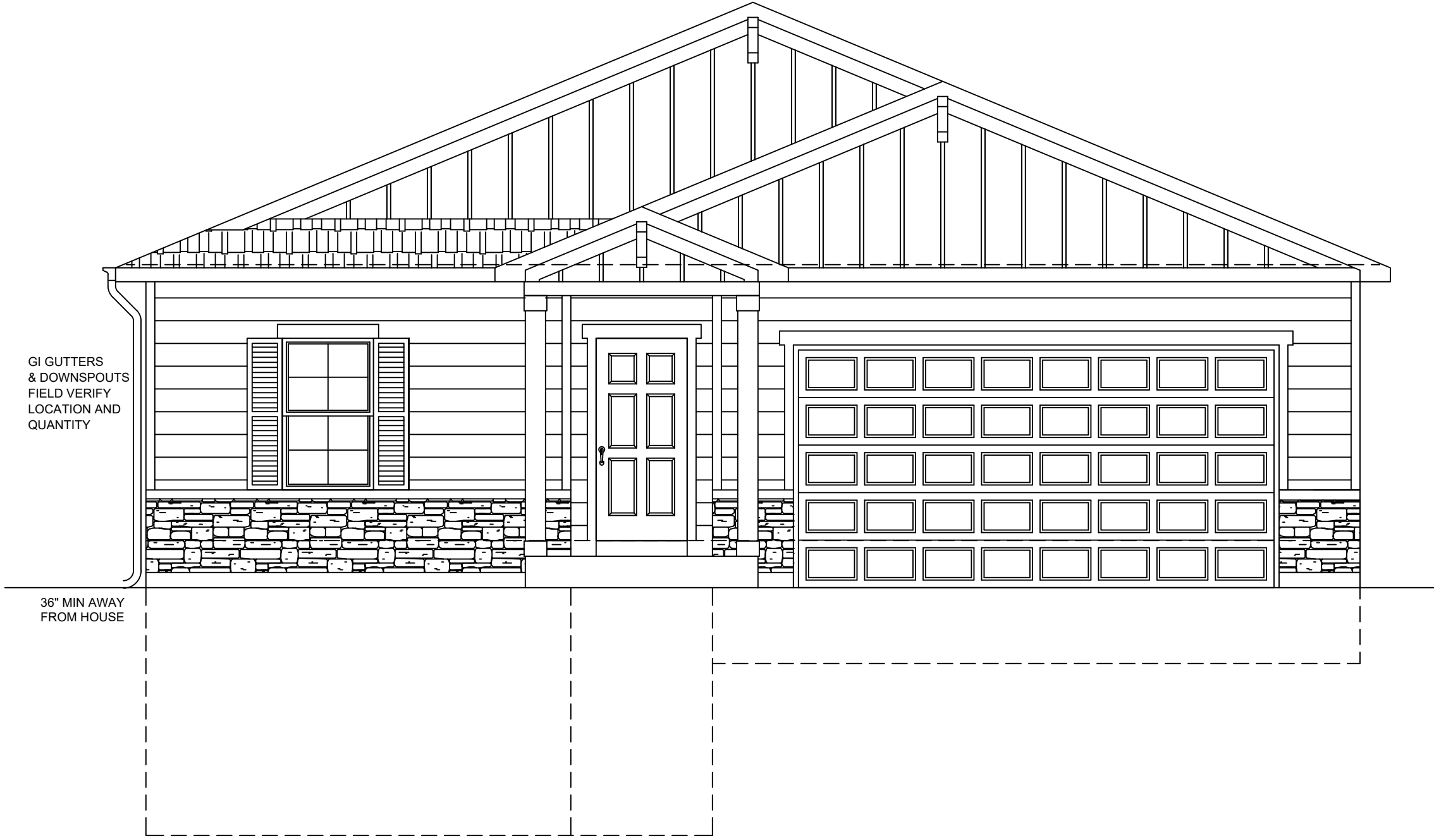
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LONG TREE CO 80124

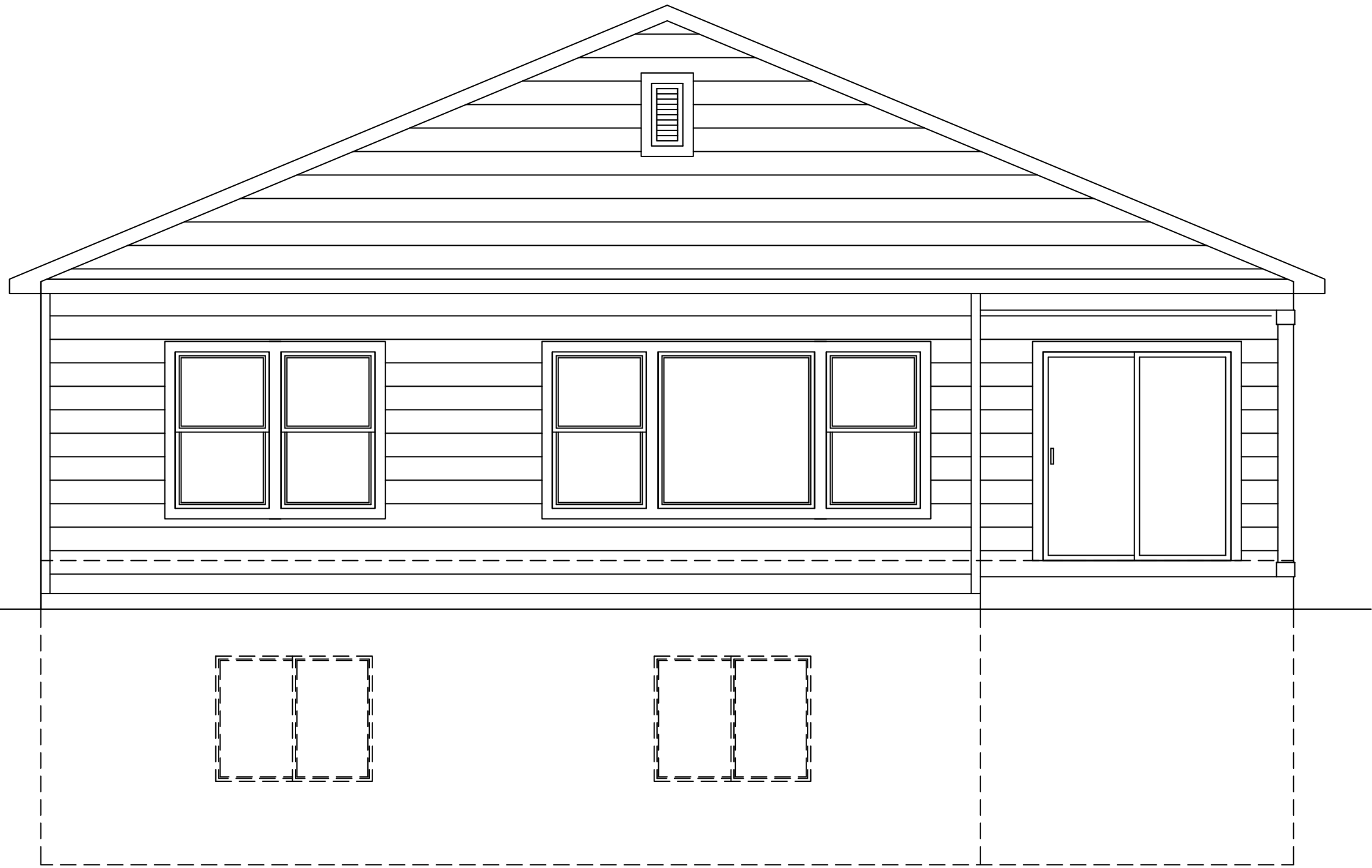
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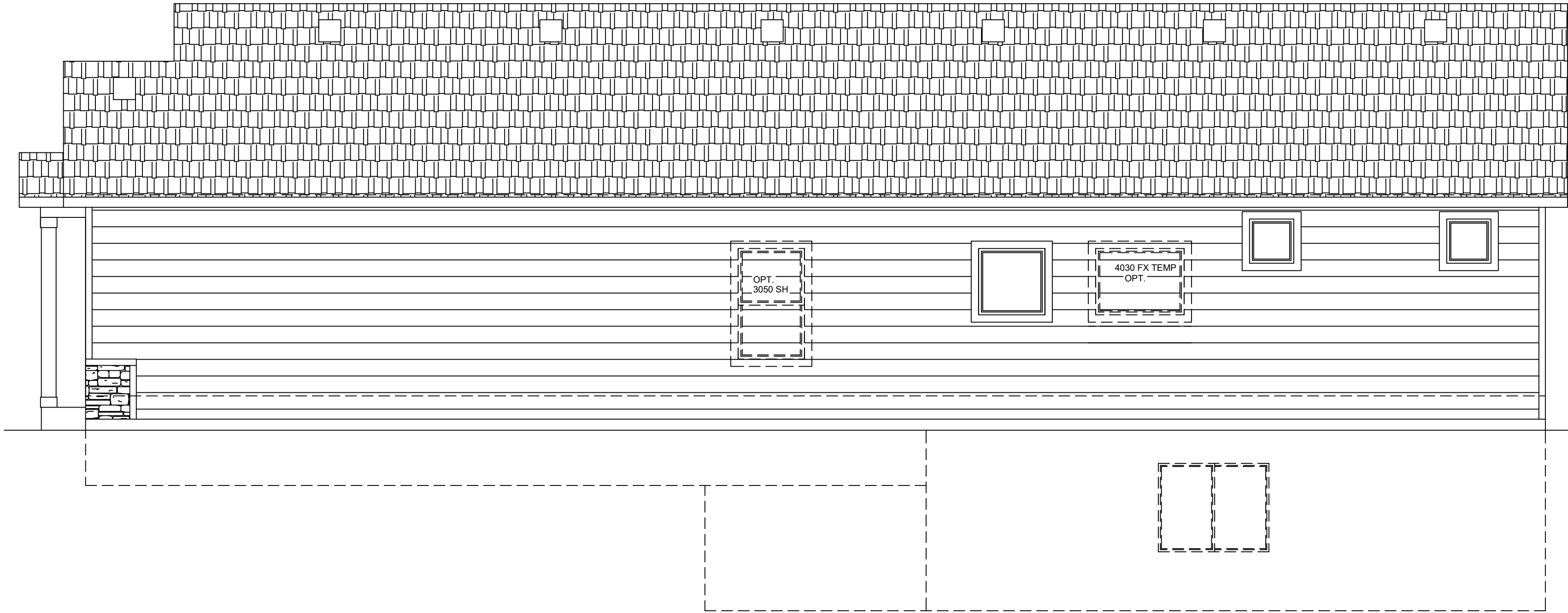
SIDE ELEVATION
1/4"=1'-0"



D1812.1 FRONT ELEVATION-TRADITIONAL
1/4"=1'-0"



REAR ELEVATION
1/4"=1'-0"



GARAGE SIDE ELEVATION
1/4"=1'-0"

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SUITE 250
COLORADO SPRINGS, CO 80920
719-580-5192

SHEET NAME
ELEVATION- TRADITIONAL
PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

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AL

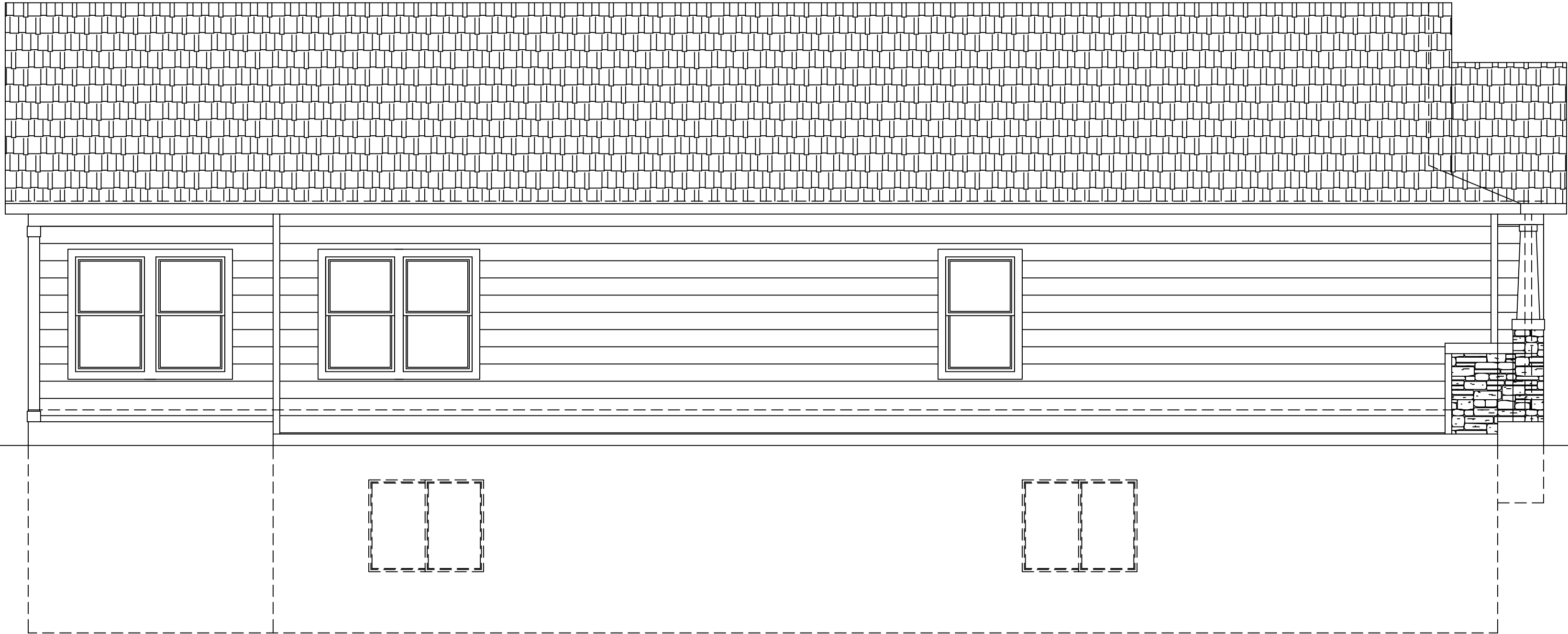
DATE:
8/27/18

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DATE	TYPE	BY	DATE	TYPE	BY

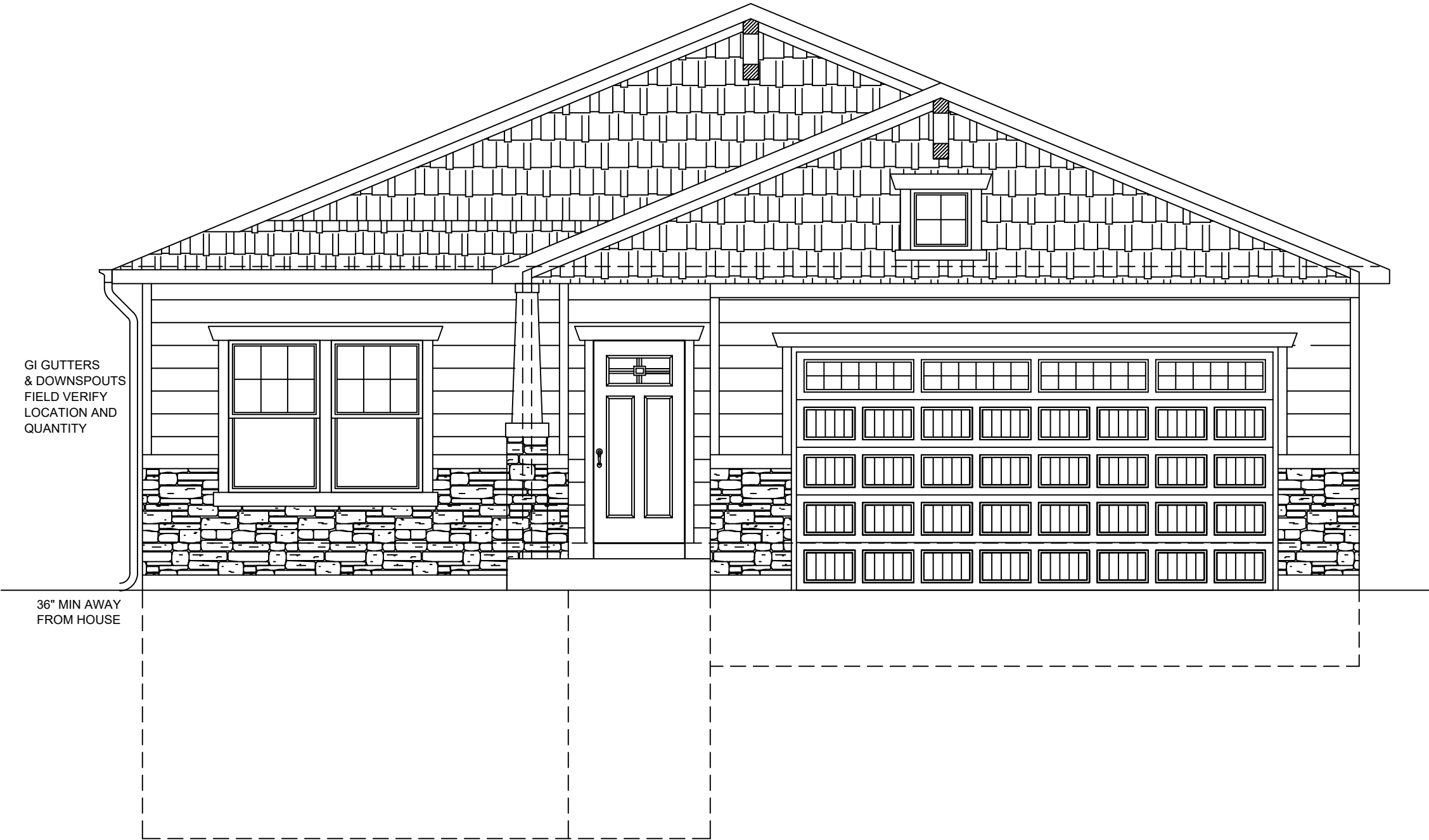
ELEVATION TRAD

SHEET NUMBER

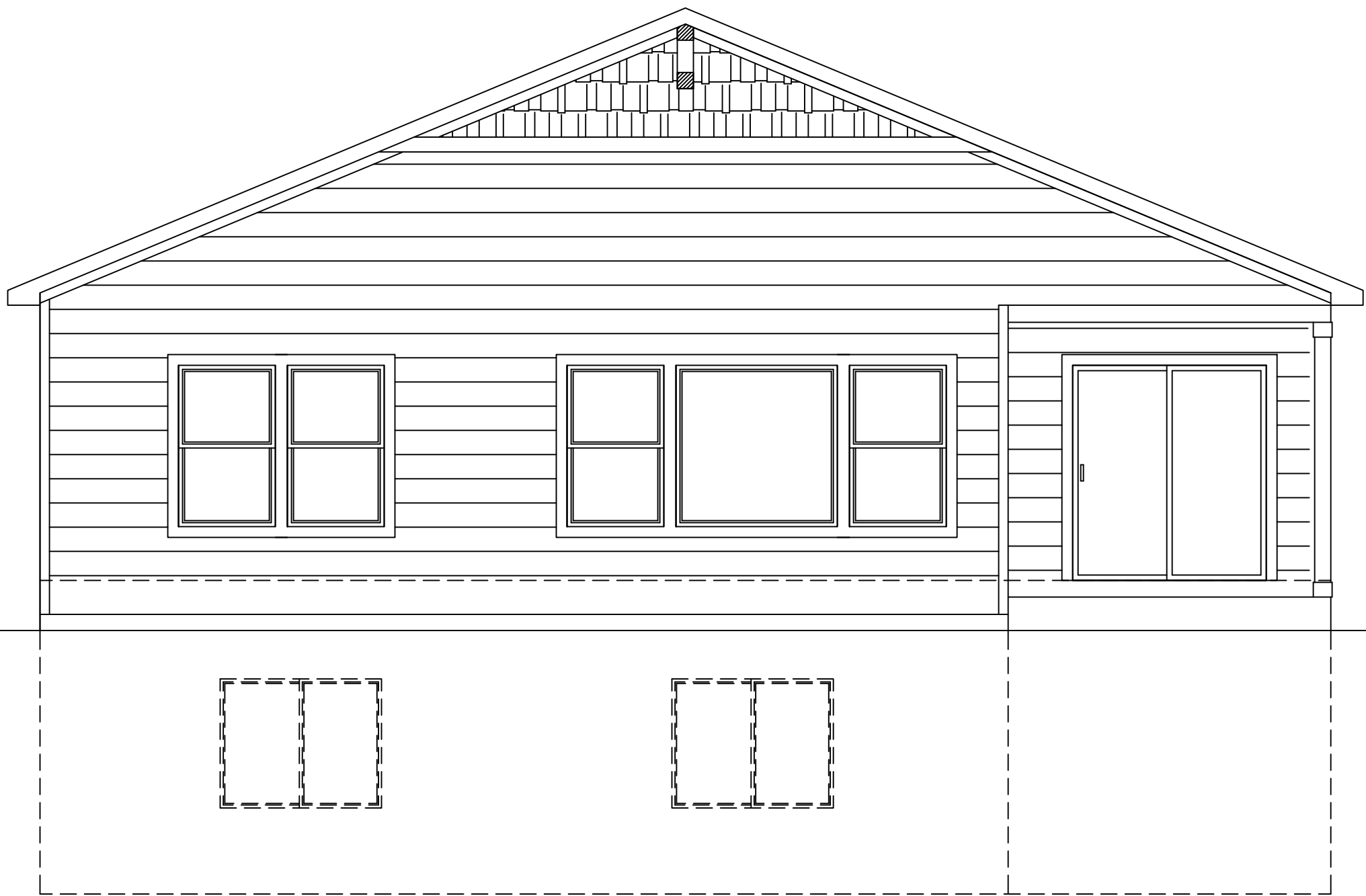
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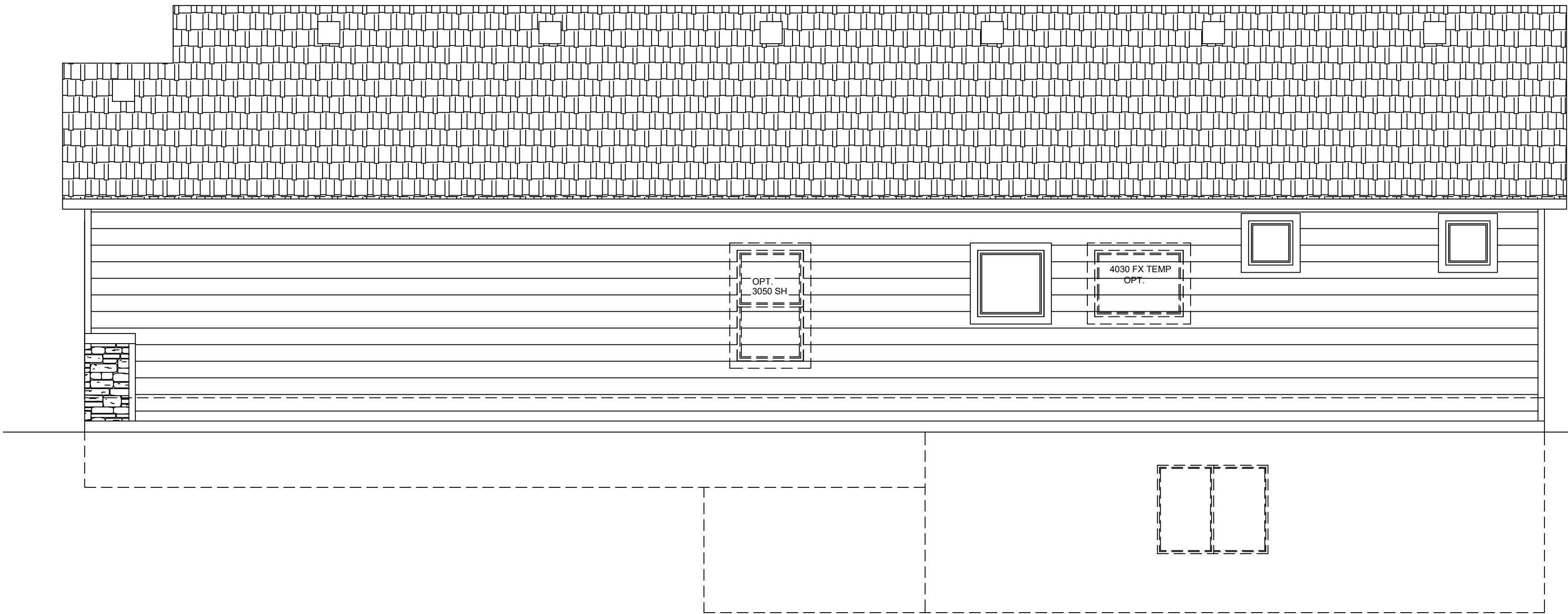
SIDE ELEVATION
1/4"=1'-0"



D1813.1 FRONT ELEVATION- CRAFTSMAN
1/4"=1'-0"



REAR ELEVATION
1/4"=1'-0"



GARAGE SIDE ELEVATION
1/4"=1'-0"

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SHEET NAME
ELEVATION- CRAFTSMAN
PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

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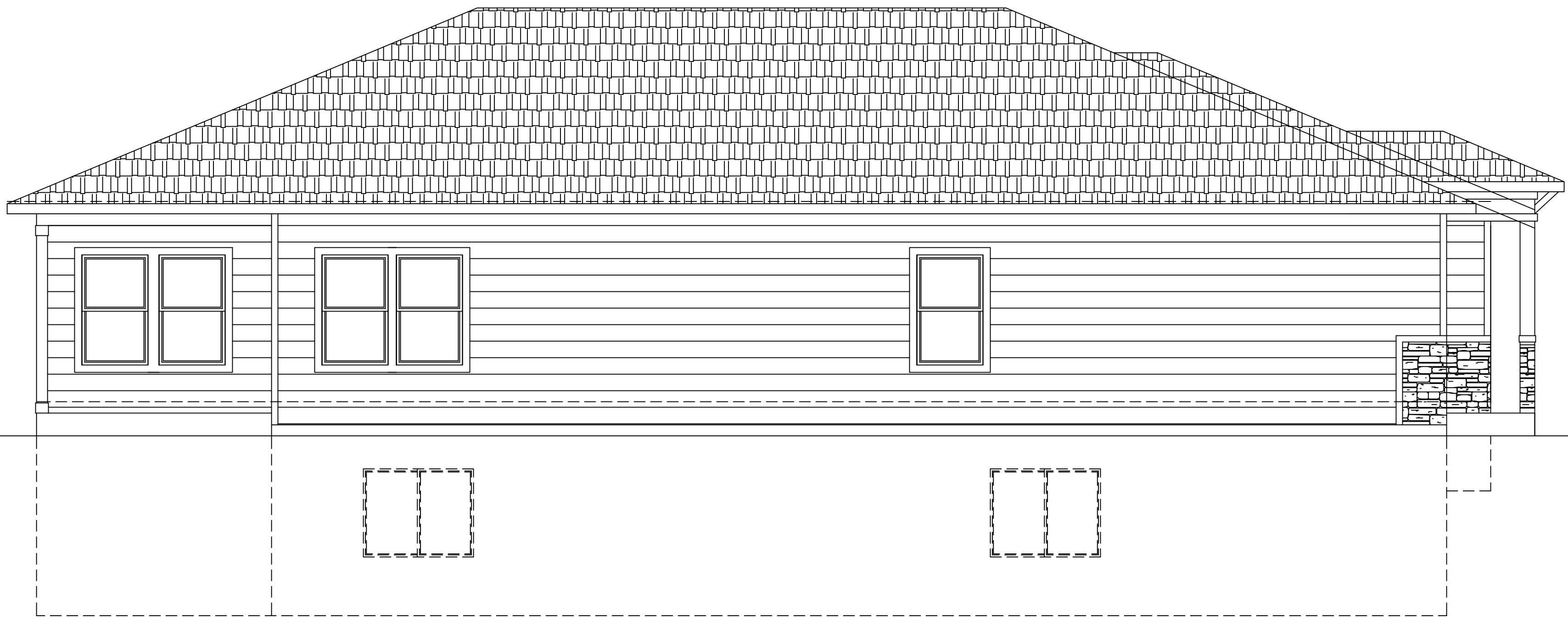
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DATE	TYPE	DATE	TYPE

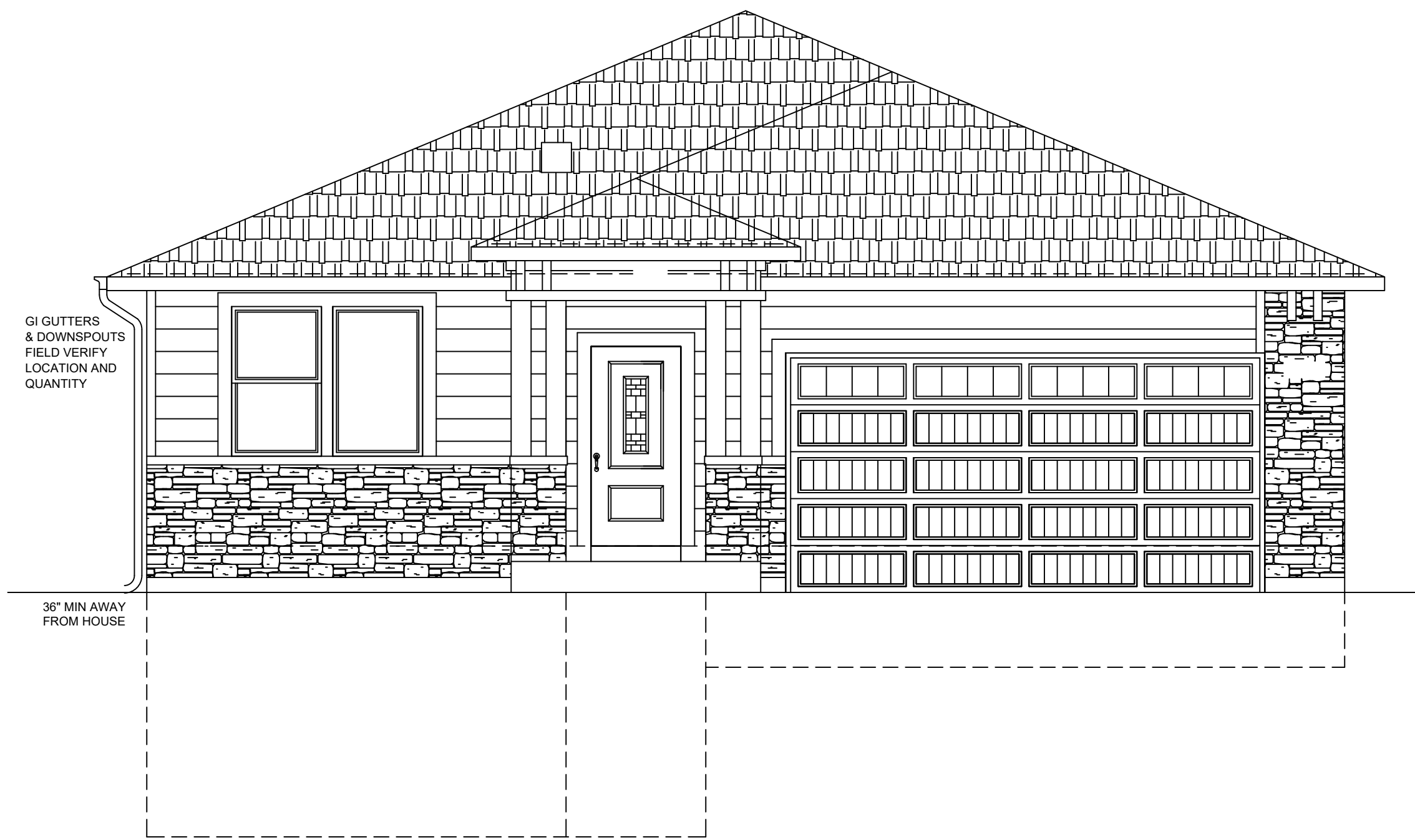
ELEVATION CRAFT.

SHEET NUMBER

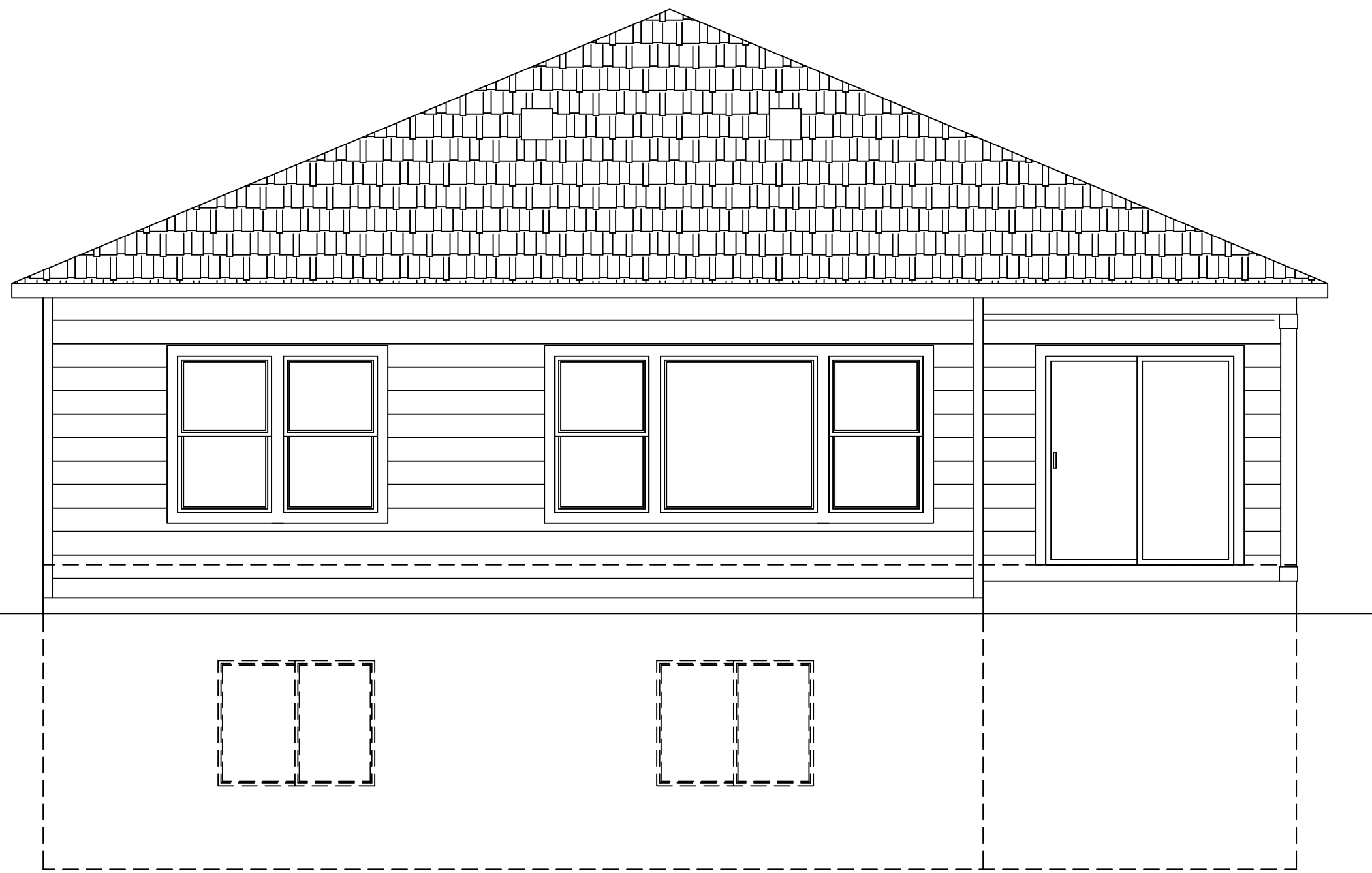
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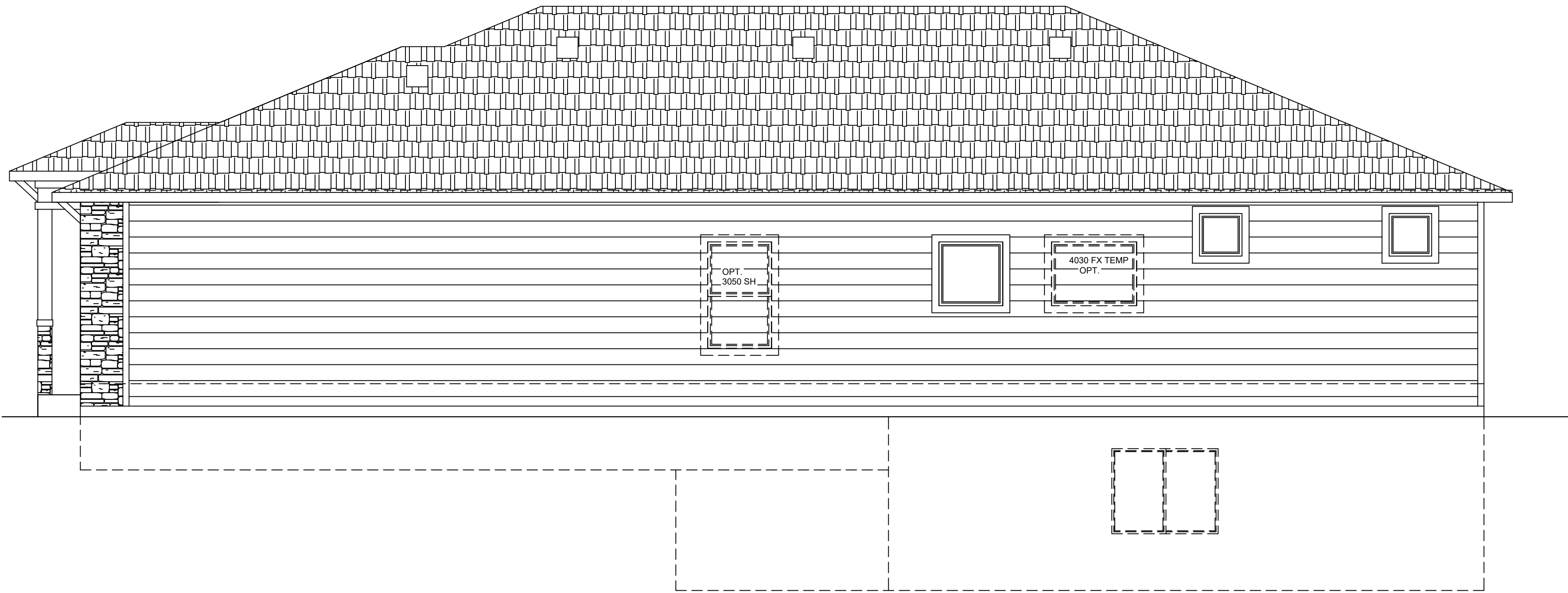
SIDE ELEVATION
1/4"=1'-0"



D1813.1 FRONT ELEVATION- MODERN PRAIRIE
1/4"=1'-0"



REAR ELEVATION
1/4"=1'-0"



GARAGE SIDE ELEVATION
1/4"=1'-0"

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SHEET NAME
ELEVATION- MODERN PRAIRIE

PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

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8/27/18

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DATE	TYPE	BY	DATE	TYPE	BY	DATE	TYPE

ELEVATION MOD. PR.

SHEET NUMBER
14



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SHEET NAME
ELEVATION- "A"

PROJECT NAME

PROJECT NAME
MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

DRAWN BY:

1

DATE:

8/27/18

[illegible]

ELEVATION ELEV "A"

SHEET NUMBER

15

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SHEET NAME
ELEVATION- "C"

PROJECT NAME
MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

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AL

DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION ELEV "C"

SHEET NUMBER

16

GARAGE SIDE ELEVATION "C"

1/4"=1'-0"

OPT BAY AT DINING

1/4"=1'-0"

REAR ELEVATION "C"

1/4"=1'-0"

D2146.7 FRONT ELEVATION "C"

1/4"=1'-0"

SIDE ELEVATION "C"

1/4"=1'-0"

Page 28 of 483

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SHEET NAME
ELEVATION- "D"

PROJECT NAME
MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	BY	DATE	BY

ELEVATION ELEV "D"

SHEET NUMBER

17

GARAGE SIDE ELEVATION "D"

1/4"=1'-0"

D2146.7 FRONT ELEVATION "D"

1/4"=1'-0"

OPT BAY AT DINING

1/4"=1'-0"

REAR ELEVATION "D"

1/4"=1'-0"

SIDE ELEVATION "D"

1/4"=1'-0"

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SHEET NAME
ELEVATION- "E"

PROJECT NAME
MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

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DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	BY	DATE	BY

ELEVATION ELEV "E"

SHEET NUMBER
18

GARAGE SIDE ELEVATION "E"
1/4"=1'-0"

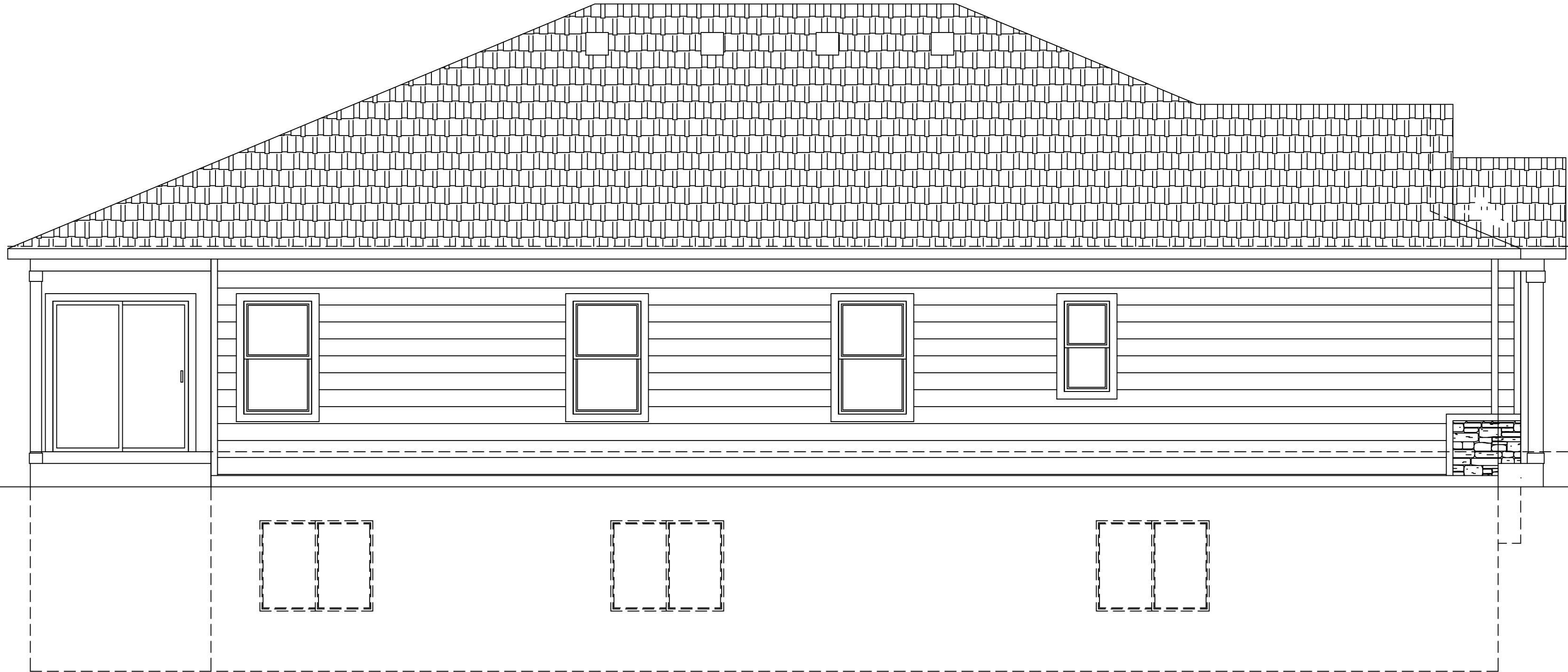
D2146.7 FRONT ELEVATION "E"
1/4"=1'-0"

OPT BAY AT DINING
1/4"=1'-0"

REAR ELEVATION "E"
1/4"=1'-0"

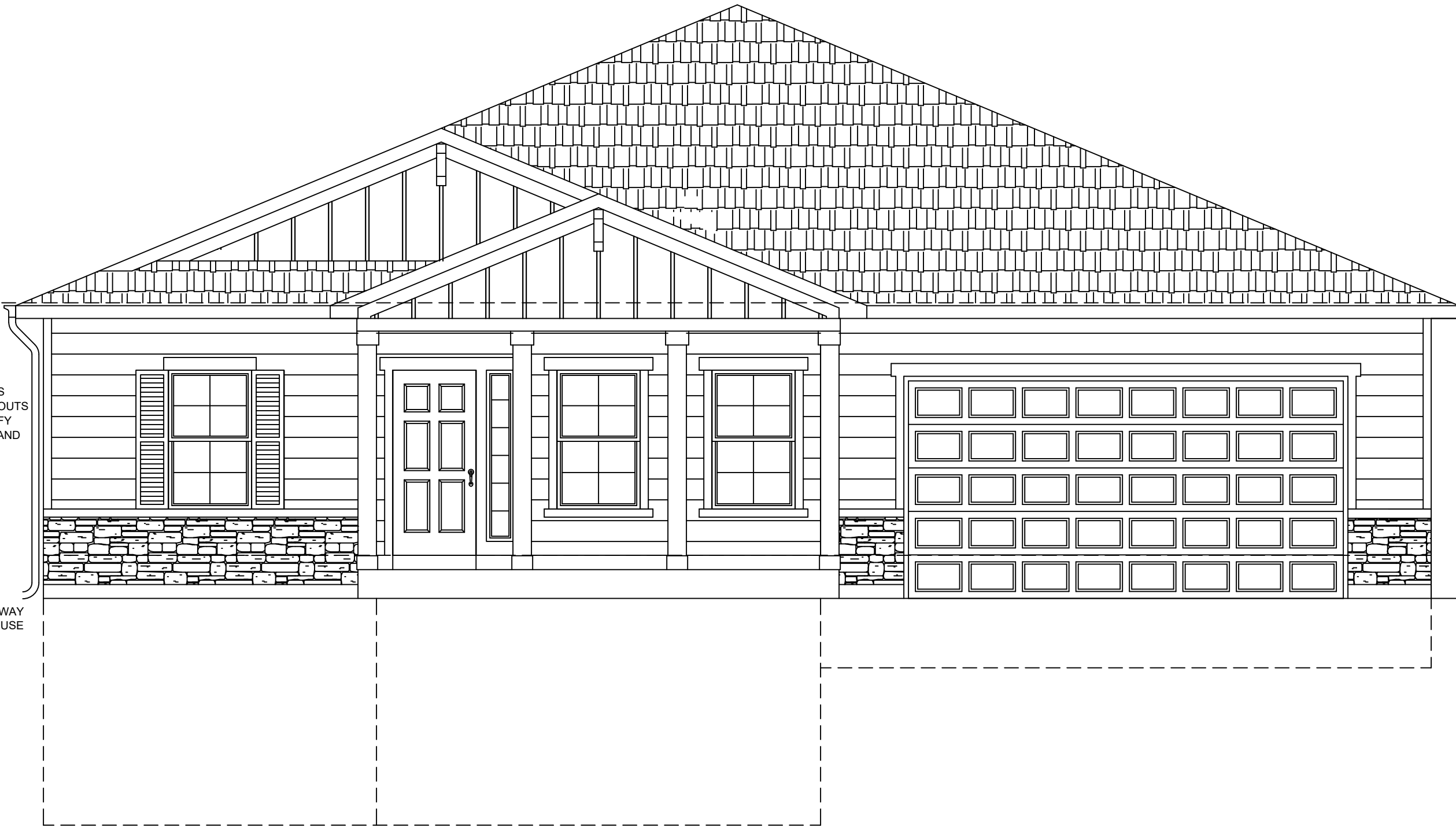
SIDE ELEVATION "E"
1/4"=1'-0"

Page 30 of 483



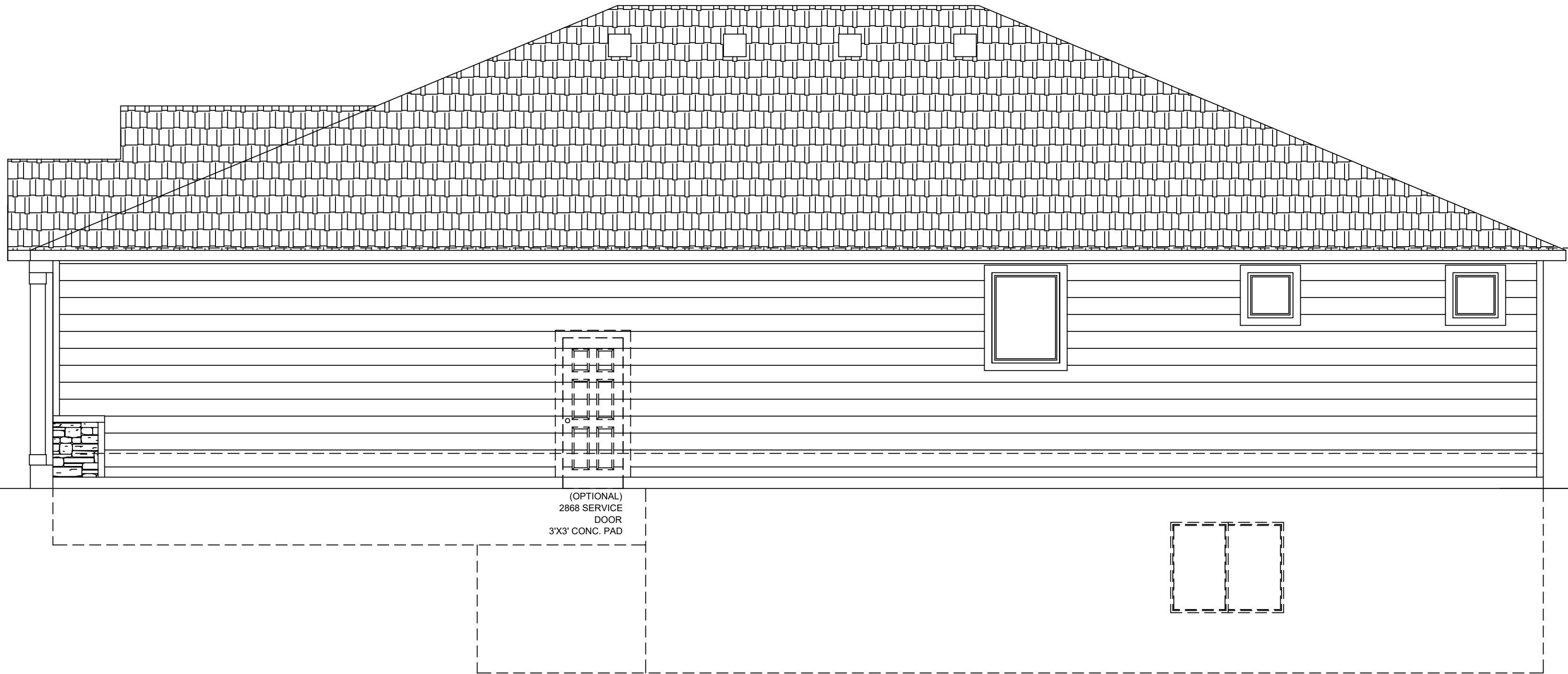
D2357.1 SIDE ELEVATION- TRADITIONAL

1/4"=1'-0"



D2357.1 FRONT ELEVATION-TRADITIONAL

1/4"=1'-0"



GARAGE SIDE ELEVATION- TRADITIONAL

1/4"=1'-0"



REAR ELEVATION- TRADITIONAL

1/4"=1'-0"

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COLORADO SPRINGS, CO 80920
719-598-5182

SHEET NAME
ELEVATION- TRADITIONAL
PROJECT NAME
MASTER PLAN D2357.1

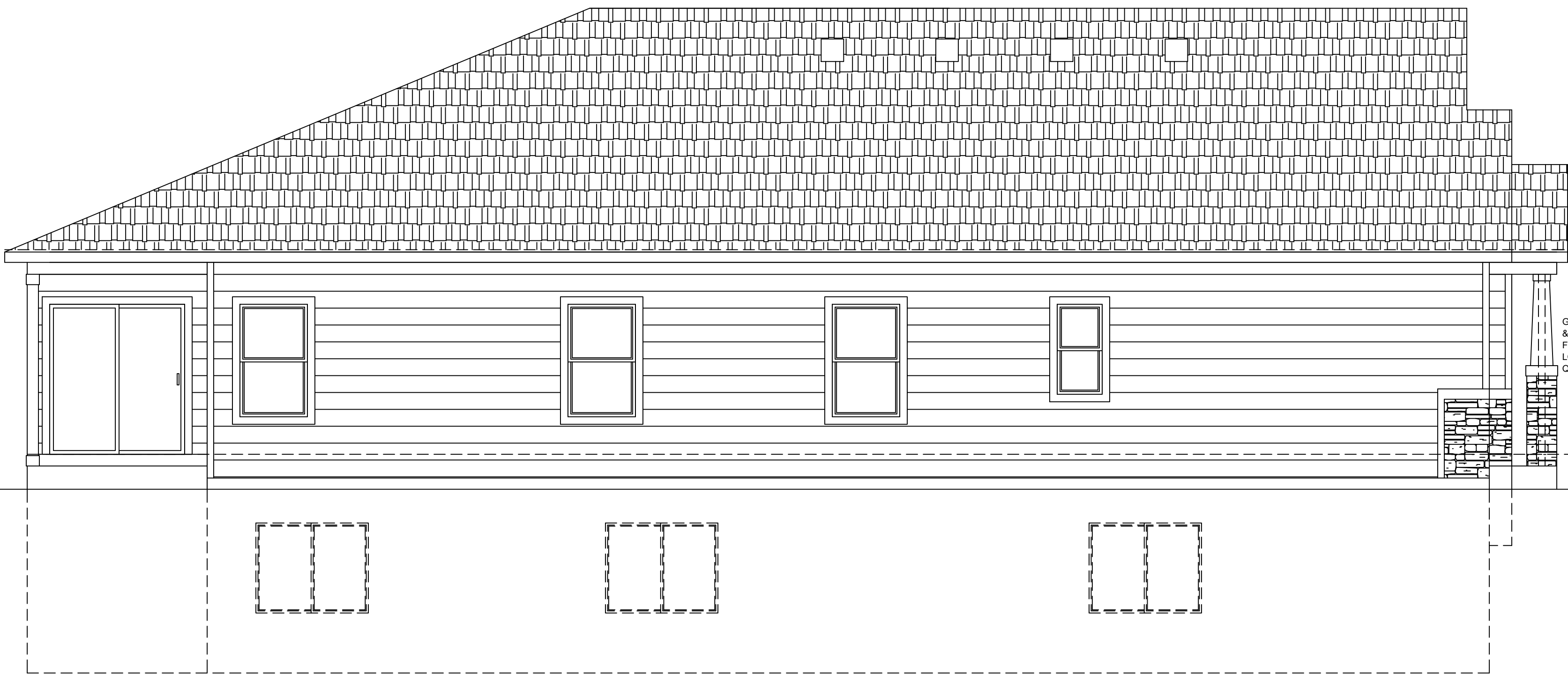
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DRAWN BY:
AL
DATE:
8/27/18

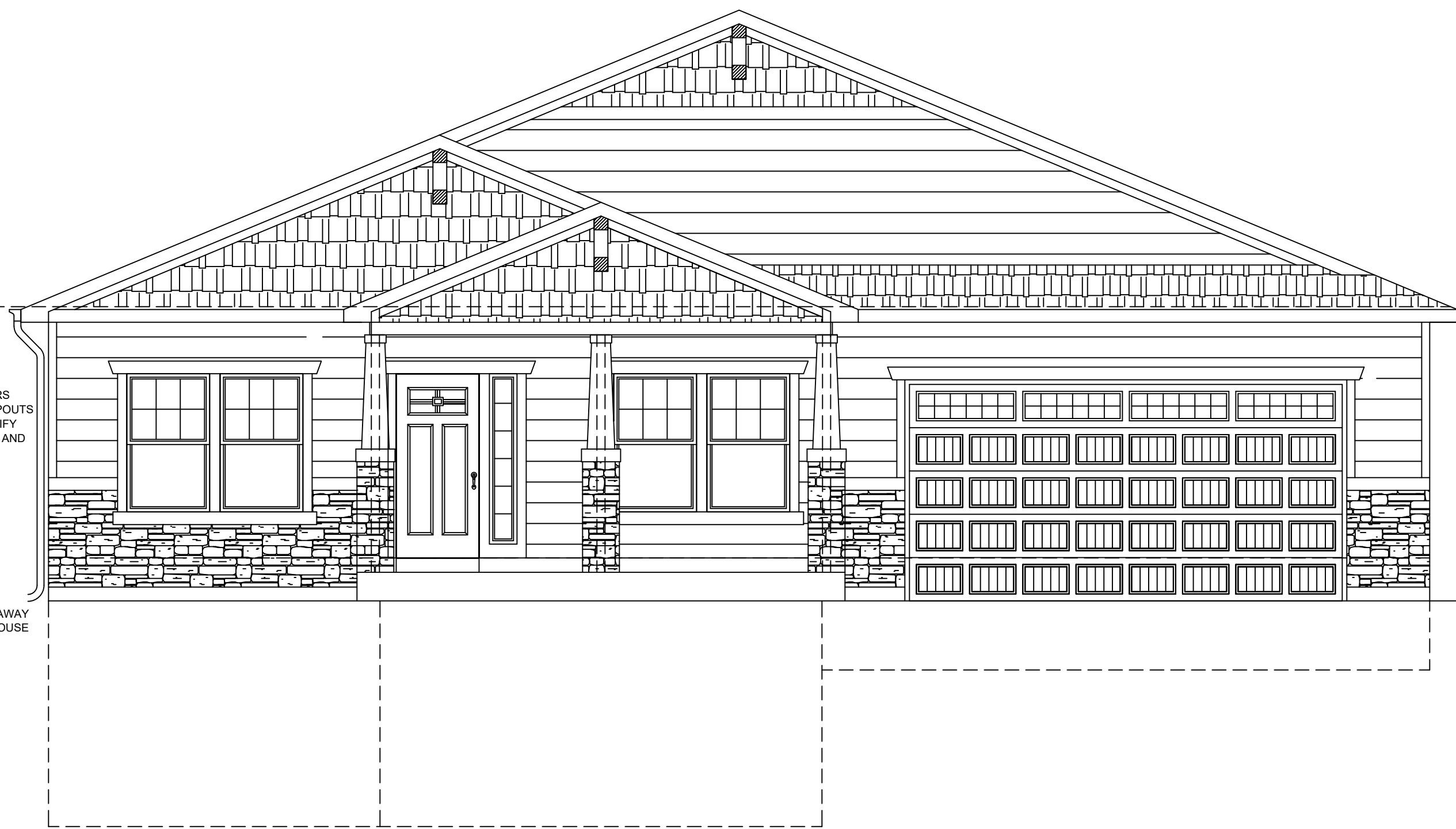
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DATE	TYPE	DATE	TYPE

ELEVATION TRAD.

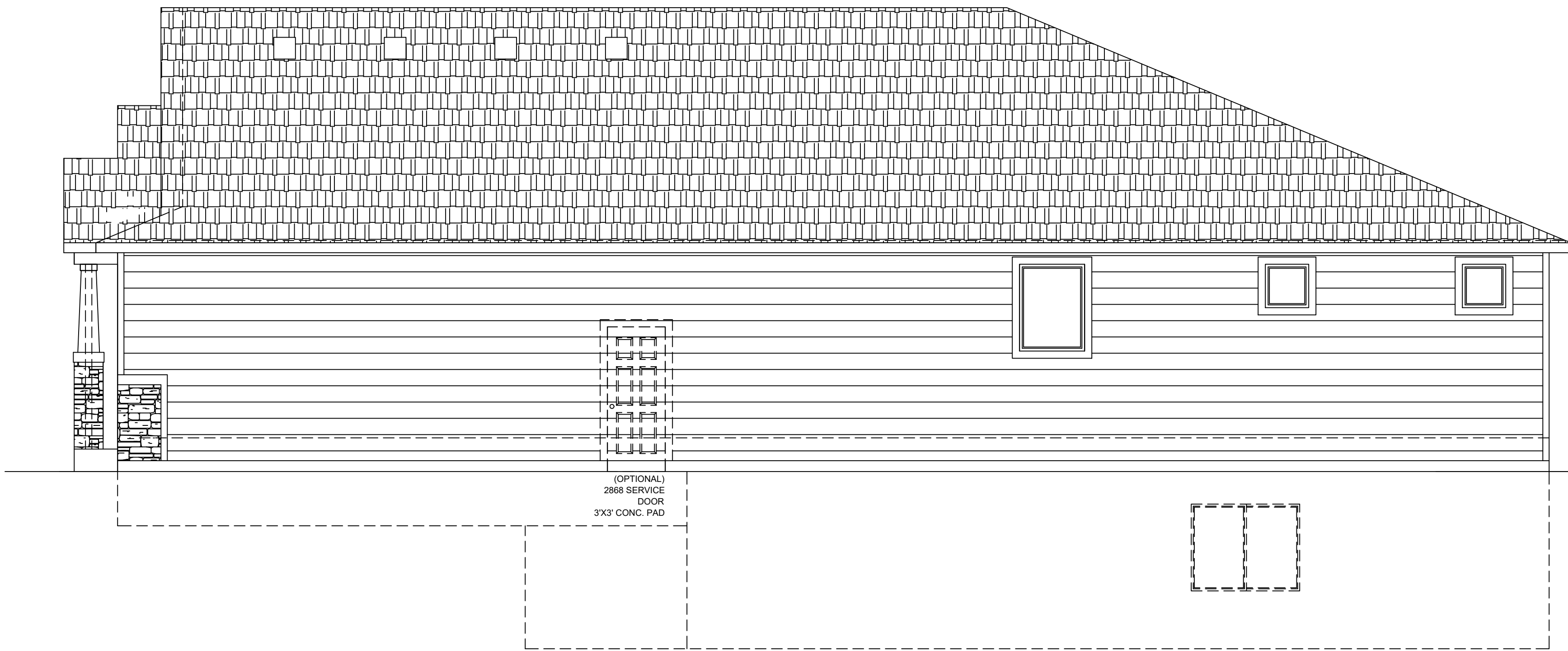
SHEET NUMBER
19



D2357.1 SIDE ELEVATION- CRAFTSMAN
1/4"=1'-0"



D2357.1 FRONT ELEVATION-CRAFTSMAN
1/4"=1'-0"



GARAGE SIDE ELEVATION- CRAFTSMAN
1/4"=1'-0"



REAR ELEVATION- CRAFTSMAN
1/4"=1'-0"

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SHEET NAME
ELEVATION- CRAFTSMAN
PROJECT NAME
MASTER PLAN D2357.1

STAMPS/ENDORSEMENTS

DRAWN BY:
AL
DATE:
8/27/18

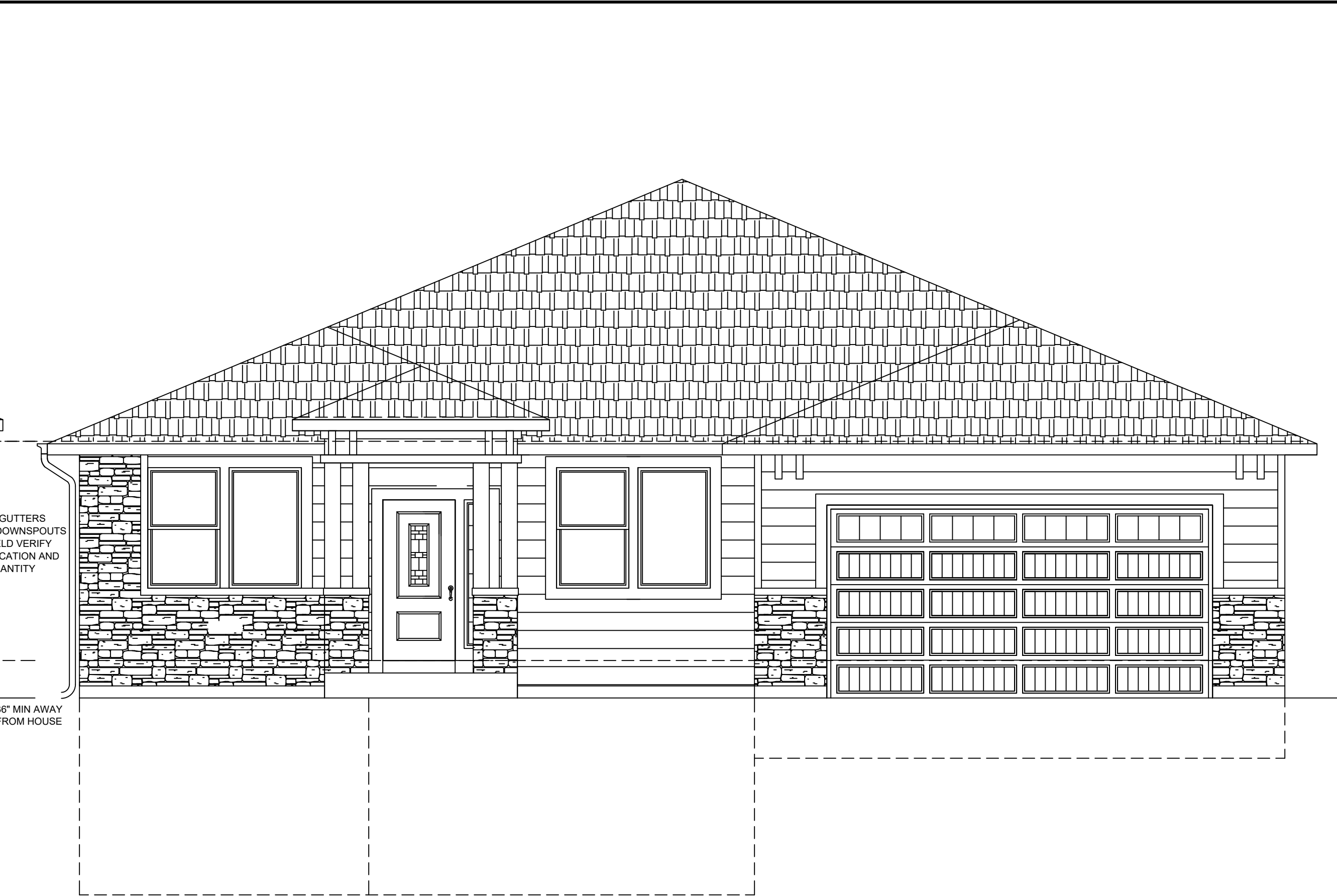
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DATE	TYPE	DATE	TYPE

ELEVATION CRAFT.

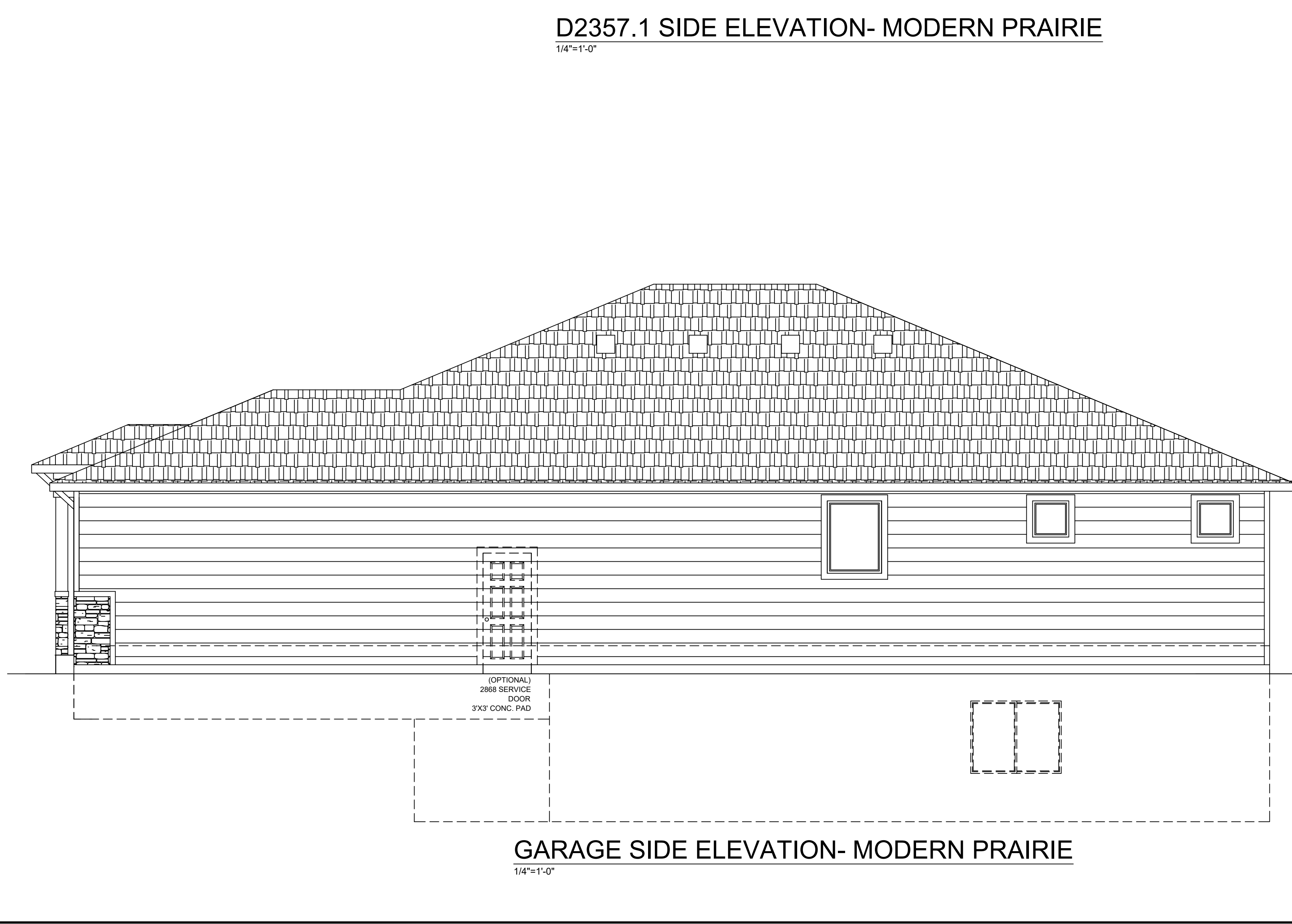
SHEET NUMBER
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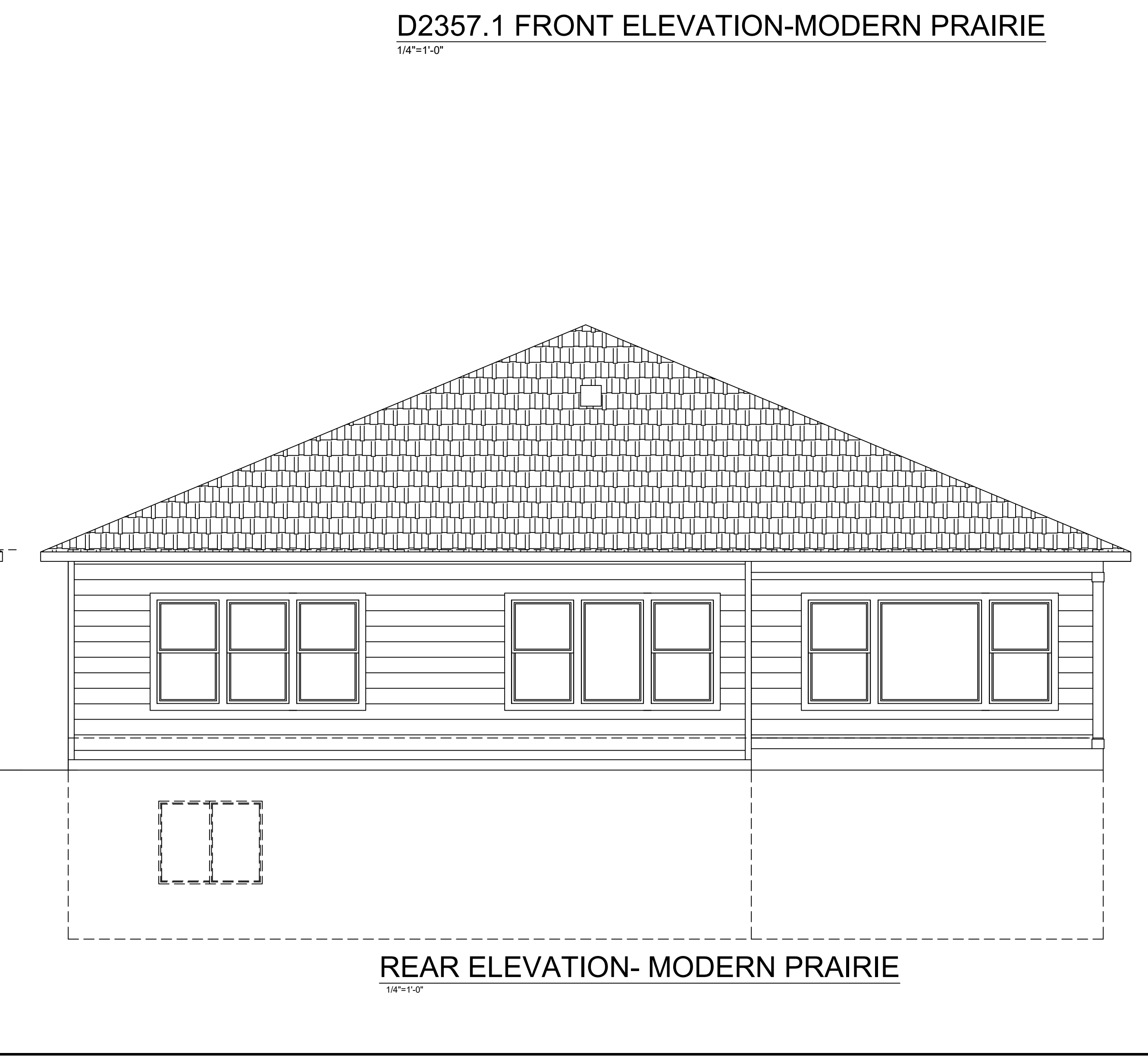
1/4"=1'-0"



1/4"=1'-0"



1/4"=1'-0"



1/4"=1'-0"

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719-598-5192

SHEET NAME
ELEVATION- MODERN PRAIRIE

PROJECT NAME
MASTER PLAN D2357.1

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION MOD. PR.

SHEET NUMBER
21



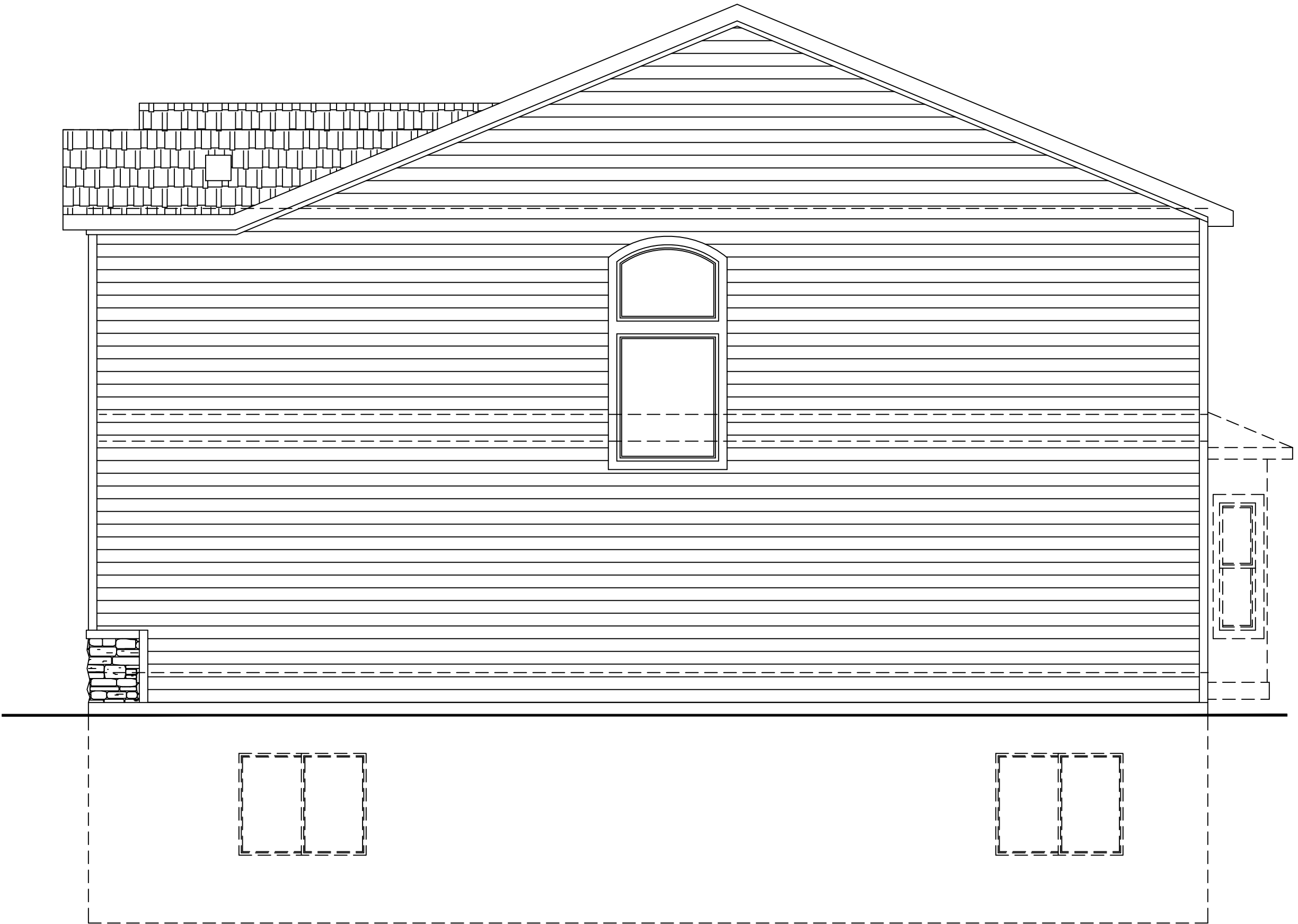
REAR ELEVATION "A"
SCALE: 1/4" = 1'-0"



GARAGE SIDE ELEVATION "A"
SCALE: 1/4" = 1'-0"



D2659.5 FRONT ELEVATION "A"
SCALE: 1/4" = 1'-0" (SHOWN w/ OPTIONAL BASEMENT)



RIGHT ELEVATION "A"
SCALE: 1/4" = 1'-0"

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SHEET NAME
ELEVATION- "A"

PROJECT NAME
MASTER PLAN D2659.5

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DATE:
8/27/18

SUBMITTALS / REVISIONS			SUBMITTALS / REVISIONS		
DATE	TYPE	BY	DATE	TYPE	BY

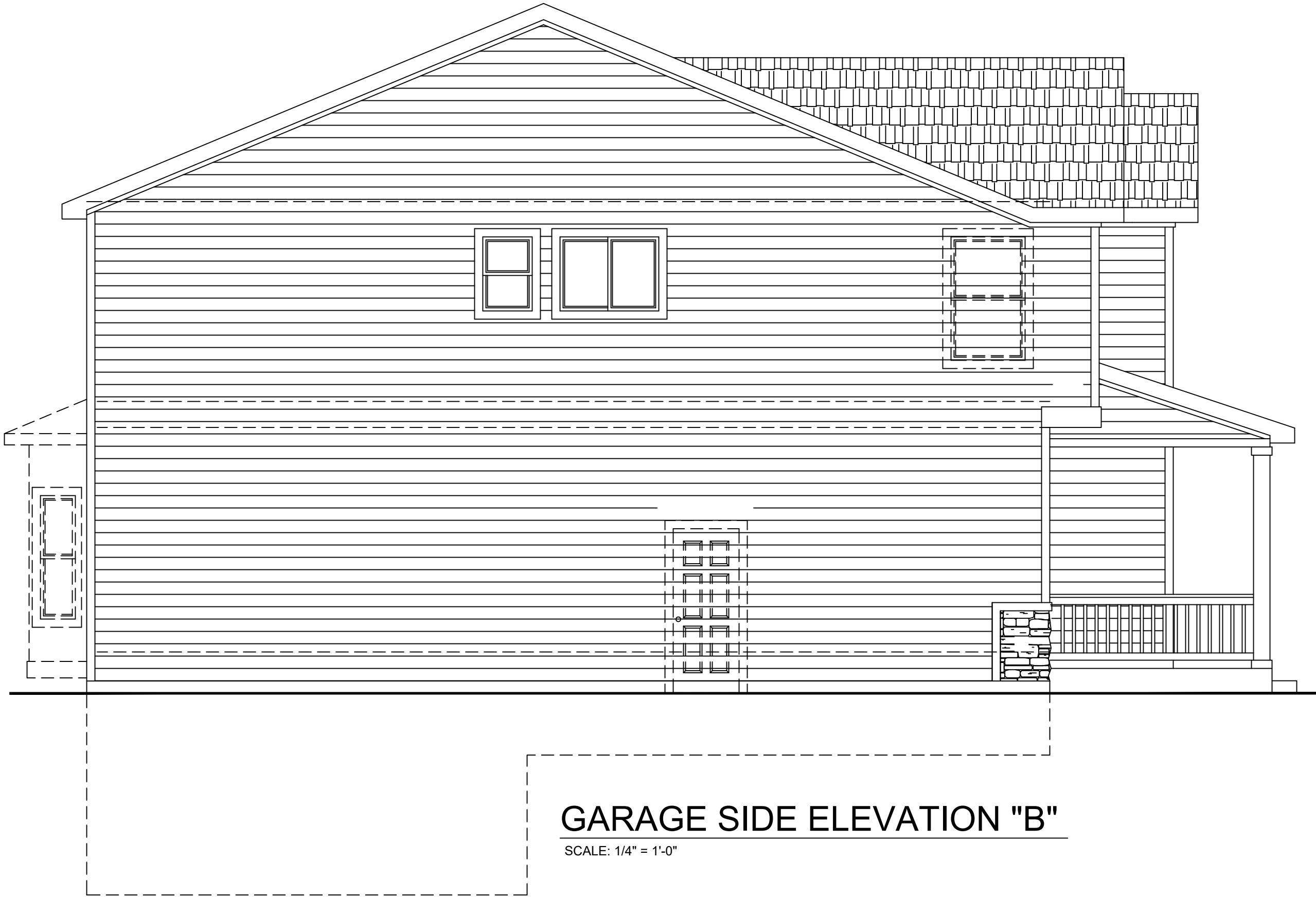
ELEVATION "A"

SHEET NUMBER
22



REAR ELEVATION "B"

SCALE: 1/4" = 1'-0"



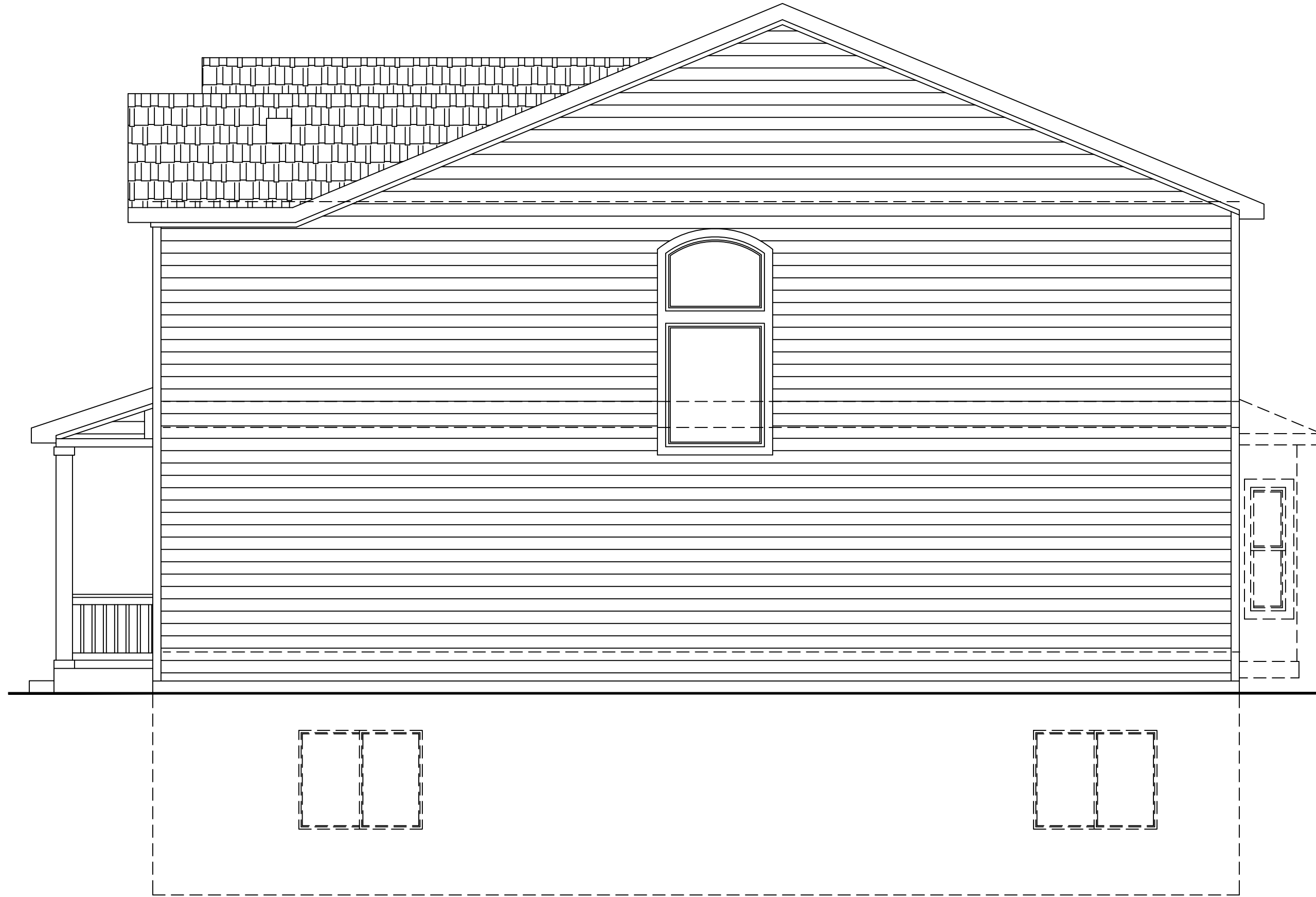
GARAGE SIDE ELEVATION "B"

SCALE: 1/4" = 1'-0"



D2659.5 FRONT ELEVATION "B"

SCALE: 1/4" = 1'-0" (SHOWN w/ OPTIONAL BASEMENT)



RIGHT ELEVATION "B"

SCALE: 1/4" = 1'-0"

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DESIGNS, AND DETAILS
SHOWN ON THIS SHEET ARE
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OF NAMED PARTIES OR ITS
SUB-CONTRACTORS IS
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CHALLENGER
HOMES
CHALLENGER BUILDING, LLC.
8605 EXPLORER DRIVE
SUITE 250
COLORADO SPRINGS, CO 80920
719-596-5192

SHEET NAME
ELEVATION- "B"
PROJECT NAME
MASTER PLAN D2659.5

STAMPS/ENDORSEMENTS

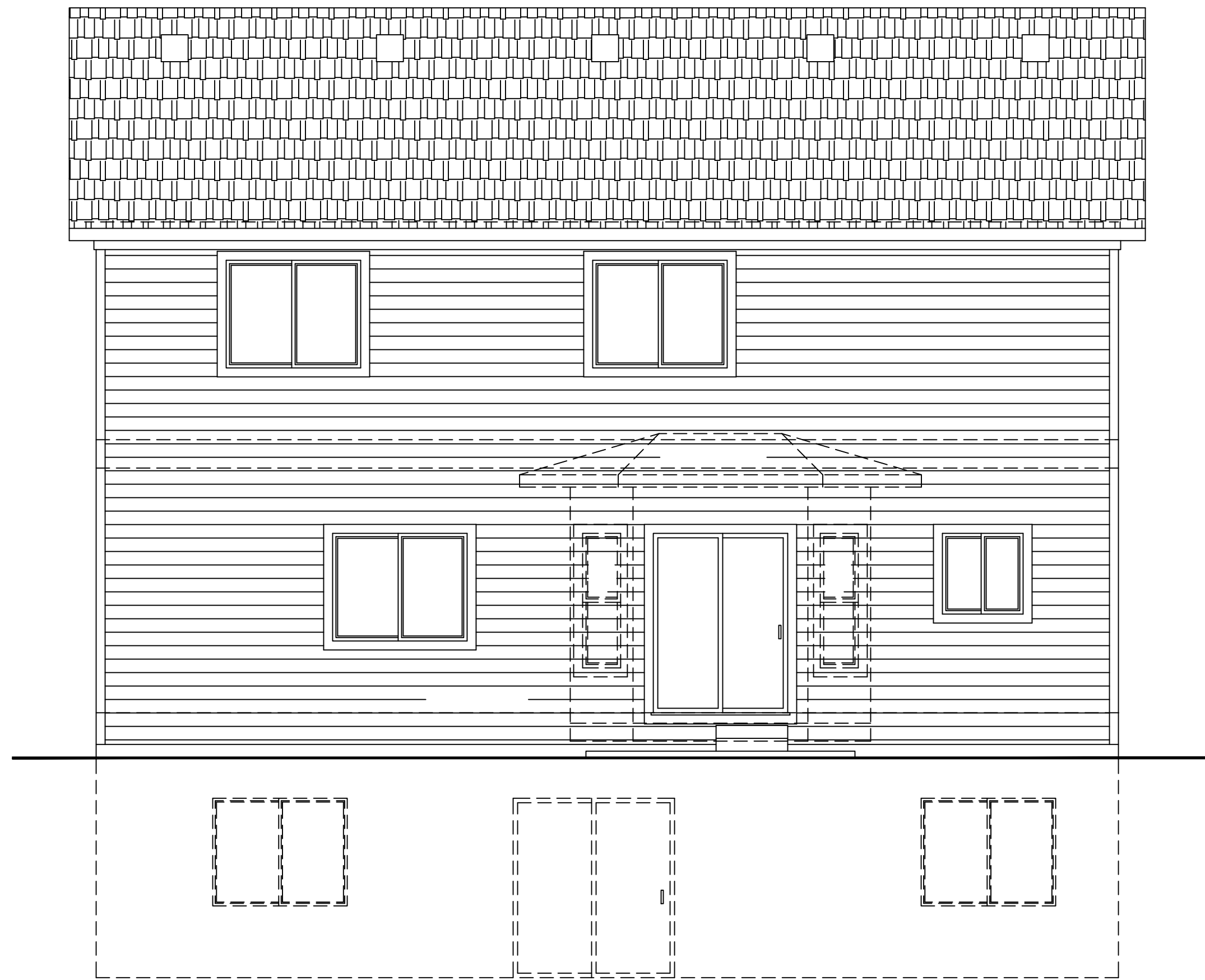
DRAWN BY:
AL
DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION "B"

SHEET NUMBER

23



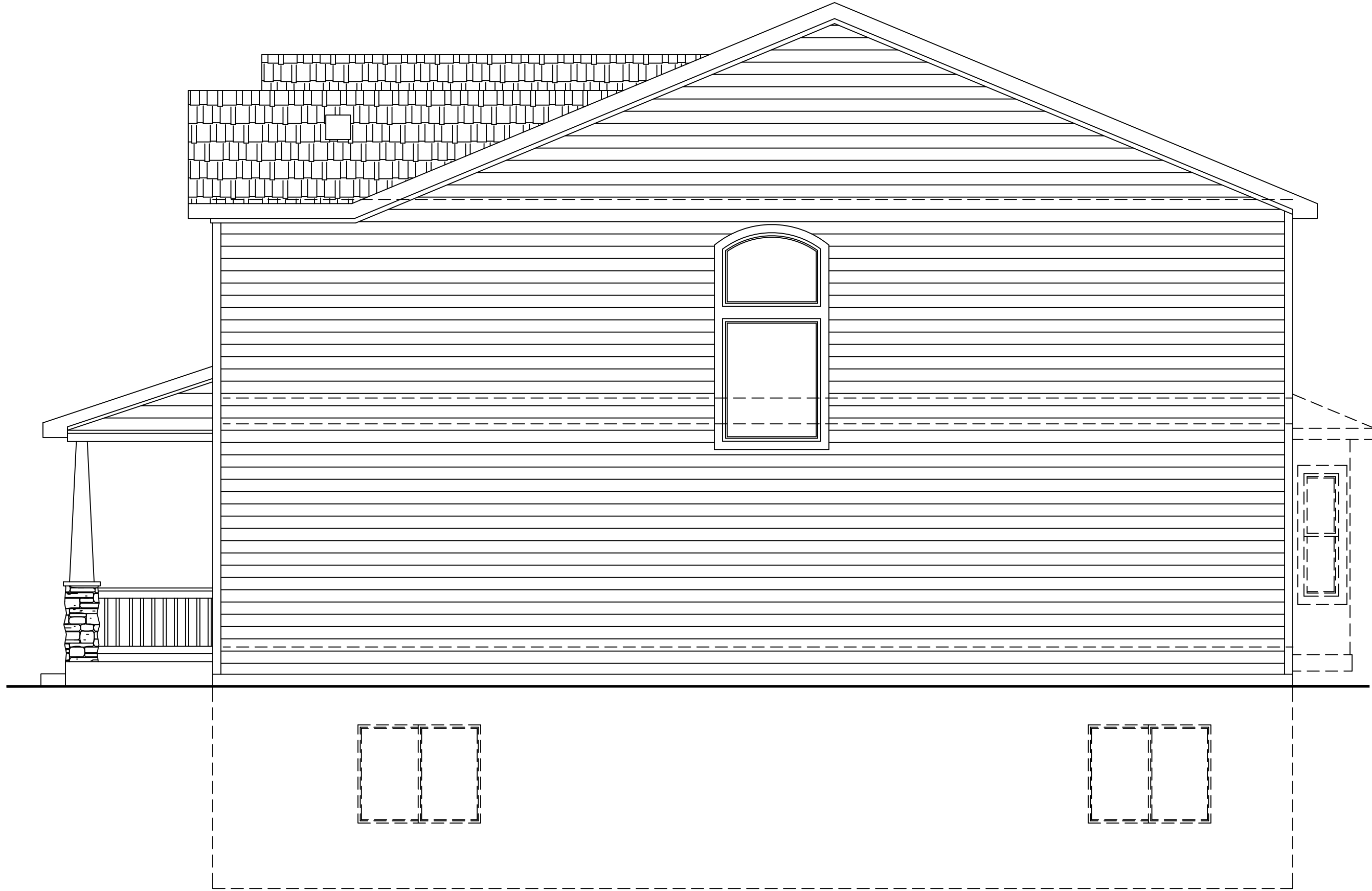
REAR ELEVATION "E"
SCALE: 1/4" = 1'-0"



GARAGE SIDE ELEVATION "E"
SCALE: 1/4" = 1'-0"



D2659.5 FRONT ELEVATION "E"
SCALE: 1/4" = 1'-0" (SHOWN w/ OPTIONAL BASEMENT)



RIGHT ELEVATION "E"
SCALE: 1/4" = 1'-0"

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SHEET NAME
ELEVATION- "E"

PROJECT NAME
MASTER PLAN D2659.5

STAMPS/ENDORSEMENTS

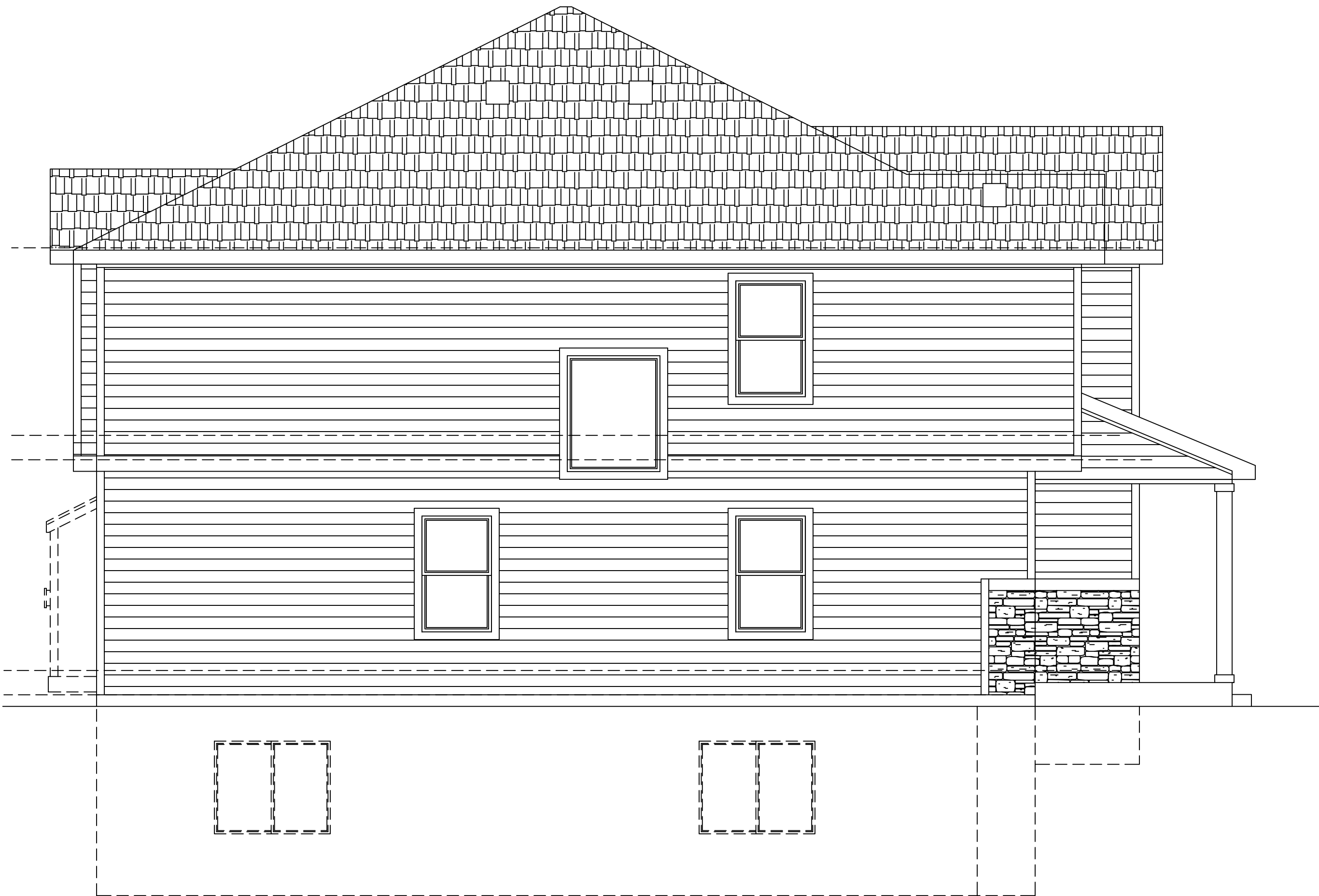
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AL

DATE:
8/27/18

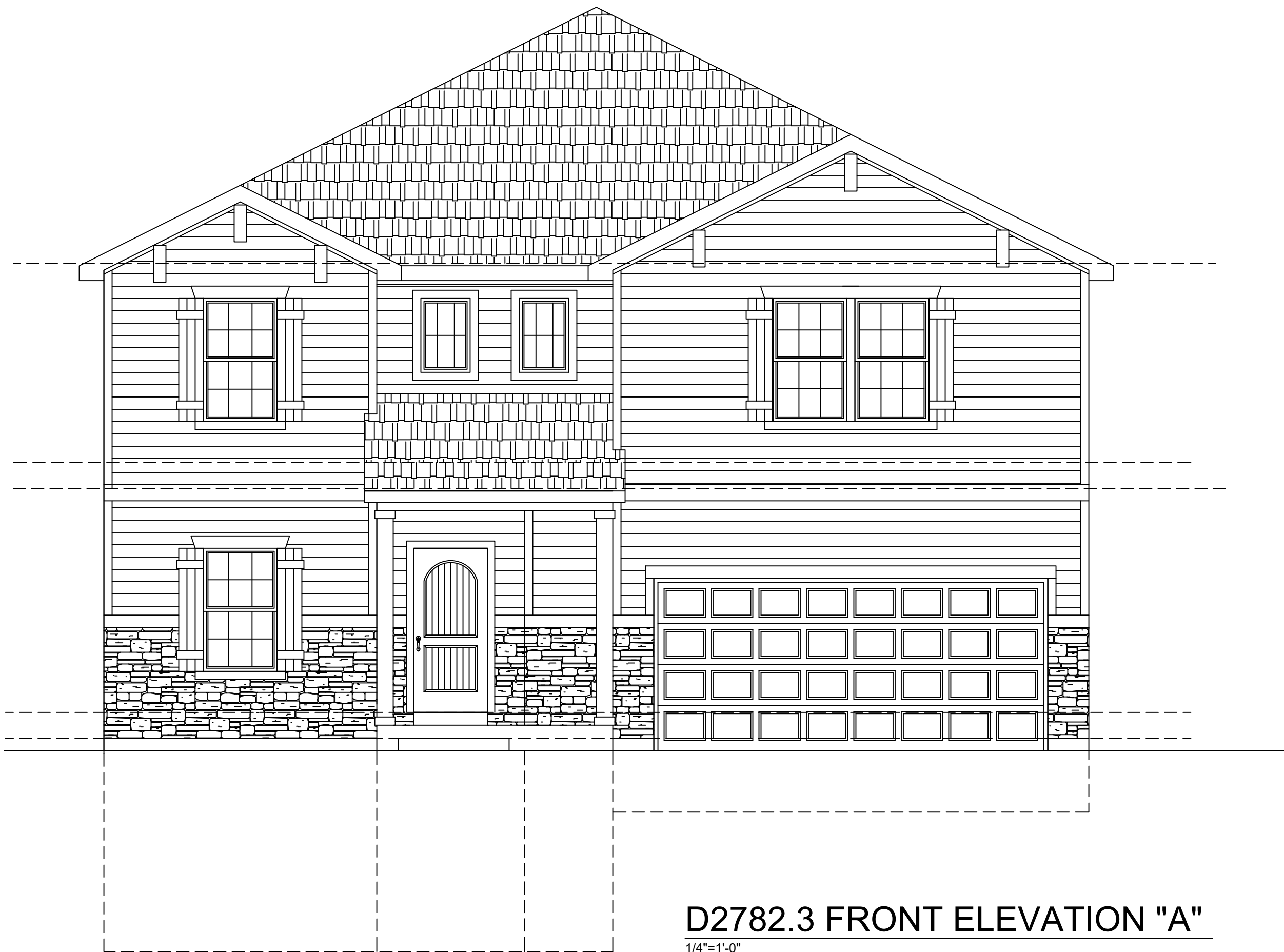
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DATE	BY	DATE	BY

ELEVATION "E"

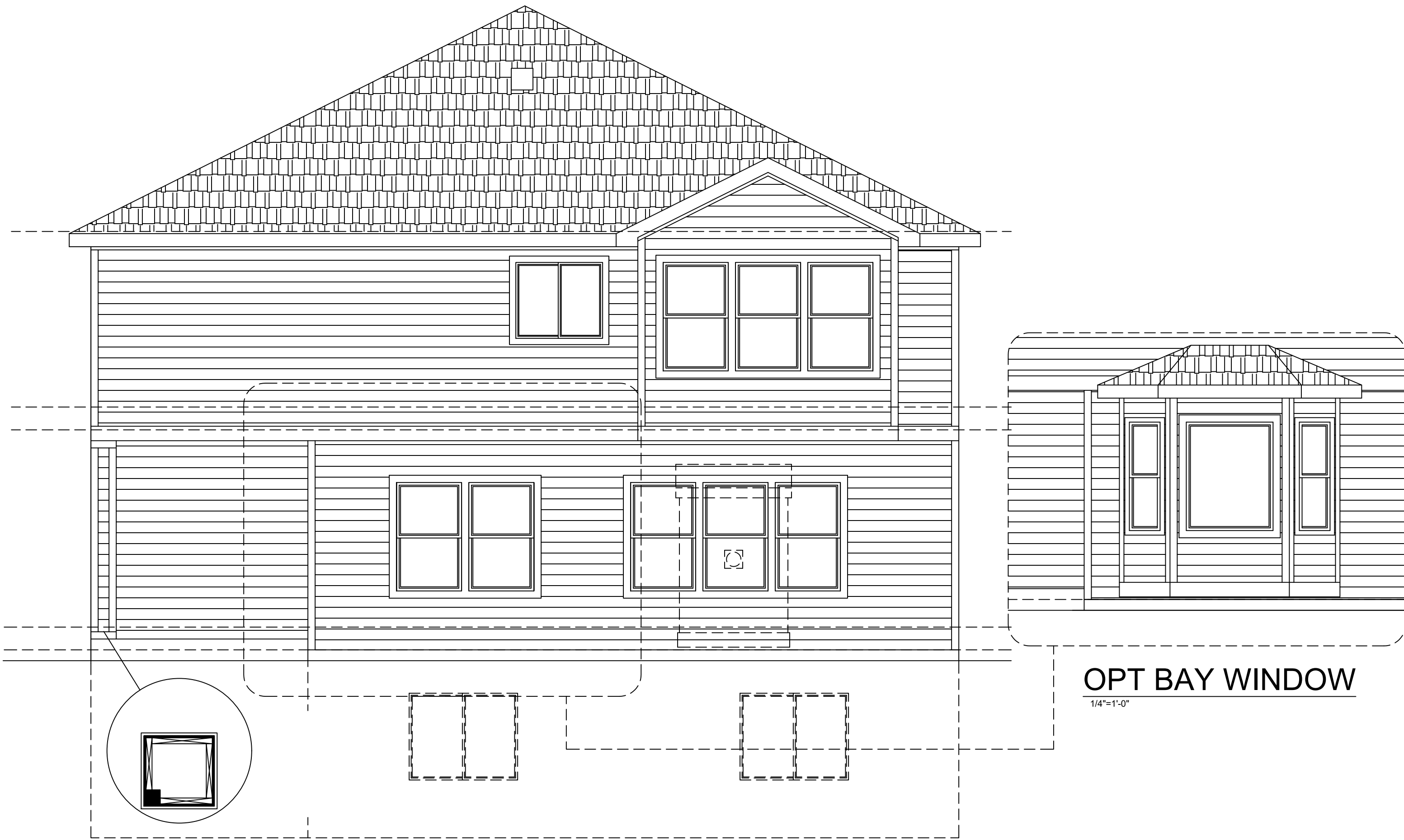
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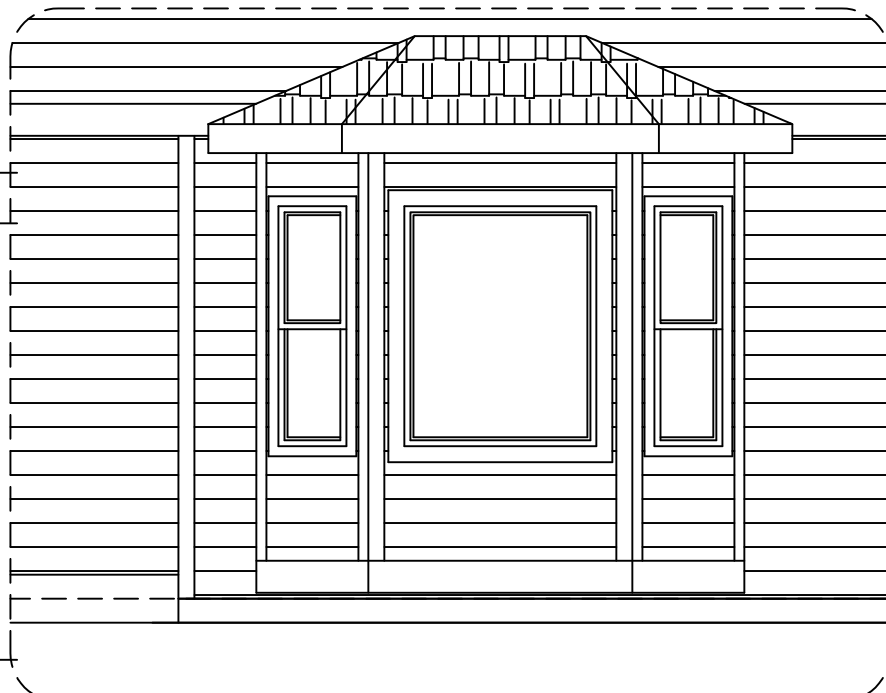
SIDE ELEVATION "A"
1/4"=1'-0"



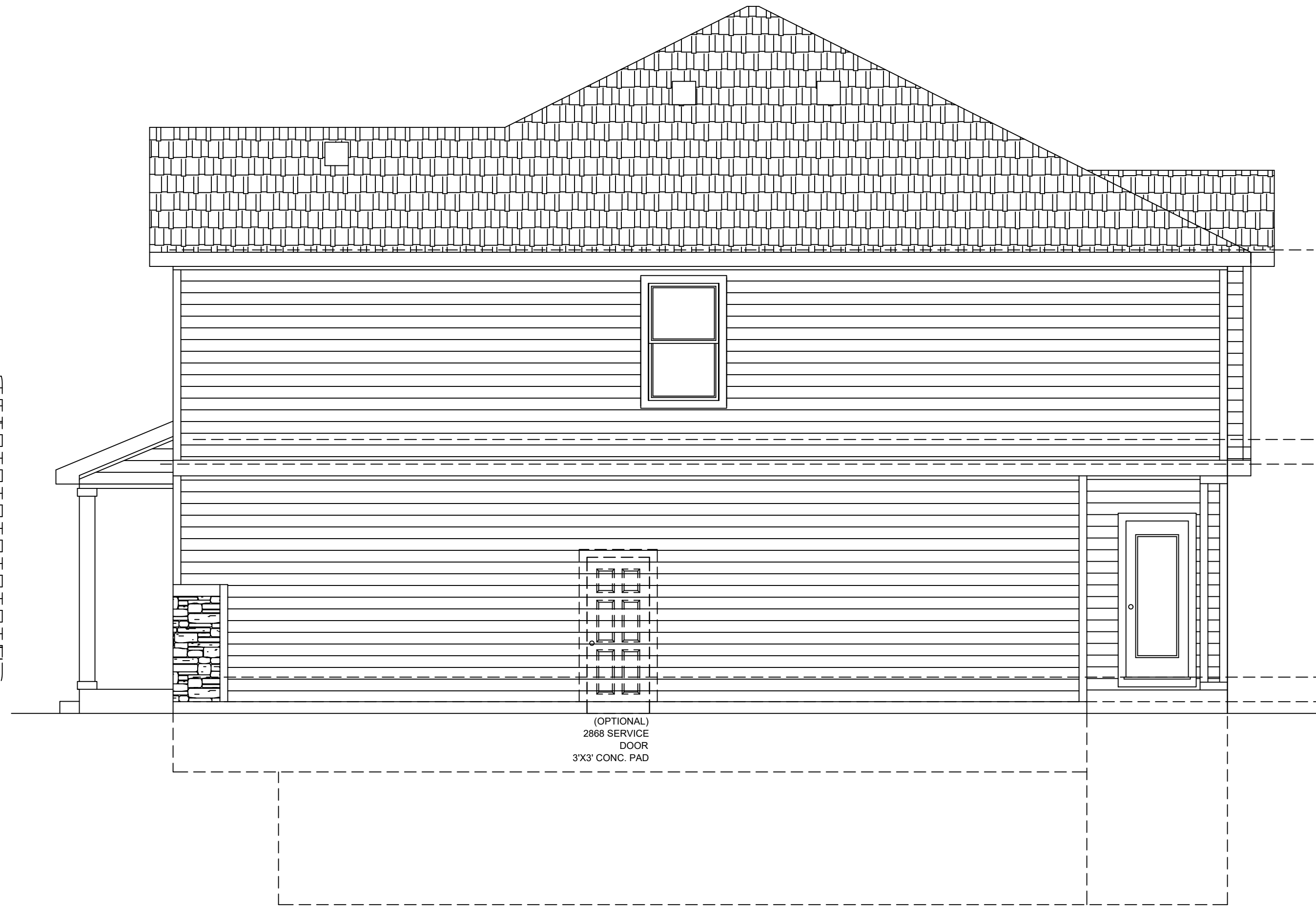
D2782.3 FRONT ELEVATION "A"
1/4"=1'-0"



REAR ELEVATION "A"
1/4"=1'-0"



OPT BAY WINDOW
1/4"=1'-0"



GARAGE SIDE ELEVATION "A"
1/4"=1'-0"

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COLORADO SPRINGS, CO 80920
719-596-5192

SHEET NAME
ELEVATION- "A"

PROJECT NAME
MASTER PLAN D2782.3

STAMPS/ENDORSEMENTS

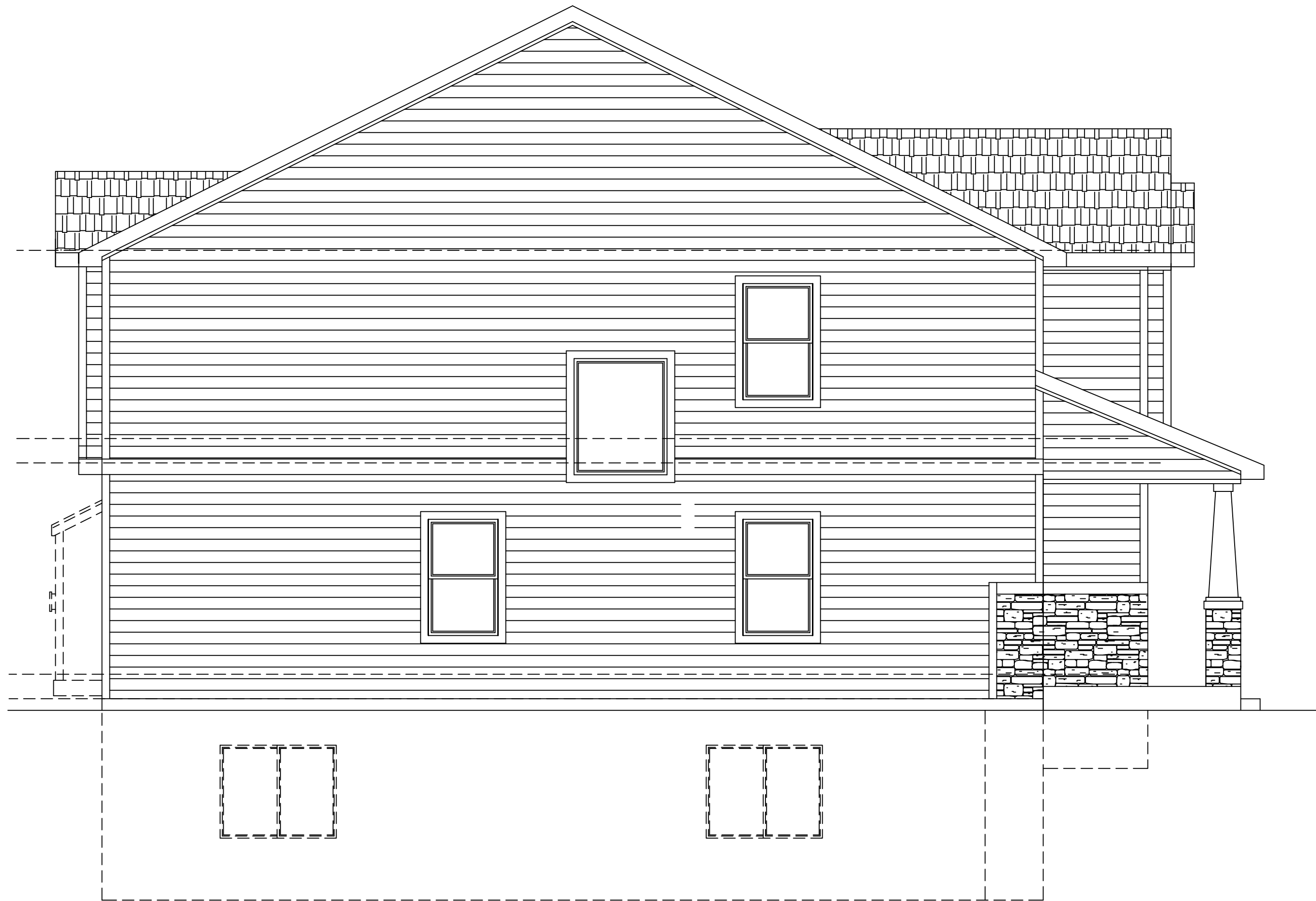
DRAWN BY:
AL

DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	BY	DATE	BY

ELEVATION "A"

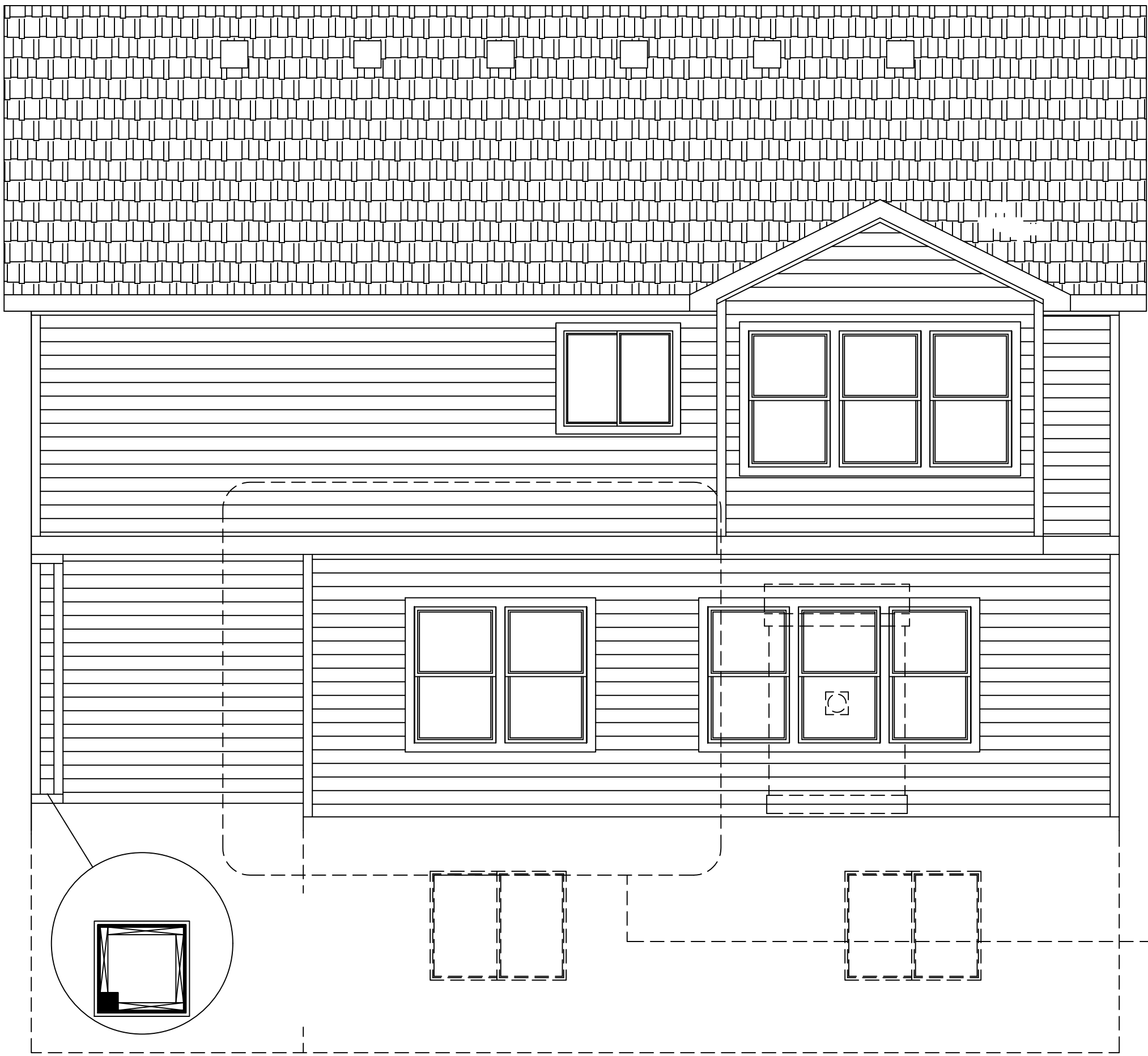
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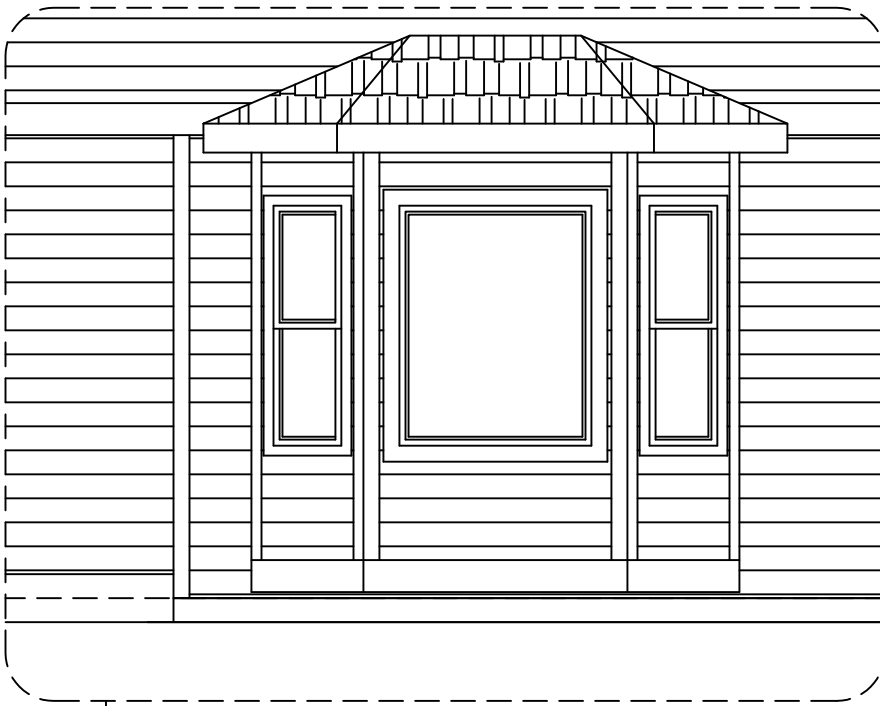
SIDE ELEVATION "B"
1/4"=1'-0"



D2782.3 FRONT ELEVATION "B"
1/4"=1'-0"



REAR ELEVATION "B"
1/4"=1'-0"



OPT BAY WINDOW
1/4"=1'-0"



GARAGE SIDE ELEVATION "B"
1/4"=1'-0"

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SHEET NAME
ELEVATION- "B"
PROJECT NAME
MASTER PLAN D2782.3

STAMPS/ENDORSEMENTS

DRAWN BY:
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DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION "B"

SHEET NUMBER
26

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719-598-5192

SHEET NAME
ELEVATION- "C"
PROJECT NAME
MASTER PLAN D2782.3

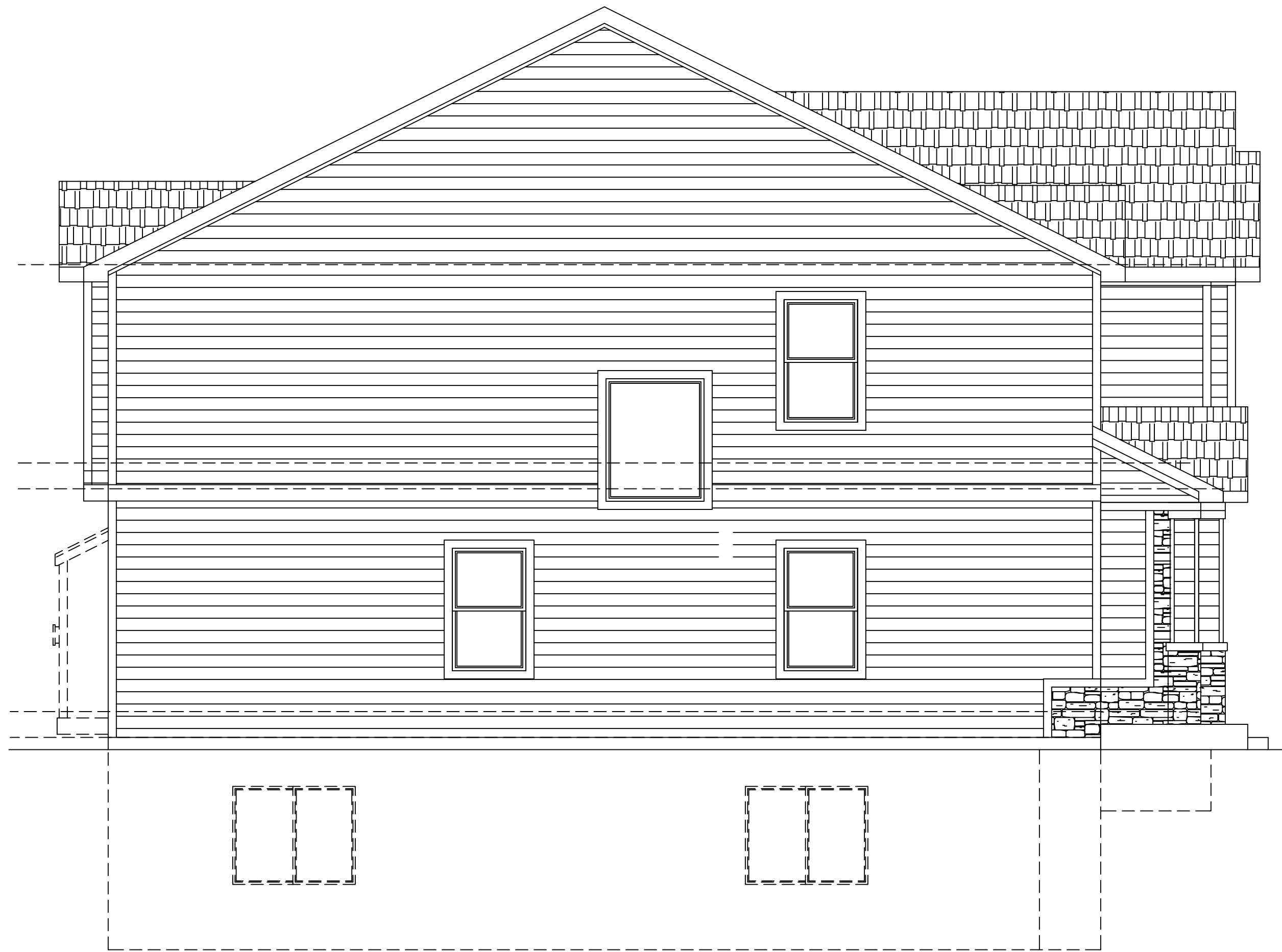
STAMPS/ENDORSEMENTS

DRAWN BY:
AL
DATE:
8/27/18

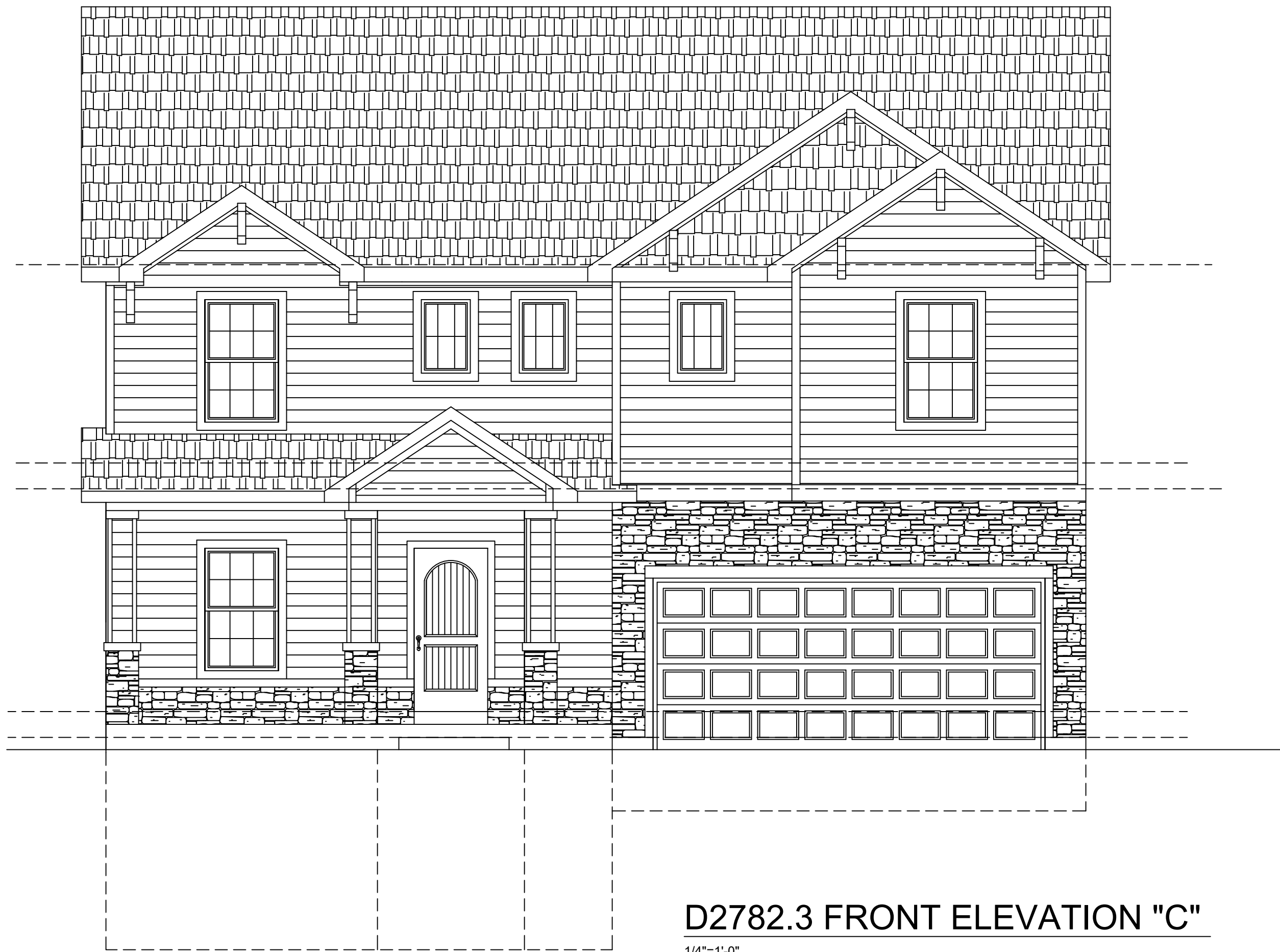
SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION "C"

SHEET NUMBER
27



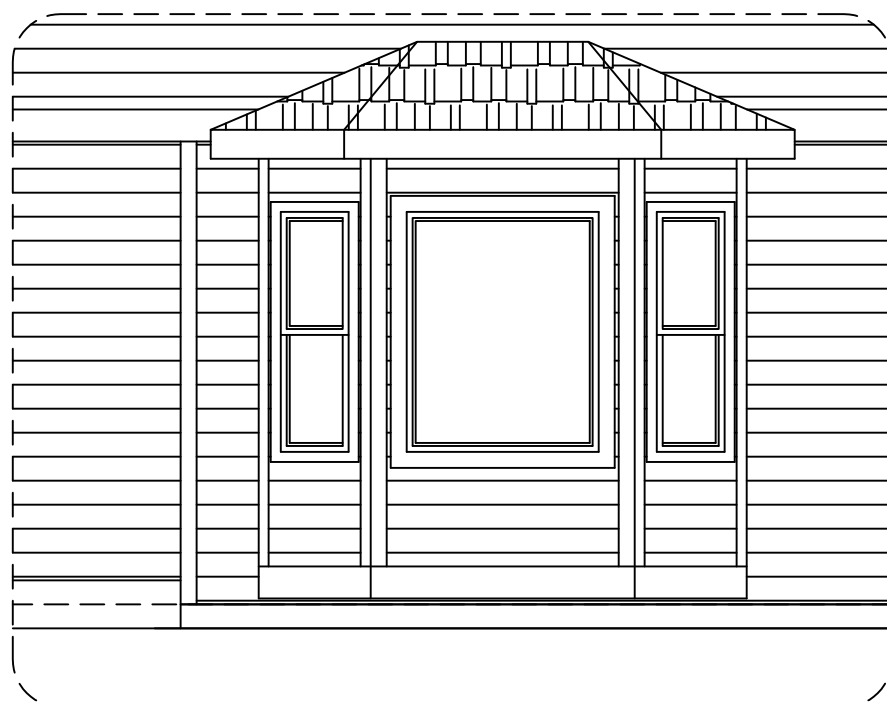
SIDE ELEVATION "C"
1/4"=1'-0"



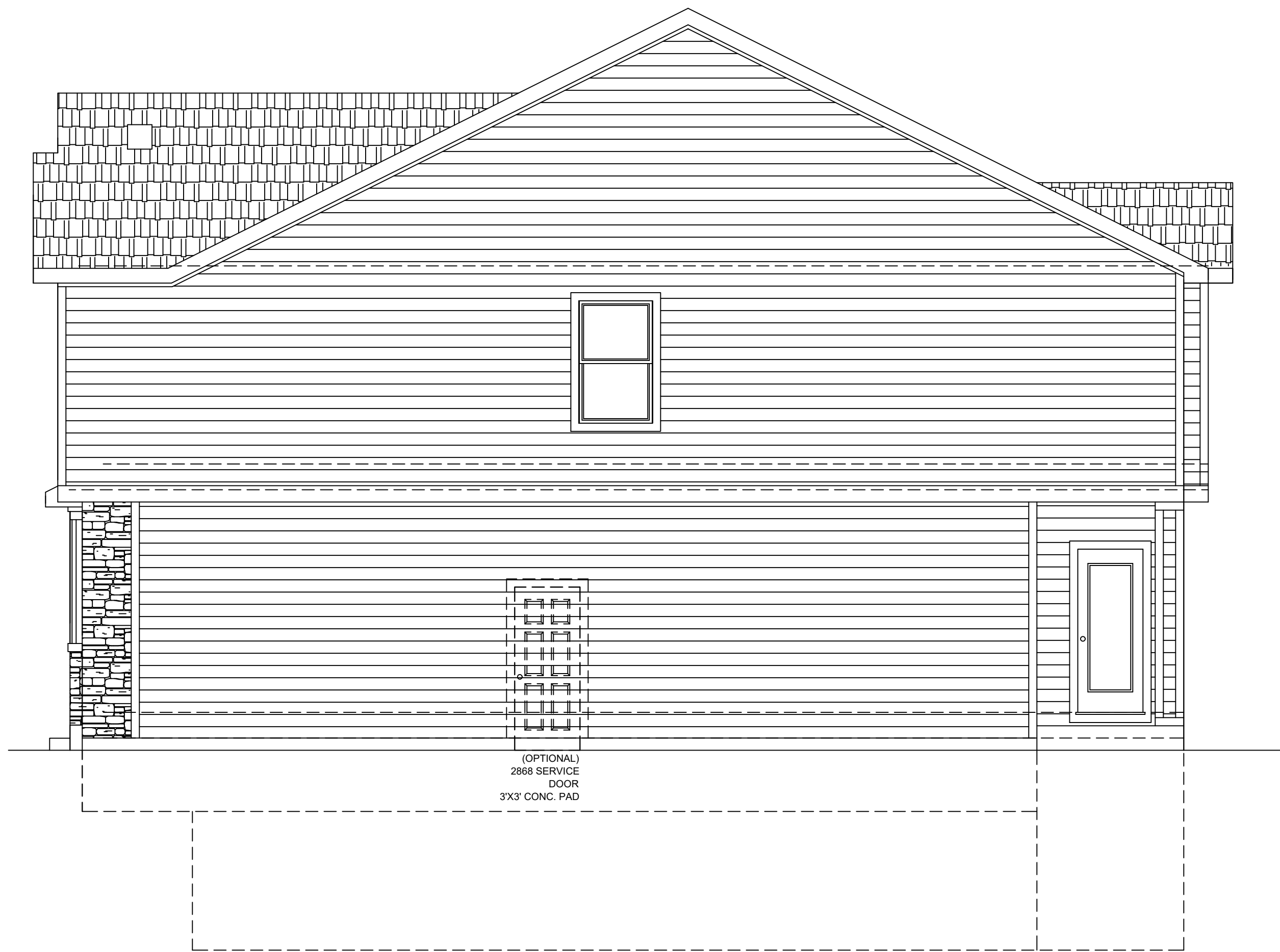
D2782.3 FRONT ELEVATION "C"
1/4"=1'-0"



REAR ELEVATION "C"
1/4"=1'-0"



OPT BAY WINDOW
1/4"=1'-0"



GARAGE SIDE ELEVATION "C"
1/4"=1'-0"

COYOTE CREEK FILING NO. 4
LOCATED IN THE NORTHEAST QUARTER SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
CITY OF FORT LUPTON, COUNTY OF WELD, STATE OF COLORADO
13.19 ACRES-59 LOTS/ 6 TRACTS

DESCRIPTION:

A PORTION OF LAND IN THE CITY OF FORT LUPTON, COLORADO, LOCATED IN THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED AT THE CENTER 1/4 CORNER BY A 3-1/4" ALUMINUM CAP STAMPED "LS 13155" AND AT THE NORTH 1/4 CORNER BY A 3-1/4" ALUMINUM CAP STAMPED "LS 14823" BEARING N00°16'07" A DISTANCE OF 2595.44 FEET AS REFERENCED TO COLORADO STATE PLANE NORTH ZONE. NAD(83).

COMMENCING AT CENTER 1/4 CORNER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN;

THENCE ON THE WEST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 5, N00°16'17" A DISTANCE OF 1,111.96 TO THE POINT OF BEGINNING;

THENCE CONTINUING ON SAID WEST LINE, N00°16'07"W A DISTANCE OF 833.49 FEET, TO A POINT ON THE SOUTHERLY LINE OF THAT LIFT STATION SITE RECORDED IN BOOK 1618 AT RECEPTION NO. 2560260, IN THE RECORDS OF THE WELD COUNTY CLERK AND RECORDER;

THENCE ON THE SOUTHERLY AND EASTERLY LINES OF SAID LIFT STATION SITE, THE FOLLOWING TWO (2) COURSES:

- N89°32'09"E A DISTANCE OF 50.00 FEET;
- N00°16'07"W A DISTANCE OF 50.00 FEET, TO A POINT ON THE SOUTHERLY LINE OF THE TWOMBLY SCHOOL PROPERTY RECORDED IN BOOK 990 RECEPTION NOS. 1919362-1919366;

THENCE ON SAID SOUTHERLY LINE, N89°32'09"E A DISTANCE OF 961.94 FEET;

THENCE DEPARTING SAID SOUTHERLY LINE, THE FOLLOWING SIX (6) COURSES:

- S01°20'50"E A DISTANCE OF 103.52 FEET;
- S46°50'18"W A DISTANCE OF 391.20 FEET;
- S01°54'09"W A DISTANCE OF 144.44 FEET;
- S62°50'48"W A DISTANCE OF 658.46 FEET;
- S00°38'00"E A DISTANCE OF 74.18 FEET;
- S89°20'49"W A DISTANCE OF 135.00 FEET, TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 574,520 SQUARE FEET OR 13.1892 ACRES.

DEDICATION:

KNOW ALL MEN BY THESE PRESENTS, THAT I/WE _____, BEING THE SOLE OWNER(S) OF THE LAND DESCRIBED HEREIN, HAVE CAUSED SAID LAND TO BE LAID OUT AND PLATTED UNDER THE NAME OF COYOTE CREEK FILING NO.4, AND DO HEREBY DEDICATE TO THE CITY OF FORT LUPTON AND ITS LICENSEES FOR PUBLIC USE FOREVER ALL STREETS, ALLEYS AND UTILITY EASEMENTS AS INDICATED HEREON. IN COMPLIANCE WITH THE CITY OF FORT LUPTON SUBDIVISION REGULATIONS AND BY CONTRACTUAL AGREEMENT, THE LANDOWNER(S) SHALL BEAR ALL EXPENSES INVOLVED IN IMPROVEMENTS.

IN WITNESS WHEREOF, WE HAVE HEREUNTO SET OUR HANDS AND SEALS THIS ____ DAY OF _____, 20____.

ACKNOWLEDGMENT

STATE OF COLORADO)
COUNTY OF WELD) ss.
THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ____ DAY OF _____, 20____
WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES _____

NOTARY PUBLIC

OWNERS APPROVAL:

KNOW ALL MEN BY THESE PRESENTS, THAT I/WE _____, BEING THE SOLE OWNER(S) OF THE LAND DESCRIBED HEREIN, AND _____ ARE ALL OF THE MORTGAGEES AND HOLDERS OF LIENS UPON THE PROPERTY, AND EACH AND ALL HEREBY CONSENT TO THIS PLAT AND JOIN THE CONVEYANCE AND DEDICATION OF ALL STREETS, ROADS, ALLEYS, EASEMENTS, PUBLIC WAYS AND PLACES SHOWN HEREON.

IN WITNESS WHEREOF, WE HAVE HEREUNTO SET OUR HANDS AND SEALS THIS ____ DAY OF _____, 201__.

ACKNOWLEDGMENT

STATE OF COLORADO)
COUNTY OF WELD) ss.
THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ____ DAY OF _____, 20____ BY
WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES _____

NOTARY PUBLIC

OWNER:

LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
ATTN: BOB QUINETTE

SURVEYOR/CIVIL ENGINEER/LANDSCAPE ARCHITECT

JR ENGINEERING
2900 SOUTH COLLEGE AVENUE, SUITE 3D
FORT COLLINS, CO 80525
ATTN: KEN MERRITT



VICINITY MAP SCALE: 1"=1000'

LAND SUMMARY CHART			
TYPE	AREA (SF)	AREA (AC)	% OF TOTAL AREA
RESIDENTIAL LOTS	349,335	7.9063	60.80%
TRACTS	101,316	2.3259	17.63%
PUBLIC ROW	123,870	2.8437	21.56%
TOTAL	574,521	13.0759	100.00%

TRACT SUMMARY CHART				
TRACT	AREA (SF)	AREA (ACRES)	USE	OWNERSHIP
Tract A	7,346	0.1686		
Tract B	32,757	0.7520		
Tract C	1,603	0.0368		
Tract D	8,203	0.1883		
Tract E	7,183	0.1649		
Tract F	44,224	1.0152		
Total Area	101,316	2.3259		

GENERAL NOTES:

- NOTICE: PER C.R.S. 13-80-105, 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 CERTIFICATION SHOWN HEREON.
- PER C.R.S. 38-51-106, "ALL LINEAL UNITS DEPICTED ON THIS LAND SURVEY PLAT ARE U.S. SURVEY FEET. ONE METER EQUALS 39.37/12 U.S. SURVEY FEET, EXACTLY ACCORDING TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY."
- PER THE BYLAWS AND RULES OF THE STATE BOARD OF LICENSURE FOR ARCHITECTS, PROFESSIONAL ENGINEERS AND PROFESSIONAL LAND SURVEYORS, CERTIFICATION IS DEFINED AS A STATEMENT THAT INCLUDES THE FOLLOWING: (A) IS SIGNED AND/OR SEALED BY A PROFESSIONAL LAND SURVEYOR REPRESENTING THAT THE SURVEYING SERVICES ADDRESSED THEREIN HAVE BEEN PERFORMED BY THE PROFESSIONAL LAND SURVEYOR OR UNDER THE PROFESSIONAL LAND SURVEYOR IN RESPONSIBLE. (B) IS BASED UPON THE PROFESSIONAL LAND SURVEYOR'S KNOWLEDGE, INFORMATION AND BELIEF. (C) IS IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE. (D) IS NOT A GUARANTY OR WARRANTY, EITHER EXPRESSED OR IMPLIED.
- THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY JR ENGINEERING, LLC. FOR ALL INFORMATION REGARDING EASEMENTS, RIGHT-OF-WAY OR TITLE OF RECORD, JR ENGINEERING, LLC RELIED UPON TITLE COMMITMENT NO. NCS-1061102-CO, PREPARED BY FIRST AMERICAN TITLE INSURANCE COMPANY, DATED APRIL 13, 2021 AT 5:00 P.M.
- LAND DESCRIBED IN THIS PLAT IS NOT IN A F.E.M.A. FLOODPLAIN AS PER FLOOD INSURANCE RATE MAP PANEL NUMBER 08123C2110E WITH A REVISION DATE OF JANUARY 20, 2016.
- A PUBLIC UTILITY EASEMENT IS HEREBY GRANTED OVER ALL OF TRACTS B & E.

SURVEYORS CERTIFICATE:

I, JARROD ADAMS, A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THIS PLAT OF COYOTE CREEK FILING NO. 4 WAS PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION, AND THIS PLAT HAS BEEN PREPARED IN COMPLIANCE WITH ALL APPLICABLE LAWS OF THE STATE OF COLORADO AT THE TIME OF THIS SURVEY WITHIN MY CONTROL, AND IS ACCURATE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF



JARROD ADAMS, COLORADO PLS NO. 38252
FOR AND ON BEHALF OF JR ENGINEERING, LLC

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., 20____ 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.

ATTEST _____ MAYOR
TOWN CLERK

CITY ENGINEER'S APPROVAL:

APPROVED ON THIS ____ DAY OF _____, 20____.
CITY ENGINEER

PLANNING COMMISSION RECOMMENDATION:

RECOMMENDED THIS ____ DAY OF _____, 20____, BY RESOLUTION NO. _____
CHAIRPERSON, FORT LUPTON PLANNING COMMISSION

CITY ADMINISTRATOR'S APPROVAL:

APPROVED ON THIS ____ DAY OF _____, 20____.
CITY ADMINISTRATOR

CITY WATER AND SEWER DEPARTMENT APPROVAL:

APPROVED ON THIS ____ DAY OF _____, 20____.
DIRECTOR OF PUBLIC WORKS

TITLE VERIFICATION CERTIFICATION:

WE, _____, DO HEREBY CERTIFY THAT WE HAVE EXAMINED THE TITLE OF ALL LAND PLATTED HEREON AND THAT TITLE TO SUCH LAND IS IN THE DEDICATOR(S), IS FREE AND CLEAR OF ALL MONETARY LIENS AND MONETARY ENCUMBRANCES AND IS OTHERWISE SUBJECT ONLY TO THOSE ITEMS OF RECORD SHOWN IN SCHEDULE B-2 OF TITLE COMMITMENT ORDER NUMBER _____ WITH AN EFFECTIVE DATE OF _____.

BY: _____ DATE _____
AS:

ACKNOWLEDGMENT
STATE OF COLORADO)
COUNTY OF WELD) ss.

ACKNOWLEDGED BEFORE ME THIS ____ DAY OF _____, 20____ BY _____ AS _____
WITNESS MY HAND AND OFFICIAL SEAL

NOTARY PUBLIC
MY COMMISSION EXPIRES: _____

ACCEPTANCE CERTIFICATE:

THE DEDICATION OF TRACTS _____ ARE HEREBY ACCEPTED FOR OWNERSHIP AND MAINTENANCE BY THE _____

BY: _____ DATE: _____

TITLE: _____
AUTHORIZED SIGNER

ACKNOWLEDGMENT
STATE OF COLORADO)
COUNTY OF _____) ss.

ACKNOWLEDGED BEFORE ME THIS ____ DAY OF _____, 20____ BY _____ AS _____
WITNESS MY HAND AND OFFICIAL SEAL

NOTARY PUBLIC
MY COMMISSION EXPIRES: _____

CLERK AND RECORDER'S CERTIFICATE:

THIS PLAT IS ACCEPTED FOR FILING IN THE OFFICE OF THE CLERK AND RECORDER OF WELD COUNTY, COLORADO,

AT ____O'CLOCK __,M., ON THE ____ DAY OF _____, 20____
AS RECEPTION NO. _____

CLERK AND RECORDER

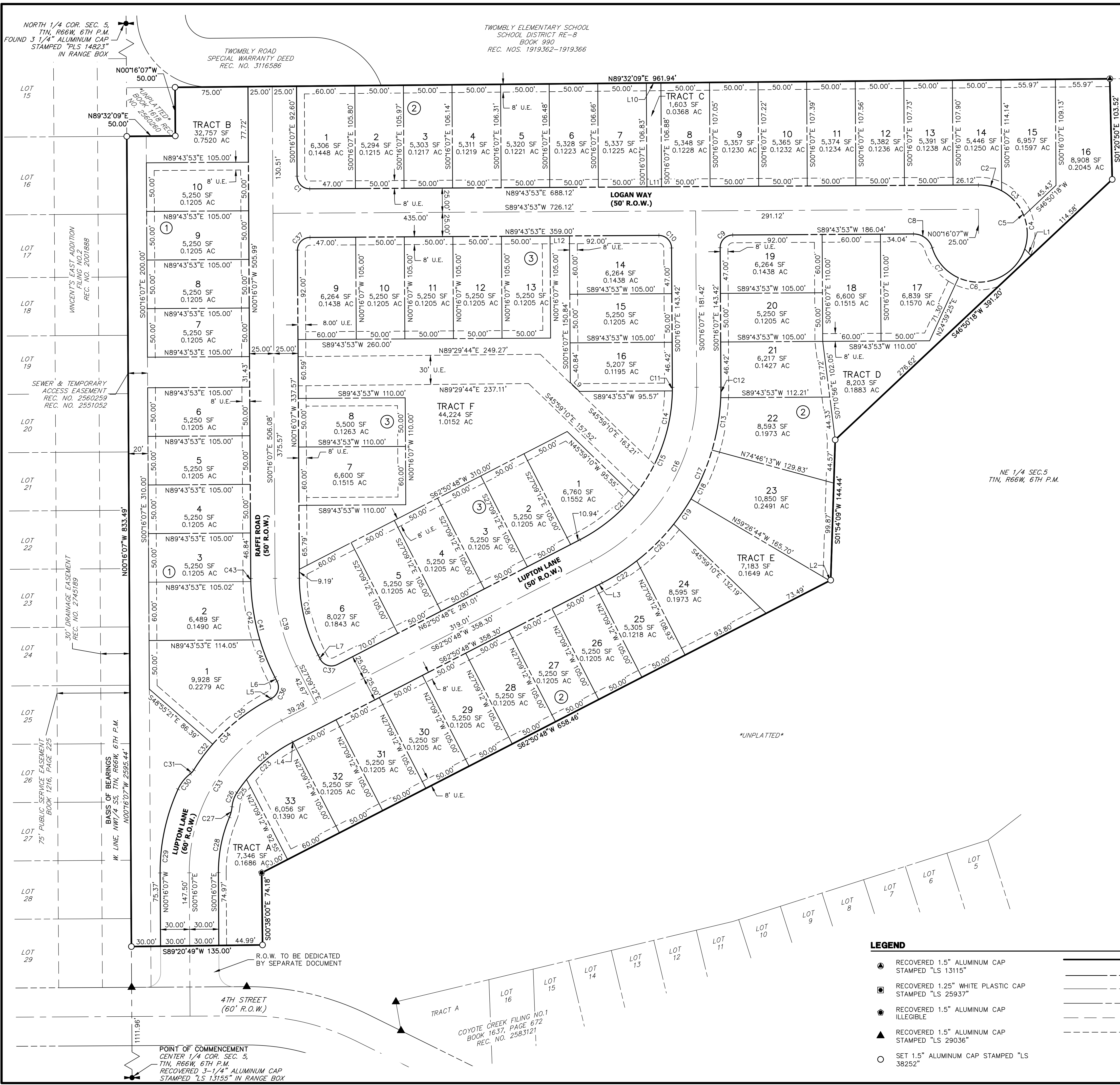
BY: DEPUTY

COYOTE CREEK FILING NO. 4
JOB NO. 16093.00
DECEMBER 13, 2021
SHEET 1 OF 2



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Fort Collins 970-491-9888 • www.jrengineering.com

COYOTE CREEK FILING NO. 4
LOCATED IN THE NORTHEAST QUARTER SECTION 5,
TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH
PRINCIPAL MERIDIAN, CITY OF FORT LUPTON,
COUNTY OF WELD, STATE OF COLORADO
13.19 ACRES-59 LOTS/ 6 TRACTS



LINE TABLE		
LINE	BEARING	DISTANCE
L1	S43°09'42"E	9.51'
L2	N62°50'48"E	1.17'
L3	S62°50'48"W	8.14'
L4	S62°50'48"W	0.16'
L5	N62°50'48"E	1.29'
L6	N27°09'12"W	4.67'
L7	N27°09'12"W	4.67'
L9	N45°59'10"W	13.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C1	90°00'00"	13.00'	20.42'	S45°16'07"E 18.38'
C2	28°31'44"	50.00'	24.90'	N76°00'15"W 24.64'
C3	40°06'33"	50.00'	35.00'	N41°41'07"W 34.29'
C4	40°06'33"	50.00'	35.00'	N01°34'34"W 34.29'
C5	25°32'54"	50.00'	221.13'	N36°25'51"E 80.18'
C8	73°23'54"	20.00'	25.62'	N53°34'09"W 23.90'
C9	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C10	90°00'00"	13.00'	20.42'	N45°16'07"W 18.38'
C11	11°0'19"	175.00'	3.58'	N00°19'03"E 3.58'
C12	2°46'17"	225.00'	10.88'	N01°07'02"E 10.88'
C13	13°56'57"	225.00'	54.78'	N09°28'39"E 54.64'
C14	38°23'55"	175.00'	117.28'	N20°06'10"E 115.10'
C15	63°06'55"	175.00'	192.77'	N31°17'21"E 183.17'
C17	63°06'55"	225.00'	247.85'	N31°17'21"E 235.51'
C18	13°58'29"	225.00'	54.88'	N23°26'23"E 54.74'
C19	8°00'31"	225.00'	31.45'	N34°25'53"E 31.42'
C20	13°41'21"	225.00'	53.76'	N45°16'49"E 53.63'
C21	23°32'40"	175.00'	71.91'	N51°04'28"E 71.41'
C22	10°43'19"	225.00'	42.10'	N57°29'09"E 42.04'
C23	23°30'43"	150.00'	61.55'	S51°05'27"W 61.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C24	29°55'48"	150.00'	78.36'	S47°52'54"W 77.47'
C25	6°25'05"	150.00'	16.80'	S36°07'33"W 16.79'
C26	27°40'04"	32.00'	15.45'	S19°04'59"W 15.30'
C27	17°37'16"	36.00'	11.07'	N14°03'35"E 11.03'
C28	23°08'19"	145.00'	58.56'	S11°18'03"W 58.16'
C29	24°48'28"	205.00'	88.76'	S12°08'07"W 88.07'
C30	27°59'58"	42.00'	20.52'	S38°32'20"W 20.32'
C31	20°50'59"	15.00'	5.46'	N42°06'50"E 5.43'
C32	9°23'19"	200.00'	32.77'	S36°22'59"W 32.74'
C34	31°09'28"	200.00'	108.76'	S47°16'04"W 107.43'
C35	21°46'10"	200.00'	75.99'	S51°57'44"W 75.53'
C36	90°00'00"	13.00'	20.42'	N17°50'48"E 18.38'
C37	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C37	90°00'00"	13.00'	20.42'	S72°09'12"E 18.38'
C38	26°53'05"	175.00'	82.11'	S13°42'39"E 81.36'
C40	10°34'57"	225.00'	41.56'	S21°51'43"E 41.50'
C41	26°53'05"	225.00'	105.58'	S13°42'39"E 104.61'
C42	15°29'53"	225.00'	60.86'	S08°49'19"E 60.67'
C43	0°48'16"	225.00'	3.16'	S00°40'14"E 3.16'

LEGEND

- RECOVERED 1.5" ALUMINUM CAP STAMPED "LS 13115"
- RECOVERED 1.25" WHITE PLASTIC CAP STAMPED "LS 25937"
- RECOVERED 1.5" ALUMINUM CAP ILLEGIBLE
- RECOVERED 1.5" ALUMINUM CAP STAMPED "LS 29036"
- SET 1.5" ALUMINUM CAP STAMPED "LS 38252"
- EXISTING BOUNDARY
- PROPOSED LOT LINE
- EXISTING PROPERTY LINE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- UTILITY EASEMENT
- BLOCK NUMBER

COYOTE CREEK FILING NO. 4
JOB NO. 16093.00
DECEMBER 13, 2021
SHEET 2 OF 2



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CONSTRUCTION PLANS

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COYOTE CREEK FILING NO. 4

GRADING AND EROSION CONTROL NOTES

- A. ALL SITE GRADING (EXCAVATION, EMBANKMENT, AND COMPACTION) SHALL CONFORM TO THE RECOMMENDATIONS OF THE LATEST SOILS INVESTIGATION FOR THIS PROPERTY AND SHALL FURTHER BE IN CONFORMANCE WITH THE CITY OF FORT LUTPON'S "STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS," LATEST EDITION.
 - B. NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATION AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
 - C. TOPSOIL SHALL BE STOCKPILED TO THE EXTENT PRACTICABLE ON THE SITE FOR USE ON AREAS TO BE REVEGETATED. ANY AND ALL STOCKPILES SHALL BE LOCATED AND PROTECTED FROM ERODIVE ELEMENTS.
 - D. TEMPORARY VEGETATION SHALL BE INSTALLED ON ALL DISTURBED AREAS WHERE PERMANENT SURFACE IMPROVEMENTS ARE NOT SCHEDULED FOR INSTALLATION WITHIN THREE MONTHS. VEGETATION SHALL BE A VIGOROUS, DROUGHT TOLERANT, NATIVE SPECIES MIX. (REFER TO SECTION 2.26.00 OF THESE STANDARDS AND SPECIFICATIONS FOR SEEDING MIX.) PROPER SCHEDULING SHOULD TAKE ADVANTAGE OF SPRING OR FALL PLANTING SEASONS FOR NATURAL GERMINATION, BUT SEEDED AREAS SHALL BE IRRIGATED, IF CONDITIONS SO MERIT.
 - E. AT ALL TIMES, THE PROPERTY SHALL BE MAINTAINED AND/OR WATERED TO PREVENT WIND-CAUSED EROSION. EARTHWORK OPERATIONS SHALL BE DISCONTINUED WHEN FUGITIVE DUST SIGNIFICANTLY IMPACTS ADJACENT PROPERTY. IF EARTHWORK IS COMPLETE OR DISCONTINUED, DUST FROM THE SITE CONTINUES TO CREATE PROBLEMS, THE OWNER/DEVELOPER SHALL IMMEDIATELY INSTITUTE MITIGATIVE MEASURES AND SHALL CORRECT DAMAGE TO ADJACENT PROPERTY.
 - F. TEMPORARY CUT/FILL SLOPES SHALL NOT EXCEED A STEEPNESS OF 2:1 (2H:1V). PERMANENT SLOPES SHALL NOT EXCEED 4:1 (4H:1V) IN AREAS TO BE SEEDED OR SODDED.
 - G. UTILITY CONSTRUCTION IS NOT APPLICABLE UNDER THIS PLAN.
 - H. THE OWNER/DEVELOPER SHALL PROVIDE ANY ADDITIONAL DUST ABATEMENT AND EROSION CONTROL MEASURES DEEMED NECESSARY BY THE CITY, SHOULD CONDITIONS MERIT THEM.
- TEMPORARY FENCES SHALL BE INSTALLED ALONG ALL BOUNDARIES OF THE CONSTRUCTION JOB OR PROJECT. LOTS SHOWN ON THE EXHIBIT MAP ARE NOT OWNED BY THE CITY. TO PREVENT GRADING ON PROPERTY NOT OWNED BY THE DEVELOPER, IN ADDITION, THE CITY MAY REQUIRE ADDITIONAL TEMPORARY FENCES IF FIELD CONDITIONS SO MERIT THEM.

SANITARY SEWER NOTES:

1. ALL SANITARY SEWER CONSTRUCTION SHALL CONFORM TO THE CITY OF FORT LUPTON ENGINEERING AND SPECIFICATIONS, LATEST VERSION.
2. ALL SEWER LINES SHALL BE PVC-ASTM D-3034, SDR 35 OR APPROVED EQUAL.
- ALL SEWER MAIN LINE SIZE 8" IN DIAMETER, UNLESS OTHERWISE NOTED.
3. SEWER LINES SHALL BE INSTALLED 5.00 FEET NORTH OR EAST OF STREET CENTERLINE, UNLESS OTHERWISE SHOWN ON PLANS. SEWER LINES SHALL BE 10.00 FEET FROM WATER LINES EXCEPT WHEN CROSSING EACH OTHER. SEWER LINES WHICH CROSS LESS THAN 1.50 FEET VERTICALLY FROM THE WATER MAIN SHALL BE ENCASED IN CONCRETE. USE RUBBER GASKETS FOR PVC ENCASEMENT.
4. SEWER RIM ELEVATIONS SHOWN ARE APPROXIMATE ONLY AND ARE NOT TO BE TAKEN AS FINAL ELEVATIONS. RING AND COVER SHALL BE SET IN CENTERED CONCRETE RINGS WITH RAM-NEK FOR ADJUSTMENT TO MATCH FINAL PAVEMENT ELEVATIONS.
5. THE CONTRACTOR AND SURVEY CREW SHALL VERIFY ELEVATIONS OF EXISTING SEWER LINES AND MANHOLES TO BE TIED TO PRIOR TO CONSTRUCTION OR STAKING OF SANITARY SEWER.
6. GRAVEL AND/OR TILE UNDERDRAINS SHALL BE INSTALLED IN ALL SEWER MAIN TRENCHES AS SHOWN ON THE SANITARY PLAN AND PROFILE SHEETS. UNDERDRAINS SHALL BE PVC-ASTM D-3034, SDR 35 INSTALLED WITHOUT GASKETS. THE CITY OF FORT LUPTON IS NOT RESPONSIBLE FOR MAINTENANCE OF UNDERDRAINS. SIZE OF UNDERDRAIN SERVICES SHALL BE 3".
7. SEWER SERVICE TEES FOR EACH UNIT SHALL BE STAKED BY A SURVEY CREW AND FURNISHED AND INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL FURNISH TO THE ENGINEER "AS-CONSTRUCTED" LOCATION OF TEES. SEWER WYES SHALL BE USED RATHER THAN TEES.
8. ALL MANHOLES SHALL BE 48-INCHES IN DIAMETER WITH 24-INCH RING AND COVER, ECEBODING CONCRETE UNLESS OTHERWISE SPECIFIED.
9. PIPE BEDDING SHALL BE CLASS "B" AND SHALL CONFORM TO ASTM C-33 OR PIPE D-448 GRADATION NO. 6 OR 67.
10. AT LEAST FIVE (5) DAYS PRIOR TO THE START OF CONSTRUCTION, A PRE-CONSTRUCTION MEETING WILL BE HELD AT THE OFFICE OF THE PUBLIC WORKS MANAGER AND ATTENDED BY THE CONTRACTOR AND REPRESENTATIVES OF THE OTHER APPROVING AGENCIES. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE PUBLIC WORKS MANAGER TO SCHEDULE THIS MEETING.
11. ALL PIPE LENGTHS ARE APPROXIMATE.
12. THE CONTRACTOR SHALL HAVE IN HIS POSSESSION AT ALL TIMES ONE (1) SIGNED COPY OF THE PLANS WHICH HAVE BEEN APPROVED BY THE CITY OF FORT LUPTON AND THE PUBLIC WORKS MANAGER.
13. ALL MANHOLES SHALL HAVE SHAPED INVERTS.
14. PRIOR TO THE START OF ANY WORK WHERE SEWER MAIN TO BE INSTALLED TIES INTO EXISTING CITY SEWER SYSTEMS, THE NEAREST MANHOLE TO THE POINT OF TIE-IN SHALL BE PLUGGED WITH A PLUMBER'S PLUG ON THE INLET SIDE BY THE CONTRACTOR. THIS PLUG SHALL REMAIN IN PLACE UNTIL FINAL ACCEPTANCE BY THE DISTRICT. IT'S PURPOSE SHALL BE TO PREVENT MUD, WATER, OR OTHER MATERIALS FROM ENTERING THE EXISTING LINE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PUMPING AND CLEANING THESE MANHOLES AND REMOVING THE PLUG WHEN SO INSTRUCTED BY THE PUBLIC WORKS MANAGER.
15. WHEN SANITARY SEWER SERVICES ARE GREATER THAN OR EQUAL TO ONE HUNDRED FEET IN LENGTH, THE CONTRACTOR SHALL INSTALL A CLEAN-OUT BEHIND THE SIDEWALK WHEN MAKING THE CONNECTION TO THE HOME.

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
303-587-1966

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V-SCALE	N/A				
DATE	12/13/21				
DESIGNED BY	AJH				
DRAWN BY	AJH				
CHECKED BY					

COYOTE CREEK FILING NO. 4

GENERAL NOTES

SHEET 2 OF 46

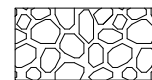
JOB NO. 16093.00

COYOTE CREEK FILING NO. 4

LAYER LINETYPE LEGEND

	EXISTING	PROPOSED
PHASE LINE		
MATCH LINE		
SECTION LINE		
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
R.O.W. A LINE		
CENTERLINE		
CITY LIMITS		
WIRE FENCE		
CHAIN LINK FENCE		
WOOD FENCE		
MASONRY FENCE		
GUARDRAIL		
CONC. BARRIER		
CABLE TV		
ELECTRIC		
FIBER OPTIC		
GAS MAIN		
IRRIGATION MAIN		
OIL/PETRO. MAIN		
OVERHEAD UTILITY		
SANITARY SEWER		
STORM DRAIN		
TELEPHONE		
WATER MAIN		
RAW WATER LINE		
SWALE/WATERWAY FLOWLINE		
DIVERSION DITCH		
DIVERSION CHANNEL		
MAJOR DRAINAGE BASIN		
MINOR DRAINAGE BASIN		
TOP OF SLOPE		
TOE OF SLOPE		
EDGE OF WATER		
INDEX CONTOUR		
INTERMEDIATE CONTOUR		
DEPRESSION CONT. (INDEX)		
DEPRESSION CONT. (INTER)		
TOP OF CUTS		
TOE OF FILLS		
CUT AND FILL LINE		
SILT FENCE		
100 YEAR FLOODPLAIN		
500 YEAR FLOODPLAIN		
FLOODWAY		
BASE FLOOD ELEVATION		
EDGE OF WETLANDS		
STONE WALL		

UTILITIES LEGEND

	EXISTING	PROPOSED
STORM SEWER		
MANHOLE		
STORM INLET		
AREA INLET — SQUARE		
AREA INLET — ROUND		
FLARED END SECTION		
RIPRAP		
SANITARY SEWER		
LINE MARKER	<i>Mkr</i> 	
SERVICE MARKER		
CLEAN-OUT		
MANHOLE W/ DIRECTIONAL FLOW ARROW		
WATER LINE		
LINE MARKER	<i>Mkr</i> 	
SERVICE MARKER		
FIRE HYDRANT		
FIRE CONNECTION		
MANHOLE		
BEND		
BLOW-OFF VALVE		
WELL		
METER		
VALVE		
REDUCER		
THRUST BLOCK		
CROSS		
PLUG W/ THRUST BLOCK		
TEE		
REVERSE ANCHOR		
ANODE		
AIR & VACUUM VALVE ASSEMBLY		
TRANSMISSION BLOW-OFF ASSEMBLY		
GAS LINE		
MARKER	<i>Mkr</i> 	
SERVICE MARKER		
METER		
VALVE		
PLUG		
TEE		
DRY UTILITIES		
CABLE TV MARKER	<i>Mkr</i> 	
CABLE TELEVISION PEDESTAL		
ELECTRIC MARKER	<i>Mkr</i> 	
ELECTRIC SERVICE MARKER		
ELECTRICAL PEDESTAL		
ELECTRICAL METER		
ELECTRICAL MANHOLE		
FIBER-OPTIC MARKER	<i>Mkr</i> 	
IRRIGATION PEDESTAL		
TELEPHONE MARKER	<i>Mkr</i> 	
TELEPHONE PEDESTAL		
TELEPHONE MANHOLE		
UTILITY POLE		
GUY ANCHOR		
GUY POLE		

MONUMENTATION LEGEND

ALUMINUM CAP – FOUND	● AC
BRASS CAP – FOUND	● BC
BENCHMARK – FOUND	⊕
CROSS – FOUND	+
MONUMENT – SET	○
MONUMENT – FOUND (DEFAULT)	●
MONUMENT – FOUND (ALTERNATE 1)	■
MONUMENT – FOUND (ALTERNATE 2)	◼
MONUMENT – FOUND (ALTERNATE 3)	▲
MONUMENT – FOUND (ALTERNATE 4)	▲
MONUMENT – FOUND (ALTERNATE 5)	⬠
MONUMENT – FOUND (ALTERNATE 6)	⬠
MONUMENT – FOUND (ALTERNATE 7)	▲
NAIL & WASHER – FOUND	● NAIL & WASHER
PANEL – FOUND	⋈
PK NAIL – FOUND	● PK NAIL
ROW MONUMENT – FOUND	⊠
ROW MARKER – FOUND	◻
SECTION CORNER – FOUND	⊕
SECTION CORNER – SET	⊕
QUARTER-SECTION CORNER – FOUND	⊕
QUARTER-SECTION CORNER – SET	⊕
SECTION CENTER – FOUND	⊙
SECTION CENTER – FOUND	⊙
CONTROL/TRaverse POINT – SET	△

TRAFFIC LEGEND

	EXISTING	PROPOSED
PARKING METER		
TRAFFIC SIGNAL BOX		
TRAFFIC SIGNAL POLE		
TRAFFIC SIGNAL		
BARRICADE		
GUARD RAIL POST		
IMPACT ATTENUATOR		
BRIDGE STYLE HIGHWAY SIGN POST		
CANTILEVER STYLE HIGHWAY SIGN POST		
RAILROAD MARKER/SIGN		
STREET LIGHT		
STREET LIGHT - SINGLE		
STREET LIGHT - DOUBLE		
LUMINAIRE		
ALTERNATE LUMINAIRE		
SIGNAL MAST ARM W/ LUMINAIRE		
PEDESTAL POLE FOUNDATION		
TRAFFIC SIGNAL POLE		
ROUND PULL BOX		
MEDIUM PULL BOX		
LARGE PULL BOX (20X33X15)		
SIGNAL HEAD WITHOUT BACK PLATE		
SIGNAL HEAD WITH BACK PLATE		
PEDESTRIAN SIGNAL HEAD		
VIDEO IMAGE DETECTOR		
OPTICOM DETECTOR		
VEHICLE DETECTION ZONE		

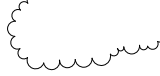
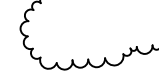
STORM WATER MANAGEMENT

	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)	
INLET PROTECTION	(IP)	
MULCHING	(MU)	
OUTLET PROTECTION	(OP)	
PAVED FLUME	(PF)	
PERMANENT SEEDING	(PS)	
REINFORCED CONCRETE DAM	(RCD)	
ROUGH CUT STREET CONTROL	(RCS)	
SEDIMENT BASIN	(SB)	
SEDIMENT CONTROL LOG	(SCL)	
SILT FENCE	(SF)	
SURFACE ROUGHENING	(SR)	
STABILIZED STAGING AREA	(SSA)	
SEDIMENT TRAP	(ST)	
STRAW BALE BARRIER	(STB)	
TERRACING	(TER)	
TEMPORARY SEEDING	(TS)	
TEMPORARY STREAM CROSSING CULVERT/BRIDGE	(TSC C)	
TEMPORARY STREAM CROSSING FORD TYPE	(TSC F)	
TEMPORARY SLOPE DRAIN	(TSD)	
VEHICLE TRACKING CONTROL	(VTC)	
VEHICLE TRACKING CONTROL WITH WASH RACK	(WR)	

DRAINAGE REPORT PLANS

	KEY
BASIN DESIGNATION (NO COEFFICIENT)	
BASIN DESIGNATION (1 COEFFICIENT)	
BASIN DESIGNATION (2 COEFFICIENTS)	
ANALYSIS POINT IDENTIFIER	
BASIN DESIGNATION (HISTORIC)	
BASIN DESIGNATION (DEVELOPED)	
SUB-BASIN DESIGNATION (DEVELOPED)	
DRAINAGE PIPE IDENTIFIER	
DRAINAGE POINT IDENTIFIER (HEXAGONAL)	
DRAINAGE POINT IDENTIFIER (TRIANGULAR)	
SWM DESIGNATION 1	
SWM DESIGNATION 2	
SWM DESIGNATION 3	
SWM DESIGNATION 4	

LANDSCAPE LEGEND

	<i>EXISTING</i>	<i>PROPOSED</i>
TREE - CONIFEROUS		
TREE - DECIDUOUS		
SHRUB/BUSH		
SHRUBS AND BUSHES		
IRRIGATION BOX		
IRRIGATION SPRINKLER		
IRRIGATION VALVE		
BOLLARD		
FLAGPOLE		

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
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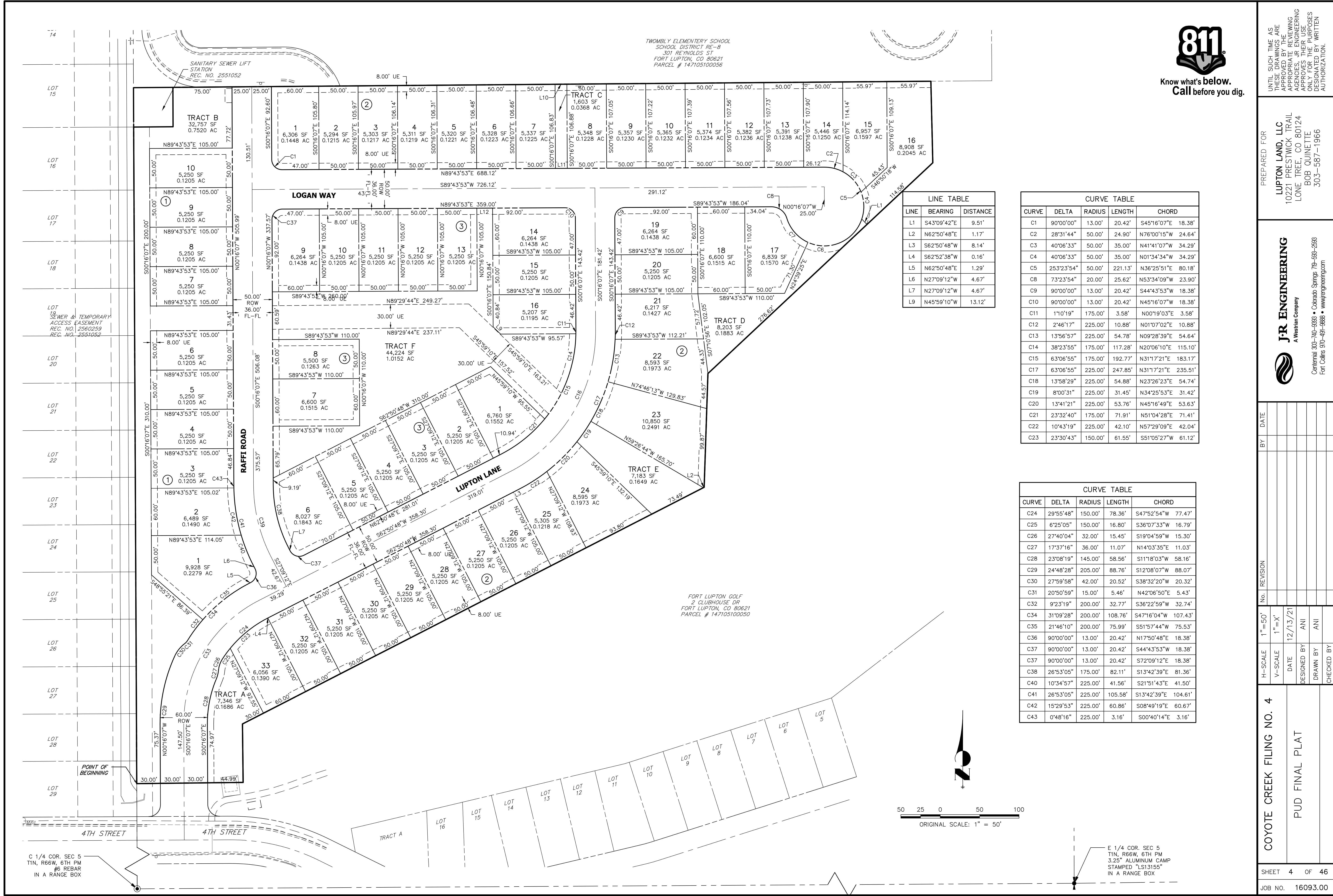
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V-SCALE	N/A
DATE	12/13/21
DESIGNED BY	AJH
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CHECKED BY	

COYOTE CREEK FILING NO. 4

OVERALL LEGEND

SHEET 3 OF 46

JOB NO. 16093.00



Know what's below.
Call before you dig.

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S43°09'42"E	9.51'
L2	N62°50'48"E	1.17'
L3	S62°50'48"W	8.14'
L4	S62°52'38"W	0.16'
L5	N62°50'48"E	1.29'
L6	N27°09'12"W	4.67'
L7	N27°09'12"W	4.67'
L9	N45°59'10"W	13.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C1	90°00'00"	13.00'	20.42'	S45°16'07"E 18.38'
C2	28°31'44"	50.00'	24.90'	N76°00'15"W 24.64'
C3	40°06'33"	50.00'	35.00'	N41°41'07"W 34.29'
C4	40°06'33"	50.00'	35.00'	N01°34'34"W 34.29'
C5	25°32'54"	50.00'	221.13'	N36°25'51"E 80.18'
C8	73°23'54"	20.00'	25.62'	N53°34'09"W 23.90'
C9	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C10	90°00'00"	13.00'	20.42'	N45°16'07"W 18.38'
C11	1°10'19"	175.00'	3.58'	N00°19'03"E 3.58'
C12	2°46'17"	225.00'	10.88'	N01°07'02"E 10.88'
C13	13°56'57"	225.00'	54.78'	N09°28'39"E 54.64'
C14	38°23'55"	175.00'	117.28'	N20°06'10"E 115.10'
C15	63°06'55"	175.00'	192.77'	N31°17'21"E 183.17'
C17	63°06'55"	225.00'	247.85'	N31°17'21"E 235.51'
C18	13°58'29"	225.00'	54.88'	N23°26'23"E 54.74'
C19	8°00'31"	225.00'	31.45'	N34°25'53"E 31.42'
C20	13°41'21"	225.00'	53.76'	N45°16'49"E 53.63'
C21	23°32'40"	175.00'	71.91'	N51°04'28"E 71.41'
C22	10°43'19"	225.00'	42.10'	N57°29'09"E 42.04'
C23	23°30'43"	150.00'	61.55'	S51°05'27"W 61.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C24	29°55'48"	150.00'	78.36'	S47°52'54"W 77.47'
C25	6°25'05"	150.00'	16.80'	S36°07'33"W 16.79'
C26	27°40'04"	32.00'	15.45'	S19°04'59"W 15.30'
C27	17°37'16"	36.00'	11.07'	N14°03'35"E 11.03'
C28	23°08'19"	145.00'	58.56'	S11°18'03"W 58.16'
C29	24°48'28"	205.00'	88.76'	S12°08'07"W 88.07'
C30	27°59'58"	42.00'	20.52'	S38°32'20"W 20.32'
C31	20°50'59"	15.00'	5.46'	N42°06'50"E 5.43'
C32	9°23'19"	200.00'	32.77'	S36°22'59"W 32.74'
C34	31°09'28"	200.00'	108.76'	S47°16'04"W 107.43'
C35	21°46'10"	200.00'	75.99'	S51°57'44"W 75.53'
C36	90°00'00"	13.00'	20.42'	N17°50'48"E 18.38'
C37	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C37	90°00'00"	13.00'	20.42'	S72°09'12"E 18.38'
C38	26°53'05"	175.00'	82.11'	S13°42'39"E 81.36'
C40	10°34'57"	225.00'	41.56'	S21°51'43"E 41.50'
C41	26°53'05"	225.00'	105.58'	S13°42'39"E 104.61'
C42	15°29'53"	225.00'	60.86'	S08°49'19"E 60.67'
C43	0°48'16"	225.00'	3.16'	S00°40'14"E 3.16'

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
303-587-1966

J.R. ENGINEERING
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COYOTE CREEK FILING NO. 4	H-SCALE		1"=50'	No.	REVISION	BY	DATE
	V-SCALE		1"=X'				
	DATE		12/13/21				
	DESIGNED BY		ANI				
	DRAWN BY		ANI				
PUD FINAL PLAT	CHECKED BY						
SHEET 4 OF 46							
JOB NO. 16093.00							



UNTIL SUCH TIME AS
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AGENCIES, JR ENGINEERING
APPROVES THEIR USE
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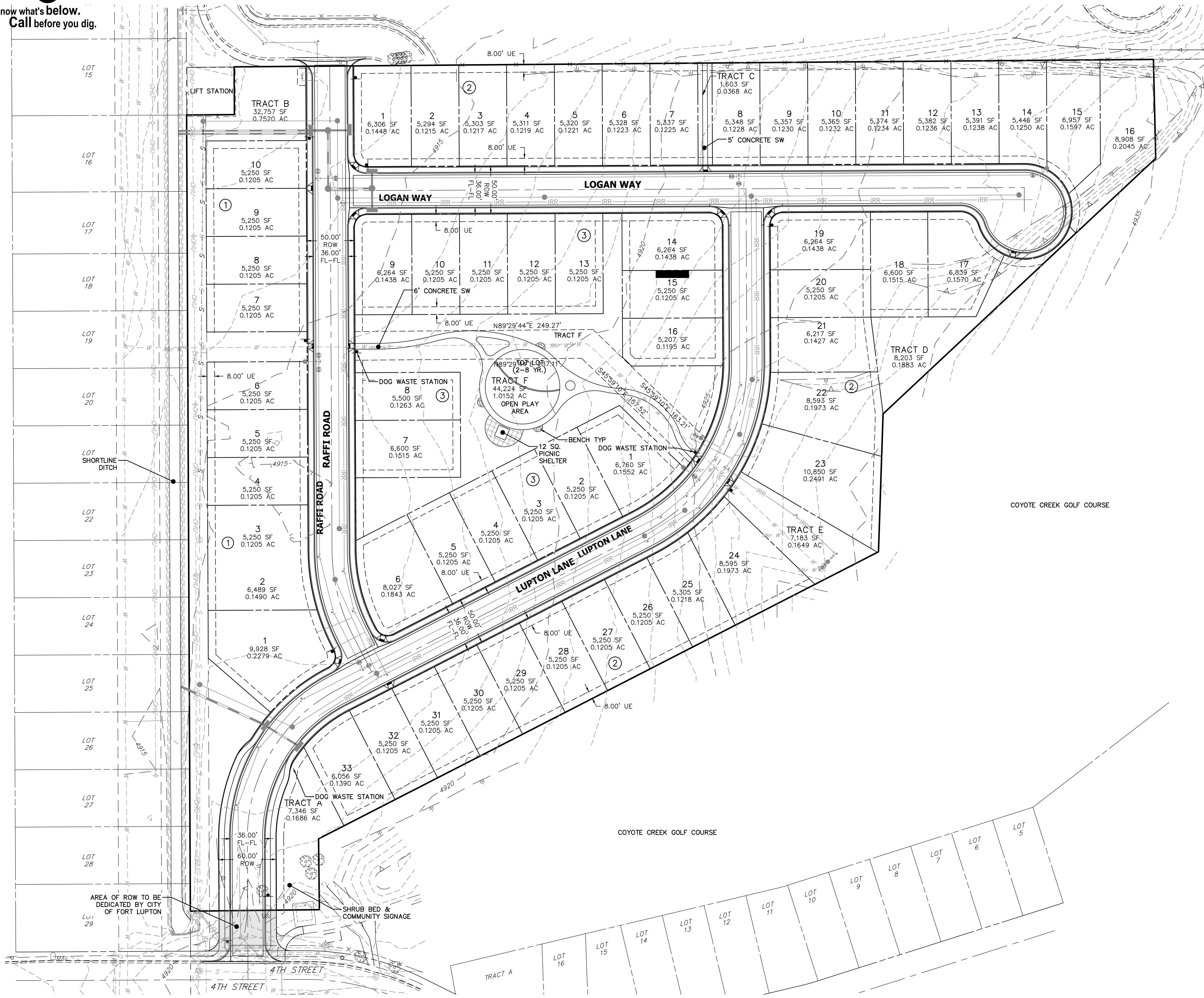
NO.	REVISION	1 = 50	DATE
		V-Scale	1" = X'
		DATE	12/13/21
		DESIGNED BY	AJH
		DRAWN BY	XXX
		CHECKED BY	

COYOTE CREEK FILING NO. 4

FINAL SITE PLAN

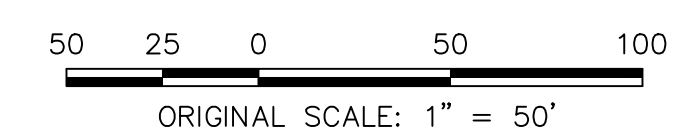
SHEET 5 OF 46

JOB NO. 16093.00



SITE LEGEND

BOUNDARY LINE	
PROPERTY LINE	
EXISTING EASEMENT LINE	
PROPOSED EASEMENT LINE	
RIGHT OF WAY	
EXISTING WOODEN FENCE	
EXISTING GAS MAIN	
EXISTING SANITARY SEWER	
PROPOSED SANITARY SEWER	
EXISTING WATER MAIN	
PROPOSED WATER MAIN	
PROPOSED ELECTRIC	
EXISTING STORM DRAIN	
PROPOSED STORM DRAIN	
EXISTING CURB AND GUTTER	
PROPOSED SIGN	
PROPOSED CURB AND GUTTER	
EXISTING STREET LIGHTS	
PROPOSED STREET LIGHT	
3/4" METER VAULTS	
FIRE HYDRANT	



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NO.	REVISION	DATE

H-SCALE	1 = 50
V-SCALE	N/A
DATE	12/13/21
DESIGNED BY	AJH
DRAWN BY	CRB
CHECKED BY	

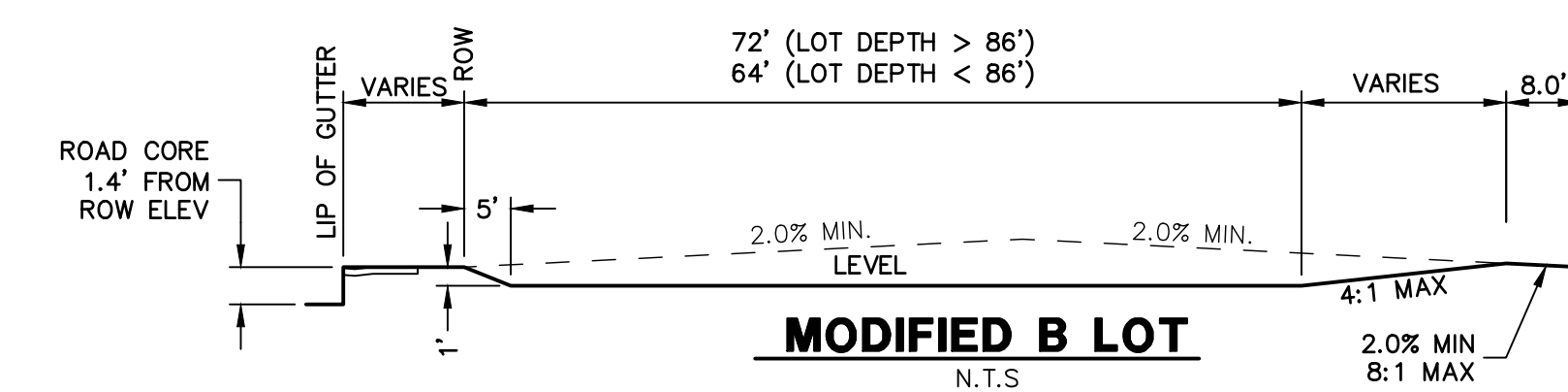
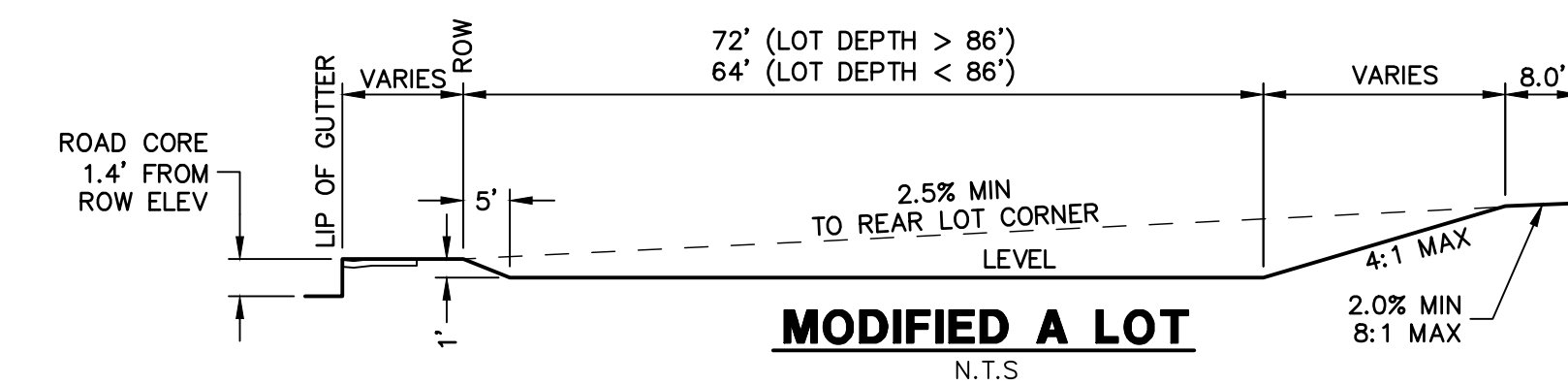
COYOTE CREEK FILING NO. 4
 FINAL GRADING & EROSION
 CONTROL PLAN

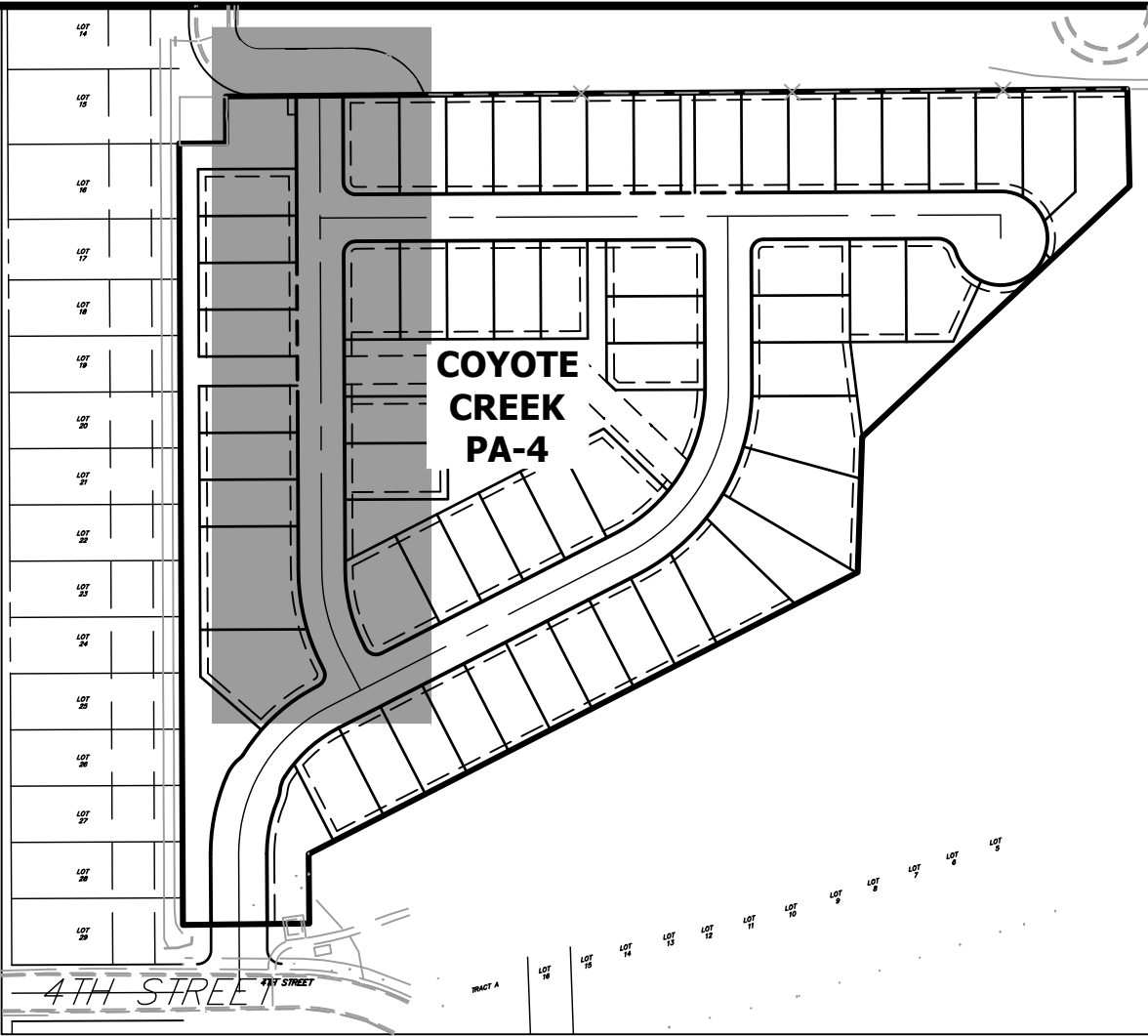
SHEET 4 OF 46

JOB NO. 16093.00



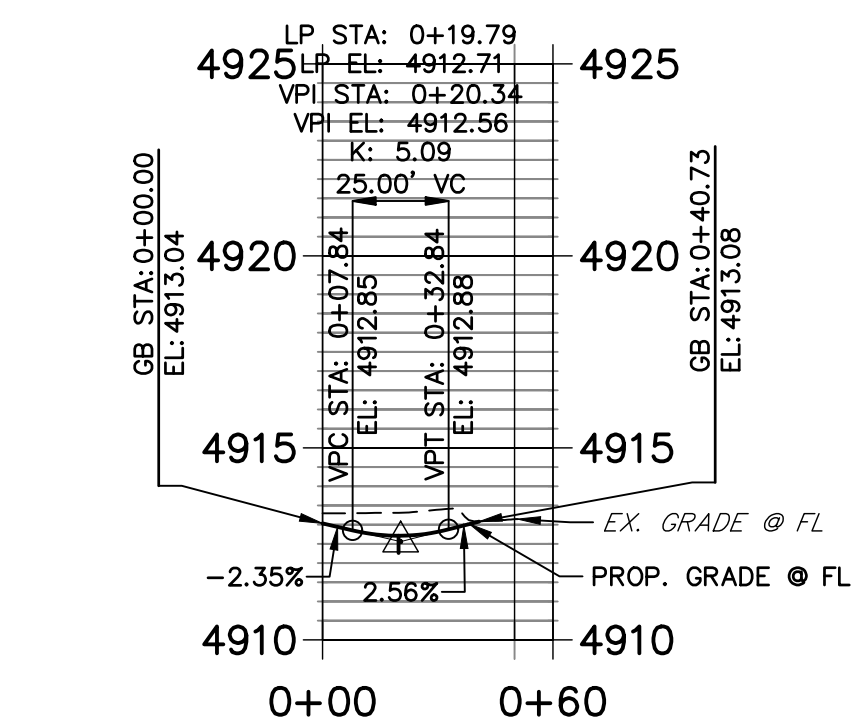
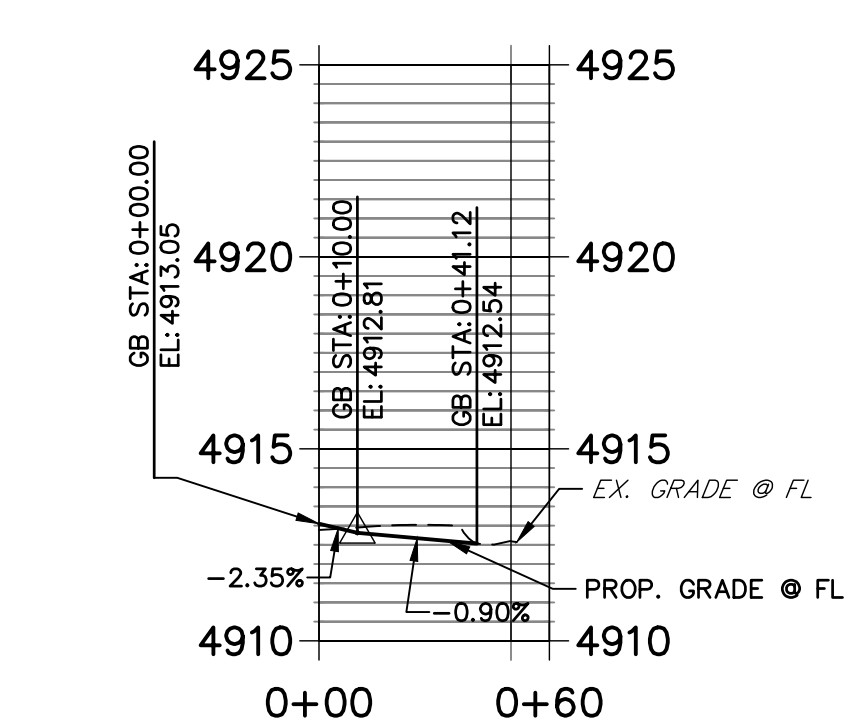
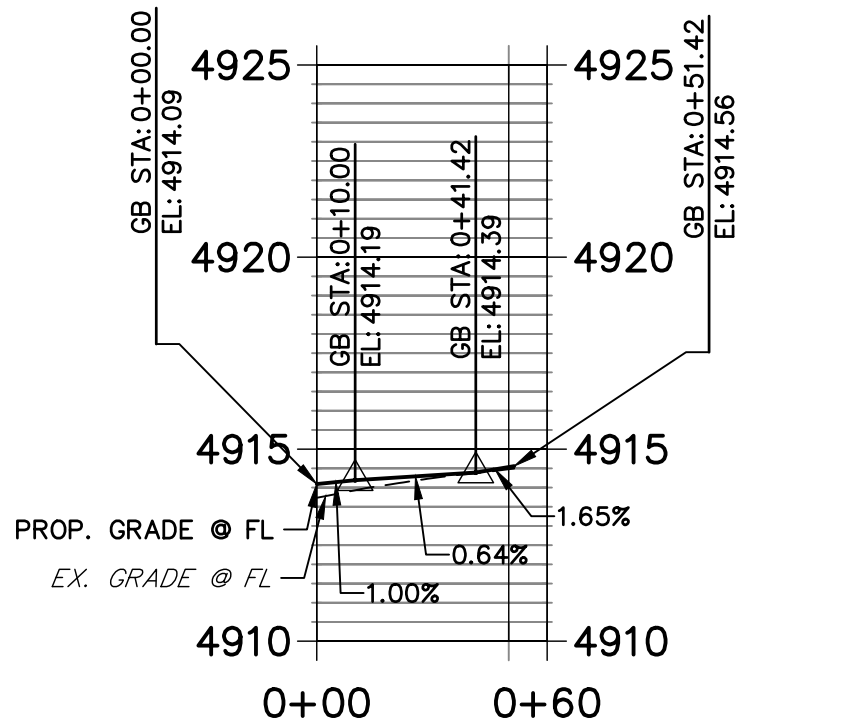
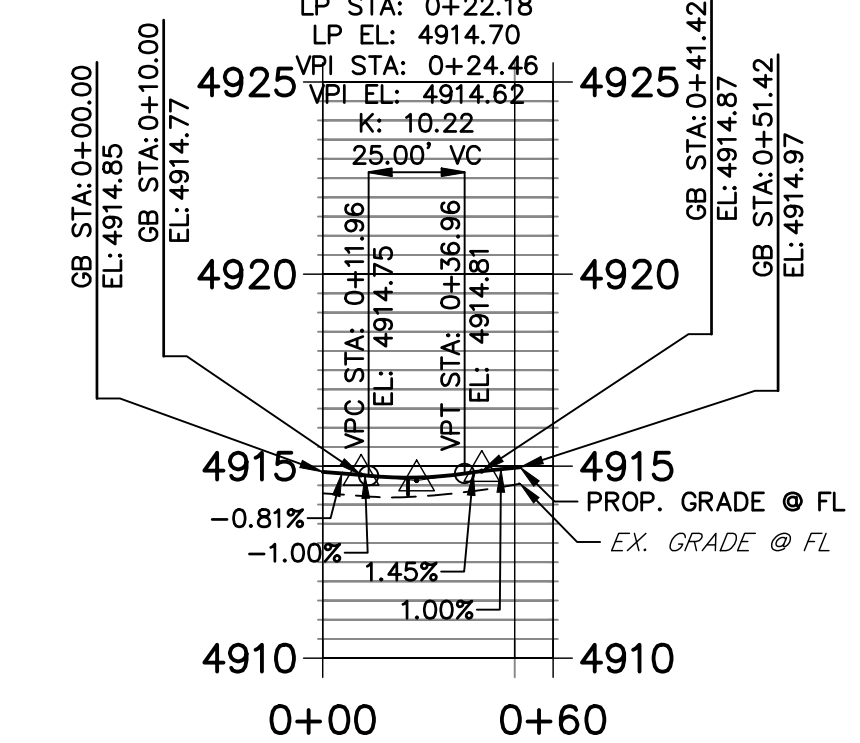
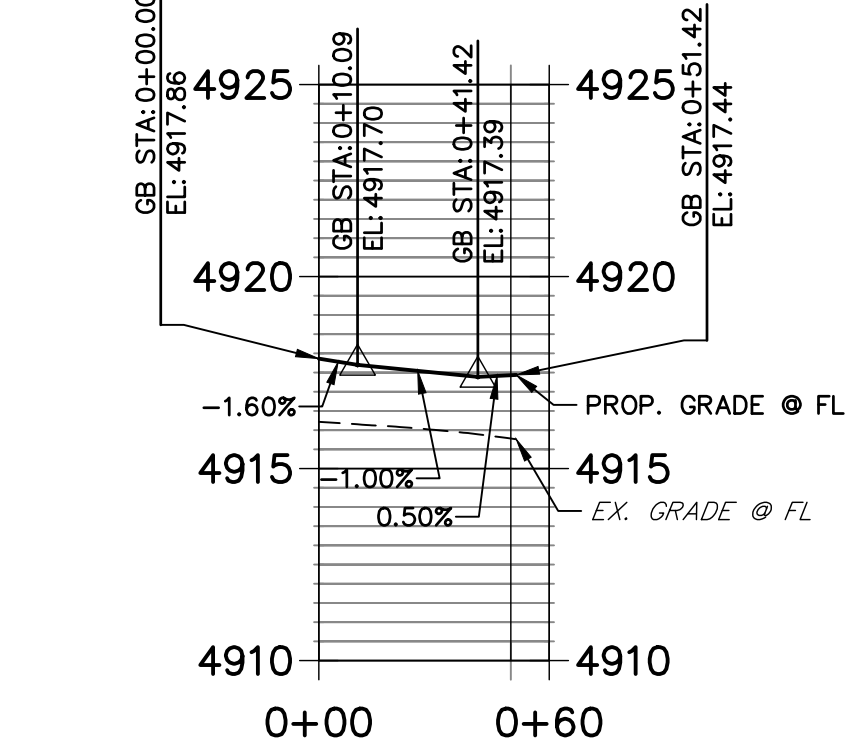
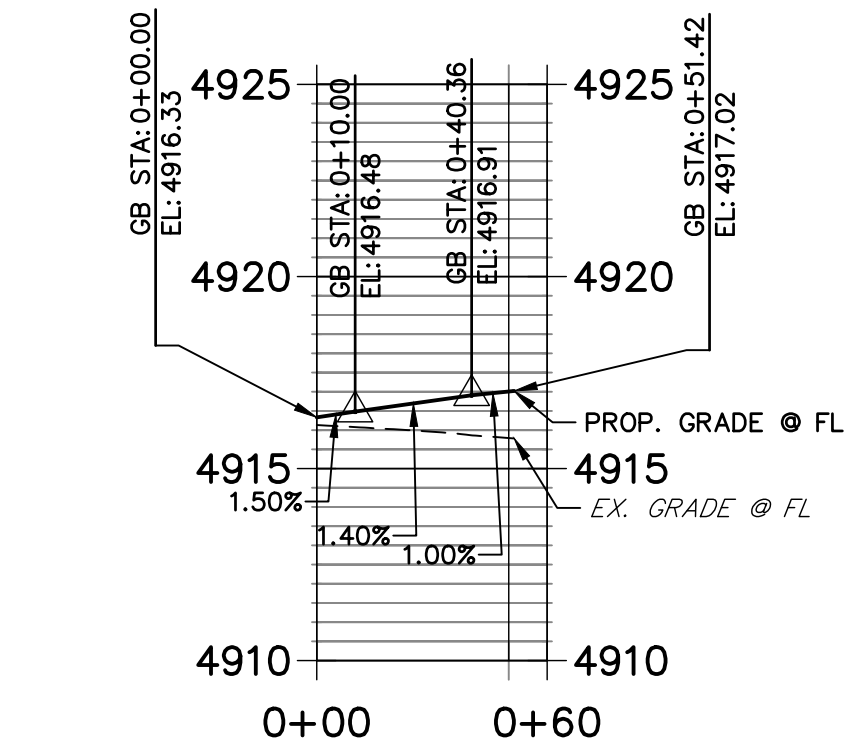
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|---|--------------------------|
|  | SILT FENCE |
|  | LIMITS OF CONSTRUCTION |
|  | VEHICLE TRACKING CONTROL |
|  | CONCRETE WASHOUT AREA |
|  | INLET PROTECTION |
|  | SEDIMENT CONTROL LOG |
|  | STABILIZED STAGING AREA |





CL- RAFFI ROAD PROFILE

STA 200+00.00 TO 207+00.00

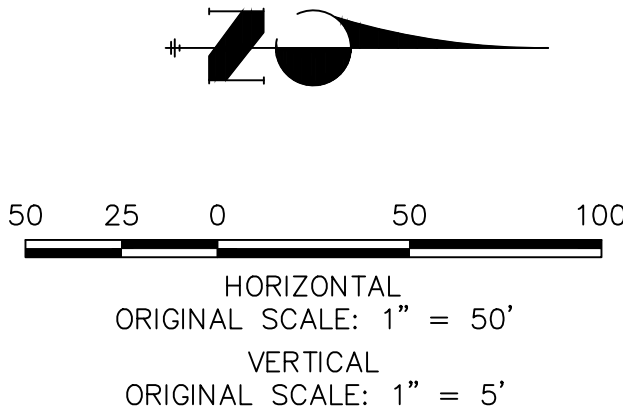


LINE TABLE		
LINE	BEARING	DISTANCE
L1	S43°09'42"E	9.51'
L2	N62°50'48"E	1.17'
L3	S62°50'48"W	8.14'
L4	S62°52'38"W	0.16'
L5	N62°50'48"E	1.29'
L6	N27°09'12"W	4.67'
L7	N27°09'12"W	4.67'
L9	N45°59'10"W	13.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C1	90°00'00"	13.00'	20.42'	S45°16'07"E 18.38'
C2	28°31'44"	50.00'	24.90'	N76°00'15"W 24.64'
C3	40°06'33"	50.00'	35.00'	N41°14'07"W 34.29'
C4	40°06'33"	50.00'	35.00'	N01°34'34"W 34.29'
C5	25°23'54"	50.00'	221.13'	N36°25'51"E 80.18'
C8	73°23'54"	20.00'	25.62'	N53°34'09"W 23.90'
C9	90°00'00"	13.00'	20.42'	S44°43'59"E 18.38'
C10	90°00'00"	13.00'	20.42'	N45°16'07"W 18.38'
C11	11°01'19"	175.00'	3.58'	N00°19'03"E 3.58'
C12	2°46'17"	225.00'	10.88'	N01°07'02"E 10.88'
C13	13°56'57"	225.00'	54.78'	N08°28'39"E 54.64'
C14	38°23'55"	175.00'	117.28'	N20°06'10"E 115.10'
C15	63°06'55"	175.00'	192.77'	N31°17'21"E 183.17'
C17	63°06'55"	225.00'	247.85'	N31°17'21"E 235.51'
C18	13°58'29"	225.00'	54.88'	N02°26'23"E 54.74'
C19	8°00'31"	225.00'	31.45'	N34°25'53"E 31.42'
C20	13°41'21"	225.00'	53.76'	N45°16'49"E 53.63'
C21	23°32'40"	175.00'	71.91'	N51°04'28"E 71.41'
C22	10°43'19"	225.00'	42.10'	N57°29'09"E 42.04'
C23	23°30'43"	150.00'	61.55'	S51°05'27"W 61.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C24	29°55'48"	150.00'	78.36'	S47°52'54"W 77.47'
C25	6°25'05"	150.00'	16.80'	S36°07'33"W 16.79'
C26	27°40'04"	32.00'	15.45'	S19°44'19"E 15.30'
C27	17°37'16"	36.00'	11.07'	N14°03'35"E 11.03'
C28	23°08'19"	145.00'	58.56'	S11°18'03"W 58.16'
C29	24°48'28"	205.00'	88.76'	S12°08'07"W 88.07'
C30	27°59'58"	42.00'	20.52'	S38°32'20"W 20.32'
C31	20°50'59"	15.00'	5.46'	N42°06'50"E 5.43'
C32	9°23'19"	200.00'	32.77'	S36°22'59"W 32.74'
C34	31°09'28"	200.00'	108.76'	S47°16'04"W 107.43'
C35	21°46'10"	200.00'	75.99'	S51°57'44"W 75.53'
C36	90°00'00"	13.00'	20.42'	N17°50'48"E 18.38'
C37	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C37	90°00'00"	13.00'	20.42'	S72°09'12"E 18.38'
C38	26°53'05"	175.00'	82.11'	S13°42'39"E 81.36'
C40	10°34'57"	225.00'	41.56'	S21°51'43"E 41.50'
C41	26°53'05"	225.00'	105.58'	S13°42'39"E 104.61'
C42	15°29'53"	225.00'	60.86'	S09°49'19"E 60.67'
C43	0°48'16"	225.00'	3.16'	S00°40'14"E 3.16'

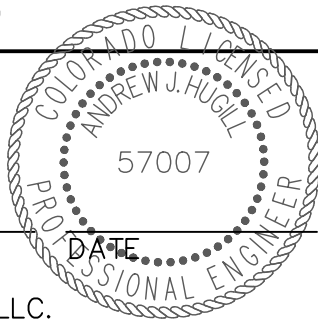
COYOTE CREEK FILING NO. 4		H-SCALE 1"=50'		No.	REVISION	BY	DATE
		V-SCALE 1"=5'					
		DATE 12/13/21					
FINAL STREET PLAN AND PROFILE		DESIGNED BY AUH					
		DRAWN BY CRB					
		CHECKED BY					
SHEET 8 OF 46		 J-R ENGINEERING A Westrian Company CENTRAL 303-740-9393 • Colorado Springs 719-589-2938 FORT COLLINS 970-491-9888 • www.jrengineering.com					
JOB NO. 16093.00		UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING ENGINEERING OFFICE APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION. PREPARED FOR LUPTON LAND, LLC 10221 PRESTWICK TRAIL LONE TREE, CO 80124 BOB QUINETTE P-303.587.1966					

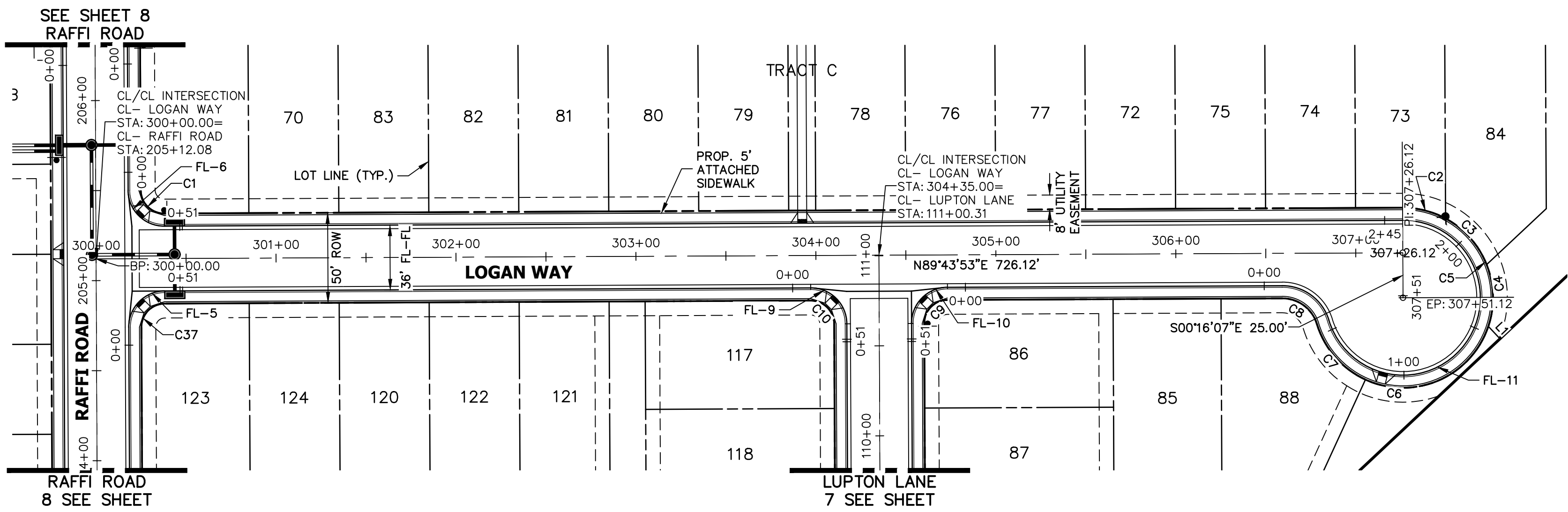


ENGINEER'S STATEMENT

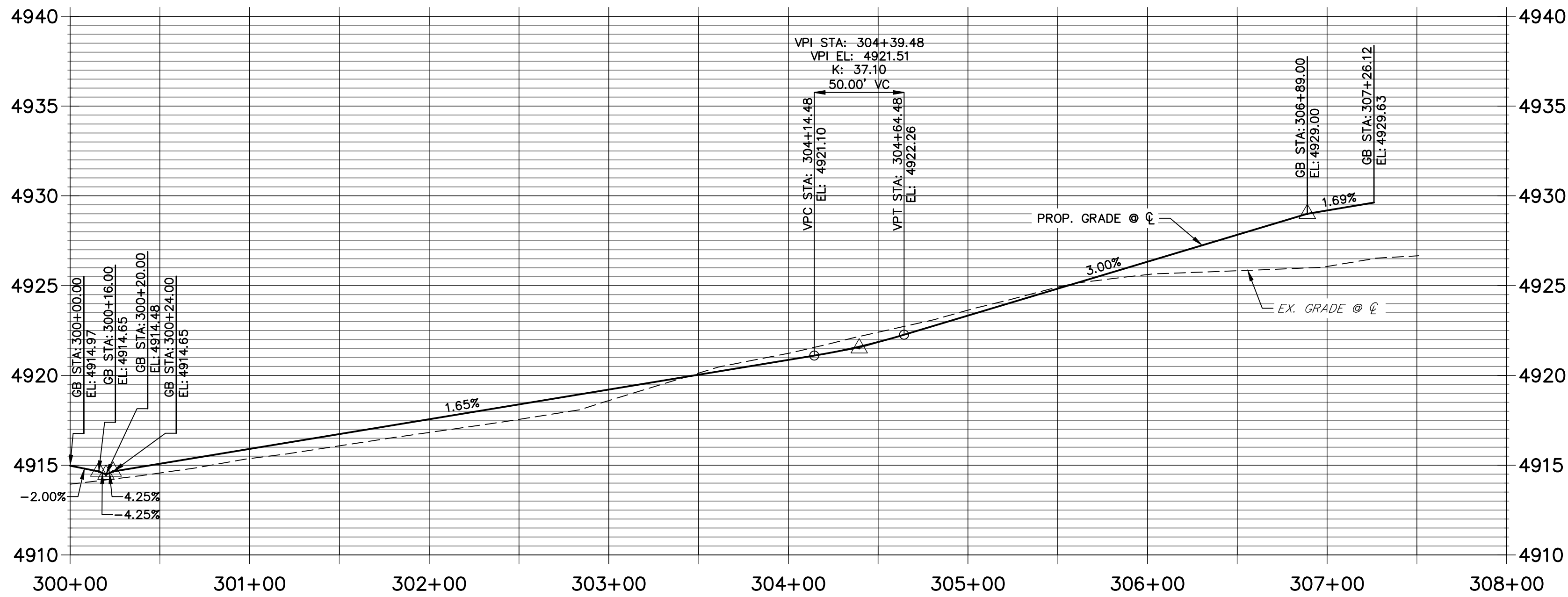
PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC





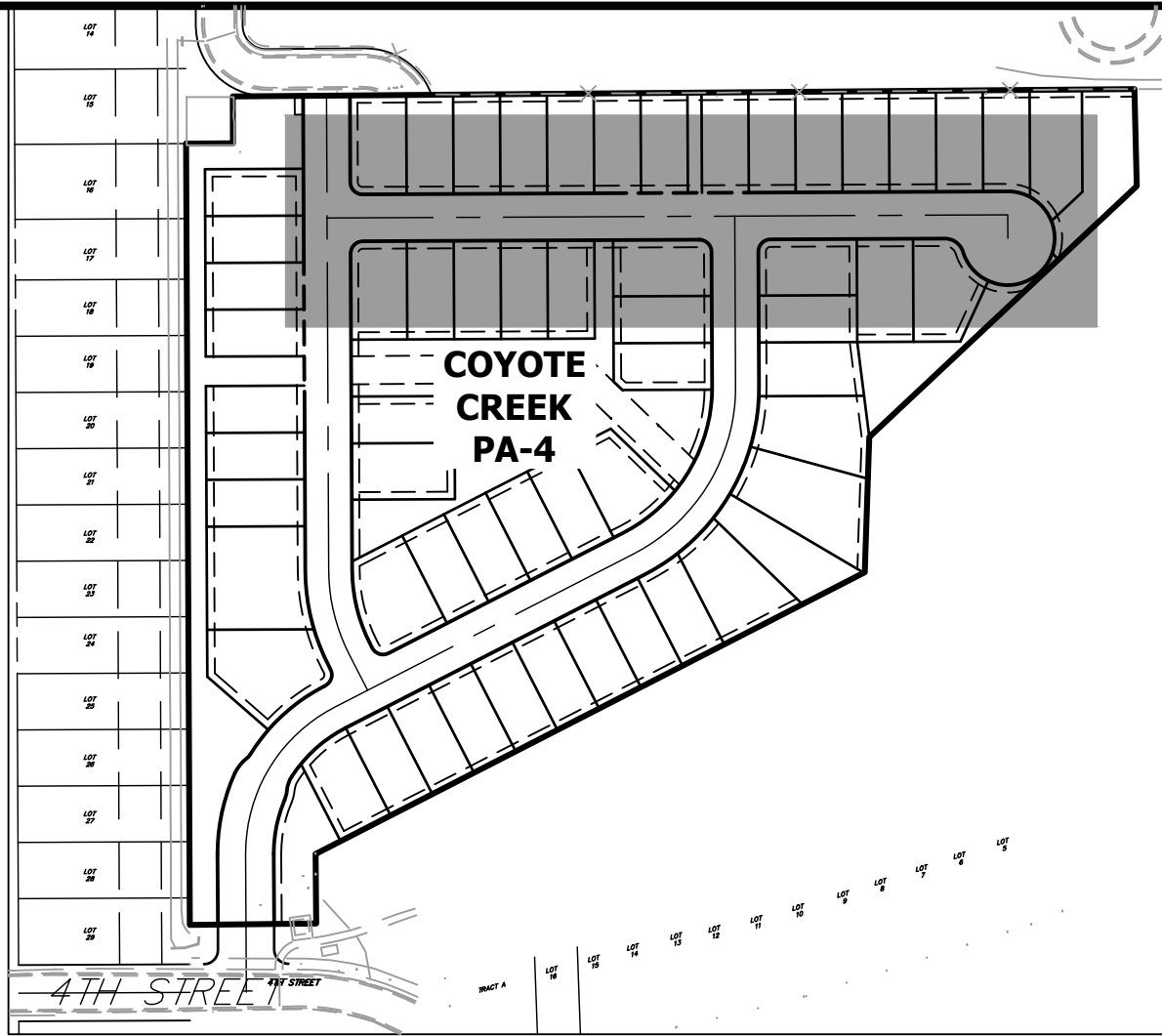
CL- LOGAN WAY PROFILE
STA 300+00.00 TO 308+00.00



LINE TABLE		
LINE	BEARING	DISTANCE
L1	S43°09'42"E	9.51'
L2	N62°50'48"E	1.17'
L3	S62°50'48"W	8.14'
L4	S62°52'38"W	0.16'
L5	N62°50'48"E	1.29'
L6	N27°09'12"W	4.67'
L7	N27°09'12"W	4.67'
L9	N45°59'10"W	13.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
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C2	28°31'44"	50.00'	24.90'	N76°00'15"W 24.64'
C3	40°06'33"	50.00'	35.00'	N41°41'07"W 34.29'
C4	40°06'33"	50.00'	35.00'	N01°34'34"W 34.29'
C5	253°23'54"	50.00'	221.13'	N36°25'51"E 80.18'
C8	73°23'54"	20.00'	25.62'	N53°34'09"W 23.90'
C9	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C10	90°00'00"	13.00'	20.42'	N45°16'07"W 18.38'
C11	1°10'19"	175.00'	3.58'	N00°19'03"E 3.58'
C12	2°46'17"	225.00'	10.88'	N01°07'02"E 10.88'
C13	13°56'57"	225.00'	54.78'	N09°28'39"E 54.64'
C14	38°23'55"	175.00'	117.28'	N20°06'10"E 115.10'
C15	63°06'55"	175.00'	192.77'	N31°17'21"E 183.17'
C17	63°06'55"	225.00'	247.85'	N31°17'21"E 235.51'
C18	13°58'29"	225.00'	54.88'	N23°26'23"E 54.74'
C19	8°00'31"	225.00'	31.45'	N34°25'53"E 31.42'
C20	13°41'21"	225.00'	53.76'	N45°16'49"E 53.63'
C21	23°32'40"	175.00'	71.91'	N51°04'28"E 71.41'
C22	10°43'19"	225.00'	42.10'	N57°29'09"E 42.04'
C23	23°30'43"	150.00'	61.55'	S51°05'27"W 61.12'

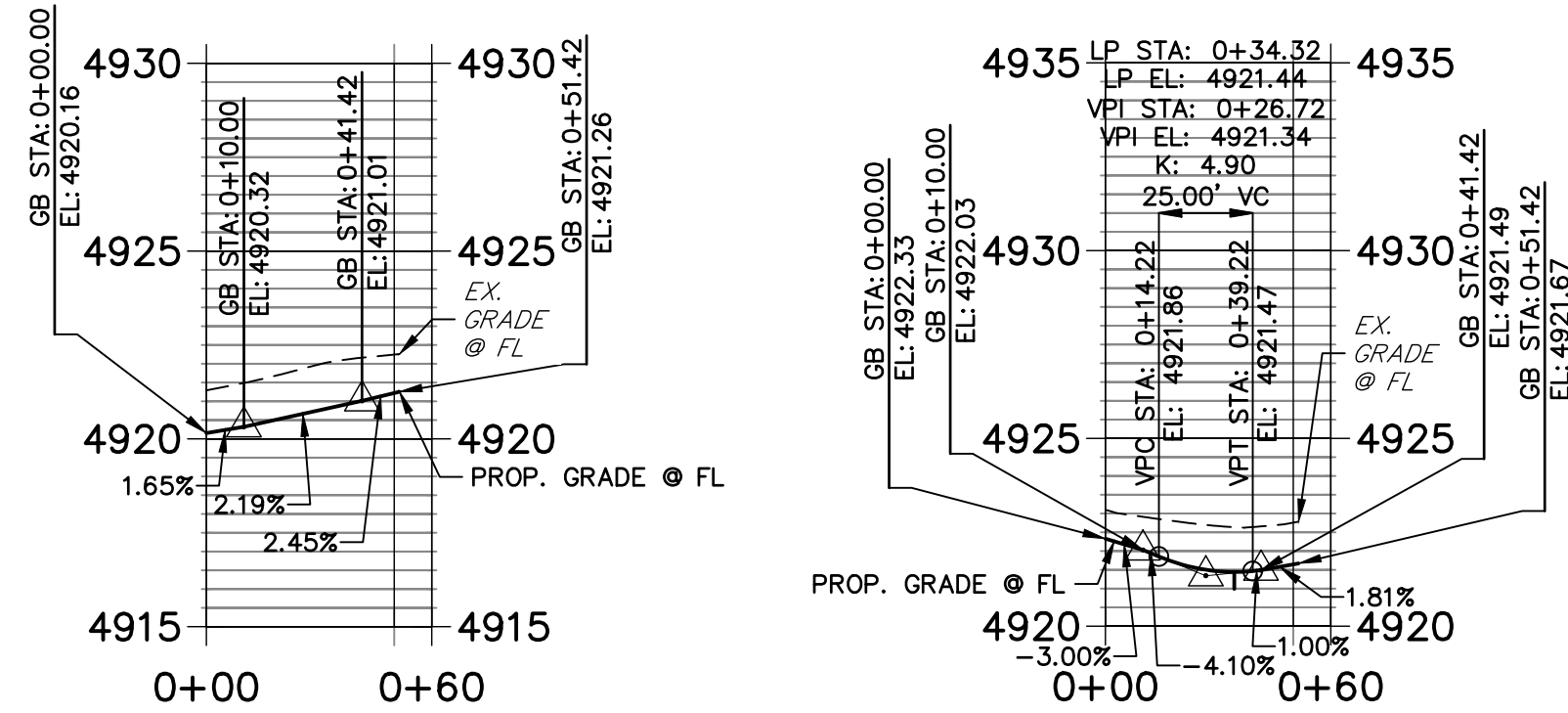
CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C24	29°55'48"	150.00'	78.36'	S47°52'54"W 77.47'
C25	6°25'05"	150.00'	16.80'	S36°07'33"W 16.79'
C26	27°40'04"	32.00'	15.45'	S19°04'59"W 15.30'
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C28	23°08'19"	145.00'	58.56'	S11°18'03"W 58.16'
C29	24°48'28"	205.00'	88.76'	S12°08'07"W 88.07'
C30	27°59'58"	42.00'	20.52'	S38°32'20"W 20.32'
C31	20°50'59"	15.00'	5.46'	N42°06'50"E 5.43'
C32	9°23'19"	200.00'	32.77'	S36°22'59"W 32.74'
C34	31°09'28"	200.00'	108.76'	S47°16'04"W 107.43'
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C37	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C37	90°00'00"	13.00'	20.42'	S72°09'12"E 18.38'
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C43	0°48'16"	225.00'	3.16'	S00°40'14"E 3.16'



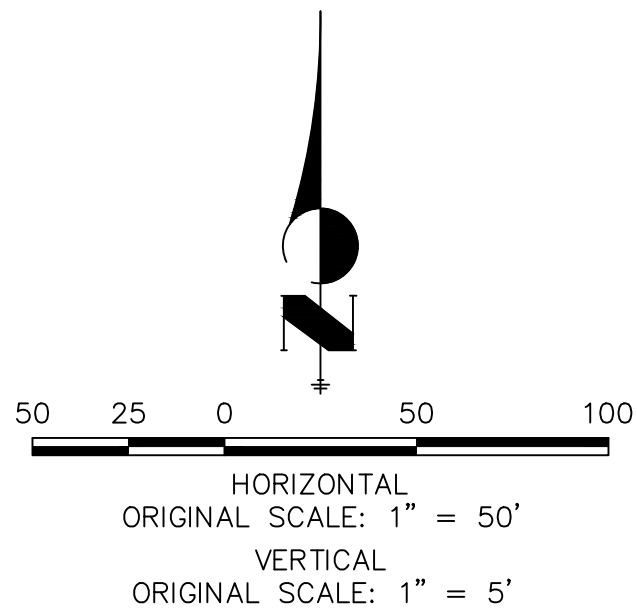
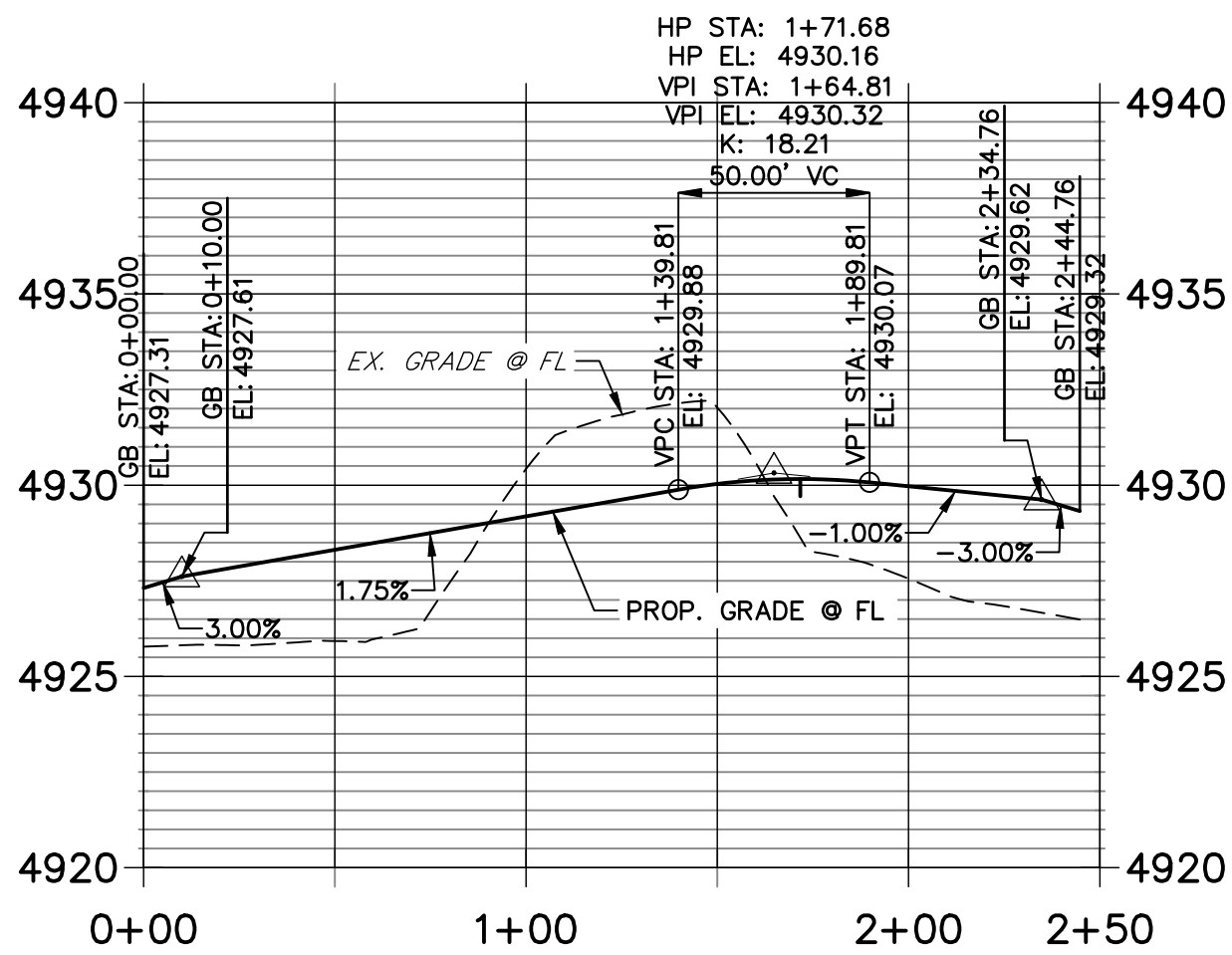
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N.T.S.

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STA 0+00.00 TO 0+60.00

FL-10 PROFILE
STA 0+00.00 TO 0+60.00



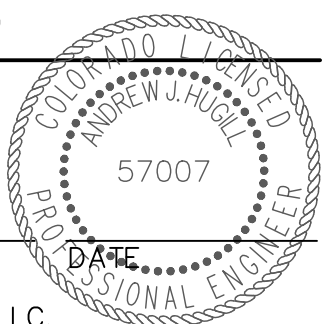
FL-11 PROFILE
STA 0+00.00 TO 2+50.00



ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



COYOTE CREEK FILING NO. 4

FINAL STREET PLAN AND
PROFILE

SHEET 9 OF 46

JOB NO. 16093.00

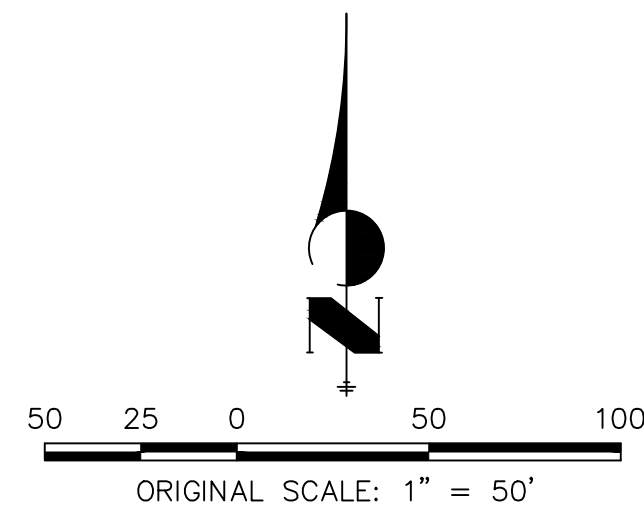
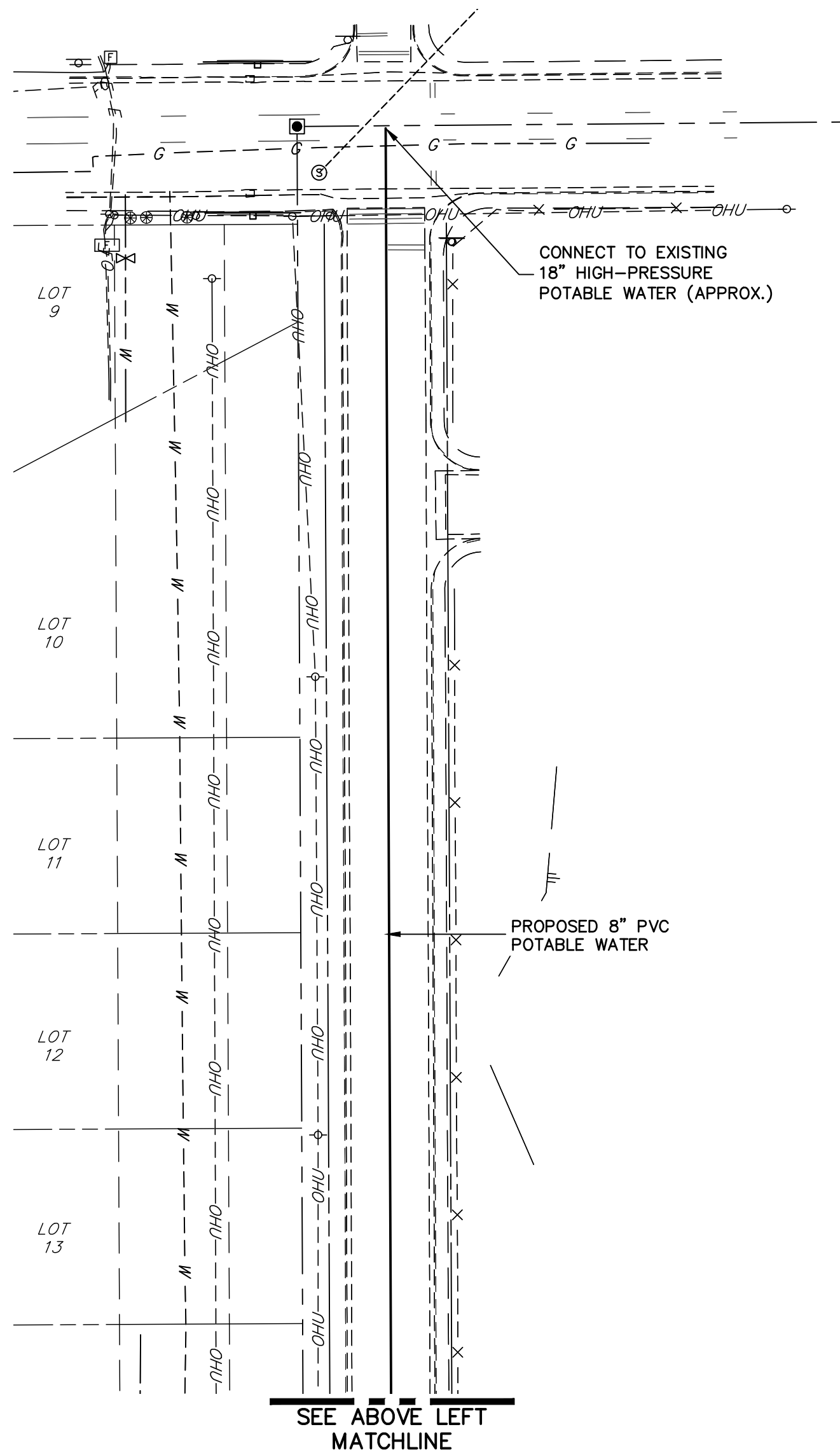
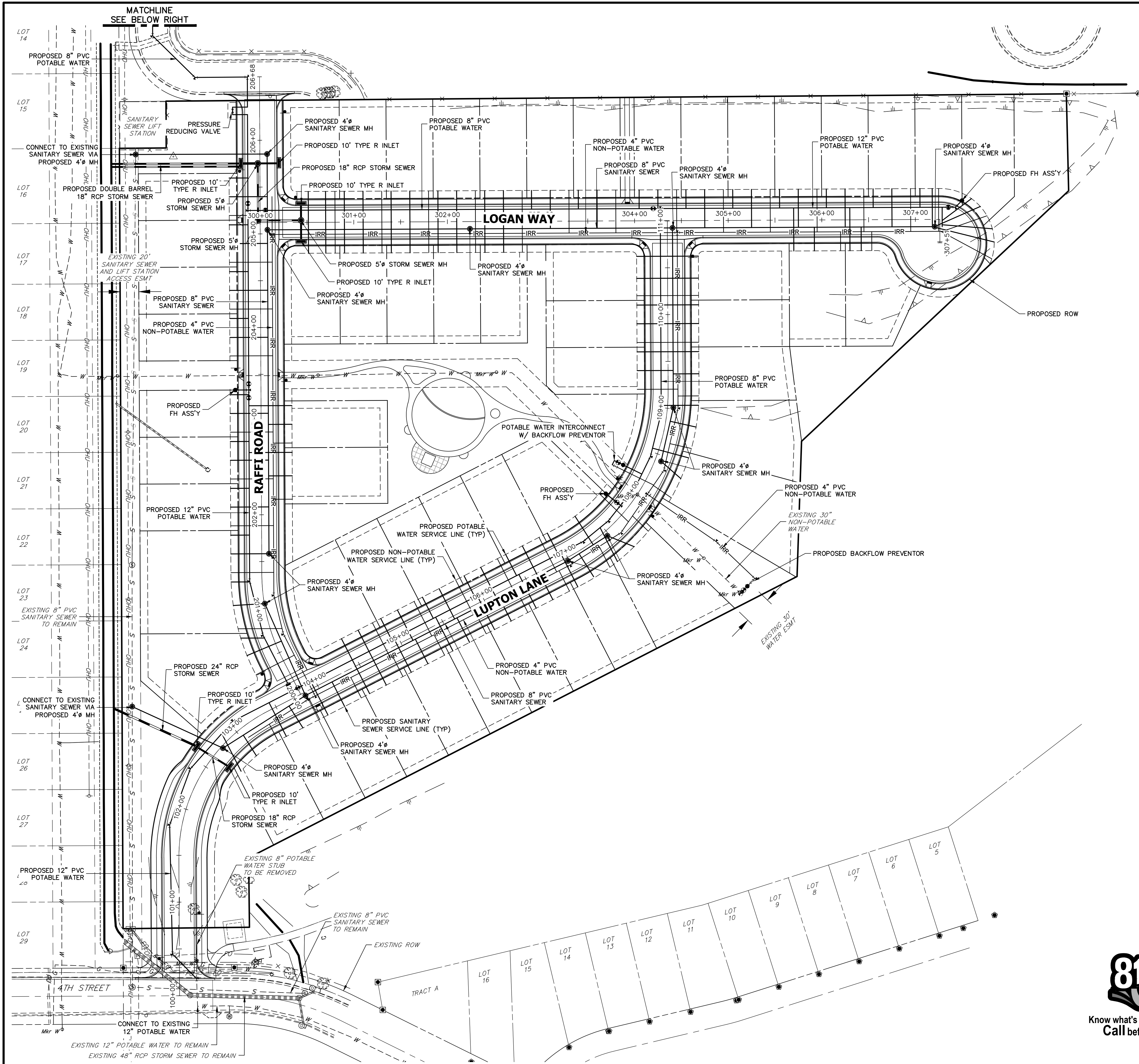
J.R. ENGINEERING
A Western Company

Central 303-740-9888 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

UNTIL SUCH TIME AS
THESE DRAWINGS ARE
APPROVED BY THE
APPROPRIATE REVIEWING
AGENCIES, OR ENGINEERING
APPROVES THEIR USE,
THESE DRAWINGS ARE
DESIGNATED BY WRITTEN
AUTHORIZATION.

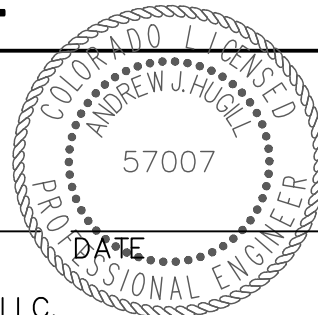




ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



COYOTE CREEK FILING NO. 4

FINAL UTILITY PLAN

SHEET 10 OF 46

JOB NO. 16093.00

BY DATE

No. REVISION

H-SCALE 1"=50'

V-SCALE N/A

DATE 12/13/21

DESIGNED BY SWW

DRAWN BY SWW

CHECKED BY

PREPARED FOR

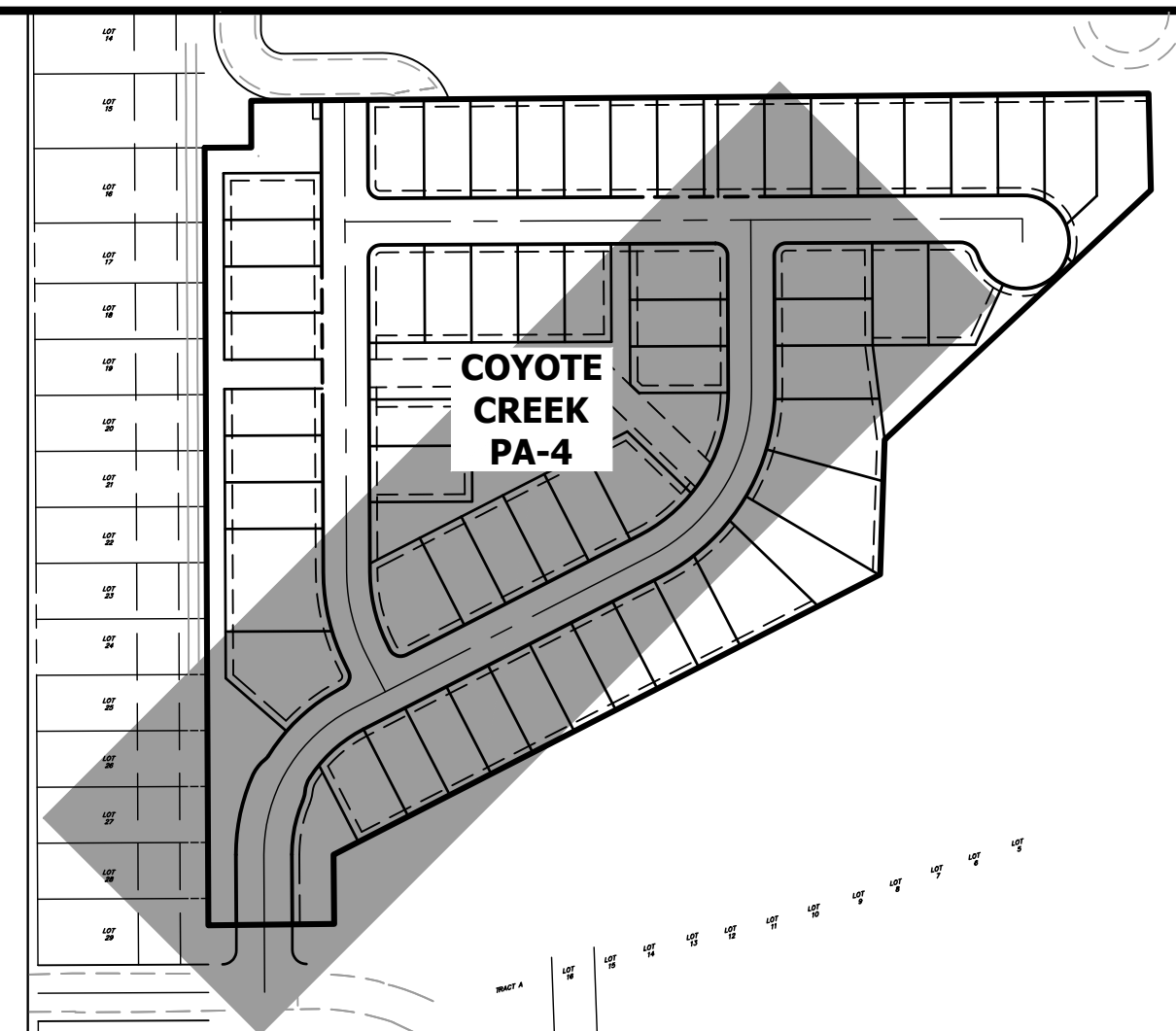
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
303-587-1966



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Fort Collins 970-491-9888 • www.jrengineering.com

UNTIL SUCH TIME AS
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APPROVES THEIR USE,
THESE DRAWINGS ARE
DESIGNATED BY WRITTEN
AUTHORIZATION.

1. ALL STATIONING IS PIPE CENTERLINE EQUATED TO ROADWAY CENTERLINE, UNLESS OTHERWISE NOTED.

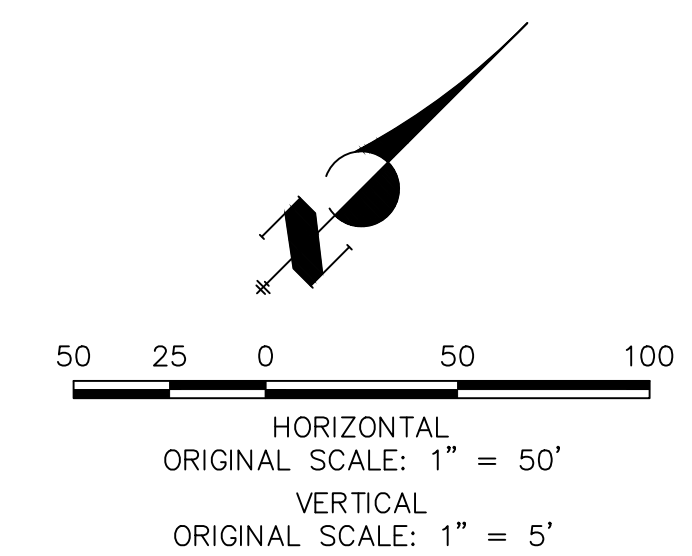


UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

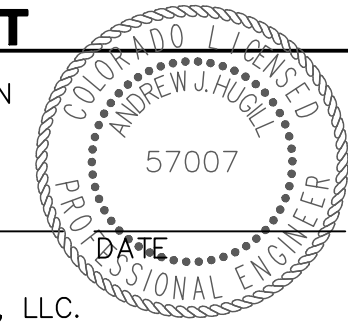
 **J·R ENGINEERING**
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-533-2533
Fort Collins 970-491-9888 • www.jrengineering.com

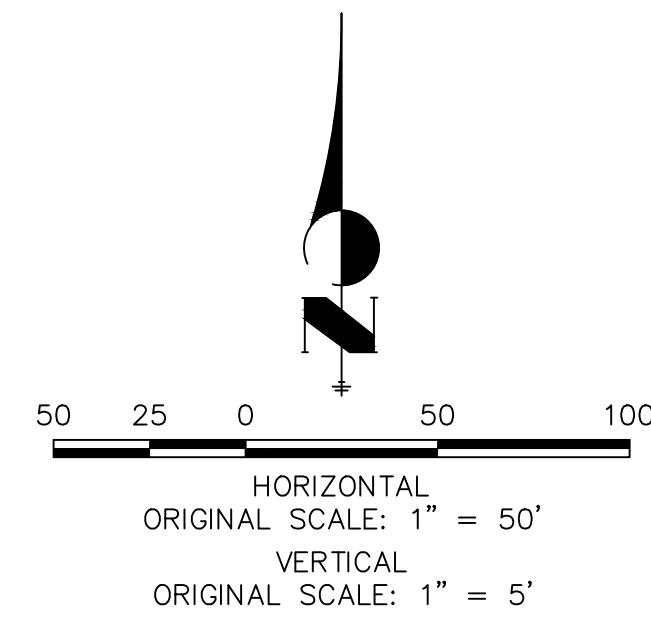
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PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



SHEET	11	OF	46
COYOTE CREEK FILING NO 4			
WATER PLAN & PROFILE			
JOB NO.	16093.00		
		H-SCALE 1"=50'	No.
		V-SCALE 1"=5'	REVISION
		DATE 12/13/21	BY
		DESIGNED BY SWW	
		DRAWN BY SWW	
		CHECKED BY	

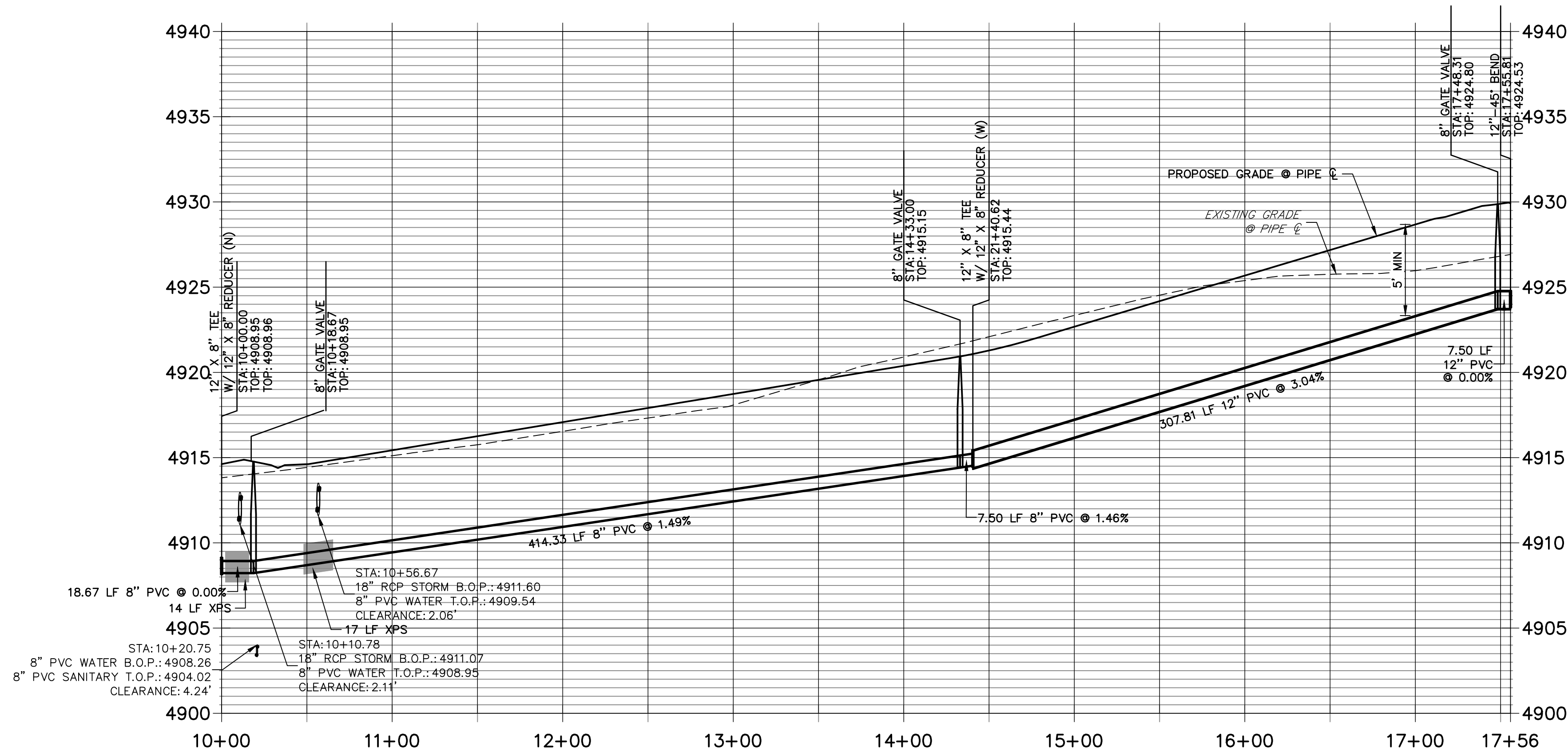


PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

 **JR ENGINEERING**
A Westrian Company

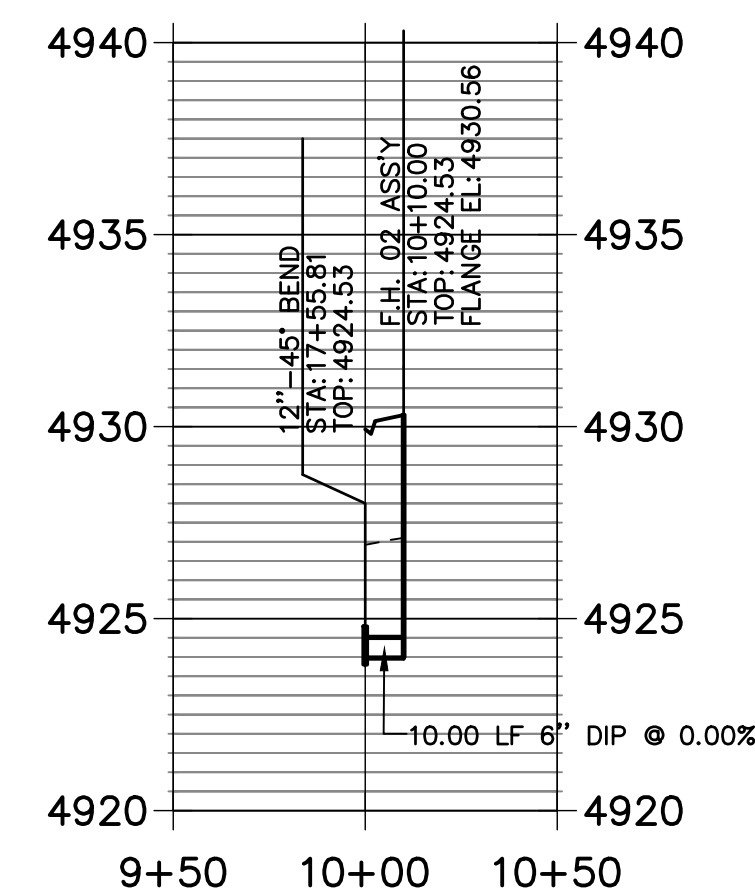
Centennial 303-740-9383 • Colorado Springs 719-559-2588
Fort Collins 970-491-3888 • www.jrengineering.com

WP02 PROFILE
STA 10+00.00 TO 17+55.81



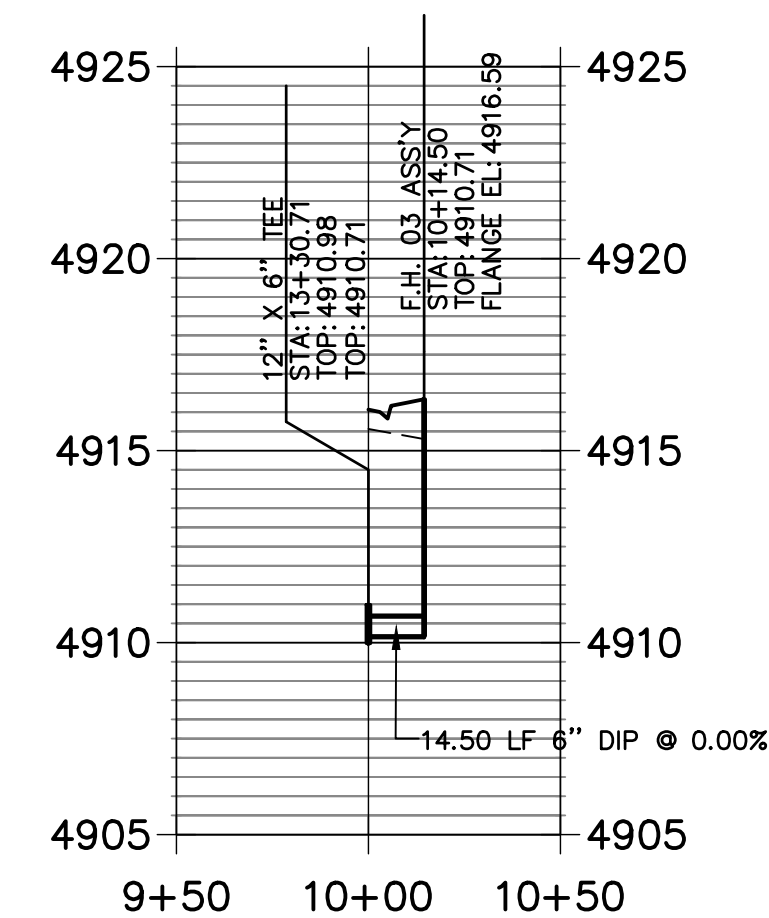
FH02 PROFILE

STA 9+50.00 TO 10+50.00



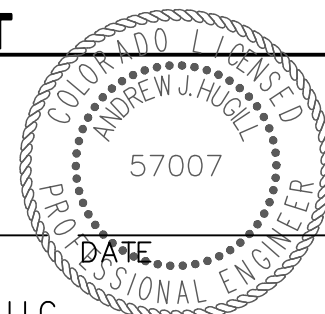
FH03 PROFILE

STA 9+50.00 TO 10+50.00



ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

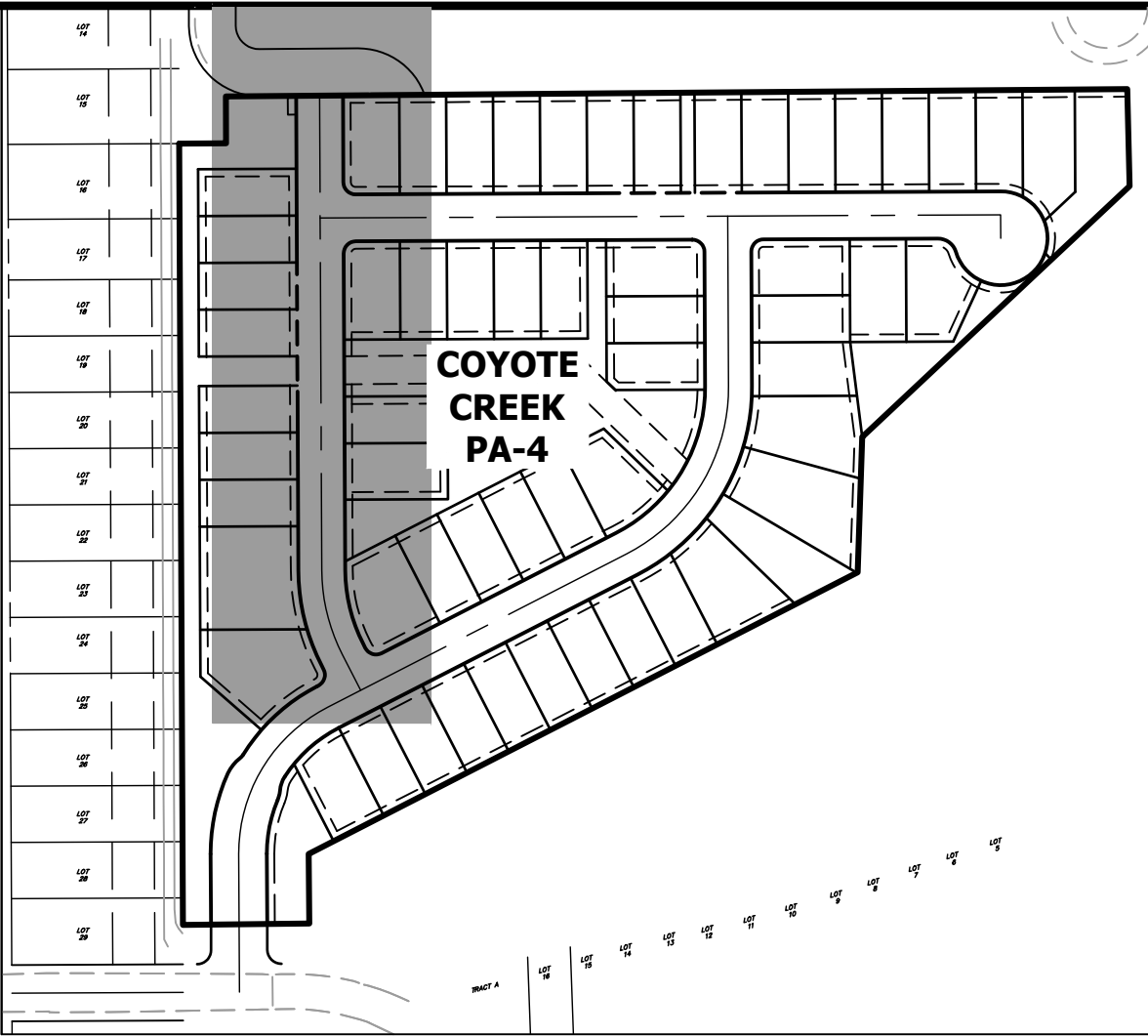


ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

COYOTE CREEK FILING NO 4	H-SCALE	1"=50'	No.	REVISION	BY	DATE
	V-SCALE	1"=5'				
	DATE	12/13/21				
	DESIGNED BY	SWW				
WATER PLAN & PROFILE	DRAWN BY	SWW				
	CHECKED BY					
SHEET 12 OF 46	JOB NO.	16093.00				

NOTES:

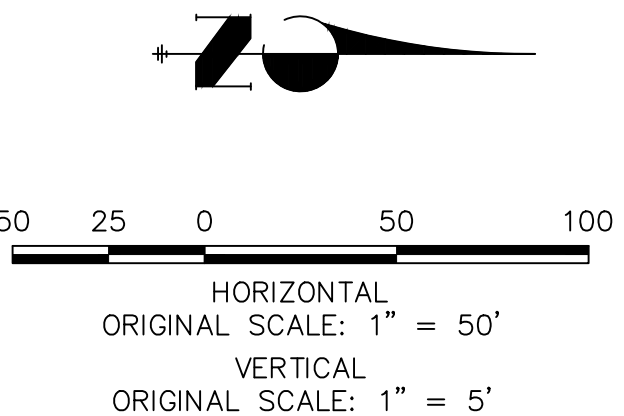
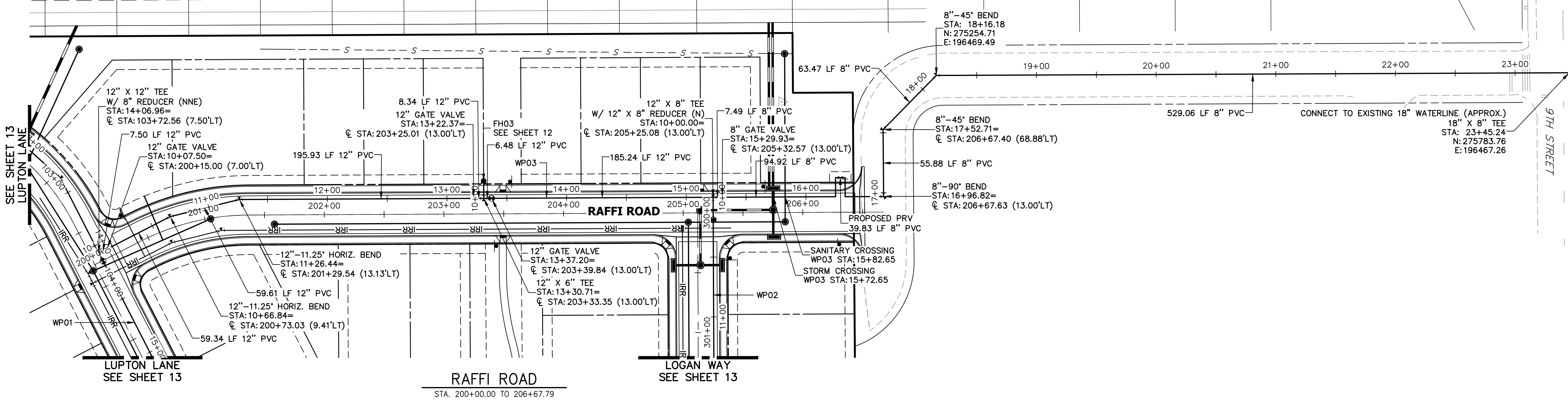
1. ALL STATIONING IS PIPE CENTERLINE EQUATED TO ROADWAY CENTERLINE, UNLESS OTHERWISE NOTED.



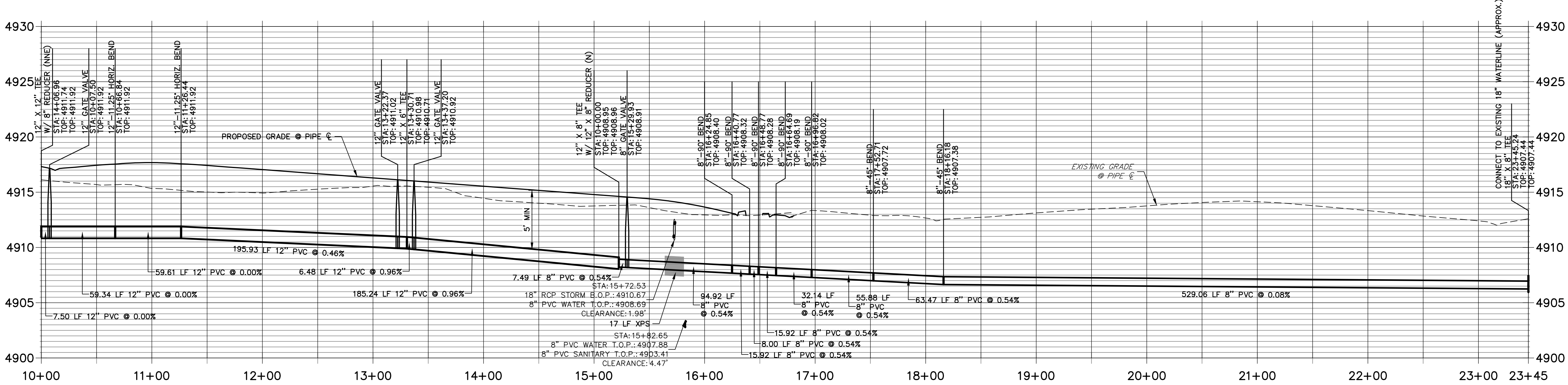
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

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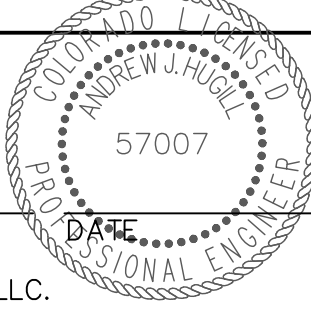
**WP03 PROFILE
STA 10+00.00 TO 23+45.24**



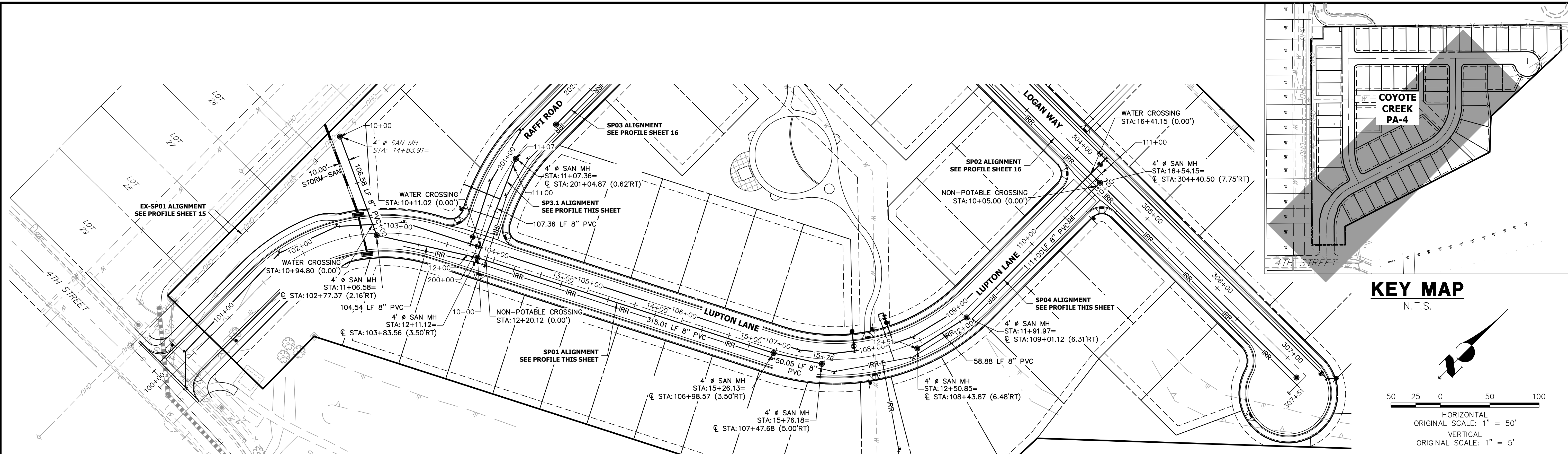
ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

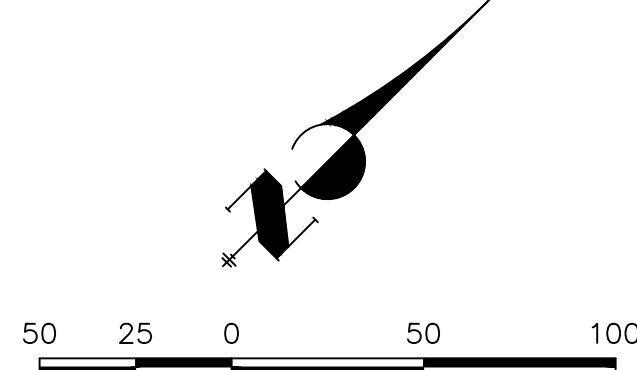


COYOTE CREEK FILING NO 4	DESIGNED BY SWW	CHECKED BY SWW
WATER PLAN & PROFILE	DATE 12/13/21	REVISION 1"=50' 1"=5'
SHEET 13 OF 46		
JOB NO. 16093.00		



KEY MAP

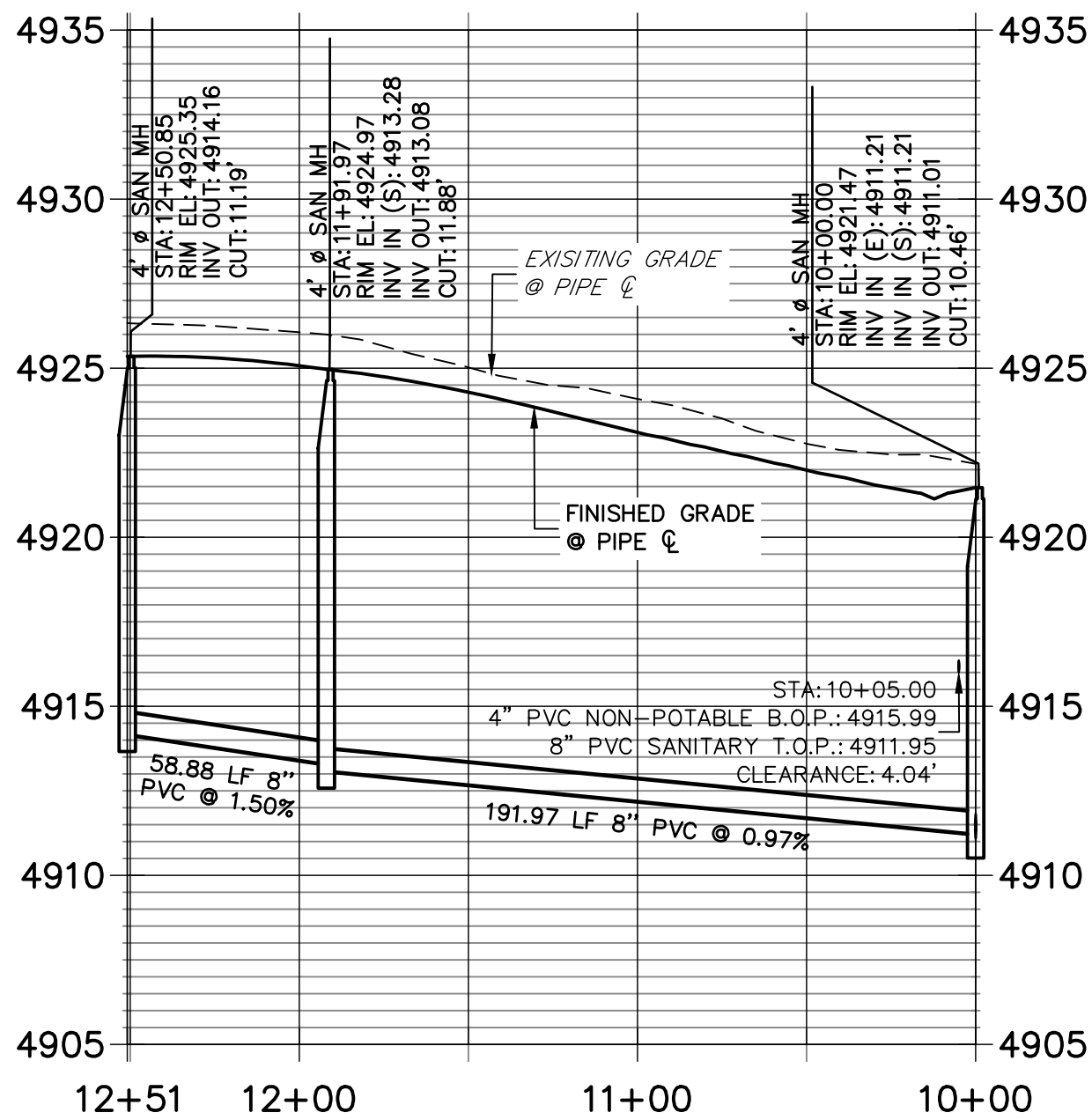
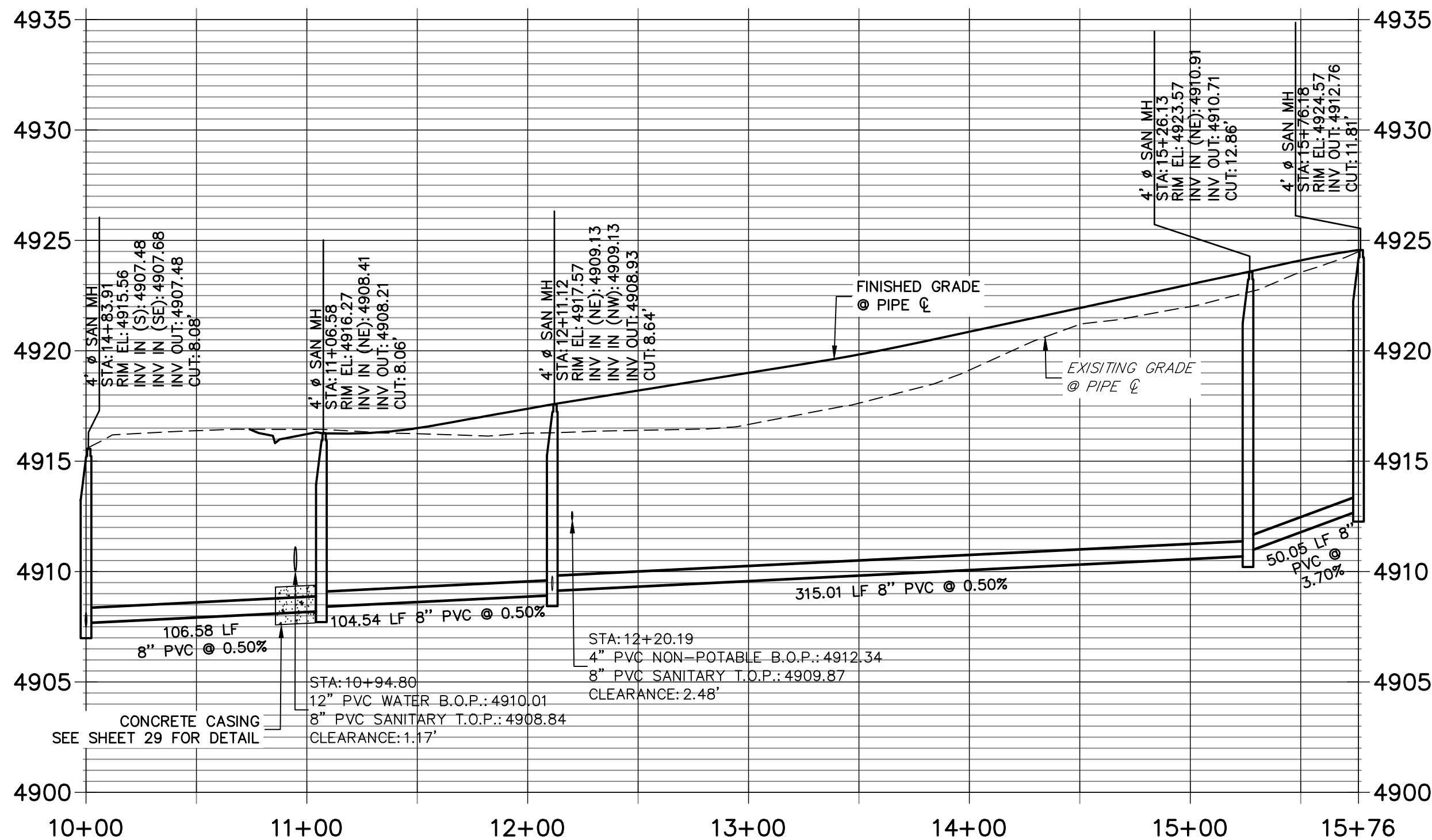
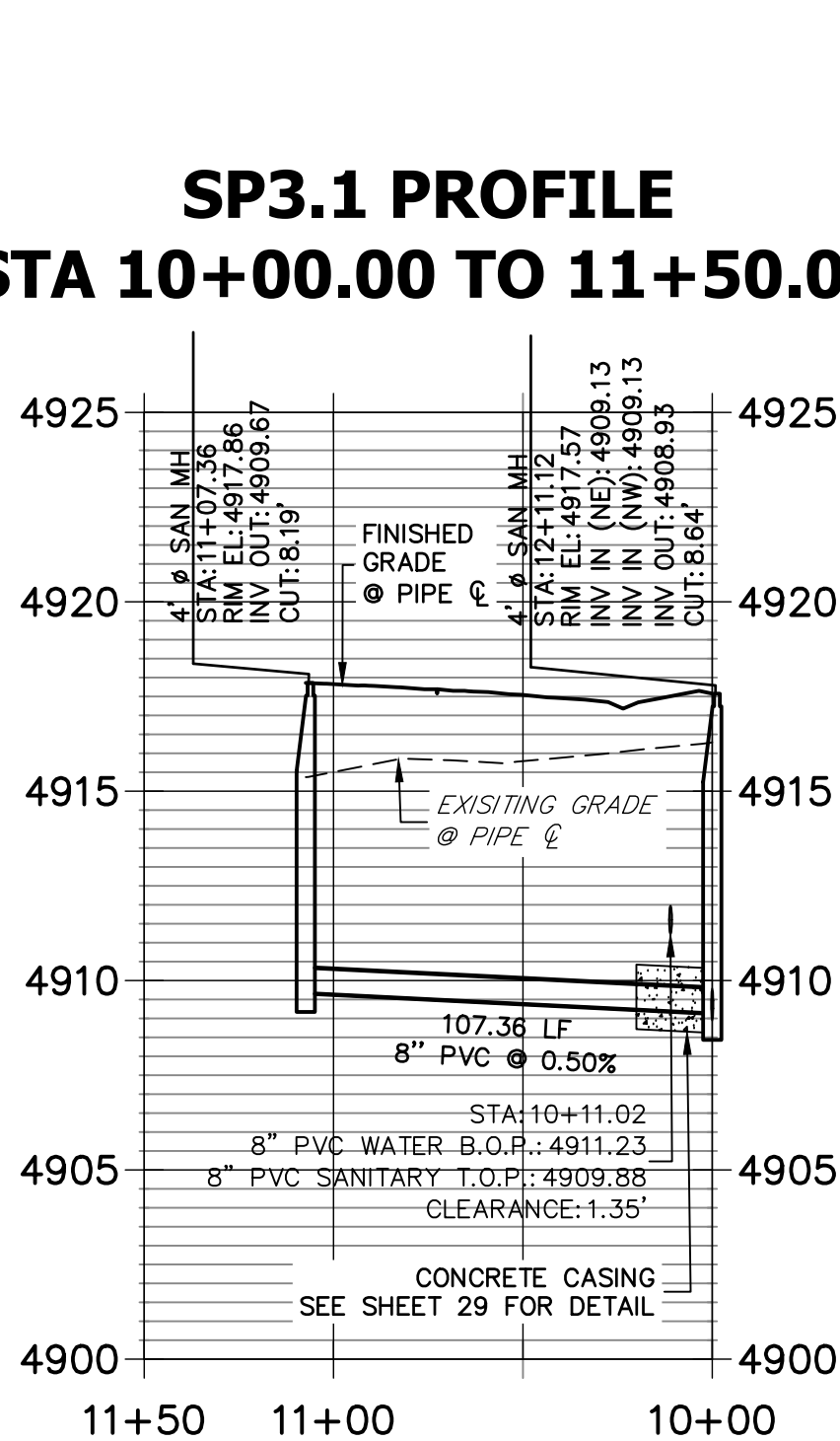
N.T.S.



SP01 PROFILE
STA 10+00.00 TO 15+76.18

SP04 PROFILE
STA 10+00.00 TO 12+50.85

SP3.1 PROFILE
STA 10+00.00 TO 11+50.00



BASIS OF BEARING:

THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED AT THE NORTH END BY A 3-1/4" ALUMINUM CAP STAMPED "1/4 2003 PLS 14823" IN A RANGE BOX AND AT THE SOUTH END BY A #6 REBAR WITH 3-1/4" ALUMINUM CAP STAMP ILLEGIBLE OFF TO THE SIDE IN A RANGE BOX, BEARING N00°16'07"W AS REFERENCED TO COLORADO STATE PLANE NORTH ZONE.

BENCHMARK:

WELD COUNTY BENCHMARK 4907, 3-3/4" PIPE CAP ON PIPE APPROXIMATELY 90 FEET WEST OF THE WESTERLY MOST RAILROAD TRACK AND 26 FEET SOUTH OF THE CENTERLINE OF 9TH STREET, ELEVATION=4908.22 (NAVD88)

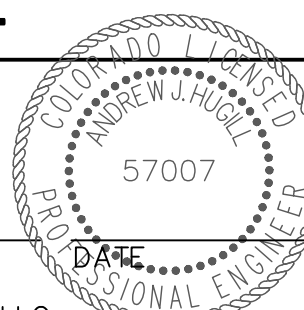
ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

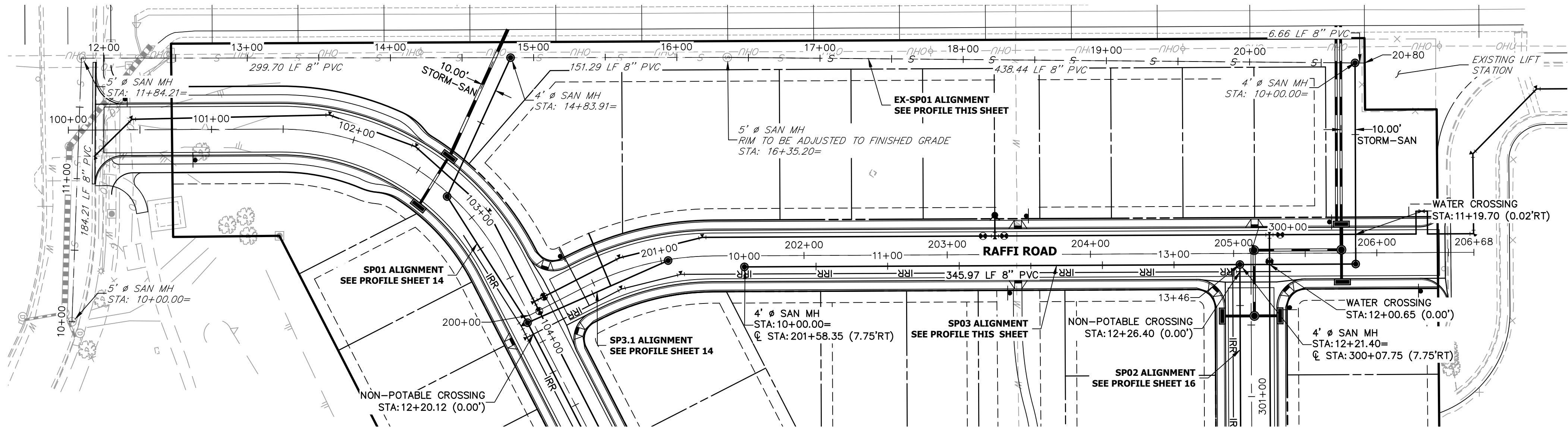
ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



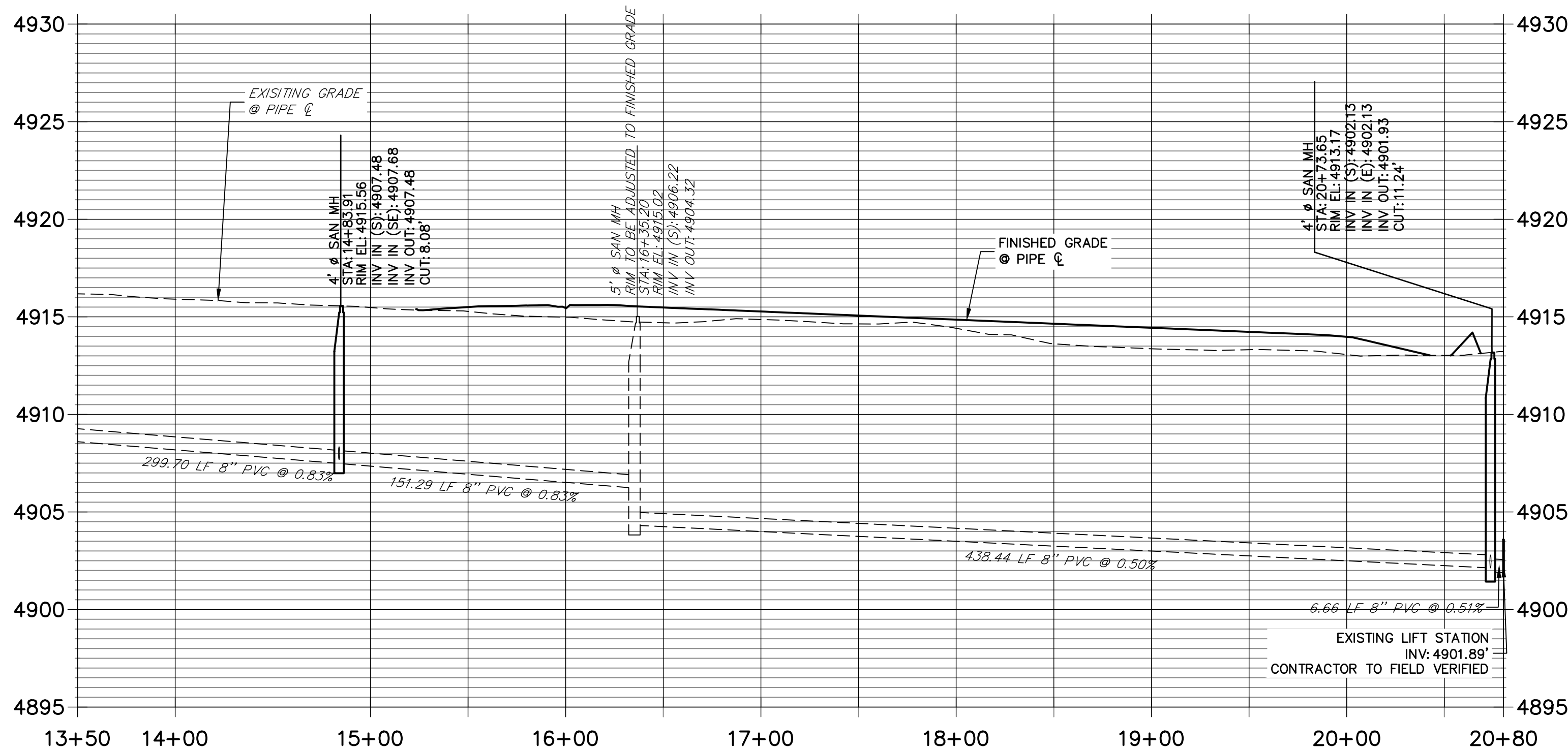
Know what's below.
Call before you dig.



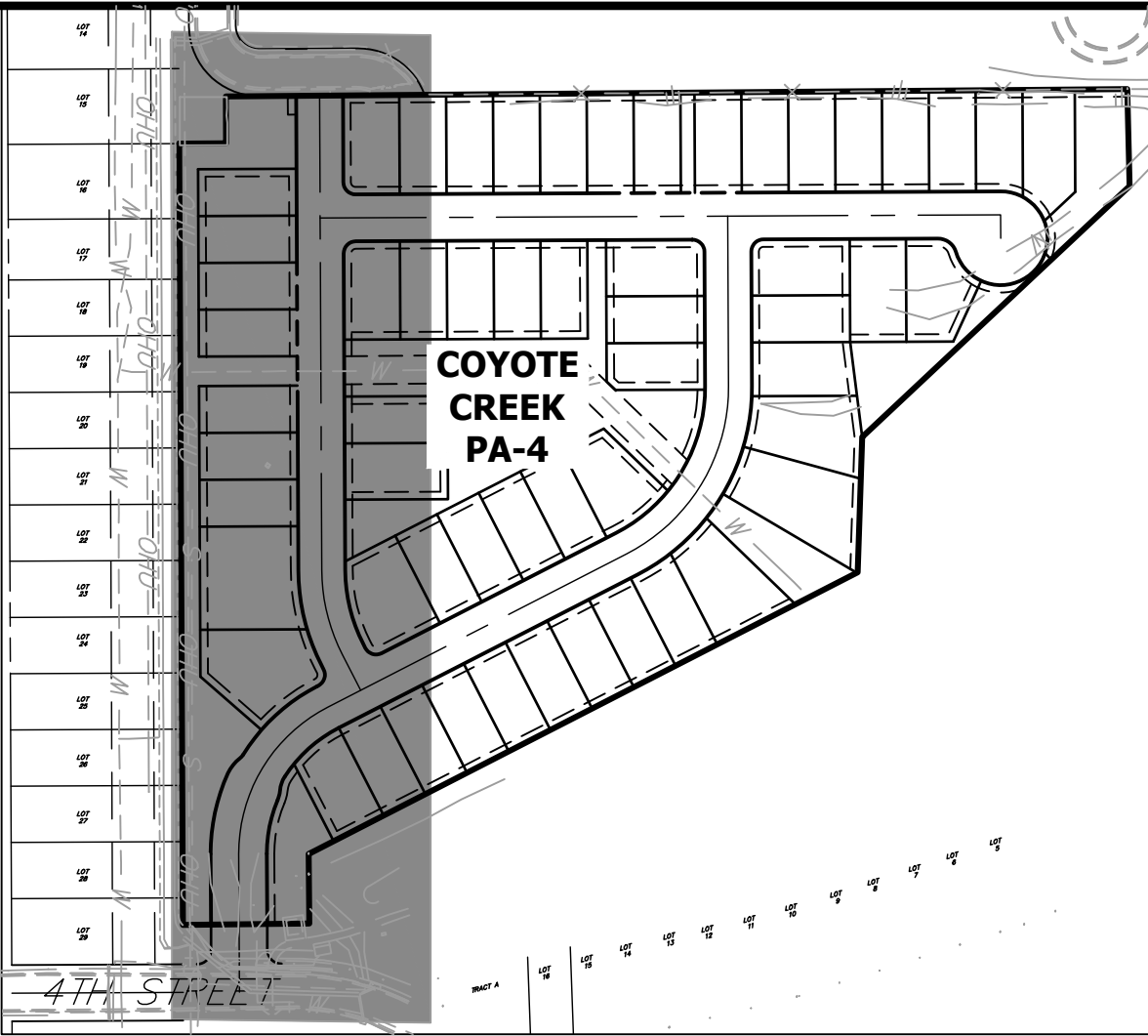
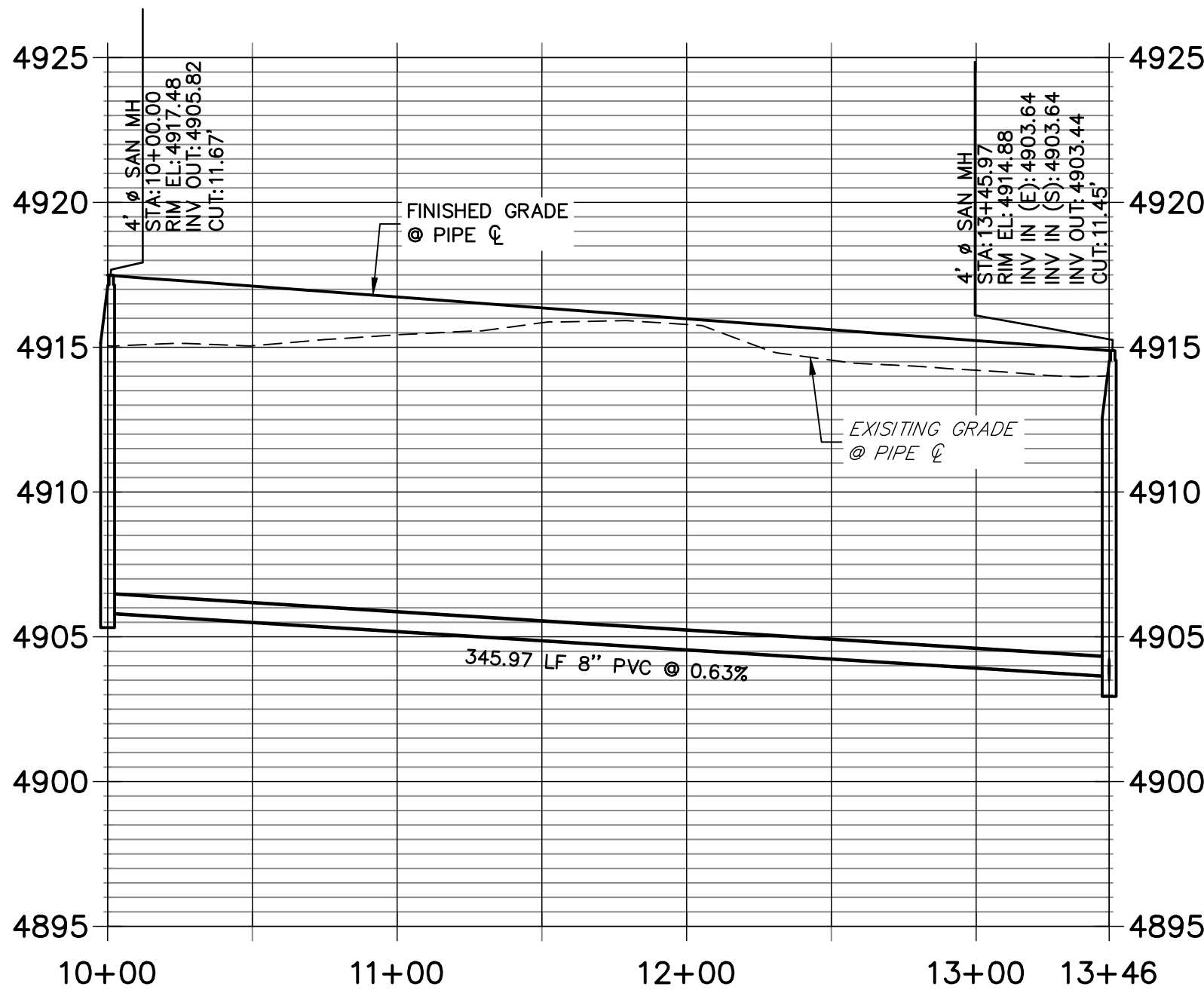
COYOTE CREEK FILING NO 4	SHEET 14 OF 46	JOB NO. 16093.00	DESIGNED BY AHC	DRAWN BY AHC	CHECKED BY	DATE 12/13/21	V-SCALE 1"=5'	H-SCALE 1"=50'	No.	REVISION	BY	DATE	UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USE FOR PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.	PREPARED FOR LUPTON LAND, LLC 10221 PRESTWICK TRAIL LOVE TREE, CO 80124 BOB QUINETTE P-303.587.1966	J.R. ENGINEERING A Western Company  Central 303-740-9383 • Colorado Springs 719-583-2593 Fort Collins 970-491-9888 • www.jrengineering.com



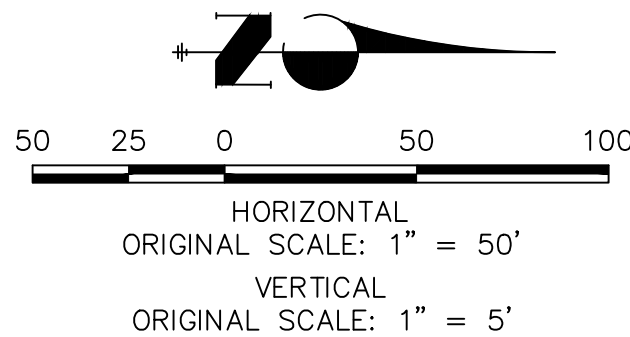
EX-SP01 PROFILE
STA 13+50.00 TO 20+80.31



SP03 PROFILE
STA 10+00.00 TO 13+45.97



KEY MAP
N.T.S.



BASIS OF BEARING:

THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED AT THE NORTH END BY A 3-1/4" ALUMINUM CAP STAMPED "1/4 2003 PLS 14823" IN A RANGE BOX AND AT THE SOUTH END BY A #6 REBAR WITH 3-1/4" ALUMINUM CAP STAMP ILLEGIBLE OFF TO THE SIDE IN A RANGE BOX, BEARING N0016'07"W AS REFERENCED TO COLORADO STATE PLANE NORTH ZONE.

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WELD COUNTY BENCHMARK 4907, 3-3/4" PIPE CAP ON PIPE APPROXIMATELY 90 FEET WEST OF THE WESTERLY MOST RAILROAD TRACK AND 26 FEET SOUTH OF THE CENTERLINE OF 9TH STREET, ELEVATION=4908.22 (NAVD88)

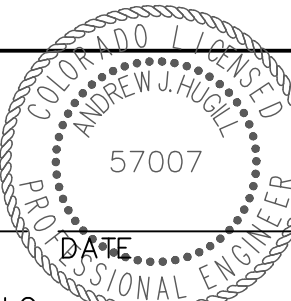
ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

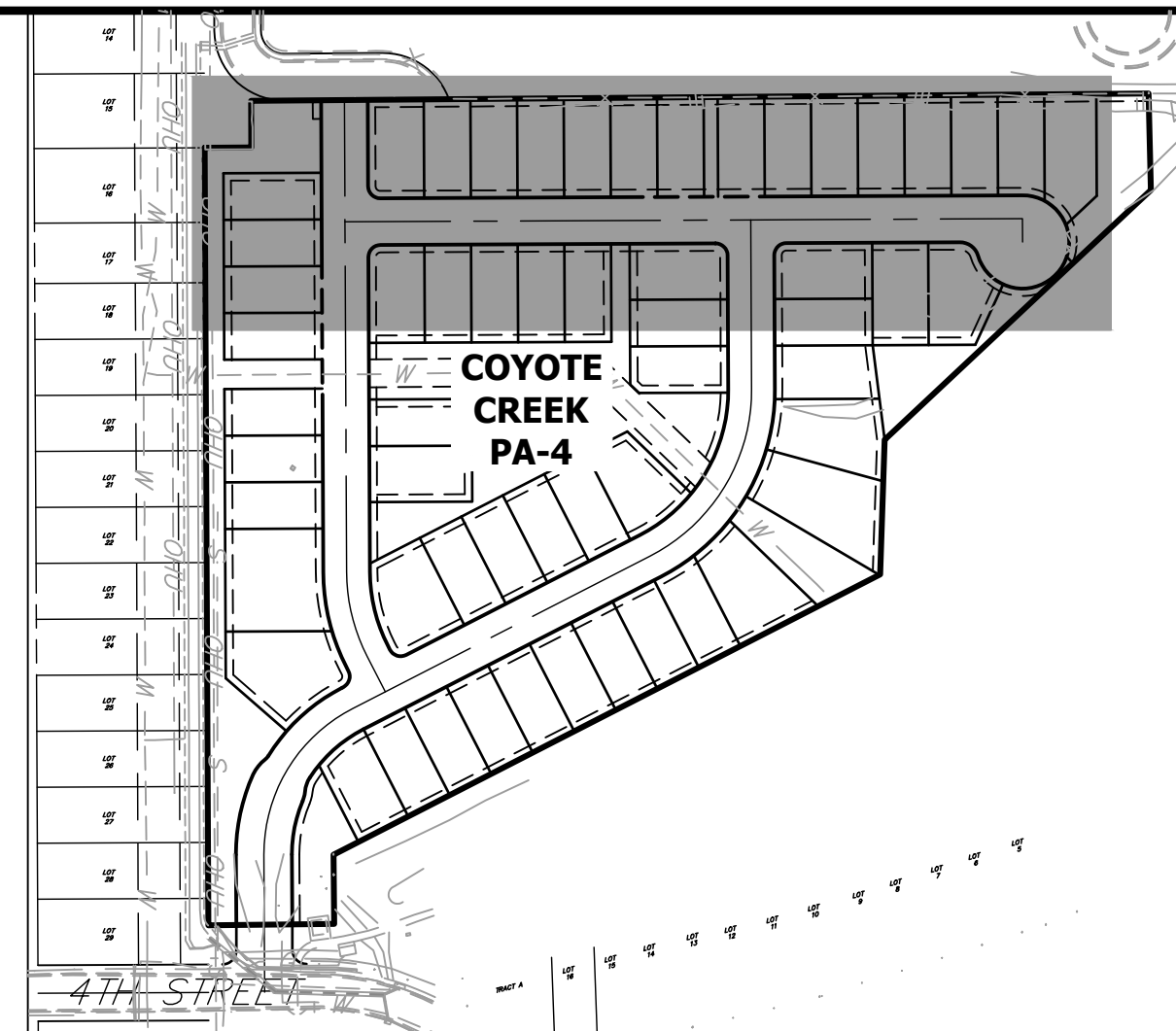


Know what's below.
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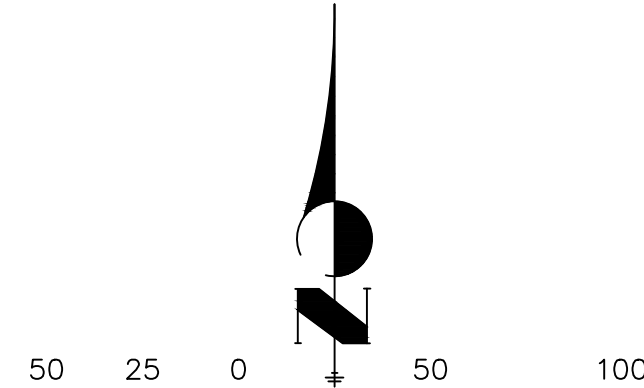


COYOTE CREEK FILING NO 4	SHEET 15 OF 46		JOB NO. 16093.00	
	SANITARY SEWER PLAN & PROFILE			
	DESIGNED BY AHC		DRAWN BY AHC	
	CHECKED BY			
BY		DATE		
No.		REVISION		
H-SCALE	1"=50'	V-SCALE	1"=5'	
DATE	12/13/21	DESIGNED BY	AHC	
DRAWN BY	AHC	CHECKED BY		
PREPARED FOR LUPTON LAND, LLC 10221 PRESTWICK TRAIL LOVE TREE, CO 80124 BOB QUINETTE P-303.587.1966				
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES, THEIR USE FOR ANY PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.				

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N.T.S.



HORIZONTAL
ORIGINAL SCALE: 1" = 50'

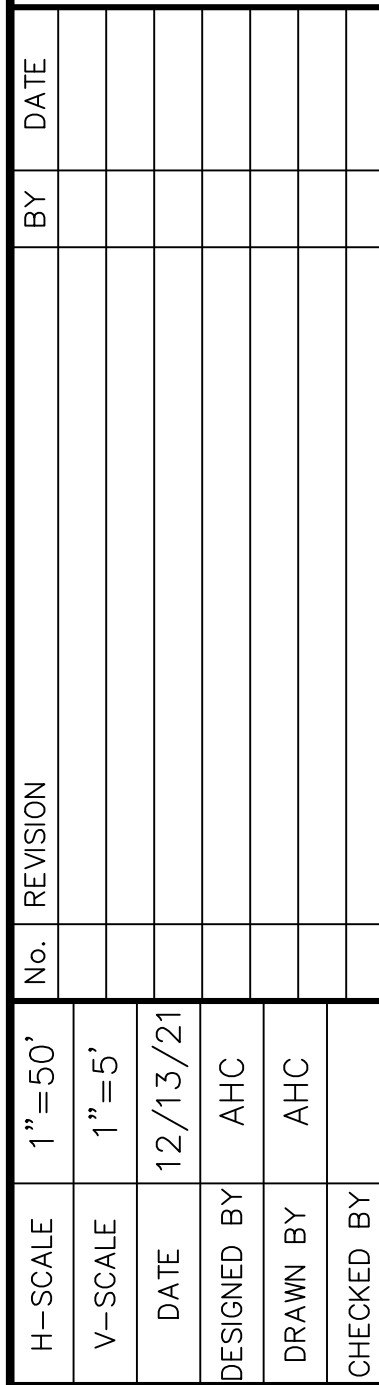
VERTICAL
ORIGINAL SCALE: 1" = 5'

PREPARED FOR

LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

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COYOTE CREEK FILING NO 4

SANITARY SEWER PLAN & PROFILE

SHEET 16 OF 46

JOB NO. 16093.00

THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 5,
TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH
PRINCIPAL MERIDIAN, BEING MONUMENTED AT THE NORTH
END BY A 3-1/4" ALUMINUM CAP STAMPED "1/4 2003 PLS
14823" IN A RANGE BOX AND AT THE SOUTH END BY A #6
REBAR WITH 3-1/4" ALUMINUM CAP STAMP ILLEGIBLE OFF
TO THE SIDE IN A RANGE BOX, BEARING N00°16'07"W AS
REFERENCED TO COLORADO STATE PLANE NORTH ZONE.

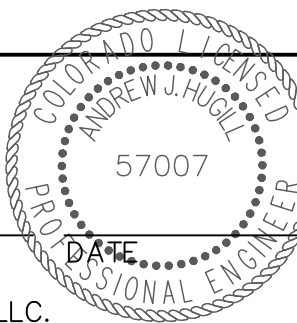
WELD COUNTY BENCHMARK 4907, 3-3/4" PIPE CAP ON
PIPE APPROXIMATELY 90 FEET WEST OF THE WESTERLY
MOST RAILROAD TRACK AND 26 FEET SOUTH OF THE
CENTERLINE OF 9TH STREET, ELEVATION=4908.22 (NAVD88)

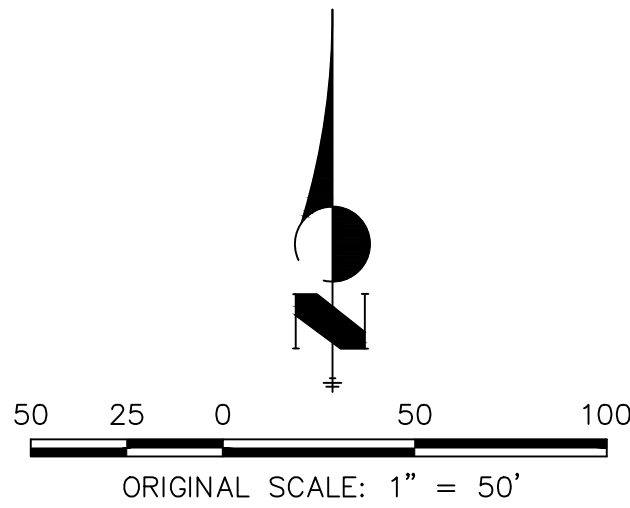
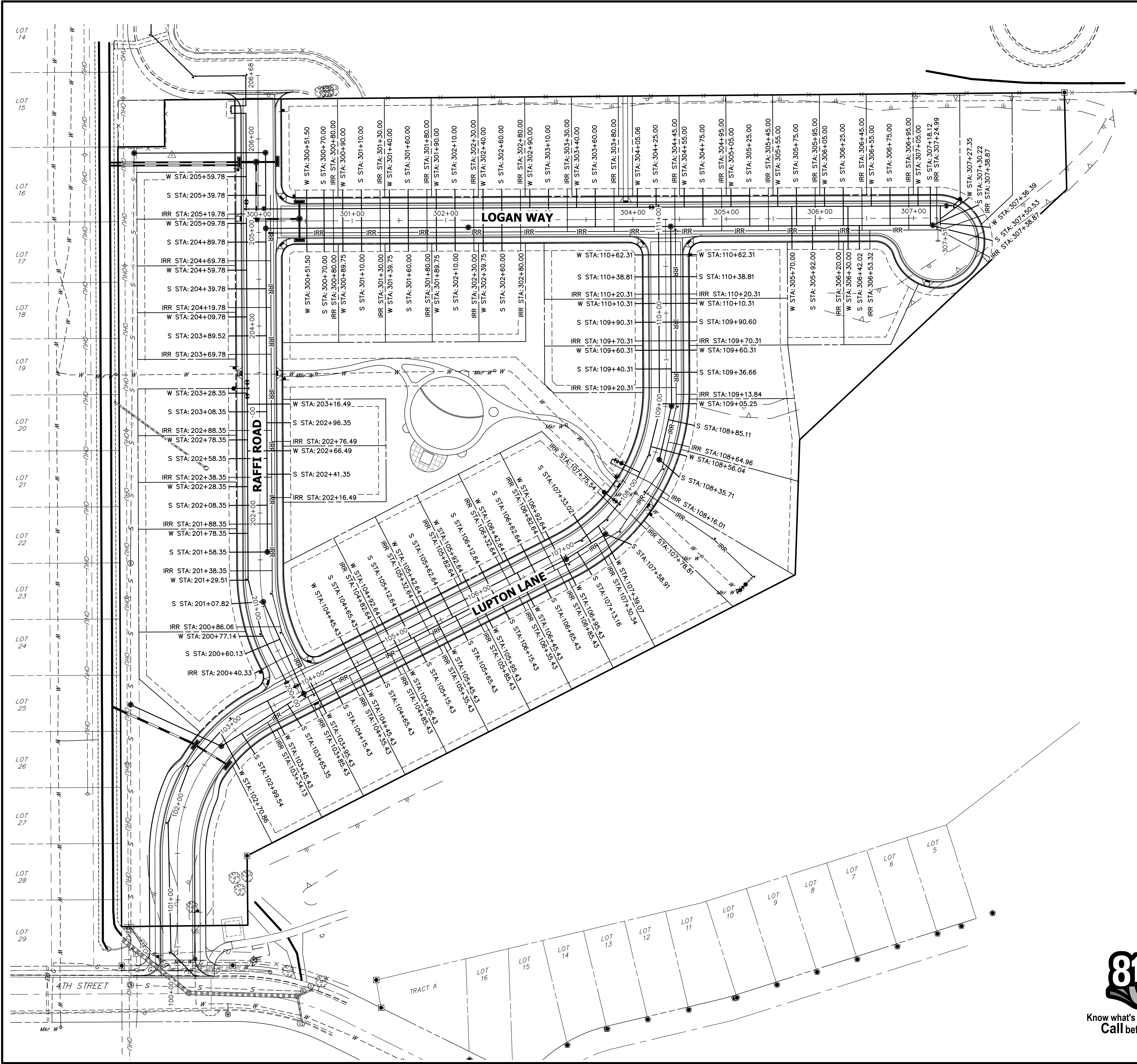
PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



Know what's **below**.
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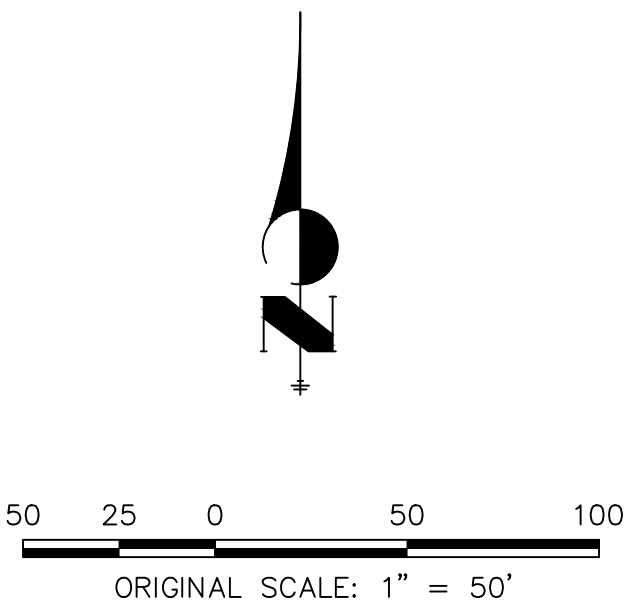


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COYOTE CREEK FILING NO. 4		H-SCALE		1"=50'		No.		REVISION		BY		DATE		J-R ENGINEERING A Western Company Central 303-740-9888 • Colorado Springs 719-583-2583 Fort Collins 970-491-9888 • www.jrengineering.com		PREPARED FOR LUPTON LAND, LLC 10221 PRESTWICK TRAIL LOVE TREE, CO 80124 BOB QUINETTE 303-587-1966		UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE FOR OTHER THAN THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.	
V-SCALE		N/A																	
DATE		12/13/21																	
DESIGNED BY		AJH																	
DRAWN BY		SWW																	
CHECKED BY																			
SERVICE PLAN																			
SHEET 17 OF 46																			
JOB NO. 16093.00																			



BASIN SUMMARY TABLE							
Tributary	Area	Percent			t _c	Q _s	Q ₁₀₀
Sub-basin	(acres)	Impervious	C _s	C ₁₀₀	(min)	(cfs)	(cfs)
A1	2.33	52%	0.49	0.64	13.0	3.9	9.8
A2	1.80	62%	0.57	0.70	11.4	3.8	8.8
A3	0.48	64%	0.60	0.73	9.7	1.1	2.6
A4	2.94	56%	0.52	0.66	11.1	5.7	13.8
A5	3.88	51%	0.49	0.64	13.7	6.4	16.1
B1	1.46	29%	0.32	0.53	13.8	1.6	5.0
B2	0.17	69%	0.63	0.74	5.0	0.5	1.2



COYOTE CREEK FILING NO. 4

YOTE CREEK FILING NO.

FINAL DRAINAGE PLAN

SHEET 18 OF 27

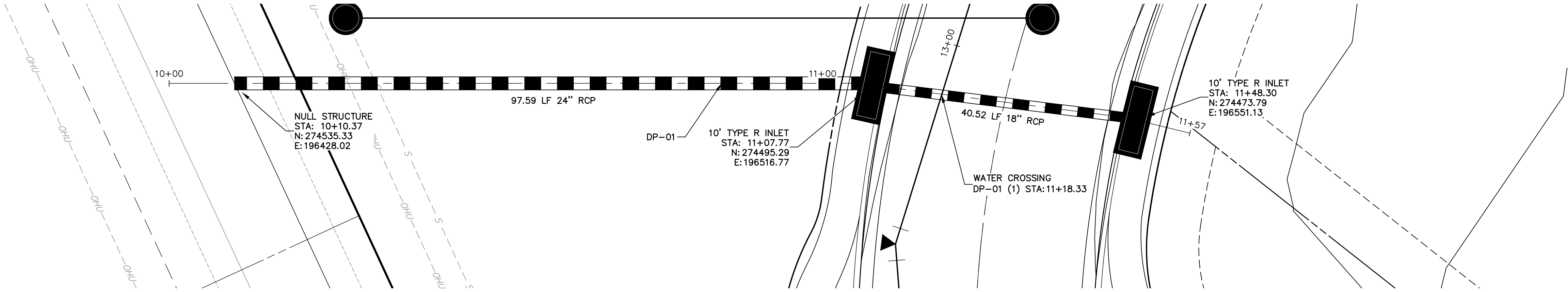
JOB NO. 16093.00

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

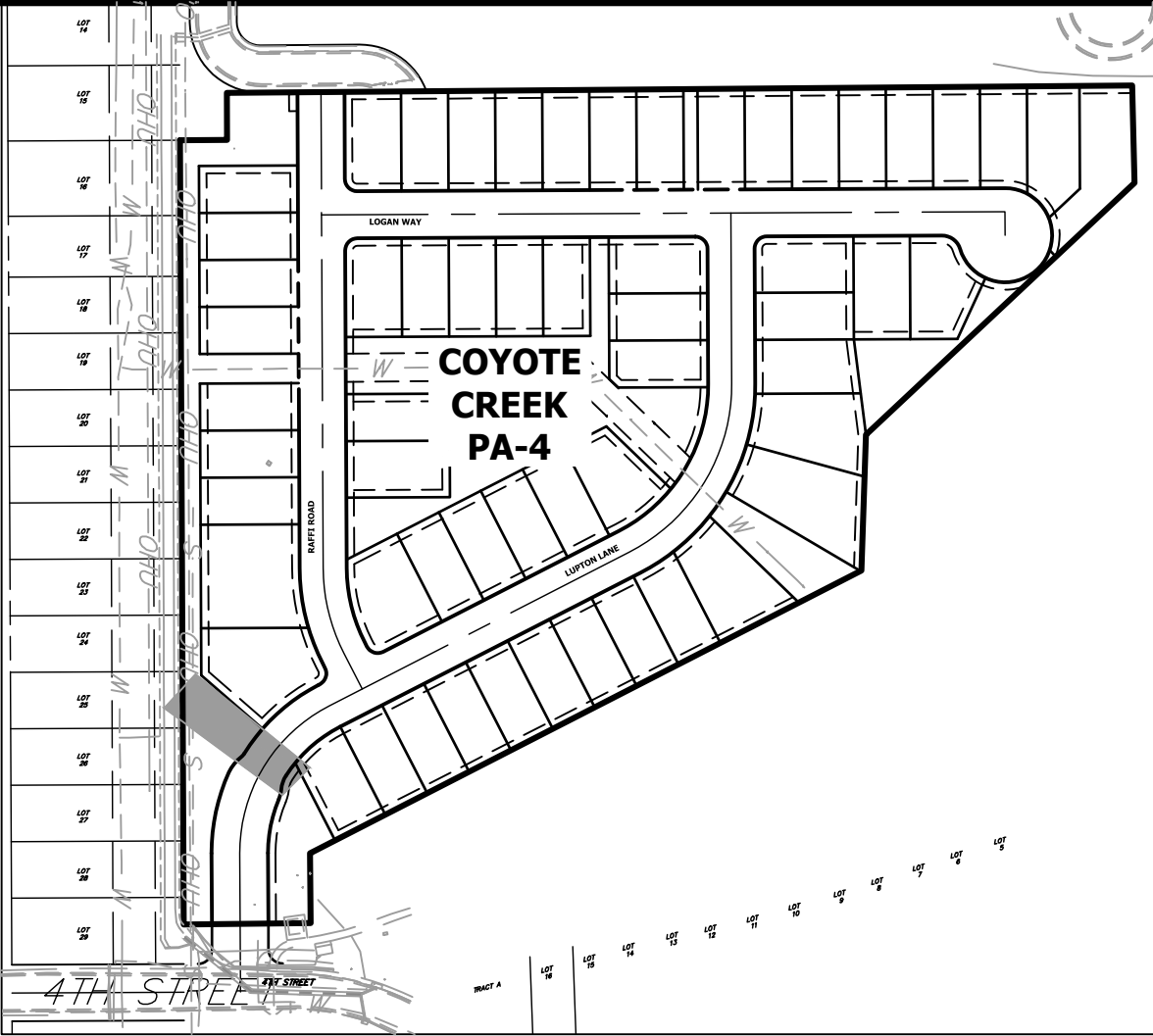
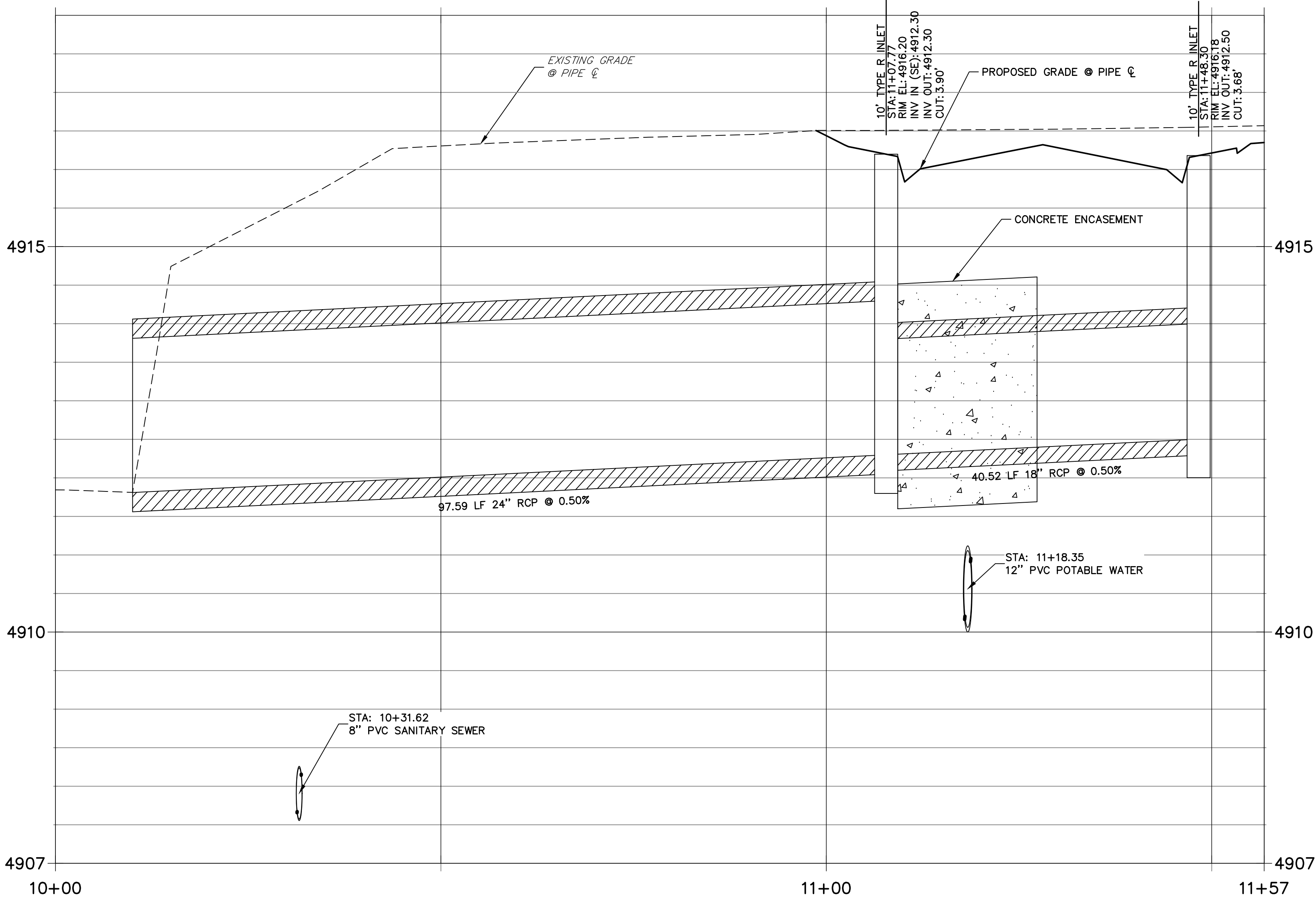
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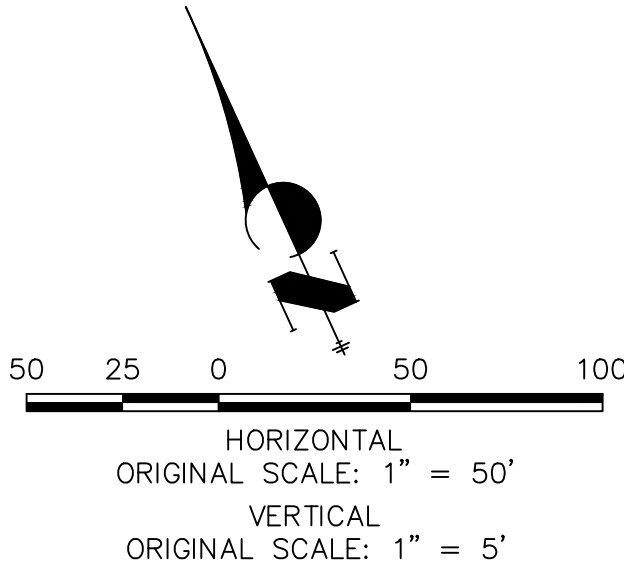
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.



DP-01 PROFILE
STA 10+00.00 TO 11+56.80



KEY MAP
N.T.S.



UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USES DESIGNATED BY WRITTEN AUTHORIZATION.

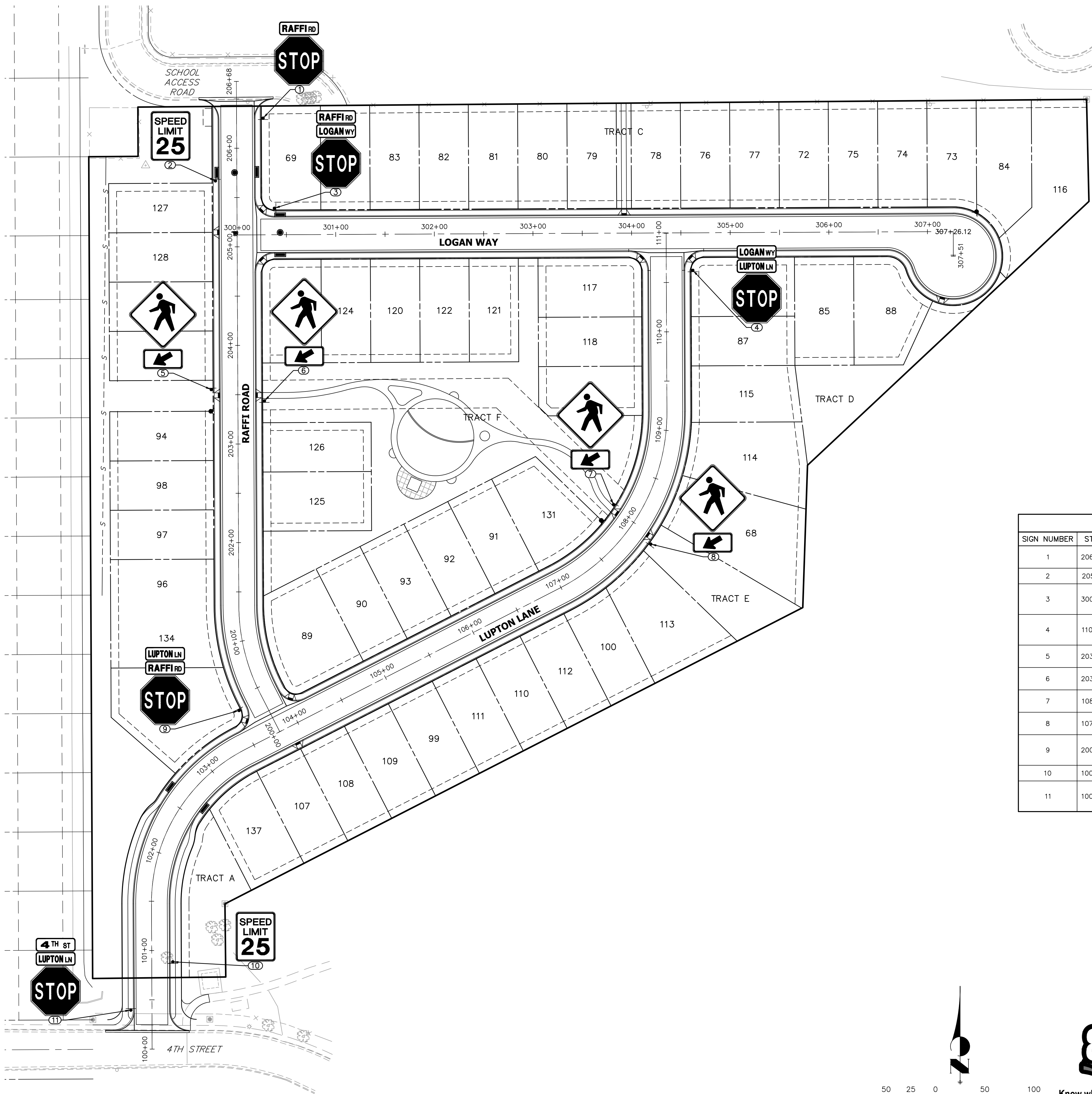
PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

**J.R. ENGINEERING**
A Western Company

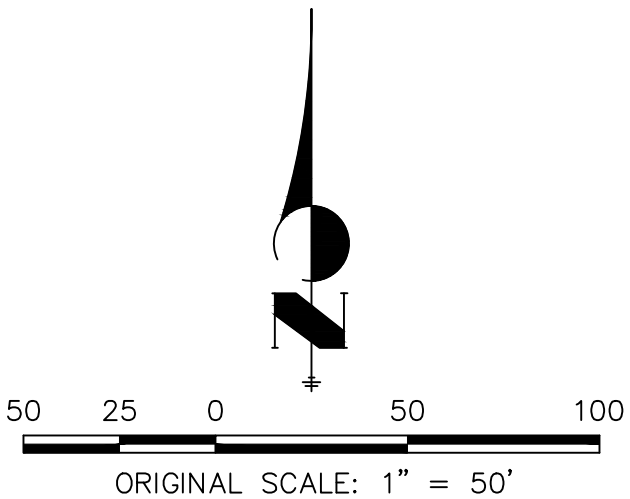
Central 303-740-9888 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

COYOTE CREEK FILING NO 4	H-SCALE	1"=50'
	V-SCALE	1"=5'
	DATE	12/13/21
	DESIGNED BY	AJH
	DRAWN BY	AJH
STORM SEWER PLAN & PROFILE	CHECKED BY	

SHEET	7	OF	46
JOB NO.	16093.00		



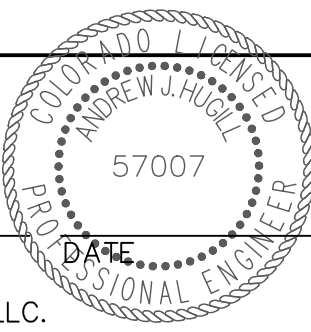
SIGN TABULATION				
SIGN NUMBER	STATION	OFFSET	ALIGNMENT	DESCRIPTION
1	206+30.47	26.92' (R)	CL- RAFFI ROAD	24"x8" D3-1 30"x30" R1-1
2	205+67.01	21.71' (L)	CL- RAFFI ROAD	24"x30" R2-1
3	300+37.95	26.92' (L)	CL- LOGAN WAY	24"x8" D3-1 24"x8" D3-1 30"x30" R1-1
4	110+62.27	26.92' (R)	CL- LUPTON LANE	24"x8" D3-1 24"x8" D3-1 30"x30" R1-1
5	203+55.33	26.92' (L)	CL- RAFFI ROAD	30"x30" W11-2 24"x12" W16-7PL
6	203+43.59	26.92' (R)	CL- RAFFI ROAD	30"x30" W11-2 24"x12" W16-7PL
7	108+04.15	26.92' (L)	CL- LUPTON LANE	30"x30" W11-2 24"x12" W16-7PL
8	107+92.39	26.92' (R)	CL- LUPTON LANE	30"x30" W11-2 24"x12" W16-7PL
9	200+38.00	26.92' (L)	CL- RAFFI ROAD	24"x8" D3-1 24"x8" D3-1 30"x30" R1-1
10	100+88.43	21.42' (R)	CL- LUPTON LANE	24"x30" R2-1
11	100+39.67	21.42' (L)	CL- LUPTON LANE	24"x8" D3-1 24"x8" D3-1 30"x30" R1-1



ENGINEER'S STATEMENT

PREPARED UNDER MY DIRECT SUPERVISION

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



COYOTE CREEK FILING NO. 4

SIGNAGE PLAN

SHEET 22 OF 46

JOB NO. 16093.00

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APPROPRIATE REVIEWING
AGENCIES, OR ENGINEERING
APPROVES THEIR USE FOR
ANY PURPOSES
DESIGNATED BY WRITTEN
AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

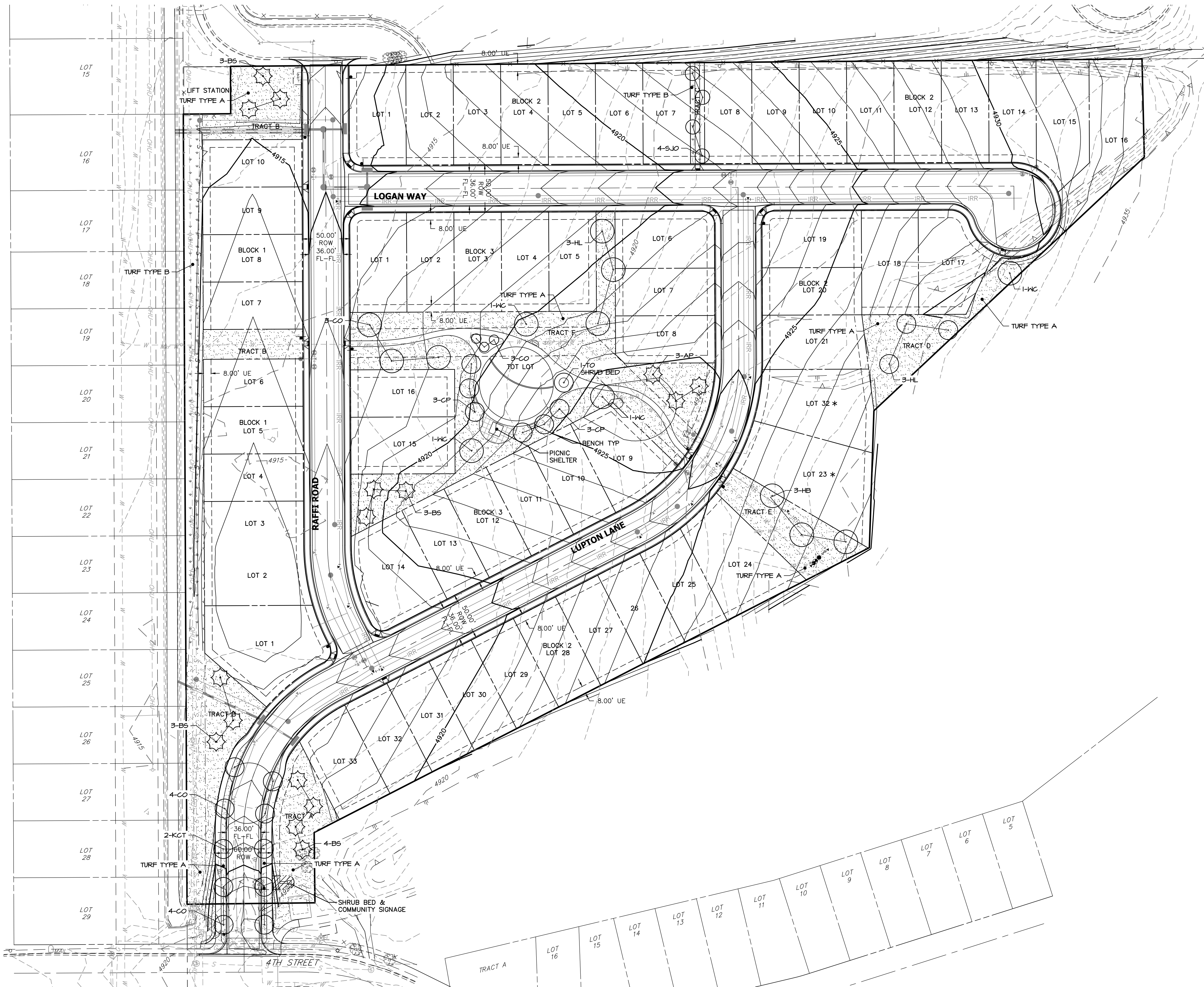
J.R. ENGINEERING
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BY	DATE	REVISION	No.	1"=50'	H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
				N/A			12/13/21	AJH	CRB	

COYOTE CREEK FILING NO. 4

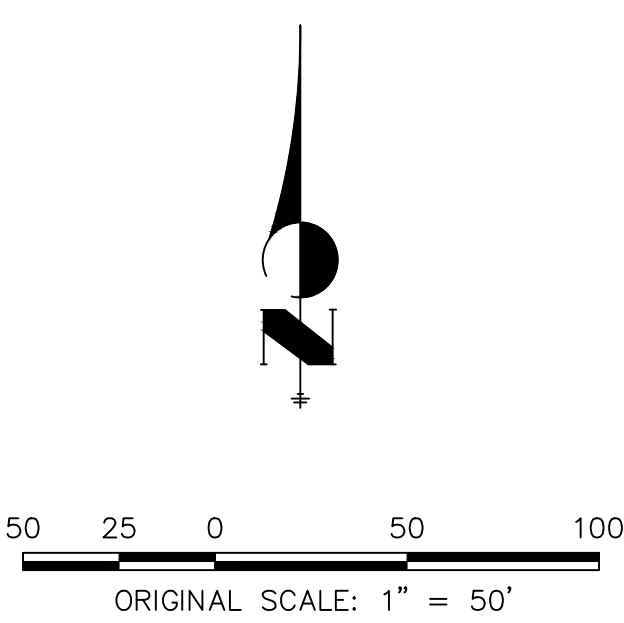


LANDSCAPE LEGEND

- EXISTING CONIFEROUS TREE TO BE PRESERVED
- EXISTING DECIDUOUS TREE TO BE PRESERVED
- PROPOSED MINOR/1' CONTOUR
- PROPOSED MAJOR/5' CONTOUR
- STEEL HEADER
- TURF TYPE A: IRRIGATED HYBRID KENTUCKY X TEXAS BLUE GRASS SOD, TURF MASTER ENVIROTURF OR APPROVED EQUAL
- TURF TYPE B: DROUGHT TOLERANT IRRIGATED TURF SEED MIX
- CONIFEROUS TREE 6' HGT
- DECIDUOUS STREET/ SHADE TREE, 2" CALIPER
- ORNAMENTAL TREE, 1 1/2" CALIPER SIZE
- STOP SIGN OR PARKING SIGN
- FIRE HYDRANT

SITE LEGEND

- BOUNDARY LINE
- PROPERTY LINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- RIGHT OF WAY
- EXISTING WOODEN FENCE
- EXISTING GAS MAIN
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- PROPOSED ELECTRIC
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- EXISTING CURB AND GUTTER
- PROPOSED SIGN
- PROPOSED CURB AND GUTTER
- EXISTING STREET LIGHTS
- PROPOSED STREET LIGHT
- 3/4" METER VAULTS
- FIRE HYDRANT



Know what's below.
Call before you dig.

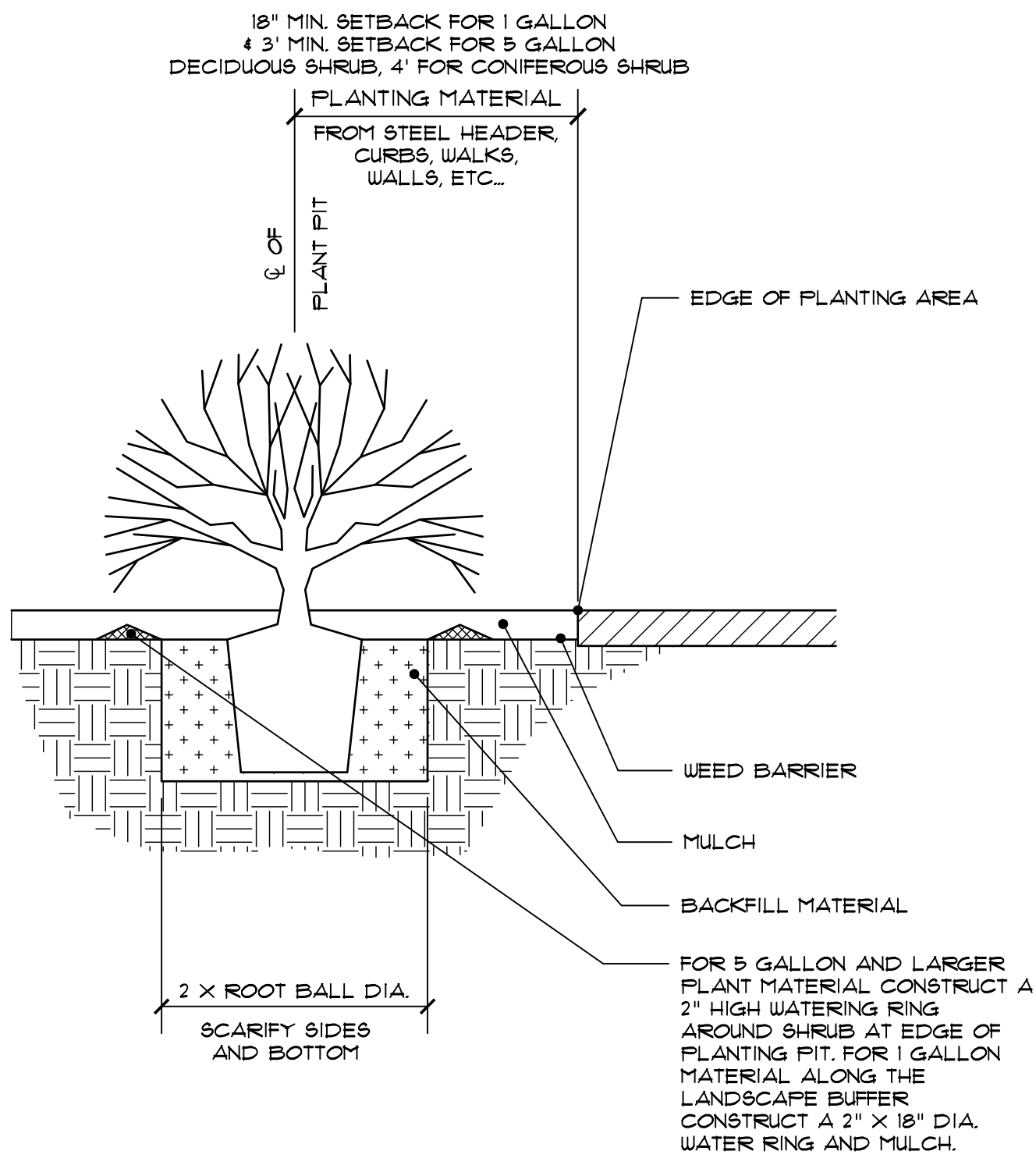
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

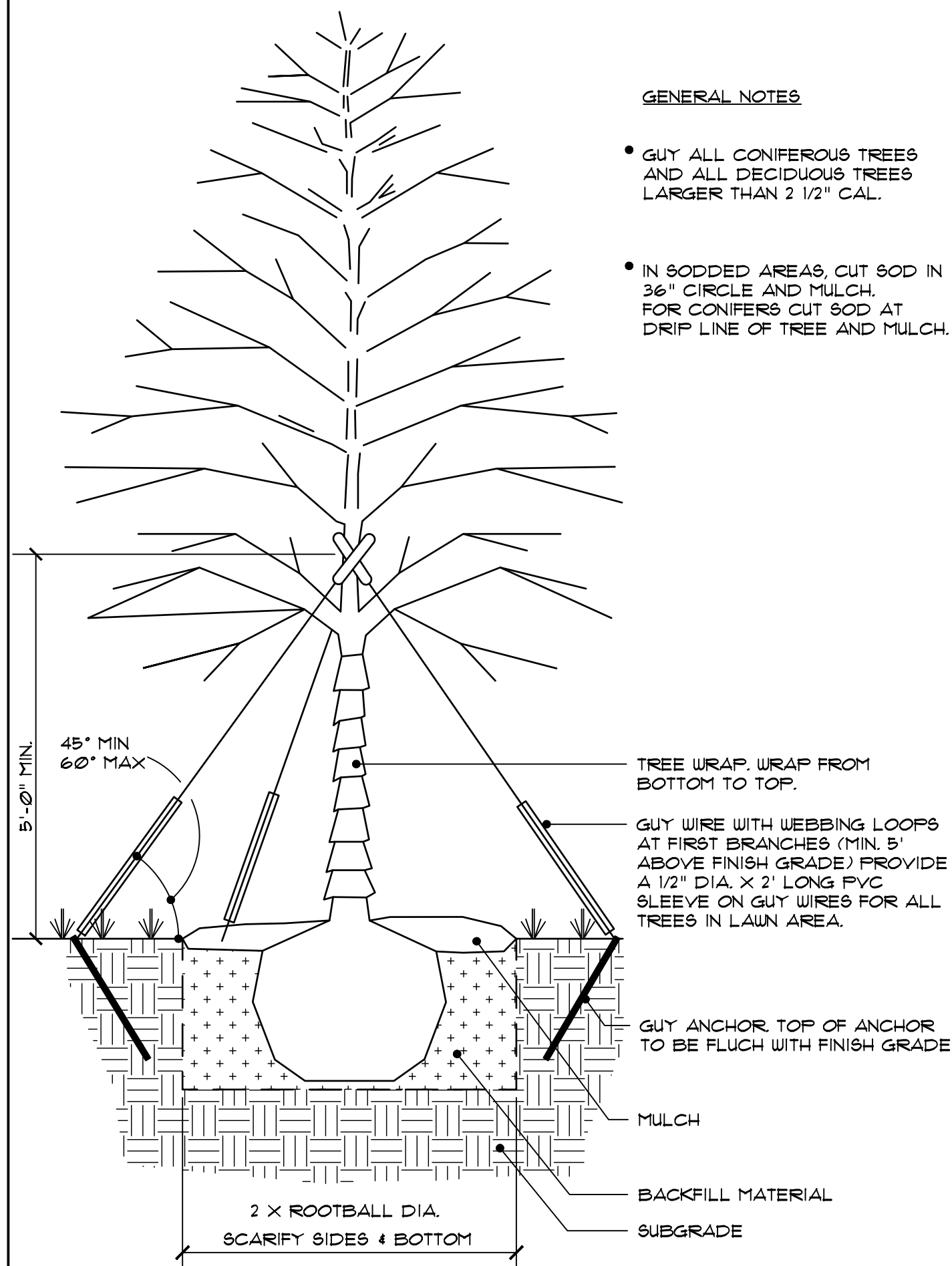
J.R. ENGINEERING
A Western Company


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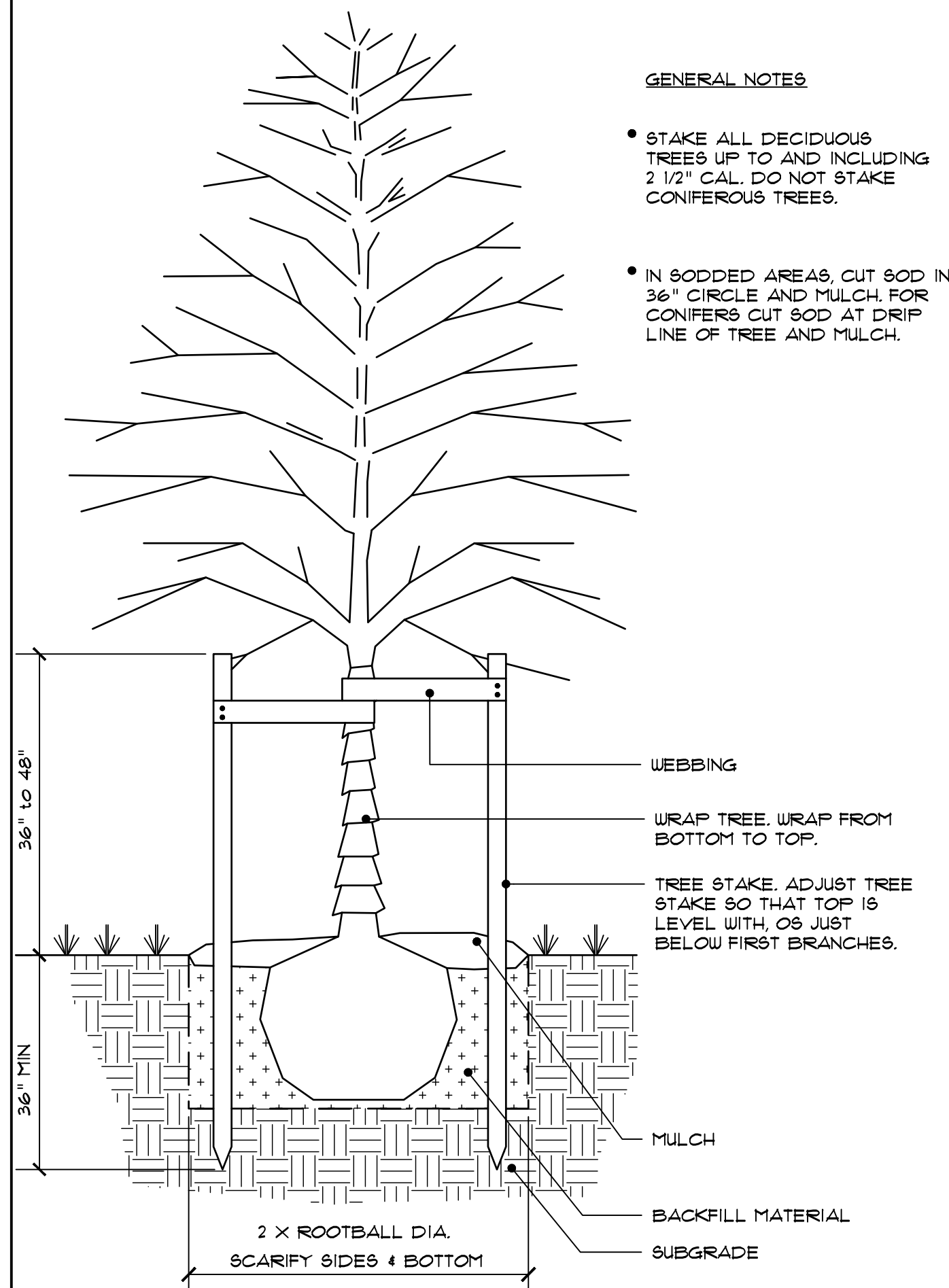
No.	REVISION	BY	DATE	1"=50'		1"=X'		DATE	DESIGNED BY	DRAWN BY	CHECKED BY
				H-SCALE	V-SCALE	12/13/21	A/JH				
COYOTE CREEK FILING NO. 4				LANDSCAPE PLAN							
SHEET 23 OF 46				JOB NO. 16093.00							



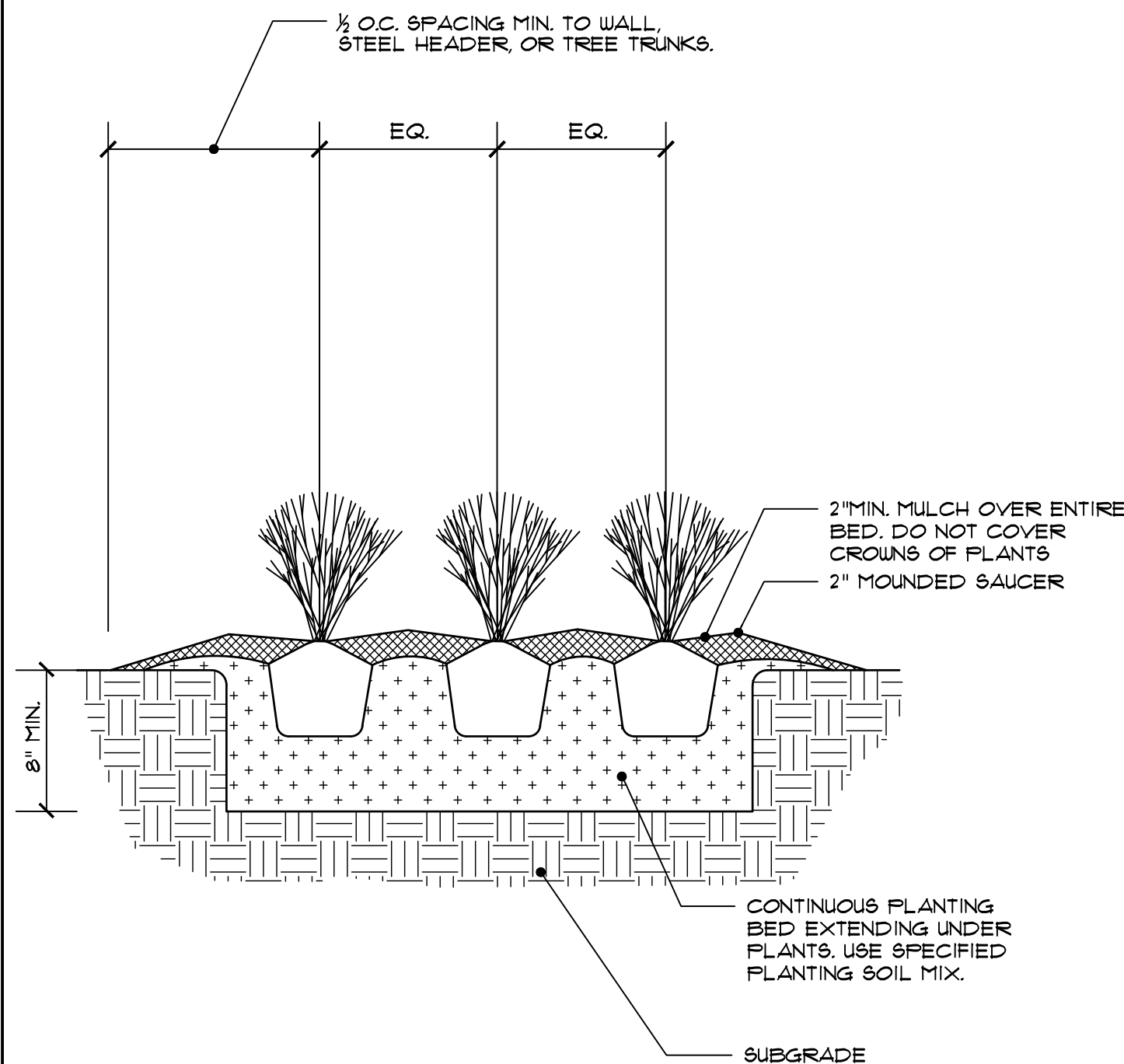
A SHRUB PLANTING



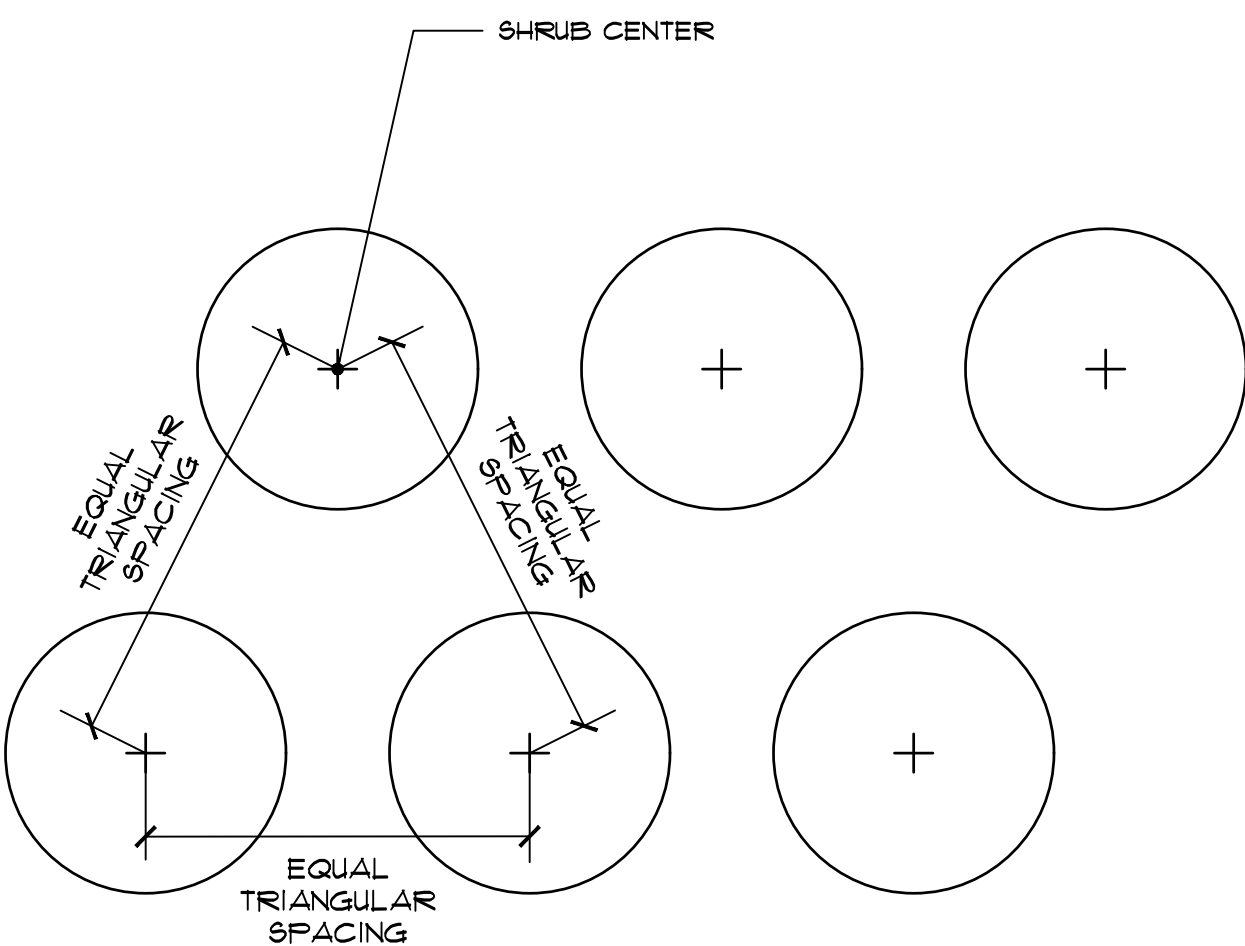
B TREE PLANTING AND GUYING



C TREE PLANTING AND STAKING



D PERENNIAL PLANTING



E TRIANGULAR SHRUB SPACING

CONIFEROUS TREES

Quantity	Symbol	Common Name	Botanical Name	Mitigation Size	Cont.	Kc Value	Species Diversity
6	AP	Austrian Pine	Pinus Nigra	8' HGT.	B4B	L	
3	BS	Colorado Blue Spruce	Picea pungens 'Colorado Blue'	8' Hgt.	B4B	L	

DECIDUOUS TREES

Quantity	Symbol	Common Name	Botanical Name	Size	Cond.	Kc Value	Species Diversity
8	CO	Chinkapin Oak	Quercus muhlenbergii	2" Cal	B4B	M	
3	HB	Hackberry	Celtis occidentalis	2" Cal	B4B	L	
5	KCT	Kentucky Coffeetree	Gymnocladus dioica 'Espresso'	2" Cal	B4B	L	
3	WC	Western Catalpa	Catalpa speciosa	3" Cal	B4B	L	
1	TRO	Texas Red Oak	Quercus buckleyi	2" Cal	B4B	L	
4	SJO	Skippy Jeans Oak	Quercus	2" Cal	B4B	L	

ORNAMENTAL TREES

Quantity	Symbol	Common Name	Botanical Name	Size	Cond.	Kc Value	Species Diversity
6	CP	Chanticleer Pear	Pyrus calleryana 'Chanticleer'	2" Cal	B4B	M	
3	ABS	Autumn Brilliance Serviceberry	Amelanchier x 'Autumn Brilliance'	1 1/2" Cal	B4B	M	

33 Total Trees

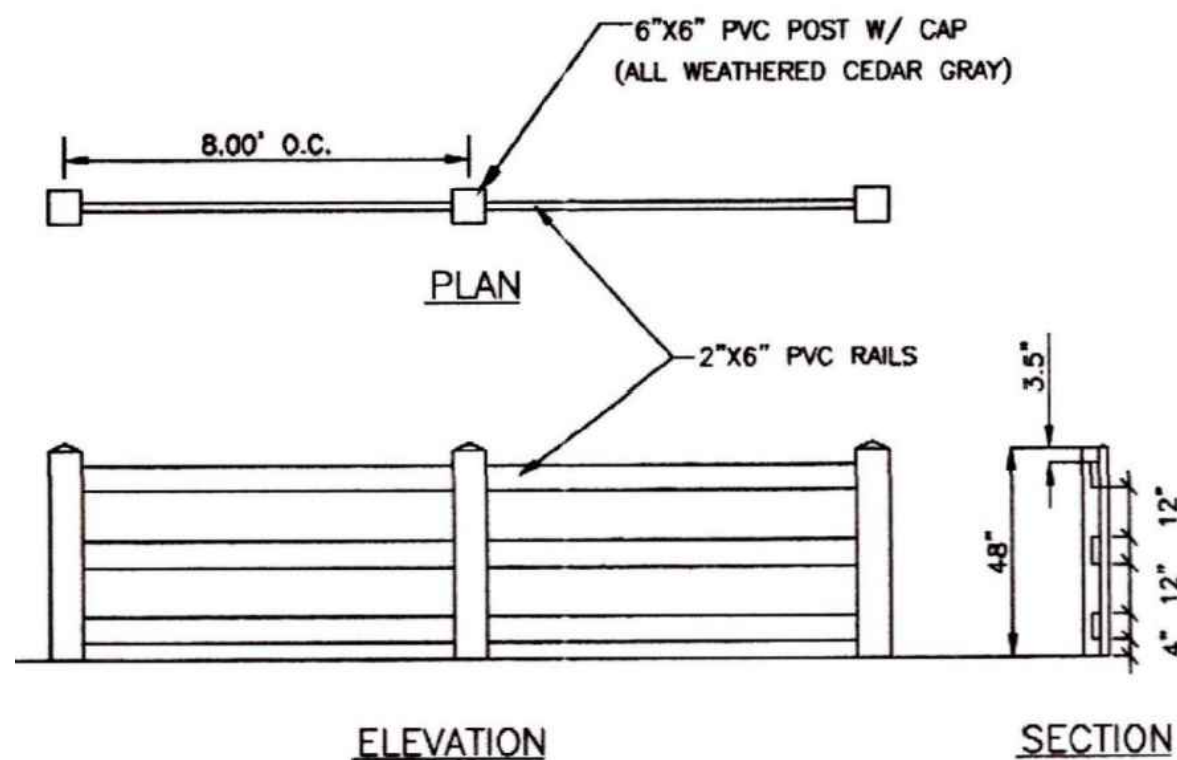
100%

TURF TYPE A: DROUGHT TOLERANT IRRIGATED SOD MIX

HYBRID KENTUCKY x TEXAS BLUEGRASS BEING A MIX OF 100% TEXAS BLUEGRASS HYBRID SEED. THE SEED SOURCE & TURF BASED MIX FOR SOD SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT BEFORE INSTALLATION OF SOD.

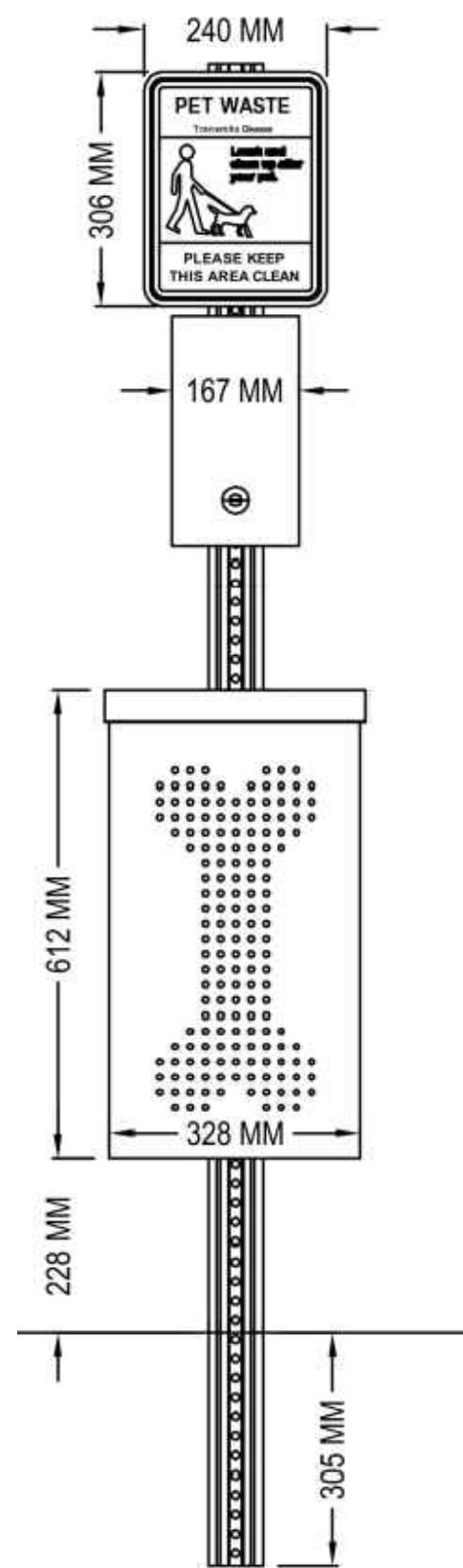
TURF TYPE B: DROUGHT TOLERANT IRRIGATED TURF SEED MIX

30% EPHRAIM CRESTED WHEATGRASS, 25% DWARF PERENNIAL RYEGRASS, 20% SR3200 BLUE FESCUE, 15% REUBENS CANADA BLUEGRASS, 10% CHEWINGS FESCUE.
TOTAL: 15 LBS/ACRE (DRILLED) = 55 SEEDS/SF



SPLIT RAIL FENCE

SCALE: NTS



DOG WASTE STATION

SCALE: NTS

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
ROB QUINETTE
P-303.587.1966

J.R. ENGINEERING
A Western Company
Central 303-740-9383 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

BY	DATE	REVISION	No.	N/A	N/A	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
						12/15/21	AUH	AUH	

COYOTE CREEK FILING NO. 4

LANDSCAPE DETAILS

SHEET 24 OF 46

JOB NO. 16093.00

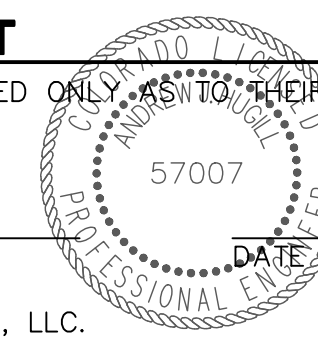
 CITY OF Fort Lupton EST. 1836 COME PAINT YOUR FUTURE WITH US	DESIGN STANDARDS	STANDARD DRAWING
	AREA INLET PROTECTION USING GRAVEL FILTER	EC 7 DATE: 8/15/14

 CITY OF Fort Lupton EST. 1836 COME PAINT YOUR FUTURE WITH US.	DESIGN STANDARDS	STANDARD DRAWING
	VEHICLE TRACKING PAD	EC 8 DATE: 8/15/14

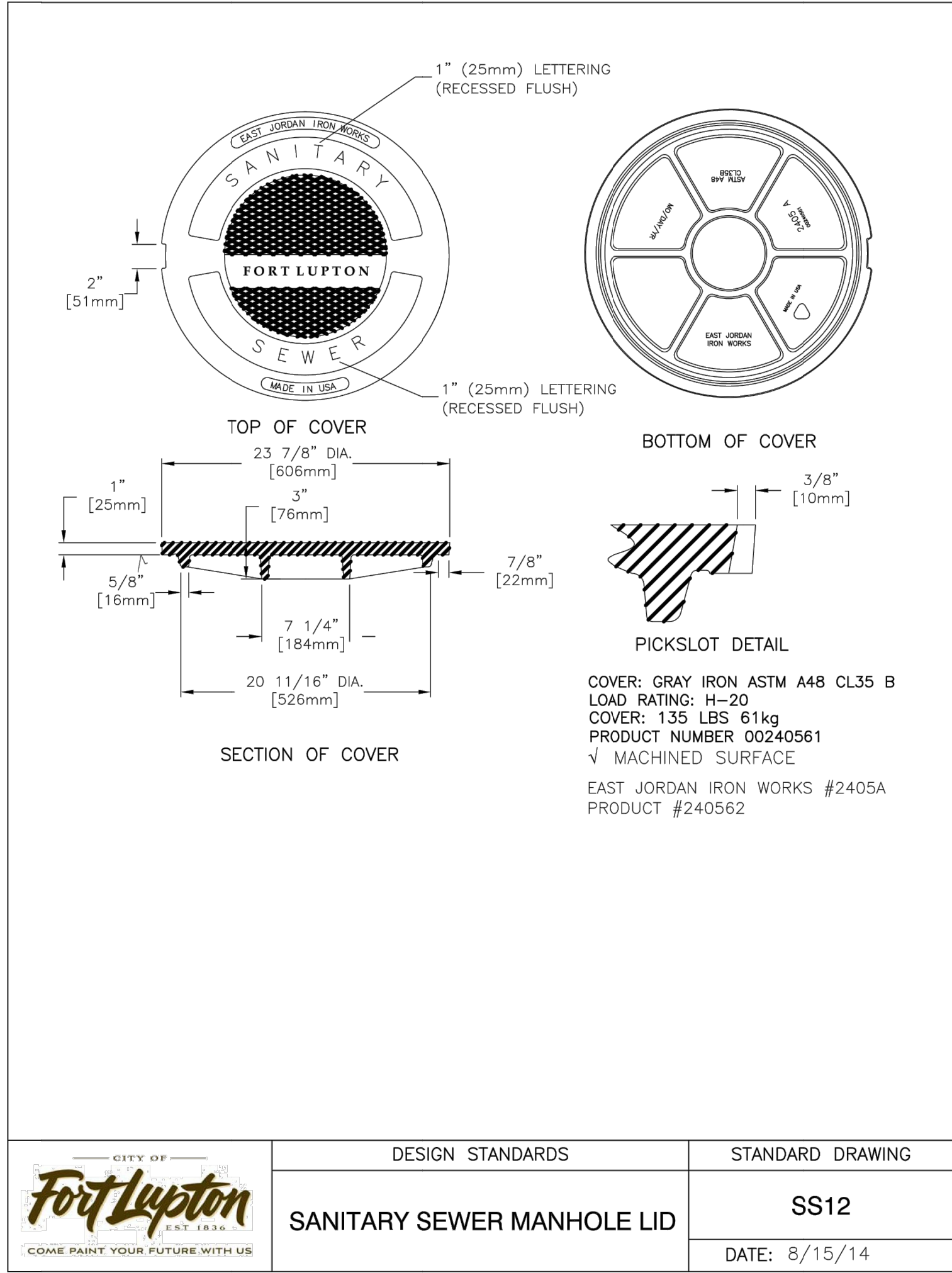
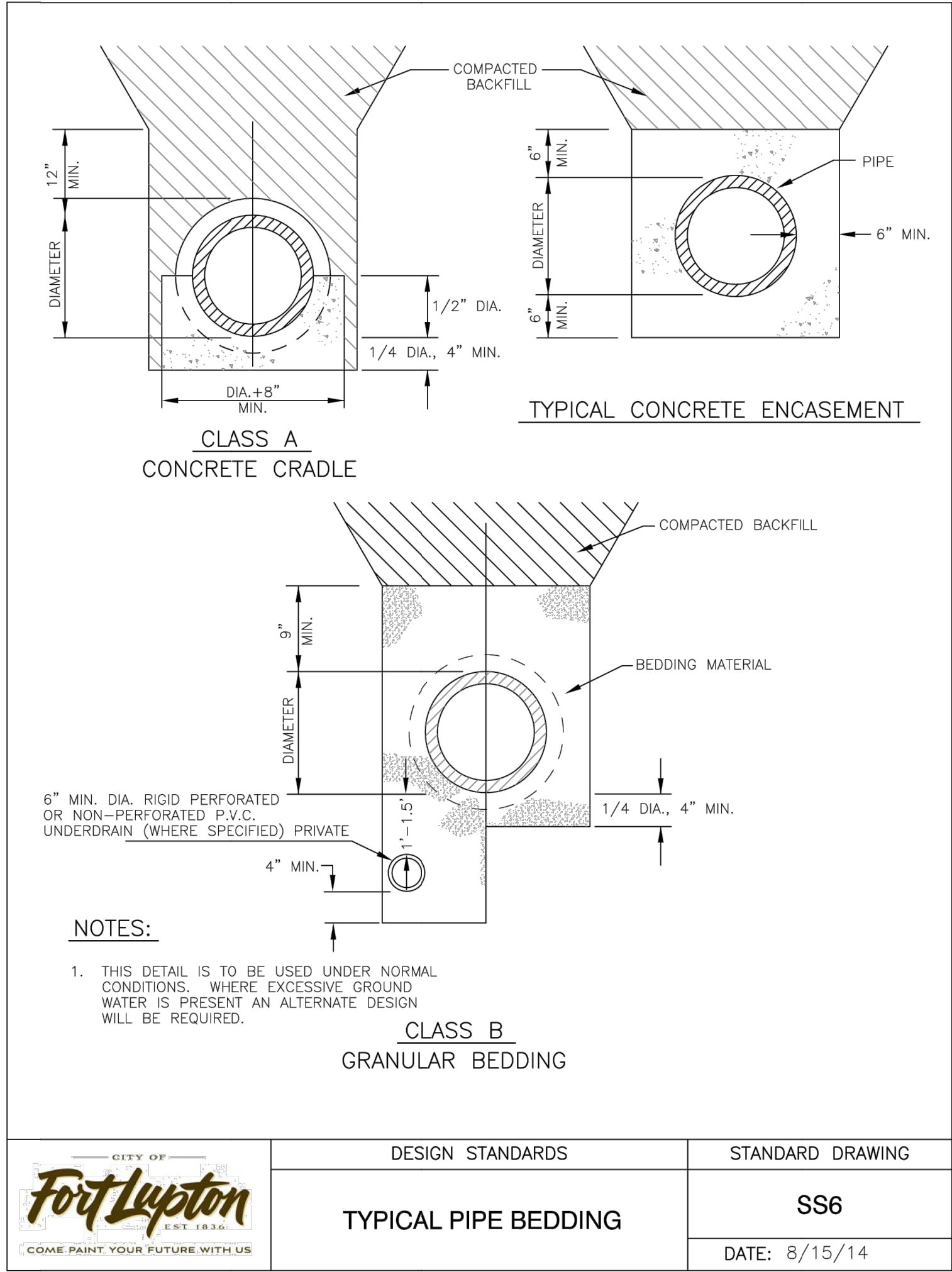
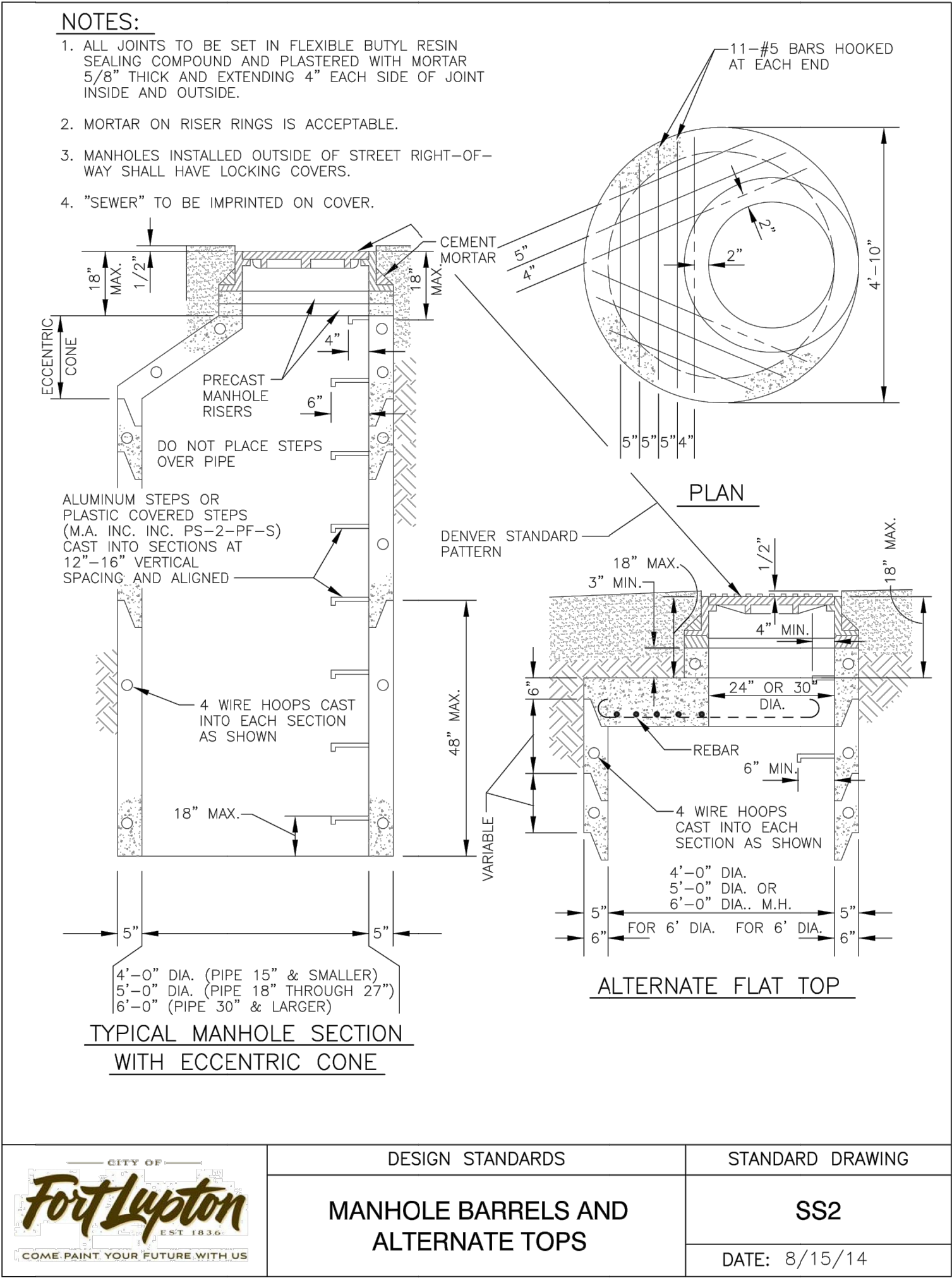
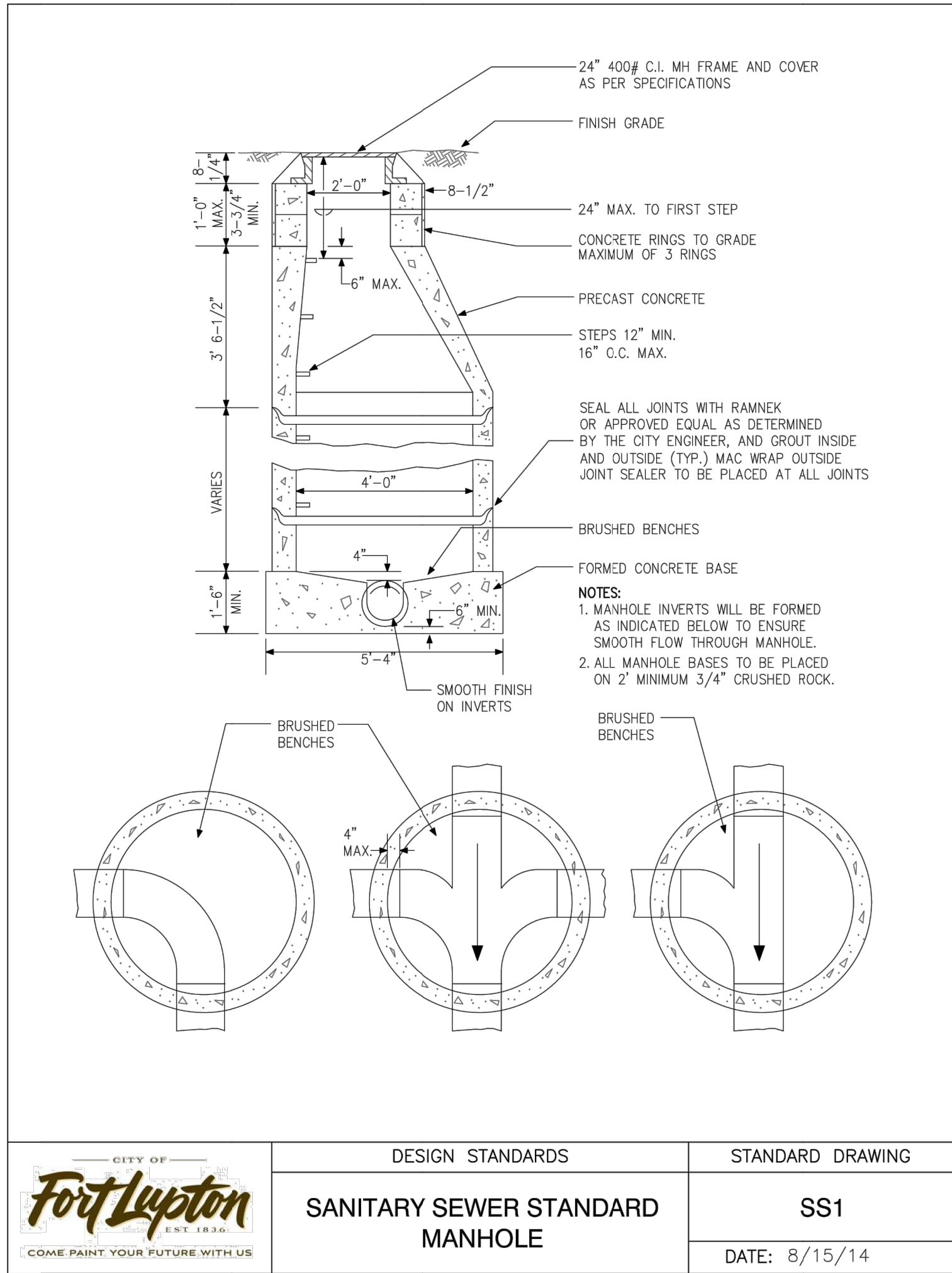
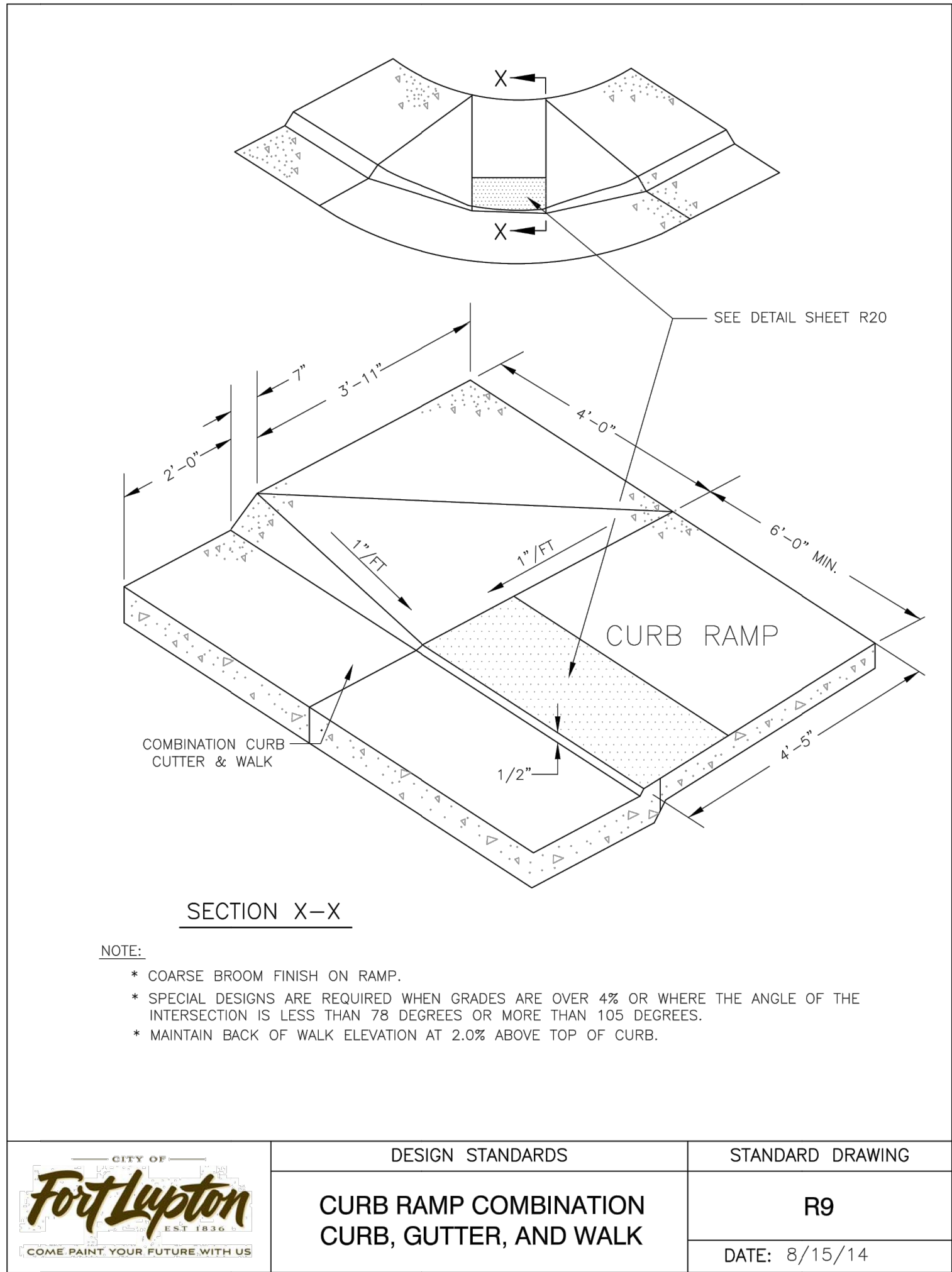
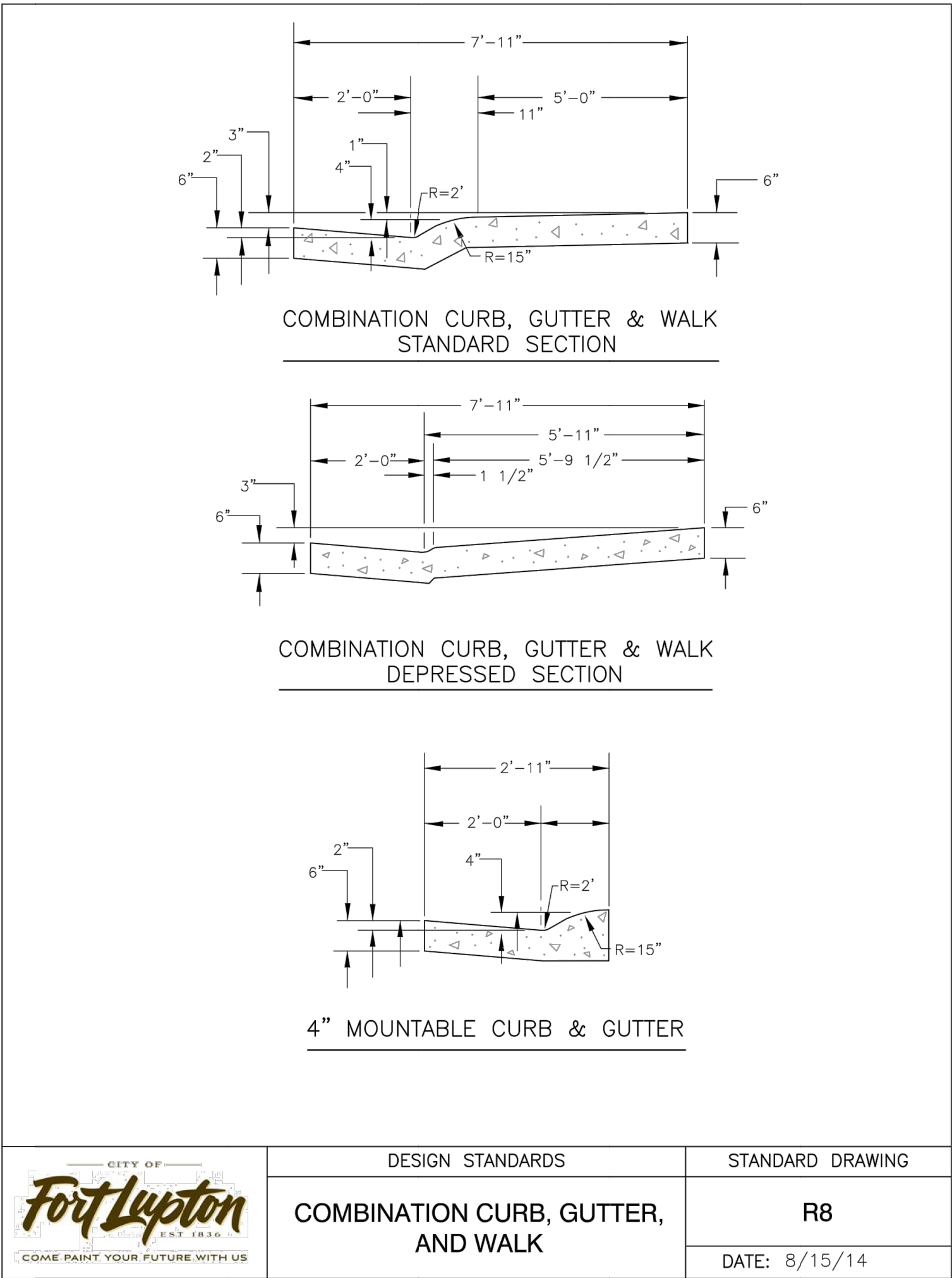
	DESIGN STANDARDS	STANDARD DRAWING
	CONCRETE WASHOUT AREA	EC 9
		DATE: 8/15/14

 CITY OF Fort Lupton EST. 1936 COME PAINT YOUR FUTURE WITH US.	DESIGN STANDARDS	STANDARD DRAWING
	SILT FENCE	EC 15
		DATE: 8/15/14

 CITY OF Fort Lupton EST. 1930 COME PAINT YOUR FUTURE WITH US	DESIGN STANDARDS	STANDARD DRAWING
	SEDIMENT CONTROL LOGS	EC 16
		DATE: 8/15/14

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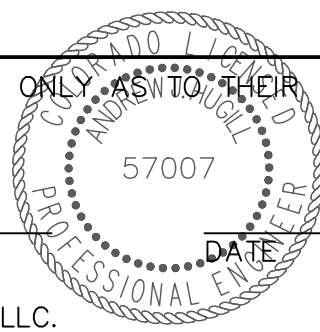
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.rencoengineering.com



ENGINEER'S STATEMENT

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT.

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

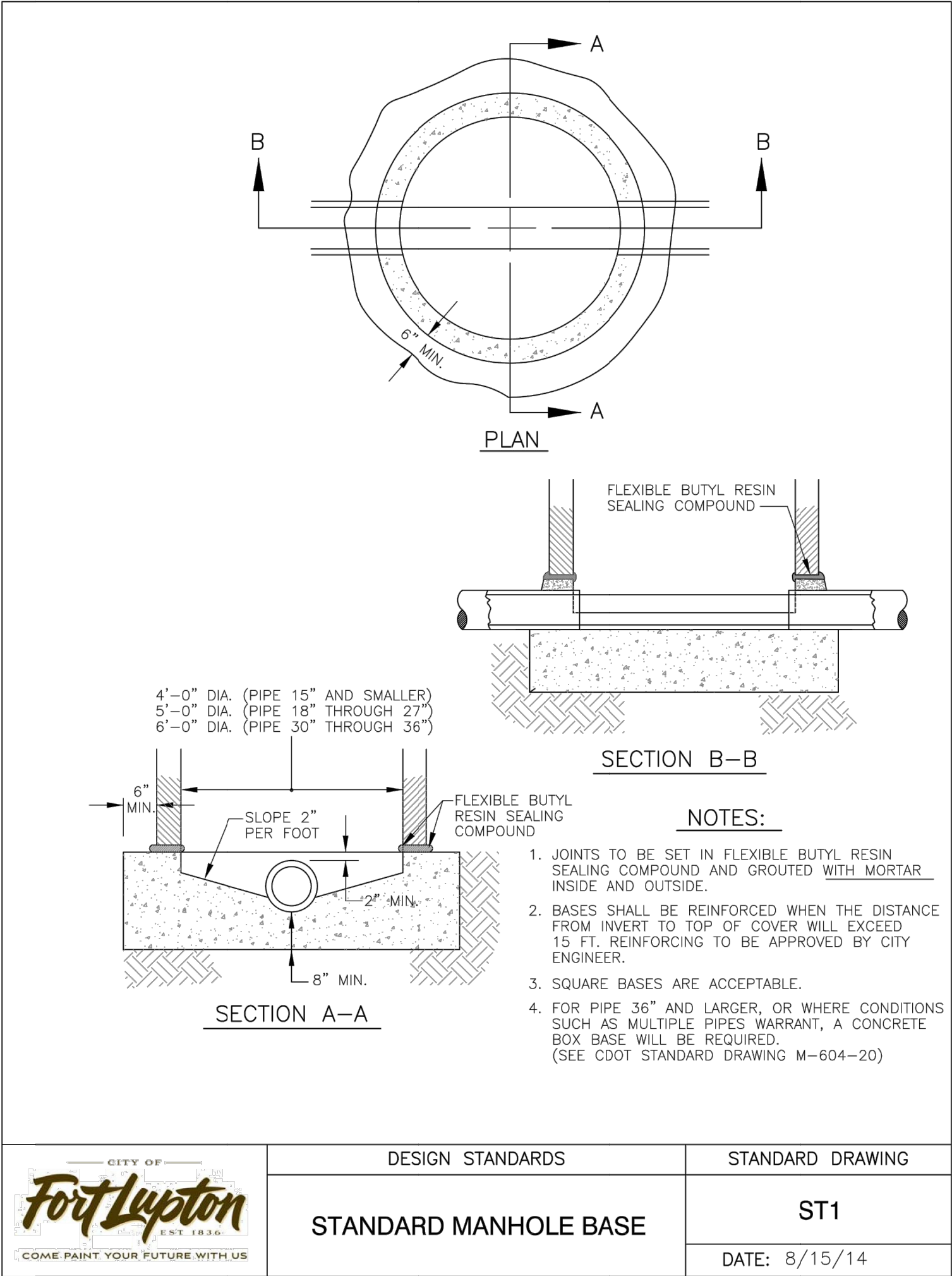


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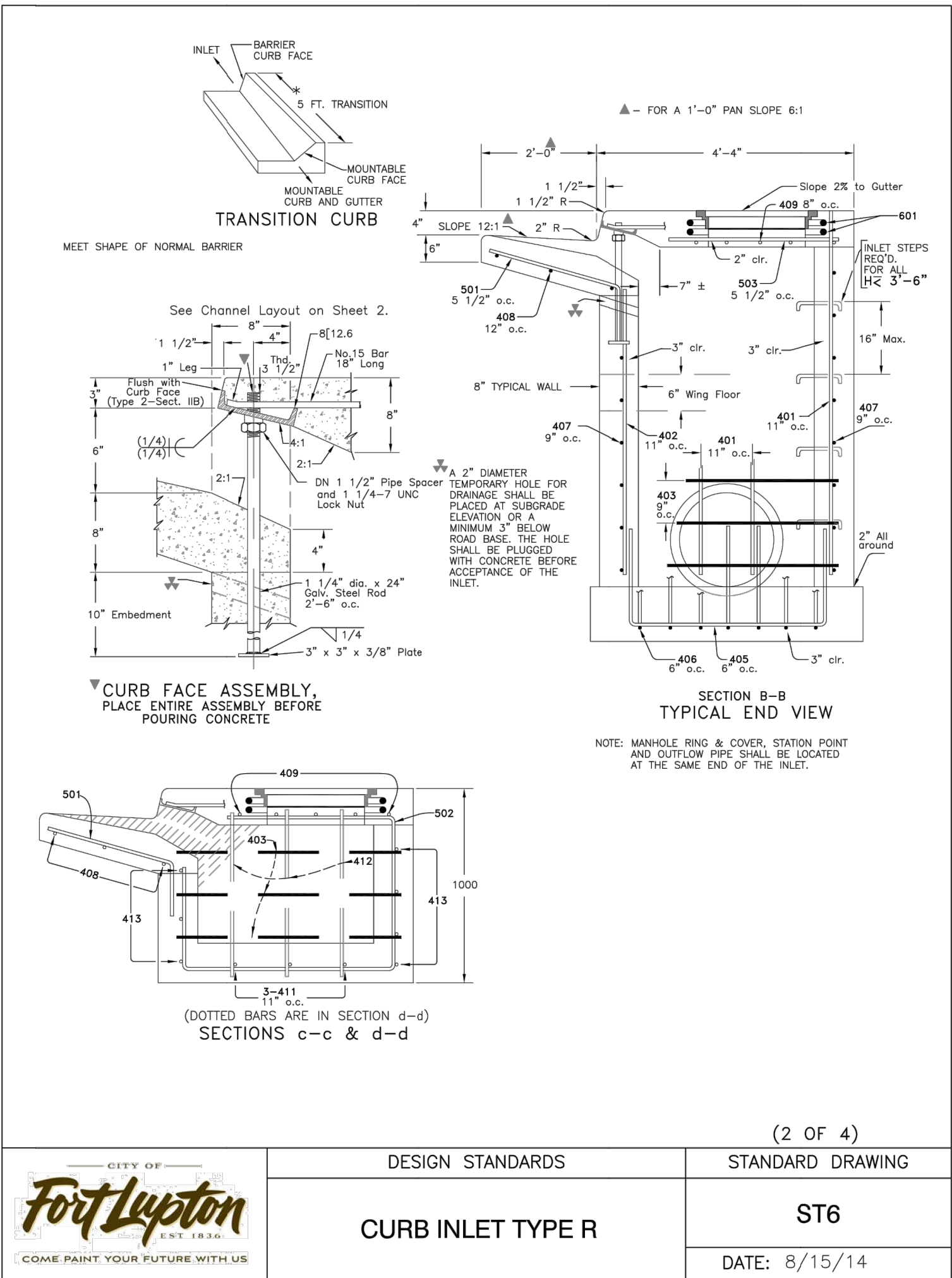
PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

J.R. ENGINEERING
A Western Company
Central 303-740-9888 • Colorado Springs 719-583-2583
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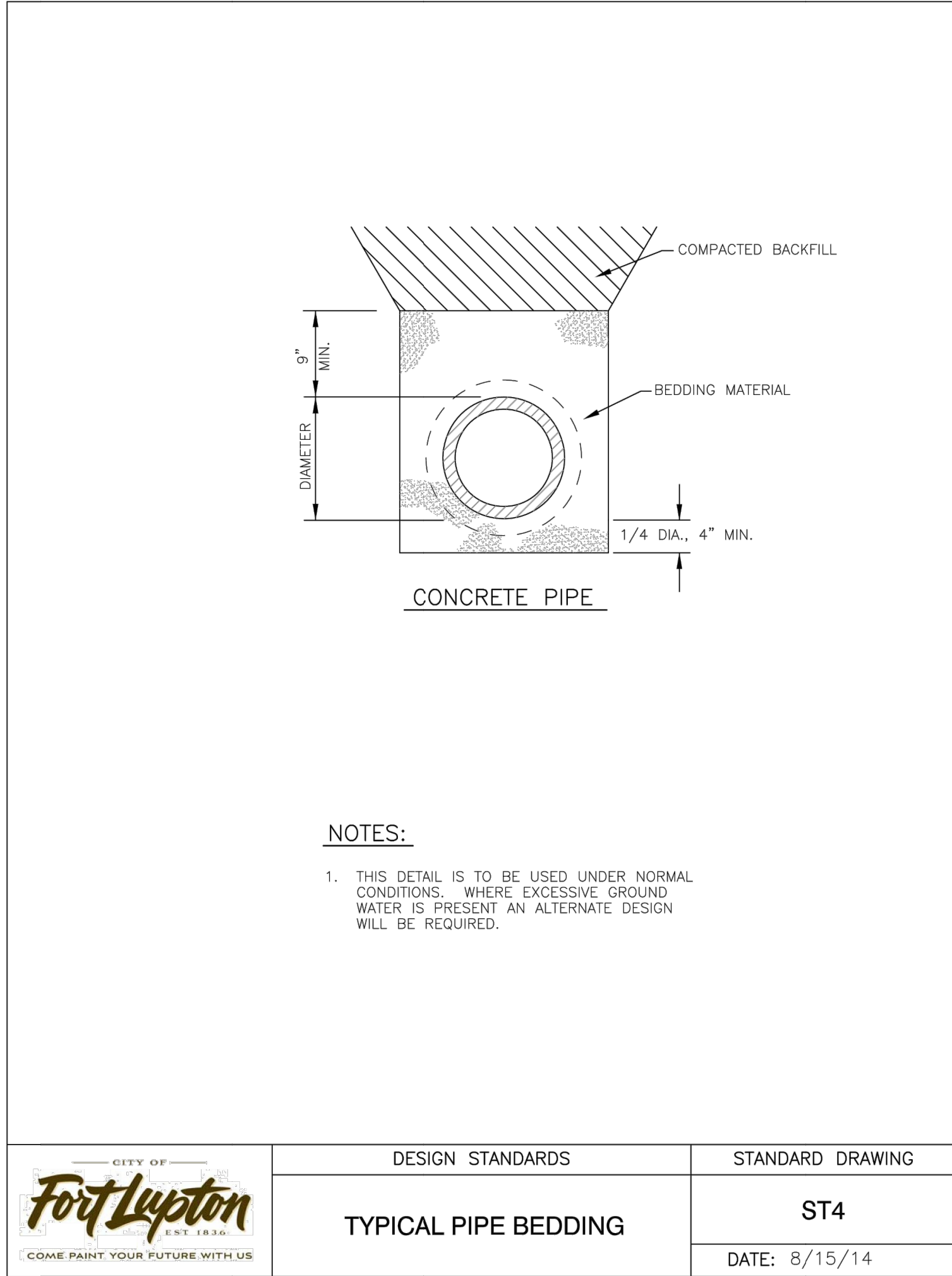
BY	DATE	No.	REVISION	H-SCALE	N/A	V-SCALE	N/A	DATE	DESIGNED BY	N/A	DRAWN BY	SWW	CHECKED BY
								12/13/21					
COYOTE CREEK FILING NO 4													
DETAILS													
SHEET 26 OF 46													
JOB NO. 16093.00													



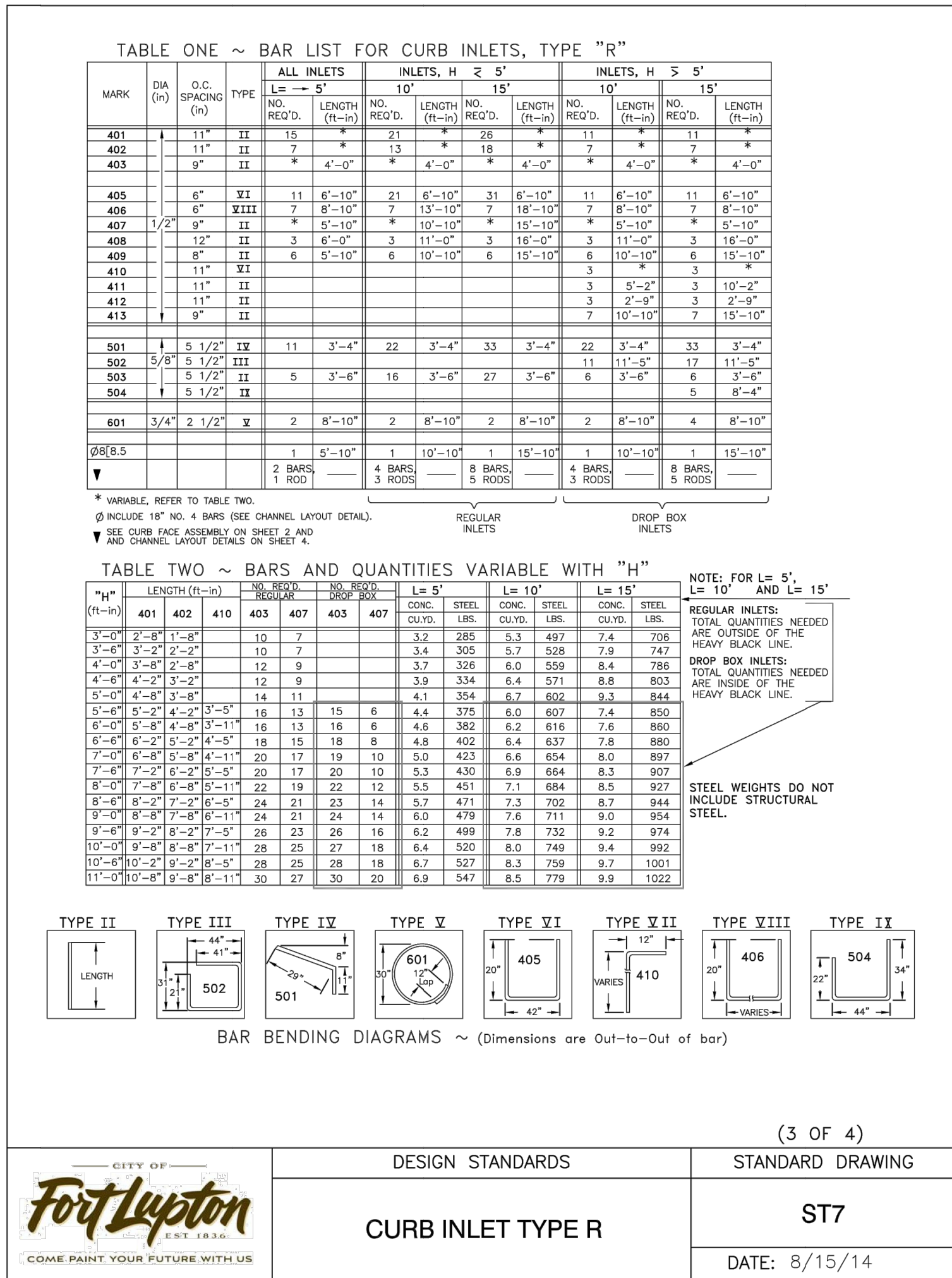
CITY OF	DESIGN STANDARDS	STANDARD DRAWING
Fort Lupton EST. 1936 COME PAINT YOUR FUTURE WITH US	STANDARD MANHOLE BASE	ST1
		DATE: 8/15/14

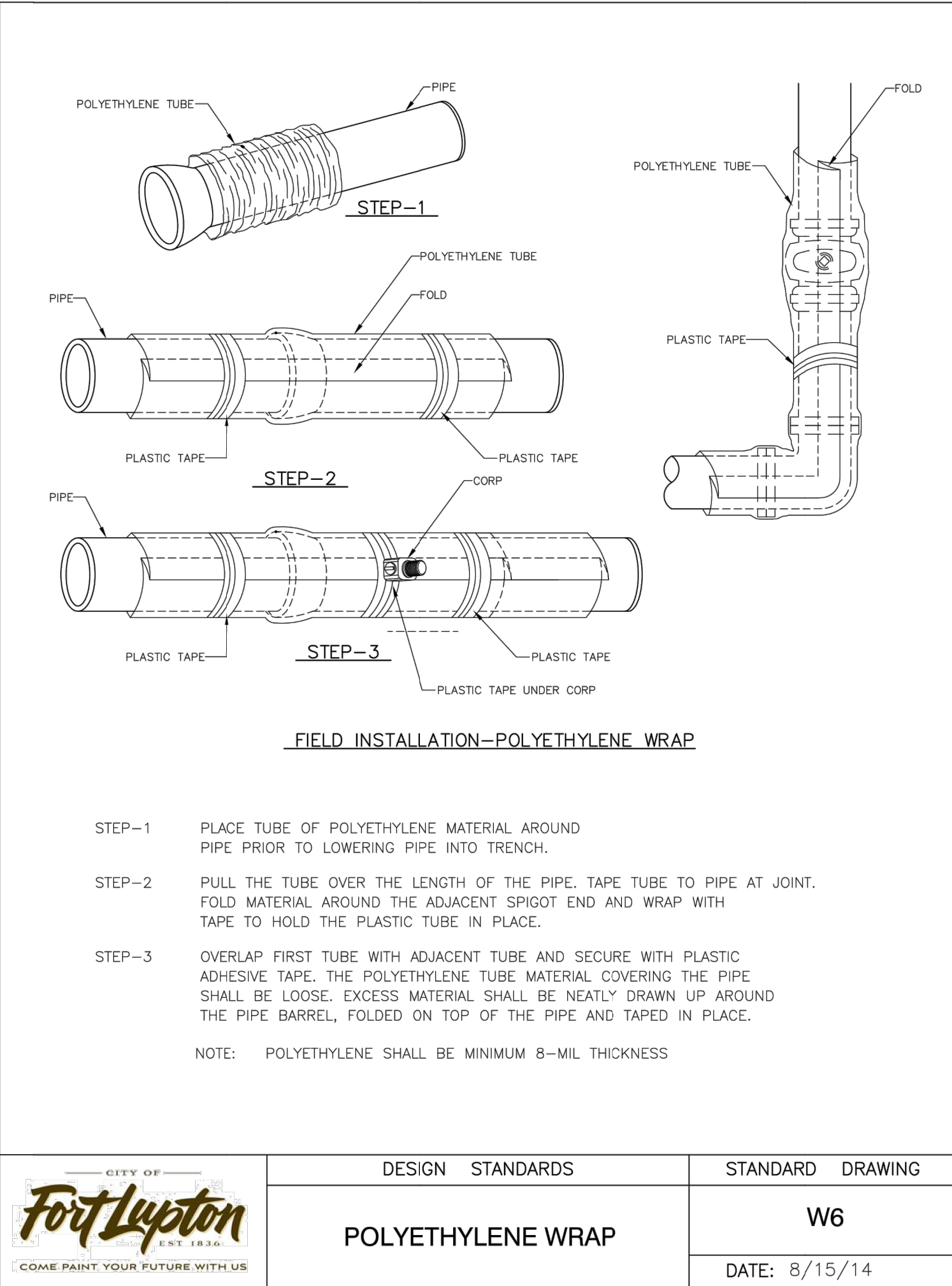
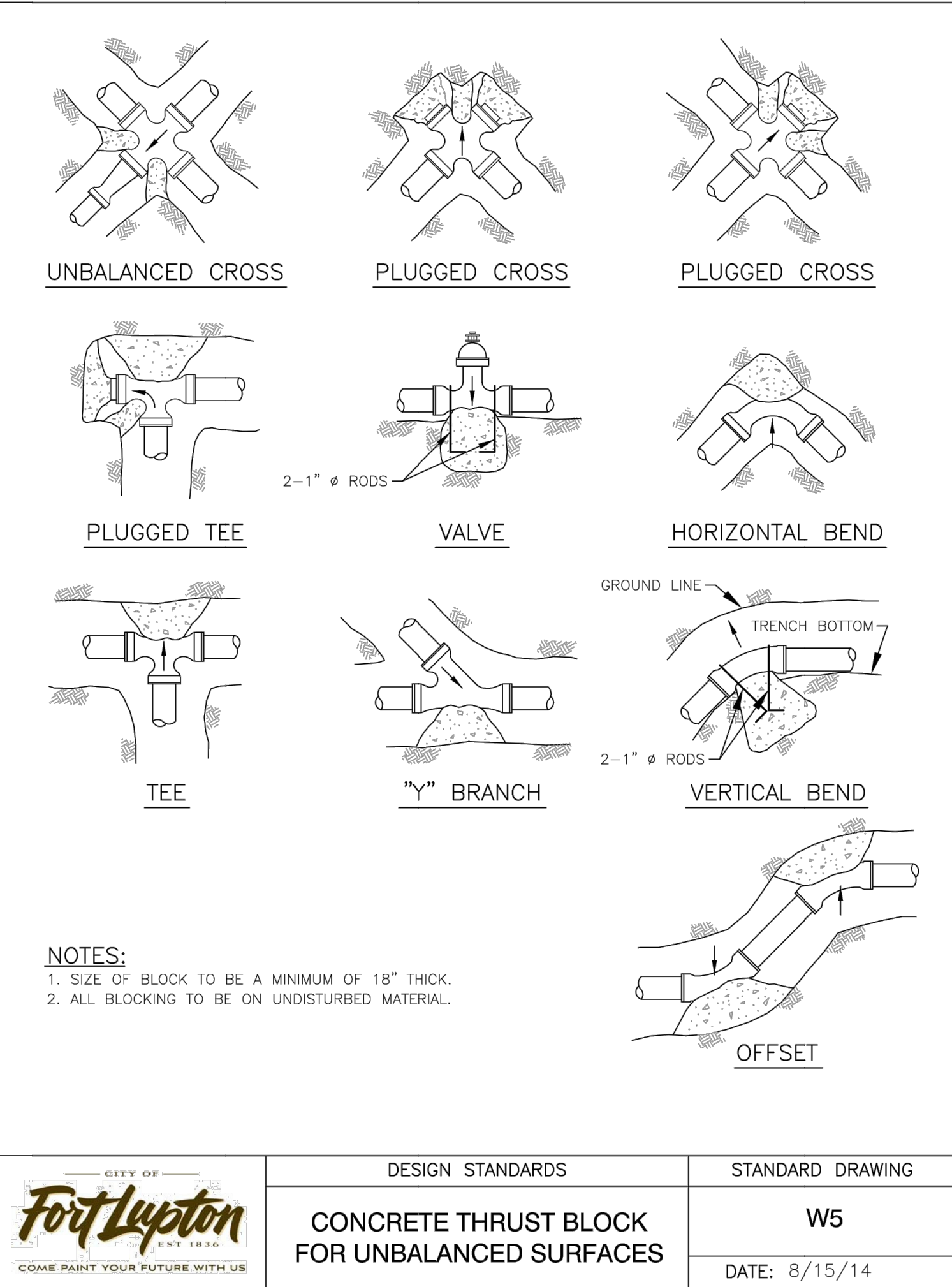
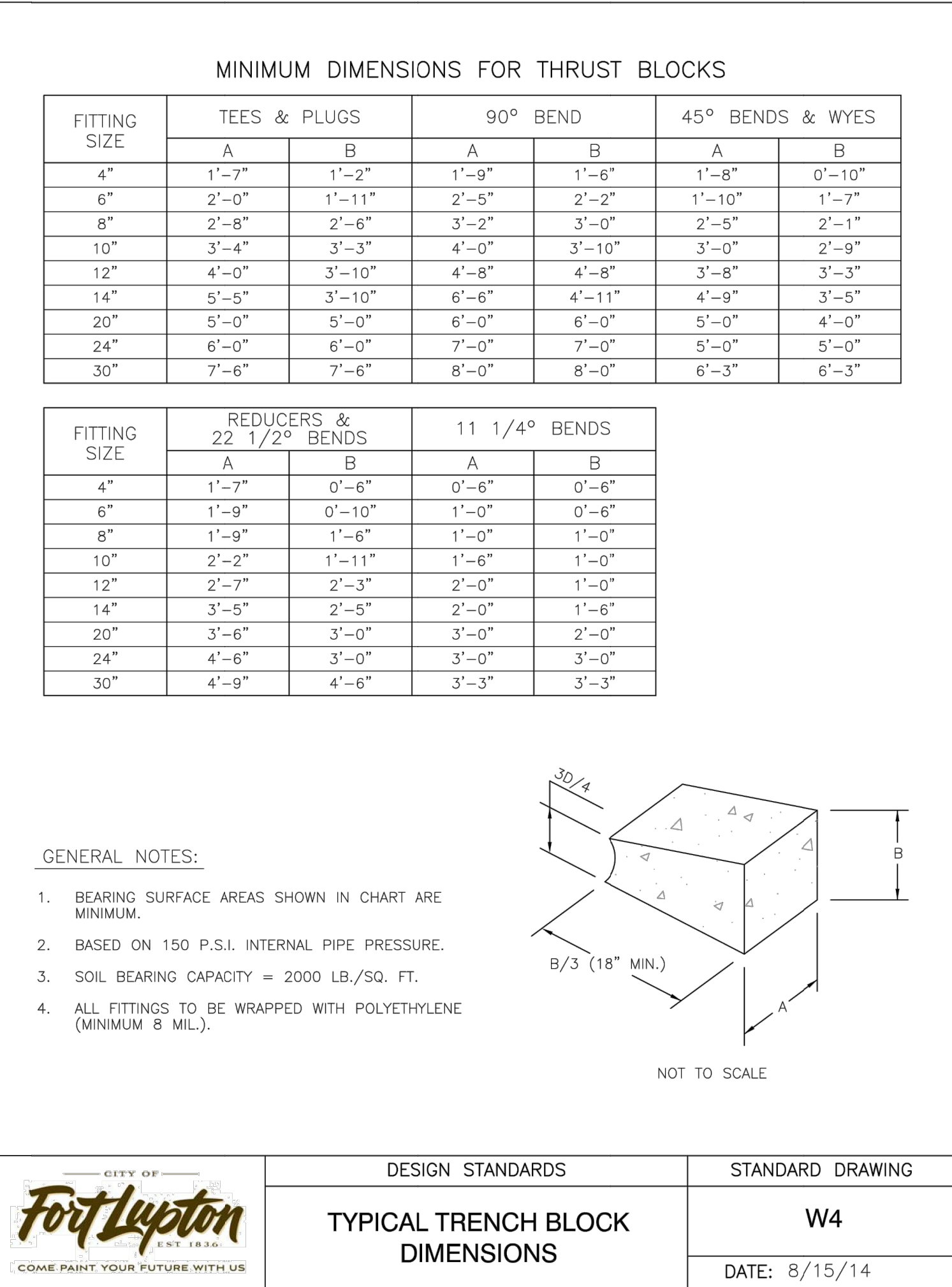
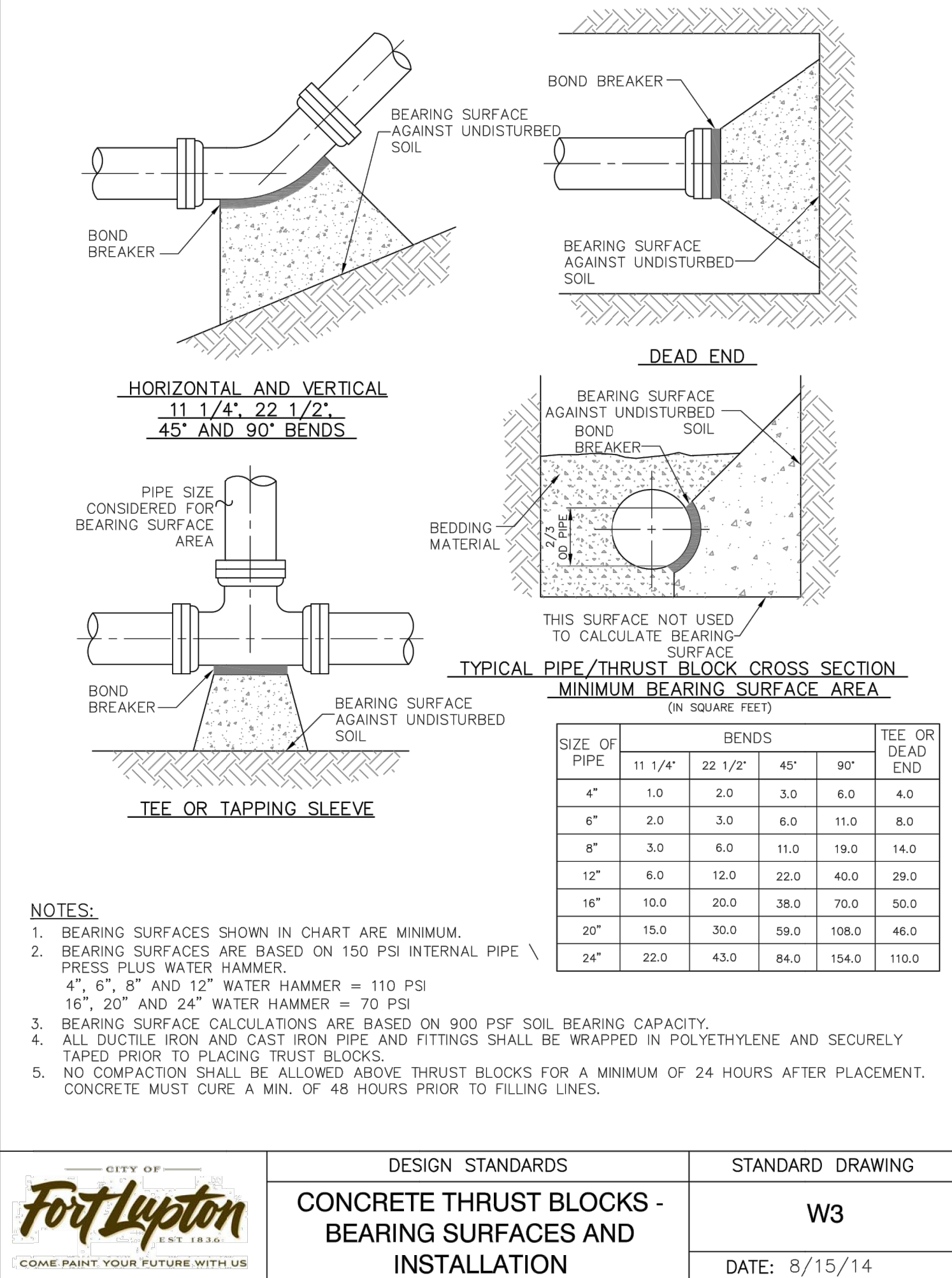
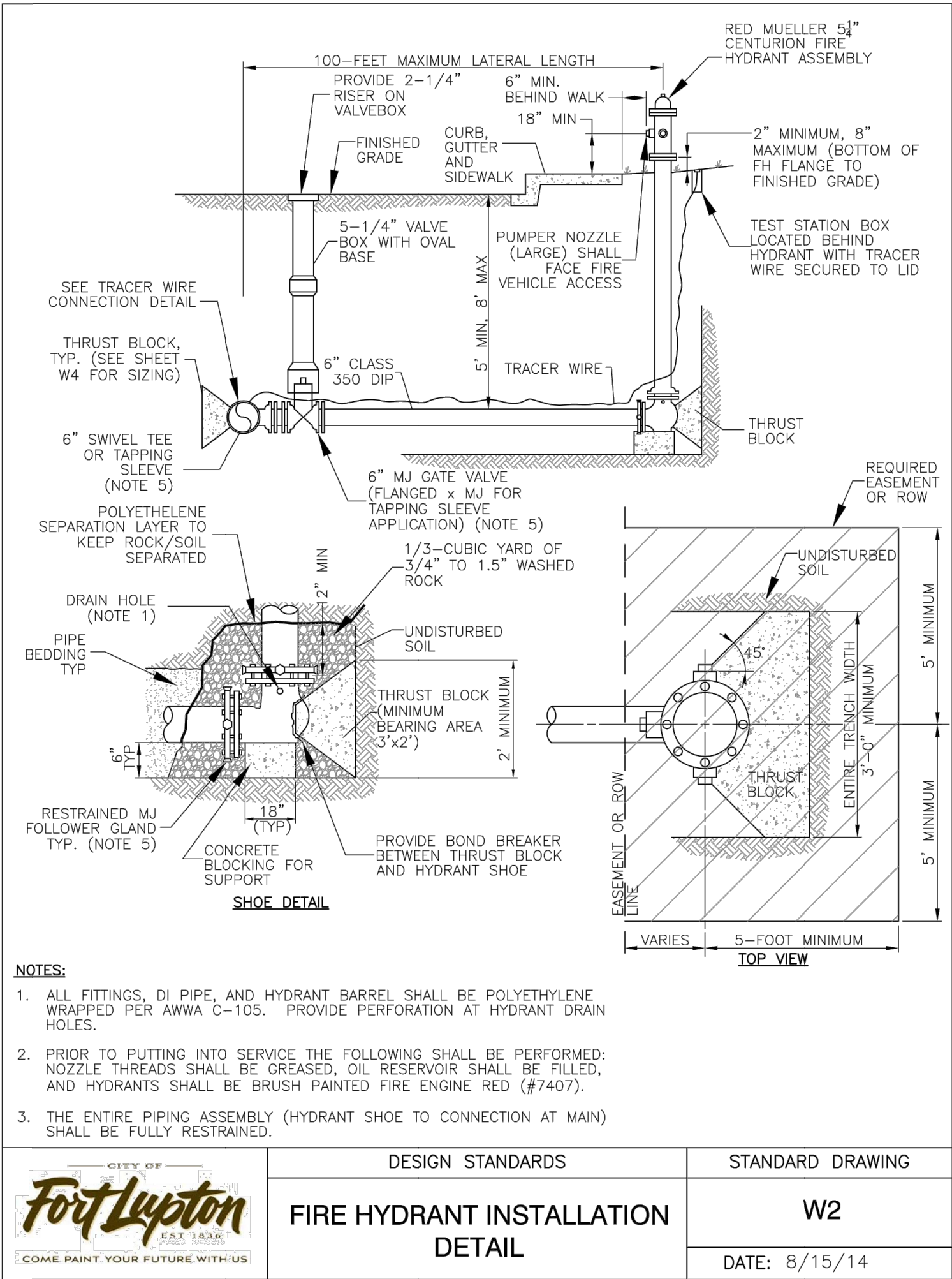
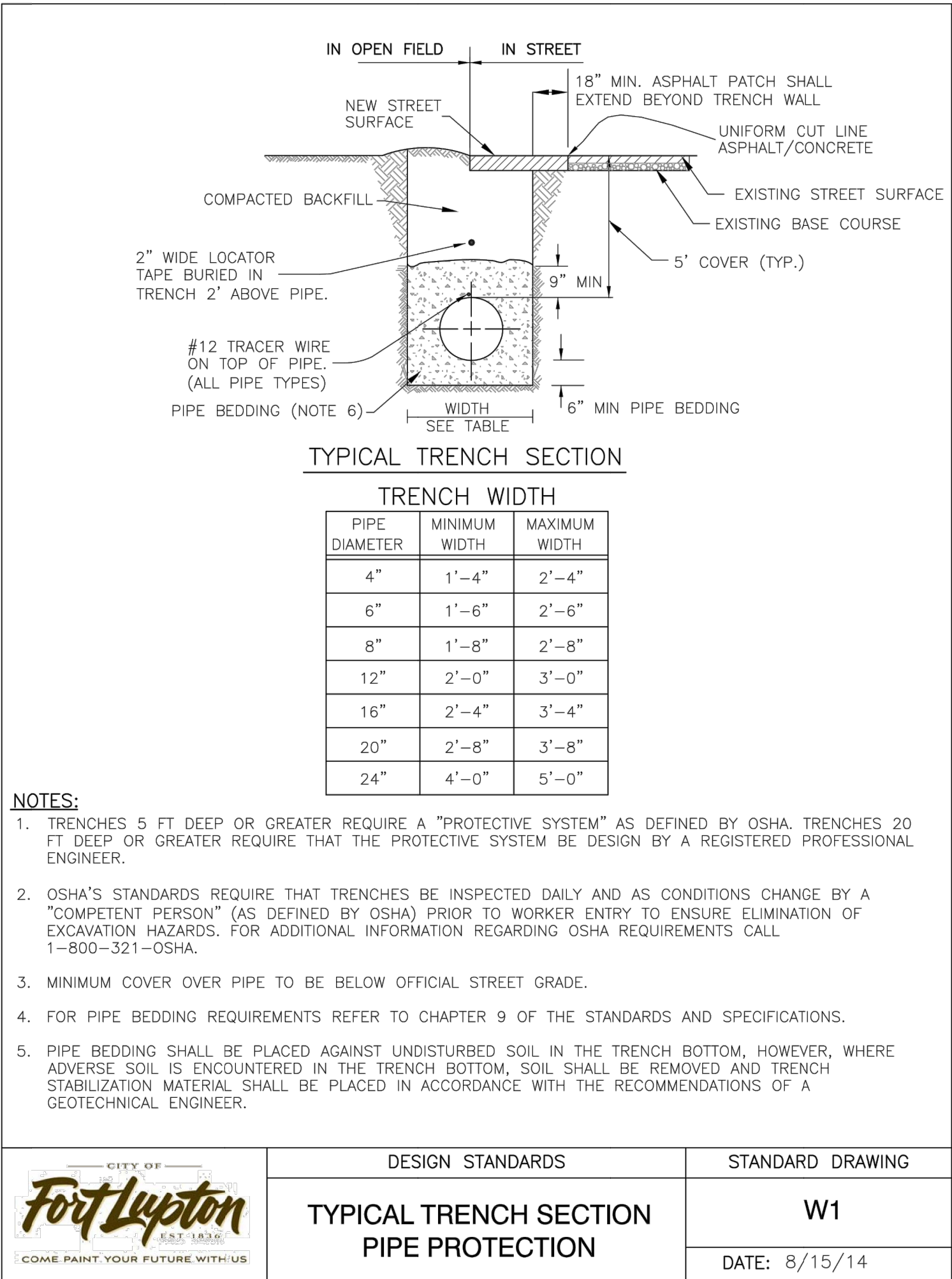


CITY OF	DESIGN STANDARDS	STANDARD DRAWING
Fort Lupton EST. 1936 COME PAINT YOUR FUTURE WITH US	CURB INLET TYPE R	ST6
		DATE: 8/15/14



CITY OF	DESIGN STANDARDS	STANDARD DRAWING
Fort Lupton EST. 1936 COME PAINT YOUR FUTURE WITH US	TYPICAL PIPE BEDDING	ST4
		DATE: 8/15/14

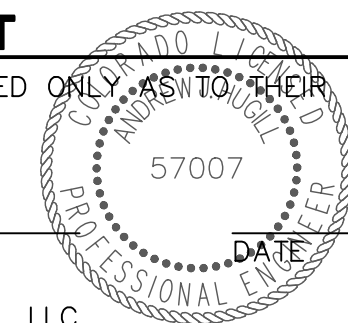




ENGINEER'S STATEMENT

STANDARD DETAILS SHOWN WERE REVIEWED ONLY AS TO THEIR APPLICATION ON THIS PROJECT.

ANDREW J. HUGILL, PE
COLORADO LIC. PE NO. 57007
FOR AND ON BEHALF OF JR ENGINEERING, LLC.



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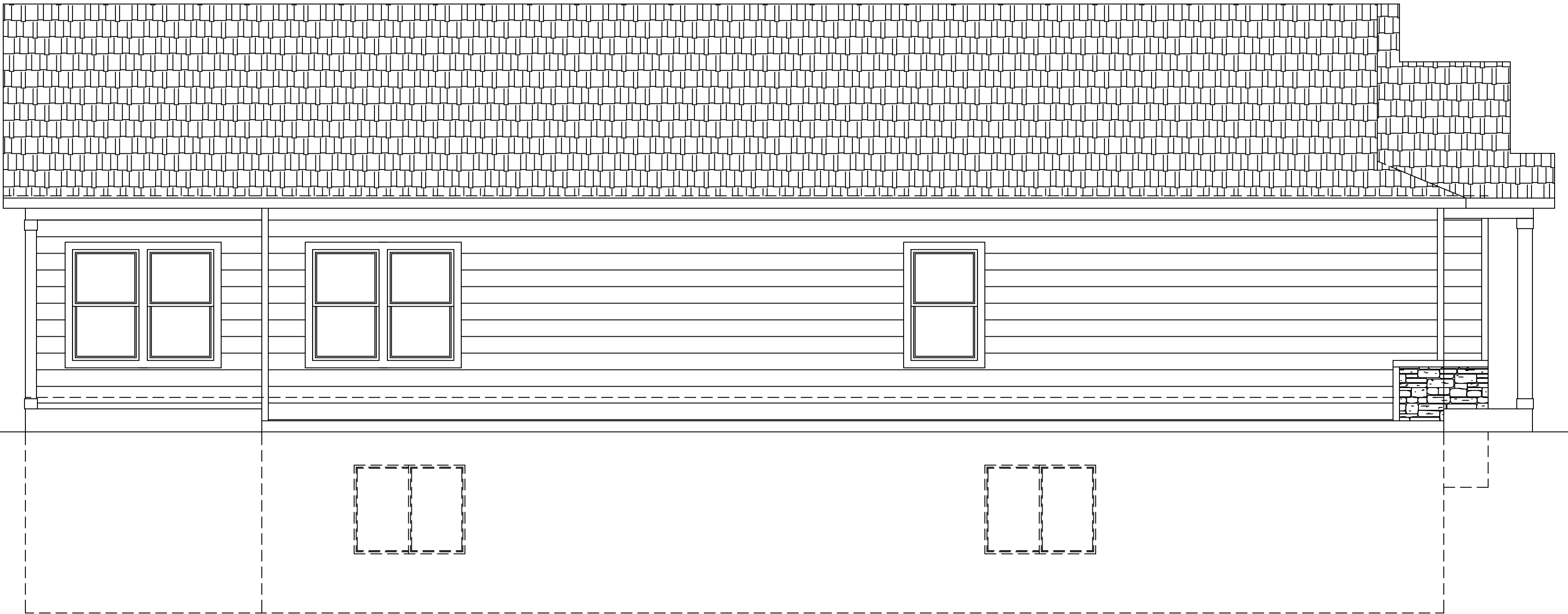
PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

J.R. ENGINEERING
A Western Company

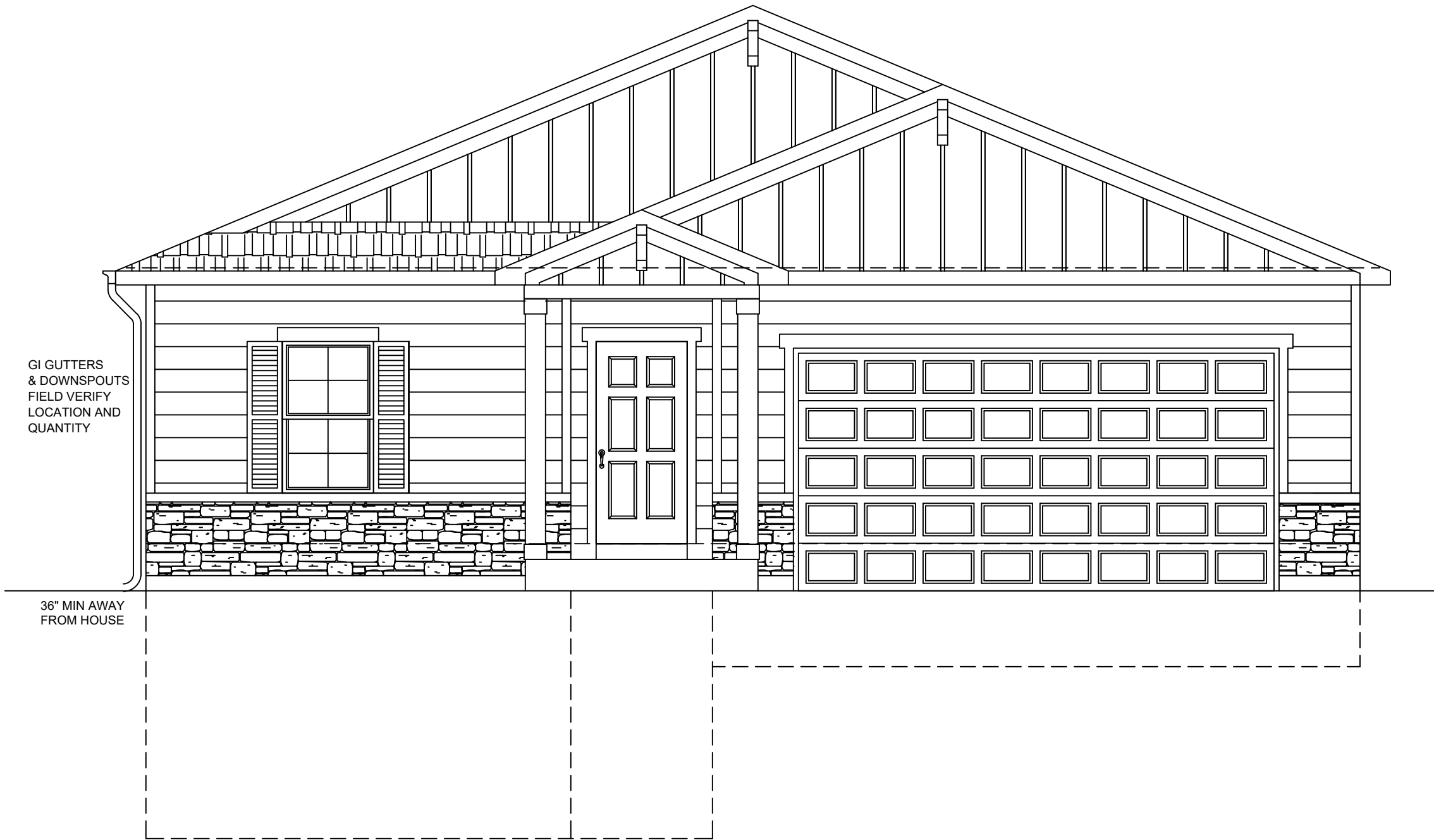


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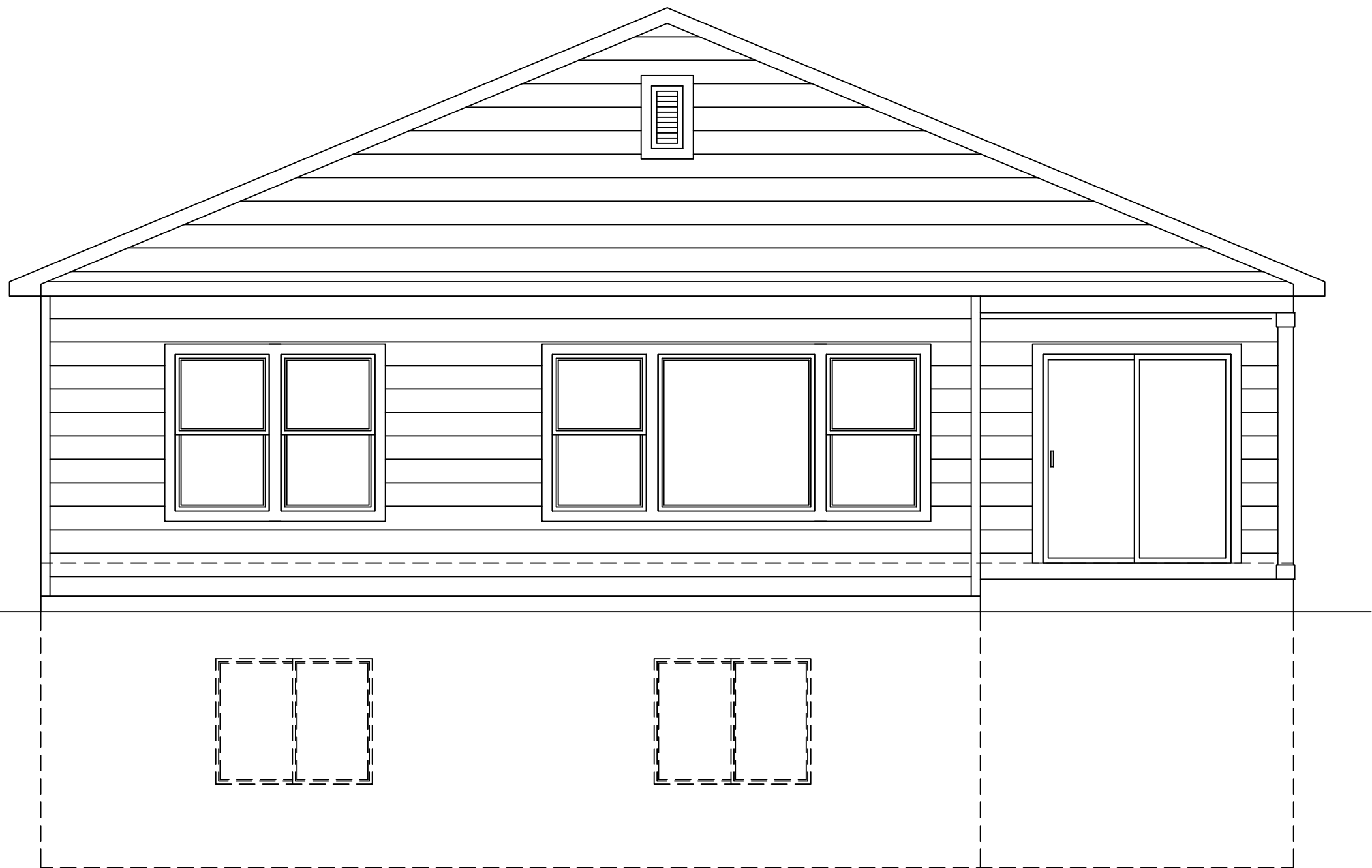
BY	DATE	No.	REVISION	H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	COYOTE CREEK FILING NO 4	DETAILS	SHEET 28 OF 46	JOB NO. 16093.00
				N/A	N/A	12/13/21	N/A	SWW					



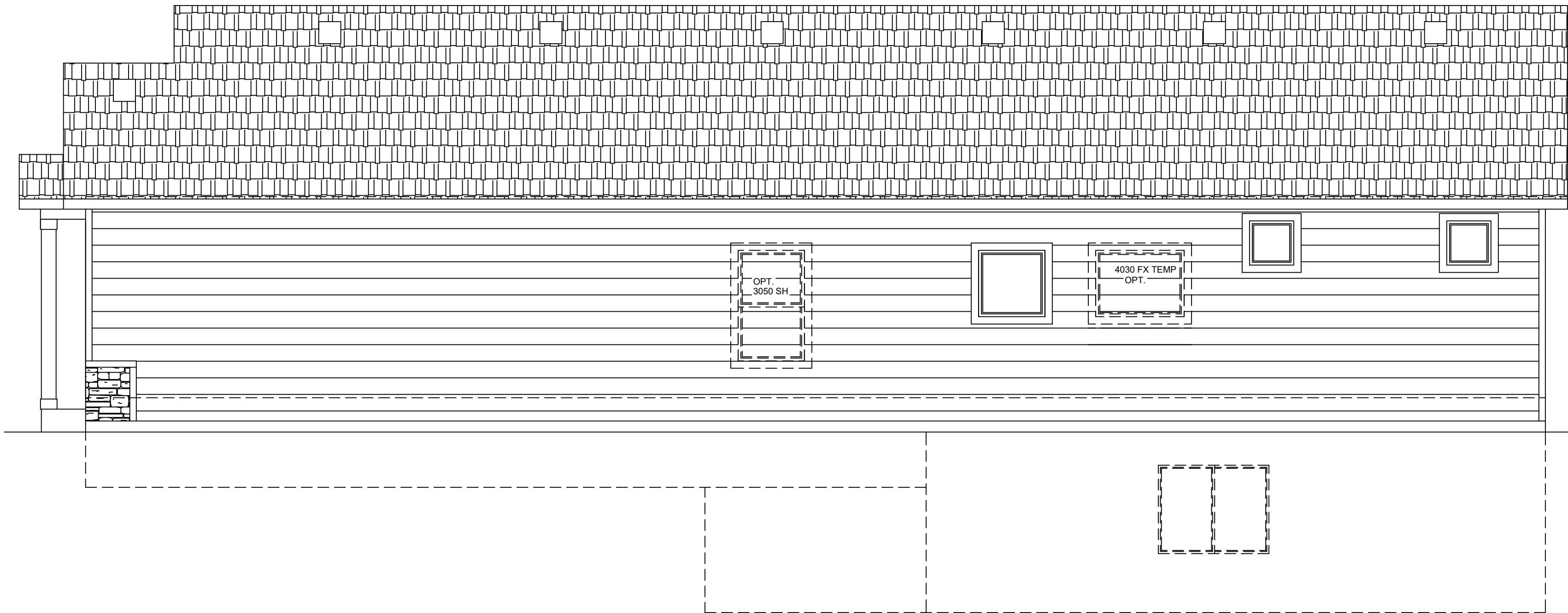
SIDE ELEVATION
1/4"=1'-0"



D1812.1 FRONT ELEVATION-TRADITIONAL
1/4"=1'-0"



REAR ELEVATION
1/4"=1'-0"



GARAGE SIDE ELEVATION
1/4"=1'-0"

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8606 EXPLORER DRIVE
SUITE 250
COLORADO SPRINGS, CO 80920
719-580-5192

SHEET NAME
ELEVATION- TRADITIONAL
PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

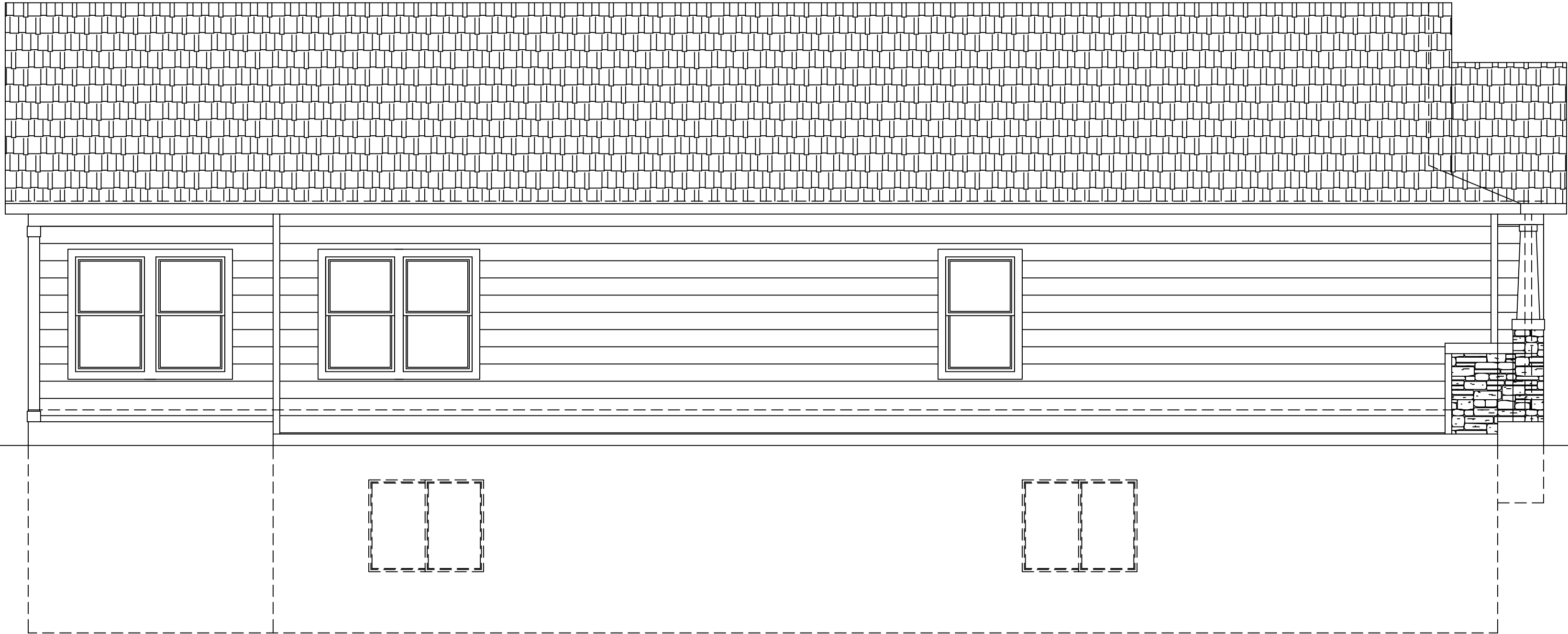
DATE:
8/27/18

SUBMITTALS / REVISIONS			SUBMITTALS / REVISIONS		
DATE	TYPE	BY	DATE	TYPE	BY

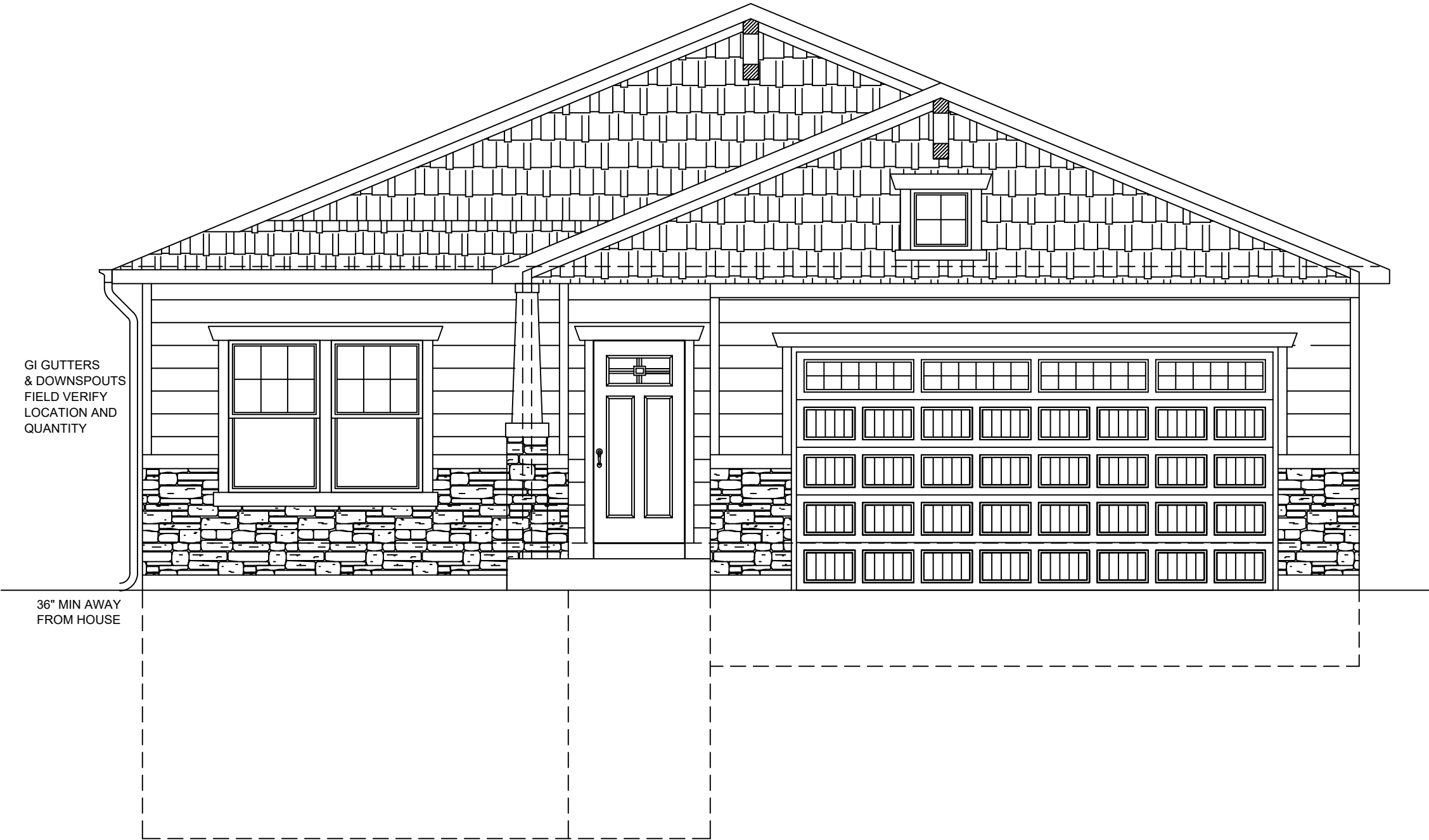
ELEVATION TRAD

SHEET NUMBER

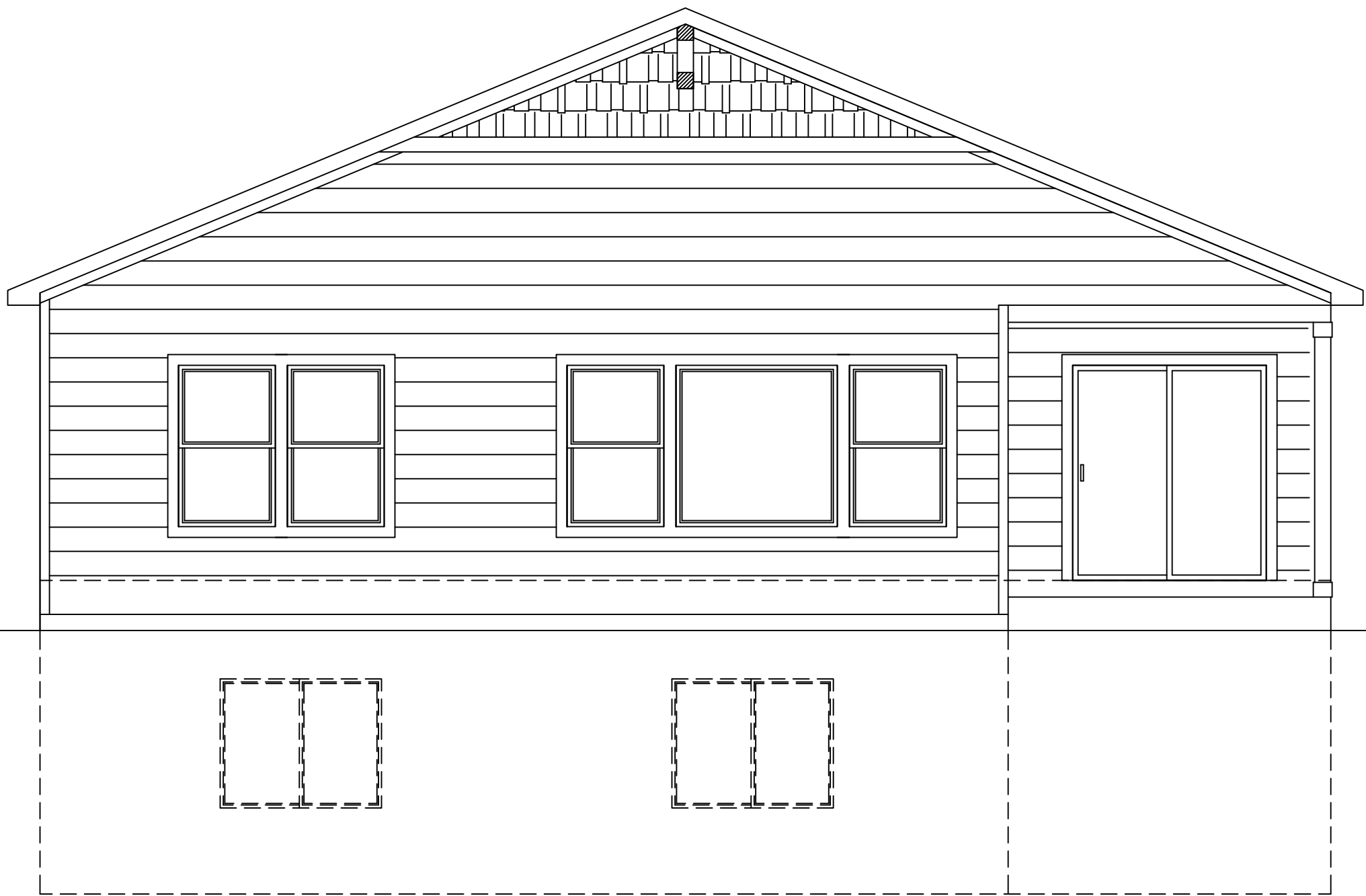
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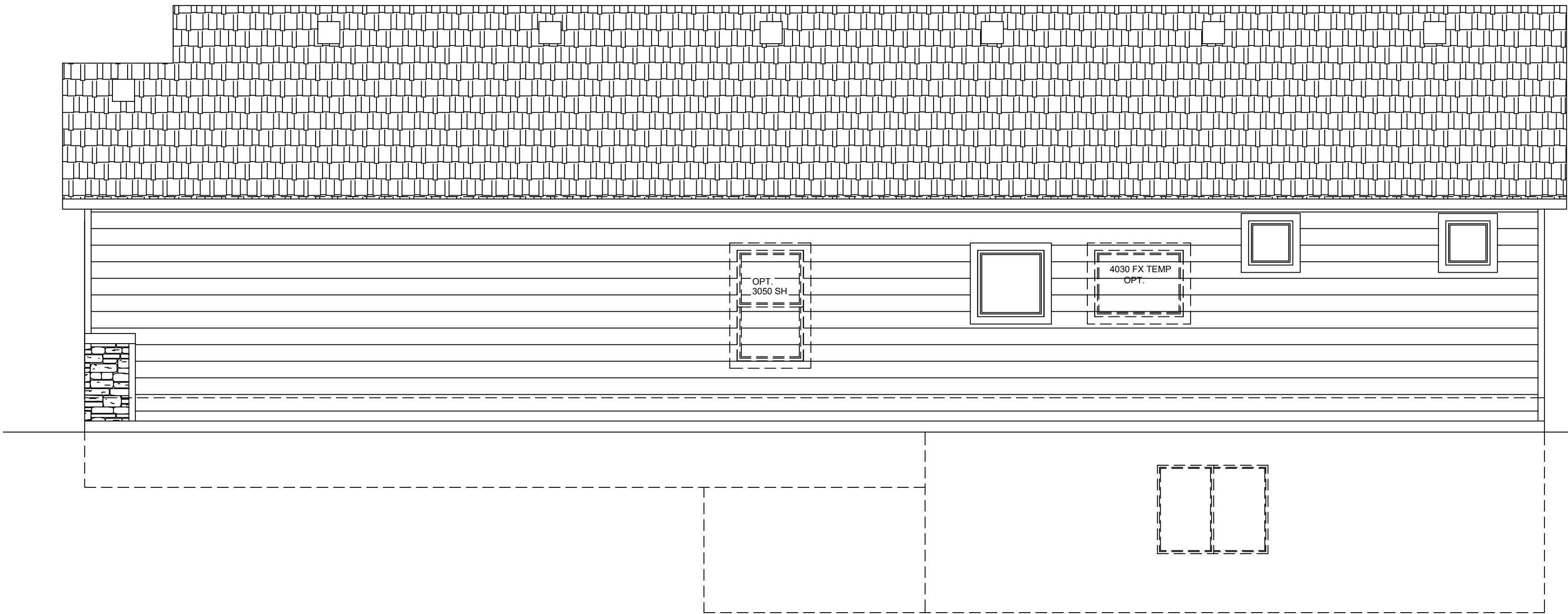
SIDE ELEVATION
1/4"=1'-0"



D1813.1 FRONT ELEVATION- CRAFTSMAN
1/4"=1'-0"



REAR ELEVATION
1/4"=1'-0"



GARAGE SIDE ELEVATION
1/4"=1'-0"

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719-580-5192

SHEET NAME
ELEVATION- CRAFTSMAN
PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

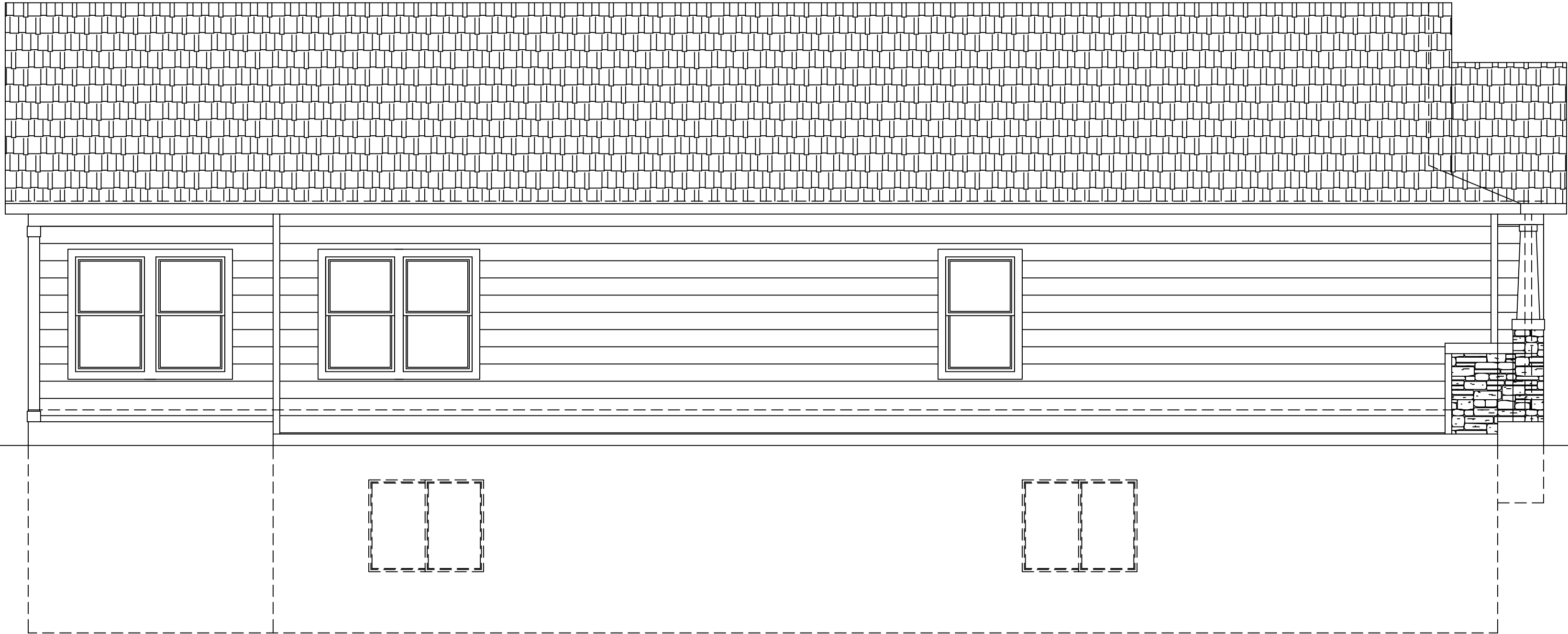
DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

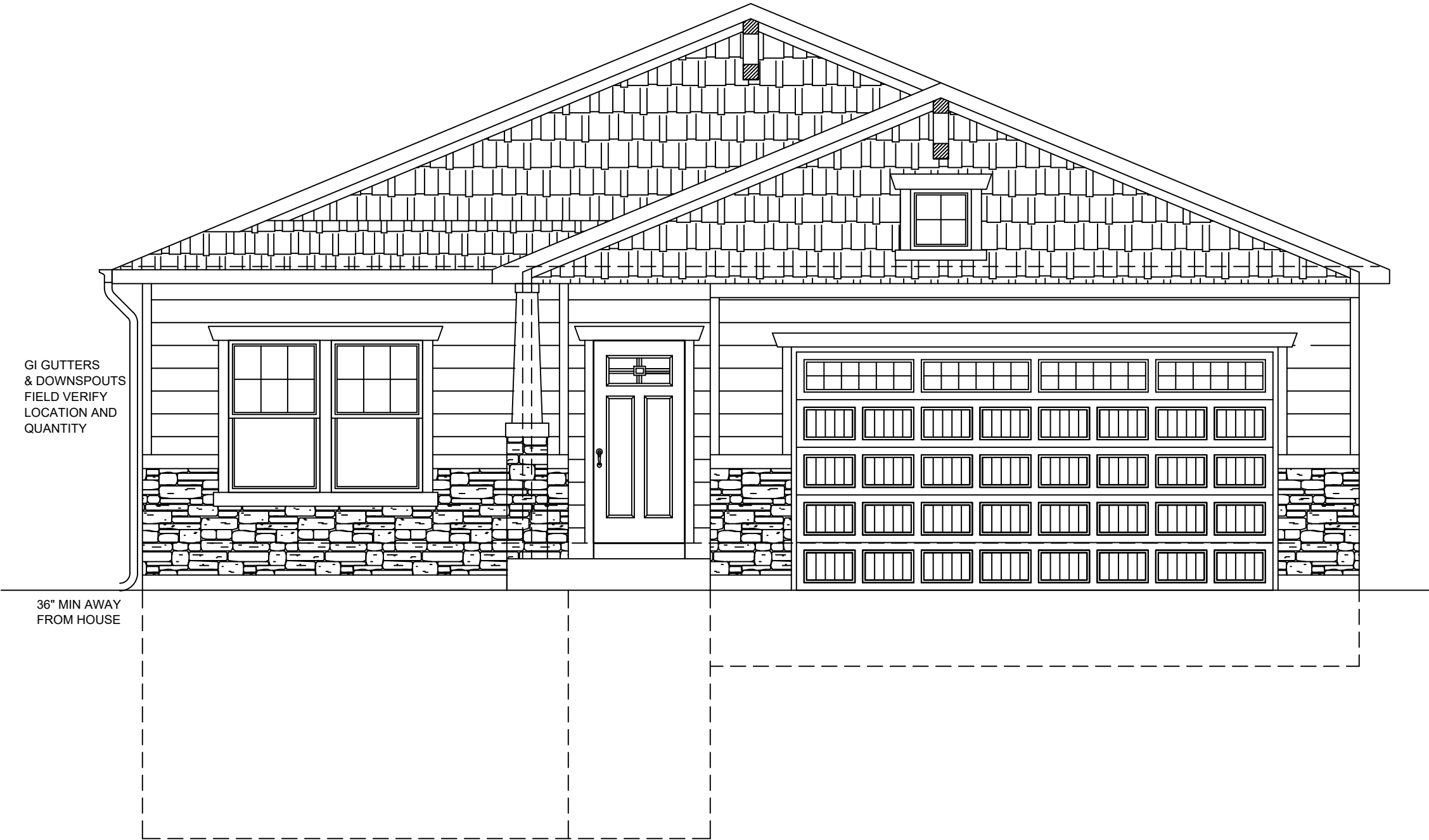
ELEVATION CRAFT.

SHEET NUMBER

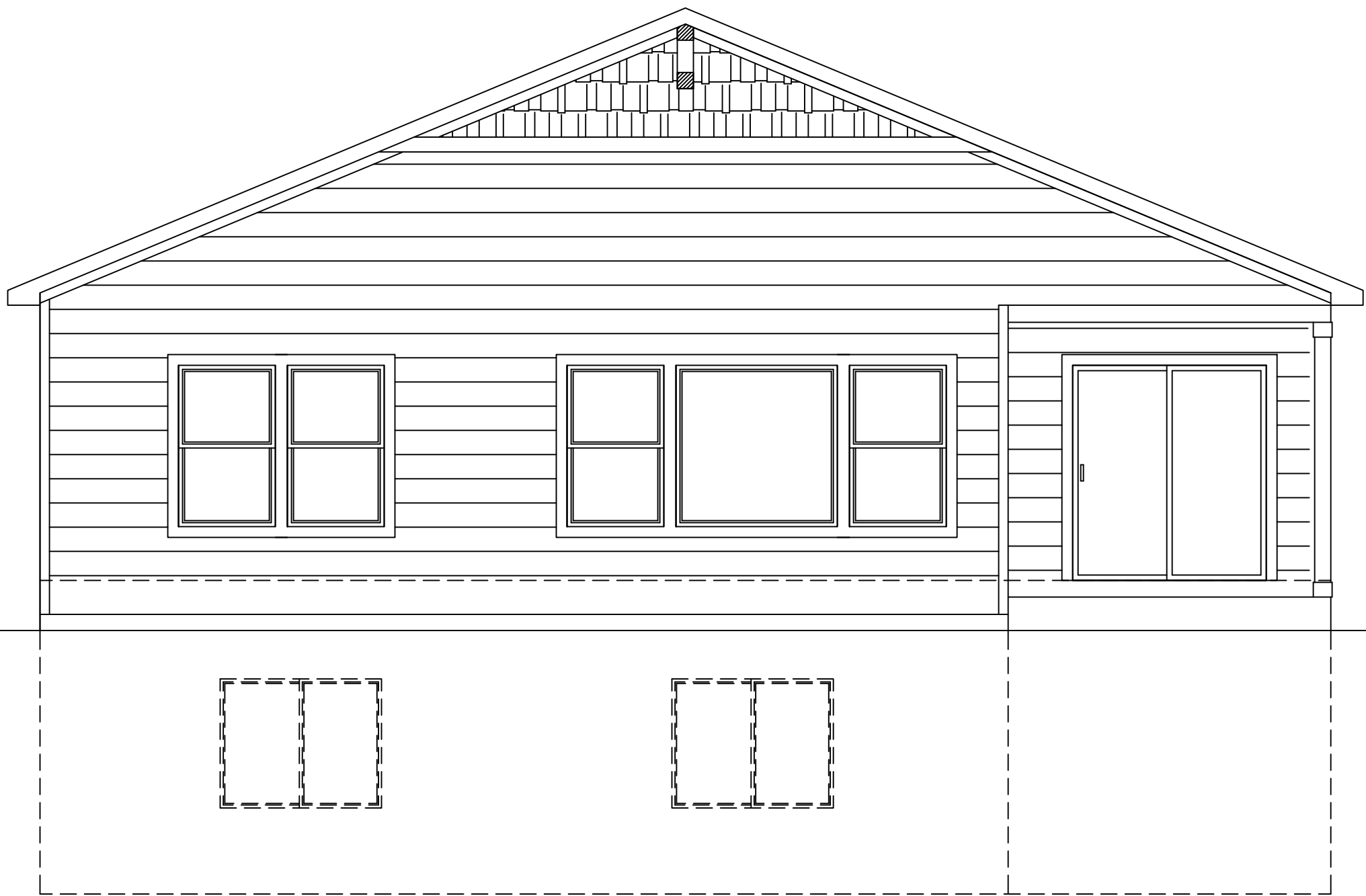
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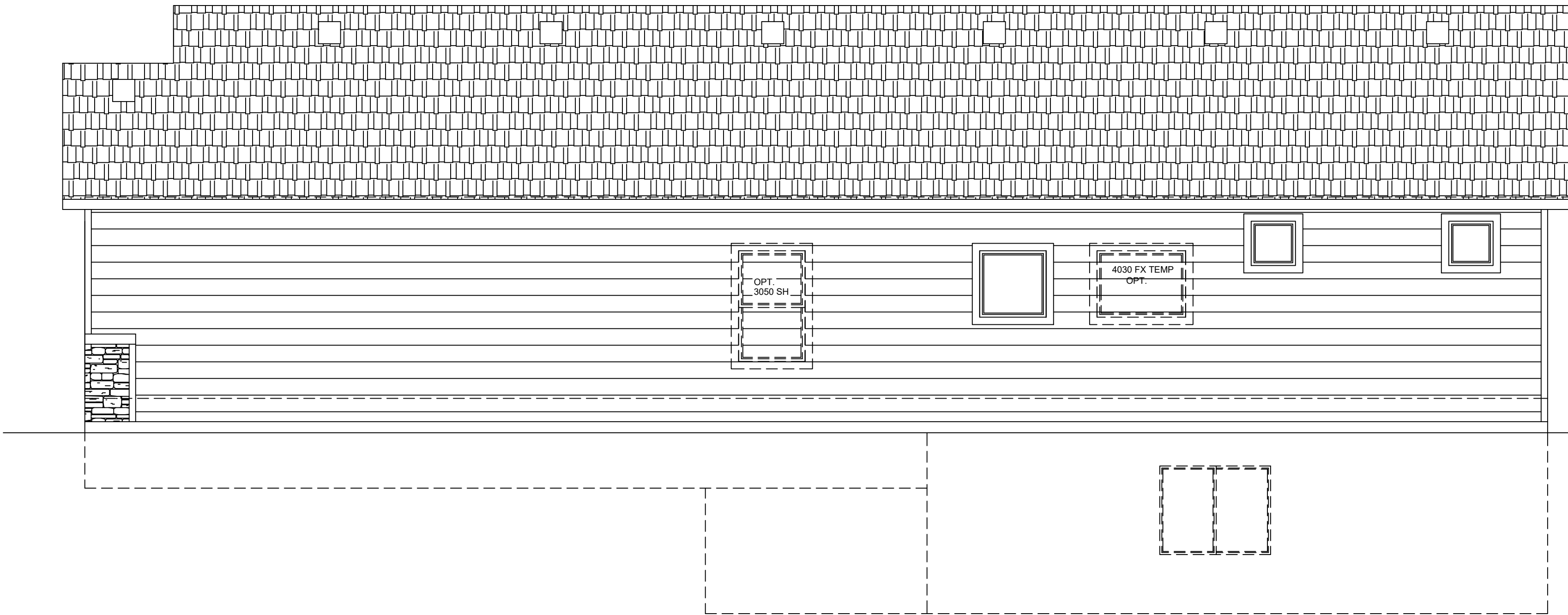
SIDE ELEVATION
1/4"=1'-0"



D1813.1 FRONT ELEVATION- CRAFTSMAN
1/4"=1'-0"



REAR ELEVATION
1/4"=1'-0"



GARAGE SIDE ELEVATION
1/4"=1'-0"

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SUITE 250
COLORADO SPRINGS, CO 80920
719-580-5152

SHEET NAME
ELEVATION- CRAFTSMAN
PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

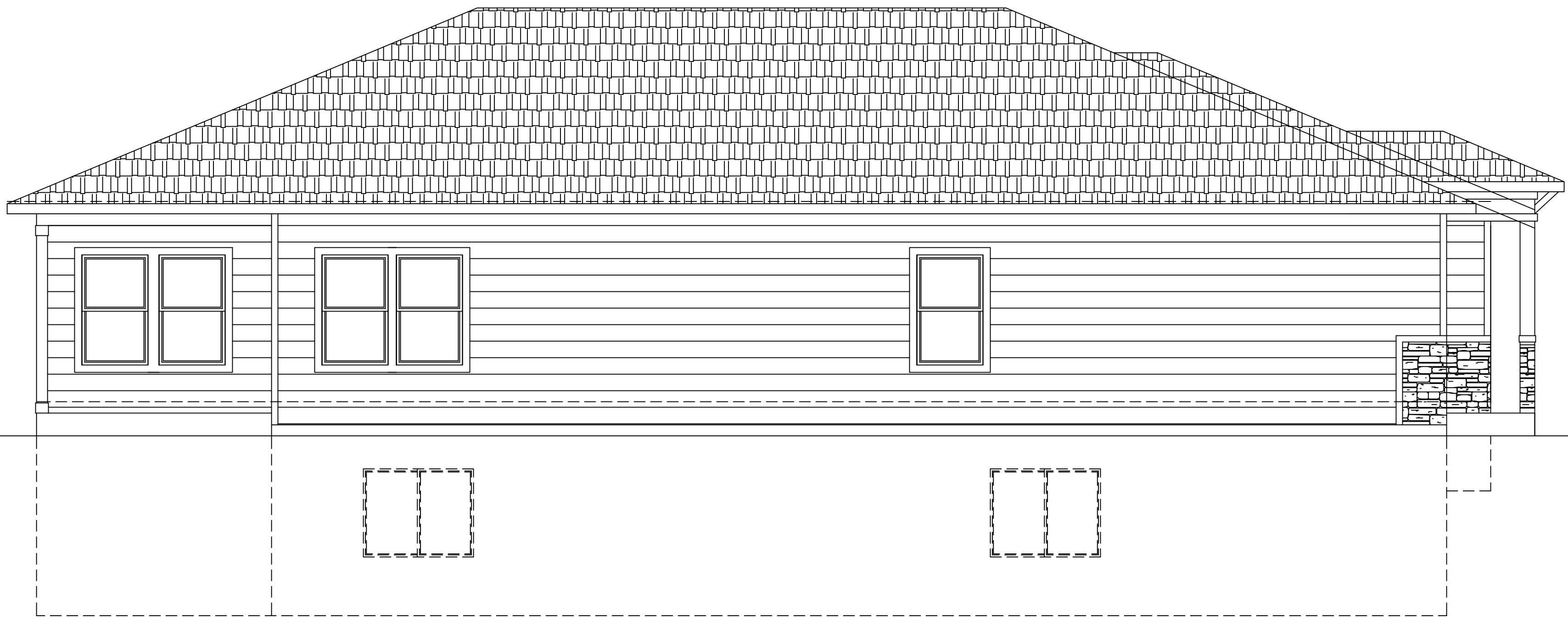
DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION CRAFT.

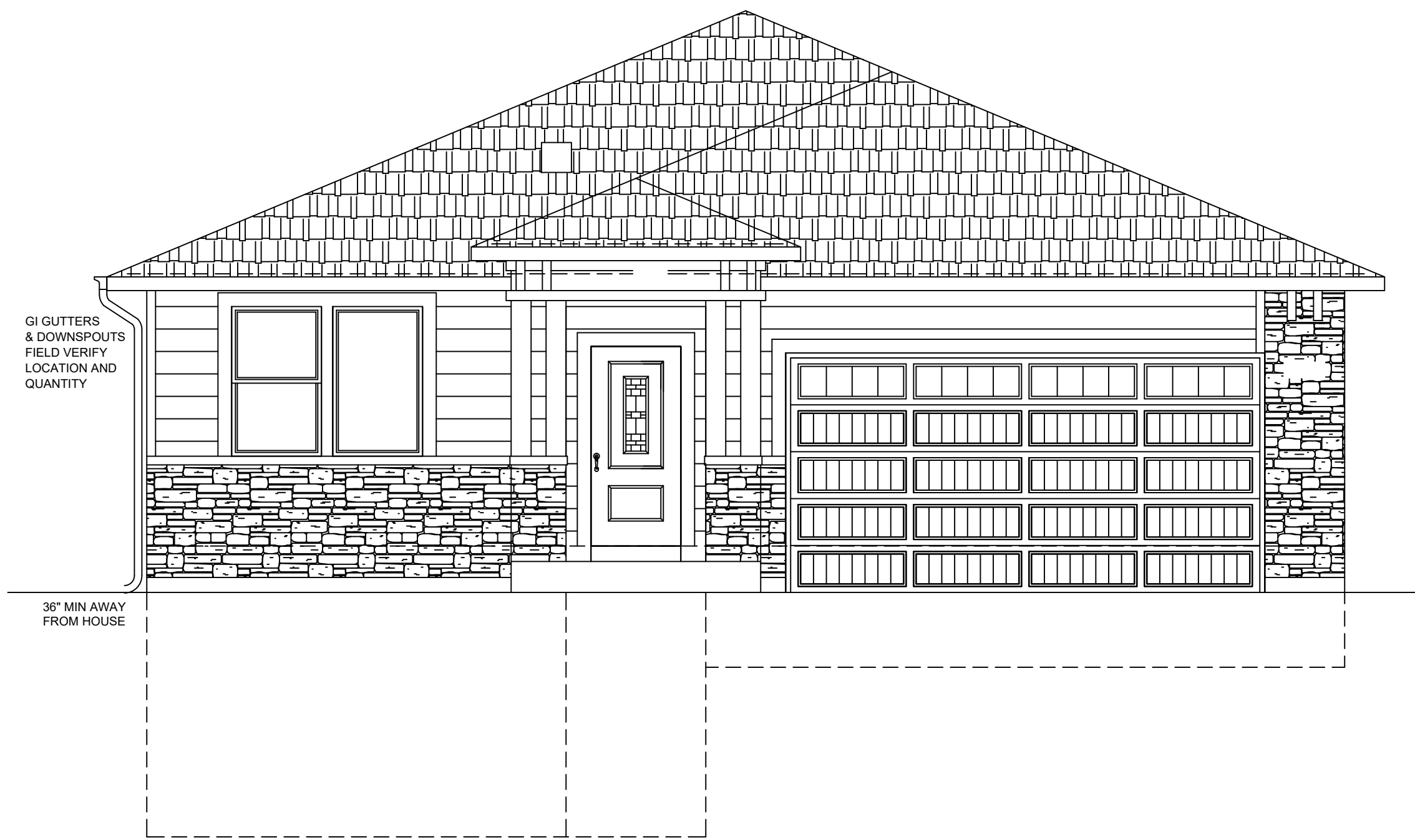
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32



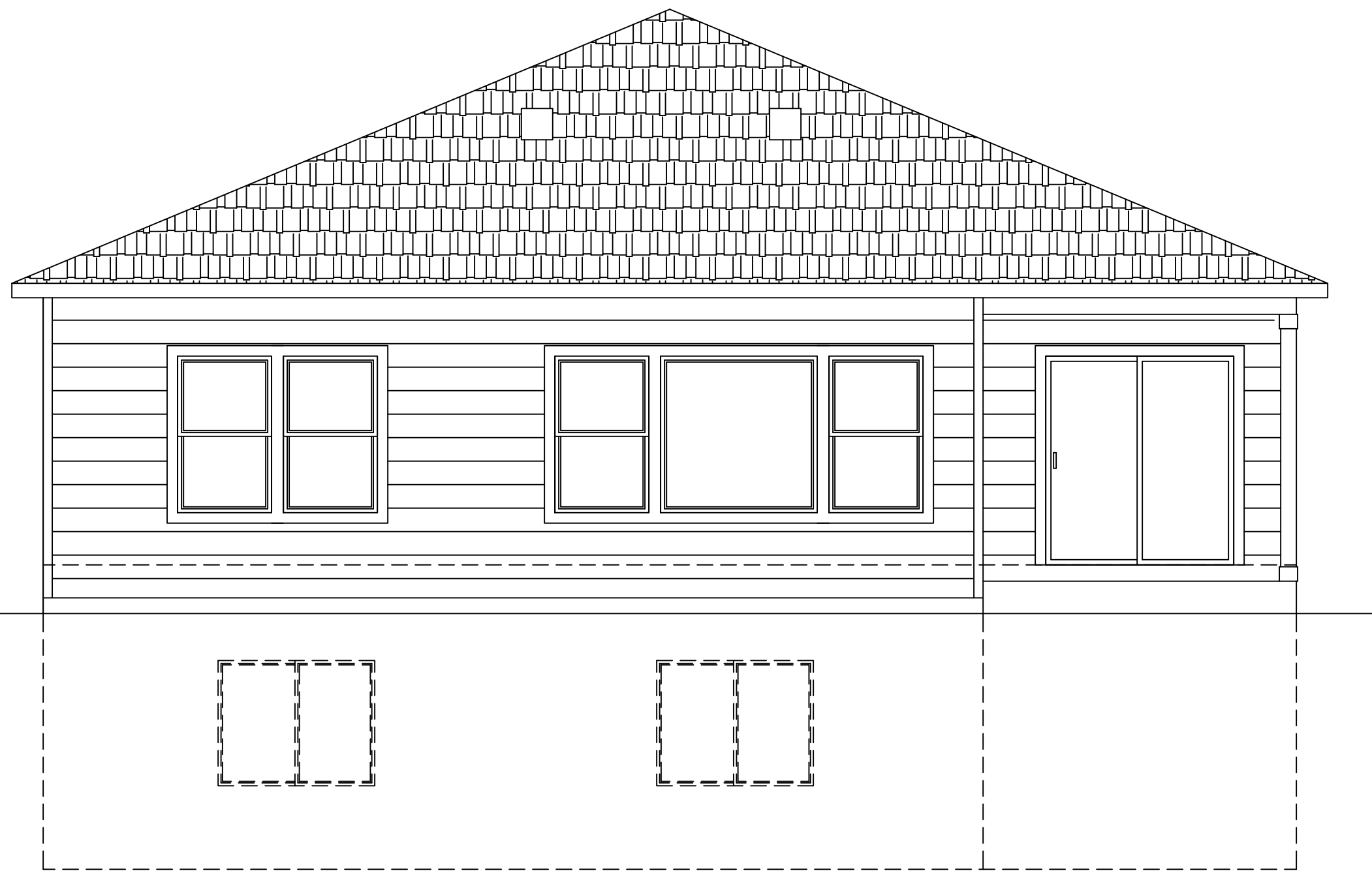
SIDE ELEVATION

1/4"=1'-0"



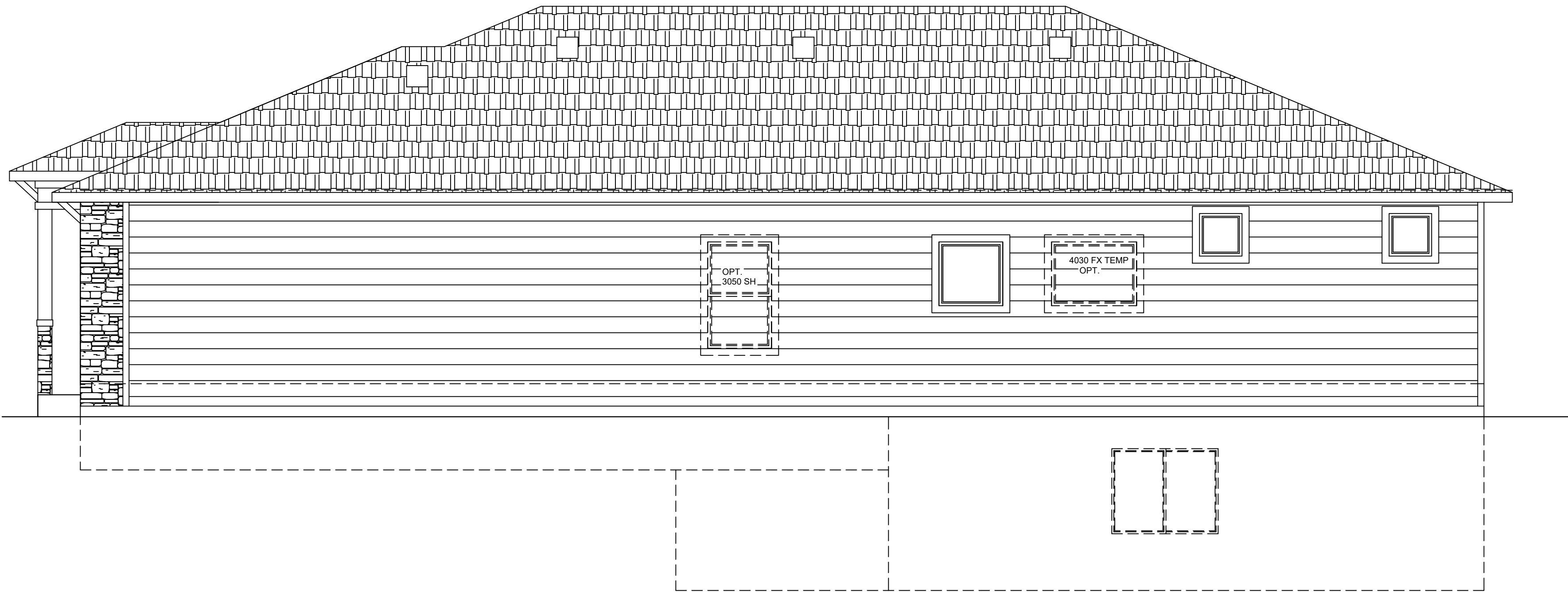
D1813.1 FRONT ELEVATION- MODERN PRAIRIE

1/4"=1'-0"



REAR ELEVATION

1/4"=1'-0"



GARAGE SIDE ELEVATION

1/4"=1'-0"

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COLORADO SPRINGS, CO 80920
719-598-5192

SHEET NAME
ELEVATION- MODERN PRAIRIE

PROJECT NAME
MASTER PLAN D1813.1

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

DATE:
8/27/18

SUBMITTALS / REVISIONS				SUBMITTALS / REVISIONS			
DATE	TYPE	BY	DATE	TYPE	BY	DATE	TYPE

ELEVATION MOD. PR.

SHEET NUMBER

33

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SUITE 250
COLORADO SPRINGS, CO 80920
719-598-5192

SHEET NAME
ELEVATION- "A"
PROJECT NAME
MASTER PLAN D2146.7

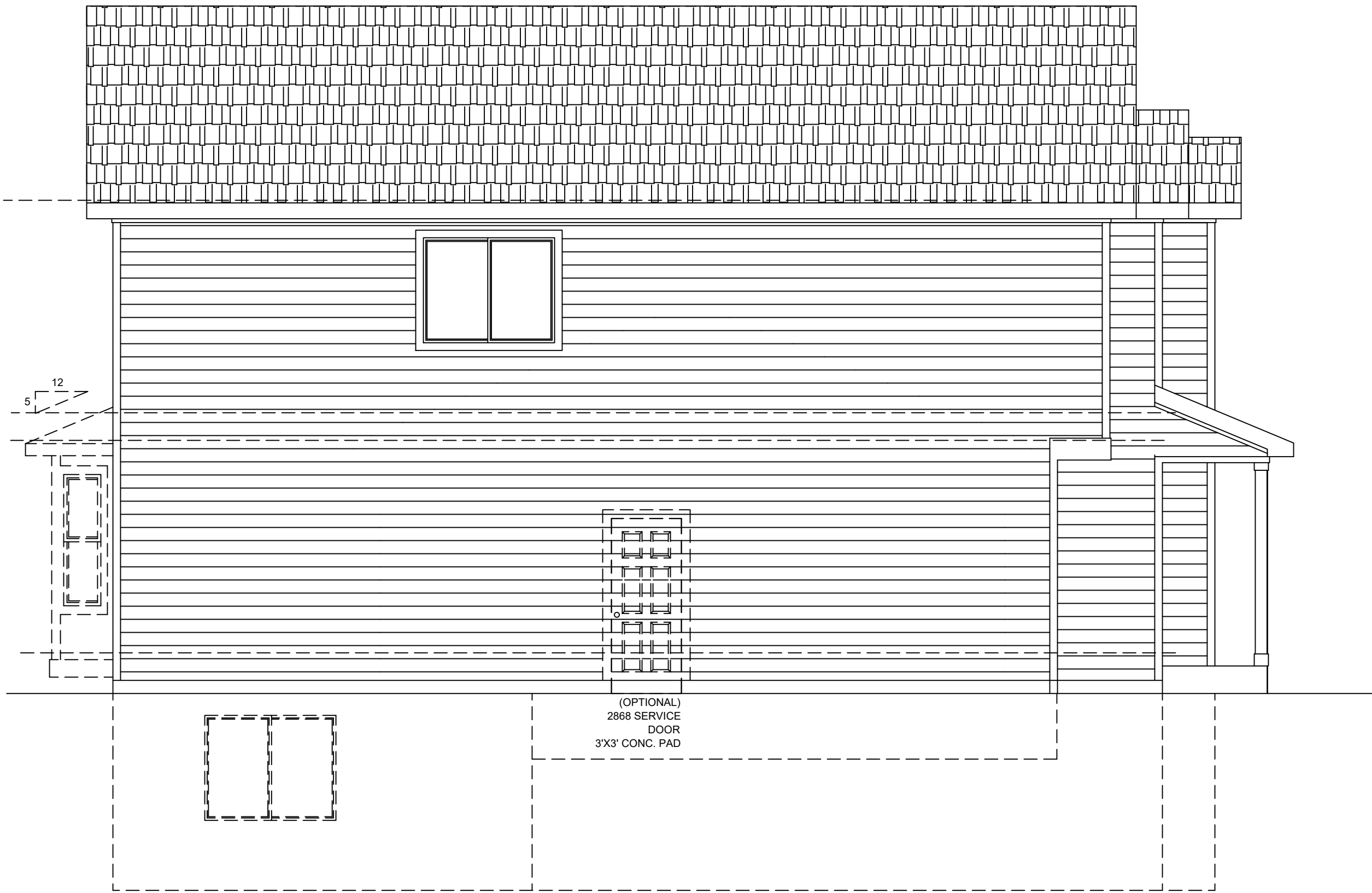
STAMPS/ENDORSEMENTS

DRAWN BY:
AL
DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	BY	DATE	BY

ELEVATION ELEV "A"

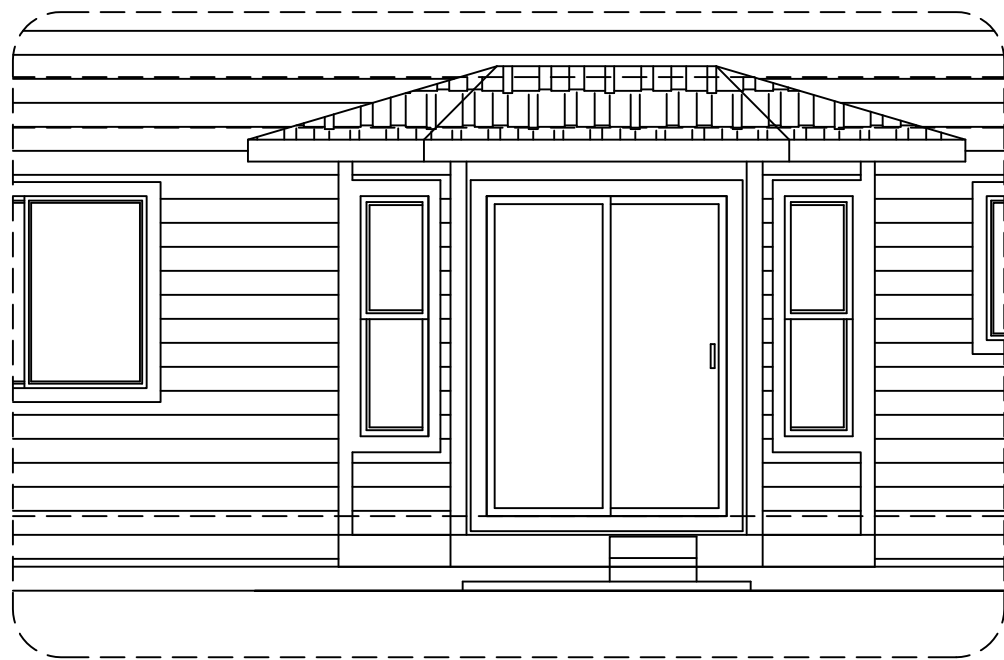
SHEET NUMBER
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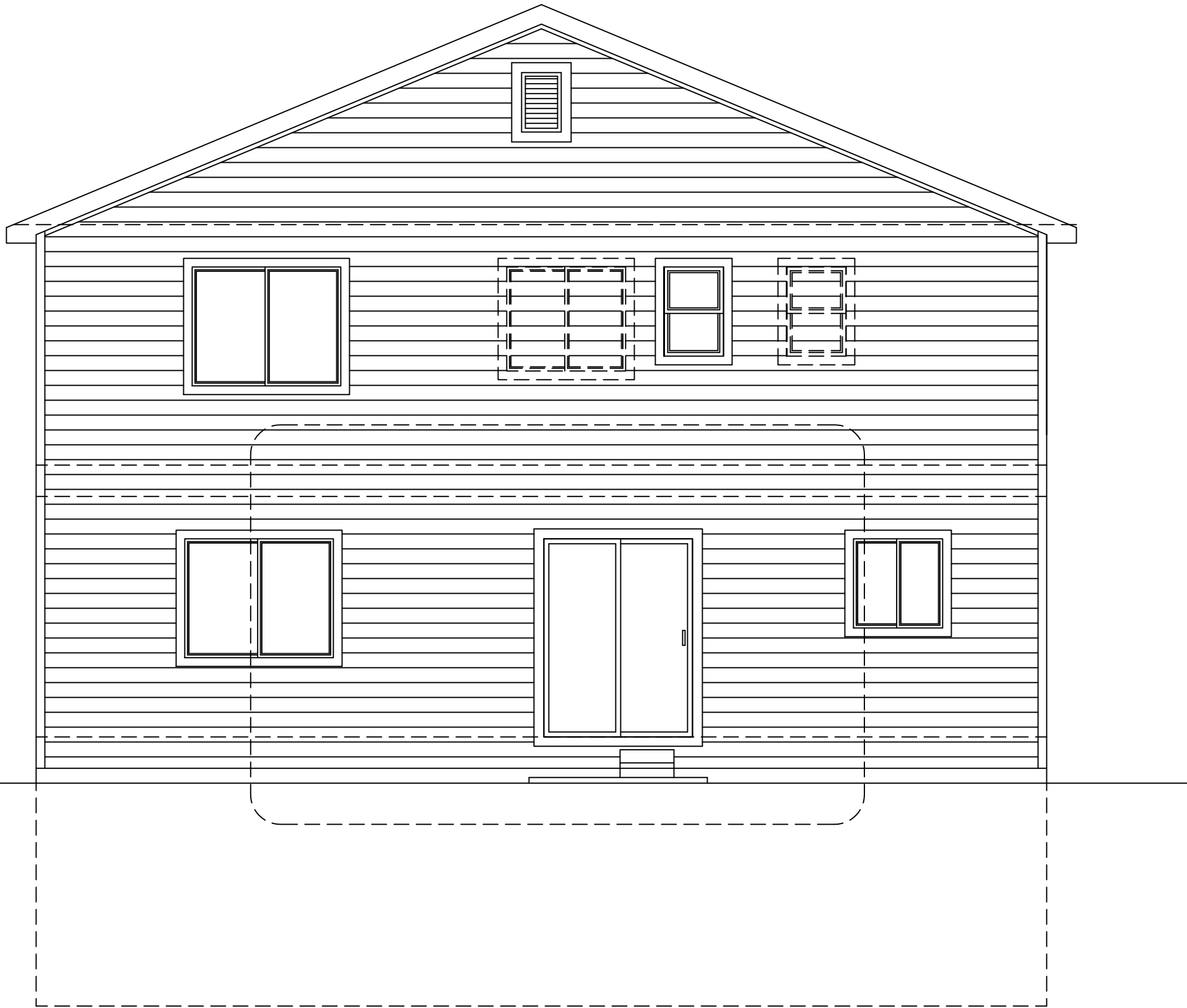
GARAGE SIDE ELEVATION "A"
1/4"=1'-0"



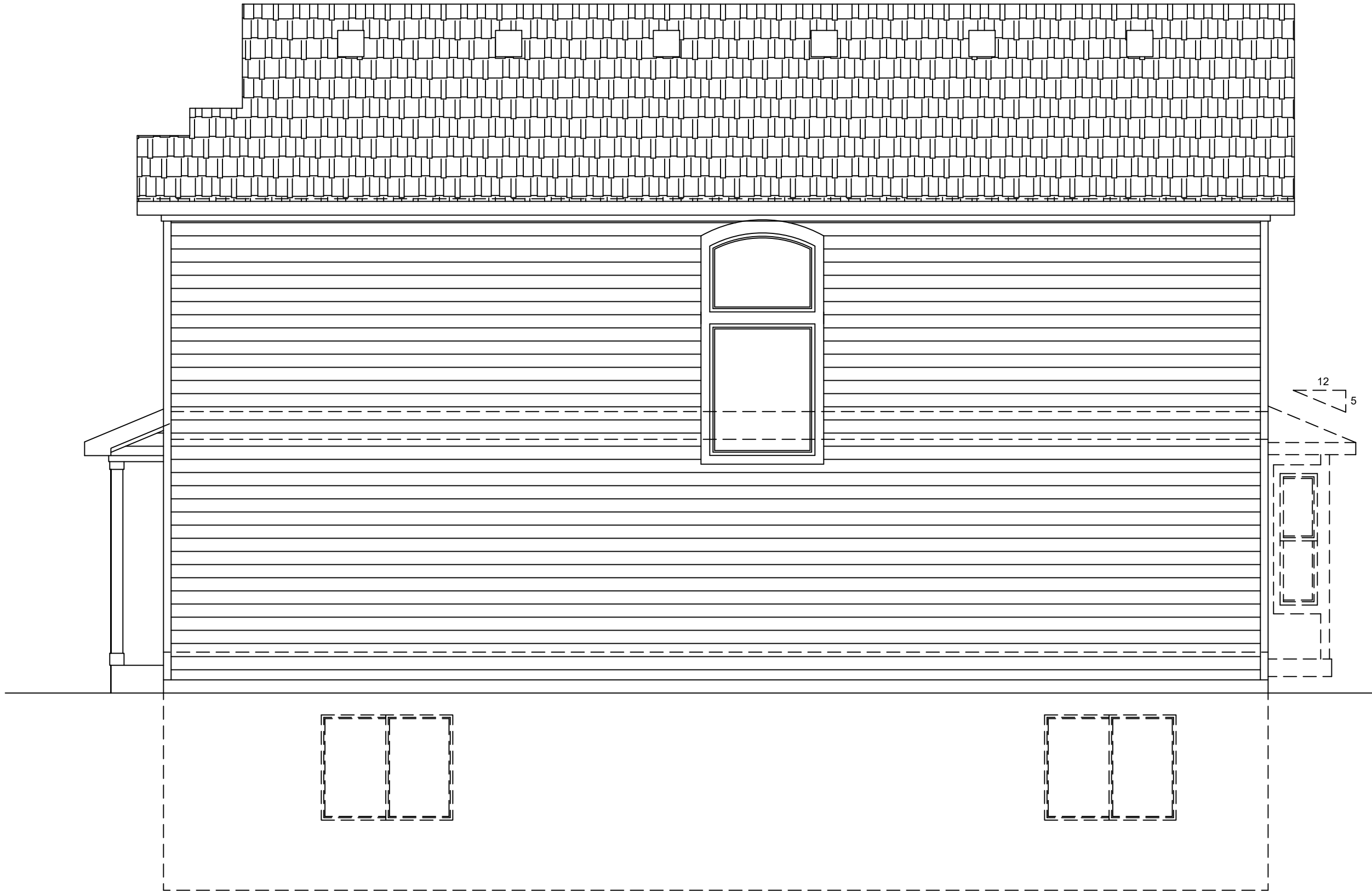
D2146.7 FRONT ELEVATION "A"
1/4"=1'-0"



OPT BAY AT DINING
1/4"=1'-0"



REAR ELEVATION "A"
1/4"=1'-0"



SIDE ELEVATION "A"
1/4"=1'-0"

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8605 EXPLORER DRIVE
SUITE 250
COLORADO SPRINGS, CO 80920
719-598-5192

SHEET NAME
ELEVATION- "C"

PROJECT NAME
MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

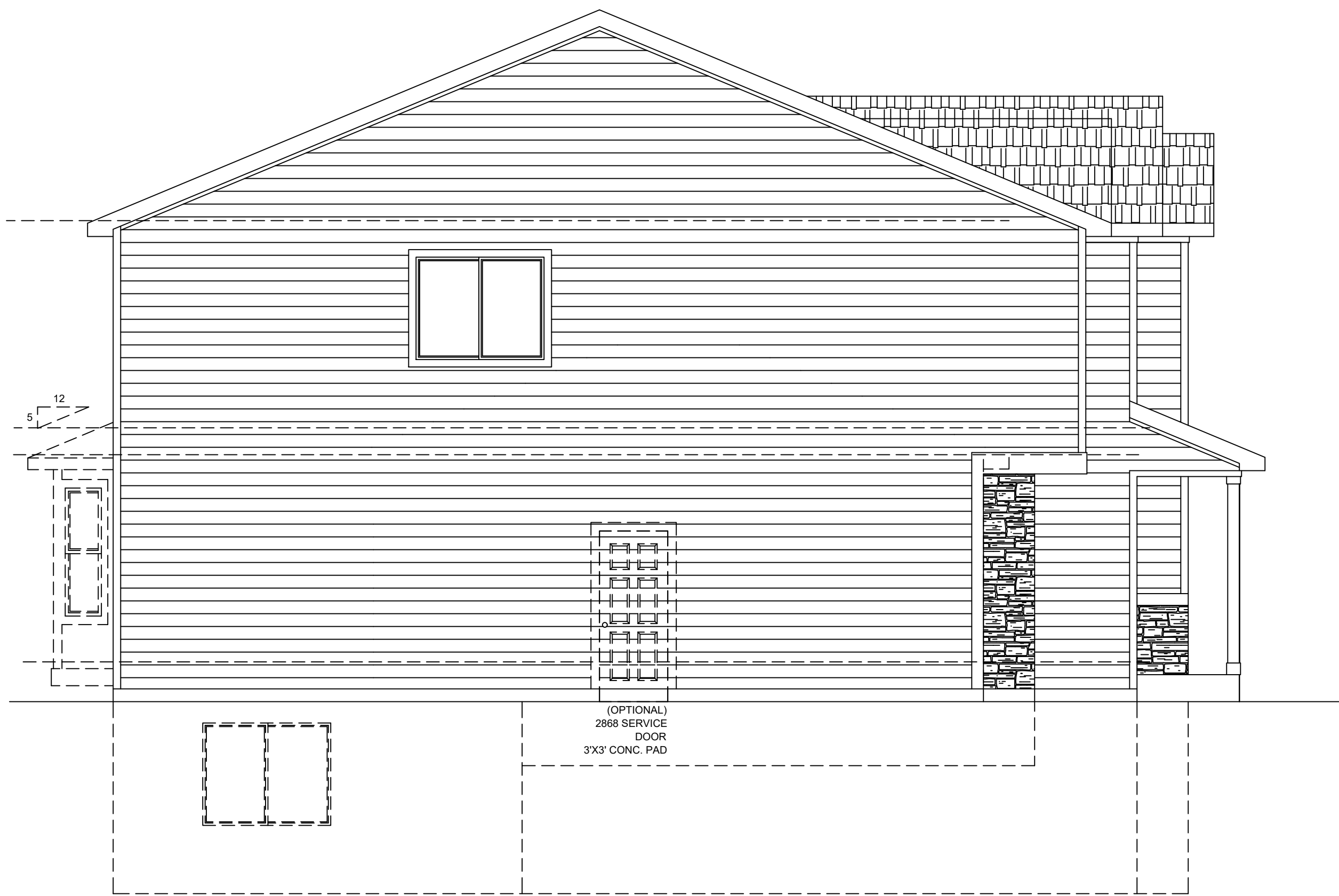
DRAWN BY:
AL
DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	TYPE	DATE	TYPE

ELEVATION ELEV "C"

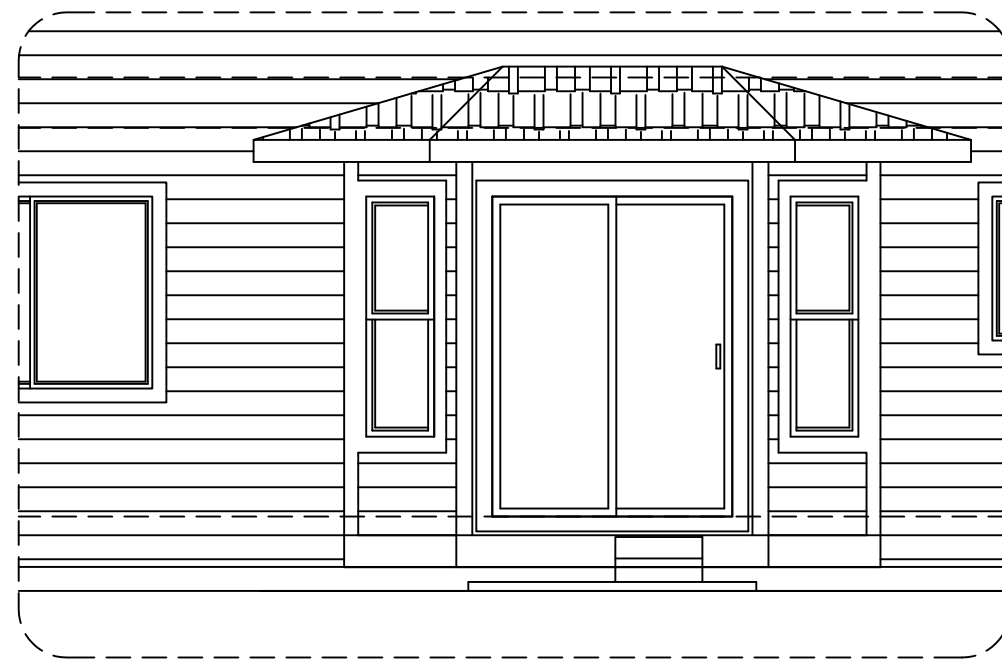
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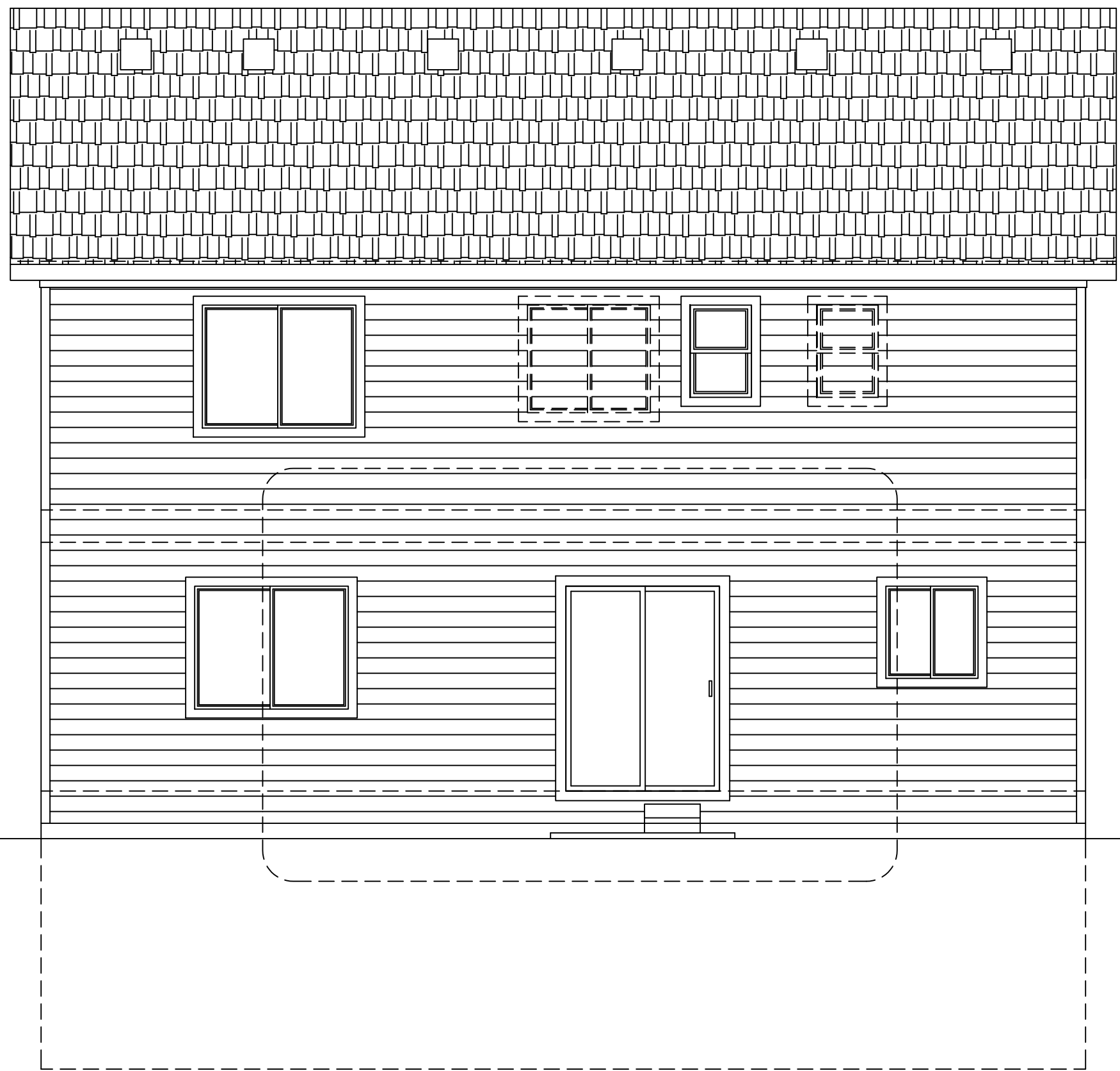
GARAGE SIDE ELEVATION "C"

1/4"=1'-0"



OPT BAY AT DINING

1/4"=1'-0"



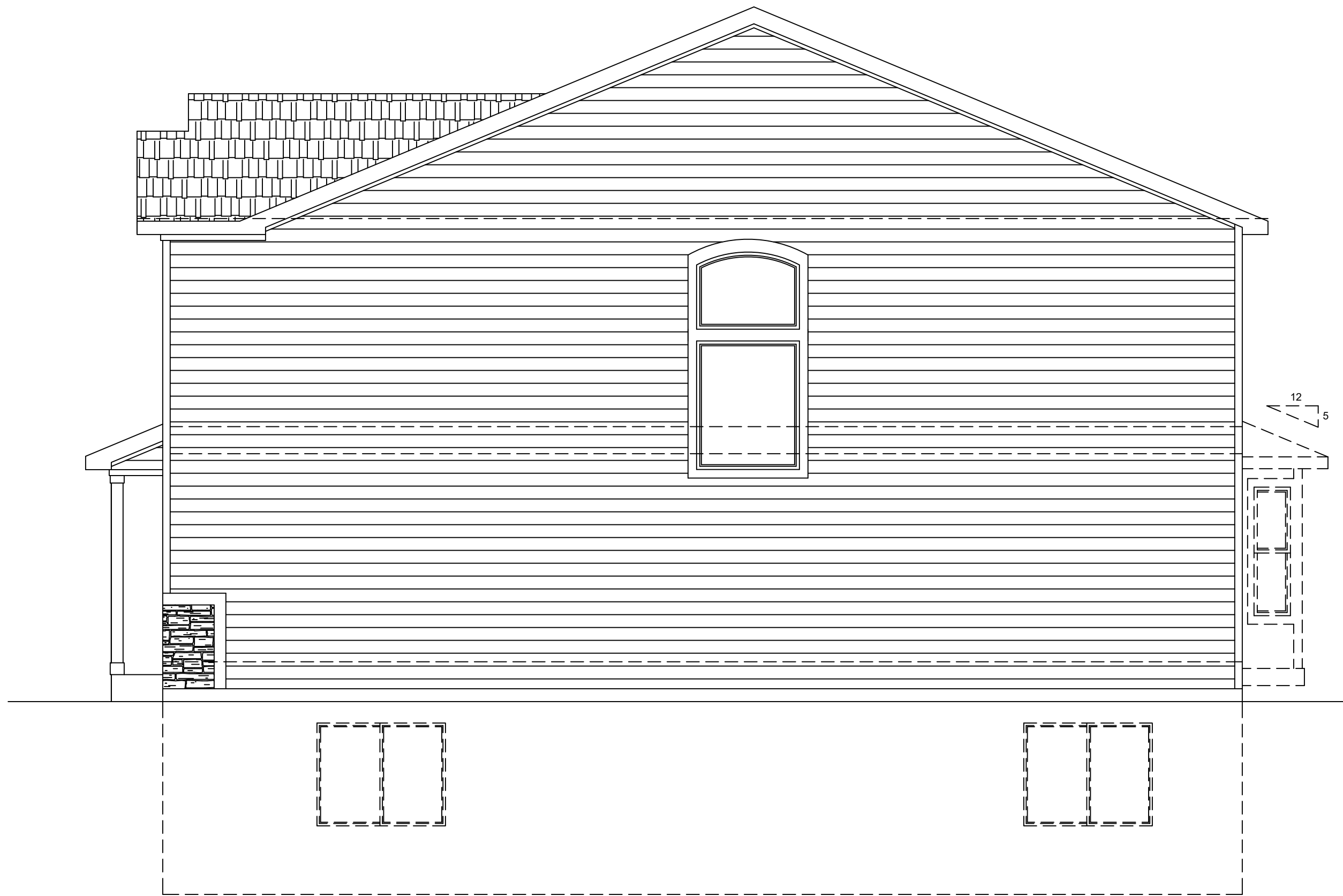
REAR ELEVATION "C"

1/4"=1'-0"



D2146.7 FRONT ELEVATION "C"

1/4"=1'-0"



SIDE ELEVATION "C"

1/4"=1'-0"

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SUITE 250
COLORADO SPRINGS, CO 80920
719-598-5192

SHEET NAME

ELEVATION- "D"

PROJECT NAME

MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

DRAWN BY:

AL

DATE:

8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	BY	DATE	BY

ELEVATION ELEV "D"

SHEET NUMBER

36

GARAGE SIDE ELEVATION "D"

1/4"=1'-0"

D2146.7 FRONT ELEVATION "D"

1/4"=1'-0"

OPT BAY AT DINING

1/4"=1'-0"

REAR ELEVATION "D"

1/4"=1'-0"

SIDE ELEVATION "D"

1/4"=1'-0"

Page 77 of 483

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8605 EXPLORER DRIVE
SUITE 250
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719-598-5192

SHEET NAME
ELEVATION- "E"

PROJECT NAME
MASTER PLAN D2146.7

STAMPS/ENDORSEMENTS

DRAWN BY:
AL

DATE:
8/27/18

SUBMITTALS / REVISIONS		SUBMITTALS / REVISIONS	
DATE	BY	DATE	BY

ELEVATION ELEV "E"

SHEET NUMBER
37

12
5

(OPTIONAL)
2868 SERVICE
DOOR
3'X3' CONC. PAD

GARAGE SIDE ELEVATION "E"
1/4"=1'-0"

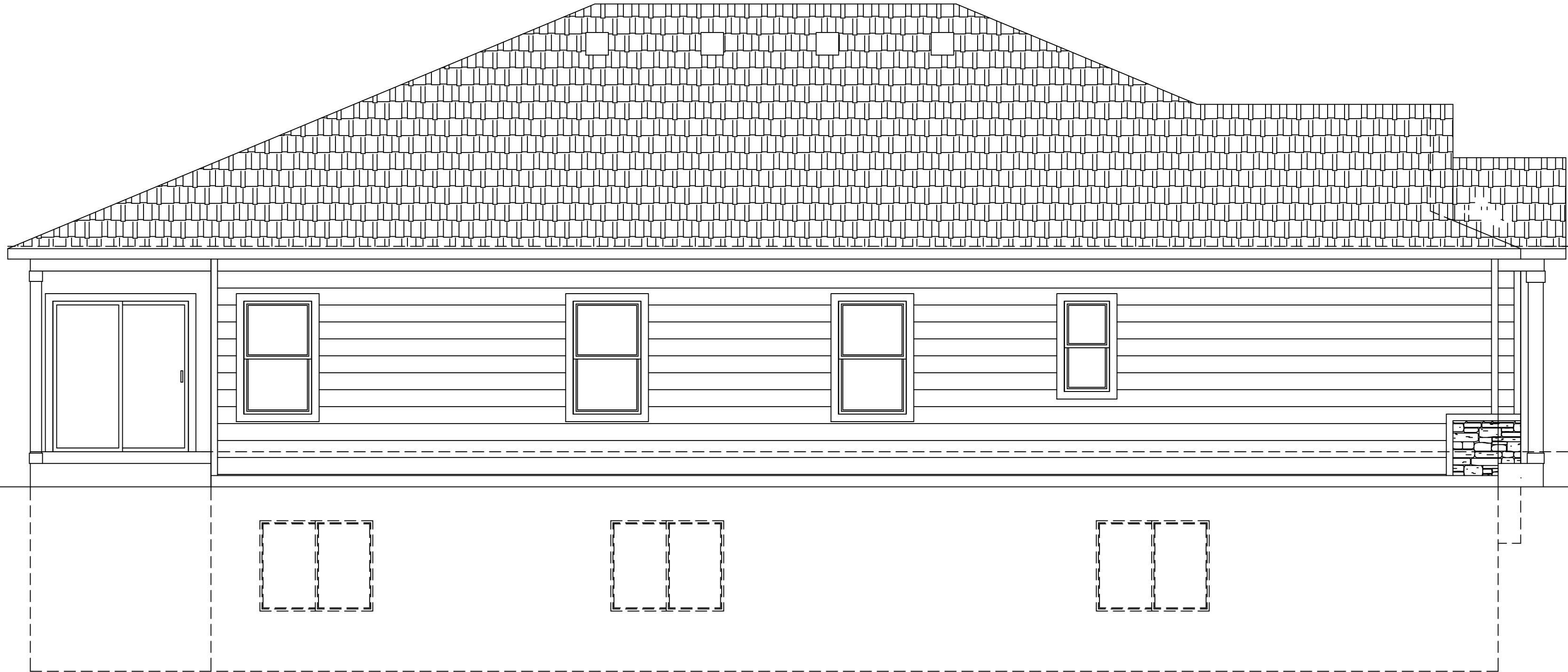
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OPT BAY AT DINING
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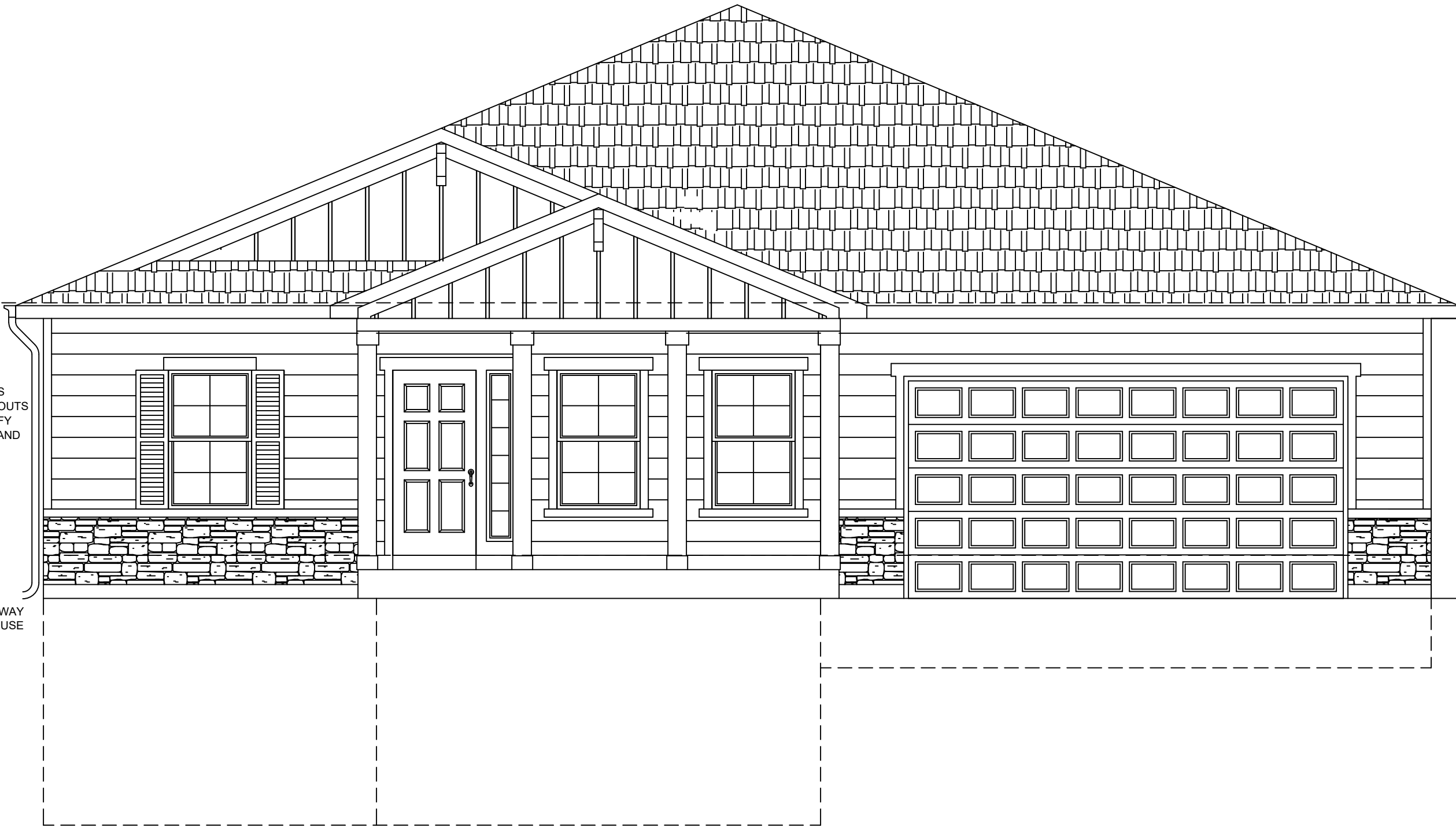
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SIDE ELEVATION "E"
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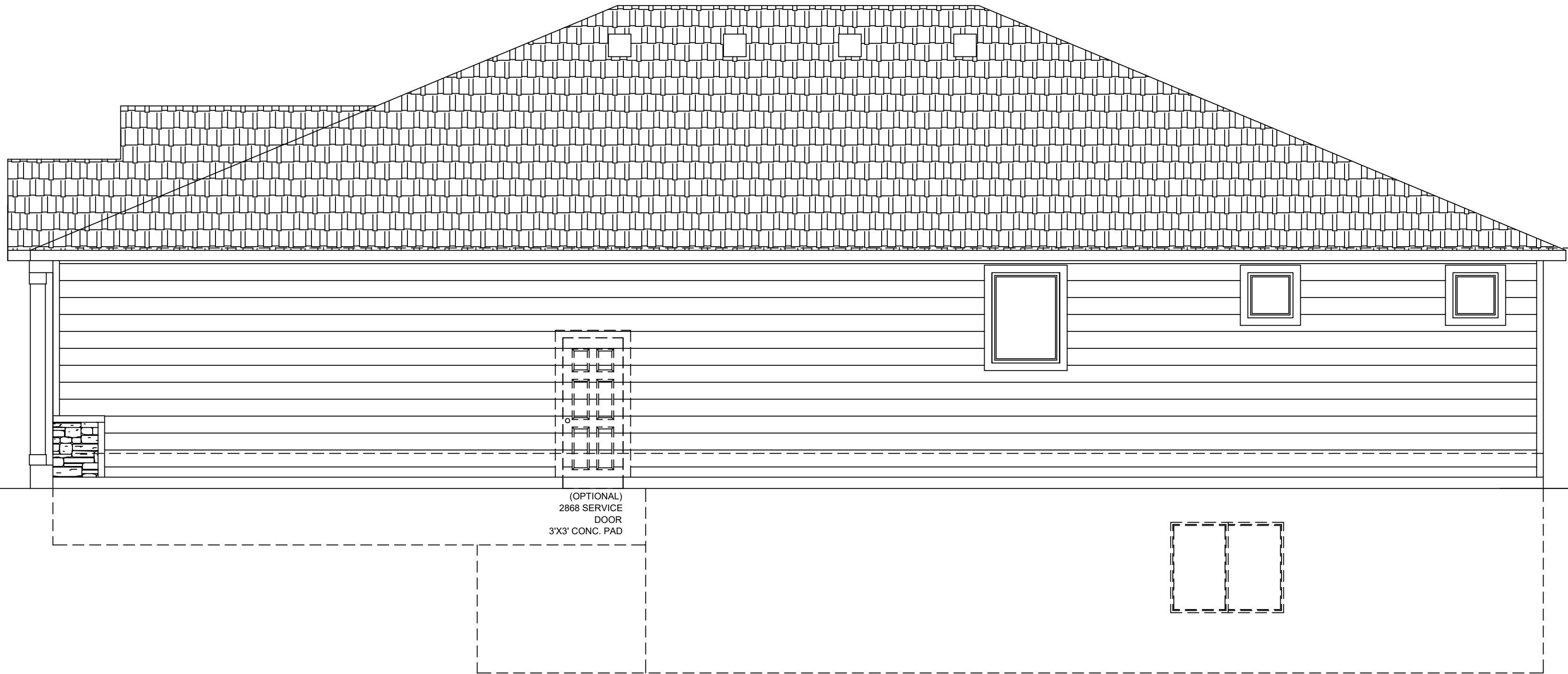
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D2357.1 FRONT ELEVATION-TRADITIONAL

1/4"=1'-0"



GARAGE SIDE ELEVATION- TRADITIONAL

1/4"=1'-0"



REAR ELEVATION- TRADITIONAL

1/4"=1'-0"

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ELEVATION- TRADITIONAL
PROJECT NAME
MASTER PLAN D2357.1

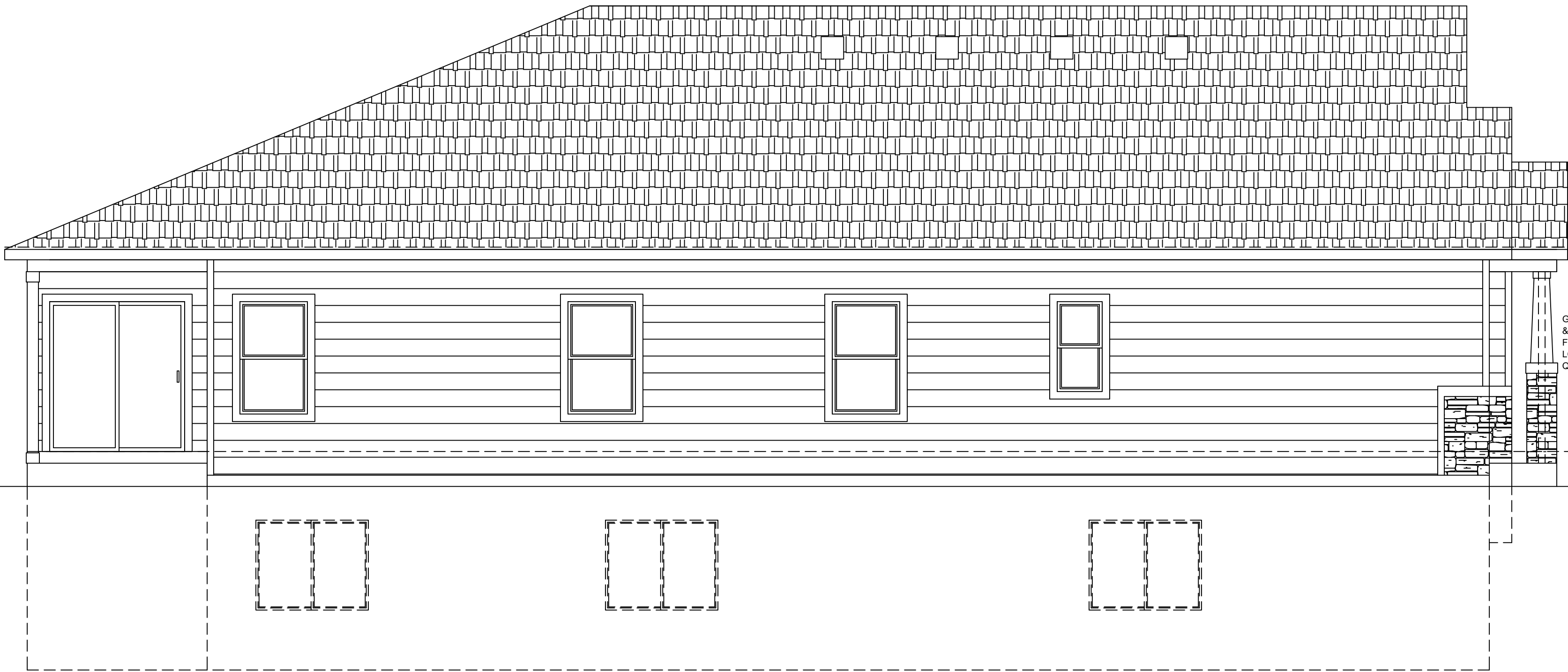
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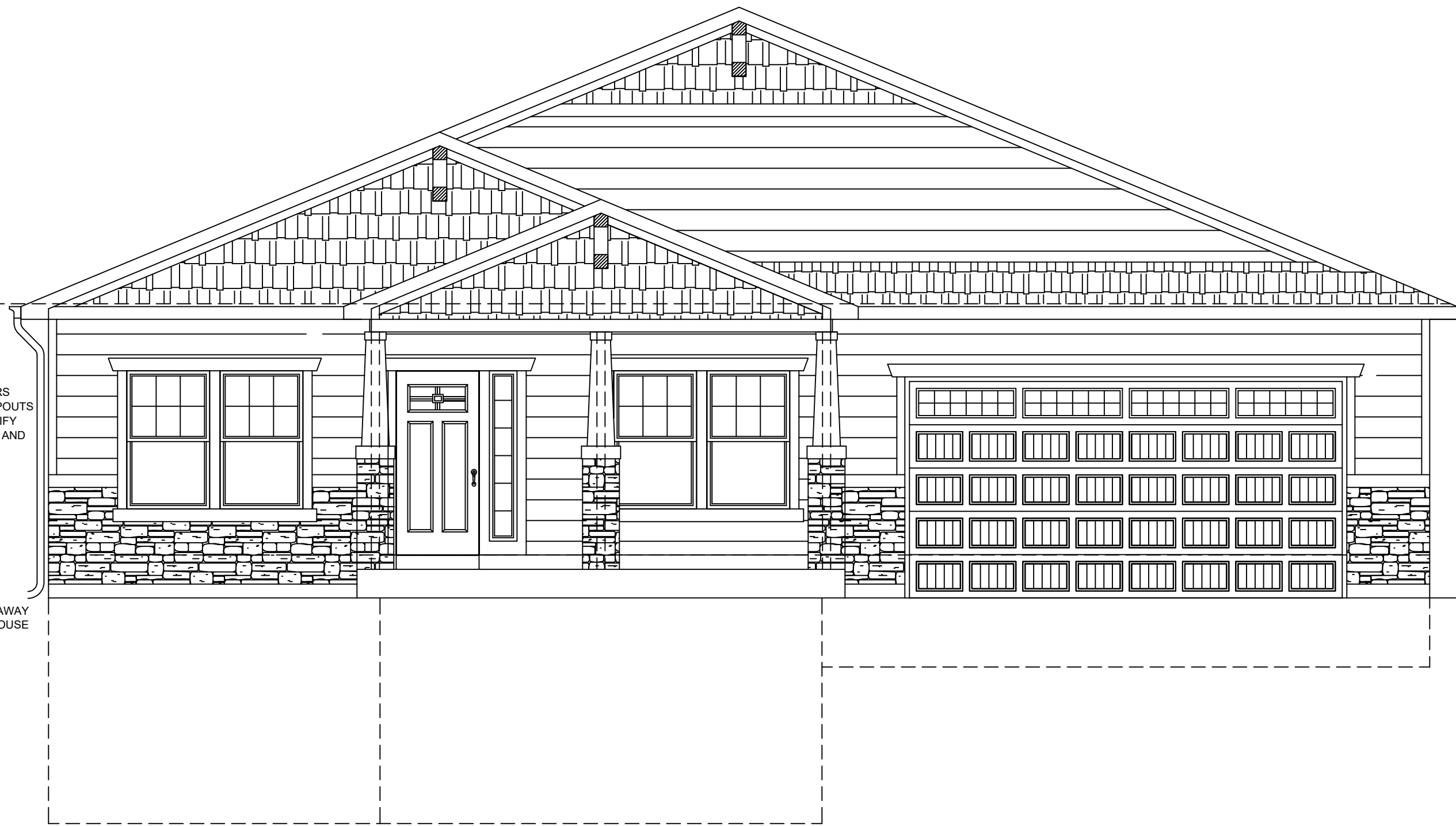
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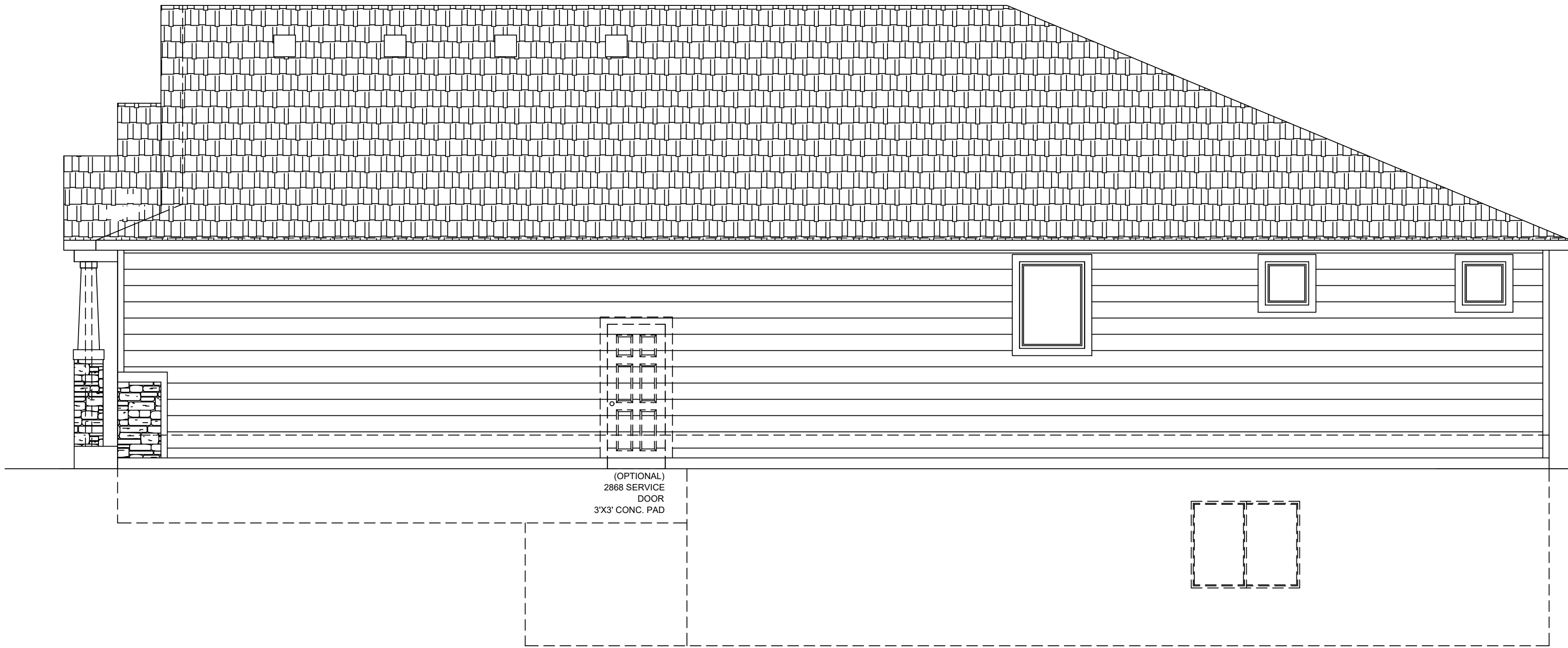
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D2357.1 FRONT ELEVATION-CRAFTSMAN
1/4"=1'-0"



GARAGE SIDE ELEVATION- CRAFTSMAN
1/4"=1'-0"



REAR ELEVATION- CRAFTSMAN
1/4"=1'-0"

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ELEVATION- CRAFTSMAN

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ELEVATION CRAFT.

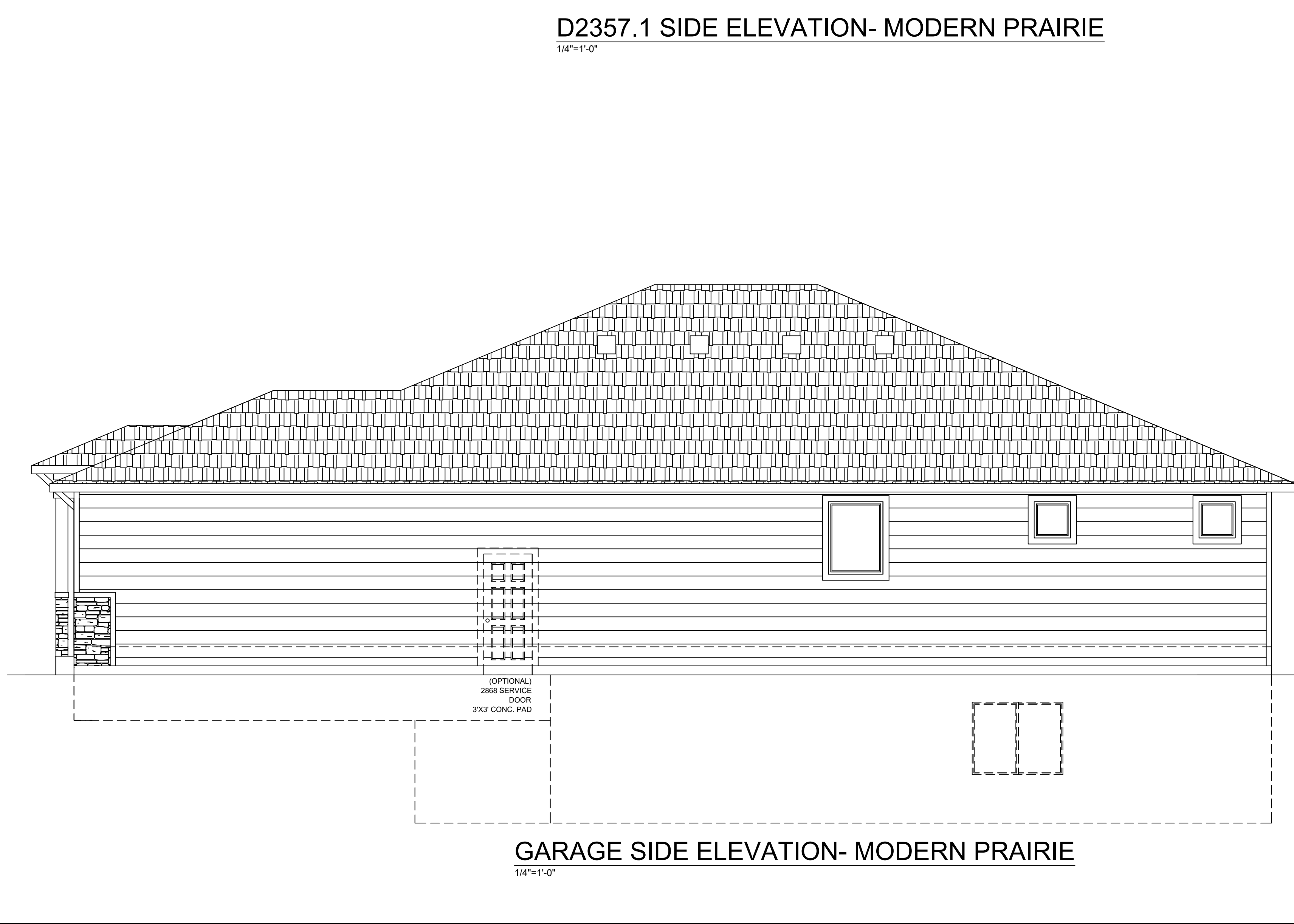
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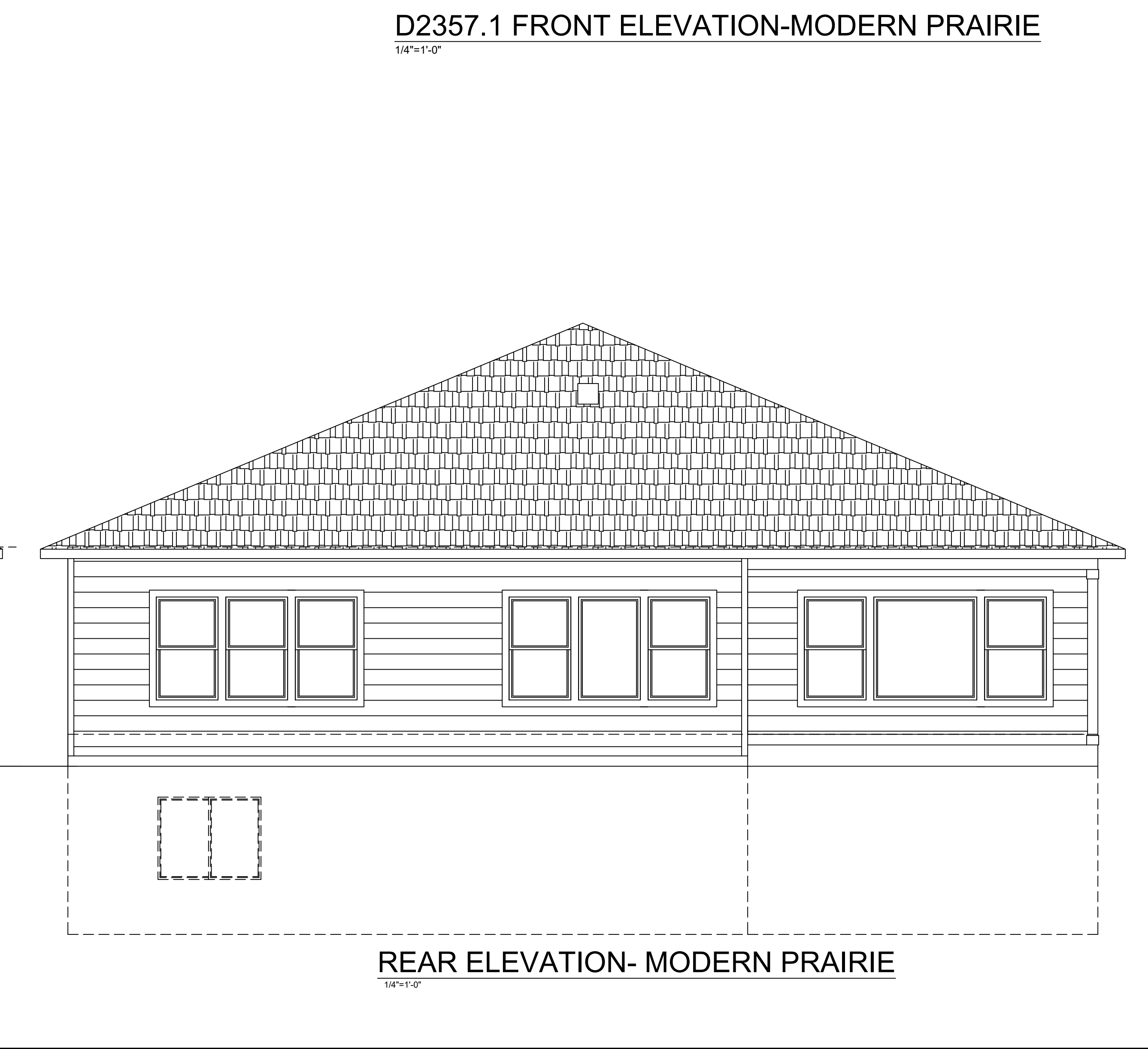
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D2357.1 FRONT ELEVATION-MODERN PRAIRIE
1/4"=1'-0"



GARAGE SIDE ELEVATION- MODERN PRAIRIE
1/4"=1'-0"



REAR ELEVATION- MODERN PRAIRIE
1/4"=1'-0"

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SHEET NAME
ELEVATION- MODERN PRAIRIE

PROJECT NAME
MASTER PLAN D2357.1

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DATE	BY	DATE	BY

ELEVATION MOD. PR.

SHEET NUMBER
40



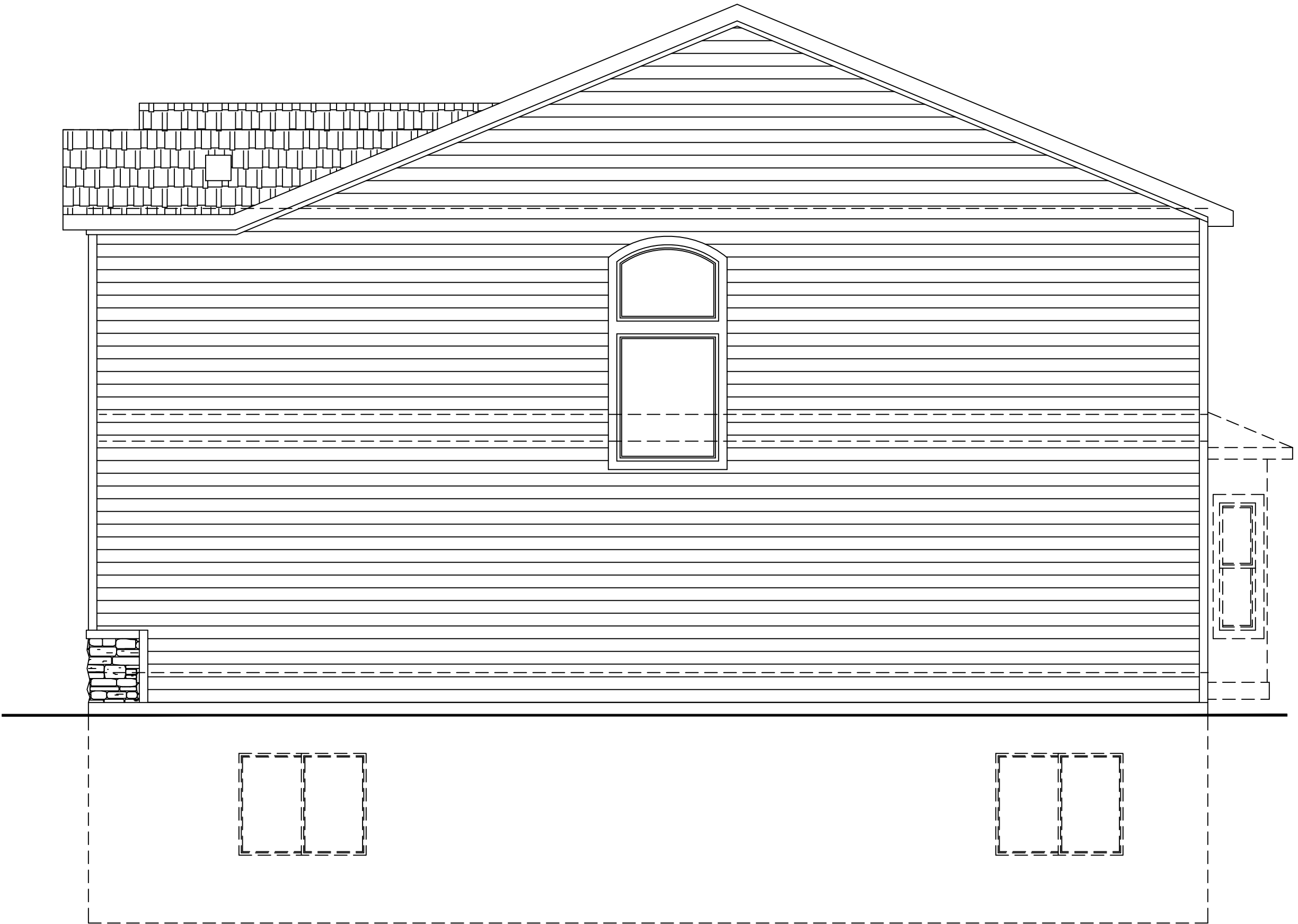
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D2659.5 FRONT ELEVATION "A"
SCALE: 1/4" = 1'-0" (SHOWN w/ OPTIONAL BASEMENT)



RIGHT ELEVATION "A"
SCALE: 1/4" = 1'-0"

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SHEET NAME
ELEVATION- "A"

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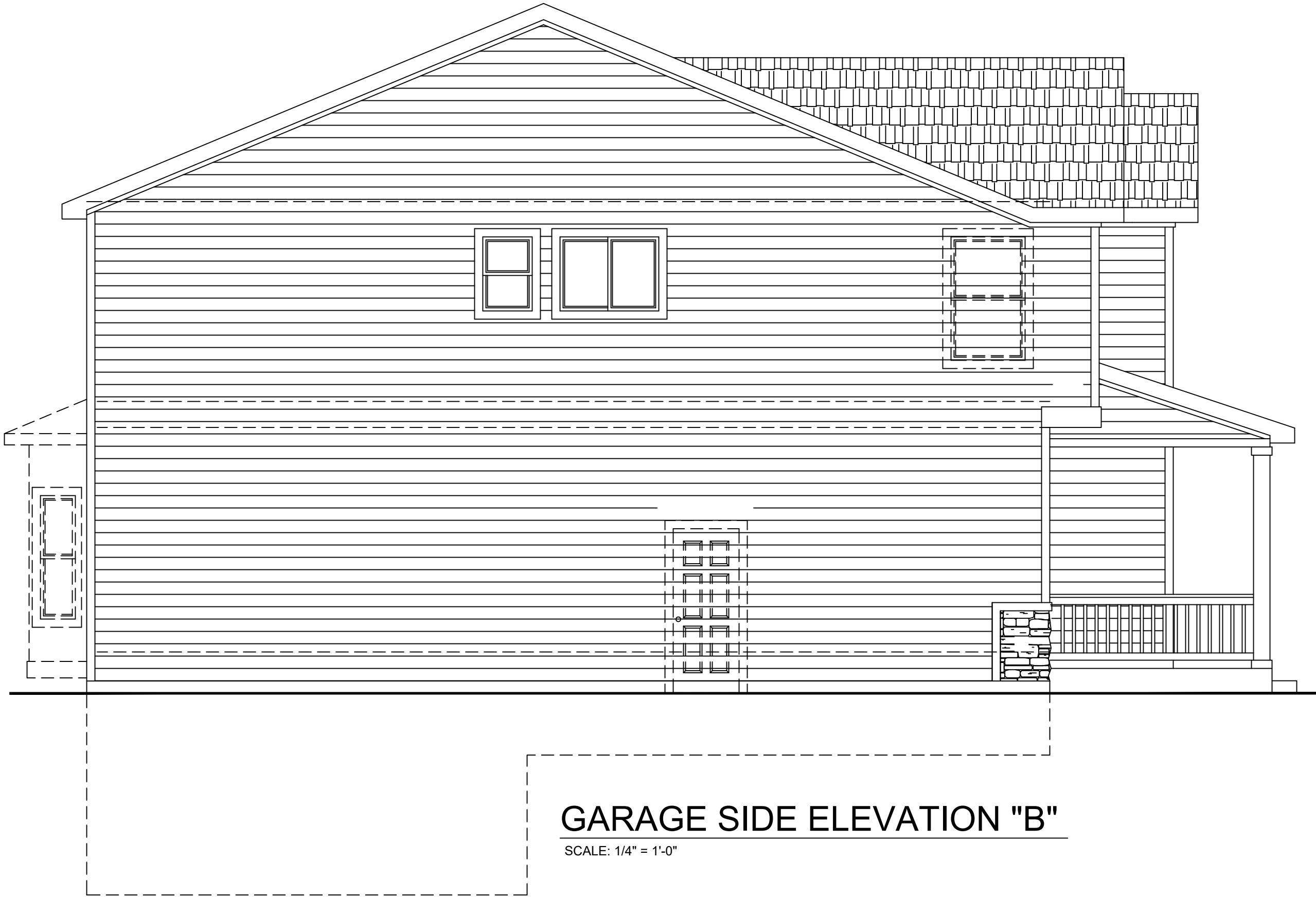
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SHEET NUMBER
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REAR ELEVATION "B"

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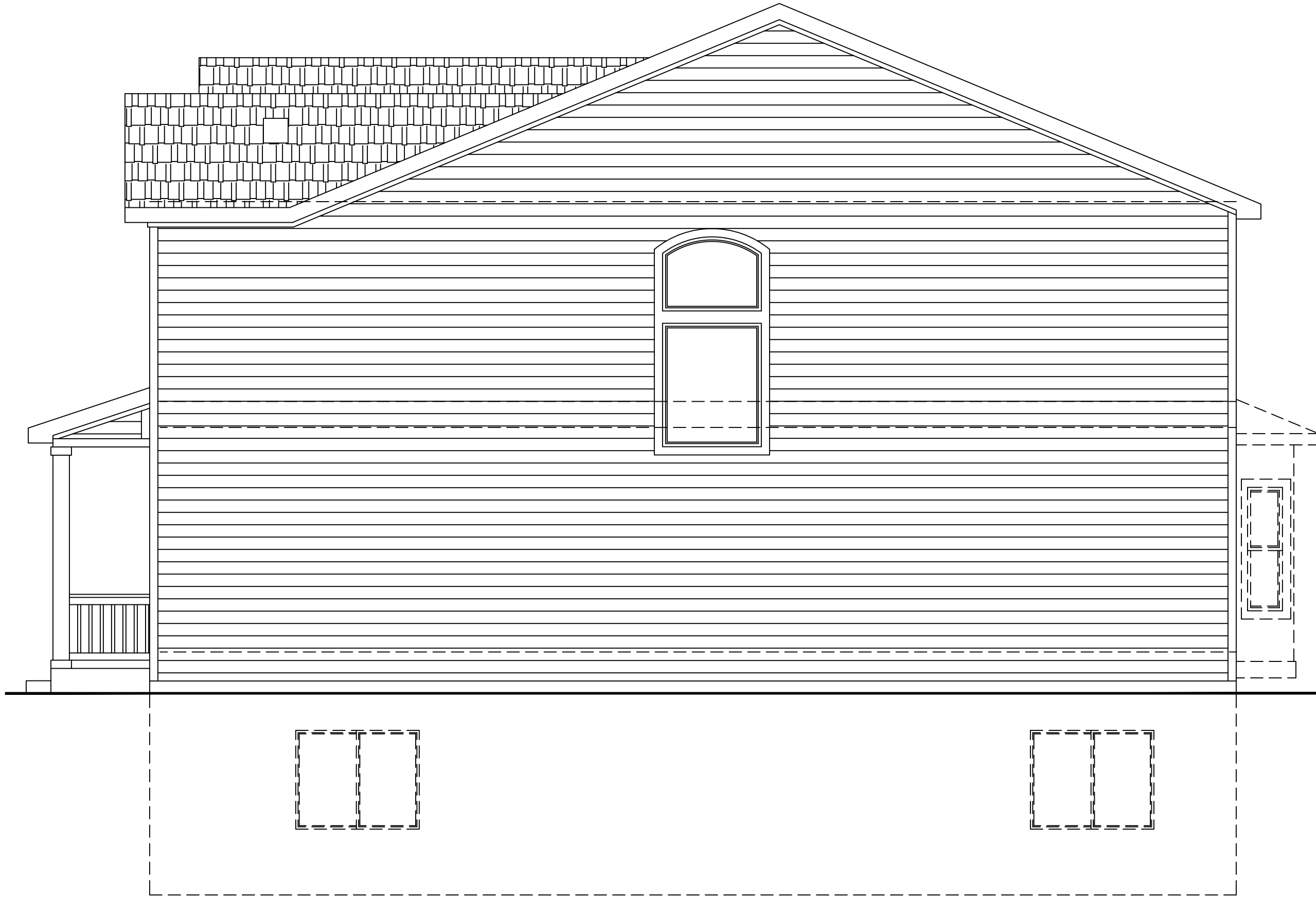
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SCALE: 1/4" = 1'-0" (SHOWN w/ OPTIONAL BASEMENT)



RIGHT ELEVATION "B"

SCALE: 1/4" = 1'-0"

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ELEVATION- "B"
PROJECT NAME
MASTER PLAN D2659.5

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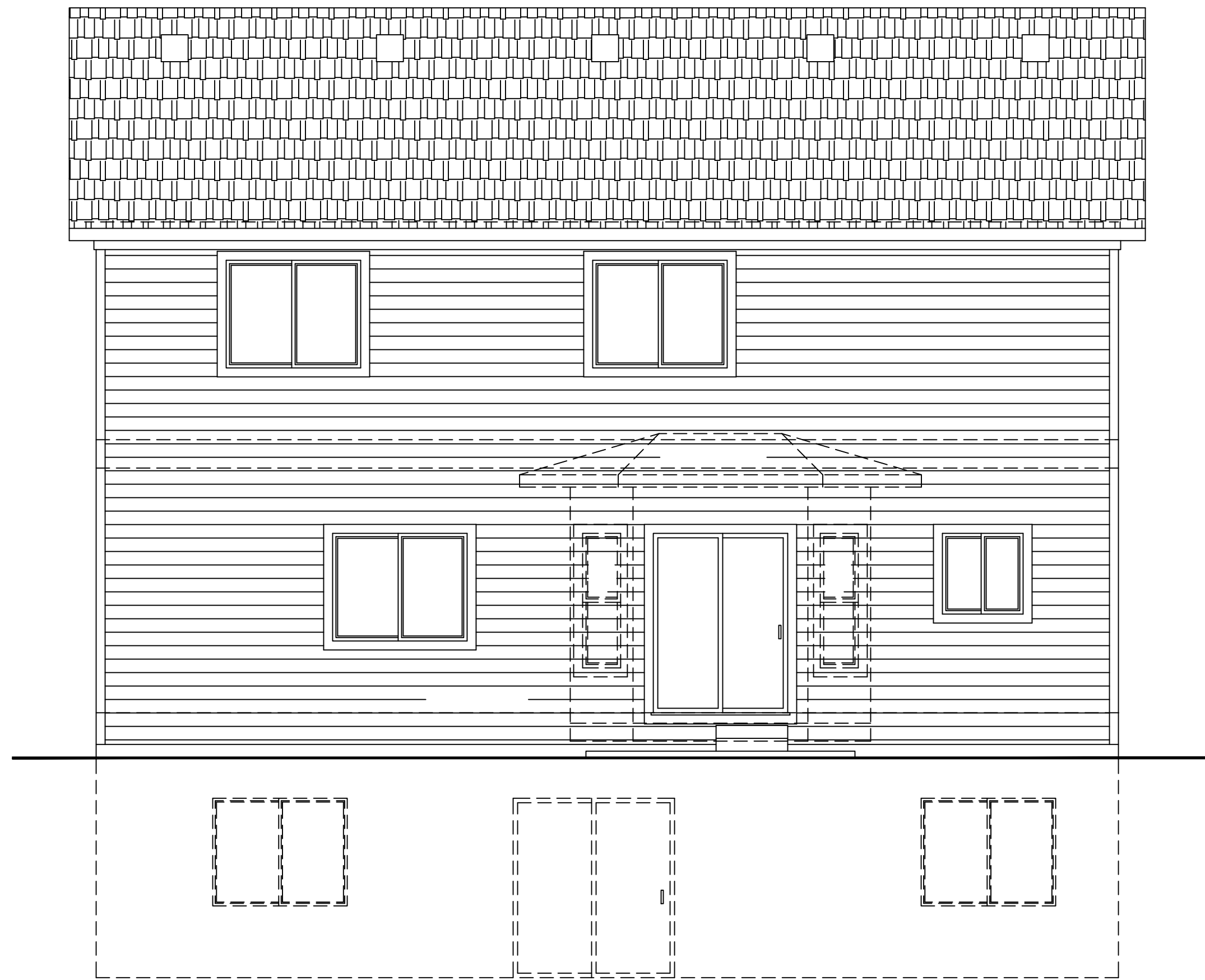
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ELEVATION "B"

SHEET NUMBER

42



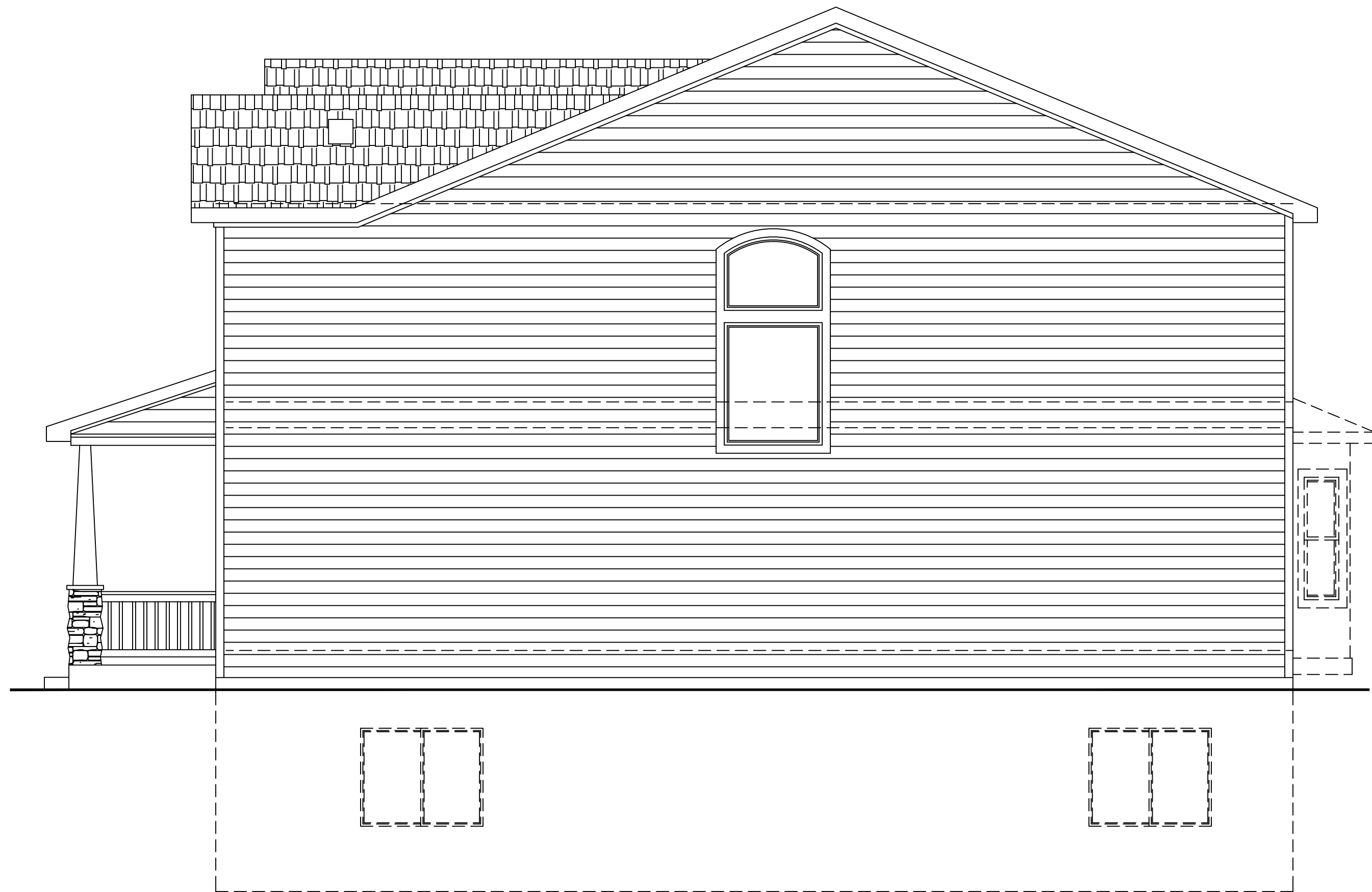
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GARAGE SIDE ELEVATION "E"
SCALE: 1/4" = 1'-0"



D2659.5 FRONT ELEVATION "E"
SCALE: 1/4" = 1'-0" (SHOWN w/ OPTIONAL BASEMENT)



RIGHT ELEVATION "E"
SCALE: 1/4" = 1'-0"

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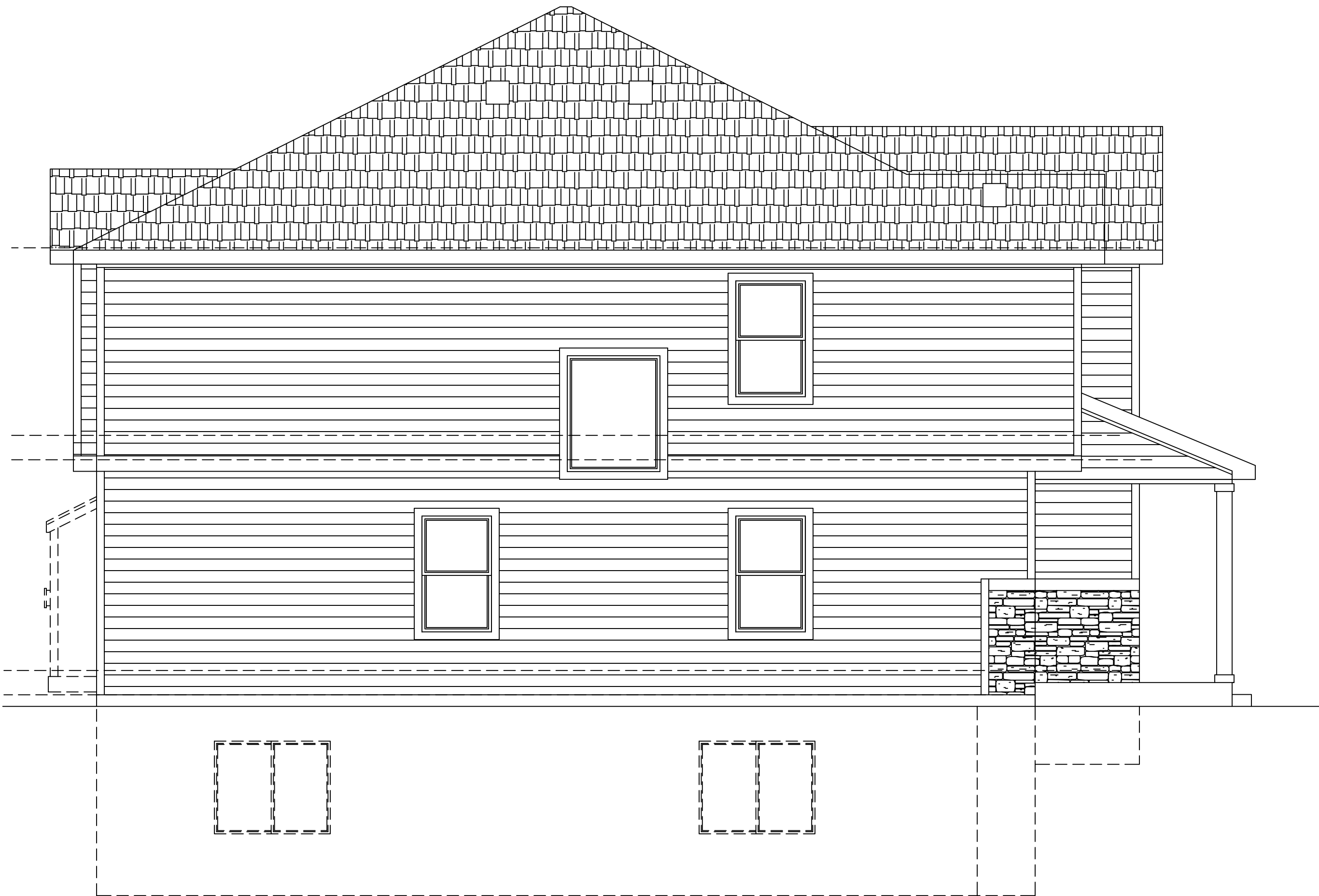
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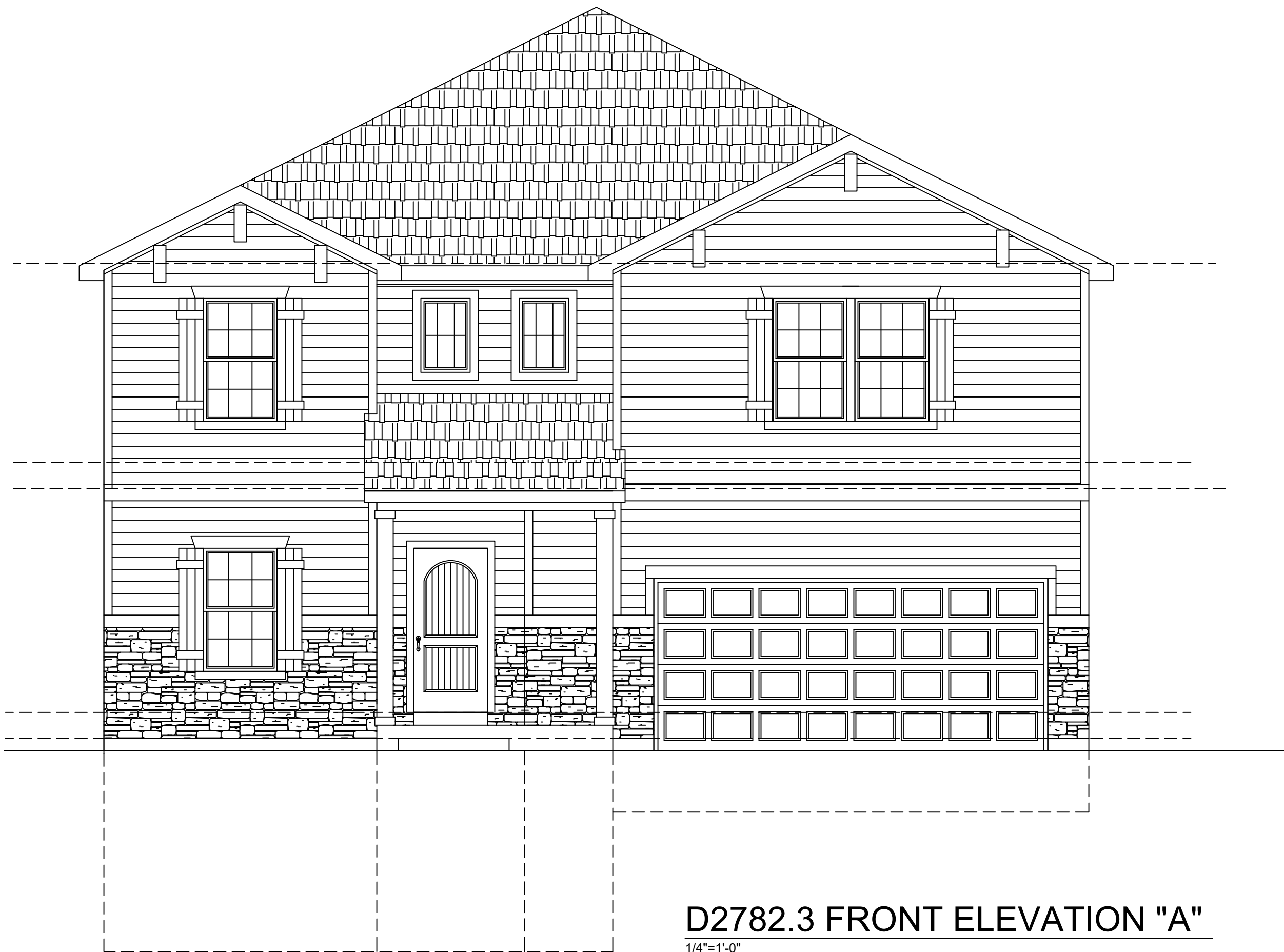
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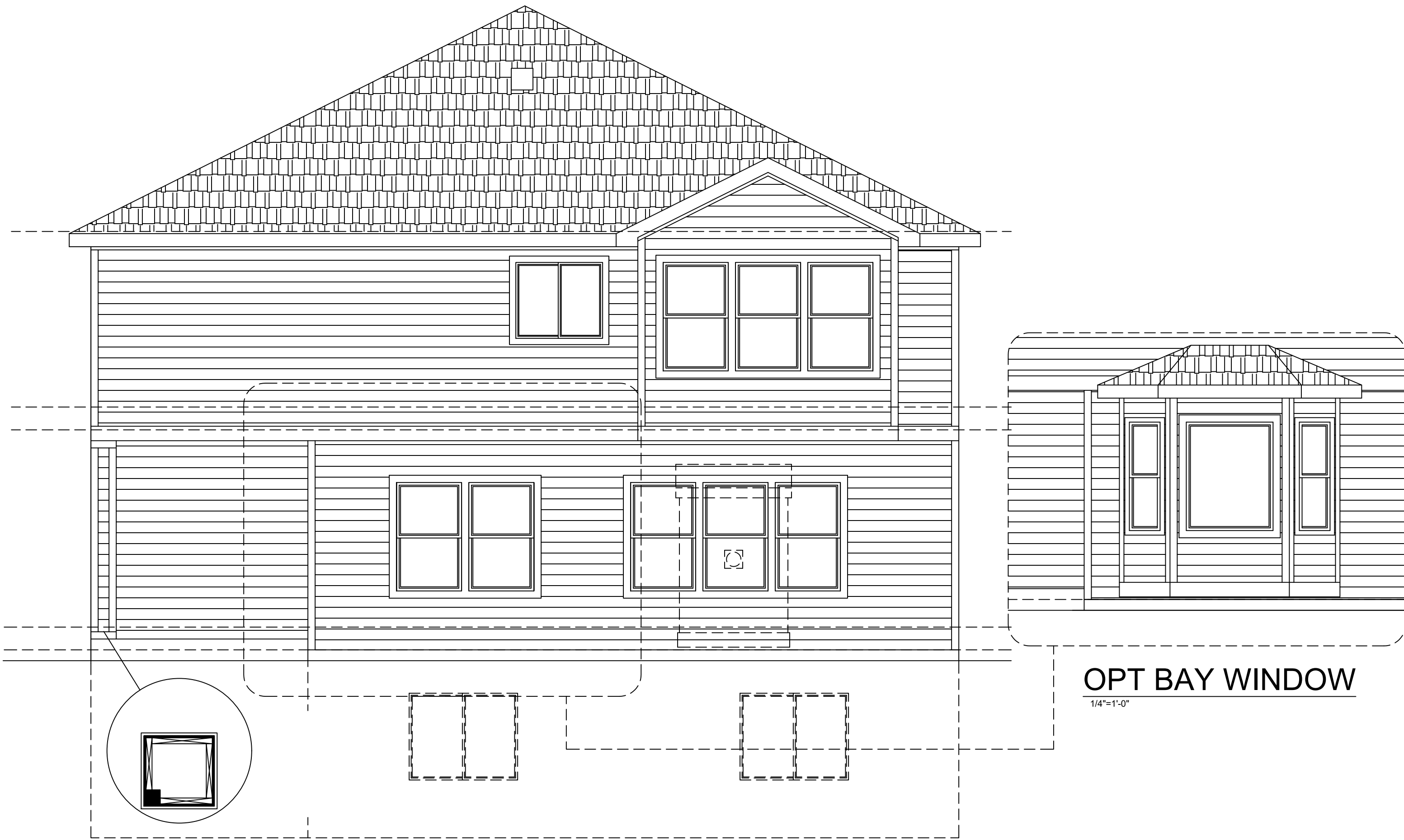
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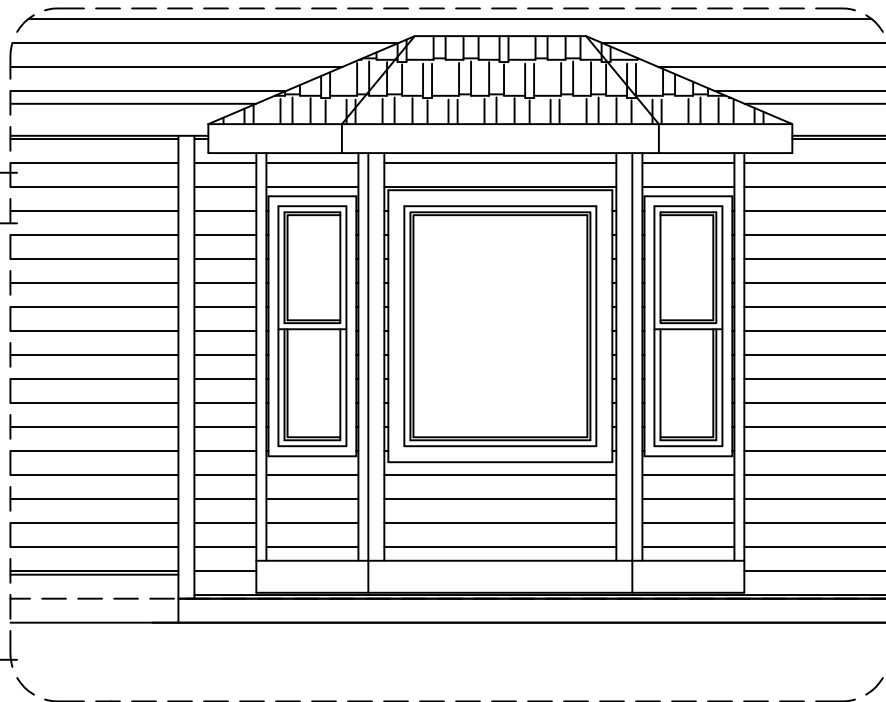
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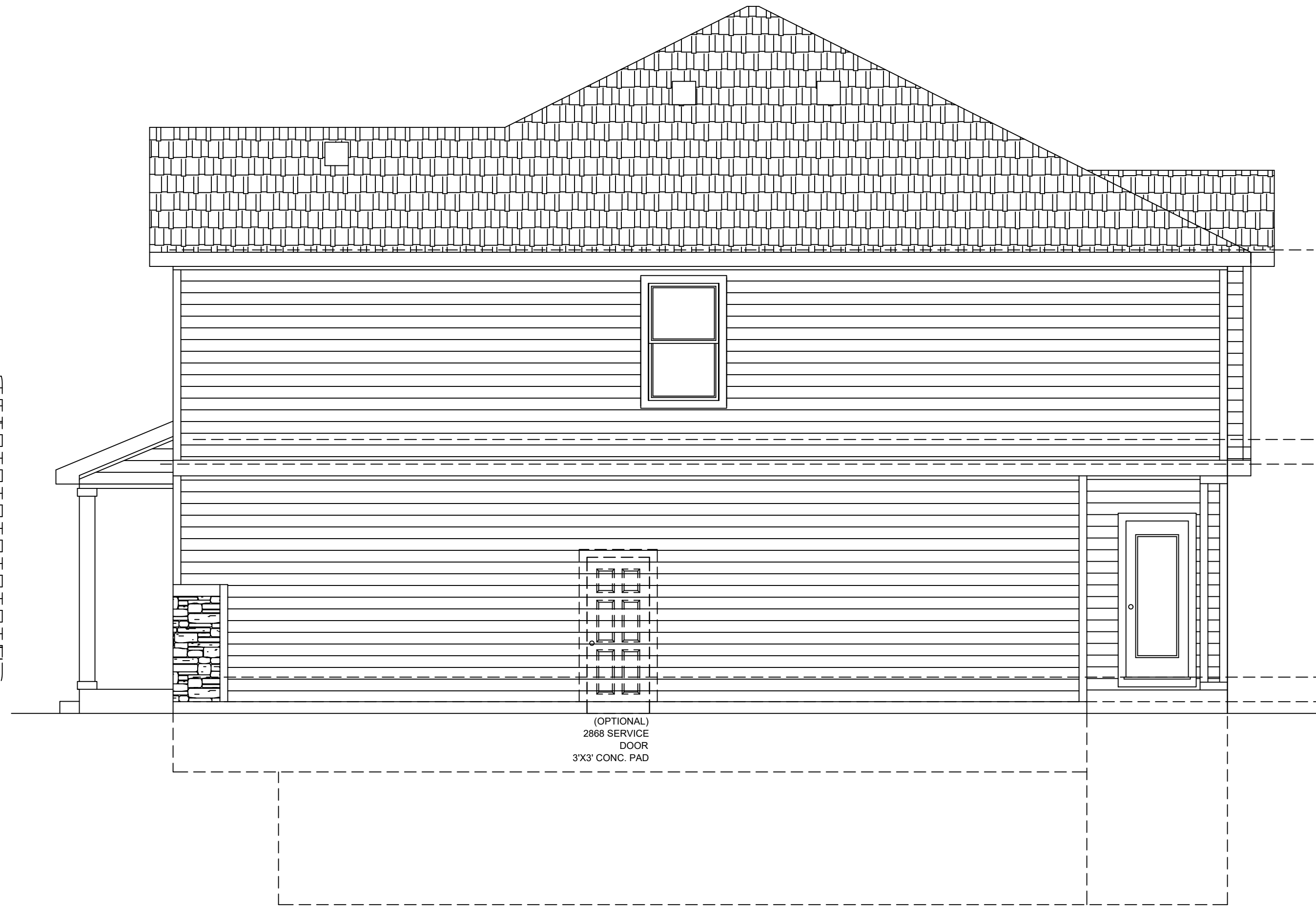
D2782.3 FRONT ELEVATION "A"
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REAR ELEVATION "A"
1/4"=1'-0"



OPT BAY WINDOW
1/4"=1'-0"



GARAGE SIDE ELEVATION "A"
1/4"=1'-0"

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PROJECT NAME
MASTER PLAN D2782.3

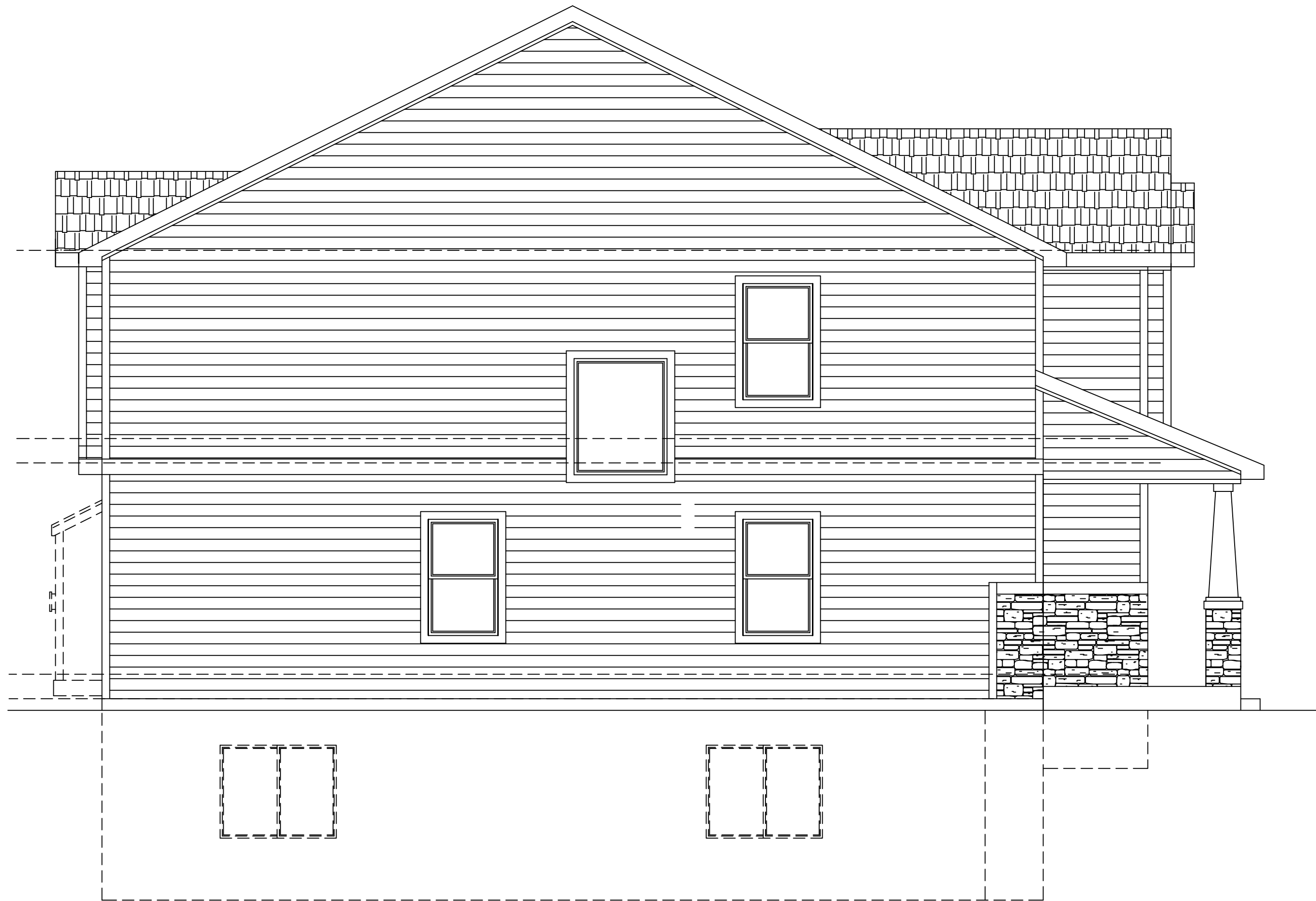
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ELEVATION "A"

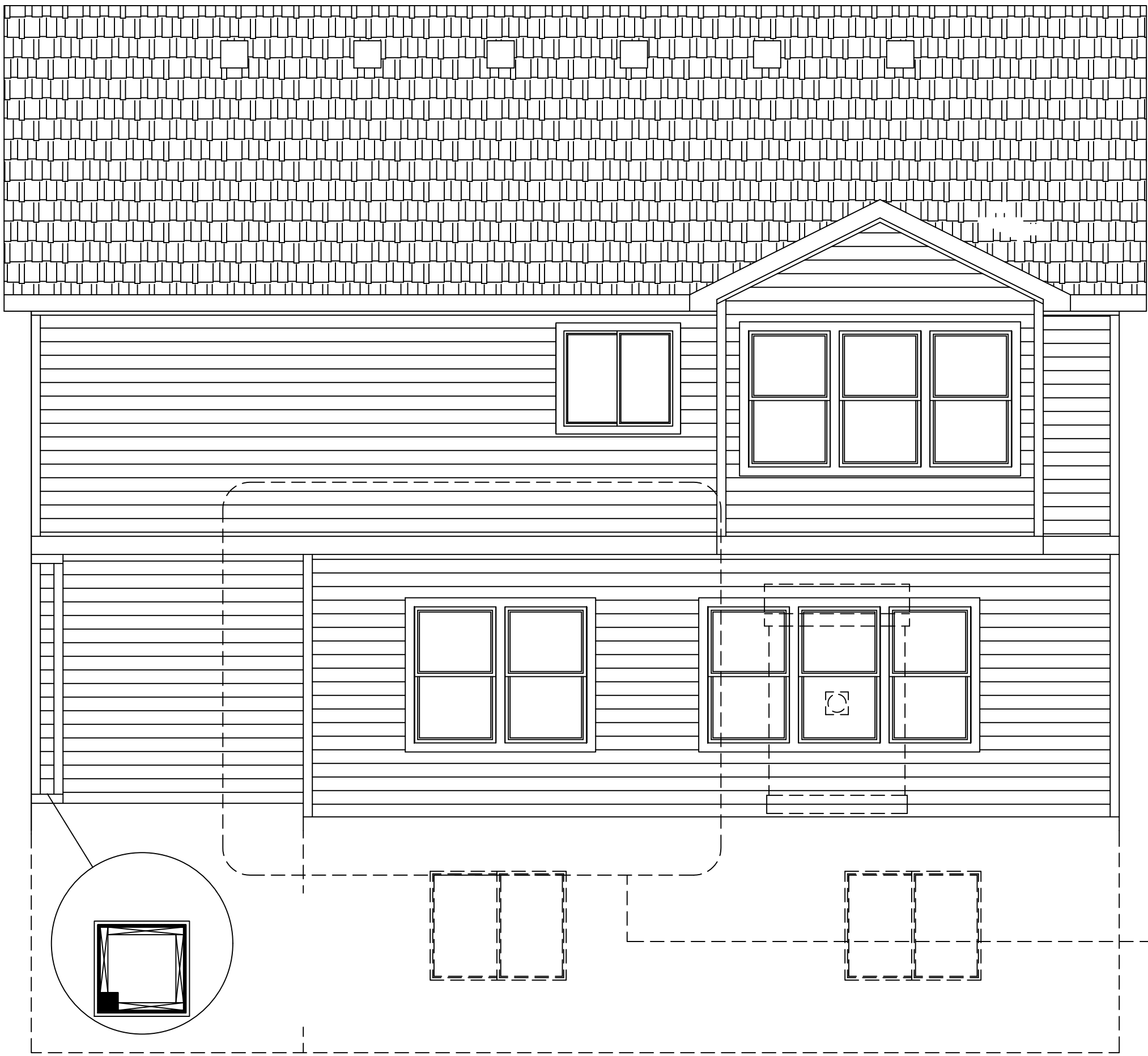
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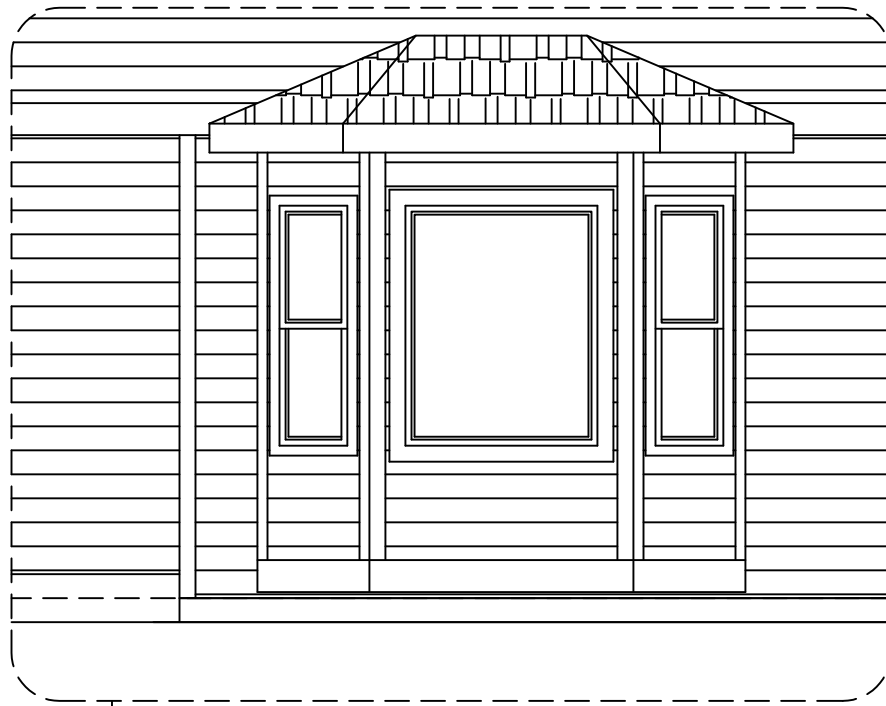
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D2782.3 FRONT ELEVATION "B"
1/4"=1'-0"



REAR ELEVATION "B"
1/4"=1'-0"



OPT BAY WINDOW
1/4"=1'-0"



GARAGE SIDE ELEVATION "B"
1/4"=1'-0"

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ELEVATION "B"

SHEET NUMBER

45

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ELEVATION- "C"

PROJECT NAME
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ELEVATION "C"

SHEET NUMBER
46

SIDE ELEVATION "C"
1/4"=1'-0"

D2782.3 FRONT ELEVATION "C"
1/4"=1'-0"

REAR ELEVATION "C"
1/4"=1'-0"

OPT BAY WINDOW
1/4"=1'-0"

GARAGE SIDE ELEVATION "C"
1/4"=1'-0"

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TRAFFIC IMPACT STUDY

To: Roy Vestal →

From: Eli Farney, PE, PTOE

Date: November 12, 2021

Case No. Coyote Creek Filing No. 4



Coyote Creek Filing No. 4 Single-Family Detached Housing Development 59 Units

North Side of 4th Street – 1 Mile East of US Route 85
Fort Lupton, CO

November 2021

Prepared By:



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1 - Executive Summary

JR Engineering has prepared a comprehensive Traffic Impact Study (TIS) for the proposed Coyote Creek Filing Number 4 single-family attached housing development on the north side of 4th Street one mile east of US Route 85 in Fort Lupton, Colorado.

The contents of this TIS include the objectives stated in **Table 1**:

Table 1 – Traffic Impact Study Objectives

Traffic Impact Study Objectives
2021 Existing Traffic Operations
2022 Opening Day Traffic Analysis
2040 Future Year Traffic Analysis

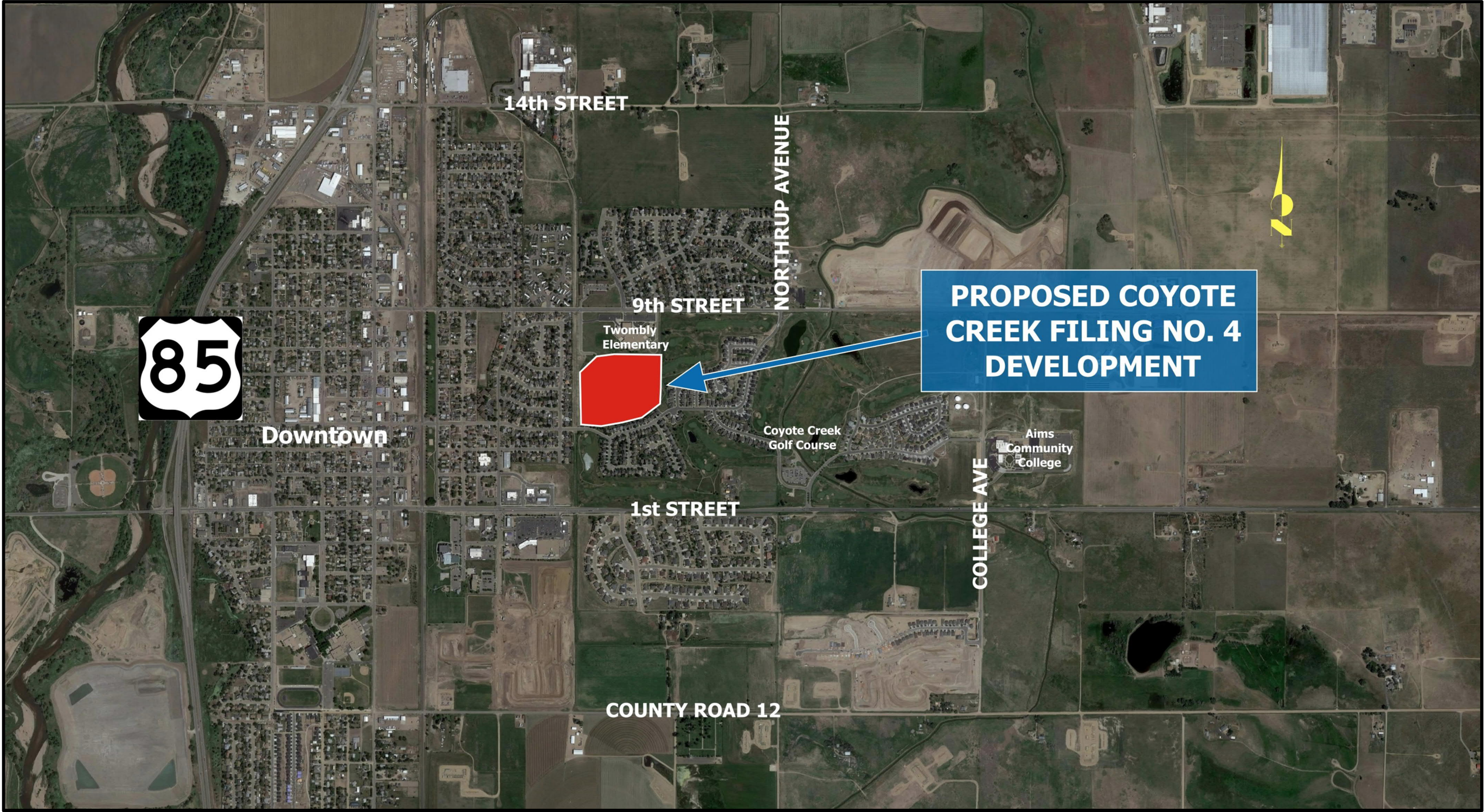
Key Findings of this Traffic Impact Study:

Description	Evaluation
Intersection Analysis Existing Conditions	I1: 9th Street & School Access Road: All approaches Level of Service C or better I2: 4th Street & Beth Avenue: All approaches Level of Service A
Intersection Analysis 2022 Opening Day	I1: 9th Street & School Access Road: All approaches Level of Service C or better I2: 4th Street & Beth Avenue: All approaches Level of Service A A1: 4th Street & Access/Logan: All approaches Level of Service A
Intersection Analysis 2040 Future Year	I1: 9th Street & School Access Road: All approaches Level of Service C or better I2: 4th Street & Beth Avenue: All approaches Level of Service A A1: 4th Street & Access/Logan: All approaches Level of Service A
Proposed Roadway Improvements (Turn lanes, acceleration lanes, etc)	Due to low traffic volumes and high Levels of Service, no new turn lane improvements are expected to be required to support movements to and from the development. There is an existing two-way-left-turn lane on 9 th Street that can be re-striped to provide a westbound left-turn lane to the access road to the site

2 - Introduction

JR Engineering (JR) has completed a review of the existing and Opening Day traffic operations at the two study intersections that will serve the proposed development access points. **Figure 1** shows a vicinity map of the proposed site.

Figure 1: Proposed Coyote Creek Filing No. 4 Development - Vicinity Map



Proposed Site Plan & Study Intersections

Figure 2 shows the proposed Site Plan & Study Intersection locations.



Figure 2: Site Plan and Study Intersection Location

3 – Existing Conditions

Existing Traffic Volumes

Existing intersection turning movement traffic counts were gathered in the field by All Traffic Data at the two intersections shown in [Figure 3](#). The existing turning movement traffic volumes are shown in [Figure 4](#).

- **Intersection Turning Movement Counts** – 9th Street & Existing School Access Road
 - o Collected on Tuesday, November 9, 2021 from 7:00 a.m. to 6:00 p.m.

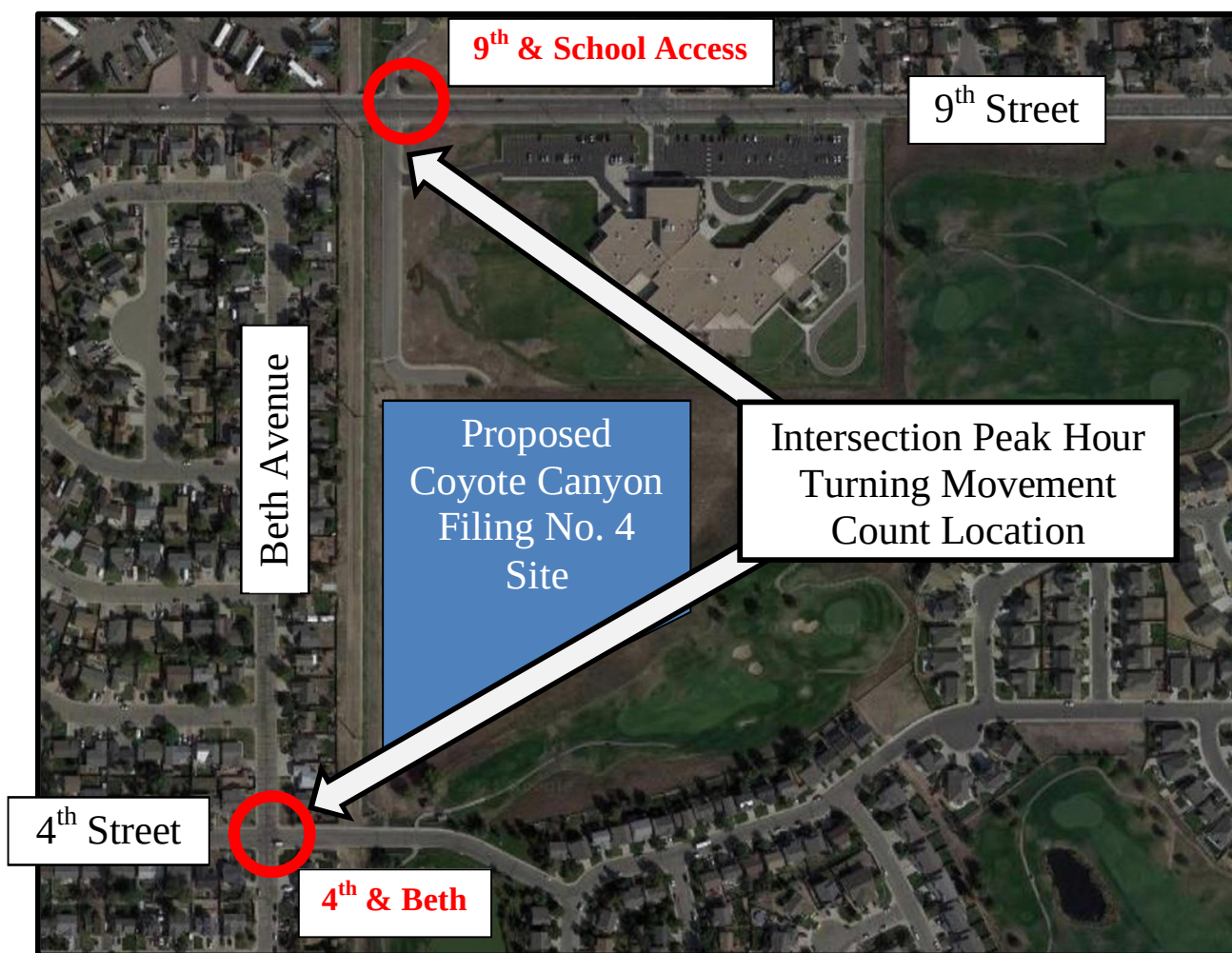


Figure 3: Peak Hour Intersection Turning Movement Count Locations

Traffic count data is available in [Appendix 2](#)

2021 Existing Traffic Volumes and Lane Geometry

Figure 4 shows the existing lane geometry and traffic volumes during the AM and PM peak hours.

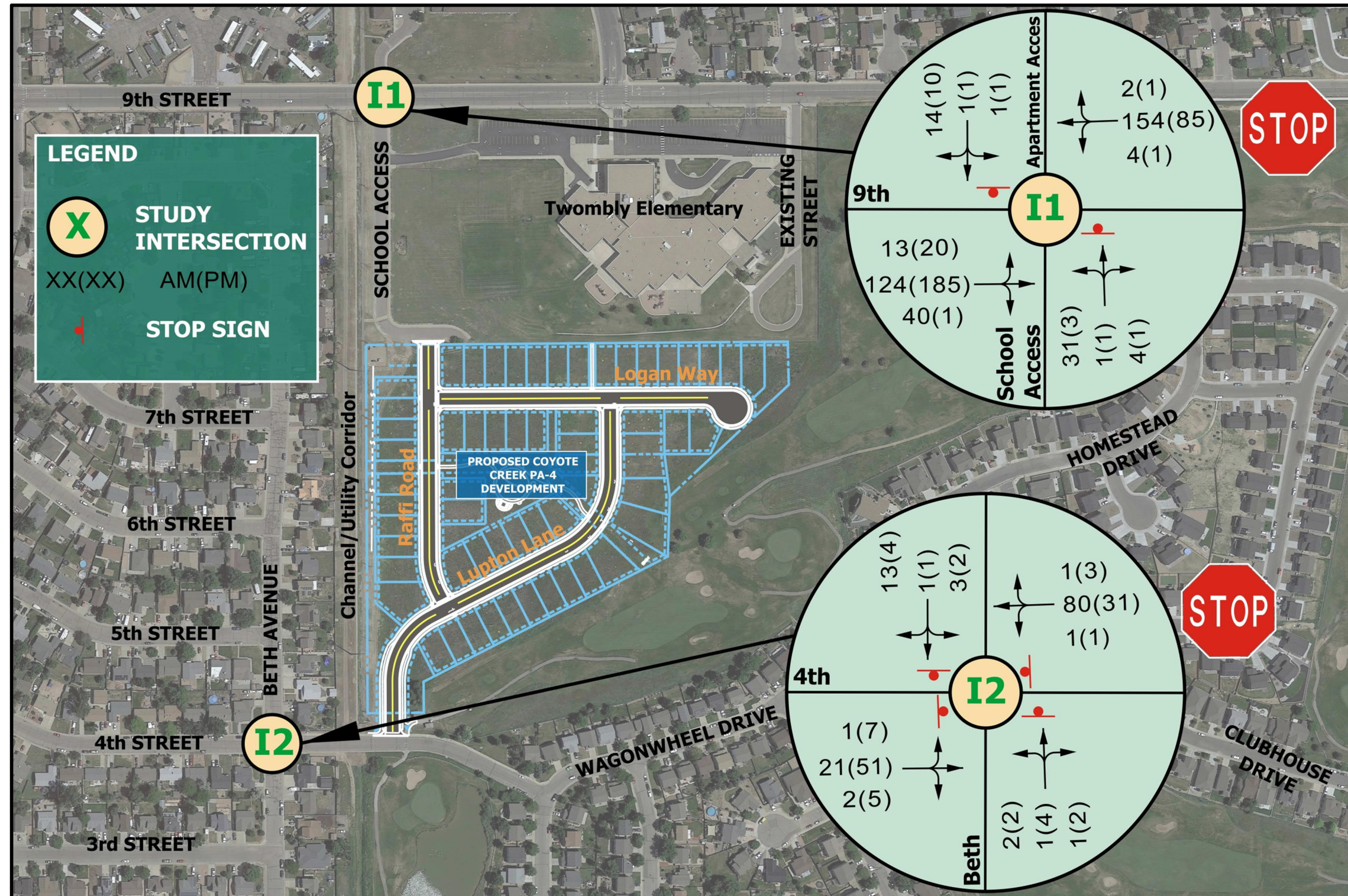


Figure 4: 2021 Existing Traffic Volumes

Existing Conditions - Level of Service

The two existing intersections that will serve as the primary access points to Coyote Creek Filing Number 4 were analyzed using the intersection turning movement traffic counts taken in November 2021.

Table 3 – Stop Controlled Intersection Level of Service – 2021 Existing Conditions

	Stop-Controlled Intersection	Direction	Opening Day Traffic LOS	
			AM Peak Hour	PM Peak Hour
	I1 – 9 th Street & School Access Road (TWO WAY STOP)	EB	N/A	N/A
		WB	N/A	N/A
		SB	B	A
		NB	C	B
	I2 – 4 th Street & Beth Avenue (ALL-WAY STOP)	EB	A	A
		WB	A	A
		SB	A	A
		NB	A	A

4 – Proposed Conditions

Traffic Growth Forecast

The proposed Coyote Creek development generates an estimated 557 weekday trips per day and is considered a small development.

Growth of existing vehicular traffic was estimated using DRCOG 2020 and 2050 ADT estimates. The growth rate was applied to existing volumes to estimate background traffic volumes.

STREET	GROWTH RATE	SOURCE
4th Street	3.7%	DRCOG
9th Street	3%	Estimate since no information provided by DRCOG

Trip Generation

The ADT and turning movement counts were estimated using the standard ITE Land Use Code 210 for Single-Family Detached based on number units. No adjustments were made for internal capture nor pass-by trips.

The proposed single-family development of 59 units produces the following volumes based on ITE:

Item	Trips Generated	Description
Average Daily Trips (ADT)	557	ADT
AM Entering Site	11	AM Peak Hour
AM Exiting Site	33	AM Peak Hour
PM Entering Site	37	PM Peak Hour
PM Exiting Site	21	PM Peak Hour

The Trip Generation report is included in [Appendix 3](#).

Trip Distribution

Based on discussions held with the City of Fort Lupton regarding the distribution of site-generated traffic, it was determined that:

- 80% of vehicles will travel to/from the south via 4th Street
- 20% of vehicles will travel to/from the north via 9th Street

Site-Generated Trip Assignment & Distribution

Figure 5 shows the site-generated trip assignment and distribution.

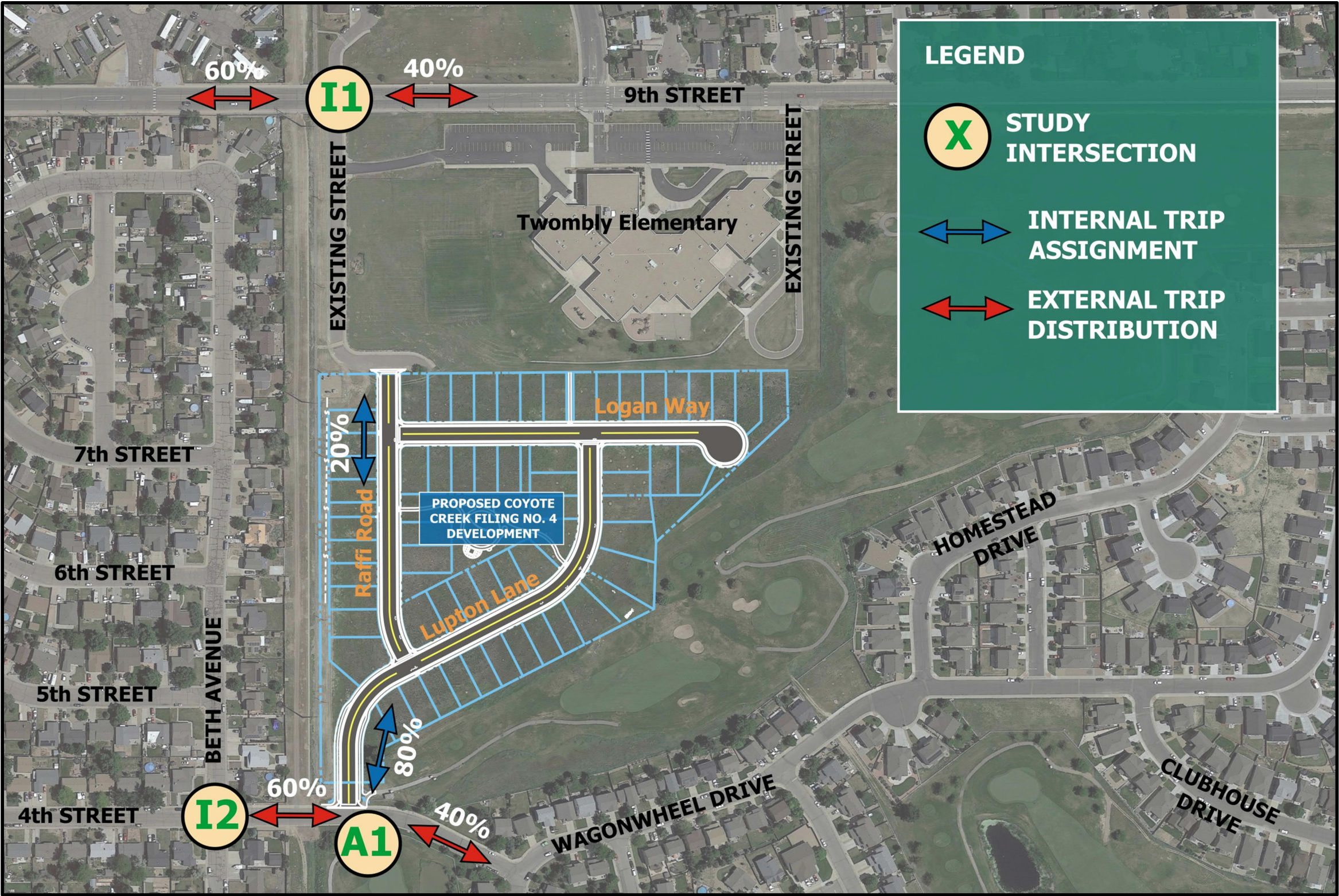


Figure 5: Site-Generated Trip Assignment and Distribution

Site-Generated Peak Hour Traffic Volumes

Figure 6 shows the traffic volumes generated by the proposed development.

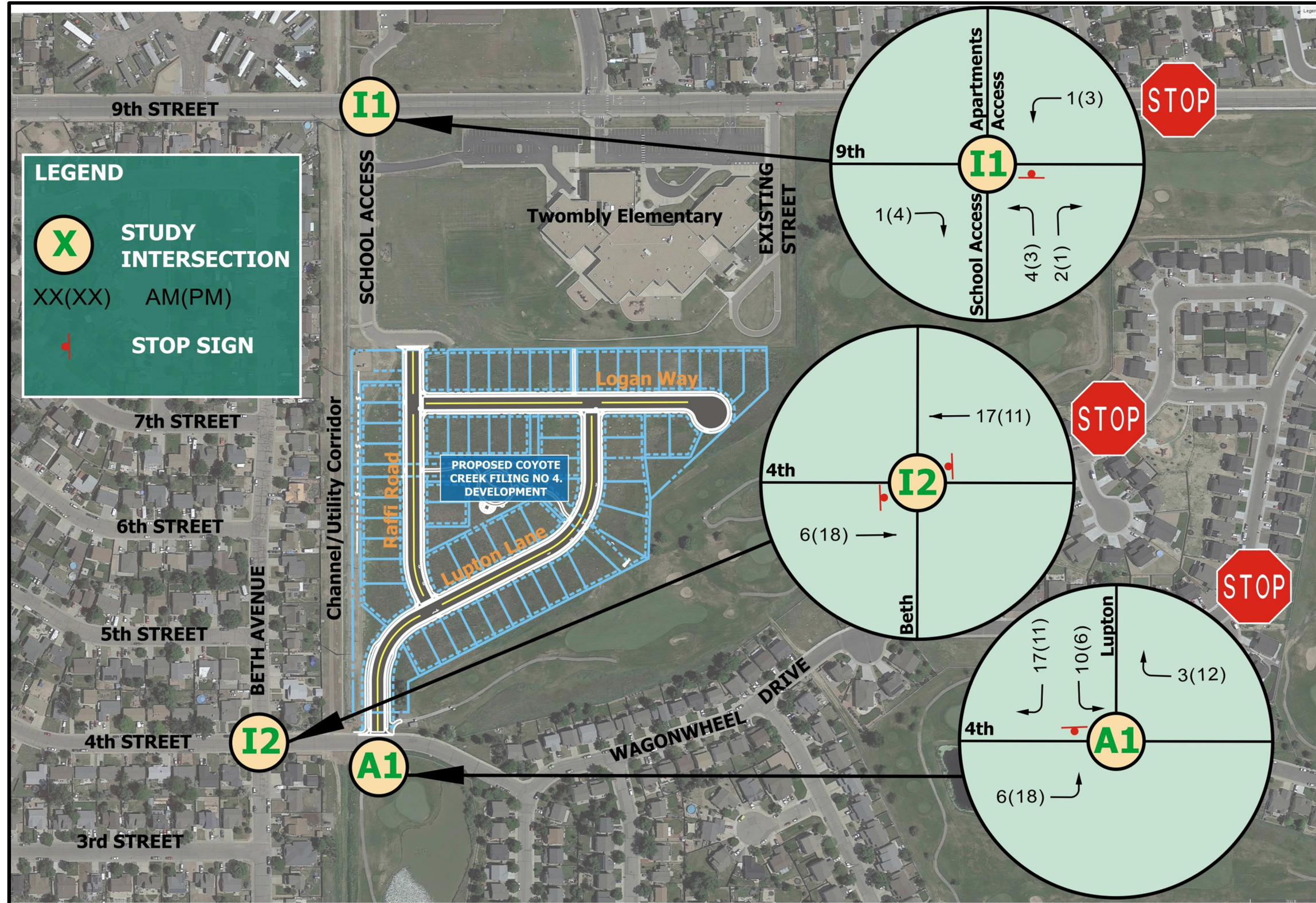


Figure 6: Site-Generated Traffic Volumes

2022 Opening Day – Peak Hour Background Traffic Volumes

Figure 7 shows the 2022 Opening Day total traffic volumes during the AM and PM peak hours.

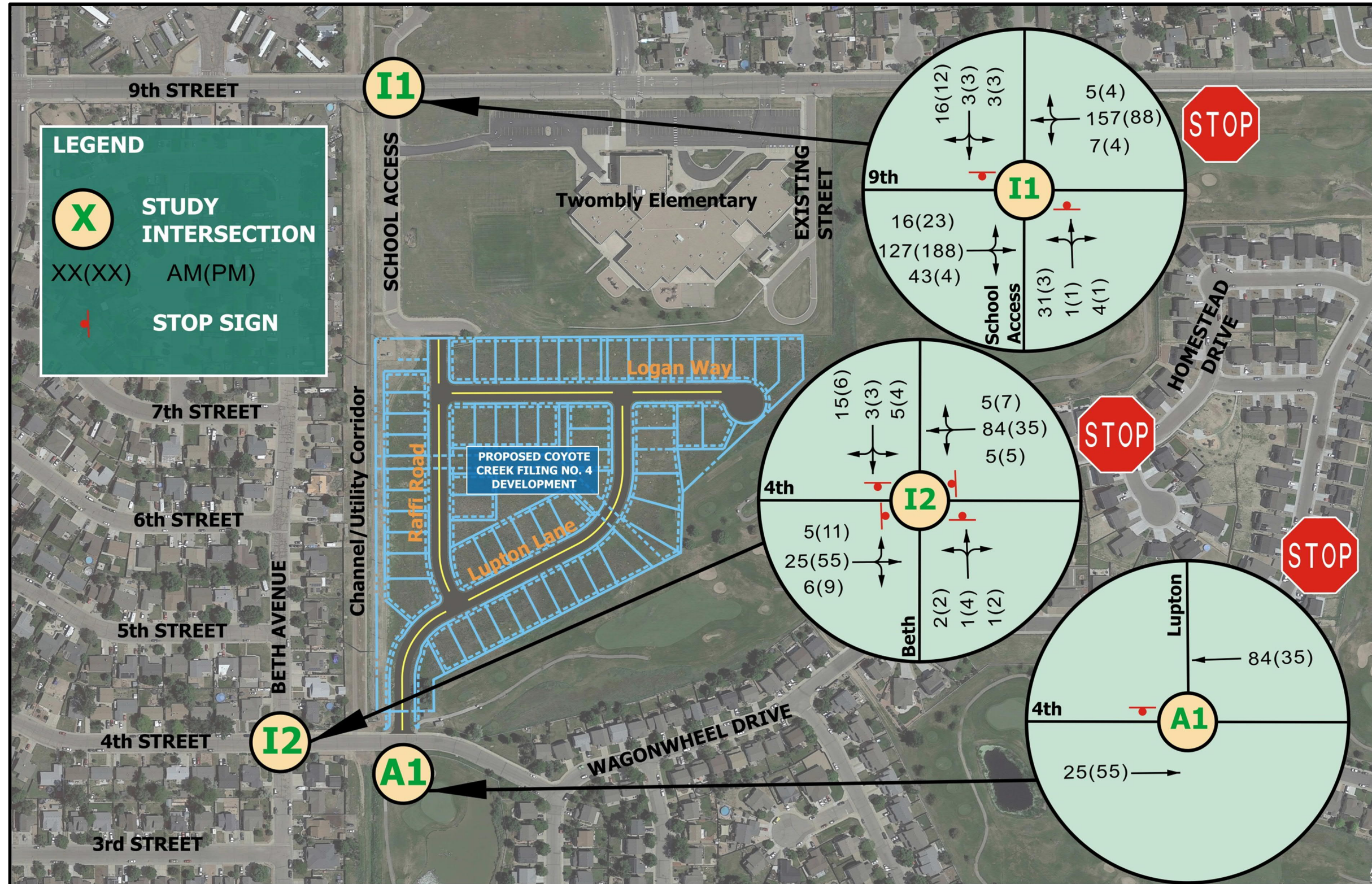


Figure 7: Opening Day 2022 Background Traffic Volumes

2040 Future Year – Peak Hour Background Traffic Volumes

Figure 8 shows the 2040 Opening Day total traffic volumes during the AM and PM peak hours.

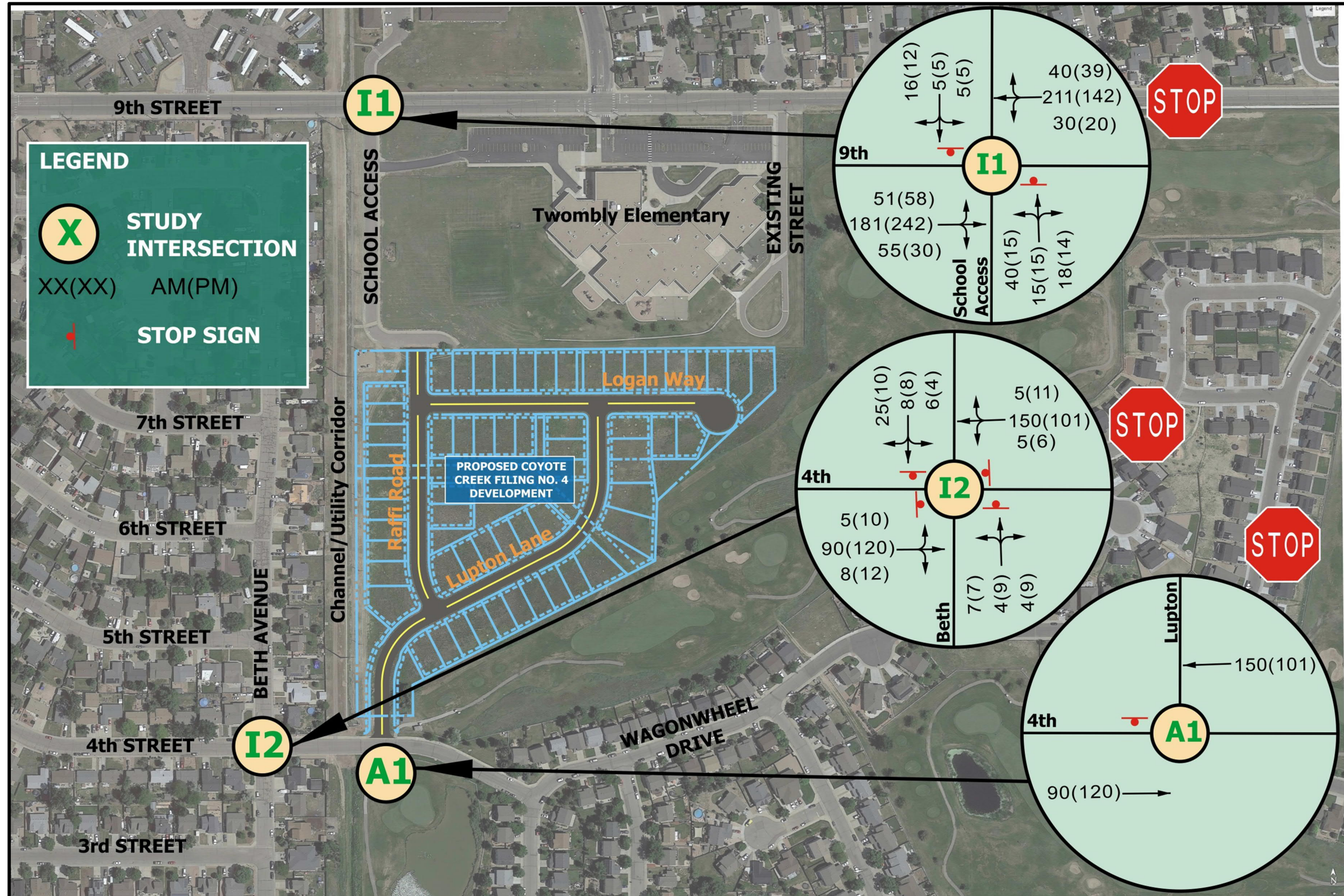


Figure 8: Future Year 2040 Background Traffic Volumes

2022 Opening Day – Peak Hour Total Traffic Volumes

Figure 9 shows the 2022 Opening Day total traffic volumes during the AM and PM peak hours.

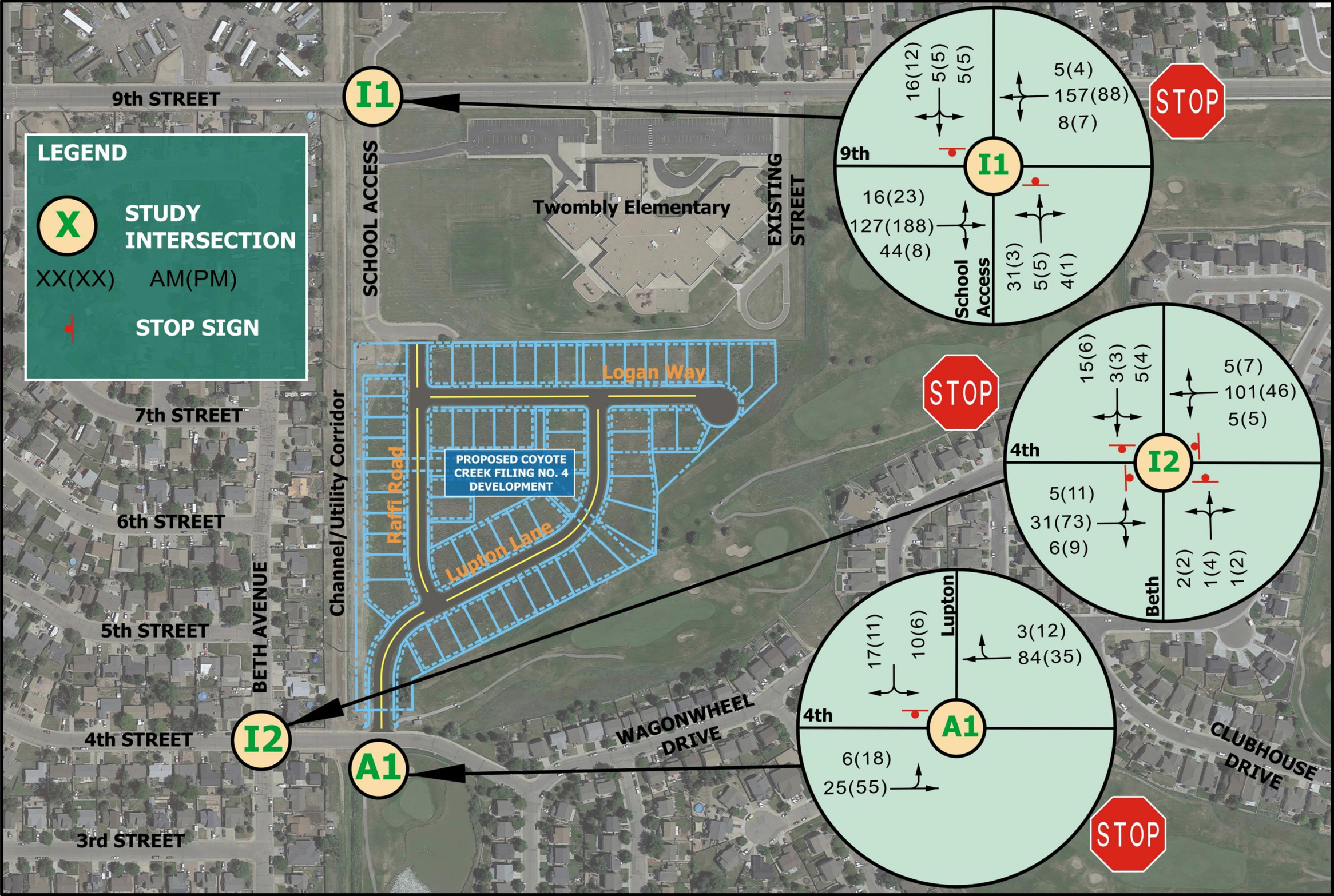


Figure 9: Opening Day 2022 Total Traffic Volumes

2040 Future Year – Peak Hour Total Traffic Volumes

Figure 10 shows the 2040 Opening Day total traffic volumes during the AM and PM peak hours.

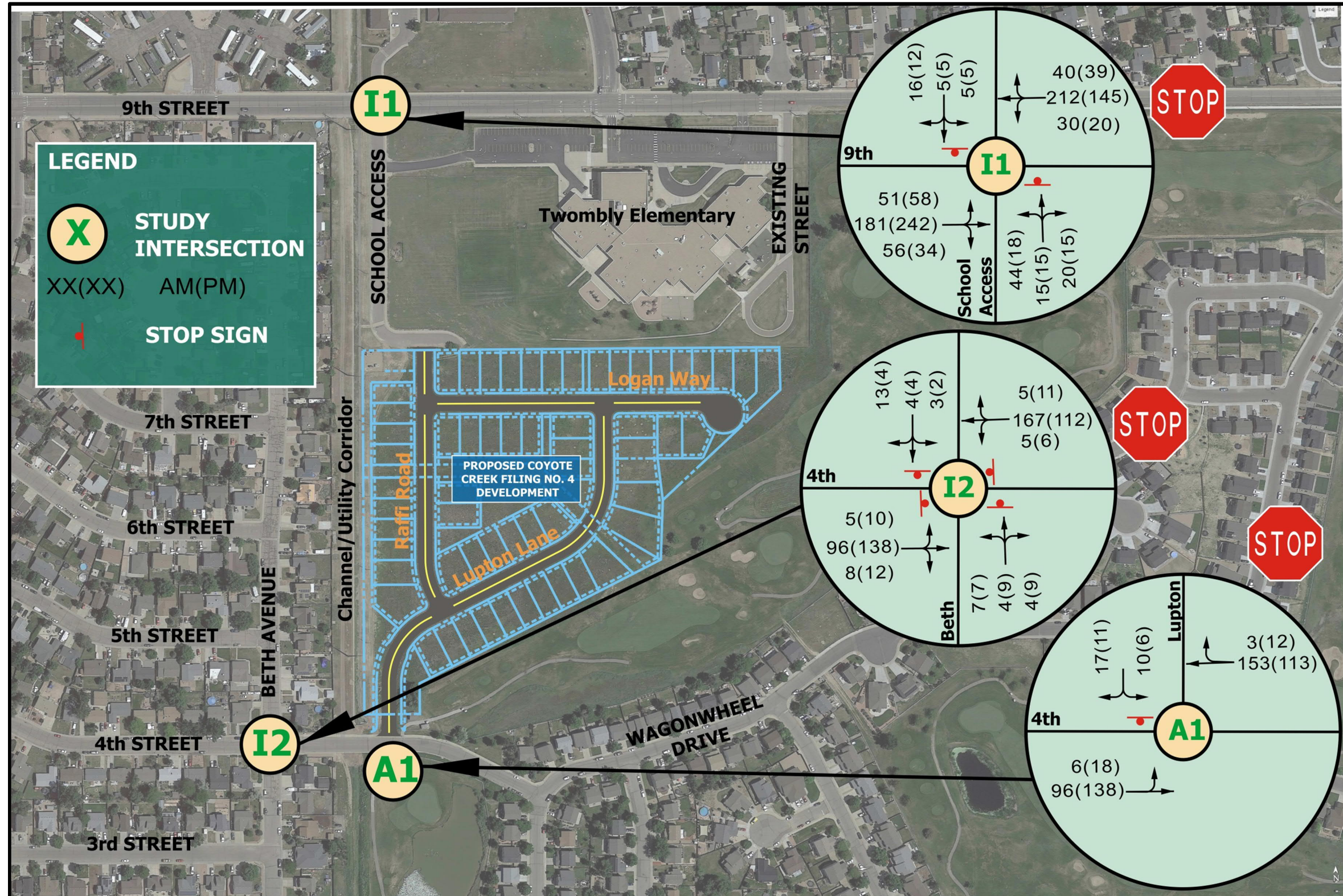


Figure 10: Opening Day 2040 Future Year Total Traffic Volumes

5 – Traffic Evaluation – Level of Service

Analysis Methodology

The premise of the Traffic Analysis methodology is as follows:

1. Estimate traffic volumes generated by the development
2. Input estimated volumes into Synchro and analyze the Study Intersection during peak hours
3. Determine operating Level of Service for the Study Intersection during peak hours

The Study intersection was analyzed using the HCM 6th Edition methodology for:

- 2022 Opening Day
- 2040 Future Year

The Synchro report for these analyses are included in **Appendix 4**.

Peak Hour Definition

Based on the traffic counts, **Table 2** shows the peak hours for 4th Street and 9th Street.

Table 2 – Peak Hour Definition

Peak Hour	Hours
Morning (AM Peak)	7:30 a.m. to 8:30 a.m.
Evening (PM Peak)	5:00 p.m. to 6:00 p.m.

Study Intersections – Opening Day 2022 Level of Service

The intersections were analyzed for the 2022 Opening Day scenario. **Table 3** indicates the 2022 Level of Service for the intersection.

Table 3 – Stop Controlled Intersection Level of Service – 2022 Opening Day

	Stop Controlled Intersection	Direction	Opening Day Traffic LOS	
			AM Peak Hour	PM Peak Hour
	I1 – 9th & Access (One-Way Stop)	EB	N/A	N/A
		WB	N/A	N/A
		NB	C	B
		SB	B	B
	I2 – 4 th & Beth (All-Way Stop)	EB	A	A
		WB	A	A
		NB	A	A
		SB	A	A
	A1 – 4 th & Logan	EB	N/A	N/A
		WB	N/A	N/A
		SB	A	A

Study Intersections – Future Year 2040 Level of Service

The intersections were analyzed for the 2022 Opening Day scenario. **Table 3** indicates the 2022 Level of Service for the intersection.

Table 3 – Stop Controlled Intersection Level of Service – 2040 Future Year

	Stop Controlled Intersection	Direction	Opening Day Traffic LOS	
			AM Peak Hour	PM Peak Hour
	I1 – 9th & Access (One-Way Stop)	EB	N/A	N/A
		WB	N/A	N/A
		NB	C	C
		SB	B	B
	I2 – 4 th & Beth (All-Way Stop)	EB	A	A
		WB	A	A
		NB	A	A
		SB	A	A
	A1 – 4 th & Logan	EB	A	A
		WB	A	A
		SB	A	A

6 – Improvement Analysis

Roadway & Intersection Modifications

The existing roadways that will serve the proposed development are classified as follows:

9th Street – 2-Lane Urban Collector

4th Street – 2-Lane Minor Collector

Based on 2040 Total Traffic volumes, no new turn lanes are anticipated to be required to support the development. There is an existing two-way-left-turn lane on 9th Street that can be re-stripped to provide a dedicated left-turn lane for turns into the site access road.

Traffic Signal Warrant Analysis

A peak hour signal warrant analysis was conducted for:

- 4th & Beth
- 9th & School Access/Apartment Access

For the signal warrant analysis, 2040 Future Year traffic volumes were used.

4th & Beth - *Does not meet Peak Hour Warrant in 2040*

9th & School Access/Apartment Access - *Does not meet Peak Hour Warrant in 2040*

The intersection was analyzed for Warrant 3, Peak Hour according to the MUTCD. The intersection did not meet this warrant for signalization due to low traffic volumes on all approaches.

7 – Conclusion

The proposed development along 4th Street is expected to have no significant impact on existing infrastructure traffic operations. Below is a summary of the findings of this TIS.

Site Generated Traffic

Item	Trips Generated	Description
Average Daily Trips (ADT)	557	ADT
AM Entering Site	11	AM Peak Hour
AM Exiting Site	33	AM Peak Hour
PM Entering Site	37	PM Peak Hour
PM Exiting Site	21	PM Peak Hour

Evaluation Conclusions

Description	Evaluation
Intersection Analysis Existing Conditions	I1: 9th Street & School Access Road: All approaches Level of Service C or better I2: 4th Street & Beth Avenue: All approaches Level of Service A
Intersection Analysis 2022 Opening Day	I1: 9th Street & School Access Road: All approaches Level of Service C or better I2: 4th Street & Beth Avenue: All approaches Level of Service A A1: 4th Street & Access/Logan: All approaches Level of Service A
Intersection Analysis 2040 Future Year	I1: 9th Street & School Access Road: All approaches Level of Service C or better I2: 4th Street & Beth Avenue: All approaches Level of Service A A1: 4th Street & Access/Logan: All approaches Level of Service A
Proposed Roadway Improvements (Turn lanes, acceleration lanes, etc)	Due to low traffic volumes and high Levels of Service, no new turn lane improvements are expected to be required to support movements to and from the development. There is an existing two-way-left-turn lane on 9 th Street that can be re-stripped to provide a westbound left-turn lane to the access road to the site
Traffic Signal Warrants	None of the study intersections will meet Peak Hour warrants for 2040 Future Year

APPENDIX 1

Existing Traffic Counts



(303) 216-2439
www.alltrafficdata.net

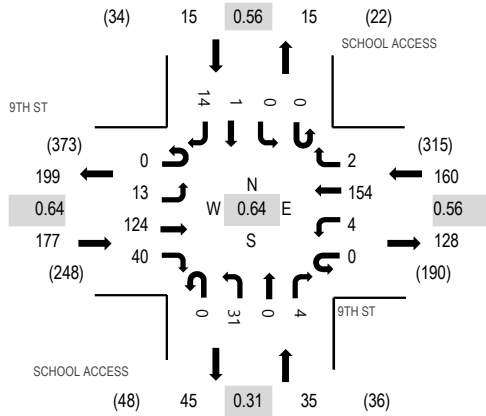
Location: 1 SCHOOL ACCESS & 9TH ST AM

Date: Tuesday, November 9, 2021

Peak Hour: 07:30 AM - 08:30 AM

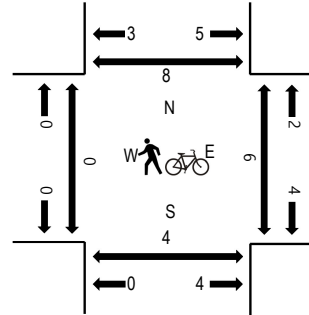
Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	9TH ST Eastbound				9TH ST Westbound				SCHOOL ACCESS Northbound				SCHOOL ACCESS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	2	15	1	0	0	56	0	0	1	0	0	0	0	0	6	81	299	0	0	0	0
7:15 AM	0	4	25	2	0	0	55	0	0	0	0	0	0	1	0	11	98	334	0	0	0	0
7:30 AM	0	3	25	8	0	0	21	0	0	0	0	0	0	0	0	2	59	387	0	0	0	0
7:45 AM	0	2	21	4	0	0	27	0	0	0	0	0	0	0	0	7	61	366	0	0	0	0
8:00 AM	0	3	55	11	0	4	34	0	0	7	0	0	0	0	1	1	116	334	0	0	2	1
8:15 AM	0	5	23	17	0	0	72	2	0	24	0	4	0	0	0	4	151		0	6	0	6
8:30 AM	0	1	10	0	0	0	26	0	0	0	0	0	0	0	0	1	38		0	0	0	1
8:45 AM	0	0	11	0	0	0	18	0	0	0	0	0	0	0	0	0	29		0	0	0	0
Count Total	0	20	185	43	0	4	309	2	0	32	0	4	0	1	1	32	633		0	6	2	8
Peak Hour	0	13	124	40	0	4	154	2	0	31	0	4	0	0	1	14	387		0	6	2	7



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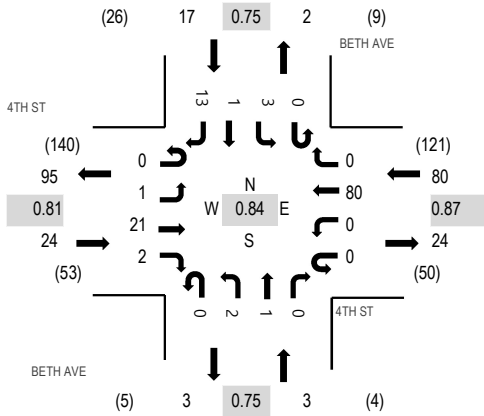
Location: 2 BETH AVE & 4TH ST AM

Date: Tuesday, November 9, 2021

Peak Hour: 07:00 AM - 08:00 AM

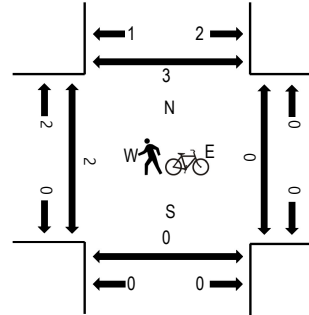
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	4TH ST Eastbound				4TH ST Westbound				BETH AVE Northbound				BETH AVE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	1	6	2	0	0	22	0	0	1	0	0	0	0	0	4	36	124	0	0	0	0
7:15 AM	0	0	7	0	0	0	23	0	0	1	0	0	0	1	0	5	37	117	0	0	0	0
7:30 AM	0	0	2	0	0	0	16	0	0	0	0	0	0	0	1	1	20	95	0	0	0	0
7:45 AM	0	0	6	0	0	0	19	0	0	0	1	0	0	2	0	3	31	93	2	0	0	3
8:00 AM	0	1	6	0	0	0	14	3	0	0	0	0	0	0	0	5	29	80	0	0	0	3
8:15 AM	0	0	6	0	0	0	9	0	0	0	0	0	0	0	0	0	15		0	0	0	0
8:30 AM	0	1	7	1	0	0	6	0	0	0	1	0	0	1	0	1	18		0	0	0	0
8:45 AM	0	1	5	1	0	0	9	0	0	0	0	0	0	1	0	1	18		0	0	0	0
Count Total	0	4	45	4	0	0	118	3	0	2	2	0	0	5	1	20	204		2	0	0	6
Peak Hour	0	1	21	2	0	0	80	0	0	2	1	0	0	3	1	13	124		2	0	0	3



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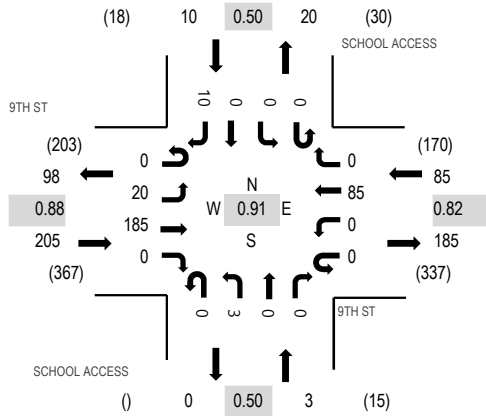
Location: 1 SCHOOL ACCESS & 9TH ST PM

Date: Tuesday, November 9, 2021

Peak Hour: 05:00 PM - 06:00 PM

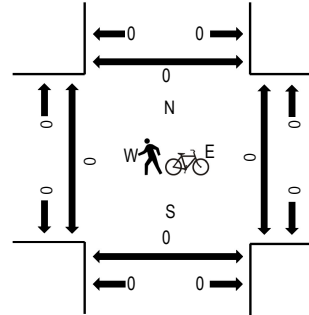
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	9TH ST Eastbound				9TH ST Westbound				SCHOOL ACCESS Northbound				SCHOOL ACCESS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	2	44	0	0	0	26	0	0	6	0	0	0	0	0	3	81	267	0	0	1	0
4:15 PM	0	3	31	0	0	0	21	0	0	2	0	0	0	0	0	2	59	262	0	1	1	0
4:30 PM	0	1	30	0	0	0	16	0	0	3	0	0	0	0	0	0	50	286	0	0	0	2
4:45 PM	0	4	47	0	0	0	22	0	0	1	0	0	0	0	0	3	77	302	0	0	0	1
5:00 PM	0	5	45	0	0	0	22	0	0	3	0	0	0	0	0	1	76	303	0	0	0	0
5:15 PM	0	3	55	0	0	0	23	0	0	0	0	0	0	0	0	2	83		0	0	0	0
5:30 PM	0	6	40	0	0	0	18	0	0	0	0	0	0	0	0	2	66		0	0	0	0
5:45 PM	0	6	45	0	0	0	22	0	0	0	0	0	0	0	0	5	78		0	0	0	0
Count Total	0	30	337	0	0	0	170	0	0	15	0	0	0	0	0	18	570		0	1	2	3
Peak Hour	0	20	185	0	0	0	85	0	0	3	0	0	0	0	0	10	303		0	0	0	0



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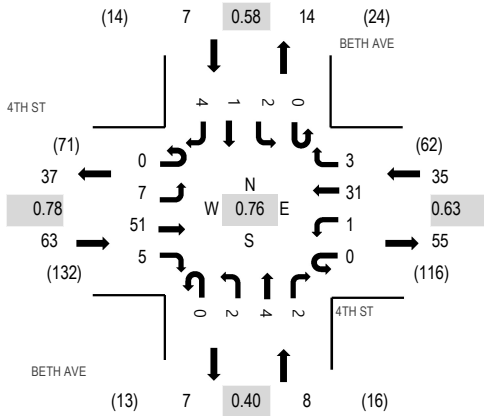
Location: 2 BETH AVE & 4TH ST PM

Date: Tuesday, November 9, 2021

Peak Hour: 04:00 PM - 05:00 PM

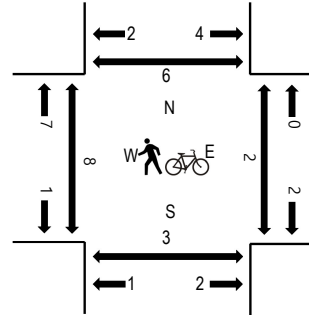
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	4TH ST Eastbound				4TH ST Westbound				BETH AVE Northbound				BETH AVE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	3	11	1	0	1	12	1	0	2	1	2	0	1	0	2	37	113	2	2	0	1
4:15 PM	0	1	15	3	0	0	9	1	0	0	1	0	0	0	0	0	30	99	5	0	2	4
4:30 PM	0	1	12	1	0	0	5	0	0	0	1	0	0	0	1	1	22	98	1	0	1	1
4:45 PM	0	2	13	0	0	0	5	1	0	0	1	0	0	1	0	1	24	101	0	0	0	0
5:00 PM	0	0	12	0	0	0	7	1	0	0	1	1	0	0	0	1	23	111	0	0	3	0
5:15 PM	0	3	18	1	0	0	4	0	1	1	0	1	0	0	0	0	29		0	0	0	0
5:30 PM	0	3	14	1	0	0	4	0	0	0	0	0	0	0	1	2	25		0	0	0	0
5:45 PM	0	1	14	2	0	0	10	1	0	3	0	0	0	1	0	2	34		0	0	0	0
Count Total	0	14	109	9	0	1	56	5	1	6	5	4	0	3	2	9	224		8	2	6	6
Peak Hour	0	7	51	5	0	1	31	3	0	2	4	2	0	2	1	4	113		8	2	3	6

APPENDIX 2

Trip Generation Report

Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: Coyote Creek PA-4

Open Date: 11/8/2021

Analysis Date: 11/8/2021

ITE	Land Use	Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic			
		★	Enter	Exit	Total	★	Enter	Exit	Total	★	Enter	Exit	Total
210	SFHOUSE 1		279	278	557		11	33	44		37	21	58
	59 Dwelling Units												
Unadjusted Volume			279	278	557		11	33	44		37	21	58
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			279	278	557		11	33	44		37	21	58

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

★ - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

P. 1

Detailed Land Use Data
For 59 Dwelling Units of SFHOUSE 1
(210) Single-Family Detached Housing

Project: Coyote Creek PA-4

Open Date: 11/8/2021
Analysis Date: 11/8/2021

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq.	Equation	R2
Weekday Average Daily Trips Source : Trip Generation Manual 10th Edition	557	0	9.44	4.81	19.39	2.1	264	50	50	False	$\ln(T) = 0.92 \ln(X) + 2.71$	0.95
Weekday AM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition	44	0	0.74	0.33	2.27	0.27	219	25	75	False	$T = 0.71(X) + 4.8$	0.89
Weekday PM Peak Hour of Adjacent Street Traffic Source : Trip Generation Manual 10th Edition	58	0	0.99	0.44	2.98	0.31	242	63	37	False	$\ln(T) = 0.96 \ln(X) + 0.2$	0.92

APPENDIX 3

Synchro Reports

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	124	40	4	154	2	31	1	4	1	1	14
Future Vol, veh/h	13	124	40	4	154	2	31	1	4	1	1	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	56	56	56	31	31	31	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	194	63	7	275	4	100	3	13	2	2	25
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	279	0	0	257	0	0	571	559	226	565	588	277
Stage 1	-	-	-	-	-	-	266	266	-	291	291	-
Stage 2	-	-	-	-	-	-	305	293	-	274	297	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1284	-	-	1308	-	-	432	438	813	436	421	762
Stage 1	-	-	-	-	-	-	739	689	-	717	672	-
Stage 2	-	-	-	-	-	-	705	670	-	732	668	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1284	-	-	1308	-	-	409	427	813	419	411	762
Mov Cap-2 Maneuver	-	-	-	-	-	-	409	427	-	419	411	-
Stage 1	-	-	-	-	-	-	726	677	-	704	668	-
Stage 2	-	-	-	-	-	-	676	666	-	704	656	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.2			16.3			10.4		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	433	1284	-	-	1308	-	-	690				
HCM Lane V/C Ratio	0.268	0.016	-	-	0.005	-	-	0.041				
HCM Control Delay (s)	16.3	7.8	0	-	7.8	0	-	10.4				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1.1	0	-	-	0	-	-	0.1				

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	185	1	1	85	1	1	1	1	1	1	10
Future Vol, veh/h	20	185	1	1	85	1	1	1	1	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	82	82	82	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	210	1	1	104	1	2	2	2	2	2	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	211	0	0	375	364	211	366	364	105
Stage 1	-	-	-	-	-	-	257	257	-	107	107	-
Stage 2	-	-	-	-	-	-	118	107	-	259	257	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1486	-	-	1360	-	-	582	564	829	590	564	949
Stage 1	-	-	-	-	-	-	748	695	-	898	807	-
Stage 2	-	-	-	-	-	-	887	807	-	746	695	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1486	-	-	1360	-	-	560	553	829	578	553	949
Mov Cap-2 Maneuver	-	-	-	-	-	-	560	553	-	578	553	-
Stage 1	-	-	-	-	-	-	735	682	-	882	806	-
Stage 2	-	-	-	-	-	-	865	806	-	729	682	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.1			10.8			9.3		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	625	1486	-	-	1360	-	-	853				
HCM Lane V/C Ratio	0.01	0.015	-	-	0.001	-	-	0.028				
HCM Control Delay (s)	10.8	7.5	0	-	7.6	0	-	9.3				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1				

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	1	21	2	1	80	1	2	1	1	3	1	13
Future Vol, veh/h	1	21	2	1	80	1	2	1	1	3	1	13
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	26	2	1	92	1	3	1	1	4	1	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.5	7.2	6.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	4%	1%	18%
Vol Thru, %	25%	88%	98%	6%
Vol Right, %	25%	8%	1%	76%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	24	82	17
LT Vol	2	1	1	3
Through Vol	1	21	80	1
RT Vol	1	2	1	13
Lane Flow Rate	5	30	94	23
Geometry Grp	1	1	1	1
Degree of Util (X)	0.006	0.033	0.105	0.023
Departure Headway (Hd)	4.116	4.012	4	3.728
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	863	892	898	952
Service Time	2.173	2.038	2.014	1.783
HCM Lane V/C Ratio	0.006	0.034	0.105	0.024
HCM Control Delay	7.2	7.2	7.5	6.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.1	0.4	0.1

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	1	21	2	1	80	1	2	1	1	3	1	13
Future Vol, veh/h	1	21	2	1	80	1	2	1	1	3	1	13
Peak Hour Factor	0.78	0.78	0.78	0.63	0.63	0.63	0.40	0.40	0.40	0.58	0.58	0.58
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	27	3	2	127	2	5	3	3	5	2	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.7	7.3	7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	4%	1%	18%
Vol Thru, %	25%	88%	98%	6%
Vol Right, %	25%	8%	1%	76%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	24	82	17
LT Vol	2	1	1	3
Through Vol	1	21	80	1
RT Vol	1	2	1	13
Lane Flow Rate	10	31	130	29
Geometry Grp	1	1	1	1
Degree of Util (X)	0.012	0.035	0.145	0.031
Departure Headway (Hd)	4.185	4.059	4.02	3.796
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	845	878	893	931
Service Time	2.262	2.1	2.043	1.869
HCM Lane V/C Ratio	0.012	0.035	0.146	0.031
HCM Control Delay	7.3	7.2	7.7	7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.1	0.5	0.1

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	127	44	8	157	5	31	5	4	5	5	16
Future Vol, veh/h	16	127	44	8	157	5	31	5	4	5	5	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	56	56	56	31	31	31	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	198	69	14	280	9	100	16	13	9	9	29
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	289	0	0	267	0	0	615	600	233	610	630	285
Stage 1	-	-	-	-	-	-	283	283	-	313	313	-
Stage 2	-	-	-	-	-	-	332	317	-	297	317	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1273	-	-	1297	-	-	403	415	806	407	399	754
Stage 1	-	-	-	-	-	-	724	677	-	698	657	-
Stage 2	-	-	-	-	-	-	681	654	-	712	654	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1273	-	-	1297	-	-	370	400	806	378	385	754
Mov Cap-2 Maneuver	-	-	-	-	-	-	370	400	-	378	385	-
Stage 1	-	-	-	-	-	-	707	661	-	682	648	-
Stage 2	-	-	-	-	-	-	638	645	-	668	639	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.4			18.5			12.2		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	395	1273	-	-	1297	-	-	548				
HCM Lane V/C Ratio	0.327	0.02	-	-	0.011	-	-	0.085				
HCM Control Delay (s)	18.5	7.9	0	-	7.8	0	-	12.2				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-	-	0.3				

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	188	8	7	88	4	3	5	1	5	5	12
Future Vol, veh/h	23	188	8	7	88	4	3	5	1	5	5	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	82	82	82	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	214	9	9	107	5	6	10	2	10	10	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	112	0	0	223	0	0	416	401	219	405	403	110
Stage 1	-	-	-	-	-	-	271	271	-	128	128	-
Stage 2	-	-	-	-	-	-	145	130	-	277	275	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1478	-	-	1346	-	-	547	538	821	556	536	943
Stage 1	-	-	-	-	-	-	735	685	-	876	790	-
Stage 2	-	-	-	-	-	-	858	789	-	729	683	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1478	-	-	1346	-	-	515	523	821	535	522	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	515	523	-	535	522	-
Stage 1	-	-	-	-	-	-	720	671	-	858	784	-
Stage 2	-	-	-	-	-	-	820	783	-	702	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.5	11.9	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	542	1478	-	-	1346	-	-	695
HCM Lane V/C Ratio	0.033	0.018	-	-	0.006	-	-	0.063
HCM Control Delay (s)	11.9	7.5	0	-	7.7	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	5	31	6	5	101	5	2	1	1	5	3	15
Future Vol, veh/h	5	31	6	5	101	5	2	1	1	5	3	15
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	38	7	6	116	6	3	1	1	7	4	20
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	7.7	7.3	7.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	12%	5%	22%
Vol Thru, %	25%	74%	91%	13%
Vol Right, %	25%	14%	5%	65%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	42	111	23
LT Vol	2	5	5	5
Through Vol	1	31	101	3
RT Vol	1	6	5	15
Lane Flow Rate	5	52	128	31
Geometry Grp	1	1	1	1
Degree of Util (X)	0.006	0.058	0.142	0.033
Departure Headway (Hd)	4.216	4.03	4.018	3.898
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	837	886	893	906
Service Time	2.301	2.069	2.042	1.977
HCM Lane V/C Ratio	0.006	0.059	0.143	0.034
HCM Control Delay	7.3	7.3	7.7	7.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.2	0.5	0.1

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	11	73	9	5	46	7	2	4	2	4	3	6
Future Vol, veh/h	11	73	9	5	46	7	2	4	2	4	3	6
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	90	11	6	53	8	3	5	3	5	4	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.4	7.3	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	25%	12%	9%	31%
Vol Thru, %	50%	78%	79%	23%
Vol Right, %	25%	10%	12%	46%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	93	58	13
LT Vol	2	11	5	4
Through Vol	4	73	46	3
RT Vol	2	9	7	6
Lane Flow Rate	11	115	67	17
Geometry Grp	1	1	1	1
Degree of Util (X)	0.012	0.127	0.074	0.019
Departure Headway (Hd)	4.159	3.996	4.012	4.038
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	849	897	891	875
Service Time	2.239	2.023	2.047	2.117
HCM Lane V/C Ratio	0.013	0.128	0.075	0.019
HCM Control Delay	7.3	7.6	7.4	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.4	0.2	0.1

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	25	84	3	10	17
Future Vol, veh/h	6	25	84	3	10	17
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	-
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	7	27	91	3	11	18
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	94	0	-	0	134	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	41	-
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	1500	-	-	-	860	964
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	981	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1500	-	-	-	856	964
Mov Cap-2 Maneuver	-	-	-	-	856	-
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	981	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.4	0		9		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1500	-	-	-	921	
HCM Lane V/C Ratio	0.004	-	-	-	0.032	
HCM Control Delay (s)	7.4	0	-	-	9	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	55	35	12	6	11
Future Vol, veh/h	18	55	35	12	6	11
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	-
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	20	60	38	13	7	12
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	51	0	-	0	145	45
Stage 1	-	-	-	-	45	-
Stage 2	-	-	-	-	100	-
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	1555	-	-	-	847	1025
Stage 1	-	-	-	-	977	-
Stage 2	-	-	-	-	924	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1555	-	-	-	836	1025
Mov Cap-2 Maneuver	-	-	-	-	836	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	924	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		8.9		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1555	-	-	-	949	
HCM Lane V/C Ratio	0.013	-	-	-	0.019	
HCM Control Delay (s)	7.3	0	-	-	8.9	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	51	181	56	30	212	40	44	15	20	5	5	16
Future Vol, veh/h	51	181	56	30	212	40	44	15	20	5	5	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	226	70	38	265	50	55	19	25	6	6	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	315	0	0	296	0	0	768	780	261	777	790	290
Stage 1	-	-	-	-	-	-	389	389	-	366	366	-
Stage 2	-	-	-	-	-	-	379	391	-	411	424	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1245	-	-	1265	-	-	319	327	778	314	322	749
Stage 1	-	-	-	-	-	-	635	608	-	653	623	-
Stage 2	-	-	-	-	-	-	643	607	-	618	587	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1245	-	-	1265	-	-	283	295	778	268	291	749
Mov Cap-2 Maneuver	-	-	-	-	-	-	283	295	-	268	291	-
Stage 1	-	-	-	-	-	-	596	570	-	613	600	-
Stage 2	-	-	-	-	-	-	596	585	-	543	551	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.8			19.9			13.5		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	340	1245	-	-	1265	-	-	455				
HCM Lane V/C Ratio	0.29	0.051	-	-	0.03	-	-	0.071				
HCM Control Delay (s)	19.9	8	0	-	7.9	0	-	13.5				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1.2	0.2	-	-	0.1	-	-	0.2				

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	58	242	34	20	145	39	18	15	15	5	5	12
Future Vol, veh/h	58	242	34	20	145	39	18	15	15	5	5	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	73	303	43	25	181	49	23	19	19	6	6	15
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	230	0	0	346	0	0	737	751	325	746	748	206
Stage 1	-	-	-	-	-	-	471	471	-	256	256	-
Stage 2	-	-	-	-	-	-	266	280	-	490	492	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
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	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1338	-	-	1213	-	-	334	340	716	330	341	835
Stage 1	-	-	-	-	-	-	573	560	-	749	696	-
Stage 2	-	-	-	-	-	-	739	679	-	560	548	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1338	-	-	1213	-	-	301	309	716	285	310	835
Mov Cap-2 Maneuver	-	-	-	-	-	-	301	309	-	285	310	-
Stage 1	-	-	-	-	-	-	534	522	-	698	679	-
Stage 2	-	-	-	-	-	-	702	663	-	490	511	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.8			16.6			13.4		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	371	1338	-	-	1213	-	-	458				
HCM Lane V/C Ratio	0.162	0.054	-	-	0.021	-	-	0.06				
HCM Control Delay (s)	16.6	7.8	0	-	8	0	-	13.4				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.6	0.2	-	-	0.1	-	-	0.2				

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	96	153	3	10	17
Future Vol, veh/h	6	96	153	3	10	17
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	-
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	7	104	166	3	11	18
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	169	0	-	0	286	168
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	118	-
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	1409	-	-	-	704	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	907	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1409	-	-	-	700	876
Mov Cap-2 Maneuver	-	-	-	-	700	-
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	907	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		9.7		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1409	-	-	-	801	
HCM Lane V/C Ratio	0.005	-	-	-	0.037	
HCM Control Delay (s)	7.6	0	-	-	9.7	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	138	113	12	6	11
Future Vol, veh/h	18	138	113	12	6	11
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	-
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	20	150	123	13	7	12
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	136	0	-	0	320	130
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	190	-
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	1448	-	-	-	673	920
Stage 1	-	-	-	-	896	-
Stage 2	-	-	-	-	842	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1448	-	-	-	663	920
Mov Cap-2 Maneuver	-	-	-	-	663	-
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	842	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.9	0		9.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1448	-	-	-	809	
HCM Lane V/C Ratio	0.014	-	-	-	0.023	
HCM Control Delay (s)	7.5	0	-	-	9.6	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	96	8	5	167	5	7	4	4	3	4	13
Future Vol, veh/h	5	96	8	5	167	5	7	4	4	3	4	13
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	119	10	6	192	6	9	5	5	4	5	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.4	7.8	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	47%	5%	3%	15%
Vol Thru, %	27%	88%	94%	20%
Vol Right, %	27%	7%	3%	65%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	109	177	20
LT Vol	7	5	5	3
Through Vol	4	96	167	4
RT Vol	4	8	5	13
Lane Flow Rate	20	135	203	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.026	0.155	0.232	0.032
Departure Headway (Hd)	4.633	4.135	4.107	4.331
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	777	857	867	831
Service Time	2.634	2.211	2.169	2.332
HCM Lane V/C Ratio	0.026	0.158	0.234	0.032
HCM Control Delay	7.8	8	8.4	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.5	0.9	0.1

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	138	12	6	112	11	7	9	9	3	4	13
Future Vol, veh/h	10	138	12	6	112	11	7	9	9	3	4	13
Peak Hour Factor	0.81	0.81	0.81	0.87	0.87	0.87	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	170	15	7	129	13	9	12	12	4	5	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.4	8.1	7.8	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	6%	5%	15%
Vol Thru, %	36%	86%	87%	20%
Vol Right, %	36%	7%	9%	65%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	160	129	20
LT Vol	7	10	6	3
Through Vol	9	138	112	4
RT Vol	9	12	11	13
Lane Flow Rate	33	198	148	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.042	0.226	0.171	0.032
Departure Headway (Hd)	4.557	4.12	4.148	4.366
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	790	861	853	825
Service Time	2.558	2.194	2.232	2.367
HCM Lane V/C Ratio	0.042	0.23	0.174	0.033
HCM Control Delay	7.8	8.4	8.1	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.9	0.6	0.1

**COYOTE CREEK FILING NO. 4
PRELIMINARY PHASE II DRAINAGE REPORT**

November 2021

Prepared For:
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(Project No. 16093.00)

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Appendices

A: Vicinity Map, Hydrologic Soils Group, IDF Data, FIRMette

B: Hydrologic Calculation

C: Coyote Creek Master Drainage Report Reference

D: Drainage Maps

CERTIFICATION STATEMENT

This Preliminary Drainage Report for the design of the Coyote Creek Filing No. 4 development was prepared by me or under my direct supervision in accordance with the City of Fort Lupton's Standards and Specifications and acceptable professional practices of the industry. We acknowledge that the City of Fort Lupton's review of this Preliminary Drainage Report is only for general conformance with submittal requirements, current design criteria and standard engineering principles and practices. We are also aware of the provisions of the City Code of the City of Fort Lupton.

Andrew J Hugill, Registered Professional Engineer
Colorado Professional Engineer No. 57007
For and on behalf of JR Engineering, LLC

I. LOCATION & BASIN DESCRIPTION

Project Location and Description

Coyote Creek Filing No. 4 is a proposed single-family residential Planned Unit Development (PUD) located within Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, Weld County, Colorado.

The approximately 13-acre site is bounded by the Shortline Ditch regional channel to the west, Twombly Elementary School to the north, and Coyote Creek Golf Course to the southeast and 4th St. to the south. The site is located roughly 1,000 feet north of 1st St. and 600 feet south of 9th St. A vicinity map is included in Appendix A. The site is located within the Coyote Creek Subdivision with the Vincents East Subdivision directly to the west.

The site is composed of type B soils which are characterized as having a moderate infiltration rate when thoroughly wet. Approximately 90 percent of the site is covered in native grasses with the ground generally sloping from east to west between zero and 3 percent.

This report presents the preliminary drainage analysis for Coyote Creek Filing No. 4. The proposed use for this site will be a residential subdivision composed of 59 single-family detached units with a local park. There is a 30" irrigation line bisecting the approximate center of the site from east to west. There is an existing 30' sanitary sewer easement along the site's western boundary and a sanitary lift station located in the northwest corner of the site.

II. DRAINAGE BASINS

Major Basin Description

The existing Coyote Creek Filing No.4 site is vacant with no FIRM map panel available for the subject site but the FIRMette is located in Appendix A. The site is located within Zone X which is a zone of minimal flood hazard.

Proposed Sub-Basin Description

Existing runoff generated from the site is routed from east to west via sheet flow into the Shortline Ditch. There is also a small portion of the existing site that is depressed with a concrete overflow structure and 18" CMP pipe to drain the area west into the adjacent Shortline ditch. The Shortline ditch routes all runoff from the site north to a regional detention facility.

Sub-basin A1:

Sub-basin A1 is approximately 2.33 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 3.9$ cfs, and $Q_{100} = 9.8$ cfs) generated in this basin is currently conveyed via sheet flow to Lupton Lane where the flow will ultimately be conveyed southwest via curb and gutter to a 10' Type R sump Inlet at design point 1 (DP1). Flows collected at this inlet will be piped northwest to the Shortline ditch.

Sub-basin A2:

Sub-basin A2 is approximately 2.02 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 4.1$ cfs, and $Q_{100} = 9.7$ cfs) generated in this basin is currently conveyed via sheet flow to Raffi Road and Lupton Lane where the flow will ultimately be conveyed south west via curb and gutter to a 10' Type R sump Inlet at design point 2 (DP2). Flows collected at this inlet will be piped northwest to the Shortline ditch.

Sub-basin A3:

Sub-basin A3 is approximately 1.21 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 2.2$ cfs, and $Q_{100} = 5.4$ cfs) generated in this basin is currently conveyed via sheet flow to Raffi Road where the flow will ultimately be conveyed north via curb and gutter to a 10' Type R Inlet at design point 3 (DP3). Flows collected at this inlet will be piped west to the Shortline ditch.

Sub-basin A4:

Sub-basin A4 is approximately 2.94 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 5.7$ cfs, and $Q_{100} = 13.8$ cfs) generated in this basin is currently conveyed via sheet flow to Lupton Lane and Logan Way where the flow will ultimately be conveyed west via curb and gutter to a 10' Type R Inlet at design point 4 (DP4). Flows collected at this inlet will be piped north then west to the Shortline ditch.

Sub-basin A5:

Sub-basin A5 is approximately 3.88 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 6.4$ cfs, and $Q_{100} = 16.1$ cfs) generated in

this basin is currently conveyed via sheet flow to Raffi Road and Logan Way where the flow will ultimately be conveyed north via curb and gutter to a 10' Type R Inlet at design point 5 (DP5). Flows collected at this inlet will be piped west to the Shortline ditch.

Sub-basin B1:

Sub-basin B1 is approximately 0.73 acres in size and made up of lawns/open space. Runoff ($Q_5 = 0.4$ cfs, and $Q_{100} = 2.1$ cfs) generated in this basin is currently conveyed via sheet flow west directly into the Shortline Ditch.

Sub-basin B2:

Sub-basin B2 is approximately 0.17 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 0.5$ cfs, and $Q_{100} = 1.2$ cfs) generated in this basin is currently conveyed via sheet flow to Raffi Road where the flow will ultimately be conveyed north via curb and gutter to a crossspan at design point 7 (D). Flows collected at this crossspan will travel approximately 120' along existing curb and gutter before entering an existing concrete rundown into the Shortline Ditch.

III. DRAINAGE DESIGN CRITERIA

Development Criteria Reference

Storm Drainage Analysis and Design Criteria for this project were implemented from the City of Fort Lupton Storm Drainage Criteria and the “Urban Storm Drainage Criteria Manual” by Mile High Flood District (MHFD).

The design storms are the 5-year storm event and the 100-year storm event. Storm sewer and roadways have been designed to safely convey the 5-year and 100-year event assuming all inlets are clogged. Rainfall intensity data was taken from Table 502 of City of Fort Lupton Criteria which can be found in Appendix A.

Hydrologic Criteria

All hydrologic data was obtained from the “City of Fort Lupton Standards and Specifications Manual” and the “Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual” Volumes 1, 2, and 3. Onsite drainage improvements were designed based on the 5 year (minor) storm event and the 100-year (major) storm event. Runoff was calculated using the Rational Method, and rainfall intensities for the 5-year and the 100-year storm return frequencies were obtained from Table 502 of the Fort Lupton Criteria Located in Appendix A. Runoff coefficients were determined based on proposed land use and from data in Table 602 from Section 6 of the Fort Lupton Criteria. Time of concentrations were developed using equations from Section 6 of the Fort Lupton Criteria. All runoff calculations and applicable charts and graphs are included in Appendix B.

Hydraulic Criteria

The Rational Method and USDCM’s SF-2 and SF-3 forms were used to determine the runoff from the minor and major storms on the site. UDFCD UD-Inlet v5.05. will be used to size the inlets.

IV. DRAINAGE FACILITY DESIGN

General Concept

The proposed Coyote Creek Filing No. 4 site is designed to convey generated runoff via storm sewers, along curb and gutter, and via surface flow to the existing Shortline Ditch on the west side of the site. Secondly, surface overflow paths have been provided, such that the 100-year storm flows remain at least one foot below the finished floor elevation in a fully clogged inlet condition. This report analyses runoff generated on-site and not any runoff generated on the golf course to the east. The Master Drainage study for Coyote creek indicates that the Golf Course is responsible to capture all flow generated from the course.

Conformance with Coyote Creek Master Drainage Study

Coyote Creek Filing No. 4 was originally studied in the Coyote Creek Master Drainage Study by Merrick and Company dated September 12, 1996. Filing No.4 is known within the Master Study as Basin I. The Master Drainage Study can be found in Appendix C. The original intent for the basin was for Multifamily residential use with a specific road layout and the master study indicates that if the site use, grading, and street alignment change that a Phase II or Phase III report will need to be done. The purpose of this report is to account for the changes from the Master Study.

The Master Study indicates that no detention or water quality is necessary for the site once the City completes the Regional Detention Facility to the north which exists at this time. The Master study also indicates “The golf course will be required to retain all of their runoff on the golf course for all events up to a maximum of the 100-year storm”. This report does not account for any runoff generated on the golf course to the east and only analyses the basins on the property which is consistent with the Master Drainage Study.

V. SUMMARY

The proposed site improvements for the Coyote Creek Filing No. 4 site are consistent with the approved Master Drainage Study referenced herein. On-site detention is not required as all site runoff will be directed to the Shortline Ditch and ultimately the Regional Detention Pond. Once flow data for the Shortline Ditch becomes available, the addition of site flows will be analyzed. It is assumed that there is sufficient capacity in the Shortline Ditch to handle site runoff during the 100 year event. The site has no adverse drainage impacts on adjacent properties, surrounding developments, or downstream infrastructure. As a result, the proposed drainage design outlined in this report meets the latest City of Fort Lupton Storm Drainage Criteria.

VI. REFERENCES

1. 2018 International Fire Code; 2018
2. City of Fort Lupton, Standards and Specifications for the Design and Construction of Public Improvements; 2014
3. City of Fort Lupton and Clear Water Solutions, Inc., 2018 Municipal Water Efficiency Plan; 2018.
4. Merrick & Company, Coyote Creek Master Drainage Study

Appendix A
Vicinity Map, Hydrologic Soils Group, IDF Data, FIRMette



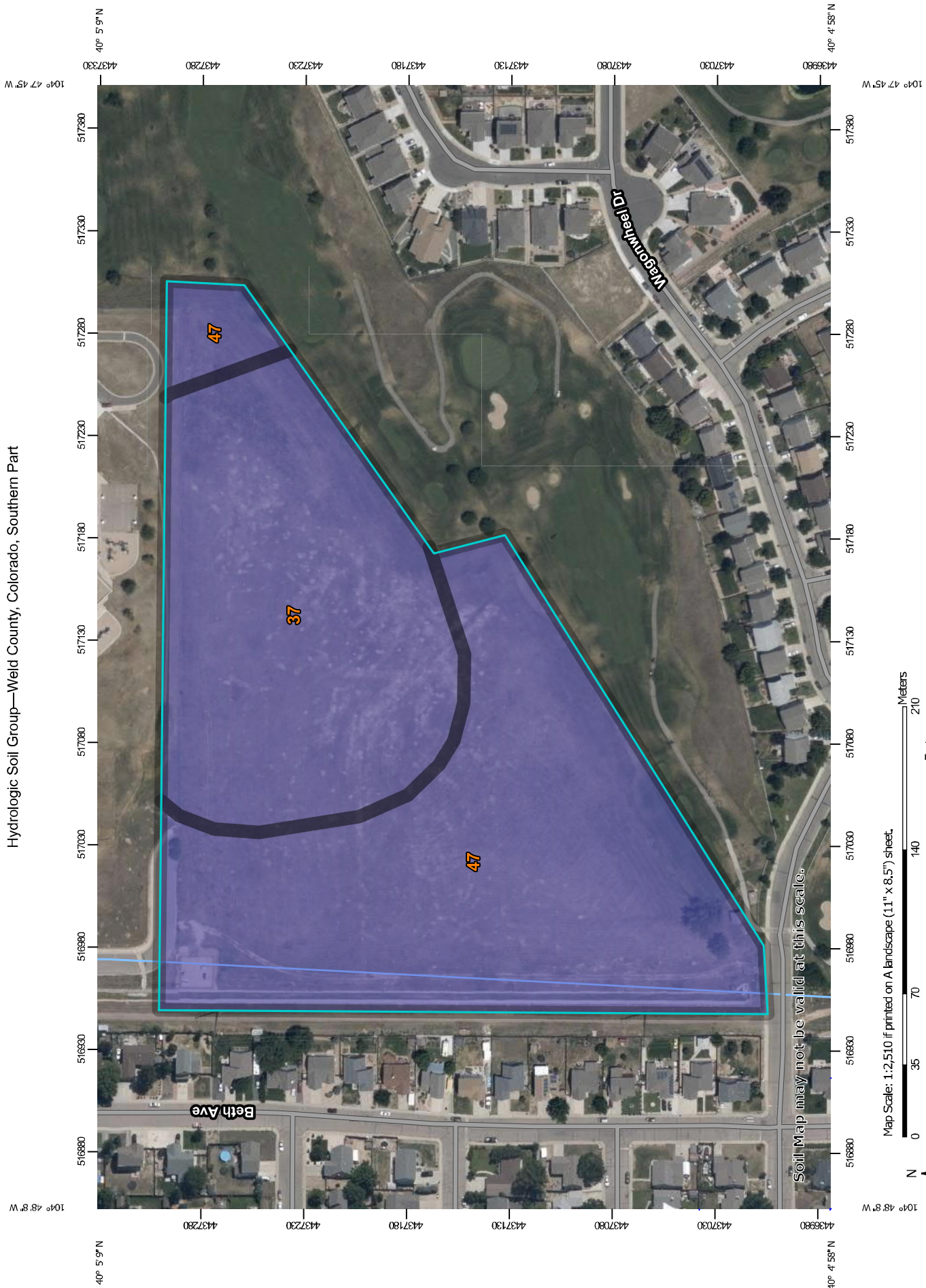
500 250 0 500
 ORIGINAL SCALE: 1" = 500'

APPENDIX A
 VICINITY MAP
 JOB NO. 16093.00
 2021-11-10
 SHEET 1 OF 1



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 Fort Collins 970-491-9888 • www.jrengineering.com



Map Scale: 1:2,510 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

11/10/2021
Page 1 of 4

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

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

C

C/D

D

Not rated or not available

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 20, Aug 31, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
37	Nelson fine sandy loam, 0 to 3 percent slopes	B	6.7	41.0%
47	Olney fine sandy loam, 1 to 3 percent slopes	B	9.6	59.0%
Totals for Area of Interest			16.2	100.0%

Description

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.

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 502
Time-Intensity-Frequency Tabulation
for the Rational Method

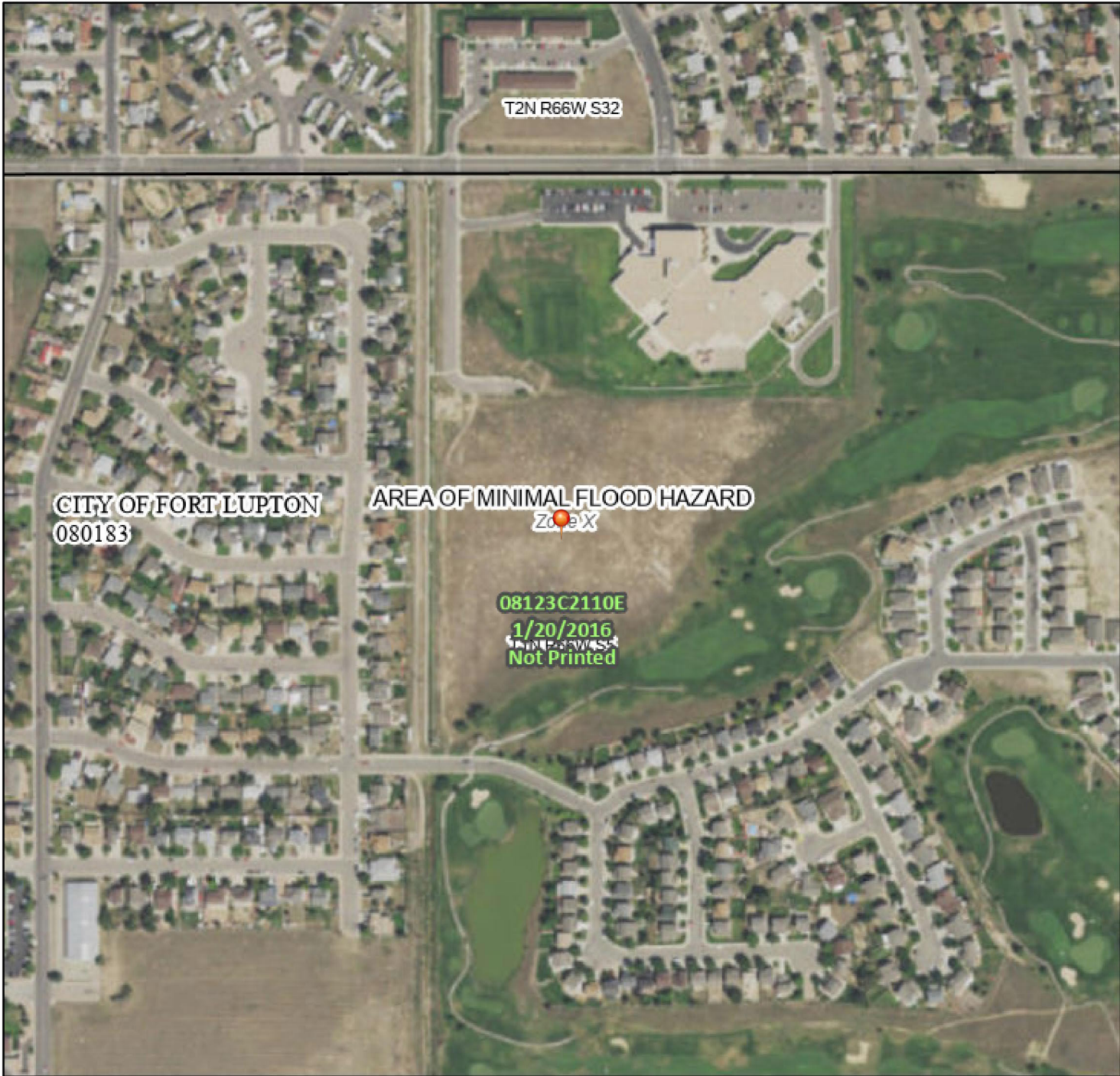
Rainfall Intensity
(in/hr)/duration

Frequency	5-min	10-min	15-min	30-min	60-min
2-year	3.48	2.70	2.28	1.58	1.00
5-year	4.92	3.84	3.24	2.24	1.42
10-year	5.88	4.56	3.84	2.66	1.68
50-year	8.16	6.36	5.36	3.72	2.35
100-year	9.48	7.32	6.16	4.28	2.71

National Flood Hazard Layer FIRMette



104°48'18"W 40°5'19"N



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 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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 11/16/2021 at 11:30 AM 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.

Appendix B

Hydrologic Calculations

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Coyote Creek Filing No. 4
 Location: Fort Lupton

Project Name: Liberty Animal Hospital
 Project No.: 16093.00
 Calculated By: AJH
 Checked By: _____
 Date: 11/10/21

Basin ID	Total Area (ac)	Paved Roads/Walks			Single Family			Lawns/Open Space			Basins Total Weighted 5 YEAR C	Basins Total Weighted 100 YEAR C
		Area (ac)	5 - YEAR C	100 - YEAR C	Area (ac)	5 - YEAR C	100 - YEAR C	Area (ac)	5 - YEAR C	100 - YEAR C		
A1	2.33	0.44	0.88	0.93	1.52	0.45	0.60	0.37	0.18	0.45	0.49	0.64
A2	2.02	0.61	0.88	0.93	1.27	0.45	0.60	0.15	0.18	0.45	0.56	0.69
A3	1.21	0.23	0.88	0.93	0.90	0.45	0.60	0.09	0.18	0.45	0.51	0.65
A4	2.94	0.68	0.88	0.93	1.97	0.45	0.60	0.30	0.18	0.45	0.52	0.66
A5	3.88	0.84	0.88	0.93	2.28	0.45	0.60	0.77	0.18	0.45	0.49	0.64
B1	0.73	0.00	0.88	0.93	0.00	0.45	0.60	0.73	0.18	0.45	0.18	0.45
B2	0.17	0.07	0.88	0.93	0.09	0.45	0.60	0.00	0.18	0.45	0.63	0.74

STANDARD FORM SF-2 TIME OF CONCENTRATION

Subdivision: Coyote Creek Filing No. 4
Location: Fort Lupton

Project Name: Liberty Animal Hospital
Project No.: 16093.00
Calculated By: AJH
Checked By:
Date: 11/10/21

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					t _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C ₅	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL. (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)	Urbanized t _c (min)	
A1	2.33	B	52%	0.49	0.64	140	2.8	9.3	588	1.7	20.0	2.6	3.8	13.0	728.0	13.3	13.0
A2	2.02	B	61%	0.56	0.69	108	2	8.0	565	1.8	20.0	2.7	3.5	11.6	673.0	13.1	11.6
A3	1.21	B	56%	0.51	0.65	140	1.64	10.7	360	0.8	20.0	1.8	3.4	14.0	500.0	12.0	12.0
A4	2.94	B	56%	0.52	0.66	100	3.8	6.7	760	2.1	20.0	2.9	4.4	11.1	860.0	14.2	11.1
A5	3.88	B	51%	0.49	0.64	197	2.74	11.1	664	2.1	20.0	2.9	3.8	14.9	861.0	13.7	13.7
B1	0.73	B	7%	0.18	0.45	77	1	14.5	684	0.3	20.0	1.1	10.4	24.9	761.0	13.8	13.8
B2	0.17	B	69%	0.63	0.74	67	3.87	4.4	85	2	20.0	2.8	0.5	4.9	152.0	10.5	5.0

NOTES:

$$t_c = t_i + t_t \quad (6-2)$$

Where: t_c = time of concentration (minutes)
t_i = initial time or overland flow time (minutes)
t_t = travel time in the ditch, channel, gutter, storm sewer, etc.
(minutes)

$$t_c = \frac{L}{180} + 10 \quad (6-5)$$

Where: t_c = time of concentration at the first design point (minutes)
L = length of basin (feet)

$$t_i = \frac{1.8(1.1-C_5)^{2.5}L}{\sqrt{s}} \quad (6-3)$$

Where: t_i = overland flow time (minutes)
C₅ = runoff coefficient for 5-year frequency (Table 602)
L = length of overland flow (feet, 500 feet maximum)
s = average basin slope (percent)

For basin lengths greater than 500 feet, the overland flow time needs to be considered in combination with the travel time (t_t). The travel time (t_t) is calculated using the hydraulic properties of the swale, ditch, channel, or street. Travel time is calculated using Equation 6-4. For preliminary work, the travel time (t_t) can be estimated using Figure 602.

$$t_t = \frac{L}{60V} \quad (6-4)$$

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Coyote Creek Filing No. 4
Location: Fort Lupton
Design Storm: 5-Year

Project Name: Liberty Animal Hospital
Project No.: 16093.00
Calculated By: AJH
Checked By:
Date: 11/10/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A1	2.33	0.49	13.0	1.14	3.46	3.9															
	2	A2	2.02	0.56	11.6	1.13	3.65	4.1															
	2.2								13.0	2.27	3.46	7.9				7.9	2.3	0.5	24	91	5.1	0.3	
	3	A3	1.21	0.51	12.0	0.62	3.59	2.2															
	4	A4	2.94	0.52	11.1	1.53	3.72	5.7															
	5	A5	3.88	0.49	13.7	1.90	3.38	6.4															
	3.3								13.7	4.05	3.38	13.7				13.7	4.1	0.5	24	91	5.7	0.3	
	6	B1	0.73	0.18	13.8	0.13	3.37	0.4															
	7	B2	0.17	0.63	5.0	0.11	4.92	0.5															

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Coyote Creek Filing No. 4
Location: Fort Lupton
Design Storm: 100-Year

Project Name: Liberty Animal Hospital
Project No.: 16093.00
Calculated By: AJH
Checked By:
Date: 11/10/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A1	2.33	0.64	13.0	1.49	6.60	9.8															
	2	A2	2.02	0.69	11.6	1.39	6.97	9.7															
	2.2								13.0	2.88	6.60	19.0				19.0	2.9	0.5	24	91	6.1	0.3	
	3	A3	1.21	0.65	12.0	0.79	6.86	5.4															
	4	A4	2.94	0.66	11.1	1.94	7.10	13.8															
	5	A5	3.88	0.64	13.7	2.49	6.45	16.1															
	3.3								13.7	5.22	6.45	33.7				33.7	5.2	0.5	24	91	10.7	0.1	
	6	B1	0.73	0.45	13.8	0.33	6.43	2.1															
	7	B2	0.17	0.74	5.0	0.13	9.40	1.2															

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

Appendix C

Coyote Creek Master Drainage Report Reference

**COYOTE CREEK
MASTER DRAINAGE STUDY**

SEPTEMBER 12, 1996

Prepared by:

MERRICK & COMPANY



**FT. LUPTON
MASTER DRAINAGE STUDY**

SEPTEMBER 12, 1996

JOB NO. 18012519
PHASE CODE 15051320
WBS CODE 1.1.4

PREPARED FOR:

NICHOLSON ENTERPRISES, INC.
MR. JIM NICHOLSON
5400 S. SYRACUSE ST., SUITE 100
ENGLEWOOD, CO 80111
(303) 770-6604

PREPARED BY:

MERRICK AND COMPANY
(2450 SOUTH PEORIA STREET)
P.O. BOX 22026
DENVER, CO 80222
(303)751-0741

**FT. LUPTON
MASTER DRAINAGE STUDY
FT. LUPTON, CO
SEPTEMBER 12, 1996**

I. GENERAL LOCATION AND DESCRIPTION

The proposed Ft. Lupton Home Development consists of three single family subdivisions and one apartment subdivision containing a total of a 114 acres. The land was recently annexed into the City of Ft. Lupton from Weld County. It is located due east of the center of Ft. Lupton and is contained within the northwest one-quarter of Section 4 and the northeast one-quarter of Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian. Primarily, it is bounded by State Highway 52 on the south, 9th Street on the north, an existing drainage ditch on the east, and College Ave. (a.k.a. 2950 Road) on the east. Aims Community College comprises a very small portion of the offsite drainage basin east of College Ave.. Other existing features are a water tank on the east side of the site, a farm house on the south, and Twombly Primary School at the northwest corner of the site. Separate from these parcels, but surrounding them is the Ft. Lupton Golf Course - now under construction.

The site is covered with native grasses and weeds. The major drainageway is the ditch flowing from south to north along the west property line. This ditch is trapezoidal in shape, with a top width of 20 feet, a bottom width of 5 feet and a depth of approximately 3 feet. An irrigation facility known as the Fulton Ditch winds its way through the center of the site from south to north. The development is shown on the Flood Insurance Rate Map as Zone C - defined by FEMA as an area of minimal flooding. The Federal Emergency Management Agency has not plotted any floodplains for this site.

II. DRAINAGE BASINS AND SUB-BASINS

The City of Fort Lupton has no flood insurance rate maps according to the Federal Emergency Management Agency computer data base. The site is shown on the Weld County, Colorado Flood Insurance Rate Map Index. It is located on panel number 080266 0869 C which is not printed due to the area being in Zone C (area of minimal flooding). No other major drainageway planning studies of the area exist.

The drainage basin consists of sandy clay soils generally. The drainage flows from east to west at a 2% slope. Because the site is located along the easterly city limits, there are no planned land uses outside of the development other than the existing uses.

The Fulton Ditch is an irrigation facility which flows from south to north through the center of the site. The Fulton Ditch Manager, Mr. Lysle Dirrim, was contacted to determine site drainage requirements in relation to the ditch. He initially said the 10-year developed flow needs to be piped below the ditch. This requirement has recently changed to allowing no runoff from the sites to enter the ditch. A permit for crossing the ditch is required. A reinforced concrete pipe crossing will not require a casing. All other pipe materials need a concrete or iron casing to

minimize puncture and crushing problems and to allow the inner pipe to be extracted without interfering with the ditch. Concrete cutoff walls are required on both sides of the ditch to a depth of 3.5' to 4' below the pipe. It is preferable to cross with the pipe 3.5' below the ditch. The ditch engineer, Mr. Coby Haden with Rocky Mountain Consultants, will make any decisions if inverted siphon crossings are contemplated.

The overall site and golf course can be divided into two main drainage basins - a northerly and a southerly basin. The basins are divided by a ridge which is pronounced near the east side of the property and becomes less pronounced near the west portion of the property. Runoff from both basins flows from east to west.

One substantial offsite basin is tributary to the site. It is a long, thin basin approximately 2 miles long adjacent to the north side of State Highway 52. This basin contains 137.74 acres. Because this basin is virtually undeveloped, it very rarely generates any runoff. However, during the major storms, runoff from this basin will accumulate at the intersection of State Highway 52 and College Ave, due to the lack of any culverts at the intersection. Runoff will build up to a depth of approximately 2 feet before overtopping and flowing westerly along the southerly boundary of one of the residential subdivisions.

The drainage philosophy developed by the City of Ft. Lupton calls for separating the drainage of the residential sites from the golf course. The golf course will be required to retain all of their runoff on the golf course for all events up to a maximum of the 100-year storm. The residential sites will not be allowed to release any runoff onto the golf course. Detention ponding will not be required for the residential sites. These constraints set up the drainage scheme for the residential sites of routing the 100-year developed storm in storm sewer and streets. The City of Ft. Lupton will construct a regional detention pond downstream of the site in the future to include detention for the residential sites.

III. DRAINAGE FACILITY DESIGN

The site was divided into 24 site basins and one offsite basin. Runoff from the offsite basin was discussed above. The southerly lots of basin A2 will be built up to confine the offsite flows into the State Highway 52 right-of-way while allowing the entire lot depth to drain to the proposed residential street. This regrading of the lots creates a substantial low point in the street at design points 1 and 2. The storm sewer and inlets have been sized to capture the 100-year storm from basins A1 and A2 at these two design points.

Inlets and storm sewer were also sized for the 100-year storm for basins D1, D2 and D3. This is to prevent any of the residential runoff from flowing onto the golf course as mandated by the City of Ft. Lupton. The storm sewer for these basins will be routed across the golf course and will require an easement.

Inlets and storm sewer for the remaining 19 basins were sized for the 5-year storm. Combining the 5-year and 100-year storm flows in the same storm sewer results in the pipe carrying a maximum flow of 119.29 cfs from design point 21 to the outlet. The 100-year storm for all of the contributing basins at this same point is 223.01 cfs. Subtracting 119.29 from 223.01 results in a maximum overland street flow of 103.72 cfs in the residential streets. The maximum allowable overland flow in a street sloped at 0.5% is 112 cfs for the 100-year storm according to the Ft. Lupton Standards. Although the allowable street capacity is not exceeded, a method will have

to be devised to get the 100-year overland street flow into the existing ditch running along the westerly boundary line of the site. This is in order to prevent the runoff from continuing to the west and adversely impacting adjacent land. This street flow could be routed into the ditch by forcing a sump vertical curve into the street at the westerly boundary line which would force the storm water to turn north. Another method would be to increase the inlet and storm sewer sizes to capture the entire 100-year storm sewer into the pipe - an expensive alternative.

It is our understanding that the City of Ft. Lupton will ultimately construct a regional detention pond north of the school and 100-year developed storm sewer pipe to be extended to this site. If this does not happen in a timely manner, the residential subdivision(s) will be required by the City to construct a temporary detention facility on the future apartment development land and/or the golf course. A basin by basin theoretical detention pond volume requirement table is included for information only. These volumes can be added in any manner for temporary detention pond sizing depending on the phasing of the project.

IV. WETLAND DETERMINATION AND REVIEW

Mr. Terry McKee with the Army Corps of Engineers has been contacted to locate any wetlands on the site. His letter of response on April 4, 1996 indicated that no wetlands exist on the project. A copy of the letter is included in this report.

V. REFERENCES

This report has been prepared in conformance with the "City of Fort Lupton Standards and Specifications for the Design and Construction of Public Improvements" dated 1994.

VI. CONCLUSION

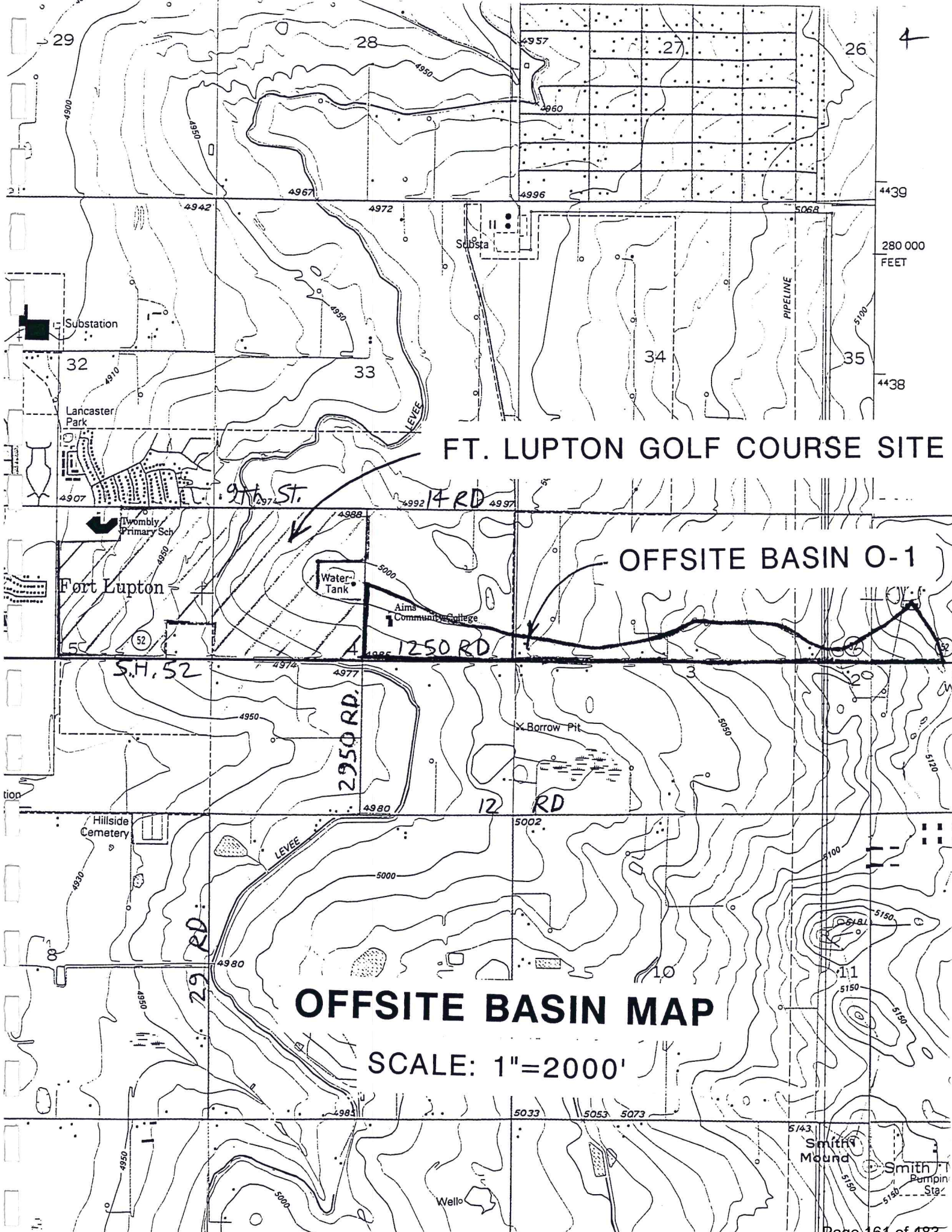
This drainage report has presented general drainage characteristics for the Ft. Lupton Master Drainage Plan, as well as some detention options and storm piping options. This report is intended to lay out the overall drainage philosophy of the project on a preliminary basis. If no changes are made to the residential sites, it can be used on a final basis with the exception of how overland street flow is transferred to the ditch at the westerly boundary line and assuming no major changes in slope are made over the existing condition. However, it is anticipated that lot layouts and street alignments will change as well as grading changes. In that case, the changes will take place with the Phase II or Phase III Drainage Reports.

If you have any questions, please feel free to call.

Respectfully submitted,

MERRICK & COMPANY

Mark F. Ericson, P.E.
Project Engineer



FT. LUPTON GOLF COURSE SITE

OFFSITE BASIN O-1

OFFSITE BASIN MAP

SCALE: 1"=2000'



REPLY TO
ATTENTION OF

5

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
TRI-LAKES PROJECT OFFICE, 9307 STATE HWY 121
LITTLETON, COLORADO 80123-6901

April 4, 1996

Mark F. Ericson
Merrick Engineers & Architects
P O Box 22026
Denver, Colorado 80222

Dear Mr. Ericson:

This letter concerns the Ft. Lupton Golf Course Wetlands which are located in the Northwest 1/4 of Section 5, Township 1 North, Range 66 West, Weld County, Colorado.

Your project has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the excavation and discharge of dredged and fill material into waters of the United States including wetlands.

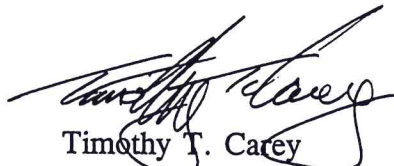
Reference is made to a March 25, 1996 wetlands determination conducted by Mr. Terry McKee of this office. During Mr. McKee's site visit, it was found that no wetlands exist at this site.

This letter is to inform you that the proposed activity, assigned number 199680280, will not require a Department of the Army (DA) Permit.

Although a DA Permit will not be required for the project, this does not eliminate the requirement that other applicable federal, state, and local permits be obtained as required.

If there are any further questions concerning this matter, please feel free to contact Mr. Terry McKee of this office at 303-979-4120.

Sincerely,

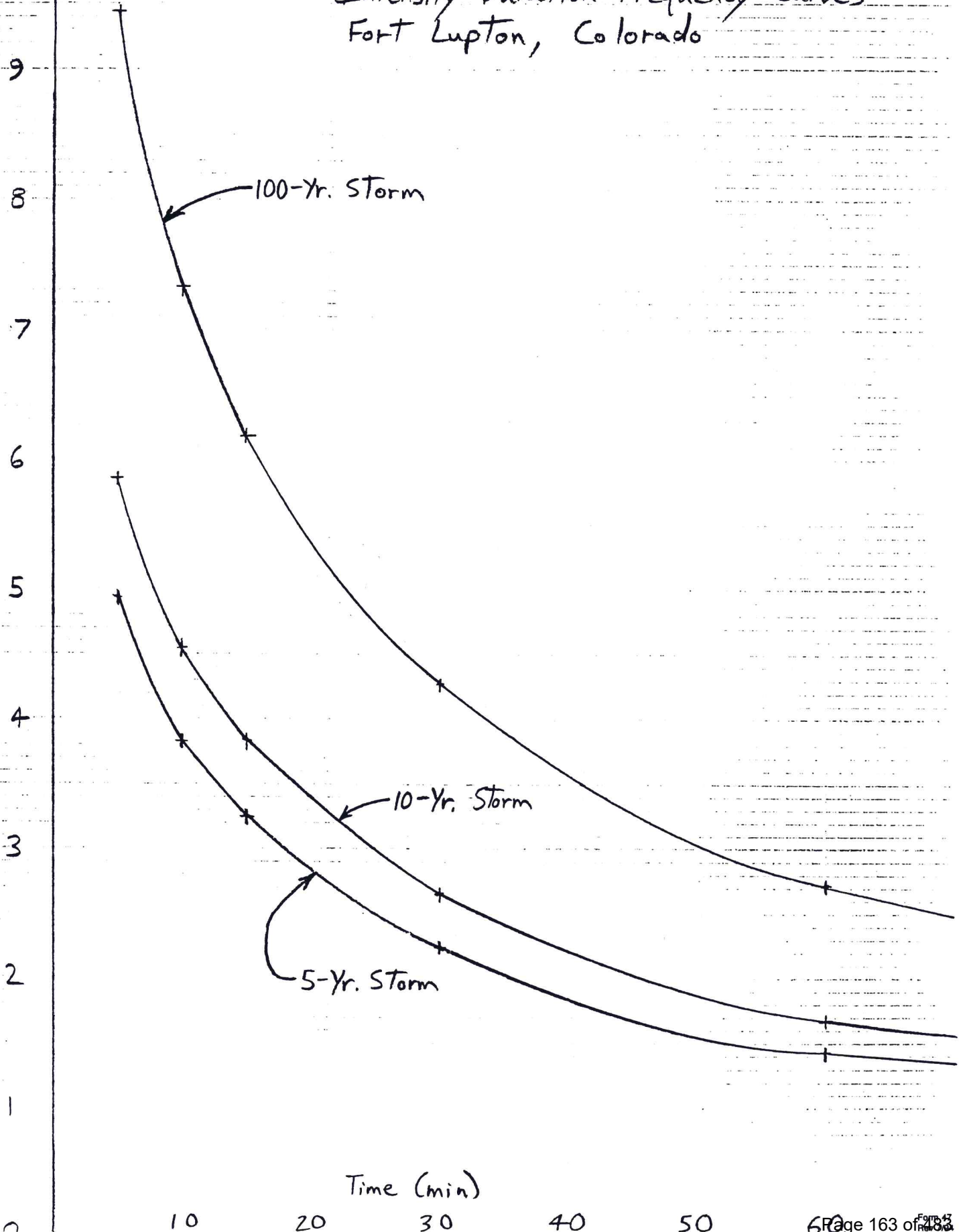


Timothy T. Carey
Project Manager



Intensity Duration Frequency Curves Fort Lupton, Colorado

Rainfall Intensity (in./hr.)





NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

**WELD COUNTY,
COLORADO**
(UNINCORPORATED AREAS)

MAP INDEX

PANELS PRINTED: 75, 325, 475, 480, 485 -
489, 495, 605, 607 - 609, 615 - 617, 619, 626
- 629, 635 - 639, 645, 675, 700, 725, 750, 775,
800, 825, 850, 855, 860, 861, 863, 864, 866,
868, 900, 925, 960, 970, 980, 981, 983, 990,
995, 1025

COMMUNITY-PANEL NUMBERS
080266 0001-1075

**MAP REVISED:
SEPTEMBER 27, 1991**

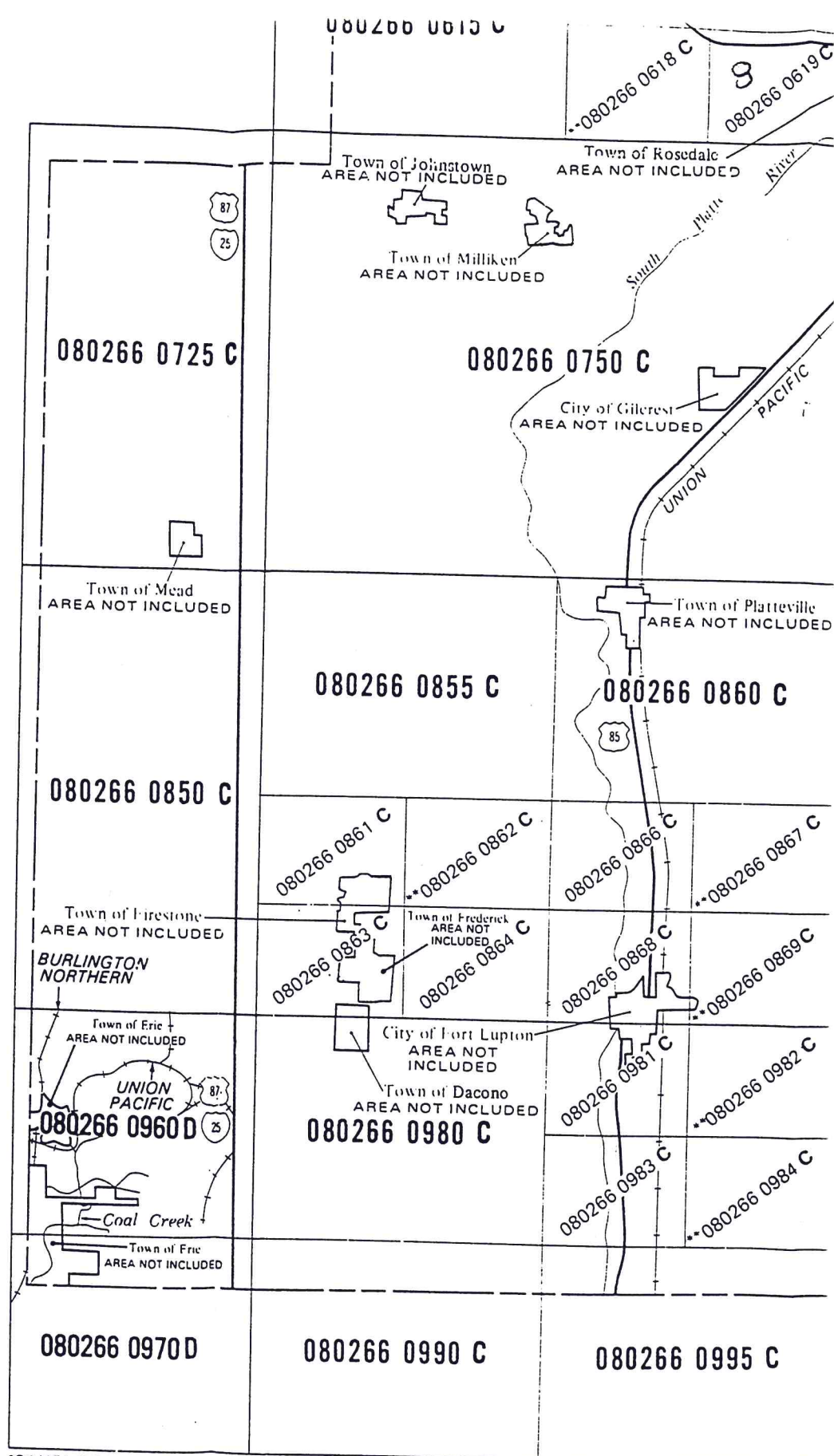


Rec ID.

G 008 000011



Ref ID.00015552



*PANEL NOT PRINTED - AREA IN ZONED
 **PANEL NOT PRINTED - AREA IN ZONEC

TABLE 3-1 (42)
RECOMMENDED RUNOFF COEFFICIENTS AND PERCENT IMPERVIOUS

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	FREQUENCY			
		2	5	10	100
<u>Business:</u>					
Commercial Areas	95	.87	.87	.88	.89
Neighborhood Areas	70	.60	.65	.70	.80
<u>Residential:</u>					
Single-Family	*	.40	.45	.50	.60
Multi-Unit (detached)	50	.45	.50	.60	.70
Multi-Unit (attached)	70	.60	.65	.70	.80
1/2 Acre Lot or Larger	*	.30	.35	.40	.60
Apartments	70	.65	.70	.70	.80
<u>Industrial:</u>					
Light Areas	80	.71	.72	.76	.82
Heavy Acres	90	.80	.80	.85	.90
<u>Parks, Cemeteries:</u>	7	.10	.18	.25	.45
<u>Playgrounds:</u>	13	.15	.20	.30	.50
<u>Schools:</u>	50	.45	.50	.60	.70
<u>Railroad Yard Areas</u>	20	.20	.25	.35	.45
<u>Undeveloped Areas:</u>					
Historic Flow Analysis-	2	(See "Lawns")			
Greenbelts, Agricultural					
Offsite Flow Analysis (when land use not defined)	45	.43	.47	.55	.65
<u>Streets:</u>					
Paved	100	.87	.88	.90	.93
Gravel (Packed)	40	.40	.45	.50	.60
<u>Drive and Walks:</u>	96	.87	.87	.88	.89
<u>Roofs:</u>	90	.80	.85	.90	.90
<u>Lawns, Sandy Soil</u>	0	.00	.01	.05	.20
<u>Lawns, Clayey Soil</u>	0	.05	.15	.25	.50

NOTE: These Rational Formula coefficients may not be valid for large basins.

*See Figure 2-1 for percent impervious.

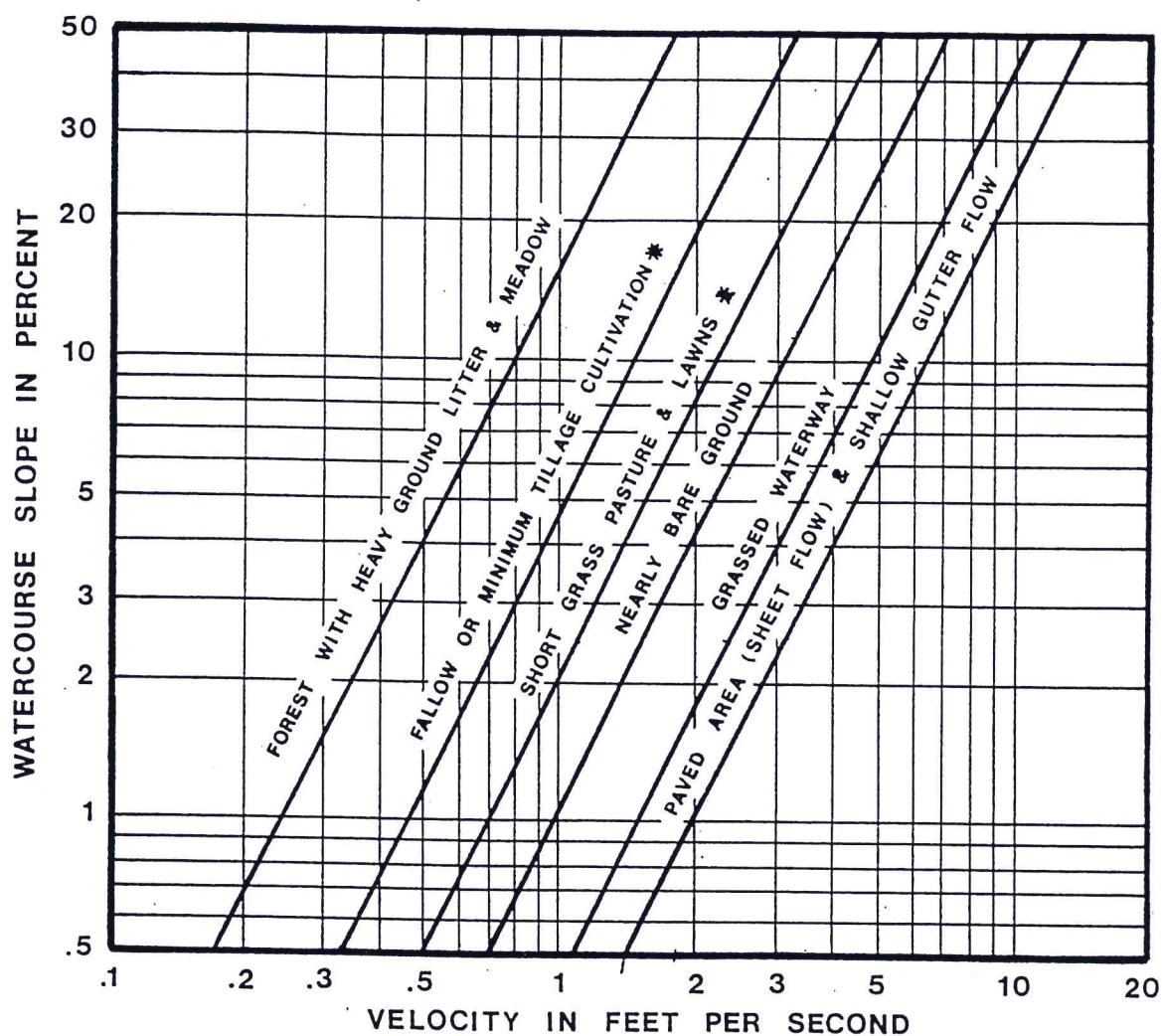


FIGURE 3-2. ESTIMATE OF AVERAGE FLOW VELOCITY FOR USE WITH THE RATIONAL FORMULA.

* MOST FREQUENTLY OCCURRING "UNDEVELOPED" LAND SURFACES IN THE DENVER REGION.

REFERENCE: "Urban Hydrology For Small Watersheds" Technical Release No. 55, USDA, SCS Jan. 1975.

5-1-84

URBAN DRAINAGE & FLOOD CONTROL DISTRICT

CHANNEL CAPACITY CALCULATION

Cross Section: 0

Ft. Lupton
Local Street

11

NLOB: .025 STCHL: 2.5 NCHL: .016 STCHR: 47.5 NROB: .025

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
0.00	2.00	2.50	1.42	6.41	1.33	7.00	1.00
9.00	1.17	25.00	1.49	41.00	1.17	43.00	1.00
43.58	1.33	47.50	1.42	50.00	2.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
2.00	2.799	1.00	2	224	2
7.22	0.80	0.00	1	31	1
1.00	0.00	50	0.0	25.0	50.0
227	0.00	1.57	0.0100	0.0100	---

Q_{100} (Max. Allowable) with Reduction = $0.8(227) = 181.6 \text{ cfs}$
 at 1% Slope (Total Street)
 = 90.8 cfs (Each Gutter)
 Agrees with chart

Q_{100} (Max Allowable) with Reduction
 = $2(56) = 112 \text{ cfs}$
 at 0.5% Slope (Total Street)

CHANNEL CAPACITY CALCULATION

12

Cross Section: 0

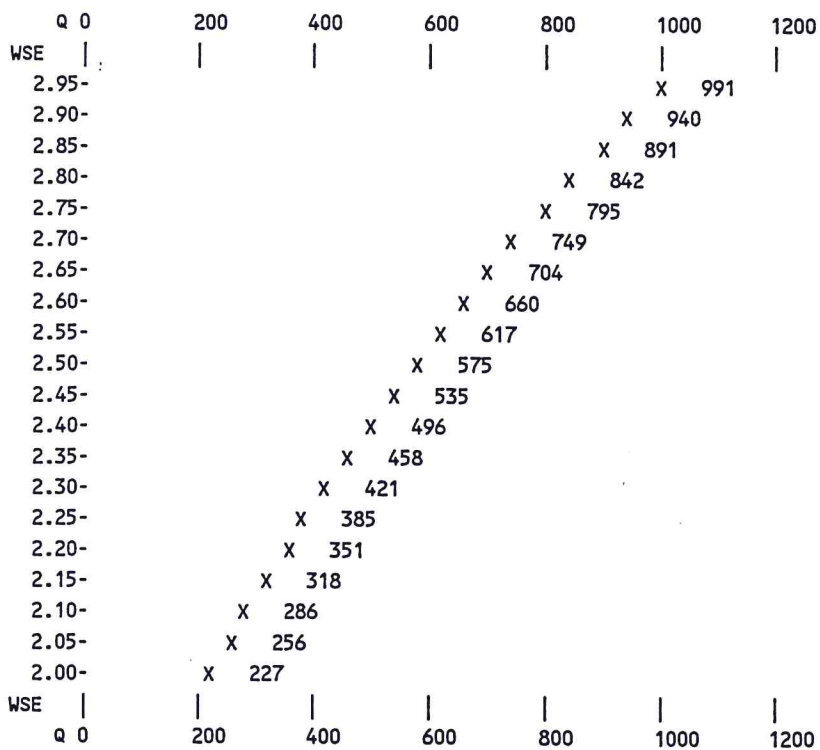
NLOB: .025 STCHL: 2.5 NCHL: .016 STCHR: 47.5 NROB: .025

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
0.00	2.00	2.50	1.42	6.41	1.33	7.00	1.00
9.00	1.17	25.00	1.49	41.00	1.17	43.00	1.00
43.58	1.33	47.50	1.42	50.00	2.00	0.00	0.00

SLOPE = .01

RATING CURVE

WATER SURFACE ELEVATION (in Feet NGVD) vs. DISCHARGE (in CFS)



FT. Lupton

$$\begin{aligned}
 Q_5 &= 7.4 \text{ cfs} \text{ gutter max. @ } 1\% \text{ slope} \\
 &= 4.2 \text{ cfs} \text{ gutter max. @ } 0.5\% \text{ slope} \\
 Q_{100} &= 92 \text{ cfs} \text{ gutter max. @ } 1\% \text{ slope} = 184 \text{ cfs Total} \\
 &= 52 \text{ cfs} \text{ gutter max. @ } 0.5\% \text{ slope} = 104 \text{ cfs Total}
 \end{aligned}$$

Type R Inlet @ 0.44' Depth - Max. Q (cfs)

Type R Size	0.5%	1.0%	Sump	Sump @ 12"
5'	3.1	3.4	4.2	11.8
10'	4.2	5.7	8.5	23.9
15'	4.6	6.5	13.9	28.9



CUHP Input

Offsite Basin 0-1 - Historic

$$\text{Area} = 137.74 \text{ ac.} = 0.215 \text{ SM}$$

$$L = 1.89 \text{ mi.}$$

$$L_c = 0.91 \text{ mi.}$$

$$\% \text{ Impervious} = 2\%$$

$$\text{Slope} = (5135 - 4985) / 10,000 = 0.015$$

$$T_c = \text{N/A}$$

$$\text{Dep. Storage Pervious} = 0.40 \text{ in.}$$

$$\text{Dep. Storage Impervious} = 0.100 \text{ in.}$$

$$\text{Initial Infiltration} = 3.000 \text{ in. Clay Soils}$$

$$\text{Decay} = .0018$$

$$\text{Final Infiltration} = 0.500 \text{ in.}$$

Computer Results

Input File HFT011000.CHI

$$Q_{100} = 98 \text{ cfs at } T_p = 70 \text{ min.}$$

Input File HFT010005.CHI

$$Q_5 = 26 \text{ cfs at } T_p = 70 \text{ min.}$$

CUHP

HFT01005,CHI 15

2 FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96
01005-YEAR 005 1.42 0.000.000.000.00

70 1 15.0 1BASIN 0-1*
.2151.8900.910 2.000.015 0.00 0.400.1003.000.00180.5000 0

E

CUHPE/PC VERSION MODIFIED IN JANUARY 1985

PRINT OPTION NUMBER SELECTED FOR THIS BASIN IS 7

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96

BASIN ID: -- BASIN COMMENT: BASIN 0-1*

AREA OF BASIN (SQMI)	LENGTH OF BASIN (MI)	DIST TO CENTROID (MI)	IMPERVIOUS AREA (PCT)	SLOPE (FT/FT)	UNIT DURATION (MIN)
.22	1.89	.91	2.00	.0150	5.00

COEFFICIENT (REFLECTING TIME TO PEAK)	COEFFICIENT (RELATED TO PEAK RATE OF RUNOFF)
.156	.265

CALCULATED UNIT HYDROGRAPH

TIME TO PEAK (MIN)	PEAK RATE OF RUNOFF (CFS/SQMI)	UNIT HYDROGRAP (CFS)	PEAK (AF)
35.68	306.80	65.96	11.47

WIDTH AT 50 = 98. MIN. WIDTH AT 75 = 51. MIN. K50 = .22 K75 = .30

RAINFALL LOSSES INPUT W/ BASIN DATA

MAX. PERVIOUS RET. = .40 IN.	MAX. IMPERVIOUS RET. = .10 IN.
INFILTRATION = 3.00 IN./HR.	DECAY = .00180/SECOND FNINFL = .50 IN./HR.

TIME	UNIT HYDROGRAPH	TIME	UNIT HYDROGRAPH	TIME	UNIT HYDROGRAPH
0.	0.	110.	34.	220.	15.
5.	7.	115.	32.	225.	14.
10.	20.	120.	31.	230.	14.
15.	35.	125.	30.	235.	13.
20.	48.	130.	29.	240.	13.
25.	58.	135.	28.	245.	12.
30.	64.	140.	27.	250.	12.
35.	66.	145.	26.	255.	11.
40.	65.	150.	25.	260.	11.
45.	62.	155.	24.	265.	10.
50.	58.	160.	23.	270.	10.
55.	54.	165.	22.	275.	10.
60.	50.	170.	21.	280.	9.
65.	48.	175.	21.	285.	9.
70.	49.	180.	20.	290.	9.
75.	48.	185.	19.	295.	8.
80.	46.	190.	18.	300.	8.
85.	44.	195.	18.	305.	8.
90.	42.	200.	17.	310.	7.
95.	40.	205.	16.	315.	0.

100.	38.	*	210.	16.	*	0.	0.	*
105.	36.	*	215.	15.	*	0.	0.	*

BASIN ID: 1 -- BASIN COMMENT: BASIN 0-1*

**** STORM NO. = 1 **** DATE OR RETURN PERIOD = 005-YEAR

TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*	TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*
0.	.00	.000	0.	*	170.	.00	.000	8.	*
5.	.03	.000	0.	*	175.	.00	.000	7.	*
10.	.05	.000	0.	*	180.	.00	.000	7.	*
15.	.12	.002	0.	*	185.	.00	.000	7.	*
20.	.22	.004	0.	*	190.	.00	.000	7.	*
25.	.35	.072	1.	*	195.	.00	.000	6.	*
30.	.18	.133	3.	*	200.	.00	.000	6.	*
35.	.08	.035	6.	*	205.	.00	.000	6.	*
40.	.06	.018	9.	*	210.	.00	.000	6.	*
45.	.05	.008	13.	*	215.	.00	.000	5.	*
50.	.05	.009	15.	*	220.	.00	.000	5.	*
55.	.04	.001	17.	*	225.	.00	.000	5.	*
60.	.04	.001	18.	*	230.	.00	.000	5.	*
65.	.04	.001	18.	*	235.	.00	.000	5.	*
70.	.04	.002	17.	*	240.	.00	.000	5.	*
75.	.04	.001	17.	*	245.	.00	.000	4.	*
80.	.03	.001	16.	*	250.	.00	.000	4.	*
85.	.03	.001	15.	*	255.	.00	.000	4.	*
90.	.03	.001	14.	*	260.	.00	.000	4.	*
95.	.03	.001	14.	*	265.	.00	.000	4.	*
100.	.02	.000	14.	*	270.	.00	.000	4.	*
105.	.02	.000	13.	*	275.	.00	.000	3.	*
110.	.02	.000	13.	*	280.	.00	.000	3.	*
115.	.02	.000	12.	*	285.	.00	.000	3.	*
120.	.02	.000	12.	*	290.	.00	.000	3.	*
125.	.00	.000	11.	*	295.	.00	.000	3.	*
130.	.00	.000	11.	*	300.	.00	.000	3.	*
135.	.00	.000	10.	*	305.	.00	.000	3.	*
140.	.00	.000	10.	*	310.	.00	.000	3.	*
145.	.00	.000	9.	*	315.	.00	.000	3.	*
150.	.00	.000	9.	*	320.	.00	.000	2.	*
155.	.00	.000	9.	*	325.	.00	.000	2.	*
160.	.00	.000	8.	*	330.	.00	.000	2.	*
165.	.00	.000	8.	*	335.	.00	.000	2.	*

TOTAL PRECIP. = 1.64 (1-HOUR RAIN = 1.42) EXCESS PRECIP. = .293 INCHES

VOLUME OF EXCESS PRECIP = 3. ACRE-FEET

PEAK Q = 18. CFS TIME OF PEAK = 65. MIN.

INFILT. = 3.00 IN/HR DECAY = .00180 FNINF = .50 IN/HR

MAX.PERV.RET. = .40 IN. MAX.IMP.RET. = .10 IN.

1 U.D.F.C.D. CUHPD RUNOFF ANALYSIS EXECUTED ON DATE AT TIME

CUHPE/PC VERSION MODIFIED IN JANUARY 1985 TO WRITE OUTPUT FILE OF STORM HYDROGRAPHS FOR SUBSEQUENT
USE WITH MULTI-PLAN RIVER ROUTING ROUTINES OF HEC-1

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96

NO HYDROGRAPH VALUES WERE WRITTEN TO AN OUTPUTFILE FOR THIS RUN OF CUHPD.

CUHP

19

FT. LUPTON OFFSITE BASIN O-1 - Historic Conditions - 8/28/96

100-YEAR 100 2.71

0.000.000.000.00

HFTOI100.CHI

0 1 15.0

1BASIN O-1*

2151.8900.910 2.000.015 0.00 0.400.1003.000.00180.5000 0

E

HFT01100.CHO

CUHPE/PC VERSION MODIFIED IN JANUARY 1985

PRINT OPTION NUMBER SELECTED FOR THIS BASIN IS 7

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96

BASIN ID: -- BASIN COMMENT: BASIN 0-1*

AREA OF BASIN (SQMI)	LENGTH OF BASIN (MI)	DIST TO CENTROID (MI)	IMPERVIOUS AREA (PCT)	SLOPE (FT/FT)	UNIT DURATION (MIN)
.22	1.89	.91	2.00	.0150	5.00

COEFFICIENT (REFLECTING TIME TO PEAK)	COEFFICIENT (RELATED TO PEAK RATE OF RUNOFF)
.156	.265

CALCULATED UNIT HYDROGRAPH

TIME TO PEAK (MIN)	PEAK RATE OF RUNOFF (CFS/SQMI)	UNIT HYDROGRAP (CFS)	PEAK (AF)	VOLUME OF RUNOFF (AF)
35.68	306.80	65.96	11.47	

WIDTH AT 50 = 98. MIN. WIDTH AT 75 = 51. MIN. K50 = .22 K75 = .30

RAINFALL LOSSES INPUT W/ BASIN DATA

MAX. PERVIOUS RET. = .40 IN.	MAX. IMPERVIOUS RET. = .10 IN.
INFILTRATION = 3.00 IN./HR.	DECAY = .00180/SECOND FNINFL = .50 IN./HR.

TIME	UNIT		TIME	UNIT		TIME	UNIT	
	HYDROGRAPH	*		HYDROGRAPH	*		HYDROGRAPH	*
0.	0.	*	110.	34.	*	220.	15.	*
5.	7.	*	115.	32.	*	225.	14.	*
10.	20.	*	120.	31.	*	230.	14.	*
15.	35.	*	125.	30.	*	235.	13.	*
20.	48.	*	130.	29.	*	240.	13.	*
25.	58.	*	135.	28.	*	245.	12.	*
30.	64.	*	140.	27.	*	250.	12.	*
35.	66.	*	145.	26.	*	255.	11.	*
40.	65.	*	150.	25.	*	260.	11.	*
45.	62.	*	155.	24.	*	265.	10.	*
50.	58.	*	160.	23.	*	270.	10.	*
55.	54.	*	165.	22.	*	275.	10.	*
60.	50.	*	170.	21.	*	280.	9.	*
65.	48.	*	175.	21.	*	285.	9.	*
70.	49.	*	180.	20.	*	290.	9.	*
75.	48.	*	185.	19.	*	295.	8.	*
80.	46.	*	190.	18.	*	300.	8.	*
85.	44.	*	195.	18.	*	305.	8.	*
90.	42.	*	200.	17.	*	310.	7.	*
95.	40.	*	205.	16.	*	315.	0.	*

100.	38.	*	210.	16.	*	0.	0.	*
105.	36.	*	215.	15.	*	0.	0.	*

BASIN ID: -- BASIN COMMENT: BASIN 0-1*

**** STORM NO. = 1 **** DATE OR RETURN PERIOD = 100-YEAR

TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*	TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*
0.	.00	.000	0.	*	180.	.00	.000	43.	*
5.	.03	.000	0.	*	185.	.00	.000	41.	*
10.	.08	.000	0.	*	190.	.00	.000	40.	*
15.	.12	.002	0.	*	195.	.00	.000	38.	*
20.	.22	.004	0.	*	200.	.00	.000	37.	*
25.	.38	.097	1.	*	205.	.00	.000	36.	*
30.	.68	.626	6.	*	210.	.00	.000	34.	*
35.	.38	.332	18.	*	215.	.00	.000	33.	*
40.	.22	.172	35.	*	220.	.00	.000	32.	*
45.	.17	.125	52.	*	225.	.00	.000	31.	*
50.	.14	.093	68.	*	230.	.00	.000	30.	*
55.	.11	.067	81.	*	235.	.00	.000	28.	*
60.	.11	.067	90.	*	240.	.00	.000	27.	*
65.	.11	.067	96.	*	245.	.00	.000	26.	*
70.	.05	.013	98.	*	250.	.00	.000	25.	*
75.	.05	.013	98.	*	255.	.00	.000	24.	*
80.	.03	.001	96.	*	260.	.00	.000	24.	*
85.	.03	.001	92.	*	265.	.00	.000	23.	*
90.	.03	.001	89.	*	270.	.00	.000	22.	*
95.	.03	.001	87.	*	275.	.00	.000	21.	*
100.	.03	.001	85.	*	280.	.00	.000	20.	*
105.	.03	.001	82.	*	285.	.00	.000	20.	*
110.	.03	.001	79.	*	290.	.00	.000	19.	*
115.	.03	.001	75.	*	295.	.00	.000	18.	*
120.	.03	.001	72.	*	300.	.00	.000	17.	*
125.	.00	.000	69.	*	305.	.00	.000	17.	*
130.	.00	.000	66.	*	310.	.00	.000	16.	*
135.	.00	.000	63.	*	315.	.00	.000	16.	*
140.	.00	.000	60.	*	320.	.00	.000	15.	*
145.	.00	.000	57.	*	325.	.00	.000	14.	*
150.	.00	.000	55.	*	330.	.00	.000	14.	*
155.	.00	.000	52.	*	335.	.00	.000	13.	*
160.	.00	.000	50.	*	340.	.00	.000	8.	*
165.	.00	.000	48.	*	345.	.00	.000	5.	*
170.	.00	.000	46.	*	350.	.00	.000	4.	*
175.	.00	.000	45.	*	355.	.00	.000	3.	*

TOTAL PRECIP. = 3.13 (1-HOUR RAIN = 2.71) EXCESS PRECIP. = 1.685 INCHES

VOLUME OF EXCESS PRECIP = 19. ACRE-FEET

PEAK Q = 98. CFS TIME OF PEAK = 70. MIN.

INFILT. = 3.00 IN/HR DECAY = .00180 FNINF = .50 IN/HR

MAX.PERV.RET. = .40 IN. MAX.IMP.RET. = .10 IN.

U.D.F.C.D. CUHPD RUNOFF ANALYSIS EXECUTED ON DATE AT TIME

CUHPE/PC VERSION MODIFIED IN JANUARY 1985 TO WRITE OUTPUT FILE OF STORM HYDROGRAPHS FOR SUBSEQUENT USE WITH MULTI-PLAN RIVER ROUTING ROUTINES OF HEC-1

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96



MERRICK
Engineers & Architects

BY Mark Ericson
CHKD. BY _____

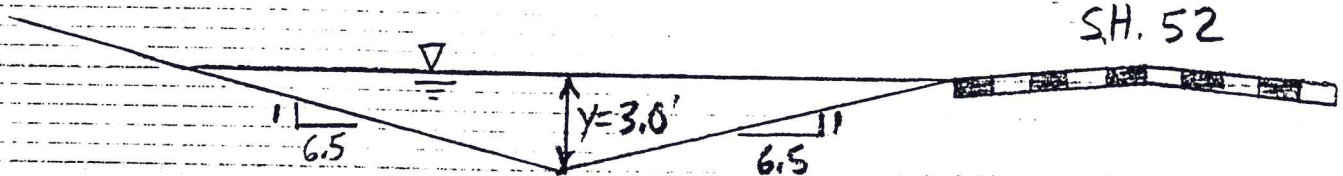
DATE 9/3/96
DATE _____

SUBJECT Ft. Lupton

SHEET NO. 23 OF _____
JOB NO. _____

Existing Ditch Capacity Along S.H. 52

Basin 0-1 $Q_{100} = 98$ cfs from CUHP



$$n = 0.035 \text{ (grass)}$$

$$S = 0.1\%$$

$$y = 3.0'$$

$$Q_{\max} = 102 \text{ cfs} > 98 \text{ cfs} - \text{O.K.}$$

DRAINAGE CALCULATIONS

		Merrick and Company					
		Intensity Duration Frequency Calculations					
		Ft. Lupton Master Drainage Study				Job No.	18012519
		Calculated By:		Mark Ericson			
			2-YEAR	5-YEAR	10-YEAR	50-YEAR	100-YEAR
One-Hour Point Rainfall (In.)			1.00	1.42	1.68	2.35	2.71
	5 Min. In./Hr.		3.48	4.94	5.85	8.18	9.43
	10 Min. In./Hr.		2.70	3.83	4.54	6.35	7.32
	15 Min. In./Hr.		2.28	3.24	3.83	5.36	6.18
	30 Min. In./Hr.		1.58	2.24	2.65	3.71	4.28
	60 Min. In./Hr.		1.00	1.42	1.68	2.35	2.71

Merrick and Company														
Time of Concentration														
Ft. Lupton Master Drainage Study														
Calculated By:		Mark Ericson		Date:		8/30/96		Job No. 18012519		Tc=Ti+Tt				
Sub-Basin Data		Initial/Overland				Travel: Time (tt)				Tc Check				
		Time (ti)								(Urbanized Basins)				
Desig:	Area	C5	Length	Slope	Ti	Length	Slope	Vel.	Tt	Comp.	Total	Tc=	Fina	Remarks
	Acres		Feet	%	Min	Feet	%	FPS	Min	Tc	Length. Feet	(L/180)+10 Min	Tc	
A1	4.63	0.45	200	3.3	11.2	600	1.8	2.7	3.7	14.9	800	N/A	15	
A2	5.33	0.45	150	3.3	9.7	1,000	1.7	2.6	6.4	16.1	1,150	16.4	16	
A3	6.38	0.45	200	2.0	13.2	1,180	1.4	2.3	8.6	21.7	1,380	17.7	18	
A4	4.32	0.45	200	2.0	13.2	450	1.6	2.5	3.0	16.2	650	13.6	14	
B1	6.61	0.45	200	2.0	13.2	1,030	1.1	2.1	8.2	21.3	1,230	16.8	17	
B2	3.72	0.45	200	2.0	13.2	1,230	1.6	2.5	8.2	21.4	1,430	17.9	18	
C1	7.67	0.45	200	2.0	13.2	1,900	1.2	2.2	14.4	27.6	2,100	21.7	22	
C2	5.79	0.45	200	2.0	13.2	230	2.0	2.9	1.3	14.5	430	12.4	12	
D1	3.63	0.45	140	2.0	11.0	680	1.5	2.4	4.7	15.7	820	14.6	15	
D2	4.68	0.45	200	2.0	13.2	550	1.3	2.2	4.2	17.3	750	14.2	14	
D3	6.01	0.45	200	2.0	13.2	1,150	1.2	2.2	8.7	21.9	1,350	17.5	18	
E1	5.05	0.45	140	2.0	11.0	480	1.3	2.2	3.6	14.6	620	13.4	13	
E2	1.84	0.45	200	2.0	13.2	200	1.3	2.2	1.5	14.7	400	12.2	12	
F1	5.05	0.45	200	2.0	13.2	250	2.0	2.9	1.4	14.6	450	12.5	13	
F2	2.02	0.45	200	2.0	13.2	200	1.5	2.4	1.4	14.6	400	12.2	12	
F3	1.52	0.45	200	2.0	13.2	80	1.3	2.2	0.6	13.8	280	11.6	12	
G1	8.72	0.45	200	2.0	13.2	1,650	1.8	2.7	10.2	23.3	1,850	20.3	20	
G2	7.85	0.45	200	2.0	13.2	900	1.7	2.6	5.8	18.9	1,100	16.1	16	
G3	2.53	0.45	200	2.5	12.2	250	2.0	2.9	1.4	13.7	450	12.5	13	
H1	2.80	0.45	200	2.5	12.2	1,000	1.9	2.8	6.0	18.2	1,200	16.7	17	
H2	6.24	0.45	200	2.0	13.2	2,100	1.8	2.7	13.0	26.1	2,300	22.8	23	
I1	3.76	0.65	40	2.0	4.1	470	2.3	3.0	2.6	6.7	510	12.8	7	
I2	5.88	0.65	200	3.5	7.6	650	2.3	3.0	3.6	11.2	850	14.7	11	
I3	3.61	0.65	60	2.0	5.0	850	0.7	1.7	8.3	13.3	910	15.1	13	

Merrick and Company								Job No. 18012519													
Storm Drainage System Design								5-Year Storm													
Ft. Lupton Master Drainage Study																					
Calculated By:				Mark Ericson																	
Date:				8/30/96																	
Street	D.P.	Direct Runoff						Total Runoff				Street		Pipe			Travel Time			Type R Inlet Size	
		Area	Area	Run.	Tc	C*A	I	Q	Tc	Sum	I	Q	Slop	Flow	Flow	Slop	Pipe	L	Vel	Tt	
		Des.	(Ac)	Coef.	Min	(Ac)	In/Hr	CFS	Min	C*A	In/Hr	CFS	%	CFS	CFS	%	Size	Ft	FPS	Min	
	1	A1	4.63	0.45	15	2.08	3.24	6.75													Size for Q100
	2	A2	5.33	0.45	16	2.40	3.19	7.65	16	4.48	3.19	14.30									Size for Q100
	3	A3	6.38	0.45	18	2.87	2.99	8.58	28	7.35	2.33	17.13						1400	2	12	15'
	4	A4	4.32	0.45	14	1.94	3.36	6.53	29	9.30	2.29	21.29						600	8	1	10'
	5	B1	6.61	0.45	17	2.97	3.09	9.19													15'
	6	B2	3.72	0.45	18	1.67	2.99	5.01	18	4.65	2.99	13.90						400	8	1	10'
	7	C1	7.67	0.45	22	3.45	2.70	9.32	31	17.40	2.21	38.45						750	8	2	15'
	8	C2	5.79	0.45	12	2.61	3.60	9.38	34	20.00	2.08	41.61						1500	8	3	15'
	9	D1	3.63	0.45	15	1.63	3.24	5.29													Size for Q100
	10	D2	4.68	0.45	14	2.11	3.36	7.08	15	3.74	3.24	12.12						300	8	1	Size for Q100
	11	D3	6.01	0.45	18	2.70	2.99	8.09	18	6.44	2.99	19.27						300	8	1	Size for Q100
	12	E1	5.05	0.45	13	2.27	3.48	7.91													Size for Q100
	13	E2	1.84	0.45	12	0.83	3.60	2.98	13	3.10	3.48	10.79									Size for Q100
	14	F1	5.05	0.45	13	2.27	3.48	7.91	23	11.82	2.62	30.96						2200	8	5	10'
	15	F2	2.02	0.45	12	0.91	3.60	3.27	24	12.73	2.56	32.58						300	8	1	5'
	16	F3	1.52	0.45	12	0.68	3.60	2.46	24	13.41	2.56	34.33						150	8	0	5'
	17	G1	8.72	0.45	20	3.92	2.83	11.10	36	37.34	1.99	74.30						900	8	2	15'
	18	G2	7.85	0.45	16	3.53	3.17	11.20	37	40.87	1.95	79.69						350	8	1	15'
	19	G3	2.53	0.45	13	1.14	3.48	3.96	38	42.01	1.91	80.23						250	8	1	5'
	20	H1	2.80	0.45	17	1.26	3.09	3.89	39	43.27	1.87	80.91						450	8	1	5'
	21	H2	6.24	0.45	23	2.81	2.62	7.36	39	46.08	1.87	86.16									10'
	22	I1	3.76	0.65	7	2.44	4.43	10.83													15'
	23	I2	5.88	0.65	11	3.82	3.72	14.22	11	6.27	3.72	23.31						250	8	1	15'
	24	I3	3.61	0.65	15	2.35	3.24	7.60													Discharge to Ditch

Merrick and Company																										
Storm Drainage System Design																										
Ft. Lupton Master Drainage Study										Job No. 18012519																

		Merrick and Company		
		Storm Drainage System Design		
		Ft. Lupton Master Drainage Study		
		SUMMARY RUNOFF TABLE		
DESIGN POINT	TRIBUTARY BASIN	CONTRI AREA (ACRES)	RUNOFF 5-YEAR STORM (CFS)	PEAK 100-YEAR STORM (CFS)
1	A1	4.63	6.75	17.17
2	A1-A2	9.96	14.30	35.74
3	A1-A3	16.34	17.13	43.53
4	A1-A4	20.66	21.29	54.17
5	B1	6.61	9.19	23.08
6	B1-B2	10.33	13.90	34.96
7	A1-C1	38.66	38.45	97.66
8	A1-C2	44.45	41.61	105.88
9	D1	3.63	5.29	13.46
10	D1-D2	8.31	12.12	30.81
11	D1-D3	14.32	19.27	48.46
12	E1	5.05	7.91	19.94
13	E1-E2	6.89	10.79	27.20
14	D1-F1	26.26	30.96	78.15
15	D1-F2	28.28	32.58	82.13
16	D1-F3	29.80	34.33	86.54
17	A1-G1	82.97	74.30	191.16
18	A1-G2	90.82	76.69	205.43
19	A1-G3	93.35	80.23	207.24
20	A1-H1	96.15	80.91	209.41
21	A1-H2	102.39	86.16	223.01
22	I1	3.76	10.83	25.12
23	I1-I2	9.64	23.31	54.52
24	I3	3.61	7.60	17.85

Merrick and Company									
Storm Drainage System Design									
Ft. Lupton Master Drainage Study						Job No. 18012519			
Calculated By:		Mark Ericson							
Date:		8/30/96							
Storm Sewer Sizing									
Based on 1% Slope									
Basin								Total	Req'd. RCP
D.P.	Q5	Q100	Q in Pipe	C5*A	i5	C100*A	i100	Q in Pipe	Pipe Dia. (in.)
1	6.75	17.17	17.17						24"
2	7.65	19.12	19.12						24"
2 to 3						5.98	5.98	35.76	30"
3	8.58	21.59	8.58						18"
3 to 4				4.81	2.29	5.98	4.37	37.15	30"
4	6.53	16.49	6.53						18"
4 to Junct.				9.45	2.29	5.98	4.37	47.77	36"
5	9.19	23.08	9.19						18"
6	5.01	12.59	5.01						18"
6 to Junct.				4.64	2.99			13.87	21"
Junct. to 7				9.45	2.21	5.98	4.21	46.06	36"
7	9.32	23.33	9.32						18"
7 to 8				12.90	2.21	5.98	4.21	53.68	36"
8	0.09	12.05	9.41						18"
8 to Junct.	9.38	23.73	9.38	15.51	2.08	5.98	3.97	56.00	36"
9	5.29	13.46	13.46						21"
10	7.08	17.86	17.86						24"
10 to 11				0.00	0.00	4.99	6.18	30.84	27"
11	8.09	20.34	20.34						24"
11 to Junct.				0.00	0.00	8.59	5.64	48.45	36"
12	7.91	19.94	19.94						24"
13	2.98	7.54	7.54						18"
13 to Junct.				3.10	3.48	0.00	0.00	10.79	21"
Junct. to 14				3.10	3.48	8.59	4.96	53.39	36"
14	7.91	19.94	7.91						18"
14 to 15				5.37	2.62	8.59	4.96	56.68	36"
15	3.27	8.28	3.27						18"
15 to 16				6.28	2.56	8.59	4.84	57.65	36"
16	2.46	6.23	2.46						18"
16 to Junct.				6.96	2.56	8.59	4.84	59.39	36"
Junct. to 17				22.47	1.99	14.57	3.84	100.66	42"
17	11.10	27.94	11.10						21"
17 to 18				26.39	1.99	14.57	3.84	108.46	48"
18	11.20	28.17	11.20						21"
18 to 19				29.92	1.95	14.57	3.77	113.27	48"
19	3.96	9.99	3.96						18"
19 to 20				31.44	1.91	14.57	3.70	113.96	48"

Pipes

3/

20	3.89	9.78	3.89						18"
20 to 21				32.70	1.87	14.57	3.63	114.04	48"
21	7.36	18.57	7.36						18"
21 to Outlet				35.51	1.87	14.57	3.63	119.29	48"
22	10.83	25.12	10.83						21"
23	14.22	33.26	14.22						18"
23 to Outlet				6.27	3.72			23.32	27"
24	7.60	17.85	N/A						

Merrick and Company								
Detention Pond Calculations								
Ft. Lupton Master Drainage Study Job No. 18012519								
For Information Only - No Onsite Detention Is Required								
Calculated By: Mark Ericson								
Formulas: $K10 = (0.95I - 1.90)/100$								
$K100 = (1.78I - 0.002I^2 - 3.56)/1000$								
$V = KA$								
Basin	Area	Percent	K10	K100	V10	V10	V100	V100
	(Acres)	Imperv. (I)			(Ac. Ft.)	(CF)	(Ac. Ft.)	(CF)
A1	4.63	43	0.0390	0.0693	0.180	7856	0.321	13973
A2	5.33	43	0.0390	0.0693	0.208	9043	0.369	16086
A3	6.38	43	0.0390	0.0693	0.249	10825	0.442	19254
A4	4.32	43	0.0390	0.0693	0.168	7330	0.299	13037
B1	6.61	43	0.0390	0.0693	0.257	11215	0.458	19948
B2	3.72	43	0.0390	0.0693	0.145	6312	0.258	11227
C1	7.67	43	0.0390	0.0693	0.299	13013	0.531	23147
C2	5.79	43	0.0390	0.0693	0.226	9824	0.401	17474
D1	3.63	43	0.0390	0.0693	0.141	6159	0.251	10955
D2	4.68	43	0.0390	0.0693	0.182	7940	0.324	14124
D3	6.01	43	0.0390	0.0693	0.234	10197	0.416	18138
E1	5.05	43	0.0390	0.0693	0.197	8568	0.350	15241
E2	1.84	43	0.0390	0.0693	0.072	3122	0.127	5553
F1	5.05	43	0.0390	0.0693	0.197	8568	0.350	15241
F2	2.02	43	0.0390	0.0693	0.079	3427	0.140	6096
F3	1.52	43	0.0390	0.0693	0.059	2579	0.105	4587
G1	8.72	43	0.0390	0.0693	0.340	14795	0.604	26316
G2	7.85	43	0.0390	0.0693	0.306	13319	0.544	23691
G3	2.53	43	0.0390	0.0693	0.099	4293	0.175	7635
H1	2.80	43	0.0390	0.0693	0.109	4751	0.194	8450
H2	6.24	43	0.0390	0.0693	0.243	10587	0.432	18832
I1	3.76	70	0.0646	0.1112	0.243	10581	0.418	18220
I2	5.88	70	0.0646	0.1112	0.380	16546	0.654	28492
I3	3.61	70	0.0646	0.1112	0.233	10158	0.402	17493
TOTAL	115.64					211006		373210

Site plan for a wastewater treatment facility showing 18 circular tanks labeled A1 through A18. Each tank contains two values: a larger number and a smaller number in parentheses. The tanks are arranged in a complex layout with various flow lines and easements. Key features include 'FULTON DITCH' running vertically through the center, 'PROPOSED 50' WIDE EASEMENT' lines, and 'C.L. PROPOSED WATER LINE'. The plan also shows topographic contours and a north arrow pointing towards the top right.

Tank Label	Value 1	Value 2 (in parentheses)
A1	4.63	0.45
A2	5.33	0.45
A3	6.36	0.45
A4	4.32	0.45
B1	6.61	0.45
B2	3.72	0.45
C1	7.67	0.45
C2	3.79	0.45
D1	3.63	0.45
D2	4.98	0.45
D3	6.01	0.45
E1	5.05	0.45
E2	1.84	0.45
F1	5.06	0.45
F2	2.03	0.45
F3	1.52	0.45
G1	8.72	0.45
G2	7.88	0.45
G3	2.53	0.45
H1	2.80	0.45
H2	6.24	0.45
I1	3.76	0.65
I2	4.89	0.65
I3	3.61	0.65

LEGEND

- STAKING POINT
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PLAYING AREA BOUNDARY
- STORM MANHOLE
- STORM SEWER
- STORM INLET
- DIRECTION OF FLOW
- DESIGN POINT
- DRAINAGE BASIN BOUNDARY
- BASIN DESIGNATION
- AREA (acres)

5-YEAR RUNOFF COEFFICIENT

[illegible]

 **Engineers & Architects**
MERRICK
2450 PEORIA STREET
DENVER, COLORADO 80222
303/751-0741 FAX: 303/751-258

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APPROVED		
CLIENT	SIGNATURE	DATE
REVIEW		
APPROVED		
CAD FILE NAME		

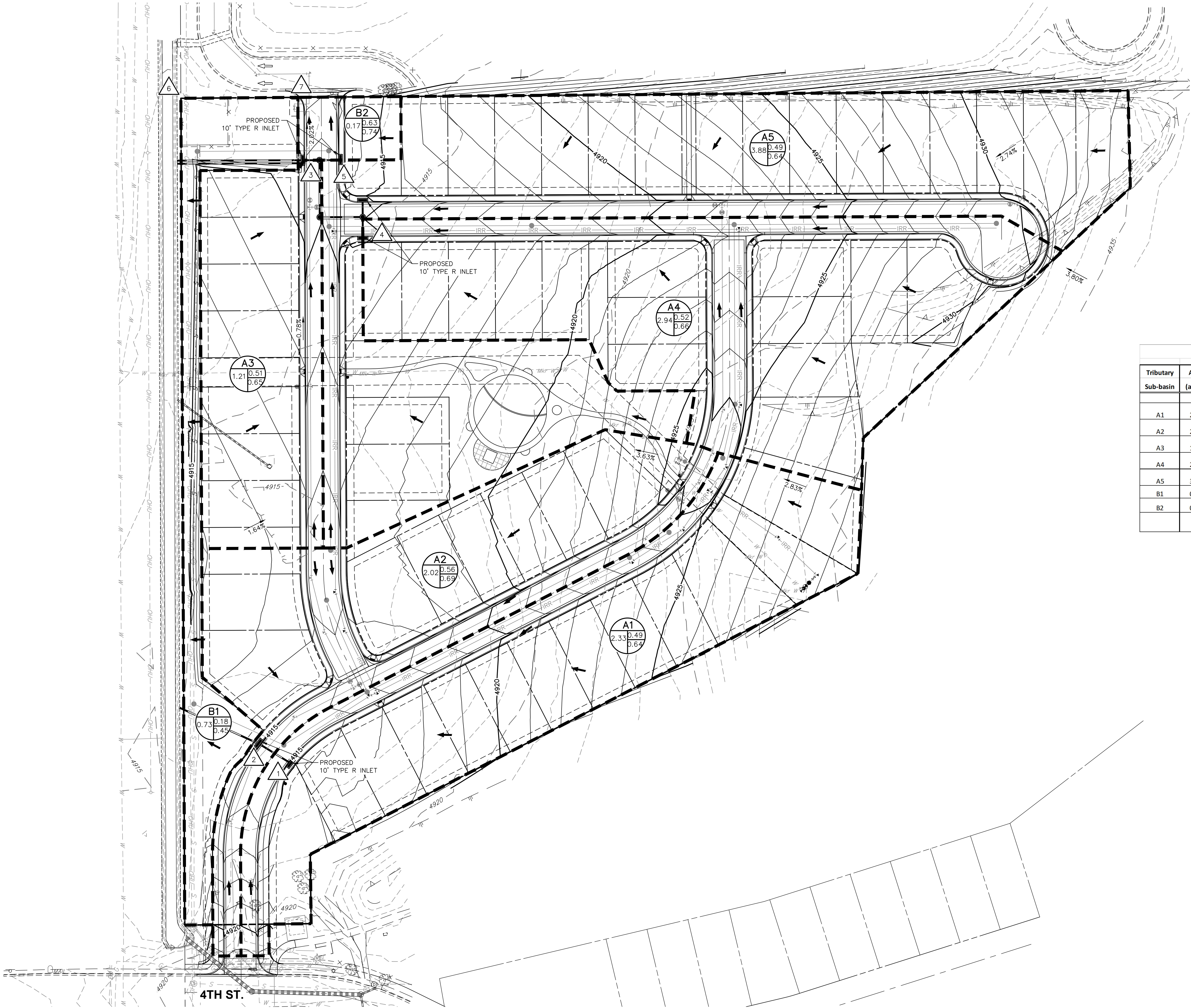
CLIENT PROJECT NO.: -
MERRICK PROJECT NO.: 18012689
SCALE: 1" = 200'

FORT LUPTON MASTER DRAINAGE PLAN

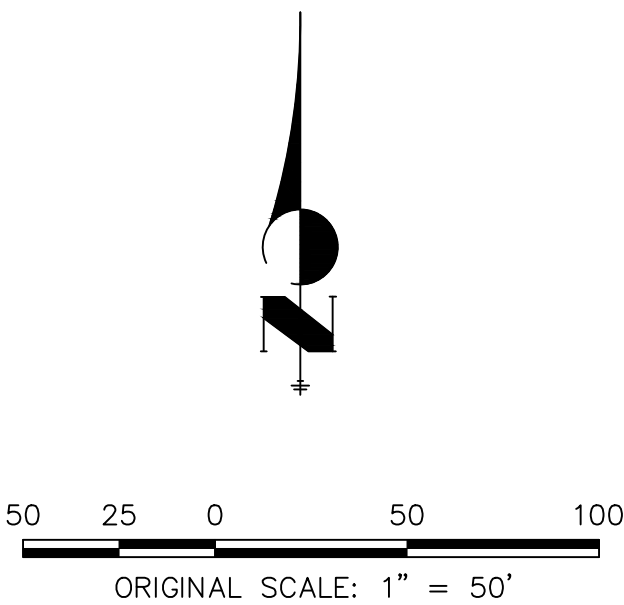
REVISION: A	DRAWING NO.: MDR.DWG	SHEET NO.: 1 OF 1
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Appendix D Drainage Maps

COYOTE CREEK FILING NO. 4



BASIN SUMMARY TABLE							
Tributary	Area	Percent			t _c	Q _s	Q ₁₀₀
Sub-basin	(acres)	Impervious	C _s	C ₁₀₀	(min)	(cfs)	(cfs)
A1	2.33	52%	0.49	0.64	13.0	3.9	9.8
A2	2.02	61%	0.56	0.69	11.6	4.1	9.7
A3	1.21	56%	0.51	0.65	12.0	2.2	5.4
A4	2.94	56%	0.52	0.66	11.1	5.7	13.8
A5	3.88	51%	0.49	0.64	13.7	6.4	16.1
B1	0.73	7%	0.18	0.45	13.8	0.4	2.1
B2	0.17	69%	0.63	0.74	5.0	0.5	1.2



UNTIL SUCH TIME AS
THESE DRAWINGS ARE
APPROVED BY THE
APPROPRIATE REVIEWING
AGENCIES, OR ENGINEERING
APPROVES THEIR USE,
THESE DRAWINGS ARE
DESIGNATED BY WRITTEN
AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LOVE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

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A Western Company
Central 303-740-9888 • Colorado Springs 719-583-2583
Fort Collins 970-491-9888 • www.jrengineering.com

COYOTE CREEK FILING NO. 4	H-SCALE	1"=50'	No.	REVISION	BY	DATE
	V-SCALE	1"=X'				
PRELIMINARY DRAINAGE PLAN	DATE	11/17/21				
	DESIGNED BY	AJH				
	DRAWN BY	XXX				
	CHECKED BY					
SHEET 5 OF 27		JOB NO. 16093.00				

**COYOTE CREEK FILING NO. 4
FINAL PHASE II DRAINAGE REPORT**

November 2021

Prepared For:
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10221 Prestwick Trail
Lone Tree, CO 80124
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Contact: Bob Quinette

Prepared By:
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(Project No. 16093.00)

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Appendices

A: Vicinity Map, Hydrologic Soils Group, IDF Data, FIRMette

B: Hydrologic Calculation

C: Hydraulic Calculations

D: Coyote Creek Master Drainage Report Reference

E: Drainage Maps

CERTIFICATION STATEMENT

This Preliminary Drainage Report for the design of the Coyote Creek Filing No. 4 development was prepared by me or under my direct supervision in accordance with the City of Fort Lupton's Standards and Specifications and acceptable professional practices of the industry. We acknowledge that the City of Fort Lupton's review of this Preliminary Drainage Report is only for general conformance with submittal requirements, current design criteria and standard engineering principles and practices. We are also aware of the provisions of the City Code of the City of Fort Lupton.

Andrew J Hugill, Registered Professional Engineer
Colorado Professional Engineer No. 57007
For and on behalf of JR Engineering, LLC

I. LOCATION & BASIN DESCRIPTION

Project Location and Description

Coyote Creek Filing No. 4 is a proposed single-family residential Planned Unit Development (PUD) located within Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, Weld County, Colorado.

The approximately 13-acre site is bounded by the Shortline Ditch regional channel to the west, Twombly Elementary School to the north, and Coyote Creek Golf Course to the southeast and 4th St. to the south. The site is located roughly 1,000 feet north of 1st St. and 600 feet south of 9th St. A vicinity map is included in Appendix A. The site is located within the Coyote Creek Subdivision with the Vincents East Subdivision directly to the west.

The site is composed of type B soils which are characterized as having a moderate infiltration rate when thoroughly wet. Approximately 90 percent of the site is covered in native grasses with the ground generally sloping from east to west between zero and 3 percent.

This report presents the preliminary drainage analysis for Coyote Creek Filing No. 4. The proposed use for this site will be a residential subdivision composed of 59 single-family detached units with a local park. There is a 30" irrigation line bisecting the approximate center of the site from east to west. There is an existing 30' sanitary sewer easement along the site's western boundary and a sanitary lift station located in the northwest corner of the site.

II. DRAINAGE BASINS

Major Basin Description

The existing Coyote Creek Filing No.4 site is vacant with no FIRM map panel available for the subject site but the FIRMette is located in Appendix A. The site is located within Zone X which is a zone of minimal flood hazard.

Proposed Sub-Basin Description

Existing runoff generated from the site is routed from east to west via sheet flow into the Shortline Ditch. There is also a small portion of the existing site that is depressed with a concrete overflow structure and 18" CMP pipe to drain the area west into the adjacent Shortline ditch. The Shortline ditch routes all runoff from the site north to a regional detention facility.

Sub-basin A1:

Sub-basin A1 is approximately 2.33 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 3.9$ cfs, and $Q_{100} = 9.8$ cfs) generated in this basin is currently conveyed via sheet flow to Lupton Lane where the flow will ultimately be conveyed southwest via curb and gutter to a 10' Type R sump Inlet at design point 1 (DP1). Flows collected at this inlet will be piped northwest to the Shortline ditch.

Sub-basin A2:

Sub-basin A2 is approximately 1.80 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 3.8$ cfs, and $Q_{100} = 8.8$ cfs) generated in this basin is currently conveyed via sheet flow to Raffi Road and Lupton Lane where the flow will ultimately be conveyed south west via curb and gutter to a 10' Type R sump Inlet at design point 2 (DP2). Flows collected at this inlet will be piped northwest to the Shortline ditch.

Sub-basin A3:

Sub-basin A3 is approximately 0.48 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 1.1$ cfs, and $Q_{100} = 2.6$ cfs) generated in this basin is currently conveyed via sheet flow to Raffi Road where the flow will ultimately be conveyed north via curb and gutter to a 10' Type R Inlet at design point 3 (DP3). Flows collected at this inlet will be piped west to the Shortline ditch.

Sub-basin A4:

Sub-basin A4 is approximately 2.94 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 5.7$ cfs, and $Q_{100} = 13.8$ cfs) generated in this basin is currently conveyed via sheet flow to Lupton Lane and Logan Way where the flow will ultimately be conveyed west via curb and gutter to a 10' Type R Inlet at design point 4 (DP4). Flows collected at this inlet will be piped north then west to the Shortline ditch.

Sub-basin A5:

Sub-basin A5 is approximately 3.88 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 6.4$ cfs, and $Q_{100} = 16.1$ cfs) generated in

this basin is currently conveyed via sheet flow to Raffi Road and Logan Way where the flow will ultimately be conveyed north via curb and gutter to a 10' Type R Inlet at design point 5 (DP5). Flows collected at this inlet will be piped west to the Shortline ditch.

Sub-basin B1:

Sub-basin B1 is approximately 1.46 acres in size and made up of lawns/open space. Runoff ($Q_5 = 1.6$ cfs, and $Q_{100} = 5.0$ cfs) generated in this basin is currently conveyed via sheet flow west directly into the Shortline Ditch.

Sub-basin B2:

Sub-basin B2 is approximately 0.17 acres in size and made up of single family residential area, lawns/open space, streets and sidewalk. Runoff ($Q_5 = 0.5$ cfs, and $Q_{100} = 1.2$ cfs) generated in this basin is currently conveyed via sheet flow to Raffi Road where the flow will ultimately be conveyed north via curb and gutter to a crossspan at design point 7 (D). Flows collected at this crossspan will travel approximately 120' along existing curb and gutter before entering an existing concrete rundown into the Shortline Ditch.

III. DRAINAGE DESIGN CRITERIA

Development Criteria Reference

Storm Drainage Analysis and Design Criteria for this project were implemented from the City of Fort Lupton Storm Drainage Criteria and the “Urban Storm Drainage Criteria Manual” by Mile High Flood District (MHFD).

The design storms are the 5-year storm event and the 100-year storm event. Storm sewer and roadways have been designed to safely convey the 5-year and 100-year event with inlets. Rainfall intensity data was taken from Table 502 of City of Fort Lupton Criteria which can be found in Appendix A.

Hydrologic Criteria

All hydrologic data was obtained from the “City of Fort Lupton Standards and Specifications Manual” and the “Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual” Volumes 1, 2, and 3. Onsite drainage improvements were designed based on the 5 year (minor) storm event and the 100-year (major) storm event. Runoff was calculated using the Rational Method, and rainfall intensities for the 5-year and the 100-year storm return frequencies were obtained from Table 502 of the Fort Lupton Criteria Located in Appendix A. Runoff coefficients were determined based on proposed land use and from data in Table 602 from Section 6 of the Fort Lupton Criteria. Time of concentrations were developed using equations from Section 6 of the Fort Lupton Criteria. All runoff calculations and applicable charts and graphs are included in Appendix B.

Hydraulic Criteria

The Rational Method and USDCM’s SF-2 and SF-3 forms were used to determine the runoff from the minor and major storms on the site. UDFCD UD-Inlet v5.05. will be used to size the inlets.

IV. DRAINAGE FACILITY DESIGN

General Concept

The proposed Coyote Creek Filing No. 4 site is designed to convey generated runoff via storm sewers, along curb and gutter, and via surface flow to the existing Shortline Ditch on the west side of the site. Secondly, surface overflow paths have been provided, such that the 100-year storm flows remain at least one foot below the finished floor elevation in a fully clogged inlet condition. This report analyses runoff generated on-site and not any runoff generated on the golf course to the east. The Master Drainage study for Coyote creek indicates that the Golf Course is responsible to capture all flow generated from the course.

Conformance with Coyote Creek Master Drainage Study

Coyote Creek Filing No. 4 was originally studied in the Coyote Creek Master Drainage Study by Merrick and Company dated September 12, 1996. Filing No.4 is known within the Master Study as Basin I. The Master Drainage Study can be found in Appendix C. The original intent for the basin was for Multifamily residential use with a specific road layout and the master study indicates that if the site use, grading, and street alignment change that a Phase II or Phase III report will need to be done. The purpose of this report is to account for the changes from the Master Study.

The Master Study indicates that no detention or water quality is necessary for the site once the City completes the Regional Detention Facility to the north which exists at this time. The Master study also indicates “The golf course will be required to retain all of their runoff on the golf course for all events up to a maximum of the 100-year storm”. This report does not account for any runoff generated on the golf course to the east and only analyses the basins on the property which is consistent with the Master Drainage Study.

V. SUMMARY

The proposed site improvements for the Coyote Creek Filing No. 4 site are consistent with the approved Master Drainage Study referenced herein. On-site detention is not required as all site runoff will be directed to the Shortline Ditch and ultimately the Regional Detention Pond. Once flow data for the Shortline Ditch becomes available, the addition of site flows will be analyzed. It is assumed that there is sufficient capacity in the Shortline Ditch to handle site runoff during the 100 year event. The site has no adverse drainage impacts on adjacent properties, surrounding developments, or downstream infrastructure. As a result, the proposed drainage design outlined in this report meets the latest City of Fort Lupton Storm Drainage Criteria.

The storm system is designed to take enough water to ensure that the roadways can convey the 100 year event safely. 4.10 cfs will ultimately bypass flowby inlets to the north offsite where the flow will travel approximately 150 feet vial curb and gutter to a concrete rundown into the Shortline Ditch.

VI. REFERENCES

1. 2018 International Fire Code; 2018
2. City of Fort Lupton, Standards and Specifications for the Design and Construction of Public Improvements; 2014
3. City of Fort Lupton and Clear Water Solutions, Inc., 2018 Municipal Water Efficiency Plan; 2018.
4. Merrick & Company, Coyote Creek Master Drainage Study

Appendix A
Vicinity Map, Hydrologic Soils Group, IDF Data, FIRMette



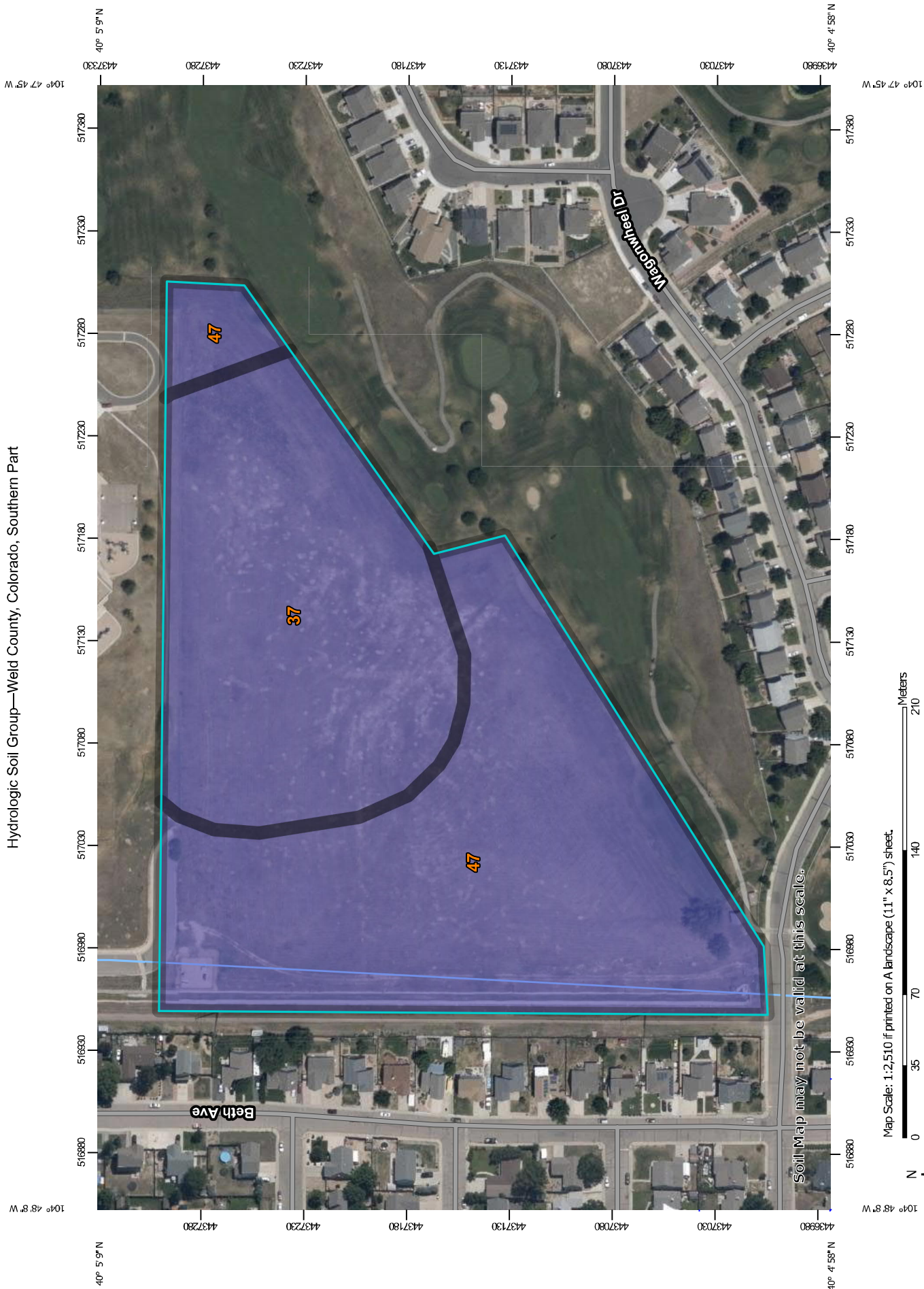
500 250 0 500
 ORIGINAL SCALE: 1" = 500'

APPENDIX A
 VICINITY MAP
 JOB NO. 16093.00
 2021-11-10
 SHEET 1 OF 1



J-R ENGINEERING
 A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
 Fort Collins 970-491-9888 • www.jrengineering.com



Map Scale: 1:2,510 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



Soil Map may not be valid at this scale.

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

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

C

C/D

D

Not rated or not available

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 20, Aug 31, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
37	Nelson fine sandy loam, 0 to 3 percent slopes	B	6.7	41.0%
47	Olney fine sandy loam, 1 to 3 percent slopes	B	9.6	59.0%
Totals for Area of Interest			16.2	100.0%

Description

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.

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 502
Time-Intensity-Frequency Tabulation
for the Rational Method

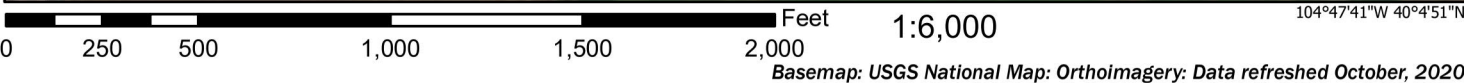
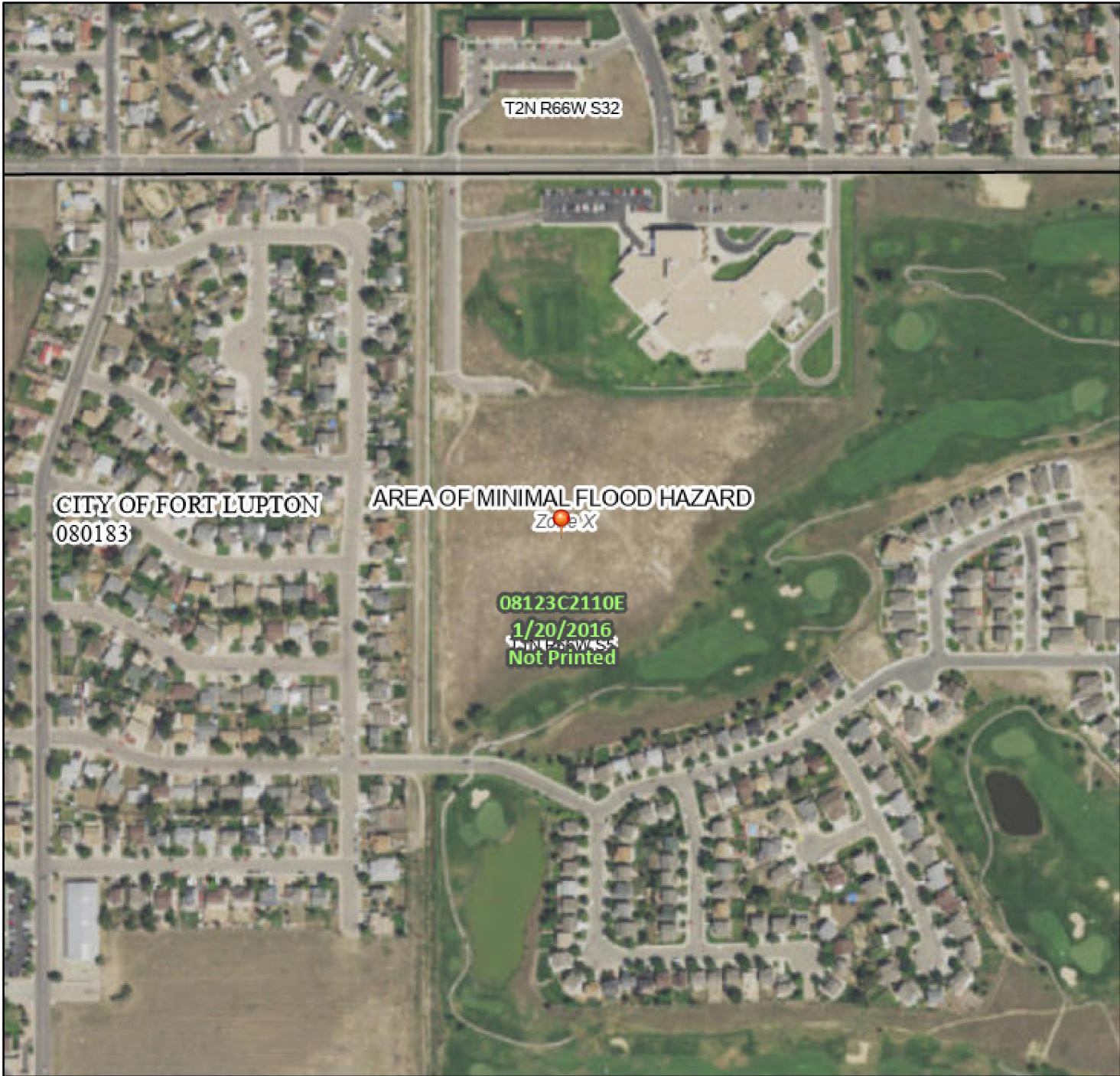
Rainfall Intensity
(in/hr)/duration

Frequency	5-min	10-min	15-min	30-min	60-min
2-year	3.48	2.70	2.28	1.58	1.00
5-year	4.92	3.84	3.24	2.24	1.42
10-year	5.88	4.56	3.84	2.66	1.68
50-year	8.16	6.36	5.36	3.72	2.35
100-year	9.48	7.32	6.16	4.28	2.71

National Flood Hazard Layer FIRMette



104°48'18"W 40°5'19"N



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 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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 **11/16/2021 at 11:30 AM** 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.

Appendix B

Hydrologic Calculations

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Coyote Creek Filing No. 4
 Location: Fort Lupton

Project Name: Liberty Animal Hospital
 Project No.: 16093.00
 Calculated By: AJH
 Checked By: _____
 Date: 12/13/21

Basin ID	Total Area (ac)	Paved Roads/Walks			Single Family			Lawns/Open Space			Basins Total Weighted 5 YEAR C	Basins Total Weighted 100 YEAR C
		Area (ac)	5 - YEAR C	100 - YEAR C	Area (ac)	5 - YEAR C	100 - YEAR C	Area (ac)	5 - YEAR C	100 - YEAR C		
A1	2.33	0.44	0.88	0.93	1.52	0.45	0.60	0.37	0.18	0.45	0.49	0.64
A2	1.80	0.60	0.88	0.93	1.05	0.45	0.60	0.15	0.18	0.45	0.57	0.70
A3	0.48	0.22	0.88	0.93	0.17	0.45	0.60	0.09	0.18	0.45	0.60	0.73
A4	2.94	0.68	0.88	0.93	1.97	0.45	0.60	0.30	0.18	0.45	0.52	0.66
A5	3.88	0.84	0.88	0.93	2.28	0.45	0.60	0.77	0.18	0.45	0.49	0.64
B1	1.46	0.00	0.88	0.93	0.73	0.45	0.60	0.73	0.18	0.45	0.32	0.53
B2	0.17	0.07	0.88	0.93	0.09	0.45	0.60	0.00	0.18	0.45	0.63	0.74

STANDARD FORM SF-2 TIME OF CONCENTRATION

Subdivision: Coyote Creek Filing No. 4
Location: 2_SF2

Project Name: Liberty Animal Hospital
Project No.: 16093.00
Calculated By: AJH
Checked By:
Date: 12/13/21

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					t _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C ₅	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL. (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)	Urbanized t _c (min)	
A1	2.33	B	52%	0.49	0.64	140	2.8	9.3	588	1.7	20.0	2.6	3.8	13.0	728.0	13.3	13.0
A2	1.80	B	62%	0.57	0.70	108	2	7.9	565	1.8	20.0	2.7	3.5	11.4	673.0	13.1	11.4
A3	0.48	B	64%	0.60	0.73	70	1.64	6.4	360	0.8	20.0	1.8	3.4	9.7	430.0	12.0	9.7
A4	2.94	B	56%	0.52	0.66	100	3.8	6.7	760	2.1	20.0	2.9	4.4	11.1	860.0	14.2	11.1
A5	3.88	B	51%	0.49	0.64	197	2.74	11.1	664	2.1	20.0	2.9	3.8	14.9	861.0	13.7	13.7
B1	1.46	B	29%	0.32	0.53	100	1	14.1	684	0.3	20.0	1.1	10.4	24.5	784.0	13.8	13.8
B2	0.17	B	69%	0.63	0.74	67	3.87	4.4	85	2	20.0	2.8	0.5	4.9	152.0	10.5	5.0

NOTES:

$$t_c = t_i + t_t \quad (6-2)$$

Where: t_c = time of concentration (minutes)
t_i = initial time or overland flow time (minutes)
t_t = travel time in the ditch, channel, gutter, storm sewer, etc.
(minutes)

$$t_c = \frac{L}{180} + 10 \quad (6-5)$$

Where: t_c = time of concentration at the first design point (minutes)
L = length of basin (feet)

$$t_i = \frac{1.8(1.1-C_5)^{2.5} L}{\sqrt{s}} \quad (6-3)$$

Where: t_i = overland flow time (minutes)
C₅ = runoff coefficient for 5-year frequency (Table 602)
L = length of overland flow (feet, 500 feet maximum)
s = average basin slope (percent)

For basin lengths greater than 500 feet, the overland flow time needs to be considered in combination with the travel time (t_t). The travel time (t_t) is calculated using the hydraulic properties of the swale, ditch, channel, or street. Travel time is calculated using Equation 6-4. For preliminary work, the travel time (t_t) can be estimated using Figure 602.

$$t_t = \frac{L}{60V} \quad (6-4)$$

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Coyote Creek Filing No. 4
Location: Fort Lupton
Design Storm: 5-Year

Project Name: Liberty Animal Hospital
Project No.: 16093.00
Calculated By: AJH
Checked By:
Date: 12/13/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A1	2.33	0.49	13.0	1.14	3.46	3.9															
	2	A2	1.80	0.57	11.4	1.03	3.68	3.8															
	2.2								13.0	2.17	3.46	7.5				7.5	2.2	0.5	24	91	5.0	0.3	Runoff from DP 1 and 2 captured by sump inlets
	3	A3	0.48	0.60	9.7	0.29	3.93	1.1															
	4	A4	2.94	0.52	11.1	1.53	3.72	5.7															
	5	A5	3.88	0.49	13.7	1.90	3.38	6.4															
	3.3								13.7	3.72	3.38	12.6				12.6	3.7	0.5	24	91	5.6	0.3	Runoff from DP 3, 4, and 5 captured by on-grade inlets
	6	B1	1.46	0.32	13.8	0.46	3.37	1.6															
	7	B2	0.17	0.63	5.0	0.11	4.92	0.5															

Notes:
Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Coyote Creek Filing No. 4
Location: Fort Lupton
Design Storm: 100-Year

Project Name: Liberty Animal Hospital
Project No.: 16093.00
Calculated By: AJH
Checked By:
Date: 12/13/21

[illegible]

Notes:
Street and Pipe C*_A values are determined by Q/i using the catchment's intensity value.

Appendix C

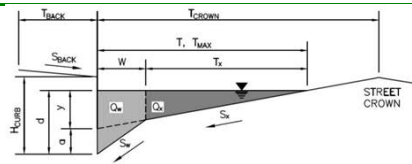
Hydraulic Calculations

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Coyote Creek Filing No. 4

Inlet ID: Inlet 1

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

[MINOR STORM Allowable Capacity is based on Depth Criterion](#)[MAJOR STORM Allowable Capacity is based on Depth Criterion](#)

T_{BACK}	=	7.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.012	

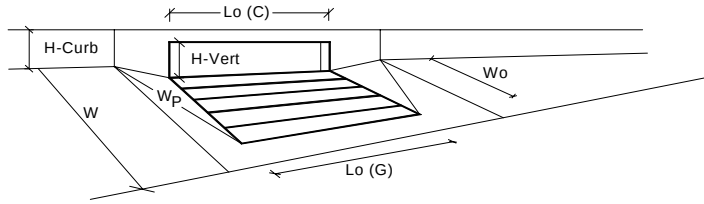
H_{CURB}	=	4.00	inches
T_{CROWN}	=	18.0	ft
W	=	2.00	ft
S_x	=	0.020	ft/ft
S_w	=	0.083	ft/ft
S_o	=	0.000	ft/ft
n_{STREET}	=	0.012	

	Minor Storm	Major Storm	
T_{MAX}	18.0	18.0	ft
d_{MAX}	4.0	5.7	inches
	☐	☐	

	Minor Storm	Major Storm	
Q_{allow}	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



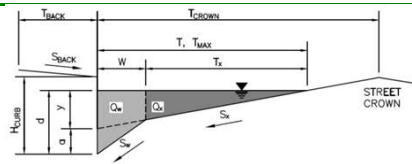
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	3	3	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.0	5.7	inches
<u>Grate Information</u>			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)		$C_r (G)$ =	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	
<u>Curb Opening Information</u>			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)		$C_r (C)$ =	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	
<u>Low Head Performance Reduction (Calculated)</u>			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.17	0.31	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.38	0.54	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.64	0.77	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
WARNING: Inlet Capacity less than Q Peak for Minor Storm		Q_a =	3.9	11.7	cfs
		$Q_{PEAK REQUIRED}$ =	3.9	9.8	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Coyote Creek Filing No. 4

Inlet ID: Inlet 2

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

T_{BACK}	=	7.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.012	

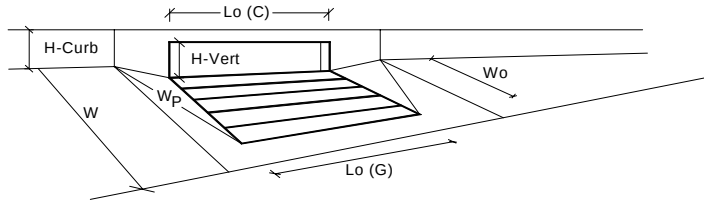
H_{CURB}	=	4.00	inches
T_{CROWN}	=	18.0	ft
W	=	2.00	ft
S_x	=	0.020	ft/ft
S_w	=	0.083	ft/ft
S_o	=	0.000	ft/ft
n_{STREET}	=	0.012	

	Minor Storm	Major Storm	
T_{MAX}	18.0	18.0	ft
d_{MAX}	4.0	5.7	inches
	☐	☐	

	Minor Storm	Major Storm	
Q_{allow}	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.01 (April 2021)



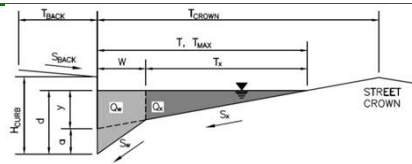
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	3	3	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.0	5.7	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 _r (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 _r (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} =	0.17	0.31	ft
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	0.38	0.54	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	0.64	0.77	
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		Q _a =	3.9	11.7	cfs
		Q _{PEAK REQUIRED} =	3.8	8.8	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Coyote Creek Filing No. 4

Inlet ID: Inlet 3

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	7.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.012	

H_{CURB}	=	4.00	inches
T_{CROWN}	=	18.0	ft
W	=	2.00	ft
S_X	=	0.020	ft/ft
S_W	=	0.083	ft/ft
S_O	=	0.008	ft/ft
n_{STREET}	=	0.012	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
T_{MAX}	18.0	18.0	ft
d_{MAX}	4.0	5.7	inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

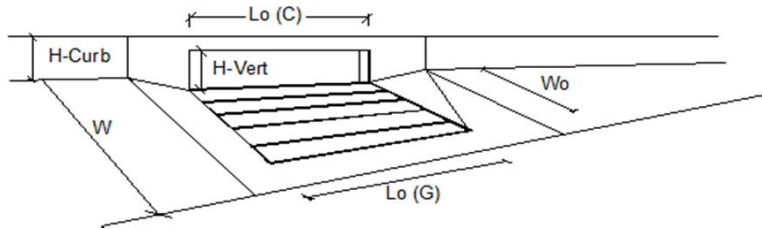
	Minor Storm	Major Storm	
Q_{allow}	4.0	15.0	cfs

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'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



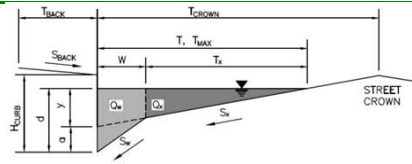
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		$a_{LOCAL} =$	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		$N_o =$	2	2	
Length of a Single 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)		$C_{r-G} =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_{r-C} =$	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		$Q =$	1.1	2.6	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		$Q_o =$	0.0	0.0	cfs
Capture Percentage = $Q_u/Q_o =$		$C \% =$	100	100	%

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Coyote Creek Filing No. 4

Inlet ID: Inlet 4

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T _{BACK} =	7.0	ft
S _{BACK} =	0.020	ft/ft
n _{BACK} =	0.012	

H _{CURB} =	4.00	inches
T _{CROWN} =	18.0	ft
W =	2.00	ft
S _x =	0.020	ft/ft
S _w =	0.083	ft/ft
S _o =	0.020	ft/ft
n _{STREET} =	0.012	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
T _{MAX} =	18.0	18.0	ft
d _{MAX} =	4.0	5.7	inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

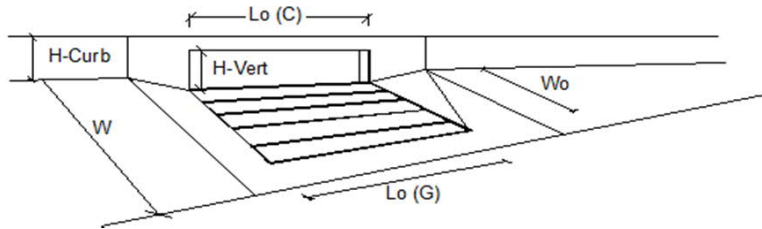
	Minor Storm	Major Storm	
Q _{allow} =	6.4	23.7	cfs

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'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



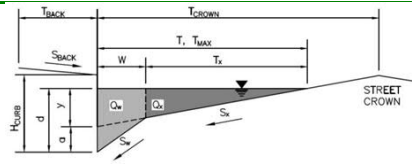
Design Information (Input)		MINOR		MAJOR
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening	
Local Depression (additional to continuous gutter depression 'a')		$a_{LOCAL} =$	5.0	5.0 inches
Total Number of Units in the Inlet (Grate or Curb Opening)		$N_o =$	2	2
Length of a Single Unit 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)		$C_{r-G} =$	N/A	N/A
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_{r-C} =$	0.10	0.10
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$		MINOR		MAJOR
Total Inlet Interception Capacity		$Q =$	5.3	8.7 cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		$Q_o =$	0.4	5.1 cfs
Capture Percentage = $Q_u/Q_o =$		$C \% =$	93	63 %

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Coyote Creek Filing No. 4

Inlet ID: Inlet 5

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	7.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.012	

H_{CURB}	=	4.00	inches
T_{CROWN}	=	18.0	ft
W	=	2.00	ft
S_x	=	0.020	ft/ft
S_w	=	0.083	ft/ft
S_o	=	0.020	ft/ft
n_{STREET}	=	0.012	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
T_{MAX}	18.0	18.0	ft
d_{MAX}	4.0	5.7	inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

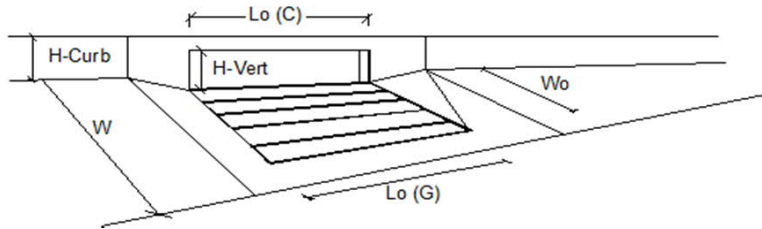
	Minor Storm	Major Storm	
Q_{allow}	6.4	23.7	cfs

WARNING: MINOR STORM max. allowable capacity is less 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'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



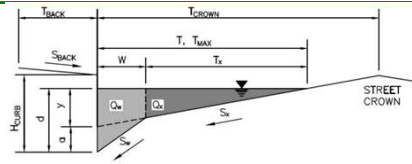
Design Information (Input)	MINOR	MAJOR	
Type of Inlet CDOT Type R Curb Opening	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR STORM			
Total Inlet Interception Capacity	5.8	9.3	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.6	6.8	cfs
Capture Percentage = Q_u/Q_o =	90	58	%

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Coyote Creek Filing No. 4

Inlet ID: Inlet 6

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T_{BACK}	=	7.0	ft
S_{BACK}	=	0.020	ft/ft
n_{BACK}	=	0.012	

H_{CURB}	=	4.00	inches
T_{CROWN}	=	18.0	ft
W	=	2.00	ft
S_x	=	0.020	ft/ft
S_w	=	0.083	ft/ft
S_o	=	0.008	ft/ft
n_{STREET}	=	0.012	

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
T_{MAX}	18.0	18.0	ft
d_{MAX}	4.0	5.7	inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

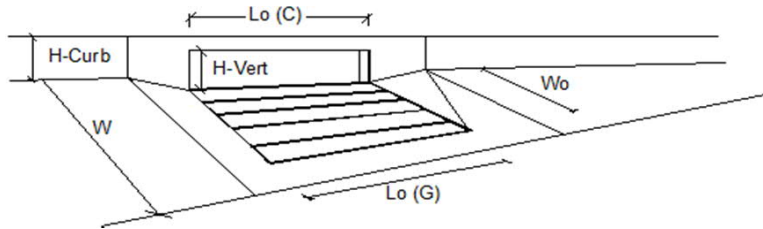
	Minor Storm	Major Storm	
Q_{allow}	4.0	15.0	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

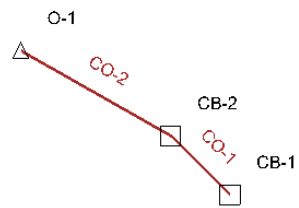
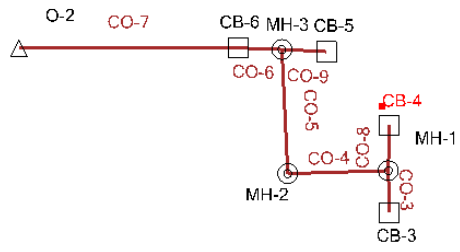
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR		MAJOR
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening	
Local Depression (additional to continuous gutter depression 'a')		$a_{LOCAL} =$	5.0	5.0 inches
Total Number of Units in the Inlet (Grate or Curb Opening)		$N_o =$	2	2
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)		$C_{r-G} =$	N/A	N/A
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_{r-C} =$	0.10	0.10
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$		MINOR		MAJOR
Total Inlet Interception Capacity		$Q =$	1.0	7.8 cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		$Q_o =$	0.0	4.1 cfs
Capture Percentage = $Q_u/Q_o =$		$C\% =$	100	66 %



100-Year Event

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Hydraulic Grade Line (In) (ft)	Flow (Known) (cfs)
CB-1	4,916.18	4,916.18	4,912.50	4,914.52	9.80
CB-2	4,916.20	4,916.20	4,912.30	4,914.17	18.60
CB-3	4,915.28	4,915.28	4,911.86	4,913.75	8.70
CB-4	4,914.84	4,914.84	4,911.84	4,913.74	9.30
CB-5	4,914.25	4,914.25	4,911.13	4,913.05	7.80
CB-6	4,914.26	4,914.26	4,910.82	4,912.42	28.40

100-Year Event

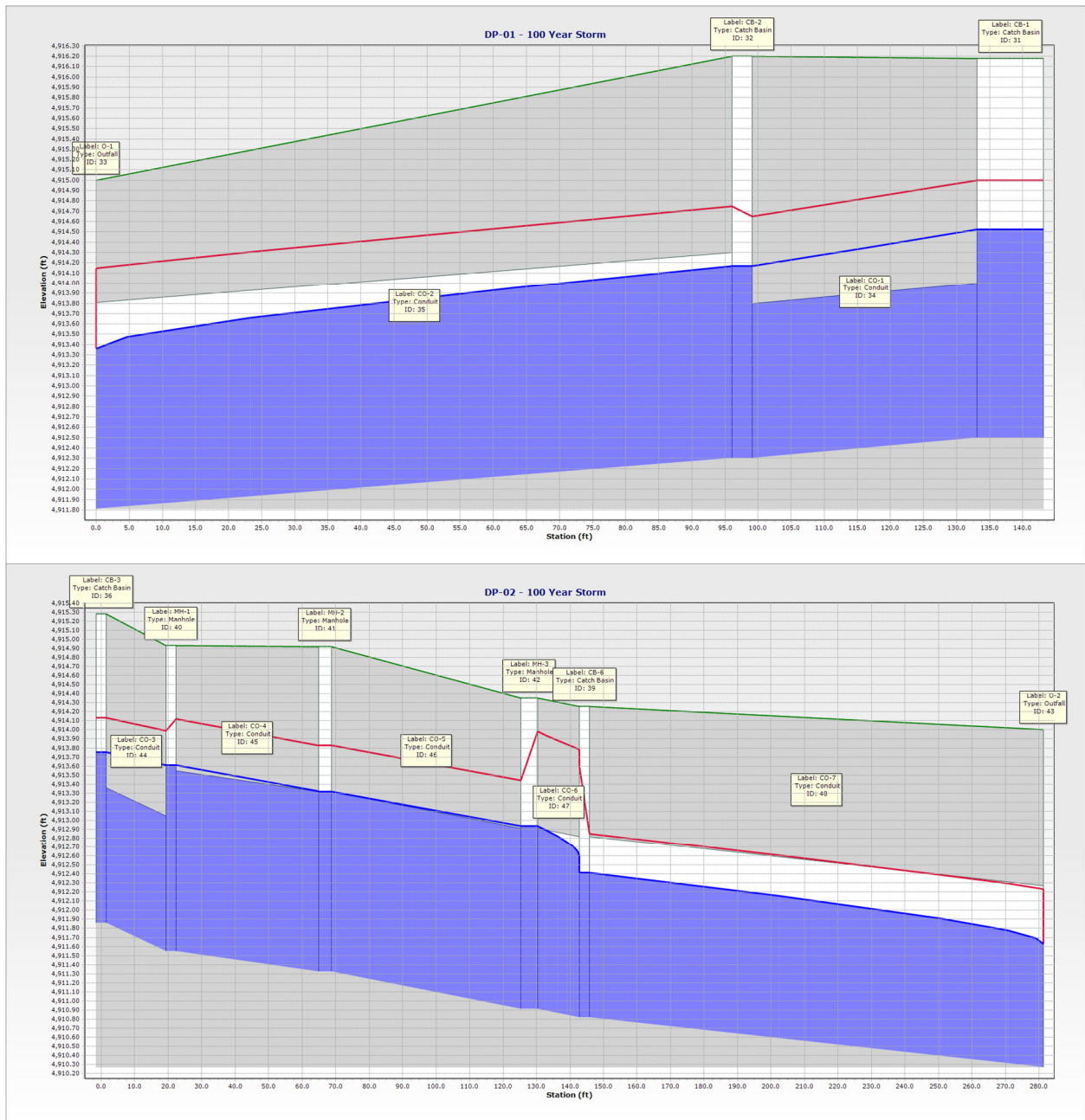
Label	Diameter (in)	Manning's n	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
CO-1	18.0	0.013	4,912.50	4,912.30	40.5	0.005	9.80	5.55	7.38	4,914.52	4,914.17
CO-2	24.0	0.013	4,912.30	4,911.81	97.6	0.005	18.60	5.92	16.03	4,914.17	4,913.36
CO-3	18.0	0.013	4,911.86	4,911.55	20.9	0.015	8.70	4.92	12.79	4,913.75	4,913.61
CO-4	24.0	0.013	4,911.55	4,911.32	45.9	0.005	18.00	5.73	16.01	4,913.61	4,913.32
CO-5	24.0	0.013	4,911.32	4,910.91	61.0	0.007	18.00	6.73	18.55	4,913.32	4,912.93
CO-6	24.0	0.013	4,910.91	4,910.82	16.4	0.005	25.80	8.21	16.75	4,912.93	4,912.60
CO-7	24.0	0.013	4,910.82	4,910.27	137.1	0.004	28.40	5.20	28.66	4,912.42	4,911.63
CO-8	18.0	0.013	4,911.84	4,911.55	16.4	0.018	9.30	5.26	13.96	4,913.74	4,913.61
CO-9	18.0	0.013	4,911.13	4,910.91	20.9	0.011	7.80	4.41	10.77	4,913.05	4,912.93

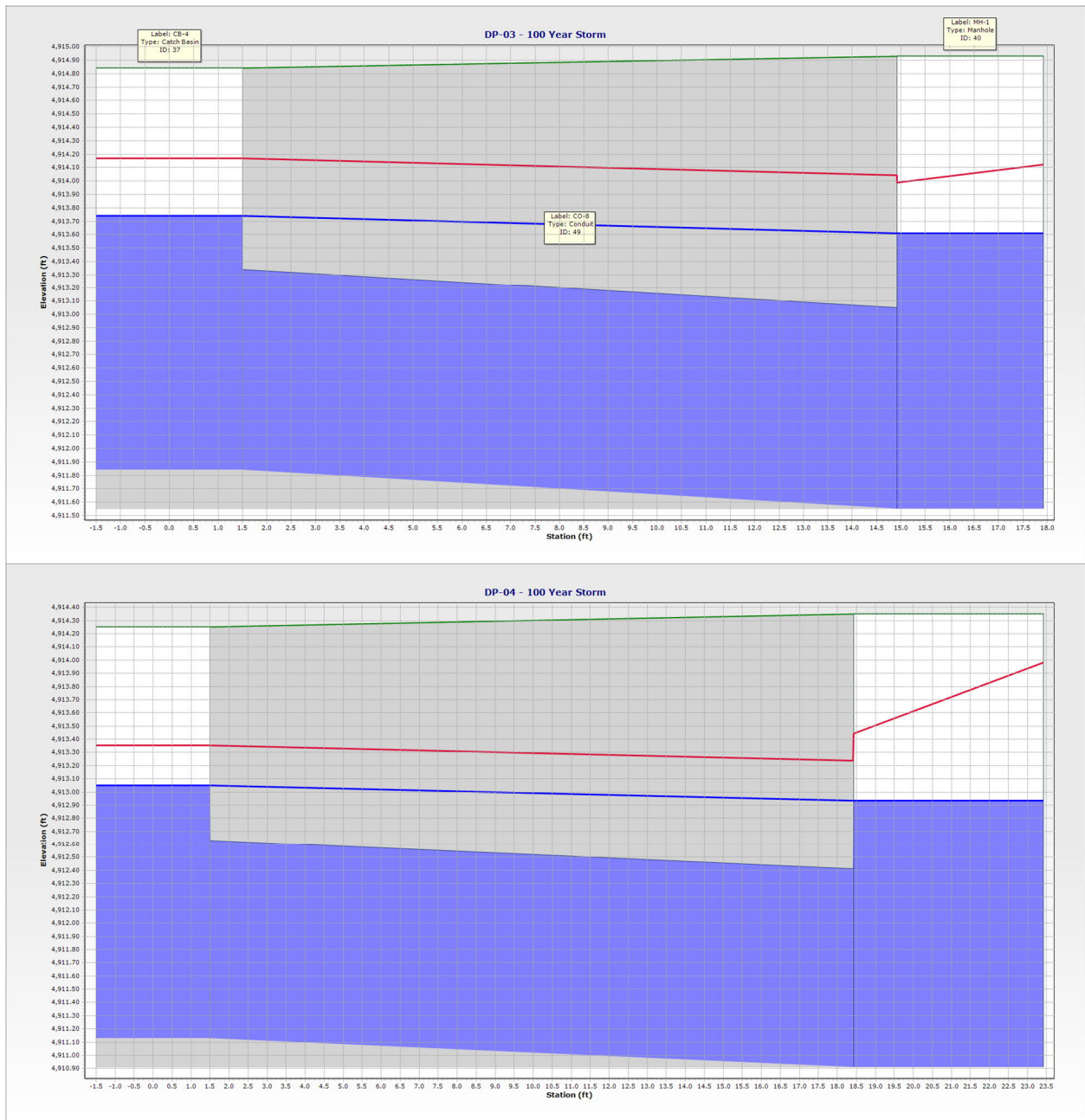
100-Year Event

Label	Flow (Total Out) (cfs)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation (Ground) (ft)	Elevation (Invert) (ft)
MH-1	18.00	4,913.99	4,914.12	4,913.61	4,913.61	4,914.93	4,911.55
MH-2	18.00	4,913.83	4,913.83	4,913.32	4,913.32	4,914.92	4,911.32
MH-3	25.80	4,913.44	4,913.98	4,912.93	4,912.93	4,914.35	4,910.91

100-Year Event

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Hydraulic Grade (ft)	Flow (Total Out) (cfs)
O-1	4,915.00	4,911.81	Free Outfall	4,913.36	18.60
O-2	4,914.00	4,910.27	Free Outfall	4,911.63	28.40





Appendix D
Coyote Creek Master Drainage Report Reference

**COYOTE CREEK
MASTER DRAINAGE STUDY**

SEPTEMBER 12, 1996

Prepared by:

MERRICK & COMPANY



**FT. LUPTON
MASTER DRAINAGE STUDY**

SEPTEMBER 12, 1996

JOB NO. 18012519
PHASE CODE 15051320
WBS CODE 1.1.4

PREPARED FOR:

NICHOLSON ENTERPRISES, INC.
MR. JIM NICHOLSON
5400 S. SYRACUSE ST., SUITE 100
ENGLEWOOD, CO 80111
(303) 770-6604

PREPARED BY:

MERRICK AND COMPANY
(2450 SOUTH PEORIA STREET)
P.O. BOX 22026
DENVER, CO 80222
(303) 751-0741

**FT. LUPTON
MASTER DRAINAGE STUDY
FT. LUPTON, CO
SEPTEMBER 12, 1996**

I. GENERAL LOCATION AND DESCRIPTION

The proposed Ft. Lupton Home Development consists of three single family subdivisions and one apartment subdivision containing a total of a 114 acres. The land was recently annexed into the City of Ft. Lupton from Weld County. It is located due east of the center of Ft. Lupton and is contained within the northwest one-quarter of Section 4 and the northeast one-quarter of Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian. Primarily, it is bounded by State Highway 52 on the south, 9th Street on the north, an existing drainage ditch on the east, and College Ave. (a.k.a. 2950 Road) on the east. Aims Community College comprises a very small portion of the offsite drainage basin east of College Ave.. Other existing features are a water tank on the east side of the site, a farm house on the south, and Twombly Primary School at the northwest corner of the site. Separate from these parcels, but surrounding them is the Ft. Lupton Golf Course - now under construction.

The site is covered with native grasses and weeds. The major drainageway is the ditch flowing from south to north along the west property line. This ditch is trapezoidal in shape, with a top width of 20 feet, a bottom width of 5 feet and a depth of approximately 3 feet. An irrigation facility known as the Fulton Ditch winds its way through the center of the site from south to north. The development is shown on the Flood Insurance Rate Map as Zone C - defined by FEMA as an area of minimal flooding. The Federal Emergency Management Agency has not plotted any floodplains for this site.

II. DRAINAGE BASINS AND SUB-BASINS

The City of Fort Lupton has no flood insurance rate maps according to the Federal Emergency Management Agency computer data base. The site is shown on the Weld County, Colorado Flood Insurance Rate Map Index. It is located on panel number 080266 0869 C which is not printed due to the area being in Zone C (area of minimal flooding). No other major drainageway planning studies of the area exist.

The drainage basin consists of sandy clay soils generally. The drainage flows from east to west at a 2% slope. Because the site is located along the easterly city limits, there are no planned land uses outside of the development other than the existing uses.

The Fulton Ditch is an irrigation facility which flows from south to north through the center of the site. The Fulton Ditch Manager, Mr. Lysle Dirrim, was contacted to determine site drainage requirements in relation to the ditch. He initially said the 10-year developed flow needs to be piped below the ditch. This requirement has recently changed to allowing no runoff from the sites to enter the ditch. A permit for crossing the ditch is required. A reinforced concrete pipe crossing will not require a casing. All other pipe materials need a concrete or iron casing to

minimize puncture and crushing problems and to allow the inner pipe to be extracted without interfering with the ditch. Concrete cutoff walls are required on both sides of the ditch to a depth of 3.5' to 4' below the pipe. It is preferable to cross with the pipe 3.5' below the ditch. The ditch engineer, Mr. Coby Haden with Rocky Mountain Consultants, will make any decisions if inverted siphon crossings are contemplated.

The overall site and golf course can be divided into two main drainage basins - a northerly and a southerly basin. The basins are divided by a ridge which is pronounced near the east side of the property and becomes less pronounced near the west portion of the property. Runoff from both basins flows from east to west.

One substantial offsite basin is tributary to the site. It is a long, thin basin approximately 2 miles long adjacent to the north side of State Highway 52. This basin contains 137.74 acres. Because this basin is virtually undeveloped, it very rarely generates any runoff. However, during the major storms, runoff from this basin will accumulate at the intersection of State Highway 52 and College Ave, due to the lack of any culverts at the intersection. Runoff will build up to a depth of approximately 2 feet before overtopping and flowing westerly along the southerly boundary of one of the residential subdivisions.

The drainage philosophy developed by the City of Ft. Lupton calls for separating the drainage of the residential sites from the golf course. The golf course will be required to retain all of their runoff on the golf course for all events up to a maximum of the 100-year storm. The residential sites will not be allowed to release any runoff onto the golf course. Detention ponding will not be required for the residential sites. These constraints set up the drainage scheme for the residential sites of routing the 100-year developed storm in storm sewer and streets. The City of Ft. Lupton will construct a regional detention pond downstream of the site in the future to include detention for the residential sites.

III. DRAINAGE FACILITY DESIGN

The site was divided into 24 site basins and one offsite basin. Runoff from the offsite basin was discussed above. The southerly lots of basin A2 will be built up to confine the offsite flows into the State Highway 52 right-of-way while allowing the entire lot depth to drain to the proposed residential street. This regrading of the lots creates a substantial low point in the street at design points 1 and 2. The storm sewer and inlets have been sized to capture the 100-year storm from basins A1 and A2 at these two design points.

Inlets and storm sewer were also sized for the 100-year storm for basins D1, D2 and D3. This is to prevent any of the residential runoff from flowing onto the golf course as mandated by the City of Ft. Lupton. The storm sewer for these basins will be routed across the golf course and will require an easement.

Inlets and storm sewer for the remaining 19 basins were sized for the 5-year storm. Combining the 5-year and 100-year storm flows in the same storm sewer results in the pipe carrying a maximum flow of 119.29 cfs from design point 21 to the outlet. The 100-year storm for all of the contributing basins at this same point is 223.01 cfs. Subtracting 119.29 from 223.01 results in a maximum overland street flow of 103.72 cfs in the residential streets. The maximum allowable overland flow in a street sloped at 0.5% is 112 cfs for the 100-year storm according to the Ft. Lupton Standards. Although the allowable street capacity is not exceeded, a method will have

to be devised to get the 100-year overland street flow into the existing ditch running along the westerly boundary line of the site. This is in order to prevent the runoff from continuing to the west and adversely impacting adjacent land. This street flow could be routed into the ditch by forcing a sump vertical curve into the street at the westerly boundary line which would force the storm water to turn north. Another method would be to increase the inlet and storm sewer sizes to capture the entire 100-year storm sewer into the pipe - an expensive alternative.

It is our understanding that the City of Ft. Lupton will ultimately construct a regional detention pond north of the school and 100-year developed storm sewer pipe to be extended to this site. If this does not happen in a timely manner, the residential subdivision(s) will be required by the City to construct a temporary detention facility on the future apartment development land and/or the golf course. A basin by basin theoretical detention pond volume requirement table is included for information only. These volumes can be added in any manner for temporary detention pond sizing depending on the phasing of the project.

IV. WETLAND DETERMINATION AND REVIEW

Mr. Terry McKee with the Army Corps of Engineers has been contacted to locate any wetlands on the site. His letter of response on April 4, 1996 indicated that no wetlands exist on the project. A copy of the letter is included in this report.

V. REFERENCES

This report has been prepared in conformance with the "City of Fort Lupton Standards and Specifications for the Design and Construction of Public Improvements" dated 1994.

VI. CONCLUSION

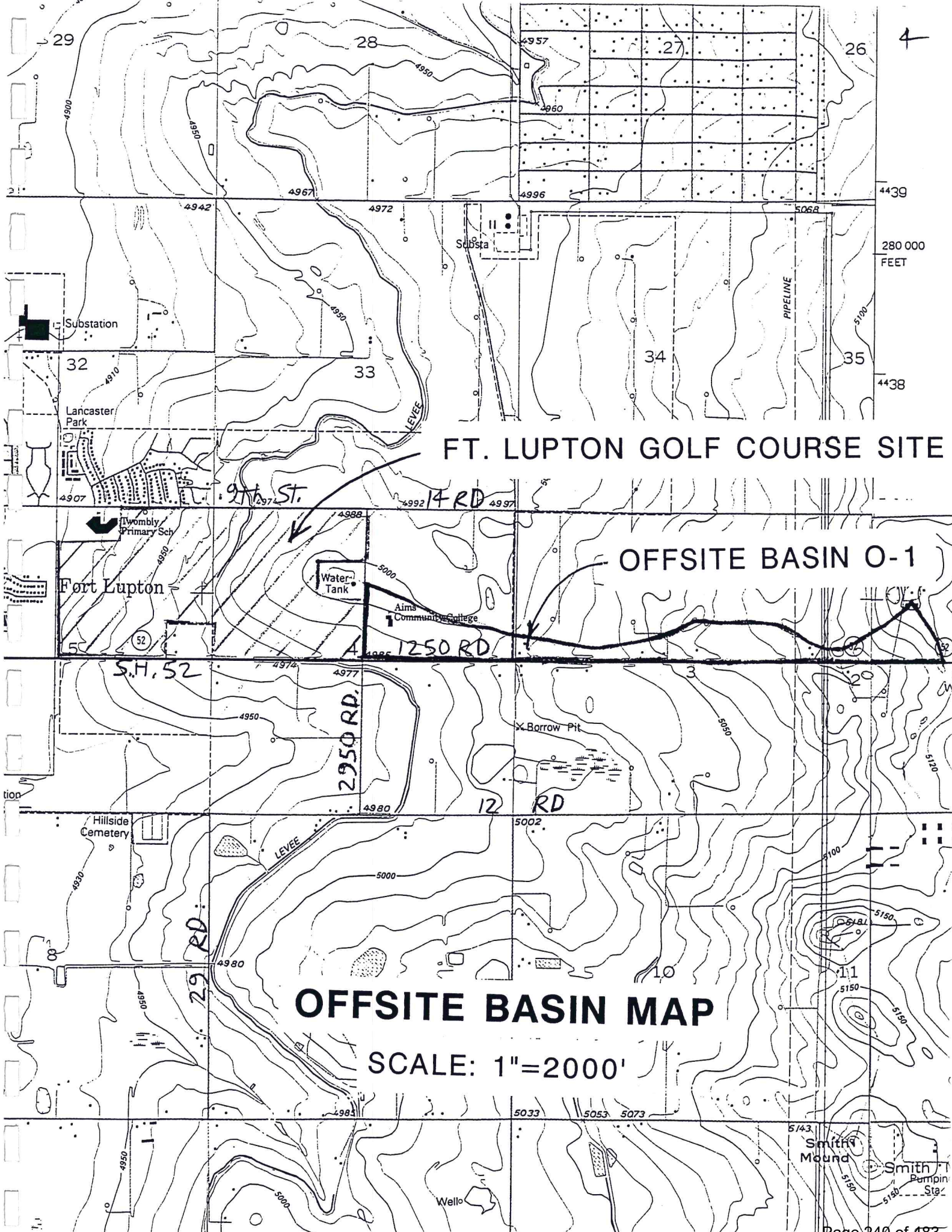
This drainage report has presented general drainage characteristics for the Ft. Lupton Master Drainage Plan, as well as some detention options and storm piping options. This report is intended to lay out the overall drainage philosophy of the project on a preliminary basis. If no changes are made to the residential sites, it can be used on a final basis with the exception of how overland street flow is transferred to the ditch at the westerly boundary line and assuming no major changes in slope are made over the existing condition. However, it is anticipated that lot layouts and street alignments will change as well as grading changes. In that case, the changes will take place with the Phase II or Phase III Drainage Reports.

If you have any questions, please feel free to call.

Respectfully submitted,

MERRICK & COMPANY

Mark F. Ericson, P.E.
Project Engineer



FT. LUPTON GOLF COURSE SITE

OFFSITE BASIN O-1

OFFSITE BASIN MAP

SCALE: 1"=2000'



REPLY TO
ATTENTION OF

5

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
TRI-LAKES PROJECT OFFICE, 9307 STATE HWY 121
LITTLETON, COLORADO 80123-6901

April 4, 1996

Mark F. Ericson
Merrick Engineers & Architects
P O Box 22026
Denver, Colorado 80222

Dear Mr. Ericson:

This letter concerns the Ft. Lupton Golf Course Wetlands which are located in the Northwest $\frac{1}{4}$ of Section 5, Township 1 North, Range 66 West, Weld County, Colorado.

Your project has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the excavation and discharge of dredged and fill material into waters of the United States including wetlands.

Reference is made to a March 25, 1996 wetlands determination conducted by Mr. Terry McKee of this office. During Mr. McKee's site visit, it was found that no wetlands exist at this site.

This letter is to inform you that the proposed activity, assigned number 199680280, will not require a Department of the Army (DA) Permit.

Although a DA Permit will not be required for the project, this does not eliminate the requirement that other applicable federal, state, and local permits be obtained as required.

If there are any further questions concerning this matter, please feel free to contact Mr. Terry McKee of this office at 303-979-4120.

Sincerely,



Timothy T. Carey
Project Manager



Intensity Duration Frequency Curves Fort Lupton, Colorado

Rainfall Intensity (in./hr.)

9
8
7
6
5
4
3
2
1
0

100-Yr. Storm

10-Yr. Storm

5-Yr. Storm

Time (min)

10 20 30 40 50



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

**WELD COUNTY,
COLORADO**
(UNINCORPORATED AREAS)

MAP INDEX

PANELS PRINTED: 75, 325, 475, 480, 485 -
489, 495, 605, 607 - 609, 615 - 617, 619, 626
- 629, 635 - 639, 645, 675, 700, 725, 750, 775,
800, 825, 850, 855, 860, 861, 863, 864, 866,
868, 900, 925, 960, 970, 980, 981, 983, 990,
995, 1025

COMMUNITY-PANEL NUMBERS
080266 0001-1075

MAP REVISED:
SEPTEMBER 27, 1991

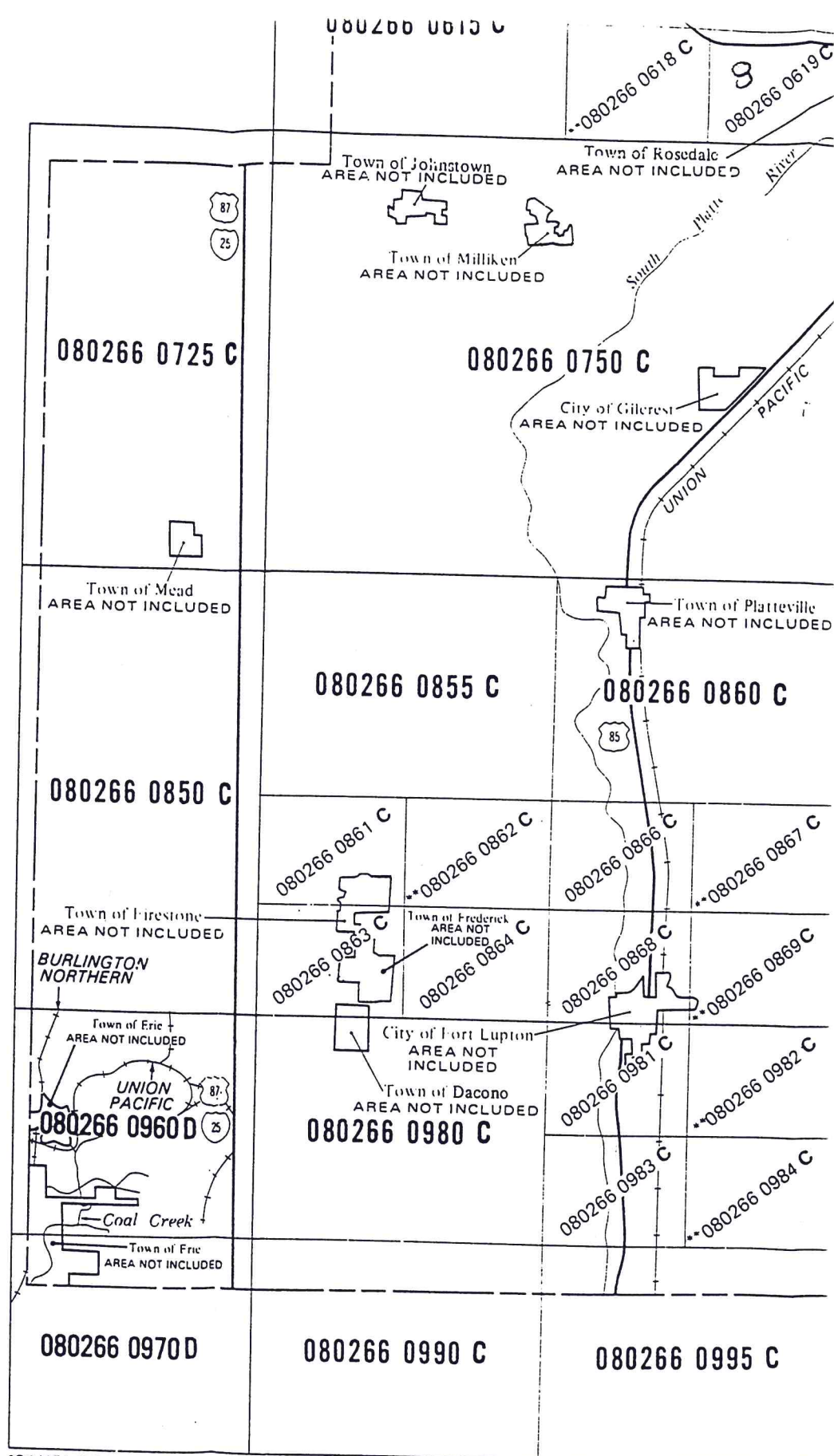


Rec ID.

G 008 000011



Ref ID.00015552



*PANEL NOT PRINTED - AREA IN ZONED
 **PANEL NOT PRINTED - AREA IN ZONEC

TABLE 3-1 (42)
RECOMMENDED RUNOFF COEFFICIENTS AND PERCENT IMPERVIOUS

LAND USE OR	PERCENT	FREQUENCY			
SURFACE CHARACTERISTICS	IMPERVIOUS	2	5	10	100
<u>Business:</u>					
Commercial Areas	95	.87	.87	.88	.89
Neighborhood Areas	70	.60	.65	.70	.80
<u>Residential:</u>					
Single-Family	*	.40	.45	.50	.60
Multi-Unit (detached)	50	.45	.50	.60	.70
Multi-Unit (attached)	70	.60	.65	.70	.80
1/2 Acre Lot or Larger	*	.30	.35	.40	.60
Apartments	70	.65	.70	.70	.80
<u>Industrial:</u>					
Light Areas	80	.71	.72	.76	.82
Heavy Acres	90	.80	.80	.85	.90
<u>Parks, Cemeteries:</u>	7	.10	.18	.25	.45
<u>Playgrounds:</u>	13	.15	.20	.30	.50
<u>Schools:</u>	50	.45	.50	.60	.70
<u>Railroad Yard Areas</u>	20	.20	.25	.35	.45
<u>Undeveloped Areas:</u>					
Historic Flow Analysis-	2	(See "Lawns")			
Greenbelts, Agricultural					
Offsite Flow Analysis	45	.43	.47	.55	.65
(when land use not defined)					
<u>Streets:</u>					
Paved	100	.87	.88	.90	.93
Gravel (Packed)	40	.40	.45	.50	.60
<u>Drive and Walks:</u>	96	.87	.87	.88	.89
<u>Roofs:</u>	90	.80	.85	.90	.90
<u>Lawns, Sandy Soil</u>	0	.00	.01	.05	.20
<u>Lawns, Clayey Soil</u>	0	.05	.15	.25	.50

NOTE: These Rational Formula coefficients may not be valid for large basins.

*See Figure 2-1 for percent impervious.

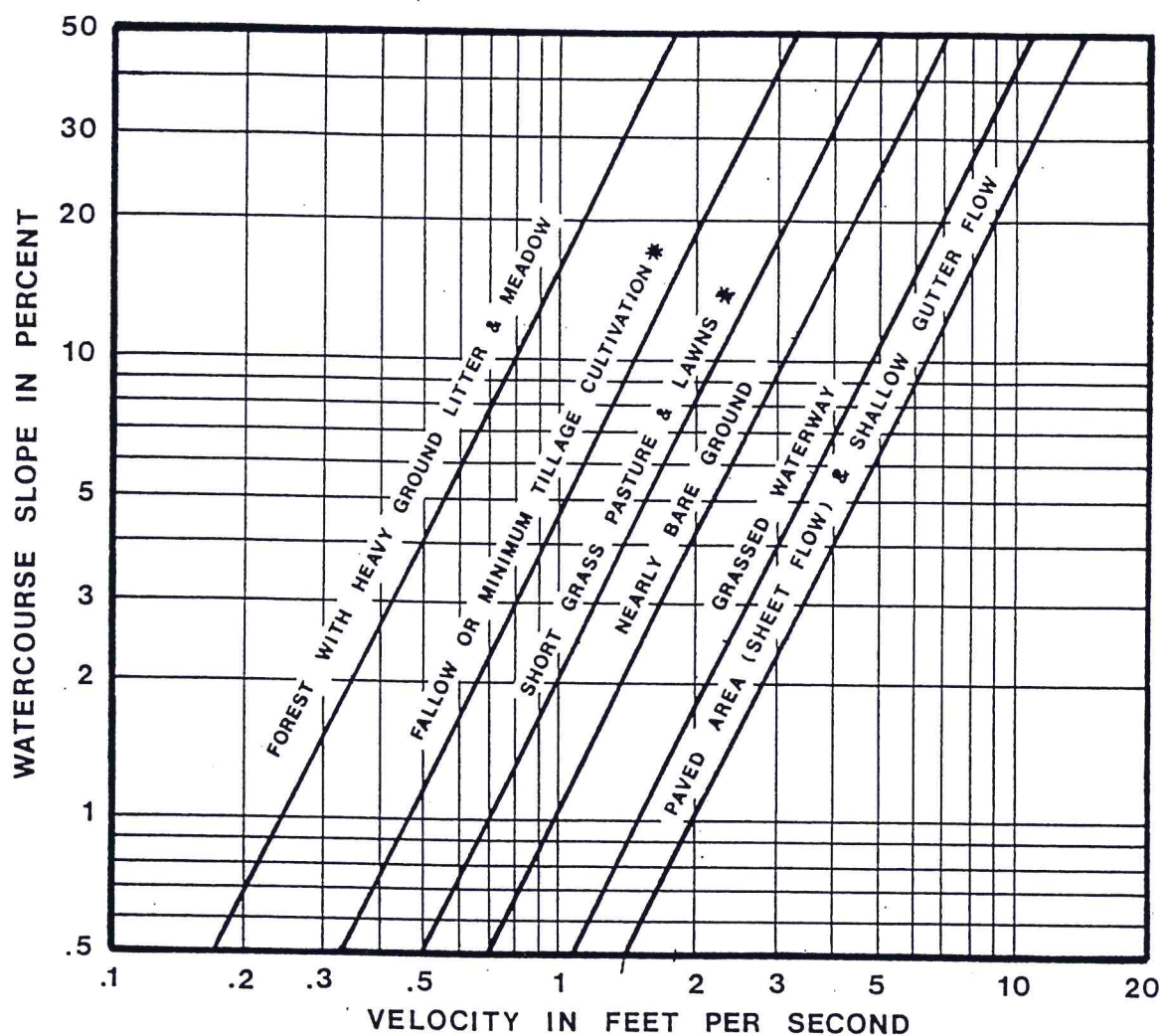


FIGURE 3-2. ESTIMATE OF AVERAGE FLOW VELOCITY FOR USE WITH THE RATIONAL FORMULA.

* MOST FREQUENTLY OCCURRING "UNDEVELOPED" LAND SURFACES IN THE DENVER REGION.

REFERENCE: "Urban Hydrology For Small Watersheds" Technical Release No. 55, USDA, SCS Jan. 1975.

5-1-84

URBAN DRAINAGE & FLOOD CONTROL DISTRICT

CHANNEL CAPACITY CALCULATION

Cross Section: 0

Ft. Lupton
Local Street

11

NLOB: .025 STCHL: 2.5 NCHL: .016 STCHR: 47.5 NROB: .025

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
0.00	2.00	2.50	1.42	6.41	1.33	7.00	1.00
9.00	1.17	25.00	1.49	41.00	1.17	43.00	1.00
43.58	1.33	47.50	1.42	50.00	2.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
2.00	2.799	1.00	2	224	2
7.22	0.80	0.00	1	31	1
1.00	0.00	50	0.0	25.0	50.0
227	0.00	1.57	0.0100	0.0100	---

Q_{100} (Max. Allowable) with Reduction = $0.8(227) = 181.6 \text{ cfs}$
 at 1% Slope (Total Street)
 = 90.8 cfs (Each Gutter)
 Agrees with chart

Q_{100} (Max Allowable) with Reduction
 = $2(56) = 112 \text{ cfs}$
 at 0.5% Slope (Total Street)

CHANNEL CAPACITY CALCULATION

12

Cross Section: 0

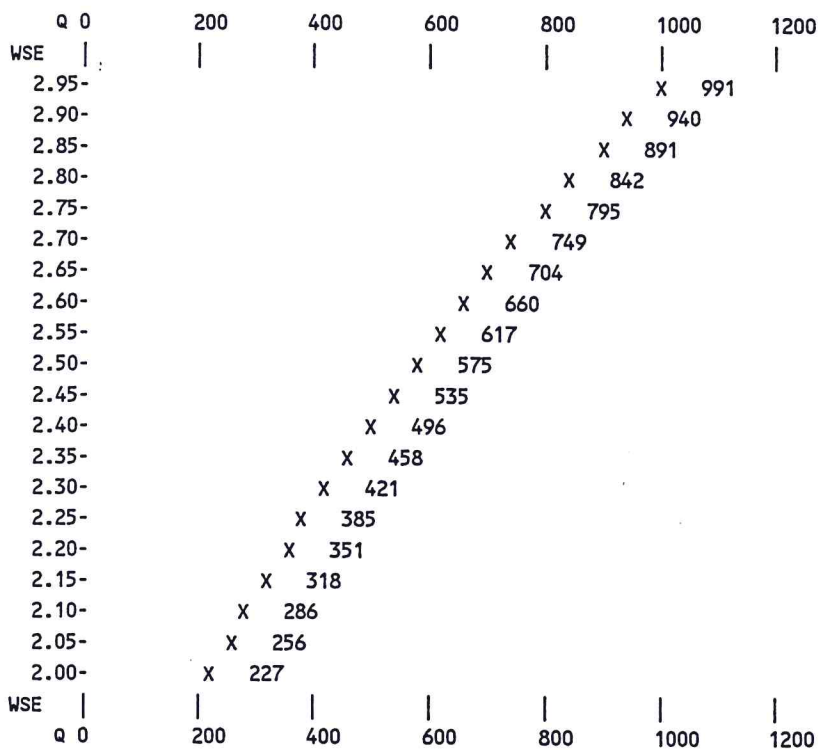
NLOB: .025 STCHL: 2.5 NCHL: .016 STCHR: 47.5 NROB: .025

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
0.00	2.00	2.50	1.42	6.41	1.33	7.00	1.00
9.00	1.17	25.00	1.49	41.00	1.17	43.00	1.00
43.58	1.33	47.50	1.42	50.00	2.00	0.00	0.00

SLOPE = .01

RATING CURVE

WATER SURFACE ELEVATION (in Feet NGVD) vs. DISCHARGE (in CFS)



Model: 4100
 Year: 2010
 Date: 10/10/10

FT. Lupton

$$\begin{aligned}
 Q_5 &= 7.4 \text{ cfs} \text{ gutter max. @ } 1\% \text{ slope} \\
 &= 4.2 \text{ cfs} \text{ gutter max. @ } 0.5\% \text{ slope} \\
 Q_{100} &= 92 \text{ cfs} \text{ gutter max. @ } 1\% \text{ slope} = 184 \text{ cfs Total} \\
 &= 52 \text{ cfs} \text{ gutter max. @ } 0.5\% \text{ slope} = 104 \text{ cfs Total}
 \end{aligned}$$

Type R Inlet @ 0.44' Depth - Max. Q (cfs)

Type R Size	0.5%	1.0%	Sump	Sump @ 12"
5'	3.1	3.4	4.2	11.8
10'	4.2	5.7	8.5	23.9
15'	4.6	6.5	13.9	28.9



CUHP Input

Offsite Basin 0-1 - Historic

$$\text{Area} = 137.74 \text{ ac.} = 0.215 \text{ SM}$$

$$L = 1.89 \text{ mi.}$$

$$L_c = 0.91 \text{ mi.}$$

$$\% \text{ Impervious} = 2\%$$

$$\text{Slope} = (5135 - 4985) / 10,000 = 0.015$$

$$T_c = \text{N/A}$$

$$\text{Dep. Storage Pervious} = 0.40 \text{ in.}$$

$$\text{Dep. Storage Impervious} = 0.100 \text{ in.}$$

$$\text{Initial Infiltration} = 3.000 \text{ in. Clay Soils}$$

$$\text{Decay} = .0018$$

$$\text{Final Infiltration} = 0.500 \text{ in.}$$

Computer Results

Input File HFT011000.CHI

$$Q_{100} = 98 \text{ cfs at } T_p = 70 \text{ min.}$$

Input File HFT010005.CHI

$$Q_5 = 26 \text{ cfs at } T_p = 70 \text{ min.}$$

CUHP

HFT01005, CHI 15

2 FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96
01005-YEAR 005 1.42 0.000.000.000.00

70 1 15.0 1BASIN 0-1*
.2151.8900.910 2.000.015 0.00 0.400.1003.000.00180.5000 0

E

CUHPE/PC VERSION MODIFIED IN JANUARY 1985

PRINT OPTION NUMBER SELECTED FOR THIS BASIN IS 7

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96

BASIN ID: -- BASIN COMMENT: BASIN 0-1*

AREA OF BASIN (SQMI)	LENGTH OF BASIN (MI)	DIST TO CENTROID (MI)	IMPERVIOUS AREA (PCT)	SLOPE (FT/FT)	UNIT DURATION (MIN)
.22	1.89	.91	2.00	.0150	5.00

COEFFICIENT (REFLECTING TIME TO PEAK)	COEFFICIENT (RELATED TO PEAK RATE OF RUNOFF)
.156	.265

CALCULATED UNIT HYDROGRAPH

TIME TO PEAK (MIN)	PEAK RATE OF RUNOFF (CFS/SQMI)	UNIT HYDROGRAP (CFS)	PEAK (AF)
35.68	306.80	65.96	11.47

WIDTH AT 50 = 98. MIN. WIDTH AT 75 = 51. MIN. K50 = .22 K75 = .30

RAINFALL LOSSES INPUT W/ BASIN DATA

MAX. PERVIOUS RET. = .40 IN.	MAX. IMPERVIOUS RET. = .10 IN.
INFILTRATION = 3.00 IN./HR.	DECAY = .00180/SECOND FNINFL = .50 IN./HR.

TIME	UNIT HYDROGRAPH	TIME	UNIT HYDROGRAPH	TIME	UNIT HYDROGRAPH
0.	0.	110.	34.	220.	15.
5.	7.	115.	32.	225.	14.
10.	20.	120.	31.	230.	14.
15.	35.	125.	30.	235.	13.
20.	48.	130.	29.	240.	13.
25.	58.	135.	28.	245.	12.
30.	64.	140.	27.	250.	12.
35.	66.	145.	26.	255.	11.
40.	65.	150.	25.	260.	11.
45.	62.	155.	24.	265.	10.
50.	58.	160.	23.	270.	10.
55.	54.	165.	22.	275.	10.
60.	50.	170.	21.	280.	9.
65.	48.	175.	21.	285.	9.
70.	49.	180.	20.	290.	9.
75.	48.	185.	19.	295.	8.
80.	46.	190.	18.	300.	8.
85.	44.	195.	18.	305.	8.
90.	42.	200.	17.	310.	7.
95.	40.	205.	16.	315.	0.

100.	38.	*	210.	16.	*	0.	0.	*
105.	36.	*	215.	15.	*	0.	0.	*

BASIN ID: 1 -- BASIN COMMENT: BASIN 0-1*

**** STORM NO. = 1 **** DATE OR RETURN PERIOD = 005-YEAR

TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*	TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*
0.	.00	.000	0.	*	170.	.00	.000	8.	*
5.	.03	.000	0.	*	175.	.00	.000	7.	*
10.	.05	.000	0.	*	180.	.00	.000	7.	*
15.	.12	.002	0.	*	185.	.00	.000	7.	*
20.	.22	.004	0.	*	190.	.00	.000	7.	*
25.	.35	.072	1.	*	195.	.00	.000	6.	*
30.	.18	.133	3.	*	200.	.00	.000	6.	*
35.	.08	.035	6.	*	205.	.00	.000	6.	*
40.	.06	.018	9.	*	210.	.00	.000	6.	*
45.	.05	.008	13.	*	215.	.00	.000	5.	*
50.	.05	.009	15.	*	220.	.00	.000	5.	*
55.	.04	.001	17.	*	225.	.00	.000	5.	*
60.	.04	.001	18.	*	230.	.00	.000	5.	*
65.	.04	.001	18.	*	235.	.00	.000	5.	*
70.	.04	.002	17.	*	240.	.00	.000	5.	*
75.	.04	.001	17.	*	245.	.00	.000	4.	*
80.	.03	.001	16.	*	250.	.00	.000	4.	*
85.	.03	.001	15.	*	255.	.00	.000	4.	*
90.	.03	.001	14.	*	260.	.00	.000	4.	*
95.	.03	.001	14.	*	265.	.00	.000	4.	*
100.	.02	.000	14.	*	270.	.00	.000	4.	*
105.	.02	.000	13.	*	275.	.00	.000	3.	*
110.	.02	.000	13.	*	280.	.00	.000	3.	*
115.	.02	.000	12.	*	285.	.00	.000	3.	*
120.	.02	.000	12.	*	290.	.00	.000	3.	*
125.	.00	.000	11.	*	295.	.00	.000	3.	*
130.	.00	.000	11.	*	300.	.00	.000	3.	*
135.	.00	.000	10.	*	305.	.00	.000	3.	*
140.	.00	.000	10.	*	310.	.00	.000	3.	*
145.	.00	.000	9.	*	315.	.00	.000	3.	*
150.	.00	.000	9.	*	320.	.00	.000	2.	*
155.	.00	.000	9.	*	325.	.00	.000	2.	*
160.	.00	.000	8.	*	330.	.00	.000	2.	*
165.	.00	.000	8.	*	335.	.00	.000	2.	*

TOTAL PRECIP. = 1.64 (1-HOUR RAIN = 1.42) EXCESS PRECIP. = .293 INCHES

VOLUME OF EXCESS PRECIP = 3. ACRE-FEET

PEAK Q = 18. CFS TIME OF PEAK = 65. MIN.

INFILT. = 3.00 IN/HR DECAY = .00180 FNINF = .50 IN/HR

MAX.PERV.RET. = .40 IN. MAX.IMP.RET. = .10 IN.

1 U.D.F.C.D. CUHPD RUNOFF ANALYSIS EXECUTED ON DATE AT TIME

CUHPE/PC VERSION MODIFIED IN JANUARY 1985 TO WRITE OUTPUT FILE OF STORM HYDROGRAPHS FOR SUBSEQUENT USE WITH MULTI-PLAN RIVER ROUTING ROUTINES OF HEC-1

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96

NO HYDROGRAPH VALUES WERE WRITTEN TO AN OUTPUTFILE FOR THIS RUN OF CUHPD.

CUHP

19

FT. LUPTON OFFSITE BASIN O-1 - Historic Conditions - 8/28/96

100-YEAR 100 2.71

0.000.000.000.00

HFTOI100.CHI

0 1 15.0

1BASIN O-1*

2151.8900.910 2.000.015 0.00 0.400.1003.000.00180.5000 0

E

HFT01100.CHO

CUHPE/PC VERSION MODIFIED IN JANUARY 1985

PRINT OPTION NUMBER SELECTED FOR THIS BASIN IS 7

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96

BASIN ID: -- BASIN COMMENT: BASIN 0-1*

AREA OF BASIN (SQMI)	LENGTH OF BASIN (MI)	DIST TO CENTROID (MI)	IMPERVIOUS AREA (PCT)	SLOPE (FT/FT)	UNIT DURATION (MIN)
.22	1.89	.91	2.00	.0150	5.00

COEFFICIENT (REFLECTING TIME TO PEAK)	COEFFICIENT (RELATED TO PEAK RATE OF RUNOFF)
.156	.265

CALCULATED UNIT HYDROGRAPH

TIME TO PEAK (MIN)	PEAK RATE OF RUNOFF (CFS/SQMI)	UNIT HYDROGRAP (CFS)	PEAK (AF)	VOLUME OF RUNOFF (AF)
35.68	306.80	65.96	11.47	

WIDTH AT 50 = 98. MIN. WIDTH AT 75 = 51. MIN. K50 = .22 K75 = .30

RAINFALL LOSSES INPUT W/ BASIN DATA

MAX. PERVIOUS RET. = .40 IN.	MAX. IMPERVIOUS RET. = .10 IN.
INFILTRATION = 3.00 IN./HR.	DECAY = .00180/SECOND FNINFL = .50 IN./HR.

TIME	UNIT		TIME	UNIT		TIME	UNIT	
	HYDROGRAPH	*		HYDROGRAPH	*		HYDROGRAPH	*
0.	0.	*	110.	34.	*	220.	15.	*
5.	7.	*	115.	32.	*	225.	14.	*
10.	20.	*	120.	31.	*	230.	14.	*
15.	35.	*	125.	30.	*	235.	13.	*
20.	48.	*	130.	29.	*	240.	13.	*
25.	58.	*	135.	28.	*	245.	12.	*
30.	64.	*	140.	27.	*	250.	12.	*
35.	66.	*	145.	26.	*	255.	11.	*
40.	65.	*	150.	25.	*	260.	11.	*
45.	62.	*	155.	24.	*	265.	10.	*
50.	58.	*	160.	23.	*	270.	10.	*
55.	54.	*	165.	22.	*	275.	10.	*
60.	50.	*	170.	21.	*	280.	9.	*
65.	48.	*	175.	21.	*	285.	9.	*
70.	49.	*	180.	20.	*	290.	9.	*
75.	48.	*	185.	19.	*	295.	8.	*
80.	46.	*	190.	18.	*	300.	8.	*
85.	44.	*	195.	18.	*	305.	8.	*
90.	42.	*	200.	17.	*	310.	7.	*
95.	40.	*	205.	16.	*	315.	0.	*

100.	38.	*	210.	16.	*	0.	0.	*
105.	36.	*	215.	15.	*	0.	0.	*

BASIN ID: -- BASIN COMMENT: BASIN 0-1*

**** STORM NO. = 1 **** DATE OR RETURN PERIOD = 100-YEAR

TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*	TIME (MIN.)	INCREMENT RAINFALL (IN)	TOTAL EXCESS PRECIP	STORM HYDROGRAPH (CFS)	*
0.	.00	.000	0.	*	180.	.00	.000	43.	*
5.	.03	.000	0.	*	185.	.00	.000	41.	*
10.	.08	.000	0.	*	190.	.00	.000	40.	*
15.	.12	.002	0.	*	195.	.00	.000	38.	*
20.	.22	.004	0.	*	200.	.00	.000	37.	*
25.	.38	.097	1.	*	205.	.00	.000	36.	*
30.	.68	.626	6.	*	210.	.00	.000	34.	*
35.	.38	.332	18.	*	215.	.00	.000	33.	*
40.	.22	.172	35.	*	220.	.00	.000	32.	*
45.	.17	.125	52.	*	225.	.00	.000	31.	*
50.	.14	.093	68.	*	230.	.00	.000	30.	*
55.	.11	.067	81.	*	235.	.00	.000	28.	*
60.	.11	.067	90.	*	240.	.00	.000	27.	*
65.	.11	.067	96.	*	245.	.00	.000	26.	*
70.	.05	.013	98.	*	250.	.00	.000	25.	*
75.	.05	.013	98.	*	255.	.00	.000	24.	*
80.	.03	.001	96.	*	260.	.00	.000	24.	*
85.	.03	.001	92.	*	265.	.00	.000	23.	*
90.	.03	.001	89.	*	270.	.00	.000	22.	*
95.	.03	.001	87.	*	275.	.00	.000	21.	*
100.	.03	.001	85.	*	280.	.00	.000	20.	*
105.	.03	.001	82.	*	285.	.00	.000	20.	*
110.	.03	.001	79.	*	290.	.00	.000	19.	*
115.	.03	.001	75.	*	295.	.00	.000	18.	*
120.	.03	.001	72.	*	300.	.00	.000	17.	*
125.	.00	.000	69.	*	305.	.00	.000	17.	*
130.	.00	.000	66.	*	310.	.00	.000	16.	*
135.	.00	.000	63.	*	315.	.00	.000	16.	*
140.	.00	.000	60.	*	320.	.00	.000	15.	*
145.	.00	.000	57.	*	325.	.00	.000	14.	*
150.	.00	.000	55.	*	330.	.00	.000	14.	*
155.	.00	.000	52.	*	335.	.00	.000	13.	*
160.	.00	.000	50.	*	340.	.00	.000	8.	*
165.	.00	.000	48.	*	345.	.00	.000	5.	*
170.	.00	.000	46.	*	350.	.00	.000	4.	*
175.	.00	.000	45.	*	355.	.00	.000	3.	*

TOTAL PRECIP. = 3.13 (1-HOUR RAIN = 2.71) EXCESS PRECIP. = 1.685 INCHES

VOLUME OF EXCESS PRECIP = 19. ACRE-Feet

PEAK Q = 98. CFS TIME OF PEAK = 70. MIN.

INFILT. = 3.00 IN/HR DECAY = .00180 FNINF = .50 IN/HR

MAX.PERV.RET. = .40 IN. MAX.IMP.RET. = .10 IN.

U.D.F.C.D. CUHPD RUNOFF ANALYSIS EXECUTED ON DATE AT TIME

CUHPE/PC VERSION MODIFIED IN JANUARY 1985 TO WRITE OUTPUT FILE OF STORM HYDROGRAPHS FOR SUBSEQUENT USE WITH MULTI-PLAN RIVER ROUTING ROUTINES OF HEC-1

FT. LUPTON OFFSITE BASIN 0-1 - Historic Conditions - 8/28/96



MERRICK
Engineers & Architects

BY Mark Ericson
CHKD. BY _____

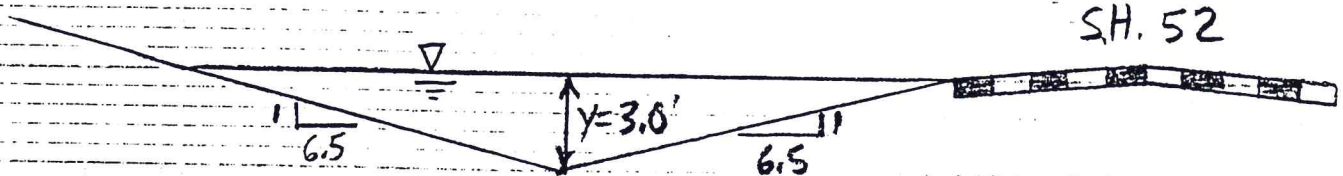
DATE 9/3/96
DATE _____

SUBJECT Ft. Lupton

SHEET NO. 23 OF _____
JOB NO. _____

Existing Ditch Capacity Along S.H. 52

Basin 0-1 $Q_{100} = 98$ cfs from CUHP



$$n = 0.035 \text{ (grass)}$$

$$s = 0.1\%$$

$$y = 3.0'$$

$$Q_{\max} = 102 \text{ cfs} > 98 \text{ cfs} - \text{O.K.}$$

DRAINAGE CALCULATIONS

Page 2

Merrick and Company														
Time of Concentration														
Ft. Lupton Master Drainage Study														
Calculated By:		Mark Ericson		Date:		8/30/96		Job No. 18012519		Tc=Ti+Tt				
Sub-Basin Data		Initial/Overland				Travel: Time (tt)				Tc Check				
		Time (ti)								(Urbanized Basins)				
Desig:	Area	C5	Length	Slope	Ti	Length	Slope	Vel.	Tt	Comp.	Total	Tc=	Fina	Remarks
	Acres		Feet	%	Min	Feet	%	FPS	Min	Tc	Length. Feet	(L/180)+10 Min	Tc	
A1	4.63	0.45	200	3.3	11.2	600	1.8	2.7	3.7	14.9	800	N/A	15	
A2	5.33	0.45	150	3.3	9.7	1,000	1.7	2.6	6.4	16.1	1,150	16.4	16	
A3	6.38	0.45	200	2.0	13.2	1,180	1.4	2.3	8.6	21.7	1,380	17.7	18	
A4	4.32	0.45	200	2.0	13.2	450	1.6	2.5	3.0	16.2	650	13.6	14	
B1	6.61	0.45	200	2.0	13.2	1,030	1.1	2.1	8.2	21.3	1,230	16.8	17	
B2	3.72	0.45	200	2.0	13.2	1,230	1.6	2.5	8.2	21.4	1,430	17.9	18	
C1	7.67	0.45	200	2.0	13.2	1,900	1.2	2.2	14.4	27.6	2,100	21.7	22	
C2	5.79	0.45	200	2.0	13.2	230	2.0	2.9	1.3	14.5	430	12.4	12	
D1	3.63	0.45	140	2.0	11.0	680	1.5	2.4	4.7	15.7	820	14.6	15	
D2	4.68	0.45	200	2.0	13.2	550	1.3	2.2	4.2	17.3	750	14.2	14	
D3	6.01	0.45	200	2.0	13.2	1,150	1.2	2.2	8.7	21.9	1,350	17.5	18	
E1	5.05	0.45	140	2.0	11.0	480	1.3	2.2	3.6	14.6	620	13.4	13	
E2	1.84	0.45	200	2.0	13.2	200	1.3	2.2	1.5	14.7	400	12.2	12	
F1	5.05	0.45	200	2.0	13.2	250	2.0	2.9	1.4	14.6	450	12.5	13	
F2	2.02	0.45	200	2.0	13.2	200	1.5	2.4	1.4	14.6	400	12.2	12	
F3	1.52	0.45	200	2.0	13.2	80	1.3	2.2	0.6	13.8	280	11.6	12	
G1	8.72	0.45	200	2.0	13.2	1,650	1.8	2.7	10.2	23.3	1,850	20.3	20	
G2	7.85	0.45	200	2.0	13.2	900	1.7	2.6	5.8	18.9	1,100	16.1	16	
G3	2.53	0.45	200	2.5	12.2	250	2.0	2.9	1.4	13.7	450	12.5	13	
H1	2.80	0.45	200	2.5	12.2	1,000	1.9	2.8	6.0	18.2	1,200	16.7	17	
H2	6.24	0.45	200	2.0	13.2	2,100	1.8	2.7	13.0	26.1	2,300	22.8	23	
I1	3.76	0.65	40	2.0	4.1	470	2.3	3.0	2.6	6.7	510	12.8	7	
I2	5.88	0.65	200	3.5	7.6	650	2.3	3.0	3.6	11.2	850	14.7	11	
I3	3.61	0.65	60	2.0	5.0	850	0.7	1.7	8.3	13.3	910	15.1	13	

		Merrick and Company																			
		Storm Drainage System Design							Job No. 18012519												
		Ft. Lupton Master Drainage Study																	5-Year Storm		
		Calculated By: Mark Ericson																			
		Date: 8/30/96																			
Street	D.P.	Direct Runoff							Total Runoff				Street		Pipe		Travel Time			Type R Inlet Size	
		Area	Area	Run.	Tc	C*A	I	Q	Tc	Sum	I	Q	Slop	Flow	Flow	Slop	Pipe	L	Vel	Tt	
		Des.	(Ac)	Coef.	Min	(Ac)	In/Hr	CFS	Min	C*A	In/Hr	CFS	%	CFS	CFS	%	Size	Ft	FPS	Min	
	1	A1	4.63	0.45	15	2.08	3.24	6.75													Size for Q100
	2	A2	5.33	0.45	16	2.40	3.19	7.65	16	4.48	3.19	14.30									Size for Q100
	3	A3	6.38	0.45	18	2.87	2.99	8.58	28	7.35	2.33	17.13						1400	2	12	15'
	4	A4	4.32	0.45	14	1.94	3.36	6.53	29	9.30	2.29	21.29						600	8	1	10'
	5	B1	6.61	0.45	17	2.97	3.09	9.19													15'
	6	B2	3.72	0.45	18	1.67	2.99	5.01	18	4.65	2.99	13.90						400	8	1	10'
	7	C1	7.67	0.45	22	3.45	2.70	9.32	31	17.40	2.21	38.45						750	8	2	15'
	8	C2	5.79	0.45	12	2.61	3.60	9.38	34	20.00	2.08	41.61						1500	8	3	15'
	9	D1	3.63	0.45	15	1.63	3.24	5.29													Size for Q100
	10	D2	4.68	0.45	14	2.11	3.36	7.08	15	3.74	3.24	12.12						300	8	1	Size for Q100
	11	D3	6.01	0.45	18	2.70	2.99	8.09	18	6.44	2.99	19.27						300	8	1	Size for Q100
	12	E1	5.05	0.45	13	2.27	3.48	7.91													Size for Q100
	13	E2	1.84	0.45	12	0.83	3.60	2.98	13	3.10	3.48	10.79									Size for Q100
	14	F1	5.05	0.45	13	2.27	3.48	7.91	23	11.82	2.62	30.96						2200	8	5	10'
	15	F2	2.02	0.45	12	0.91	3.60	3.27	24	12.73	2.56	32.58						300	8	1	5'
	16	F3	1.52	0.45	12	0.68	3.60	2.46	24	13.41	2.56	34.33						150	8	0	5'
	17	G1	8.72	0.45	20	3.92	2.83	11.10	36	37.34	1.99	74.30						900	8	2	15'
	18	G2	7.85	0.45	16	3.53	3.17	11.20	37	40.87	1.95	79.69						350	8	1	15'
	19	G3	2.53	0.45	13	1.14	3.48	3.96	38	42.01	1.91	80.23						250	8	1	5'
	20	H1	2.80	0.45	17	1.26	3.09	3.89	39	43.27	1.87	80.91						450	8	1	5'
	21	H2	6.24	0.45	23	2.81	2.62	7.36	39	46.08	1.87	86.16									10'
	22	I1	3.76	0.65	7	2.44	4.43	10.83													15'
	23	I2	5.88	0.65	11	3.82	3.72	14.22	11	6.27	3.72	23.31						250	8	1	15'
	24	I3	3.61	0.65	15	2.35	3.24	7.60													Discharge to Ditch

Merrick and Company																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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		Merrick and Company		
		Storm Drainage System Design		
		Ft. Lupton Master Drainage Study		
		SUMMARY RUNOFF TABLE		
DESIGN POINT	TRIBUTARY BASIN	CONTRI AREA (ACRES)	RUNOFF 5-YEAR STORM (CFS)	PEAK 100-YEAR STORM (CFS)
1	A1	4.63	6.75	17.17
2	A1-A2	9.96	14.30	35.74
3	A1-A3	16.34	17.13	43.53
4	A1-A4	20.66	21.29	54.17
5	B1	6.61	9.19	23.08
6	B1-B2	10.33	13.90	34.96
7	A1-C1	38.66	38.45	97.66
8	A1-C2	44.45	41.61	105.88
9	D1	3.63	5.29	13.46
10	D1-D2	8.31	12.12	30.81
11	D1-D3	14.32	19.27	48.46
12	E1	5.05	7.91	19.94
13	E1-E2	6.89	10.79	27.20
14	D1-F1	26.26	30.96	78.15
15	D1-F2	28.28	32.58	82.13
16	D1-F3	29.80	34.33	86.54
17	A1-G1	82.97	74.30	191.16
18	A1-G2	90.82	76.69	205.43
19	A1-G3	93.35	80.23	207.24
20	A1-H1	96.15	80.91	209.41
21	A1-H2	102.39	86.16	223.01
22	I1	3.76	10.83	25.12
23	I1-I2	9.64	23.31	54.52
24	I3	3.61	7.60	17.85

Merrick and Company									
Storm Drainage System Design									
Ft. Lupton Master Drainage Study						Job No. 18012519			
Calculated By:				Mark Ericson					
Date:		8/30/96							
Storm Sewer Sizing									
Based on 1% Slope									
Basin								Total	Req'd. RCP
D.P.	Q5	Q100	Q in Pipe	C5*A	i5	C100*A	i100	Q in Pipe	Pipe Dia. (in.)
1	6.75	17.17	17.17						24"
2	7.65	19.12	19.12						24"
2 to 3						5.98	5.98	35.76	30"
3	8.58	21.59	8.58						18"
3 to 4				4.81	2.29	5.98	4.37	37.15	30"
4	6.53	16.49	6.53						18"
4 to Junct.				9.45	2.29	5.98	4.37	47.77	36"
5	9.19	23.08	9.19						18"
6	5.01	12.59	5.01						18"
6 to Junct.				4.64	2.99			13.87	21"
Junct. to 7				9.45	2.21	5.98	4.21	46.06	36"
7	9.32	23.33	9.32						18"
7 to 8				12.90	2.21	5.98	4.21	53.68	36"
8	0.09	12.05	9.41						18"
8 to Junct.	9.38	23.73	9.38	15.51	2.08	5.98	3.97	56.00	36"
9	5.29	13.46	13.46						21"
10	7.08	17.86	17.86						24"
10 to 11				0.00	0.00	4.99	6.18	30.84	27"
11	8.09	20.34	20.34						24"
11 to Junct.				0.00	0.00	8.59	5.64	48.45	36"
12	7.91	19.94	19.94						24"
13	2.98	7.54	7.54						18"
13 to Junct.				3.10	3.48	0.00	0.00	10.79	21"
Junct. to 14				3.10	3.48	8.59	4.96	53.39	36"
14	7.91	19.94	7.91						18"
14 to 15				5.37	2.62	8.59	4.96	56.68	36"
15	3.27	8.28	3.27						18"
15 to 16				6.28	2.56	8.59	4.84	57.65	36"
16	2.46	6.23	2.46						18"
16 to Junct.				6.96	2.56	8.59	4.84	59.39	36"
Junct. to 17				22.47	1.99	14.57	3.84	100.66	42"
17	11.10	27.94	11.10						21"
17 to 18				26.39	1.99	14.57	3.84	108.46	48"
18	11.20	28.17	11.20						21"
18 to 19				29.92	1.95	14.57	3.77	113.27	48"
19	3.96	9.99	3.96						18"
19 to 20				31.44	1.91	14.57	3.70	113.96	48"

Pipes

3/

20	3.89	9.78	3.89						18"
20 to 21				32.70	1.87	14.57	3.63	114.04	48"
21	7.36	18.57	7.36						18"
21 to Outlet				35.51	1.87	14.57	3.63	119.29	48"
22	10.83	25.12	10.83						21"
23	14.22	33.26	14.22						18"
23 to Outlet				6.27	3.72			23.32	27"
24	7.60	17.85	N/A						

Merrick and Company								
Detention Pond Calculations								
Ft. Lupton Master Drainage Study Job No. 18012519								
For Information Only - No Onsite Detention Is Required								
Calculated By: Mark Ericson								
Formulas: $K10 = (0.95I - 1.90)/100$								
$K100 = (1.78I - 0.002I^2 - 3.56)/1000$								
$V = KA$								
Basin	Area	Percent	K10	K100	V10	V10	V100	V100
	(Acres)	Imperv. (I)			(Ac. Ft.)	(CF)	(Ac. Ft.)	(CF)
A1	4.63	43	0.0390	0.0693	0.180	7856	0.321	13973
A2	5.33	43	0.0390	0.0693	0.208	9043	0.369	16086
A3	6.38	43	0.0390	0.0693	0.249	10825	0.442	19254
A4	4.32	43	0.0390	0.0693	0.168	7330	0.299	13037
B1	6.61	43	0.0390	0.0693	0.257	11215	0.458	19948
B2	3.72	43	0.0390	0.0693	0.145	6312	0.258	11227
C1	7.67	43	0.0390	0.0693	0.299	13013	0.531	23147
C2	5.79	43	0.0390	0.0693	0.226	9824	0.401	17474
D1	3.63	43	0.0390	0.0693	0.141	6159	0.251	10955
D2	4.68	43	0.0390	0.0693	0.182	7940	0.324	14124
D3	6.01	43	0.0390	0.0693	0.234	10197	0.416	18138
E1	5.05	43	0.0390	0.0693	0.197	8568	0.350	15241
E2	1.84	43	0.0390	0.0693	0.072	3122	0.127	5553
F1	5.05	43	0.0390	0.0693	0.197	8568	0.350	15241
F2	2.02	43	0.0390	0.0693	0.079	3427	0.140	6096
F3	1.52	43	0.0390	0.0693	0.059	2579	0.105	4587
G1	8.72	43	0.0390	0.0693	0.340	14795	0.604	26316
G2	7.85	43	0.0390	0.0693	0.306	13319	0.544	23691
G3	2.53	43	0.0390	0.0693	0.099	4293	0.175	7635
H1	2.80	43	0.0390	0.0693	0.109	4751	0.194	8450
H2	6.24	43	0.0390	0.0693	0.243	10587	0.432	18832
I1	3.76	70	0.0646	0.1112	0.243	10581	0.418	18220
I2	5.88	70	0.0646	0.1112	0.380	16546	0.654	28492
I3	3.61	70	0.0646	0.1112	0.233	10158	0.402	17493
TOTAL	115.64					211006		373210

Site plan for a wastewater treatment facility showing 18 circular tanks labeled A1 through A18. Each tank contains two values: a larger number on top and a smaller number on the bottom, separated by a horizontal line. The tanks are arranged in a complex layout with various flow lines and easements. Key features include 'FULTON DITCH' running vertically through the center, 'PROPOSED 50' WIDE LINE EASEMENT' areas, and 'C.L. PROPOSED WATER LINE'. The plan also shows topographic contours and a north arrow pointing towards the top right.

Tank Label	Top Value	Bottom Value
A1	4.63	0.45
A2	5.33	0.45
A3	6.36	0.45
A4	4.32	0.45
B1	6.61	0.45
B2	3.72	0.45
C1	7.67	0.45
C2	3.79	0.45
D1	3.63	0.45
D2	4.98	0.45
D3	6.01	0.45
E1	5.05	0.45
E2	1.84	0.45
F1	5.06	0.45
F2	2.03	0.45
F3	1.52	0.45
G1	8.72	0.45
G2	7.88	0.45
G3	2.53	0.45
H1	2.80	0.45
H2	6.24	0.45
I1	3.76	0.65
I2	4.89	0.65
I3	3.61	0.65

LEGEND

- STAKING POINT
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PLAYING AREA BOUNDARY
- STORM MANHOLE
- STORM SEWER
- STORM INLET
- DIRECTION OF FLOW
- DESIGN POINT
- DRAINAGE BASIN BOUNDARY
- BASIN DESIGNATION
- AREA (acres)

[illegible]

Engineers & Architects
MERRICK
 2450 PEORIA STREET
 DENVER, COLORADO 80222
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SCALE: 1" = 200'

FORT LUPTON
MASTER DRAINAGE PLAN

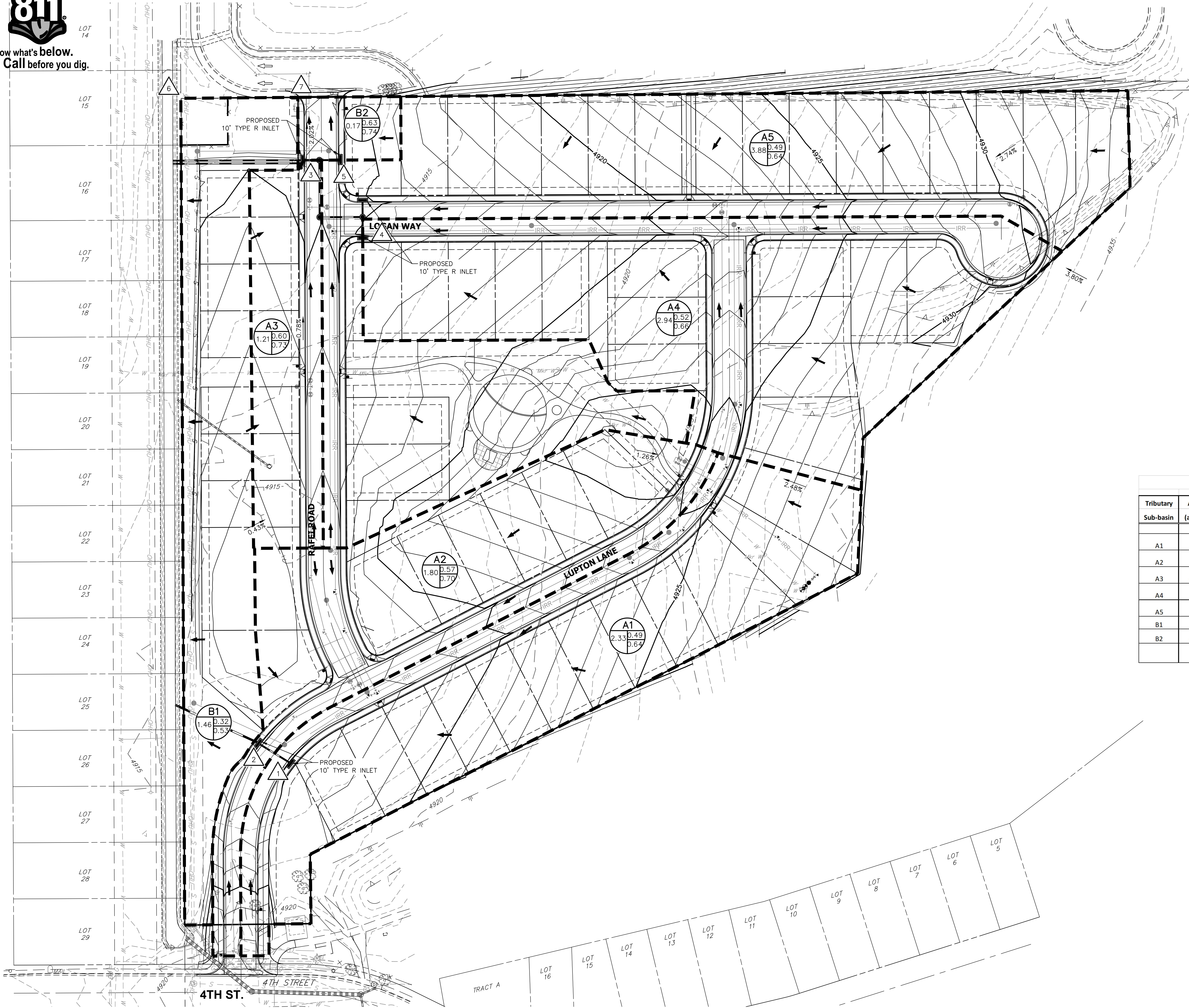
REVISION: A	DRAWING NO.: MDR.DWG	SHEET NO.: 1 OF 1
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Appendix E Drainage Maps

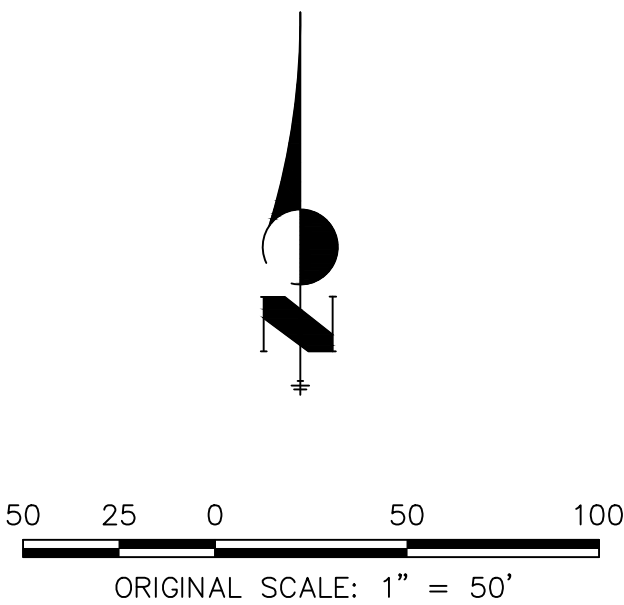


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BASIN SUMMARY TABLE							
Tributary Sub-basin	Area (acres)	Percent Impervious	C _s	C ₁₀₀	t _c (min)	Q _s (cfs)	Q ₁₀₀ (cfs)
A1	2.33	52%	0.49	0.64	13.0	3.9	9.8
A2	1.80	62%	0.57	0.70	11.4	3.8	8.8
A3	0.48	64%	0.60	0.73	9.7	1.1	2.6
A4	2.94	56%	0.52	0.66	11.1	5.7	13.8
A5	3.88	51%	0.49	0.64	13.7	6.4	16.1
B1	1.46	29%	0.32	0.53	13.8	1.6	5.0
B2	0.17	69%	0.63	0.74	5.0	0.5	1.2



UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE AGENCIES, OR ENGINEERING APPROVES THEIR USE, THE USER ASSUMES RESPONSIBILITY FOR ANY DAMAGE OR LOSS OF LIFE OR PROPERTY. AUTHORIZATION.

PREPARED FOR
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LOVE TREE, CO 80124
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P-303.587.1966

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BY	DATE	No.	REVISION	H-SCALE 1"=50'	V-SCALE 1"=X'	DATE 12/13/21	DESIGNED BY AJH	DRAWN BY XXX	CHECKED BY	COYOTE CREEK FILING NO. 4	SHEET 18 OF 27	JOB NO. 16093.00

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT
PARCEL A – COYOTE CREEK SUBDIVISION
4TH STREET AND WAGONWHEEL DRIVE
FORT LUPTON, COLORADO

TERRACON PROJECT NO. 25025241
October 31, 2002

Prepared for:

Matrix Funding Corporation
c/o Cimarron Consultants, Inc.
6551 South Revere Parkway, Suite 265
Englewood, Colorado 80111

Attn: Mr. Karl Kasch

Prepared by:

Terracon
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Terracon

October 31, 2002

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Attn: Mr. Karl Kasch

**Re: Preliminary Geotechnical Engineering Report
Proposed Multi-Family Residential Development
Parcel A – Coyote Creek Subdivision
4th Street and Wagonwheel Drive
Fort Lupton, Colorado
Terracon Project No. 25025241**

Terracon has completed preliminary geotechnical engineering exploration for the proposed multi-family residential development to be located near the northwest corner of 4th Street and Wagonwheel Drive in Fort Lupton, Colorado. This study was performed in general accordance with our Proposal Number 2502420 dated July 17, 2002.

The results of our engineering study, including the Boring Location Map, laboratory test results, Logs of Borings, and the preliminary geotechnical recommendations needed to aid in the design and construction of foundations and other earth connected phases of this project are attached.

The subsurface soils at the site consisted of native materials comprised of sands with varying amounts of silt, clay and gravel, clays with varying amounts of sand, and silt with varying amounts of sand extending to depths of about 3 to 14-1/2 feet below existing site grade. Claystone and/or sandstone bedrock was encountered beneath the native soils and extended to the full depth of exploration. The information obtained by geologic survey and the results of field exploration and laboratory testing completed for this study indicate that the sand and silt soils, and sandstone bedrock are generally considered to be non- to low expansive. The clay soils have a low to moderate expansive potential. The claystone bedrock should be considered to be moderately to very highly expansive. The soils and bedrock at anticipated foundation bearing depth have a low to high load bearing capability.

Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, we recommend that the proposed buildings be supported on a grade beam and drilled pier or spread footing foundation systems. Drilled pier foundation systems will generally be required in areas where potentially expansive claystone bedrock is encountered at relatively shallow depths. If basement construction is not incorporated into the design of the structures, consideration could be given to supporting the proposed

buildings on post-tensioned slab foundation systems. However, if potentially highly to very highly expansive claystone bedrock is encountered at or near slab bearing elevation, consideration should be given to partial removal of these materials, moisture conditioning and recompaction and/or replacement with non- to low expansive on-site or imported soils.

Slab-on-grade associated with the spread footing and drilled pier foundation options is considered acceptable when bearing on non- to low expansive soils provided that care is taken in the placement and compaction of the subgrade materials and that some movement can be tolerated. However, given the engineering characteristics of near surface expansive clays or claystone bedrock which may be encountered at or near floor slab bearing elevations, consideration should be given to partial removal of these materials, and replacement with non- to low expansive on-site or imported soils. If little or no movement can be tolerated, consideration should be given to the use of structural floor systems

Shallow groundwater conditions within some portions of the site will require particular attention in the design and construction.

Other design and construction recommendations, based upon geotechnical conditions, are presented in the report.

Supplementary geotechnical engineering exploration should be performed at the site when final design plans become available and preliminary design studies are complete. Supplemental geotechnical explorations will be used to confirm or modify the recommendations contained in this preliminary report.

We appreciate being of service to you in the geotechnical engineering phase of this project, and are prepared to assist you during the construction phases as well. If you have any questions concerning this report or any of our testing, inspection, design and consulting services, please do not hesitate to contact us.

Sincerely,
TERRACON



Mohammed H. Abusalih, E.I.T.
Staff Engineer



Michael E. Anderson, P.E.
Geotechnical Department Manager



Copies to: Addressee (5)

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APPENDIX A: LOGS OF BORINGS

APPENDIX B: LABORATORY TEST RESULTS

APPENDIX C: GENERAL NOTES

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT
PARCEL A – COYOTE CREEK SUBDIVISION
4TH STREET AND WAGONWHEEL DRIVE
FORT LUPTON, COLORADO

TERRACON PROJECT NO. 25025241
October 31, 2002

INTRODUCTION

This report contains the results of our preliminary geotechnical engineering exploration for the proposed multi-family residential development to be located near the northwest corner of 4th Street and Wagonwheel Drive in Fort Lupton, Colorado.

The purpose of these services is to provide information and preliminary geotechnical engineering recommendations relative to:

- subsurface soil and bedrock conditions;
- groundwater conditions;
- foundation design and construction;
- basement construction;
- lateral earth pressures;
- floor slab design and construction;
- pavement design and construction;
- earthwork; and
- drainage.

The preliminary recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and experience with similar soil conditions, structures and our understanding of the proposed project.

PROPOSED CONSTRUCTION

As we understand, the project will consist of the development of an approximate 15-acre parcel. Development will be for multi-family residential purposes. A total of 160 residential units are planned. We assume that the residences will consist of one to three-story wood frame structures supported on reinforced concrete foundation systems. We also understand that basement construction may be incorporated into the design of the buildings.

Other major site development, will include the construction of asphalt concrete or Portland cement concrete paved drives and parking areas, along with the installation of underground utilities.

Preliminary grading plans were available prior to the preparation of this report. Maximum fill and cut depths are anticipated to be on the order of about 1 to 4 feet. Generally, cut operations are anticipated within the north and northeastern portions of the site. It is our understanding that the materials derived from cut areas may be transported and used as roadway subgrade materials along Mountain View Avenue, if they meet the requirements outlined in the previous geotechnical engineering report for pavement thickness design for Filing No. 5 of Coyote Creek Subdivision, Terracon Project No. 25025217 dated September 25, 2002.

SITE EXPLORATION

The scope of the services performed for this project included site reconnaissance by a field engineer, a subsurface exploration program, laboratory testing and engineering analysis.

Field Exploration: A total of 10 test borings were drilled on October 10, 2002 to depths of about 20 to 25 feet below existing site grade at the approximate locations shown on the Boring Location Map, Figure 1. Six borings were located throughout the site, with the remaining four borings drilled within the northeast portion of the site where cut operations are planned. All borings were advanced with a truck-mounted drilling rig, utilizing 4-inch diameter solid stem auger.

The borings were located in the field by pacing from property lines and/or existing site features. Elevations were taken at each boring location by interpolation from contours indicated on the provided Site Plan prepared by Merrick Engineering and Architects. The accuracy of boring locations and elevations should only be assumed to the level implied by the methods used.

Lithologic logs of each boring were recorded by the field engineer during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving ring barrel samplers. Representative bulk samples of subsurface materials were obtained from the borings located within the planned cut areas of the site.

Penetration resistance measurements were obtained by driving the ring barrel into the subsurface materials with a 140-pound hammer falling 30 inches. The penetration resistance value is a useful index to the consistency, relative density or hardness of the materials encountered.

Groundwater measurements were made in each boring at the time of site exploration and several days after drilling.

Laboratory Testing: All samples retrieved during the field exploration were returned to the laboratory for observation by the project geotechnical engineer, and were classified in accordance with the Unified Soil Classification System described in Appendix C. Samples of bedrock were classified in accordance with the general notes for Rock Classification. At that time, an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials. Following the completion of laboratory testing, the field descriptions were confirmed or modified as necessary and Logs of Borings were prepared and are presented in Appendix A.

Laboratory test results are presented in Appendix B, and were used for the geotechnical engineering analyses, and the development of preliminary foundation and earthwork recommendations. All laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

Selected soil and bedrock samples were tested for the following engineering properties:

- Water content
- Dry density
- Consolidation
- Expansion
- Grain size
- Plasticity Index
- Water soluble sulfate content

SITE CONDITIONS

The site was vacant at the time of field exploration and to our knowledge had not been previously developed. The site was bounded on the north by Twombly Elementary School, on the east and south by Coyote Creek Golf Course, and on the west by an existing irrigation ditch. The ground surface was generally flat with an estimated elevation differential of about 17 to 20 feet across the entire parcel. Vegetation consisted of a sparse growth of native grass and brush cover. Site drainage was generally in the form of sheet surface flow directed to the west and southwest. An unlined irrigation ditch, about 25 feet wide and about 4 to 6 feet deep, was observed along the western property line of the site. Evidence of potential underground utilities was observed within the northern and central portions of the site.

SUBSURFACE CONDITIONS

Geology: Surficial geologic conditions at the site, as mapped by the U.S. Geological Survey (USGS) (¹Soister, 1965), consist of alluvial sand and silt deposits of Pleistocene Age. These materials are described as grayish-yellow to grayish-orange sand and silt with some clay, scattered pebbles and gravel lenses. These materials are on the order of about 25 to 30 feet in thickness.

Bedrock underlying the surface units consists of the Dawson Formation of Cretaceous Age. This formation is mostly comprised of dark gray shale and clay with some yellowish-gray siltstone and partly limonitic arkosic sandstone; ironstone concentrations as much as 4 feet in diameter, especially in the lower part; and rare lenticular coal beds less than 3 feet thick. Thickness has been reported to be on the order of about 550 to 600 feet.

Due to the gently sloping nature of the site, geologic hazards at the site are anticipated to be low. Seismic activity in the area is anticipated to be low; and from a structural standpoint, the property should be relatively stable. With proper site grading around the proposed structures, erosional problems at the site should be reduced.

Mapping completed by the Colorado Geological Survey (²Hart, 1972), indicates the site is in an area of "Windblown sand or silt" with areas of "Low Swell Potential" adjacent to the site. This material has been described as having low swell potential and may be subject to severe settlement or collapse when water is allowed to saturate the deposits. Bedrock with higher swell potential may be locally less than 10 feet below the ground surface.

Soil and Bedrock Conditions: As presented on the Logs of Boring, surface soils to depths of 3 to 14-1/2 feet below existing site grade consisted of native materials comprised of sands with varying amounts of silt, clay and gravel, clays with varying amounts of sand and silts with varying amounts of sand. Claystone and/or sandstone was encountered beneath the native soils and extended to the full depth of exploration.

Field and Laboratory Test Results: Field test results indicate that the clay soils vary from stiff to very stiff in consistency. The sand and silt soils vary from loose to medium dense in relative density. The claystone and sandstone bedrock varied from weathered to very hard in hardness.

¹Soister, Paul E., 1965, *Geologic Map of the Fort Lupton Quadrangle, Colorado*, United States Geological Survey, Map GQ-397.

²Hart, Stephen S., 1972, *Potentially Swelling Soil and Rock in the Boulder-Fort Collins-Greeley Area, Front Range-Urban Corridor Colorado*, Colorado Geological Survey, Sheet 1 of 4.

Laboratory test results indicate clay soils have a low to moderate expansive potential. The sand and silt soils, and sandstone bedrock are generally considered to be non- to low expansive. The claystone bedrock should be considered to be moderately to very highly expansive. Results of water soluble sulfate indicated values ranging from 0 to 410 mg/L.

Laboratory classification testing was performed on the subsurface soils obtained from Boring Nos. 7 through 10 where cut operations are anticipated to be performed. Following is a summary of the laboratory classification testing:

Boring No. (Sample Depth)	USCS Classification	AASHTO Classification
7 (0-7')	SM	A-2-4 (0)
8 (0-3-1/2')	CL	A-4 (1)
9 (0-4')	SC	A-6 (2)
10 @ 2'	ML	A-4 (0)
10 @ 4'	SM	A-2-4 (0)

Groundwater Conditions: Groundwater was encountered at depths of about 5 to 22-1/2 feet below existing site grade in the majority of the borings at the time of field exploration. Groundwater was not observed in Boring Nos. 2, 8, and 10. When checked several days after drilling, groundwater was measured in the majority of the borings at depths of about 7 to 12 feet below existing site grade. However, Boring Nos. 2 and 10 had caved-in under dry conditions at depths of about 4 and 23 feet below existing site grade. Additionally, groundwater was not observed in Boring No. 8 when checked several days after drilling. These observations represent groundwater conditions at the time of the field exploration, and may not be indicative of other times or at other locations. Groundwater levels can be expected to fluctuate with varying seasonal and weather conditions.

Based upon review of U.S. Geological Survey Maps (³Hillier, et al, 1979), regional groundwater beneath the project area predominates in colluvial, landslide or windblown materials, or in fractured weathered consolidated sedimentary bedrock located at a depth near ground surface. Seasonal variations in groundwater conditions are expected since the aquifer materials may not be perennially saturated. Groundwater is generally encountered at depths ranging from 5 to 20 feet below ground surface; depth to seasonal groundwater is generally 10 feet or less.

Zones of perched and/or trapped groundwater may also occur at times in the subsurface soils overlying bedrock, on top of the bedrock surface or within permeable fractures in the

³Hillier, Donald E. and Schneider, Paul A., Jr., 1979, *Depth to Water Table (1976-1977) in the Boulder-Fort Collins-Greeley Area, Colorado*, United States Geological Survey, Map I-855-I.

bedrock materials. The location and amount of perched water is dependent upon several factors, including hydrologic conditions, type of site development, irrigation demands on or adjacent to the site, fluctuations in water features, seasonal and weather conditions.

Fluctuations in groundwater levels can best be determined by implementation of a groundwater-monitoring plan. Such a plan would include installation of groundwater-monitoring wells, and periodic measurement of groundwater levels over a sufficient period of time.

The possibility of groundwater fluctuations should be considered when developing design and construction plans for the project.

ENGINEERING ANALYSES AND PRELIMINARY RECOMMENDATIONS

The preliminary recommendations presented in this report are based on the assumption that the subsurface conditions do not deviate appreciably from those encountered in the borings. Supplementary geotechnical engineering exploration should be performed at the site upon completion of initial design studies. Supplemental geotechnical explorations will be used to confirm or modify the recommendations contained in this preliminary report.

Geotechnical Considerations: The site appears suitable for the proposed construction. Potentially moderately to very highly expansive claystone bedrock along with shallow groundwater conditions encountered at relatively shallow depths within some portions of the site will require particular attention in the design and construction.

Potentially moderately to very highly expansive claystone bedrock was encountered at relatively shallow depths within the majority of the site. Foundation systems and floor slabs designed to mitigate the expansive potential of the claystone bedrock may have to be incorporated in these areas. Additionally, shallow groundwater conditions were encountered within some portions of the site. Significant cuts may have to be limited or fill may have to be placed in these areas to reduce the effects of shallow groundwater conditions on full basement construction, if utilized. If basements are utilized, a minimum separation distance of about 4 to 6 feet should be maintained between foundations and groundwater levels.

Preliminary grading plans were available prior to the preparation of this report. Generally, maximum cut and fill depths on the order of about 1 to 4 feet are anticipated. The majority of the deep cut operations appear to be within the northern and northeastern portions of the site.

Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, we recommend that the proposed buildings could be supported on a grade beam and drilled pier or spread footing foundation systems. Drilled pier foundation systems will generally be required in areas where potentially expansive claystone bedrock is encountered at relatively shallow depths. If basement construction is not incorporated into the design of the structures, consideration could be given to supporting the proposed buildings on post-tensioned slab foundation systems. However, if potentially highly to very highly expansive claystone bedrock is encountered at or near slab bearing elevation, consideration should be given to partial removal of these materials to depths of about 3 to 5 feet, moisture conditioning and recompaction and/or replacement with non- to low expansive on-site or imported soils.

Slab-on-grade associated with the spread footing and drilled pier foundation options is considered acceptable when bearing on non- to low expansive soils provided that care is taken in the placement and compaction of the subgrade materials and that some movement can be tolerated. However, given the engineering characteristics of near surface expansive clays and claystone bedrock which may be encountered at or near floor slab bearing elevations, consideration should be given to partial removal of these materials to depths of about 3 to 5 feet, and replacement with non- to low expansive on-site or imported soils. If little or no movement can be tolerated, consideration should be given to the use of structural floor systems

Preliminary design and construction recommendations for foundation systems and other earth connected phases of the project are outlined below.

Foundation Systems:

Drilled Straight Shaft Piers: Due to the potential presence of moderately to very highly expansive claystone bedrock at relatively shallow depths within the majority of the site, a grade beam and drilled pier foundation system is considered applicable for support of the proposed structures. Straight shaft piers, drilled a minimum of 8 to 10 feet into medium hard or harder bedrock, with a minimum shaft length of 20 to 25 feet can be used for preliminary design purposes.

For axial compression loads, piers may be preliminarily designed for maximum end-bearing pressures ranging from 20,000 to 30,000 pounds per square foot (psf), and skin friction values ranging from 2,000 to 3,000 psf for the portion of the pier in medium hard or harder bedrock.

To reduce potential uplift forces on piers, small diameter piers and long grade beam spans, which increase individual pier loading, are recommended. A void space should be provided beneath grade beams, between piers. The void material should be of suitable strength to support the weight of fresh concrete used in grade beam construction and to avoid collapse when foundation backfill is placed.

Drilling to design depths should be possible with conventional single flight power augers. Groundwater conditions and caving soils across the site indicate that temporary steel casing will likely be required in some areas to properly drill and clean piers prior to concrete placement. Groundwater should be removed from each pier hole prior to concrete placement. Pier concrete should be placed immediately after completion of drilling and cleaning. If pier concrete cannot be placed in dry conditions, a tremie should be used for concrete placement. Due to potential sloughing and raveling, foundation concrete quantities may exceed calculated geometric volumes.

If casing is used for pier construction, it should be withdrawn in a slow continuous manner maintaining a sufficient head of concrete to prevent infiltration of water or the creation of voids in pier concrete. Pier concrete should have a relatively high fluidity when placed in cased pier holes or through a tremie.

Spread Footings: Due to the presence of non- to low expansive soils within some portions of the site, spread footing foundations bearing upon undisturbed non- to low expansive native soils or sandstone bedrock, recompacted native soils, and/or engineered fill are recommended for support of some of the proposed buildings. Additionally, a minimum separation distance of about 5 to 7 feet should be maintained between spread footings and potentially expansive claystone bedrock.

The footings may be designed for maximum bearing pressures ranging from about 1,500 to 2,500 psf. In addition, the footings may need to be sized to maintain minimum dead load pressures of about 500 to 800 psf. The design bearing pressure applies to dead loads plus design live load conditions. The design bearing pressures may be increased by one-third when considering total loads that include wind or seismic conditions.

Exterior footings should be placed a minimum of 36 inches below finished grade for frost protection and to provide confinement for the bearing soils. Interior footings should bear a minimum of 12 inches below finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

Footings should be proportioned to minimize differential foundation movement. Proportioning on the basis of equal total movement is recommended; however,

proportioning to relative constant dead load pressure will also reduce differential movement between adjacent footings. Total movement resulting from the assumed structural loads is estimated to be on the order of about 1 inch. Proper drainage should be provided in the preliminary design and during construction to reduce the settlement potential.

Areas of low density soils may be encountered at foundation bearing depth. When such conditions exist beneath planned footing areas, the subgrade soils should be removed and replaced as engineered fill.

Post-Tensioned Slabs: Post-tensioned slab construction can be considered as an alternate foundation system for support of the proposed buildings if basement construction is not incorporated into the design. However, potentially moderately to very highly expansive claystone bedrock encountered at or within foundation bearing elevation will require modification prior to slab construction. Modification would consist of partial removal of these materials to depths of about 3 to 5 feet, moisture conditioning and recompaction and/or replacement with non- to low on-site or imported soils. Post-tensioned slabs should be designed using criteria outlined by the Post-Tensioning Institute⁴ based on the following:

- Maximum Allowable Bearing Pressure.....1,500 to 2,500 psf
- Edge Moisture Variation Distance, e_m
 - Center Lift Condition5.5 feet
 - Edge Lift Condition.....2.5 feet
- Estimated Maximum Settlement (sands or sandstone) 1 inch
- Estimated Differential Settlement (sands or sandstone).....½ to 1 inch
- Differential Soil Movement, y_m
 - Center Lift Condition (clays and claystone)2 to 4 inches
 - Edge Lift Condition (clays and claystone)½ to 1-1/2 inches
- Slab-Subgrade friction coefficient, μ
 - on polyethylene sheeting 0.75
 - on cohesionless soils 1.00
 - on cohesive soils.....2.00

⁴ _____, (1996), *Design and Construction of Post-Tensioned Slabs-on-Ground*, Post-Tensioning Institute, Second Edition.

Post-tensioned slabs, thickened or turndown edges and/or interior beams should be designed and constructed in accordance with the requirements of the Post-Tensioning Institute and the American Concrete Institute.

The above outlined differential soil movement values should also be considered as the potential amounts for tilting of the structures, which could be caused by non-uniform and significant wetting of the subsurface materials below the foundation, resulting in potential differential movements.

Exterior slab edges should be placed a minimum of 36 inches below finished grade for frost protection. Finished grade is the lowest adjacent grade for perimeter beams.

Masonry walls should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

Basement Construction: Groundwater was encountered at depths of about 5 to 22-1/2 feet below existing site grade in the majority of the borings at the time of field exploration. However, groundwater was not encountered in Boring Nos. 2, 8 and 10 at the time of field exploration. When checked several days after drilling, groundwater was measured at depths of about 7 to 12 feet below existing site grade in some of the borings. However, groundwater was not observed in Boring 8, and dry caving had occurred in Boring Nos. 2 and 10 when checked several days after drilling. Therefore, full-depth basement construction is considered acceptable on the site provided that a minimum separation of 4 to 6 feet can be maintained between the bottom of the lowest foundation element and groundwater levels. Fill material should be placed or cut depths should be minimized in areas of shallow groundwater. If the site is not raised or cut depths are not limited, interceptor drains or underdrains will likely be required to mitigate groundwater conditions for basement construction.

Perched groundwater may occur at times since the subsurface soils are relatively impermeable and tend to trap water. Completion of site development, including installation of landscaping and irrigation systems, will likely lead to perched groundwater development.

To reduce the potential for perched groundwater to impact foundation bearing soils and enter the basement of the structure, installation of a perimeter drainage system is recommended. The drainage system should be constructed around the interior or exterior perimeter of the basement foundation, and sloped at a minimum 1/8 inch per foot to a suitable outlet, such as a sump and pump system.

Lateral Earth Pressures: For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

- Active:
 - Cohesive soil backfill (on-site clay or silt)..... 50 to 55 psf/ft
 - Cohesionless soil backfill (on-site sand, processed sandstone or imported soil) 35 to 45 psf/ft
 - Undisturbed subsoil 35 to 40 psf/ft
 - On-site claystone bedrock materials.....not recommended for use
- Passive:
 - Cohesive soil backfill (on-site clay or silt)..... 250 to 300 psf/ft
 - Cohesionless soil backfill (on-site sand, processed sandstone or imported soil)..... 300 to 350 psf/ft
 - Shallow grade beam and foundation walls..... 250 to 350 psf/ft
 - Drilled Piers..... 400 to 500 psf/ft
 - Undisturbed soils or bedrock 400 to 500 psf/ft
- Coefficient of base friction 0.35 to 0.40
- Adhesion at the base of footings 500 to 750 psf

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest:
 - Cohesive soil backfill (on-site clay or silt)..... 60 to 65 psf/ft
 - Cohesionless soil backfill (on-site sand, processed sandstone or imported soil) 50 to 60 psf/ft
 - Undisturbed subsoil 60 to 70 psf/ft
 - On-site claystone bedrock materials.....not recommended for use

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if submerged conditions are to be included in the design.

Fill against grade beams, basement walls, and foundations should be well compacted. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Claystone bedrock is not recommended as backfill materials for foundation and basement walls. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

Seismic Considerations: The project site is located in Seismic Risk Zone I of the Seismic Zone Map of the United States as indicated by the 1997 Uniform Building Code. Based upon the nature of the subsurface materials, Soil Profile Type "Sc" should be used for the design of structures for the proposed project (1997 Uniform Building Code, Table No. 16-J).

Floor Slab Design and Construction: The following recommendations are applicable with slabs-on-grade associated with the spread footing and drilled pier foundation options.

Non- to Low Expansive Materials: Due to the presence of non- to low expansive soils within some portions of the site, slab-on-grade construction is considered acceptable provided that care is taken in the placement and compaction of the subgrade soils and that some movement can be tolerated. Some differential movement of a slab-on-grade floor system is possible should these subgrade soils increase in moisture content. Movement on the order of about 1 to 2 inches is possible. Such movements are considered within general tolerance for normal slab-on-grade construction. To reduce any potential slab movements, the subgrade soils should be prepared as outlined in the "Earthwork" section of this report.

For preliminary structural design of concrete slabs-on-grade, a modulus of subgrade reaction of 100 pounds per cubic inch (pci) may be used for floors supported on existing or engineered fill consisting of on-site soils. A modulus of 200 pci may be used for floors supported on non-expansive imported fill meeting the specifications outlined below.

Additional floor slab design and construction recommendations for slabs supported on non- to low expansive soils are as follows:

- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement.
- Contraction joints should be provided in slabs to control the location and extent of cracking.
- A minimum 1 to 2-inch void space should be constructed above, or below non-bearing partition walls placed on the floor slab. Special framing details should be provided at doorjambs and frames within partition walls to avoid potential distortion. Partition walls should be isolated from suspended ceilings.
- Interior trench backfill placed beneath slabs should be compacted in accordance with recommended specifications outlined below.

- If moisture sensitive floor coverings are used on interior slabs, consideration should be given to the use of barriers to minimize potential vapor rise through the slab.
- Floor slabs should not be constructed on frozen subgrade.
- Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

Moderately to Very Highly Expansive Materials: Due to the potential presence of moderately to very highly expansive claystone bedrock at or near basement bearing elevations within the majority of the site, differential movement of floor slab-on-grade may occur should the claystone bedrock undergo changes in moisture content. Movement on the order of 2 to 3 inches or more is possible. A common practice to reduce potential slab heave involves overexcavation of the potentially expansive claystone bedrock materials encountered at or within slab bearing elevation to depths of about 3 to 5 feet, and replacement with non- to low on-site or imported soils. This alternative will not eliminate the possibility of slab heave; but movements should be reduced and tend to be more uniform. If little or no movement can be tolerated, consideration should be given to using structural floor systems.

Preliminary Pavement Design and Construction: Preliminary design of pavements for the project have been based on the procedures outlined in the 1993 "Guideline for Design of Pavement Structures" by the American Association of State Highway and Transportation Officials (AASHTO). As discussed, the design presented herein is for preliminary planning purposes for the project. For pavement areas located within City of Fort Lupton right-of-way, a pavement design report meeting the City of Fort Lupton specifications will be required.

Traffic criteria assumed for pavement thickness designs include single 18-kip equivalent single axle loads (ESAL's) of 36,500 for automobile parking, and 109,500 for drive lanes.

Based upon AASHTO criteria, Colorado is located within Climatic Region VI of the United States. This region is characterized as being dry, with hard ground freeze and spring thaw. The spring thaw condition typically results in saturated or near-saturated subgrade soil moisture conditions. The AASHTO criteria suggest that these moisture conditions are prevalent for approximately 12-½ percent of the annual moisture variation cycle.

Local drainage characteristics of proposed pavement areas are considered to vary from fair to good depending upon location on the site. For purposes of this preliminary design analysis, fair drainage characteristics are considered to control the design. These

characteristics, coupled with the approximate duration of saturated subgrade conditions, results in a design drainage coefficient of 1.0 when applying the AASHTO criteria for design.

For preliminary flexible pavement design, a terminal serviceability index of 2.0 was utilized along with an inherent reliability of 85 percent and a design life of 20 years. Using the correlated design R-value, appropriate ESAL, environmental criteria and other factors, the structural numbers (SN) of the pavement sections were determined on the basis of the 1993 AASHTO design equation.

In addition to the preliminary flexible pavement design analyses, a preliminary rigid pavement design analysis was completed, based upon AASHTO design procedures. Rigid pavement design is based on an evaluation of the Modulus of Subgrade Reaction of the soils (K-value), the Modulus of Rupture of the concrete, and other factors previously outlined. The preliminary design K-value for the subgrade soil was determined by correlation to the laboratory tests results. A modulus of rupture of 600 psi (working stress 450 psi) was used for pavement concrete. The rigid pavement thickness for each traffic category was determined on the basis of the AASHTO design equation.

Recommended alternatives for flexible and rigid pavements, summarized for each traffic area, are as follows:

Traffic Area	Alternative	Recommended Pavement Thickness (Inches)			
		Asphalt Concrete Surface	Aggregate Base Course	Portland Cement Concrete	Total
Automobile Parking	A	6			6
	B	4	7		11
	C			5*	5*
Main Traffic Corridors	A	7			7
	B	5	7		12
	C			5*	5*

* Minimum pavement section thickness according to AASHTO

It should be noted that the above calculated sections were based on the correlated soil properties of the clay soils. Thinner sections are anticipated for pavements supported on sandy soils, as well as thicker sections for pavements supported on claystone bedrock. Additionally, swell mitigation may be required in areas where potentially expansive claystone bedrock is encountered at shallow depths.

A final pavement design should be completed subsequent to mass grading operations to confirm or modify the preliminary pavement thickness alternatives. The final design will account for variations in the pavement subgrade soils within paved areas and may have to meet the City of Fort Lupton or Weld County requirements. Accordingly, the actual thickness may vary from those outlined above.

Each alternative should be investigated with respect to current material availability and economic conditions. Rigid concrete pavement, a minimum of 6 inches in thickness, is recommended at the location of dumpsters where trash trucks park and load.

Aggregate base course (if used on the site) should consist of a blend of sand and gravel which meets strict specifications for quality and gradation. Use of materials meeting Colorado Department of Transportation (CDOT) Class 5 or 6 specifications is recommended for base course.

Aggregate base course should be placed in lifts not exceeding 6 inches and should be compacted to a minimum of 95 percent standard Proctor density (ASTM D698).

Where rigid pavements are used, materials meeting CDOT Class P specifications are recommended. Other specifications outlined by the City of Fort Lupton or Weld County should be followed.

The performance of all pavements can be enhanced by minimizing excess moisture which can reach the subgrade soils. The following preliminary recommendations should be considered at minimum:

- site grading at a minimum 2 percent grade away from the pavements;
- compaction of any utility trenches for landscaped areas to the same criteria as the pavement subgrade;
- sealing all landscaped areas in or adjacent to pavements to minimize or prevent moisture migration to subgrade soils;
- placing compacted backfill against the exterior side of curb and gutter; and,
- placing curb, gutter and/or sidewalk directly on subgrade soils without the use of base course materials.

Borrow Fill Materials: We understand materials derived from cut operations on the site may be used as subgrade materials for Mountain View Avenue within Filing No. 5 of the development if found to meet the specifications outlined in the referenced geotechnical engineering report. Based upon review of laboratory classification test results, it appears that the surface soils appear to be of the same or higher quality and meet the specifications

outlined in the referenced report. Therefore, it is our opinion that these materials could be used beneath pavements along Mountain View Boulevard.

Earthwork:

General Considerations: The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project.

All earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation: Strip and remove existing vegetation, debris, and other deleterious materials from proposed building and pavement areas. All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be wasted from the site, or used to revegetate landscaped areas or exposed slopes after completion of grading operations.

The site should be initially graded to create a relatively level surface to receive fill, and to provide for a relatively uniform thickness of fill beneath proposed building structures.

All exposed areas which will receive fill, once properly cleared, should be scarified to a minimum depth of 10 inches, conditioned to near optimum moisture content, and compacted.

Although evidence of fills or underground facilities such as septic tanks, cesspools, basements, and utilities was not observed during the site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. If excavations need to penetrate into the bedrock, ripping or jack-hammering may be needed to advance the excavation.

Depending upon depth of excavation and seasonal conditions, groundwater may be encountered in excavations on the site. Pumping from sumps may be utilized to control

water within excavations. Well points may be required for significant groundwater flow, or where excavations penetrate groundwater to a significant depth.

Based upon the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively stable. However, the stability of the subgrade may be affected by precipitation, proximity to the existing irrigation ditch and golf course, proximity to existing groundwater conditions, repetitive construction traffic or other factors. If unstable conditions develop, workability may be improved by scarifying and drying. Overexcavation of wet zones and replacement with granular materials may be necessary. Use of lime, fly ash, kiln dust, cement or geotextiles could also be considered as a stabilization technique. Laboratory evaluation is recommended to determine the effect of chemical stabilization on subgrade soils prior to construction. Lightweight excavation equipment may be required to reduce subgrade pumping.

The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottom. All excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.

Subgrade Preparation: Subgrade soils beneath interior and exterior slabs, and beneath pavements should be scarified, moisture conditioned and compacted to a minimum depth of 12 inches. The moisture content and compaction of subgrade soils should be maintained until slab or pavement construction.

Fill Materials and Placement: Clean on-site soils or approved imported materials may be used as fill material.

Imported soils (if required) should conform to the following:

<u>Gradation</u>	<u>Percent finer by weight (ASTM C136)</u>
6".....	100
3".....	70-100
No. 4 Sieve.....	50-100
No. 200 Sieve.....	50 (max)
• Liquid Limit	30 (max)
• Plasticity Index.....	15 (max)
• Maximum expansive potential (%)*	1.5

*Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 100 psf surcharge and submerged.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Engineered fill should be compacted to a minimum of 95 percent of the standard Proctor density test (ASTM D698).

On-site clay soils and processed claystone should be compacted within a moisture content range of optimum to 3 percent above optimum. On-site sands, processed sandstone and/or imported soils should be compacted within a moisture range of 3 percent below to 3 percent above optimum unless modified by the project geotechnical engineer.

Shrinkage: For balancing grading plans, estimated shrink or swell of soils and bedrock when used as compacted fill following recommendations in this report are as follows:

<u>Material</u>	<u>Estimated Shrink (-) Swell (+) Based on ASTM D698</u>
On-site soils:	
Clays and silts.....	+5 to -10%
Sands	-5 to -15%
On-site bedrock materials:	
Claystone.....	+5 to +10%
Sandstone	-5 to -10%

Slopes: For permanent slopes in compacted fill areas less than about 12 feet in height, recommended maximum configurations for on-site materials is 3 (Horizontal):1 (Vertical).

The face of all slopes should be compacted to the minimum specification for fill embankments. Alternately, fill slopes can be over-built and trimmed to compacted material.

For permanent slopes in cut areas less than about 12 feet in height, recommended maximum configurations for on-site materials are as follows:

<u>Material</u>	<u>Maximum Slope Horizontal:Vertical</u>
Cohesive soils (clays and silts)	3:1
Cohesionless soils (sands)	2-1/2:1
Bedrock	2:1

If steeper slopes are required for site development, stability analyses should be completed to design the grading plan.

Saturation or near saturation of the slopes may likely result in slope failure, even if the slopes are constructed to the recommended configurations. If saturated conditions are likely, due to irrigation, surface flows or other sources, Terracon should be informed and stability analyses should be performed.

Excavation and Trench Construction: Excavations into the on-site soils will encounter a variety of conditions. Excavations into the clays and bedrock can be expected to stand on relatively steep temporary slopes during construction. However, caving soils and groundwater may also be encountered. The individual contractor(s) should be made responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottom. All excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.

The soils to be penetrated by the proposed excavations may vary significantly across the site. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, the actual conditions should be evaluated to determine any excavation modifications necessary to maintain safe conditions.

As a safety measure, it is recommended that all vehicles and soil piles be kept to a minimum lateral distance from the crest of the slope equal to no less than the slope height. The exposed slope face should be protected against the elements.

Additional Design and Construction Considerations:

Exterior Slab Design and Construction: Compacted subgrade or existing clay soils and claystone will expand with increasing moisture content; therefore, exterior concrete grade slabs may heave, resulting in cracking or vertical offsets. The potential for

damage would be greatest where exterior slabs are constructed adjacent to the building or other structural elements. To reduce the potential for damage, we recommend:

- exterior slabs be supported on fill with no, or very low expansion potential;
- strict moisture-density control during placement of subgrade fills;
- placement of effective control joints on relatively close centers and isolation joints between slabs and other structural elements;
- provision for adequate drainage in areas adjoining the slabs; and
- use of designs which allow vertical movement between the exterior slabs and adjoining structural elements.

In those locations where movement of exterior slabs must be held to a minimum, consideration should be given to:

- constructing slabs with a stem or key-edge, a minimum of 6 inches in width and at least 12 inches below grade;
- supporting keys or stems on drilled piers; or
- providing structural exterior slabs supported on foundations similar to the building.

Underground Utility Systems: All piping should be adequately bedded for proper load distribution. Where utilities are excavated below groundwater, temporary dewatering will be required during excavation, pipe placement and backfilling operations for proper construction. Utility trenches should be excavated on safe and stable slopes in accordance with OSHA regulations as discussed above. Backfill should consist of the on-site soils or existing bedrock. If bedrock is used, all plus 6-inch material should be removed from it prior to its use. The pipe backfill should be compacted to a minimum of 95 percent of Standard Proctor Density ASTM D698.

All underground piping within or near the proposed structure should be designed with flexible couplings, so minor deviations in alignment do not result in breakage or distress. Utility knockouts in grade beams should be oversized to accommodate differential movements.

Corrosion Protection: Results of soluble sulfate testing indicate that ASTM Type II Portland cement is suitable for all concrete on and below grade. Foundation concrete should be designed for moderate sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

Surface Drainage: Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 10 percent for at least 5 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems should not be installed within 5 feet of foundation walls. Landscaped irrigation adjacent to the foundation system should be minimized or eliminated.

GENERAL COMMENTS

Supplemental exploration and analyses should be undertaken in order to develop final design parameters and to confirm and/or modify the preliminary recommendations and conclusions contained in this report.

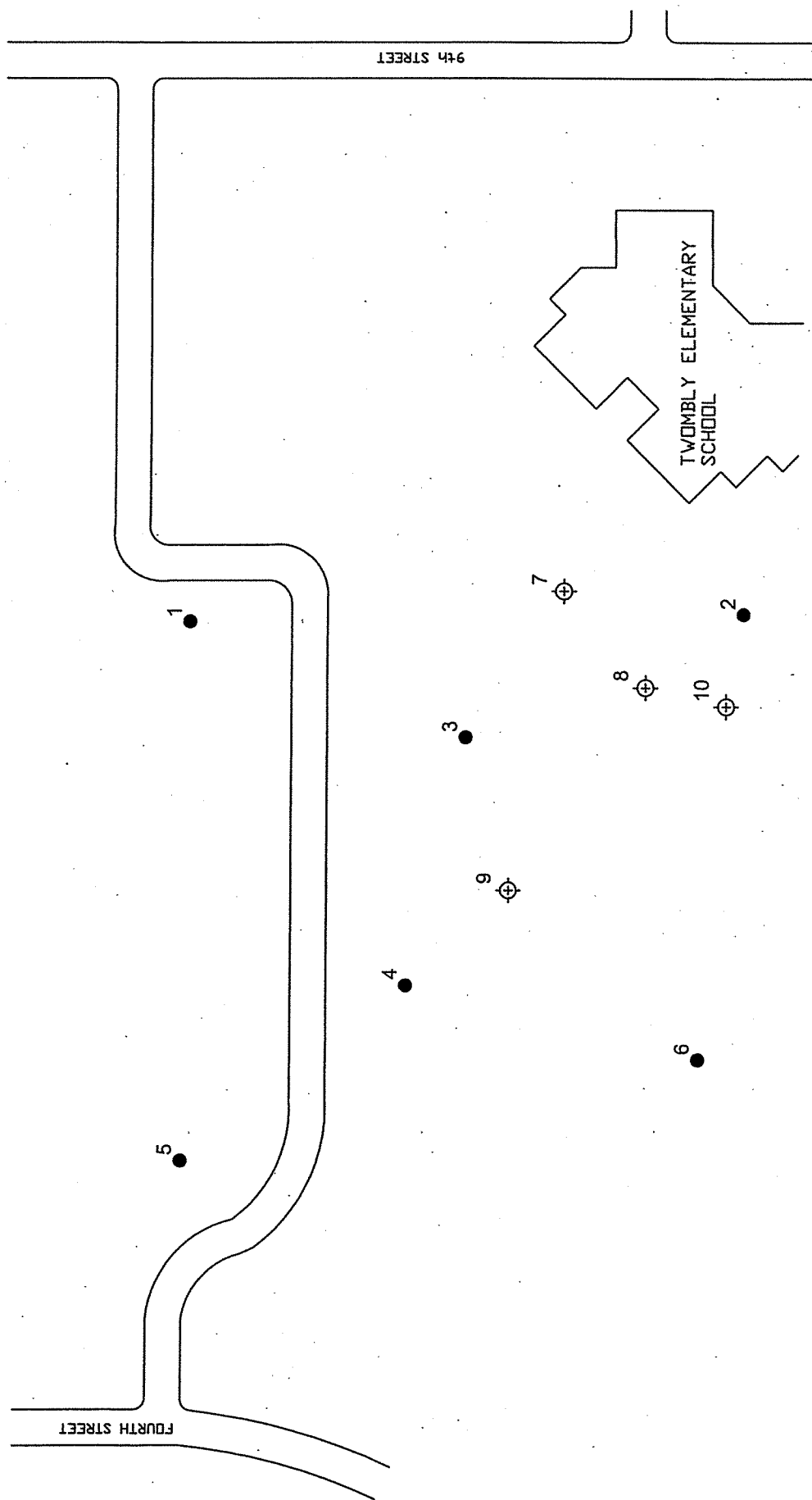
Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide testing and observation during excavation, grading, foundation and construction phases of the project.

The analysis and recommendations presented in this preliminary report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include, either specifically or by implication, any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is

concerned about the potential for such contamination or pollution, other studies should be undertaken.

This preliminary report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.



NOT TO SCALE

FIGURE-1 BORING LOCATION MAP

APPROXIMATE BORROW PIT BORING
LOCATION

APPROXIMATE BORING LOCATION

PARCEL A - COYOTE CREEK SUBDIVISION
FORT LUPTON, COLORADO

PROJECT NUMBER: 25025241 DATE: OCTOBER 25, 2002 DRAWN BY: KMS

Terracon

LOG OF BORING NO. 1

Page 1 of 1

CLIENT		Proposed Multi- Family Residential Development									
SITE		PROJECT									
Fort Lupton, Colorado		Parcel A- Coyote Creek Subdivision									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
				NUMBER	TYPE	RECOVERY, in.	BLOWS / in.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	% Swell or Consol/ Surcharge Load
	Approx. Surface Elev.: 4913.5 ft										
	SILTY SAND, fine to coarse grained, loose to medium dense, brown to dark brown, dry to moist										-1.6/ 500PSF
		5	SM	1	RS	12	29/12	4	105		
			SM	2	RS	12	10/12	9	101		
	LEAN CLAY, with sand, stiff, brown, moist										
		10	CL	3	RS	12	14/12				
		15		4	RS	12	39/12				
	SANDY CLAYSTONE, firm to hard, gray to brown, moist to wet, with sandstone lenses										
		20		5	RS	6	50/6				
	SANDSTONE, fine grained, very hard, strongly cemented, brown, moist to wet										
		25		6	RS	4	50/4				
	Stopped boring at 25 feet										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	19.5	WD	10 10/16/02
WL			
WL			

Terracon

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

Page 1 of 1

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

WATER LEVEL OBSERVATIONS, ft			
WL	∇	NONE WD	∇ DCI@40/16/02
WL	∇		∇
WL			

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

Page 1 of 1

Matrix Funding Corporation

Proposed Multi- Family Residential Development

Fort Lupton, Colorado

Parcel A- Coyote Creek Subdivision

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

WATER LEVEL OBSERVATIONS, ft				
WL	∇ 14.5	WD	∇ 8	10/16/02
WL	∇		∇	
WL				

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

LOG OF BORING NO. 4

Page 1 of 1

CLIENT					Proposed Multi- Family Residential Development										
SITE					PROJECT										
Fort Lupton, Colorado					Parcel A- Coyote Creek Subdivision										
GRAPHIC LOG	DESCRIPTION				DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS				
							NUMBER	TYPE	RECOVERY, in.	BLOWS / in.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	% Swell or Consol/ Surcharge Load	
	Approx. Surface Elev.: 4920.5 ft														
	SANDY LEAN CLAY, very stiff, brown, dry to moist														-1.5/ 500PSF
3	4917.5					CL	1	RS	12	29/12	6	108			
	CLAYEY SAND, fine grained, medium dense, light brown, dry to moist														
5.5	4915				5	SC	2	RS	12	23/12	6	112			
	SANDY CLAYSTONE, medium hard, brown, iron staining, moist to wet														
					10		3	RS	12	50/12	15	117			
12.5	4908														
	CLAYSTONE, with sand, firm, dark brown to gray brown, iron staining, moist to wet														
					15		4	RS	12	39/12					
17.5	4903														
	SANDSTONE, fine grained, medium hard, weak to moderate cementation, brown, moist to wet														
20	4900.5				20		5	RS	11	50/11					
	Stopped boring at 20 feet														

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 12.5	WD	▽ 9.5 10/16/02
WL	▽		▽
WL			

Terracon

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

LOG OF BORING NO. 5

Page 1 of 1

CLIENT					Proposed Multi- Family Residential Development										
SITE					PROJECT										
Fort Lupton, Colorado					Parcel A- Coyote Creek Subdivision										
GRAPHIC LOG	DESCRIPTION				DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS				
							NUMBER	TYPE	RECOVERY, in.	BLOWS / in.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	% Swell or Consol/ Surcharge Load	
	Approx. Surface Elev.: 4916.5 ft														
	3 SILTY SAND, fine to coarse grained, trace gravel, loose, dark brown, moist 4913.5					SM	1	RS	12	17/12	11	117		-0.3/ 500PSF	
	CLAYSTONE, weathered, light gray to grey, moist				5		2	RS	12	12/12	15	116			
	7 SANDSTONE, fine grained, some clay, medium hard to very hard, weakly to strongly cemented, grey to light brown, moist to wet 4909.5														
					10		3	RS	9	50/9					
					15		4	RS	NR	50/5					
					20		5	RS	8	50/8					
	Stopped boring at 20 feet														

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft			
WL	14	WD	11 10/16/02
WL			
WL			

Terracon

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

LOG OF BORING NO. 6

Page 1 of 1

CLIENT		Matrix Funding Corporation		Proposed Multi- Family Residential Development									
SITE		Fort Lupton, Colorado		PROJECT									
				Parcel A- Coyote Creek Subdivision									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS					
				NUMBER	TYPE	RECOVERY, in.	BLOWS / in.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	% Swell or Consol/ Surcharge Load		
	Approx. Surface Elev.: 4930 ft												
	SILTY SAND, fine grained, loose, light gray, moist												
	4 4926		SM	1	RS	12	9/12	9	112				-0.6/ 500PSF
	SILTY SANDSTONE, fine to medium grained, trace claystone fragments, weathered, weakly cemented, light gray to yellow brown, moist to wet	5		2	RS	12	14/12	11	104				
		10		3	RS	12	13/12	22	103				
	12 4918												
	SANDY CLAYSTONE, firm to medium hard, gray to brown, moist	15		4	RS	12	38/12						
		20		5	RS	9	50/9						
	Stopped boring at 20 feet												

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft

WL	▽ 5	WD	▽ 7	10/16/02
WL	▽		▽	
WL				

Terracon

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

LOG OF BORING NO. 7

Page 1 of 1

CLIENT		Matrix Funding Corporation		Proposed Multi- Family Residential Development									
SITE		Fort Lupton, Colorado		PROJECT									
				Parcel A- Coyote Creek Subdivision									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS				% Swell or Consol/ Surcharge Load	
				NUMBER	TYPE	RECOVERY, in.	BLOWS / in.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf			
	Approx. Surface Elev.: 4920.5 ft												
	SILTY SAND, fine to coarse grained, medium dense, brown, dry to moist		SM	1	GRAB								
			SM	2	RS	12	26/12	4	102				
		5	SM	3	RS	12	41/12	3	108				
7	4913.5												
	CLAYSTONE, trace sand, firm, dark brown, iron staining, moist			4	GRAB								
				5	RS	12	30/12	16	116				
12	4908.5												
	SANDY CLAYSTONE, medium hard, light gray, moist			6	RS	10	50/10						
		15											
17.5	4903												
	SANDSTONE, fine grained, very hard, weakly cemented, light brown, moist to wet			7	RS	5	50/5						
20	4900.5	20											
	Stopped boring at 20 feet												

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft

WL	18	WD	10	10/16/02
WL		WD		
WL		WD		

Terracon

BORING STARTED	10-10-02
BORING COMPLETED	10-10-02
RIG	CME 55
FOREMAN	SF
APPROVED	MEA
JOB #	25025241

BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

Page 1 of 1

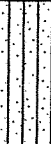
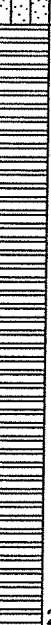
BOREHOLE 99 25025241.GPJ TERRACON.GDT 10/29/02

WATER LEVEL OBSERVATIONS, ft		
WL	<u> </u> NONE WD	<u> </u> NONE 10/16/02
WL	<u> </u>	<u> </u>
WL		

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

Page 1 of 1

Page 1 of 1

CLIENT		Proposed Multi- Family Residential Development									
SITE		PROJECT									
Fort Lupton, Colorado		Parcel A- Coyote Creek Subdivision									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			% Swell or Consol/ Surcharge Load
				NUMBER	TYPE	RECOVERY, in.	BLOWS / in.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	Approx. Surface Elev.: 4927 ft										
	SANDY SILT, medium dense, light yellow brown, dry to moist	4	ML	1	RS	12	26/12	7	99		+4.4/ 500PSF
	SILTY SAND, fine to medium grained, loose, yellow brown, dry to moist	8.5	SM	2	RS	12	14/12	1			
	CLAYSTONE, firm to medium hard, olive brown to dark gray, iron staining, trace lignite, moist	25		3	RS	12	34/12	18	112		
				4	RS	12	36/12				
				5	RS	10	50/10				
	Stopped boring at 25 feet	25									

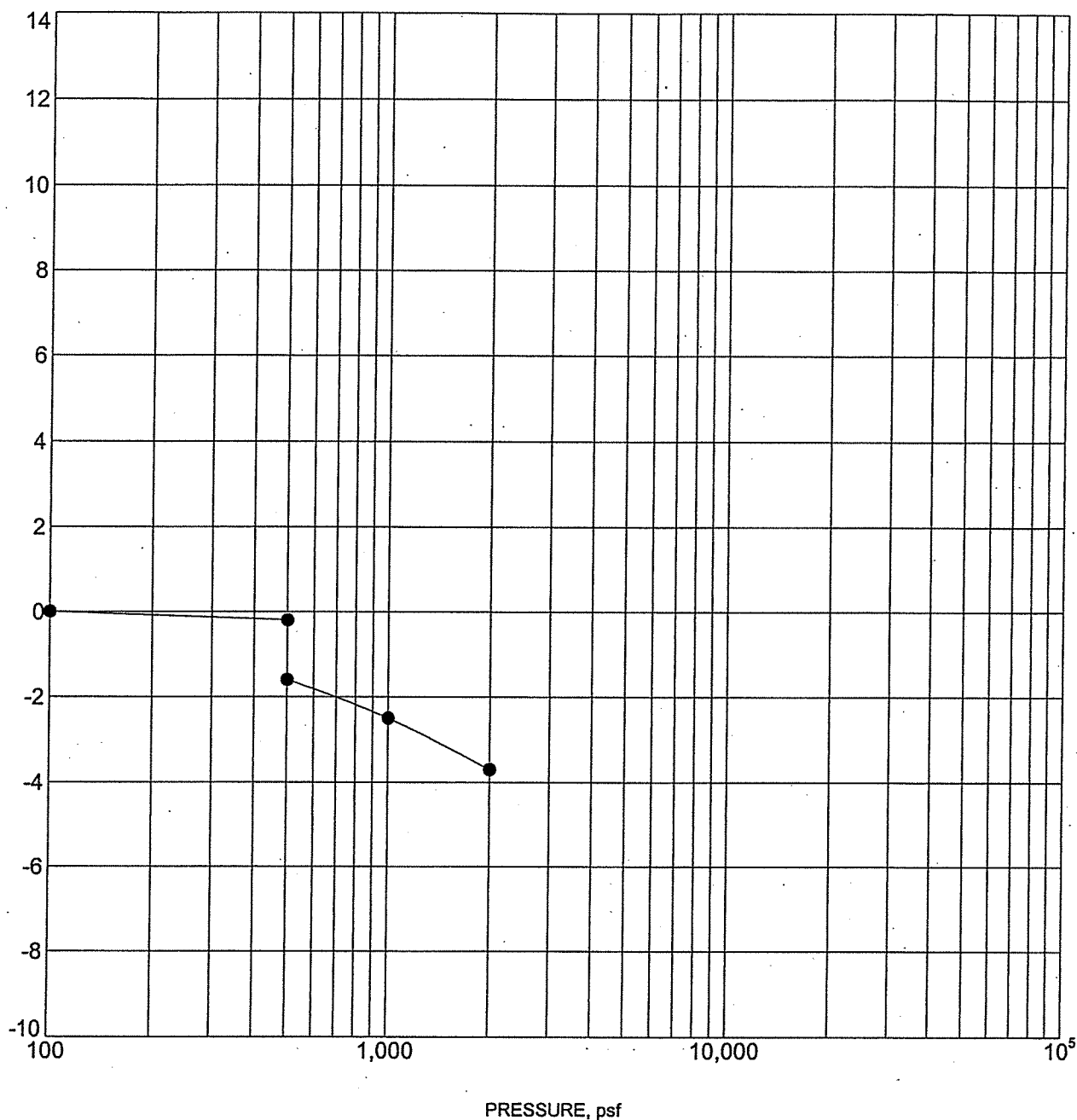
The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	∇ NONE WD	∇ DCI@11/16/02
WL	∇	∇
WL		

Terracon

BORING STARTED		10-10-02	
BORING COMPLETED		10-10-02	
RIG	CME 55	FOREMAN	SF
APPROVED	MEA	JOB #	25025241

AXIAL STRAIN, %



Specimen Identification			Classification	γ_d , pcf	WC, %
●	1	4.0ft	SILTY SAND	101	9

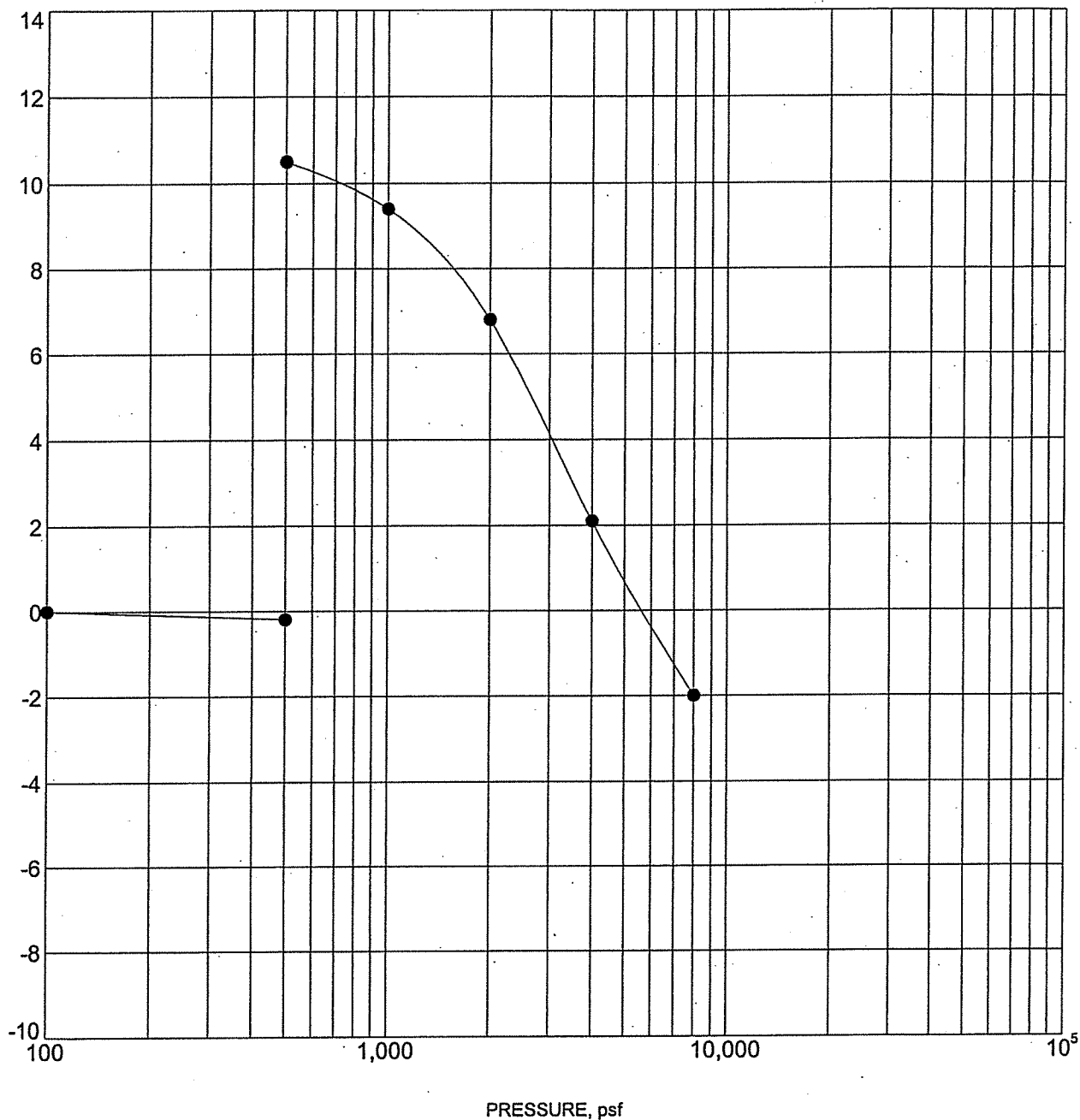
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



Specimen Identification	Classification	γ_d , pcf	WC, %
● 2 9.0ft	CLAYSTONE	117	14

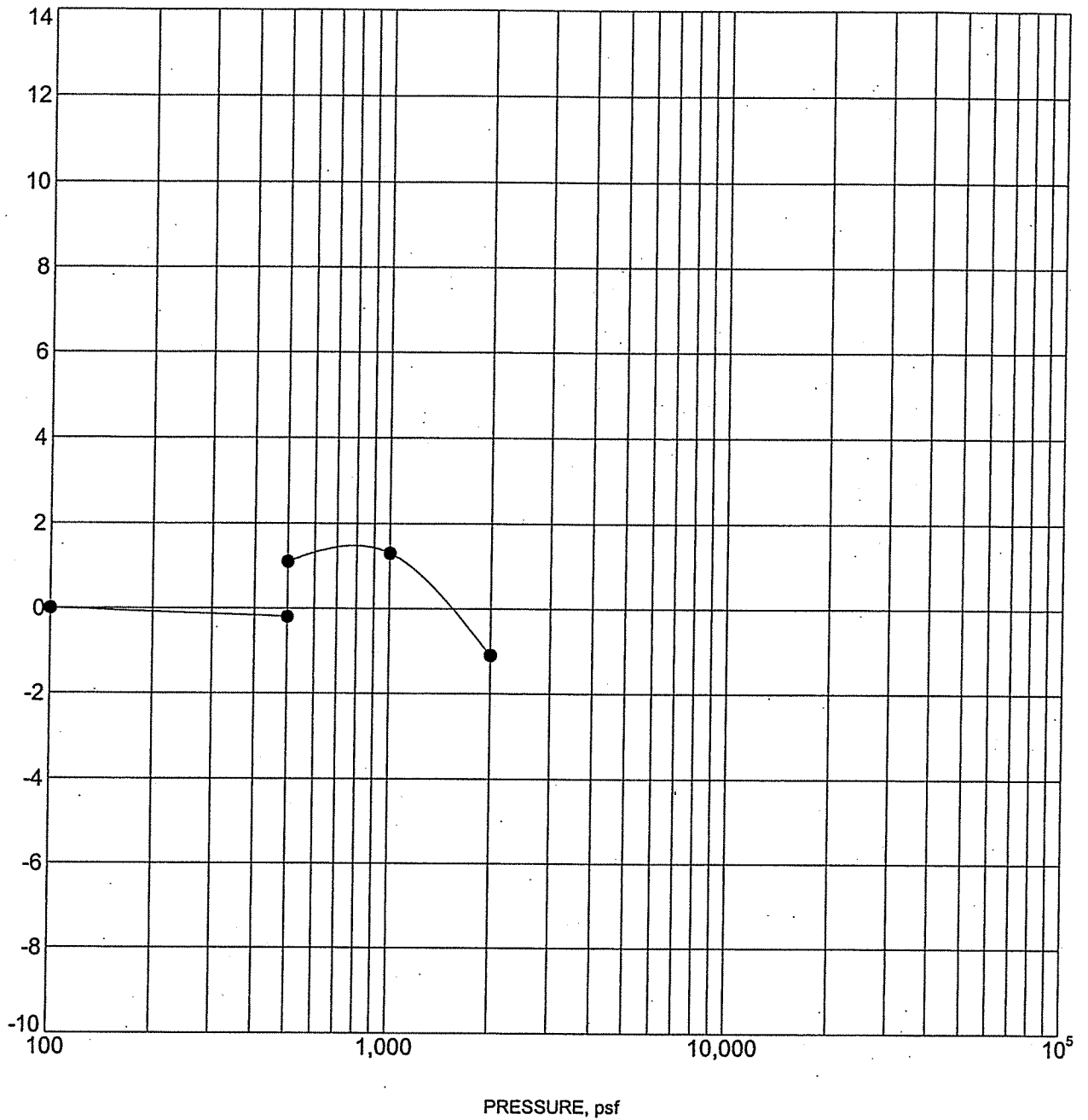
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



Specimen Identification		Classification	γ_d , pcf	WC, %
● 3	4.0ft	CLAYSTONE	108	11

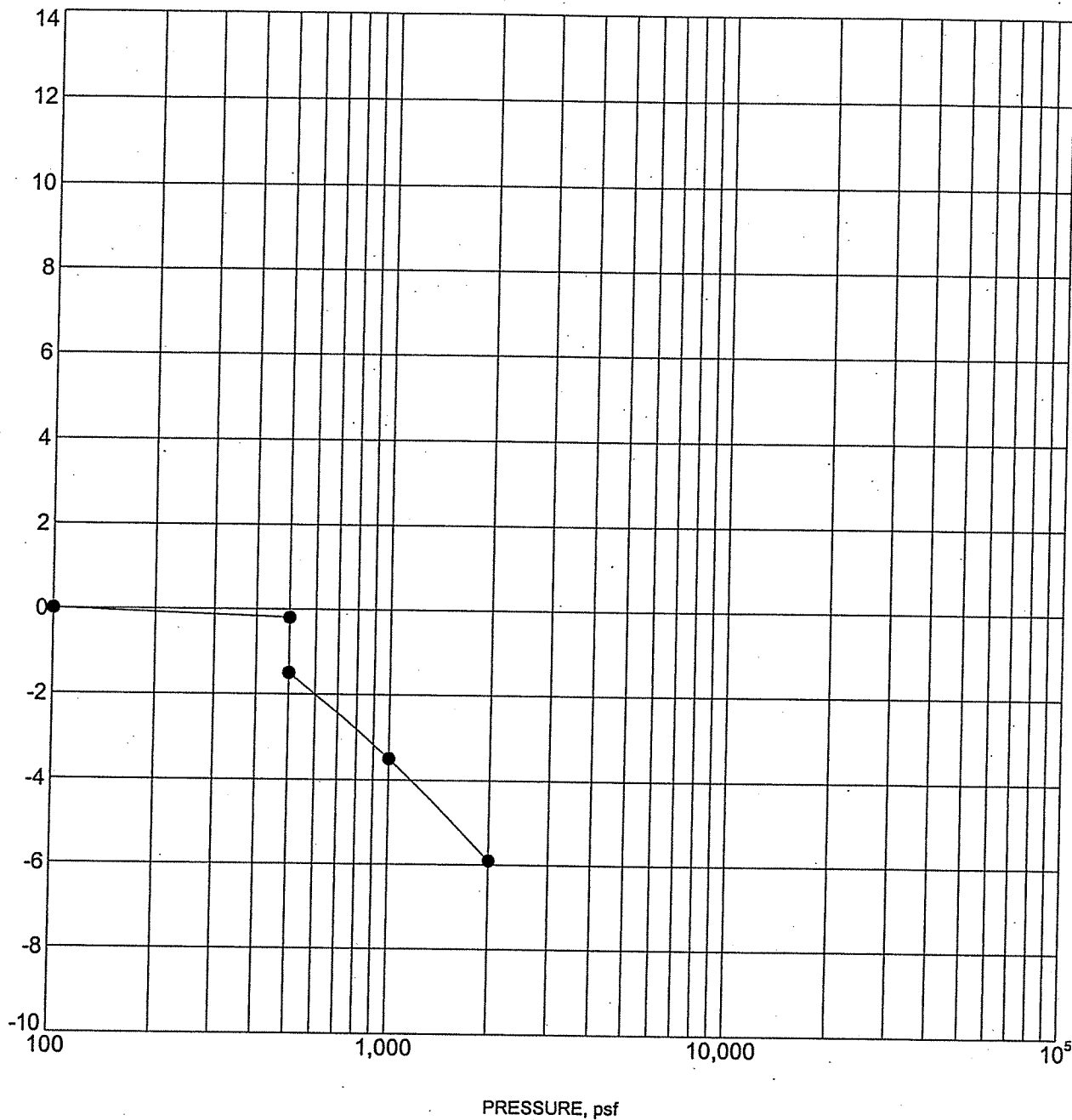
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



Specimen Identification		Classification	γ_d , pcf	WC, %
●	4 2.0ft	SANDY LEAN CLAY	108	6

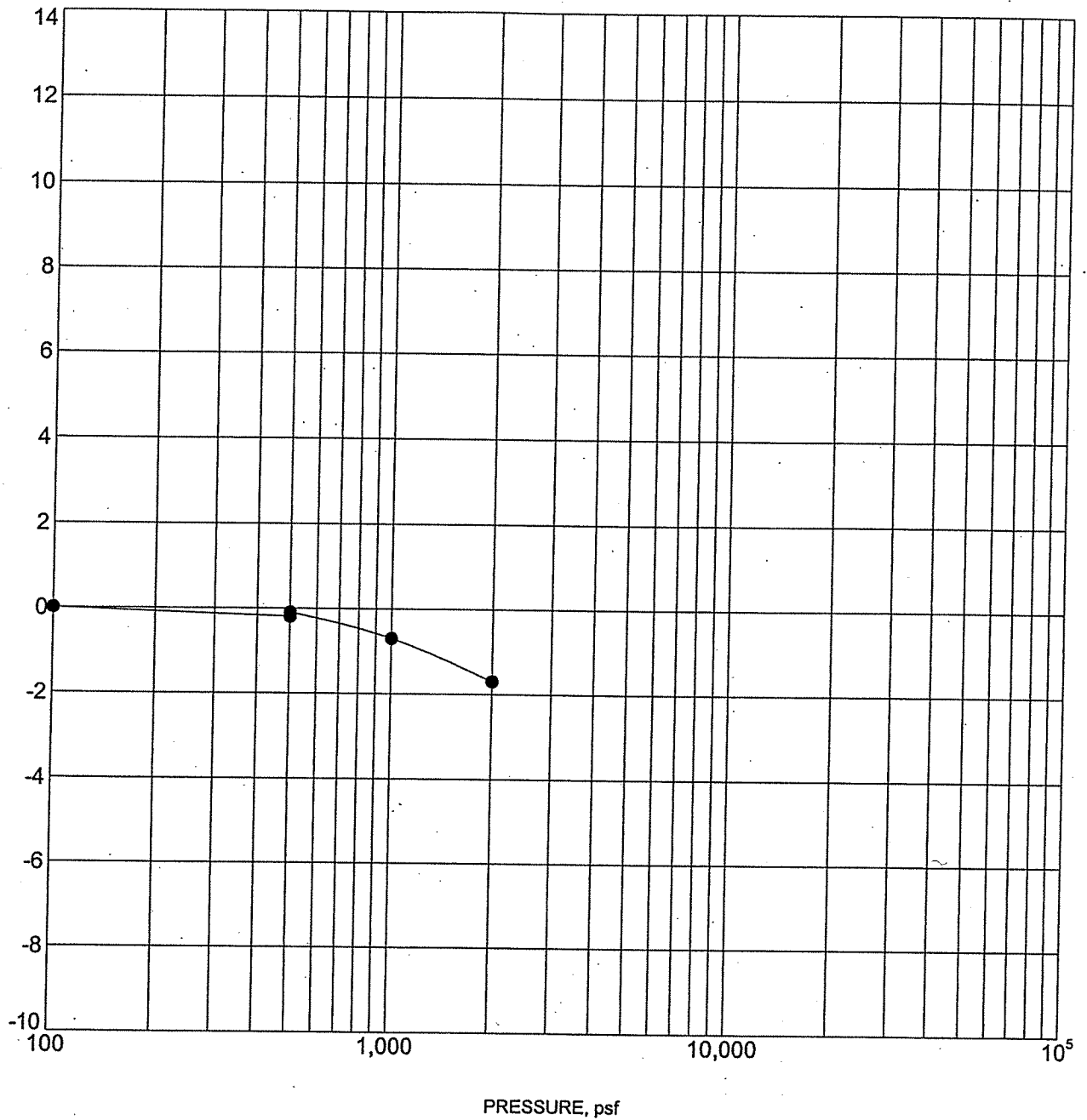
Notes: Disturbed

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



Specimen Identification		Classification	γ_d , pcf	WC, %
●	5 4.0ft	CLAYSTONE	116	15

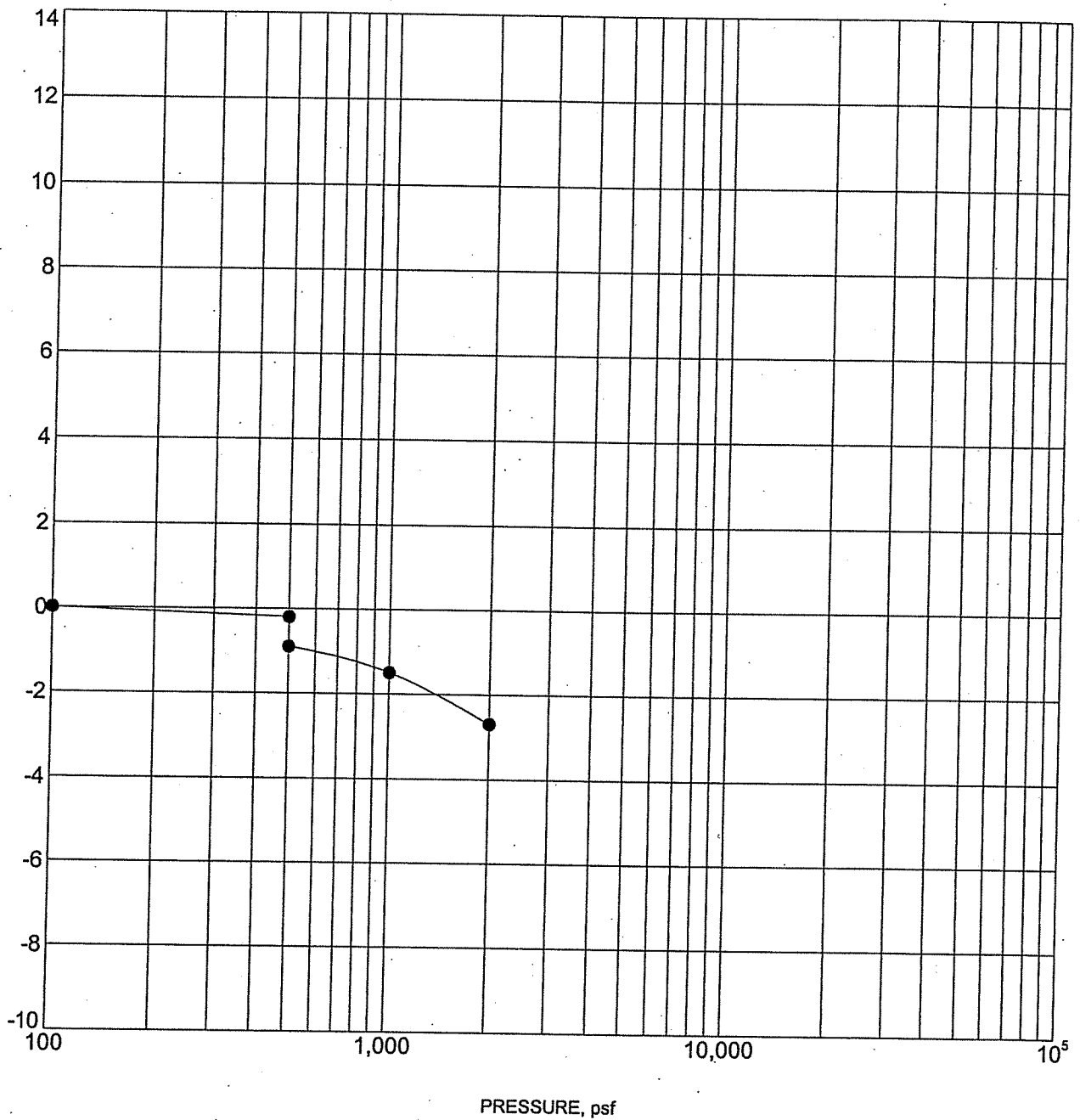
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



Specimen Identification		Classification	γ_d , pcf	WC, %
●	6 2.0ft	SILTY SAND	112	9

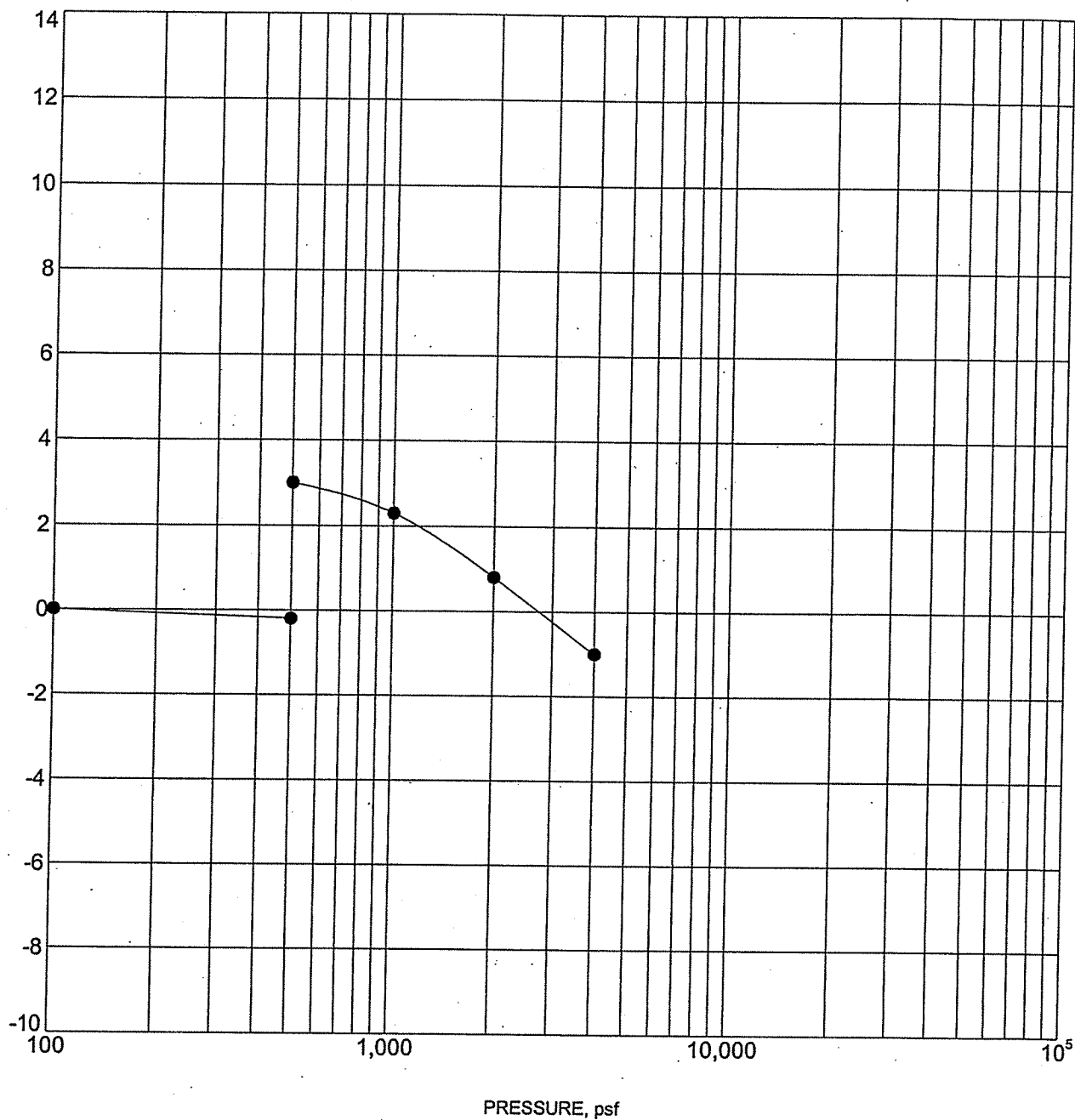
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



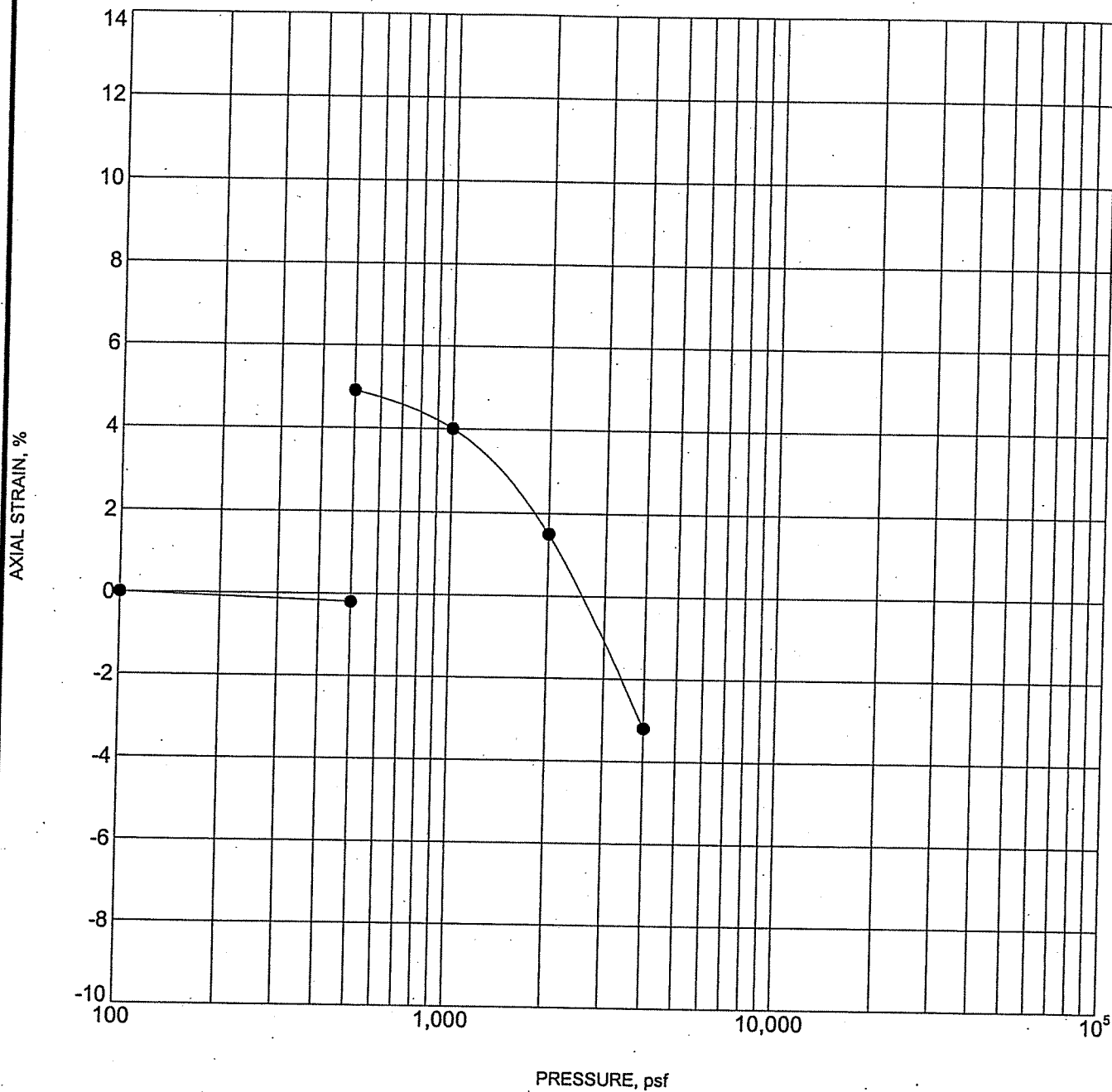
Specimen Identification		Classification	γ_d , pcf	WC, %
●	7 9.0ft	CLAYSTONE	116	16

Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02



Specimen Identification		Classification	γ_d , pcf	WC, %
● 8	4.0ft	CLAYSTONE	104	14

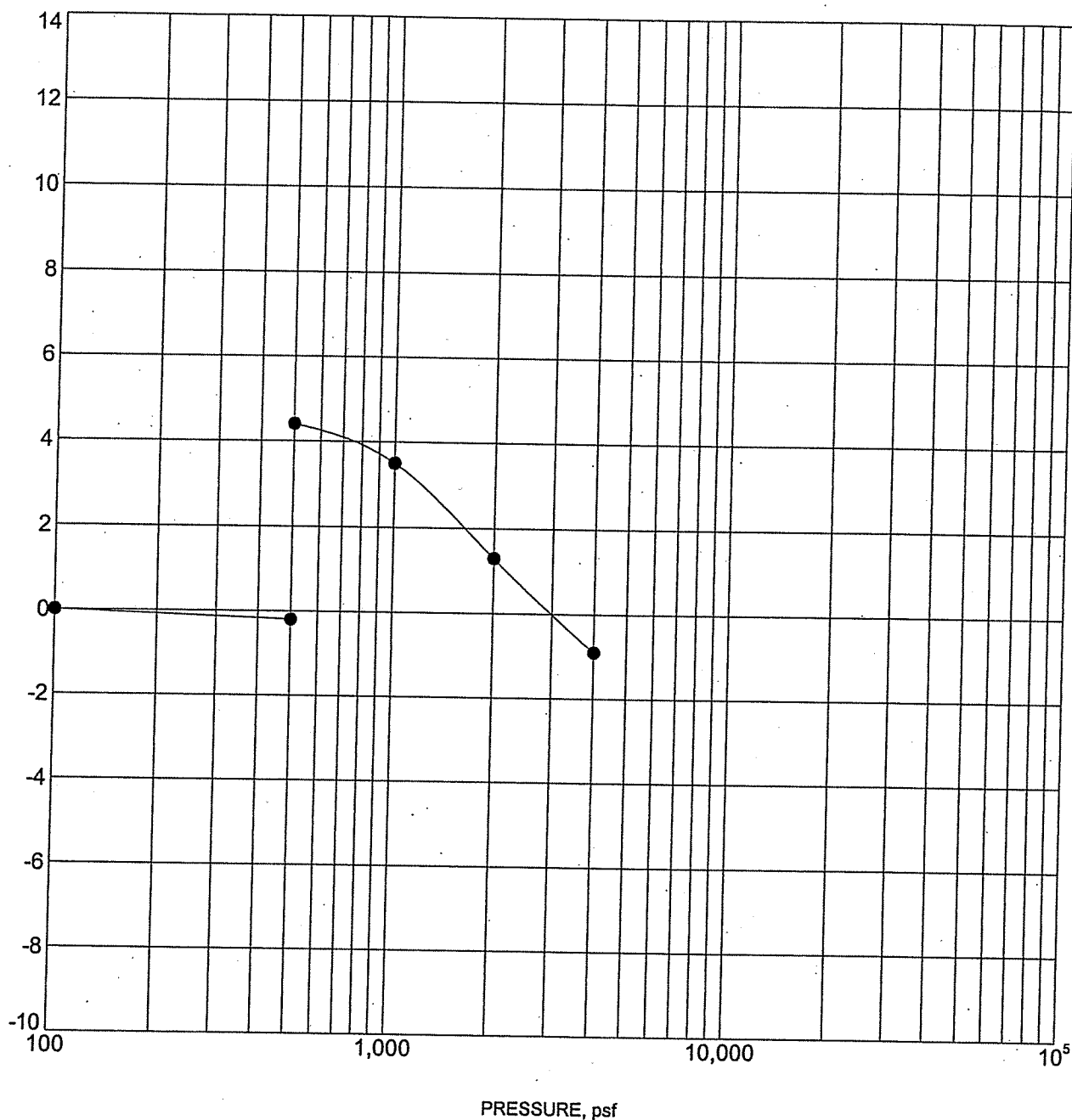
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



Specimen Identification		Classification	γ_d , pcf	WC, %
●	9 4.0ft	CLAYSTONE	98	18

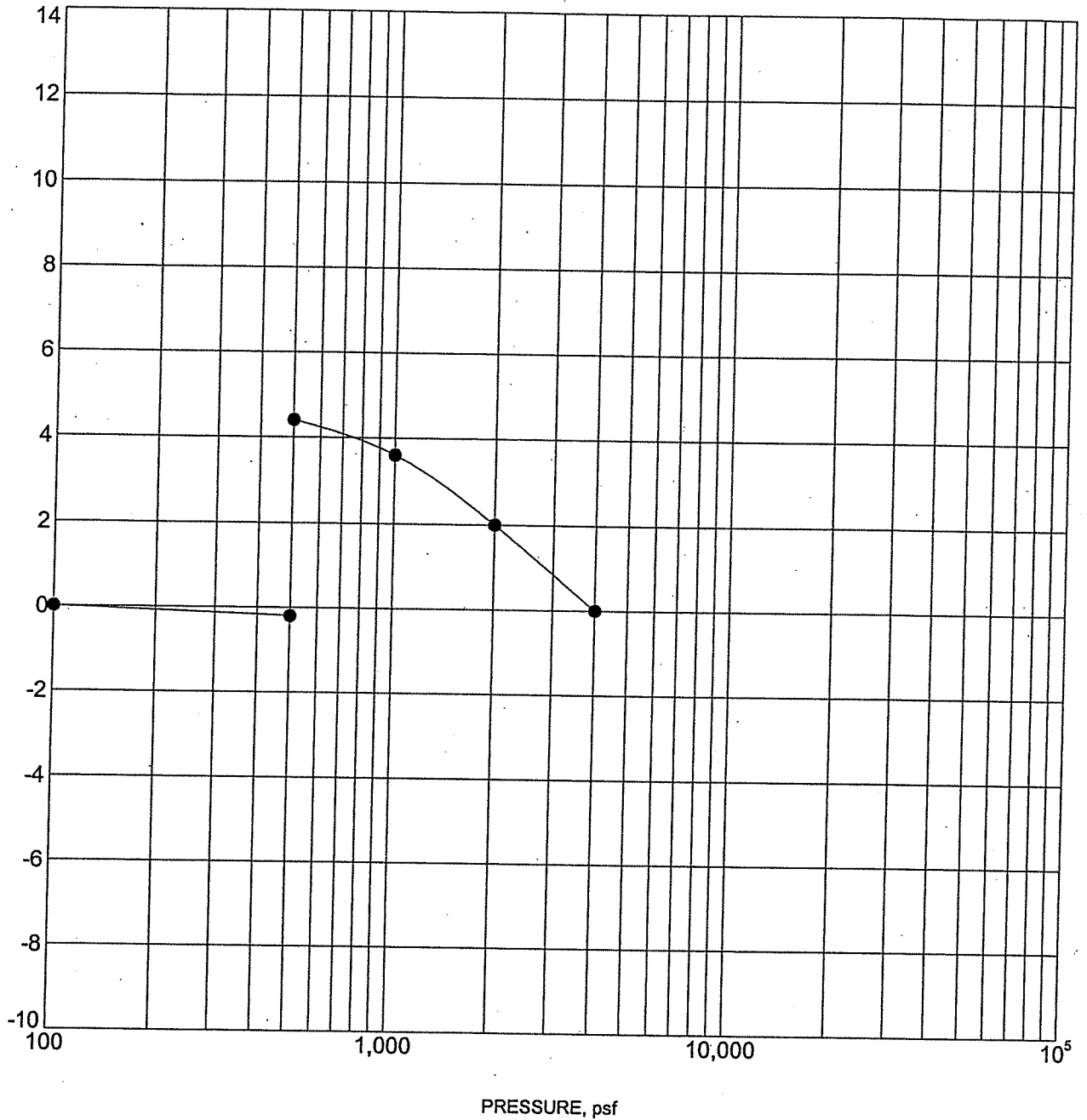
Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

AXIAL STRAIN, %



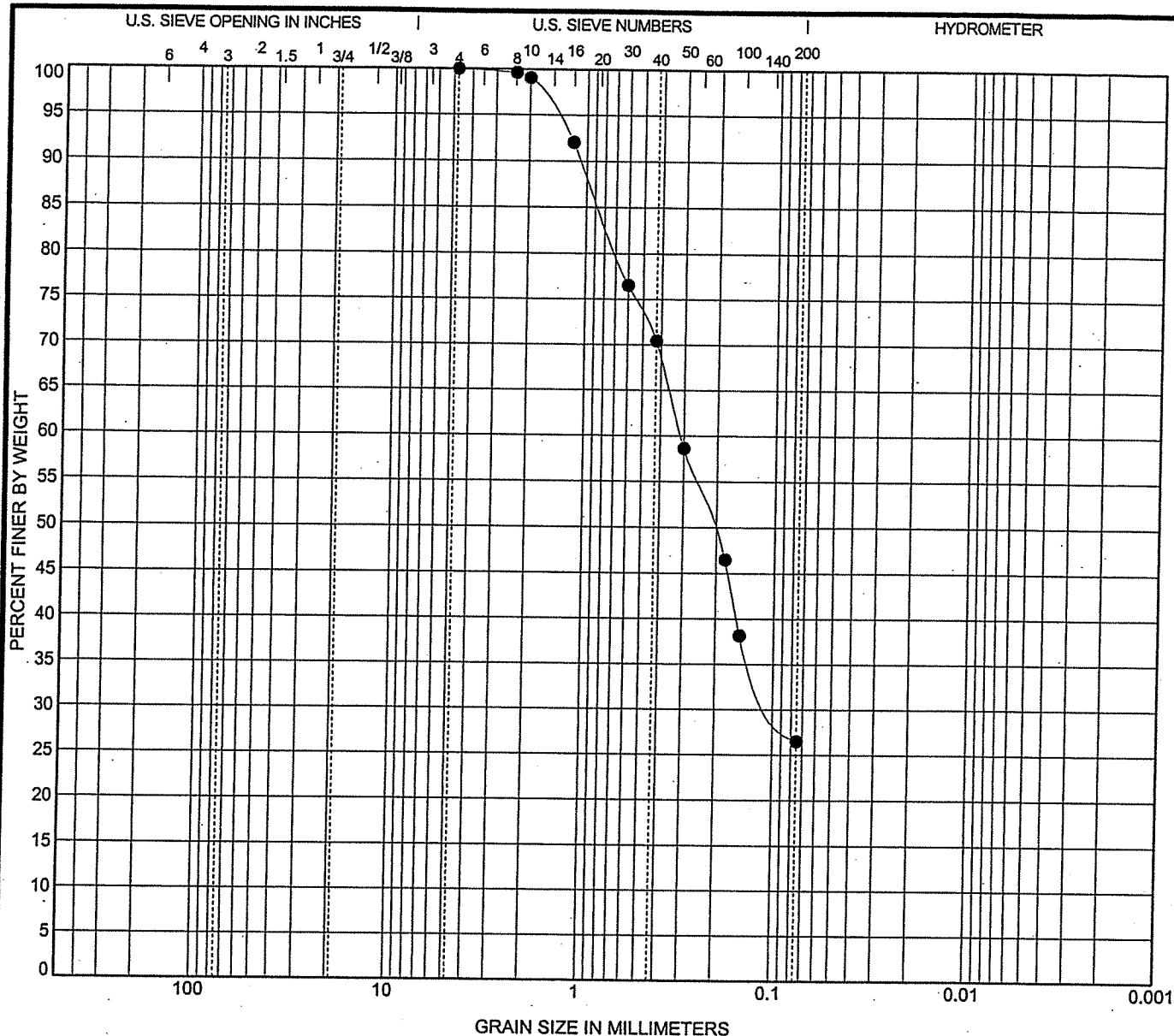
Specimen Identification			Classification	γ_d , pcf	WC, %
●	10	9.0ft	CLAYSTONE	112	18

Notes:

Terracon

CONSOLIDATION TEST

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02



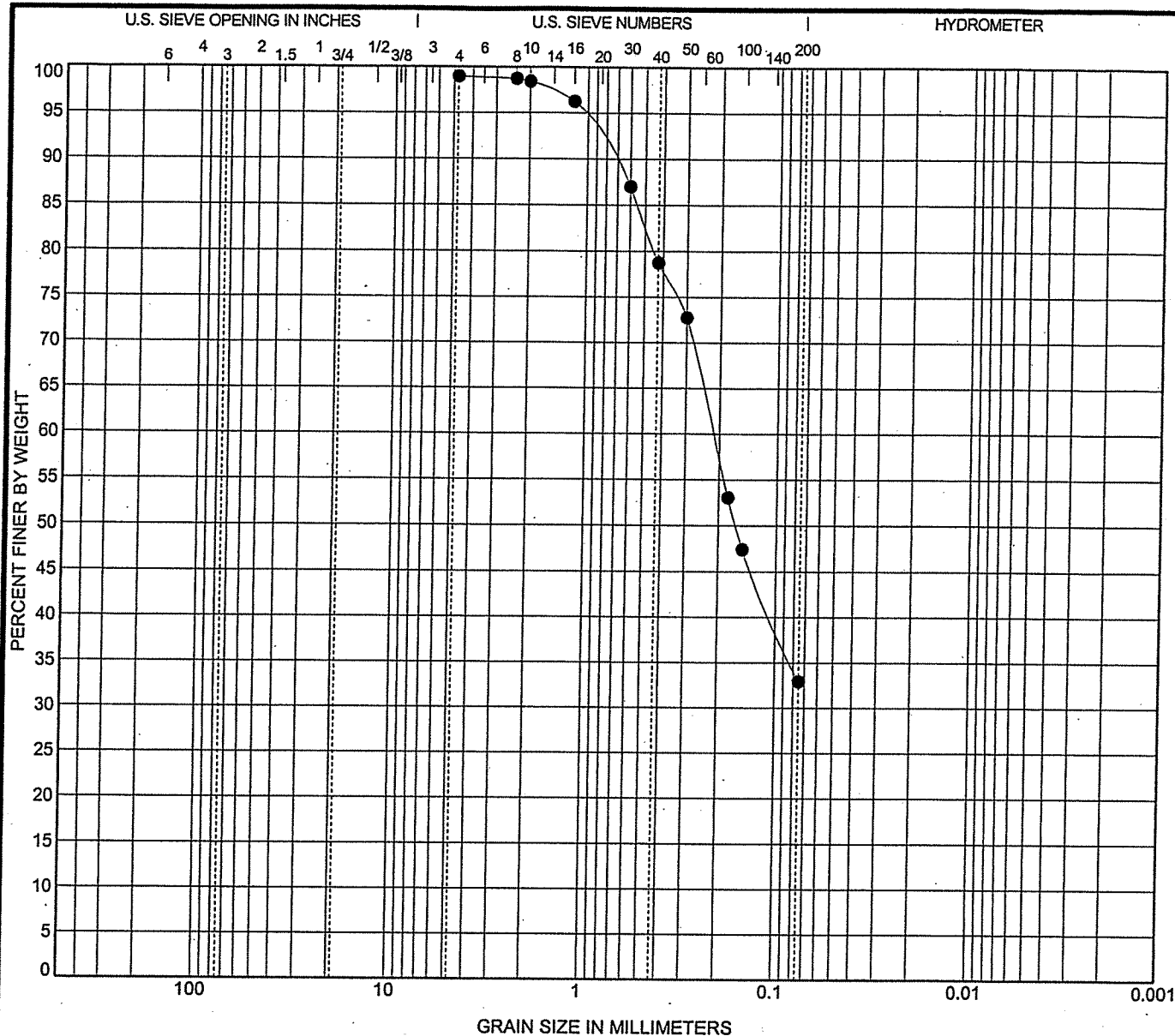
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification				LL	PL	PI	Cc	Cu
● 1	2.0ft	SILTY SAND(SM)				NP	NP	NP		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 1	2.0ft	4.75	0.313	0.092		0.0	73.5	26.5		

GRAIN SIZE DISTRIBUTION

Terracon

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02



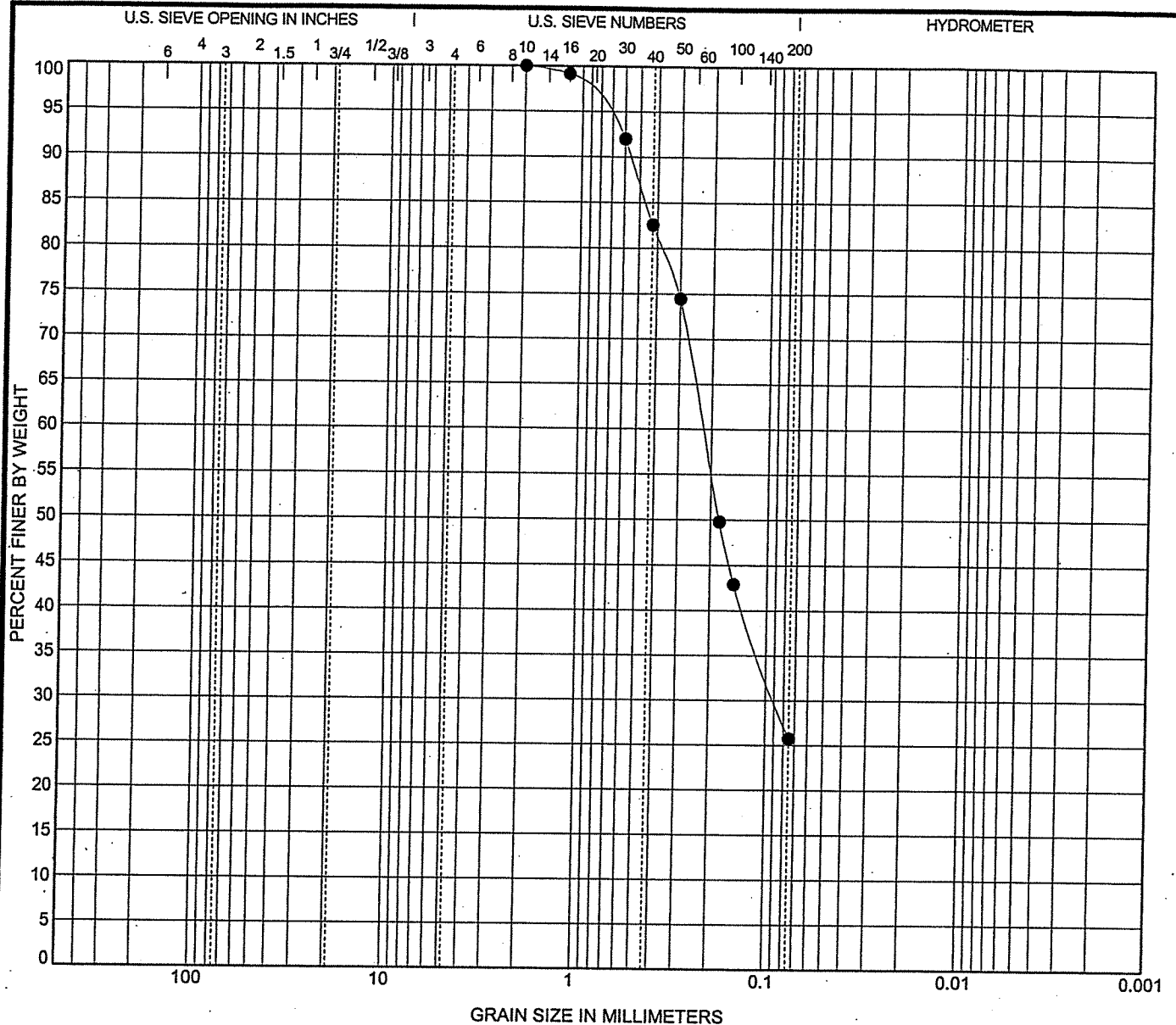
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification				LL	PL	PI	Cc	Cu
● 7	0.0ft	SILTY SAND(SM)				NP	NP	NP		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 7	0.0ft	4.75	0.216			0.0	66.0	32.9		

GRAIN SIZE DISTRIBUTION

Terracon

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02



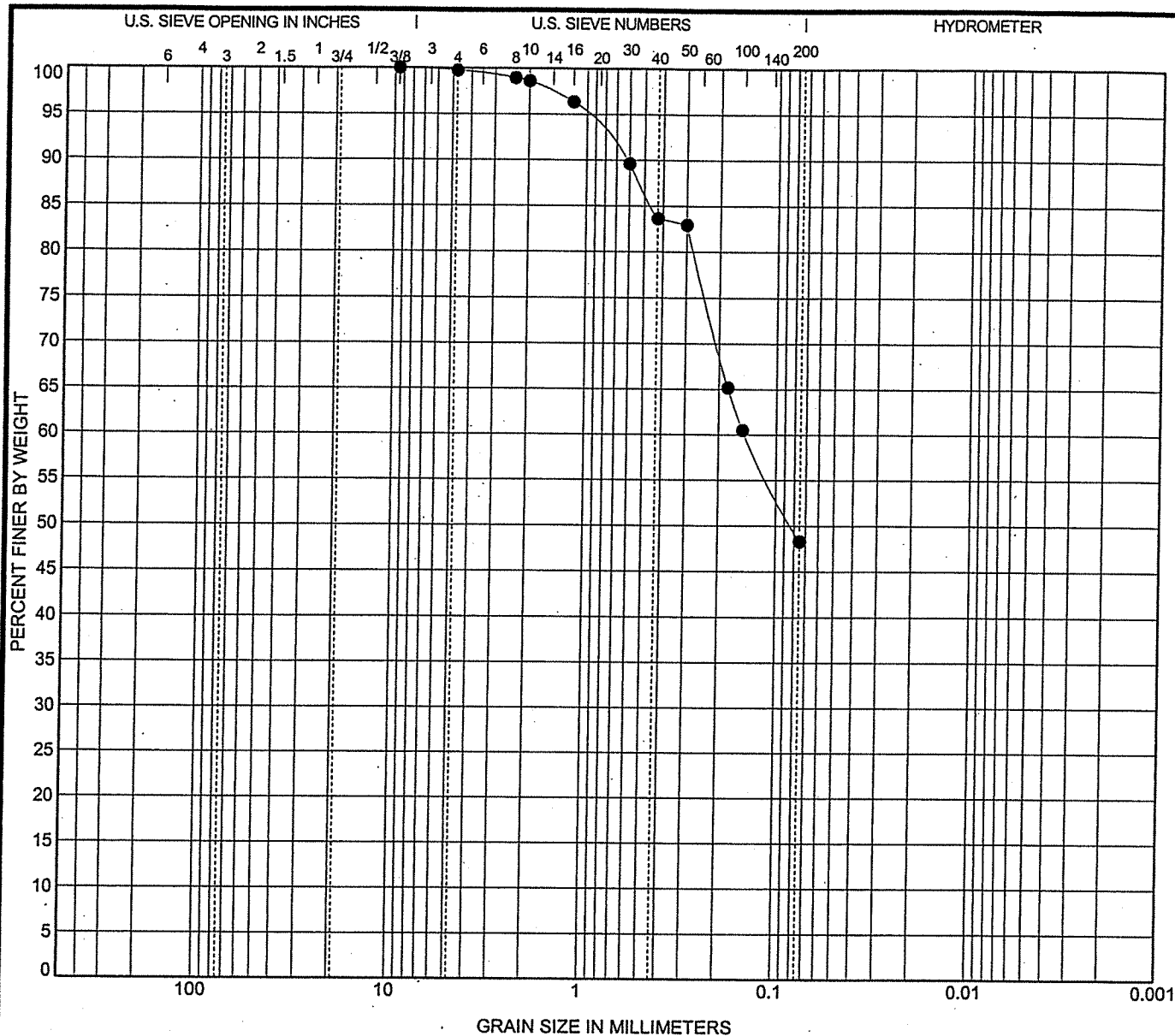
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification				LL	PL	PI	Cc	Cu
● 7	4.0ft	SILTY SAND(SM)				NP	NP	NP		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 7	4.0ft	2	0.222	0.089		0.0	74.3	25.7		

GRAIN SIZE DISTRIBUTION

Terracon

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification				LL	PL	PI	Cc	Cu
● 9	0.0ft	CLAYEY SAND(SC)				23	13	10		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● 9	0.0ft	9.5	0.146			0.3	51.5	48.3		

Terracon

GRAIN SIZE DISTRIBUTION

Project: Parcel A- Coyote Creek Subdivision
 Site: Fort Lupton, Colorado
 Job #: 25025241
 Date: 10-29-02

SOIL PROPERTIES

PARCEL A - COYOTE CREEK SUBDIVISION - FORT LUPTON, COLORADO

TERRACON Project No. 25025241

Boring No.	Depth (ft)	Soil Class.	Soil Property		Atterberg Limits		Expansion/Consolidation			Shear Strength		Corrected R-Value		Water Soluble Matter, (mg/l)		Remarks
			Initial Dry Density (pcf)	Initial Water Content (%)	LL	PI	Surcharge KSF	Expansion (%)	Max. Swell Pressure KSF	C KSF	ϕ Deg			Salts	Sulfates	
1	2	SM	105	4												4,5
1	4	SM	101	9			0.5	-1.6								3,4,5
2	2	SM	102	2												4,5
2	4		112	2												4
2	9		117	14			0.5	+10.5								3,4
3	2	CL	102	10												4,5
3	4		108	11			0.5	+2.1								3,4
3	9		--	--										18		--
4	2	CL	108	6												4,5
4	4	SC	112	6												4,5
4	9		117	15												4
5	2	SM	117	11											0	4,5

* = Partially disturbed sample

- = Compression/settlement

Note: Initial Dry Density and Initial Water Content are in-situ values unless otherwise Noted.

Legend

Shear Strength Test Method

DS - Direct Shear

DS - Direct Shear (Saturated)

UC - Unconfined Compression

UU - Unconsolidated Undrained

CU - Consolidated Undrained w/pore pressure

CU - Consolidated Undrained

CD - Consolidated Drained

REMARKS

1. Compacted density (approximately 95% of ASTM D698 maximum density at moisture content slightly below optimum).
2. Compacted density (approximately 95% of ASTM D1557 maximum density at moisture content slightly below optimum).
3. Submerged to approximate saturation.
4. Dry density determined from one ring of a multi-ring sample.
5. Visual Classification.

Terracon

SOIL PROPERTIES

PARCEL A - COYOTE CREEK SUBDIVISION - FORT LUPTON, COLORADO

TERRACON Project No. 25025241

Boring No.	Depth (ft)	Soil Class.	Soil Property		Atterberg Limits		Expansion/Consolidation				Shear Strength		Water Soluble Matter, (mg/l)		Remarks
			Initial Dry Density (pcf)	Initial Water Content (%)	LL	PI	Surcharge KSF	Expansion (%)	Max. Swell Pressure KSF	C KSF	φ Deg	Salts	Sulfates		
5	4		116	15											4
6	2	SM	112	9			0.5	-0.6							3,4,5
6	4		104	11											4
6	9		103	22											4
7	2	SM	102	4											4
7	4	SM	108	3											4,5
7	9		116	16			0.5	+3.0							4,5
8	2	CL	89	14											3,4
8	4		104	14											4,5
9	2	SC	85	15			0.5	+4.9							3,4
9	4		98	18									410		4,5
10	2	ML	99	7			0.5	+4.4							3,4
															4,5

* = Partially disturbed sample

- = Compression/settlement

Note: Initial Dry Density and Initial Water Content are in-situ values unless otherwise Noted.

Legend

Shear Strength Test Method

DS - Direct Shear

DS - Direct Shear (Saturated)

UC - Unconfined Compression

UU - Unconsolidated Undrained

CU - Consolidated Undrained w/pore pressure

CU - Consolidated Undrained

CD - Consolidated Drained

REMARKS

1. Compacted density (approximately 95% of ASTM D698 maximum density at moisture content slightly below optimum).
2. Compacted density (approximately 95% of ASTM D1557 maximum density at moisture content slightly below optimum).
3. Submerged to approximate saturation.
4. Dry density determined from one ring of a multi-ring sample.
5. Visual Classification.

Terracon

TERRACON Project No. 25025241

Note: Initial Dry Density and Initial Water Content are in-situ values unless otherwise noted.

Levcon

PHYSICAL PROPERTIES
PARCEL A – COYOTE CREEK SUBDIVISION – FORT LUPTON, COLORADO
TERRACON Project No. 25025241

Boring No.	Depth (ft)	Soil Class.	Particle Size Distribution, % Passing by Weight					Atterberg Limits		Moisture-Density Relationship			Specific Gravity		Permeability		Corrected R-Value	Remarks
			3"	#4	#10	#40	#200	LL	PI	Dry Density (pcf)	Optimum Moisture (%)	Method			Dry Density (pcf)	K Cm/Sec		
1	2	A-2-4 (0) SM	100	99	70	26	NV	NP										2
2	9	A-7-6 (33) CH				88	51	36	22									3
3	2	A-6 (11) CL				63	36	NV	NP									3
7	0-7	A-2-4 (0) SM	100	99	98	79	33	NV	NP									2
7	4	A-2-4 (0) SM			100	83	26	NV	NP									2
7	9	A-7-6 (25) CL				89	43	28	8									3
8	0-3-1/2	A-4 (1) CL				53	22	11										3
9	0-4	A-6 (2) SC	100	99	84	48	24	NV	NP									2
10	2	A-4 (0) ML				54	19	NV	NP									3
10	4	A-2-4 (0) SM			100	99	19	NV	NP									2

REMARKS:

Classification/Particle Size

1. Visual

2. Laboratory Tested

3. Minus #200 Only

Note: NP = non-plastic

Moisture-Density Relationship

4. Tested ASTM D698/AASHTO T99

5. Tested ASTM D1577/AASHTO T180

Specific Gravity

6. Minus #4

7. Plus #4

Permeability

8. Constant Head

9. Falling Head

R-Value

10. Expansion Pressure ____ psf

11. Exudation Pressure 300 psi

Terracon

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value". For 3" O.D. ring samplers (RS) the penetration value is reported as the number of blows required to advance the sampler 12 inches using a 140-pound hammer falling 30 inches, reported as "blows per foot," and is not considered equivalent to the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling
WCI:	Wet Cave in	WD:	While Drilling
DCI:	Dry Cave in	BCR:	Before Casing Removal
AB:	After Boring	ACR:	After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

FINE-GRAINED SOILS

<u>(RS)</u> <u>Blows/Ft.</u>	<u>(SS)</u> <u>Blows/Ft.</u>	<u>Consistency</u>
< 3	< 2	Very Soft
3-4	2-3	Soft
5-9	4-6	Medium Stiff
10-18	7-12	Stiff
19-42	13-26	Very Stiff
> 42	> 26	Hard

COARSE-GRAINED SOILS

<u>(RS)</u> <u>Blows/Ft.</u>	<u>(SS)</u> <u>Blows/Ft.</u>	<u>Relative Density</u>
0-6	< 3	Very Loose
7-18	4-9	Loose
19-58	10-29	Medium Dense
59-98	30-49	Dense
> 98	> 49	Very Dense

BEDROCK

<u>(RS)</u> <u>Blows/Ft.</u>	<u>(SS)</u> <u>Blows/Ft.</u>	<u>Consistency</u>
< 30	< 20	Weathered
30-49	20-29	Firm
50-89	30-49	Medium Hard
90-119	50-79	Hard
> 119	> 79	Very Hard

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Terms of Other Constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Terms of Other Constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 - 12
Modifiers	> 12

PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1-10
Medium	11-30
High	30+

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests^A

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a				Soil Classification	
				Group Symbol	Group Name ^a
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^c	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well graded gravel ^f
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel ^f
		Gravels with Fines More than 12% fines ^c	Fines classify as ML or MH	GM	Silty gravel ^{f,g,h}
			Fines classify as CL or CH	GC	Clayey gravel ^{f,g,h}
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^o	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well graded sand ⁱ
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand ⁱ
		Sands with Fines More than 12% fines ^o	Fines classify as ML or MH	SM	Silty sand ^{g,h,i}
			Fines classify as CL or CH	SC	Clayey sand ^{g,h,i}
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	$PI > 7$ and plots on or above "A" line ^j	CL	Lean clay ^{k,l,m}
			$PI < 4$ or plots below "A" line ^j	ML	Silt ^{k,l,m}
		organic	Liquid limit - oven dried < 0.75	OL	Organic clay ^{k,l,m,n}
			Liquid limit - not dried		Organic silt ^{k,l,m,o}
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay ^{k,l,m}
			PI plots below "A" line	MH	Elastic silt ^{k,l,m}
		organic	Liquid limit - oven dried < 0.75	OH	Organic clay ^{k,l,m,p}
			Liquid limit - not dried		Organic silt ^{k,l,m,o}
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

^ABased on the material passing the 3-in. (75-mm) sieve

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols: GW-GM well graded gravel with silt, GW-GC well graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^DSands with 5 to 12% fines require dual symbols: SW-SM well graded sand with silt, SW-SC well graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^FIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^JIf Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^KIf soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

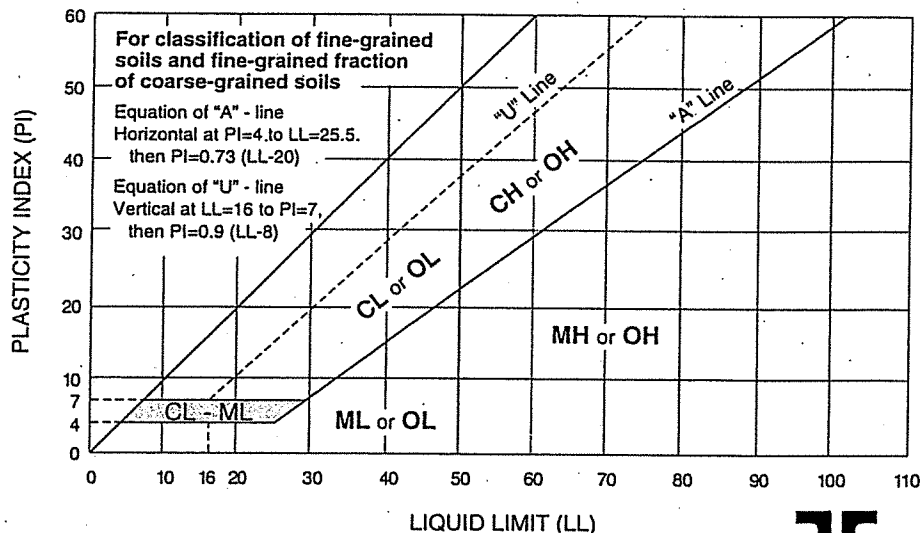
^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



ROCK CLASSIFICATION

(Based on ASTM C-294)

Sedimentary Rocks

Sedimentary rocks are stratified materials laid down by water or wind. The sediments may be composed of particles or pre-existing rocks derived by mechanical weathering, evaporation or by chemical or organic origin. The sediments are usually indurated by cementation or compaction.

Chert Very fine-grained siliceous rock composed of micro-crystalline or cryptocrystalline quartz, chalcedony or opal. Chert is various colored, porous to dense, hard and has a conchoidal to splintery fracture.

Claystone Fine-grained rock composed of or derived by erosion of silts and clays or any rock containing clay. Soft massive and may contain carbonate minerals.

Conglomerate Rock consisting of a considerable amount of rounded gravel, sand and cobbles with or without interstitial or cementing material. The cementing or interstitial material may be quartz, opal, calcite, dolomite, clay, iron oxides or other materials.

Dolomite A fine-grained carbonate rock consisting of the mineral dolomite $[\text{CaMg}(\text{CO}_3)_2]$. May contain noncarbonate impurities such as quartz, chert, clay minerals, organic matter, gypsum and sulfides. Reacts with hydrochloric acid (HCL).

Limestone A fine-grained carbonate rock consisting of the mineral calcite (CaCO_3). May contain noncarbonate impurities such as quartz, chert, clay minerals, organic matter, gypsum and sulfides. Reacts with hydrochloric acid (HCL).

Sandstone Rock consisting of particles of sand with or without interstitial and cementing materials. The cementing or interstitial material may be quartz, opal, calcite, dolomite, clay, iron oxides or other material.

Shale Fine-grained rock composed of or derived by erosion of silts and clays or any rock containing clay. Shale is hard, platy, of fissile may be gray, black, reddish or green and may contain some carbonate minerals (calcareous shale).

Siltstone Fine grained rock composed of or derived by erosion of silts or rock containing silt. Siltstones consist predominantly of silt sized particles (0.0625 to 0.002 mm in diameter) and are intermediate rocks between claystones and sandstones and may contain carbonate minerals.

ROCK CLASSIFICATION

(Based on ASTM C-294)

Metamorphic Rocks

Metamorphic rocks form from igneous, sedimentary, or pre-existing metamorphic rocks in response to changes in chemical and physical conditions occurring within the earth's crust after formation of the original rock. The changes may be textural, structural, or mineralogic and may be accompanied by changes in chemical composition. The rocks are dense and may be massive but are more frequently foliated (laminated or layered) and tend to break into platy particles. The mineral composition is very variable depending in part on the degree of metamorphism and in part on the composition of the original rock.

- | | |
|----------------------|---|
| Marble | A recrystallized medium- to coarse-grained carbonate rock composed of calcite or dolomite, or calcite and dolomite. The original impurities are present in the form of new minerals, such as micas, amphiboles, pyroxenes, and graphite. |
| Metaquartzite | A granular rock consisting essentially of recrystallized quartz. Its strength and resistance to weathering derive from the interlocking of the quartz grains. |
| Slate | A fine-grained metamorphic rock that is distinctly laminated and tends to split into thin parallel layers. The mineral composition usually cannot be determined with the unaided eye. |
| Schist | A highly layered rock tending to split into nearly parallel planes (schistose) in which the grain is coarse enough to permit identification of the principal minerals. Schists are subdivided into varieties on the basis of the most prominent mineral present in addition to quartz or to quartz and feldspars; for instance, mica schist. Greenschist is a green schistose rock whose color is due to abundance of one or more of the green minerals, chlorite or amphibole, and is commonly derived from altered volcanic rock. |
| Gneiss | One of the most common metamorphic rocks, usually formed from igneous or sedimentary rocks by a higher degree of metamorphism than the schists. It is characterized by a layered or foliated structure resulting from approximately parallel lenses and bands of platy minerals, usually micas or prisms, usually amphiboles, and of granular minerals, usually quartz and feldspars. All intermediate varieties between gneiss and schist and between gneiss and granite are often found in the same areas in which well-defined gneisses occur. |

ROCK CLASSIFICATION

(Based on ASTM C-294)

Igneous Rocks

Igneous rocks are formed by cooling from a molten rock mass (magma). Igneous rocks are divided into two classes (1) plutonic, or intrusive, that have cooled slowly within the earth; and (2) volcanic, or extrusive, that formed from quickly cooled lavas. Plutonic rocks have grain sizes greater than approximately 1 mm, and are classified as coarse- or medium-grained. Volcanic rocks have grain sizes less than approximately 1 mm, and are classified as fine-grained. Volcanic rocks frequently contain glass. Both plutonic and volcanic rocks may consist of porphyries that are characterized by the presence of large mineral grains in a fine-grained or glassy groundmass. This is the result of sharp changes in rate of cooling or other physico-chemical conditions during solidification of the melt.

Granite

Granite is a medium- to coarse-grained light-colored rock characterized by the presence of potassium feldspar with lesser amounts of plagioclase feldspars and quartz. The characteristic potassium feldspars are orthoclase or microcline, or both; the common plagioclase feldspars are albite and oligoclase. Feldspars are more abundant than quartz. Dark-colored mica (biotite) is usually present, and light-colored mica (muscovite) is frequently present. Other dark-colored ferromagnesian minerals, especially hornblende, may be present in amounts less than those of the light-colored constituents.

Quartz-Monzonite and Grano-Diorite

Rocks similar to granite but contain more plagioclase feldspar than potassium feldspar.

Basalt

Fine-grained extrusive equivalent of gabbro and diabase. When basalt contains natural glass, the glass is generally lower in silica content than that of the lighter-colored extrusive rocks.

**LABORATORY TEST
SIGNIFICANCE AND PURPOSE**

TEST	SIGNIFICANCE	PURPOSE
California Bearing Ratio	Used to evaluate the potential strength of subgrade soil, subbase, and base course material, including recycled materials for use in road and airfield pavements.	Pavement Thickness Design
Consolidation	Used to develop an estimate of both the rate and amount of both differential and total settlement of a structure.	Foundation Design
Direct Shear	Used to determine the consolidated drained shear strength of soil or rock.	Bearing Capacity, Foundation Design, and Slope Stability
Dry Density	Used to determine the in-place density of natural, inorganic, fine-grained soils.	Index Property Soil Behavior
Expansion	Used to measure the expansive potential of fine-grained soil and to provide a basis for swell potential classification.	Foundation and Slab Design
Gradation	Used for the quantitative determination of the distribution of particle sizes in soil.	Soil Classification
Liquid & Plastic Limit, Plasticity Index	Used as an integral part of engineering classification systems to characterize the fine-grained fraction of soils, and to specify the fine-grained fraction of construction materials.	Soil Classification
Permeability	Used to determine the capacity of soil or rock to conduct a liquid or gas.	Groundwater Flow Analysis
pH	Used to determine the degree of acidity or alkalinity of a soil.	Corrosion Potential
Resistivity	Used to indicate the relative ability of a soil medium to carry electrical currents.	Corrosion Potential
R-Value	Used to evaluate the potential strength of subgrade soil, subbase, and base course material, including recycled materials for use in road and airfield pavements.	Pavement Thickness Design
Soluble Sulphate	Used to determine the quantitative amount of soluble sulfates within a soil mass.	Corrosion Potential
Unconfined Compression	To obtain the approximate compressive strength of soils that possess sufficient cohesion to permit testing in the unconfined state.	Bearing Capacity Analysis for Foundations
Water Content	Used to determine the quantitative amount of water in a soil mass.	Index Property Soil Behavior

REPORT TERMINOLOGY (Based on ASTM D653)

<i>Allowable Soil Bearing Capacity</i>	The recommended maximum contact stress developed at the interface of the foundation element and the supporting material.
<i>Alluvium</i>	Soil, the constituents of which have been transported in suspension by flowing water and subsequently deposited by sedimentation.
<i>Aggregate Base Course</i>	A layer of specified material placed on a subgrade or subbase usually beneath slabs or pavements.
<i>Backfill</i>	A specified material placed and compacted in a confined area.
<i>Bedrock</i>	A natural aggregate of mineral grains connected by strong and permanent cohesive forces. Usually requires drilling, wedging, blasting or other methods of extraordinary force for excavation.
<i>Bench</i>	A horizontal surface in a sloped deposit.
<i>Caisson (Drilled Pier or Shaft)</i>	A concrete foundation element cast in a circular excavation which may have an enlarged base. Sometimes referred to as a cast-in-place pier or drilled shaft.
<i>Coefficient of Friction</i>	A constant proportionality factor relating normal stress and the corresponding shear stress at which sliding starts between the two surfaces.
<i>Colluvium</i>	Soil, the constituents of which have been deposited chiefly by gravity such as at the foot of a slope or cliff.
<i>Compaction</i>	The densification of a soil by means of mechanical manipulation
<i>Concrete Slab-on-Grade</i>	A concrete surface layer cast directly upon a base, subbase or subgrade, and typically used as a floor system.
<i>Differential Movement</i>	Unequal settlement or heave between, or within foundation elements of structure.
<i>Earth Pressure</i>	The pressure exerted by soil on any boundary such as a foundation wall.
<i>ESAL</i>	Equivalent Single Axle Load, a criteria used to convert traffic to a uniform standard, (18,000 pound axle loads).
<i>Engineered Fill</i>	Specified material placed and compacted to specified density and/or moisture conditions under observations of a representative of a geotechnical engineer.
<i>Equivalent Fluid</i>	A hypothetical fluid having a unit weight such that it will produce a pressure against a lateral support presumed to be equivalent to that produced by the actual soil. This simplified approach is valid only when deformation conditions are such that the pressure increases linearly with depth and the wall friction is neglected.
<i>Existing Fill (or Man-Made Fill)</i>	Materials deposited throughout the action of man prior to exploration of the site.
<i>Existing Grade</i>	The ground surface at the time of field exploration.

REPORT TERMINOLOGY (Based on ASTM D653)

<i>Expansive Potential</i>	The potential of a soil to expand (increase in volume) due to absorption of moisture.
<i>Finished Grade</i>	The final grade created as a part of the project.
<i>Footing</i>	A portion of the foundation of a structure that transmits loads directly to the soil.
<i>Foundation</i>	The lower part of a structure that transmits the loads to the soil or bedrock.
<i>Frost Depth</i>	The depth at which the ground becomes frozen during the winter season.
<i>Grade Beam</i>	A foundation element or wall, typically constructed of reinforced concrete, used to span between other foundation elements such as drilled piers.
<i>Groundwater</i>	Subsurface water found in the zone of saturation of soils or within fractures in bedrock.
<i>Heave</i>	Upward movement.
<i>Lithologic</i>	The characteristics which describe the composition and texture of soil and rock by observation.
<i>Native Grade</i>	The naturally occurring ground surface.
<i>Native Soil</i>	Naturally occurring on-site soil, sometimes referred to as natural soil.
<i>Optimum Moisture Content</i>	The water content at which a soil can be compacted to a maximum dry unit weight by a given compactive effort.
<i>Perched Water</i>	Groundwater, usually of limited area maintained above a normal water elevation by the presence of an intervening relatively impervious continuous stratum.
<i>Scarify</i>	To mechanically loosen soil or break down existing soil structure.
<i>Settlement</i>	Downward movement.
<i>Skin Friction (Side Shear)</i>	The frictional resistance developed between soil and an element of the structure such as a drilled pier.
<i>Soil (Earth)</i>	Sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter.
<i>Strain</i>	The change in length per unit of length in a given direction.
<i>Stress</i>	The force per unit area acting within a soil mass.
<i>Strip</i>	To remove from present location.
<i>Subbase</i>	A layer of specified material in a pavement system between the subgrade and base course.
<i>Subgrade</i>	The soil prepared and compacted to support a structure, slab or pavement system.

**COYOTE CREEK FILING NO. 4
UTILITY STUDY**

November 2021

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(Project No. 16093.00)

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A: Vicinity Map

B: Potable Water Demand Table, Model Map, WaterCAD Map & Results

C: Non-Potable Water Demand Table, Model Map, WaterCAD Map & Results

D: Sanitary Sewer Loading, Basin Map, FlowMaster Results

CERTIFICATION STATEMENT

This Utility Report for the design of the Coyote Creek Filing No. 4 development was prepared by me or under my direct supervision in accordance with the City of Fort Lupton's Standards and Specifications and acceptable professional practices of the industry. We acknowledge that the City of Fort Lupton's review of this Utility Study is only for general conformance with submittal requirements, current design criteria and standard engineering principles and practices. We are also aware of the provisions of the City Code of the City of Fort Lupton.

Andrew J. Hugill, Registered Professional Engineer
Colorado Professional Engineer No. 57007
For and on behalf of JR Engineering, LLC

I. INTRODUCTION

Project Location and Description

Coyote Creek Filing No. 4 is a proposed single-family residential Planned Unit Development (PUD) located within Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, Weld County, Colorado.

The approximately 13-acre site is bounded by the Shortline Ditch regional channel to the west, Twombly Elementary School to the north, and Coyote Creek Golf Course to the southeast. A vicinity map is included in Appendix A.

This report presents the utility system analysis for the potable water, non-potable water, and sanitary sewer systems for Coyote Creek Filing No. 4.

II. POTABLE WATER SYSTEM

Existing System and Proposed System

Potable water for Coyote Creek Filing No. 4 will be supplied by the City of Fort Lupton. There is an existing 18" high-pressure potable water mainline within 9th Street, and an existing 12" potable water mainline within 4th Street with an 8" stub north into the site.

An 8" proposed waterline will connect to the 18" potable water mainline in 9th Street by means of a PRV and will continue south along the existing road west of Twombly Elementary School. An 8" and 12" waterline will loop through the proposed development and connect with the existing 12" water mainline in 4th Street. A non-potable water interconnect is proposed on the potable waterline within Lupton Lane. A map of the existing and proposed potable water system is included in Appendix B.

Calculated Potable Water Demands and Design Flow Requirements

The basis of the design for this study was set forth in Chapter 3 of the City of Fort Lupton *Standards and Specifications for the Design and Construction of Public Improvements*, 2014. The following is a summary of the applicable criteria for Coyote Creek Filing No. 4, a single-family detached residential development:

Criteria for Establishing Potable Water Demands

Zoning	Type of Development	People per Unit	Per Capita Demand
R-1 to R-5	Single Family Detached	2.62	200 gallons

Maximum Day Factor 2.5

Peak Hour Factor 4.0

Criteria for Operating Pressures and Sizing of Mains

	Minimum Pressure	Maximum Head Loss	Maximum Velocity	Hazen-Williams "C" Coefficient
Peak Hour Demand	50 psi	2 ft/1000 ft	5 ft/s	130
Maximum Day Demand + Fire Flow	20 psi	N/A	7 ft/s	

Fire Flow Demand

Single Family Detached* 1,500 gpm

*Per IFC Table B105.1(2) for assumed Type V-B and total building area < 3,600 SF

The total potable water demand for Coyote Creek Filing No. 4 is shown **Table 1** below.

Table 1: Coyote Creek Filing No. 4 Total Potable Demand Summary Table

Dwelling Units	Unit Demand (gpd/DU)	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Peak Hour Demand (gpd)
59	524	30,916	77,290	123,664

A non-potable water interconnect is proposed on the potable waterline within Lupton Lane. The total non-potable interconnect maximum day demand is 24,256 gpd, and the peak-hour demand is 38,809 gpd. The interconnect demand corresponds to the amount of water drawn out of interconnect reservoir, which is fed by the potable water system, to supply the non-potable water network in the event that the non-potable system is down. The demands for each modeled junction within Coyote Creek Filing No. 4 are shown in Appendix B.

Hydraulic Analysis

Bentley's WaterCAD V.8 was used to model and analyze the proposed potable water distribution system. The City is still in the process of obtaining flow pressure tests for both 4th Street and 9th Street. Prior to obtaining the flow test on 4th Street, a system pressure of 85psi was assumed and an HGL of 5113' was estimated for the boundary condition at 4th Street. An HGL of 5103' was estimated for the connection to the 18" high-pressure waterline in 9th Street, just before the proposed PRV. The following assumptions were used in developing the WaterCAD model:

- There is an unlimited water supply, provided to the site from the two connection points to the existing water lines in 4th Street and 9th Street.
- Water demand for the each proposed residential lot is taken at the node nearest the center of the lot.
- Existing and proposed water lines are assumed to be 5' in depth.

WaterCAD scenarios were set up to analyze maximum hour demand plus peak irrigation flow, and maximum daily demand plus peak irrigation flow and fire flow. A separate scenario was run for each of the three proposed hydrant locations.

The design of the water distribution system is based on the maximum daily demand plus peak irrigation flow and fire flow scenarios, which were the higher demand scenarios compared to the maximum hour demand plus peak irrigation flow scenario. In order to keep maximum daily demand plus fire flow velocities below 7 ft/s, the 8" stub off of the waterline in 4th Street cannot be utilized and a 12" connection is being proposed instead. Results of the hydraulic analysis and a map of the WaterCAD pipes and nodes are included in Appendix B.

Conclusions

This study presents the results of the analysis performed for the potable water system associated with the proposed Coyote Creek Filing No. 4 development. The design and layout of the potable water system as shown and discussed in this study and in the Appendices conform to the Fort Lupton design standards and requirements for fire protection, minimum pressures and maximum velocities.

III. NON-POTABLE WATER SYSTEM

Existing and Proposed System

Non-potable water for the Coyote Creek Filing No. 4 development will be supplied by the City of Fort Lupton via an existing 30" non-potable waterline that bisects the Filing No. 4 site.

A 4" non-potable waterline is proposed to loop through the Filing No. 4 development and connect to the existing 30" non-potable waterline through a metered tap on the southeast corner of the site. A potable water interconnect is also proposed within Lupton Lane. A map of the existing and proposed non-potable water system is included in Appendix C.

Calculated Non-Potable Water Demands and Design Flow Requirements

The basis of design for this study was set forth in Chapter 3 of the City of Fort Lupton *Standards and Specifications for the Design and Construction of Public Improvements*, 2014. The following is a summary of the applicable water system criteria and assumed parameters used to establish the non-potable water demand and design:

Land Use	Assumed Percentage of Total Area to be Irrigated	Average Day Demand*
Single-Family Residential	45%	1.55 gpm/acre
Park	75%	

*Established using the SACWSD Design Standards and Criteria

Maximum Day Factor 2.5

Peak Hour Factor 4.0

Criteria for Operating Pressures and Sizing of Mains

	Minimum Pressure	Maximum Head Loss	Maximum Velocity	Hazen-Williams "C" Coefficient
Peak Hour Demand and Maximum Day Demand	50 psi	2 ft/1000 ft	5 ft/s	130

Coyote Creek Filing No. 4 is comprised of 59 single-family detached residential lots, with 41 lots sized 50'x105' and 18 lots sized 60'x105' or slightly larger, and a total residential land use area of approximately 8 acres. There is also a proposed 1-acre park in the center of the development.

The total non-potable water demand for Coyote Creek Filing No. 4 is shown **Table 2** below.

Table 2: Coyote Creek Filing No. 4 Total Non-Potable Demand Summary Table

Total Area (Acres)		Total Irrigated Area (Acres)	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Peak Hour Demand (gpd)
Single-Family (45% Irrigated)	Park (75% Irrigated)				
8	1	4.35	9,702	24,256	38,809

Hydraulic Analysis

Bentley's WaterCAD V.8 was used to model and analyze the proposed non-potable water distribution system for two separate scenarios. In one scenario, the non-potable water was supplied solely by the potable water interconnect in Lupton Lane. The potable water interconnect was assigned an HGL of 5112', determined from the potable water model. In the second scenario, the non-potable water was only supplied by the connection to the existing 30" non-potable waterline, and an HGL of 5120' was estimated under the assumption of an 85 psi system pressure. The minimum operating pressure for the system to still meet City criteria was determined to be 50 psi, which corresponds to an HGL of 5040'. The non-potable network was not modeled in a scenario where it was supplied by both non-potable water connections, because at any given time, the non-potable water system will only ever be supplied by one of the two.

The following assumptions were used in developing the WaterCAD model:

- There is an unlimited water supply in each scenario, provided to the site from either the proposed potable water connection in Lupton Lane, or the existing 30" non-potable waterline.
- Existing and proposed non-potable water lines are assumed to be 5' in depth.

Each of the two scenarios was analyzed using maximum hour demand and maximum day demand. Results of the hydraulic analysis and a map of the WaterCAD pipes and nodes for each scenario are included in Appendix C.

Conclusions

This study presents the results of the analysis performed for the non-potable water system associated with the proposed Coyote Creek Filing No. 4 Development. The design and layout of the non-potable water system as shown and discussed in this study and in the Appendices conform to the Fort Lupton design standards and requirements for minimum pressures and maximum velocities.

IV. SANITARY SEWER SYSTEM

Existing and Proposed System

The Coyote Creek Filing No. 4 sanitary sewer will be serviced by the existing Fort Lupton 8" sanitary sewer that runs north along the site's western property boundary to an existing lift station located in the northwest corner of the site.

The proposed 8" Coyote Creek Filing No. 4 sanitary sewer network will tie into the existing 8" sanitary pipe with new manholes two locations—one in the southwest corner of the development, north of 4th Street, and one in the northwest corner of the development, just south of the existing lift station. A map of the existing and proposed sanitary sewer system is included in Appendix D.

Calculated Wastewater Flows and Design Flow Requirements

The basis of design for this study was set forth in Chapter 4 of the City of Fort Lupton *Standards and Specifications for the Design and Construction of Public Improvements*, 2014. The following is a summary of the criteria used to establish the wastewater flows and preliminary sanitary sewer design:

Criteria for Establishing Wastewater Flows

Single-Family Residential Population Density:	2.90 People/Unit
Residential Average Use:	70 Gallons/Capita/Day
Peak Factor:	3.0
Infiltration and Inflow Rate (for all uses):	1000 Gallons/Acre/Day

Design Requirements

Diameter	Minimum Slope	Maximum Slope	Minimum Flow Velocity (at peak design flow, and n=0.015)
8 in (minimum)	0.50%	19%	2 ft/s

The proposed Coyote Creek Filing No. 4 development has a total area of approximately 13.25 acres, comprised of 59 single-family detached residential lots. This corresponds to an estimated total population of 171 and an estimated population density of 13 people per acre. The total wastewater design flows calculated for Coyote Creek Filing No. 4 are shown in **Table 3** below.

Table 3: Coyote Creek Filing No. 4 Total Wastewater Design Flows Summary Table

Acres	DU's	Flow Rate (gpd)			
		Average Day	Peak Day	Infiltration and Inflow	Peak Day Flow + Infiltration and Inflow
13.25	59	11,977	35,931	13,250	49,181

Wastewater from Coyote Creek Filing No. 4 will be ordinary domestic sewage from single-family residences, and will not contain industrial waste.

Hydraulic Analysis

Given the proposed grade and proposed sanitary sewer layout, the site was divided into three basins and analyzed at three design points, illustrated in the sanitary sewer system map in Appendix D. The sanitary wastewater loading calculations for each basin can also be found in Appendix D.

Bentley's FlowMaster hydraulic analysis software was used to analyze the proposed sanitary sewer system, and the results are included in Appendix D. Note that the flow velocities range from 1.44 ft/s to 1.80 ft/s, which fall below the minimum flow velocity criteria of 2 ft/s. The low velocities are typical considering the low number of lots contributing to the sewer system. The proposed 8" sanitary sewer pipes are the minimum size allowed, and steeper slopes are not feasible given depth constraints set by the existing sanitary sewer line downstream.

Conclusions

This study presents the results of the analysis performed for the sanitary sewer system associated with the proposed Coyote Creek Filing No. 4 Development. The design and layout of the sanitary sewer system as shown and discussed in this study and Appendices conform to the Fort Lupton design standards.

V. CONCLUSION

This study presents the results of the analyses performed for the potable water, non-potable water, and sanitary sewer systems associated with the Coyote Creek Filing No. 4 development. The design of the systems as shown and discussed is in conformance with the Fort Lupton design standards and requirements.

VI. REFERENCES

1. 2018 International Fire Code; 2018
2. City of Fort Lupton, Standards and Specifications for the Design and Construction of Public Improvements; 2014
3. City of Fort Lupton and Clear Water Solutions, Inc., 2018 Municipal Water Efficiency Plan; 2018

Appendix A Vicinity Map



500 250 0 500
 ORIGINAL SCALE: 1" = 500'

APPENDIX A
 VICINITY MAP
 JOB NO. 16093.00
 2021-11-10
 SHEET 1 OF 1



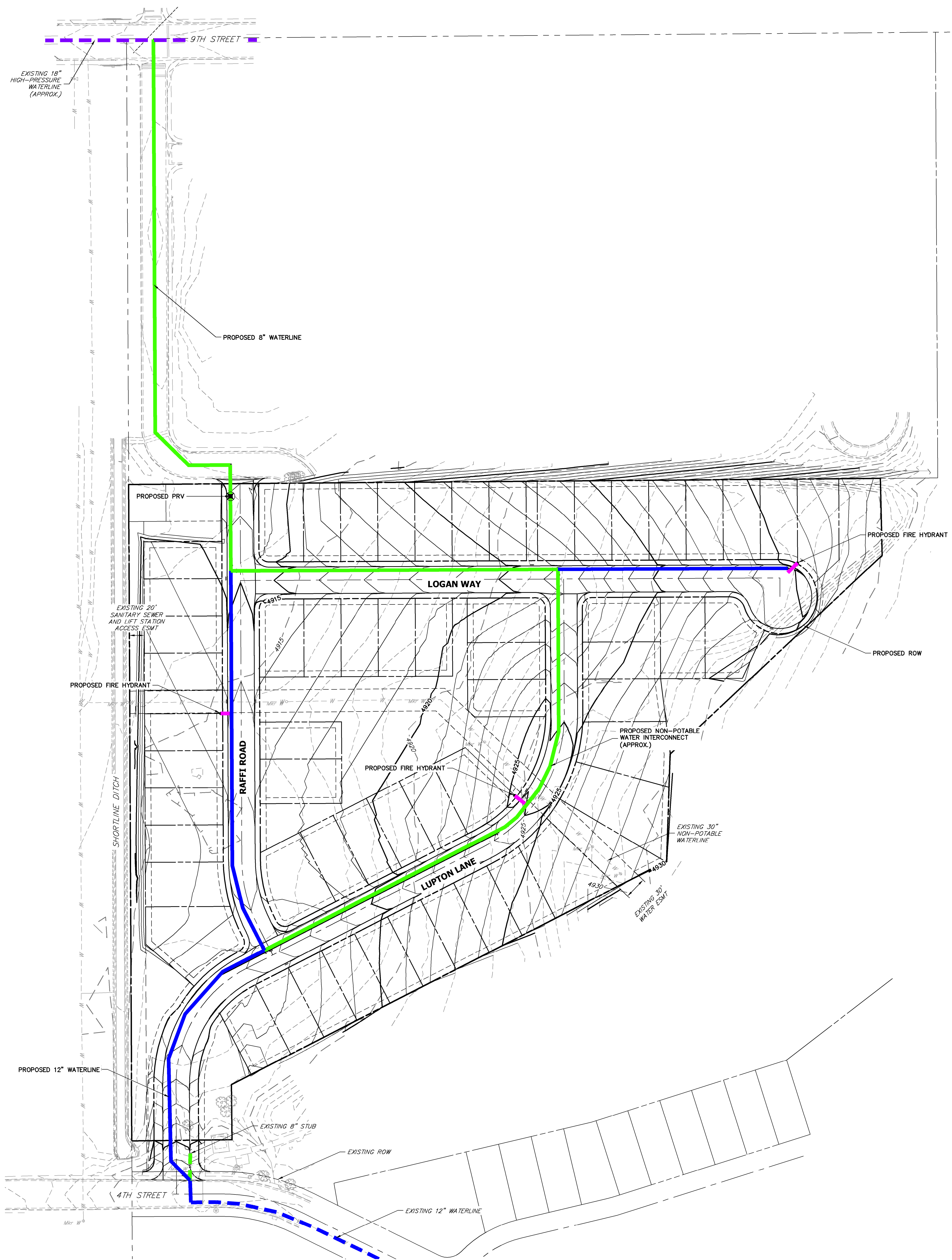
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Appendix B
Potable Water System Demands, Model Map,
and WaterCAD Map & Results

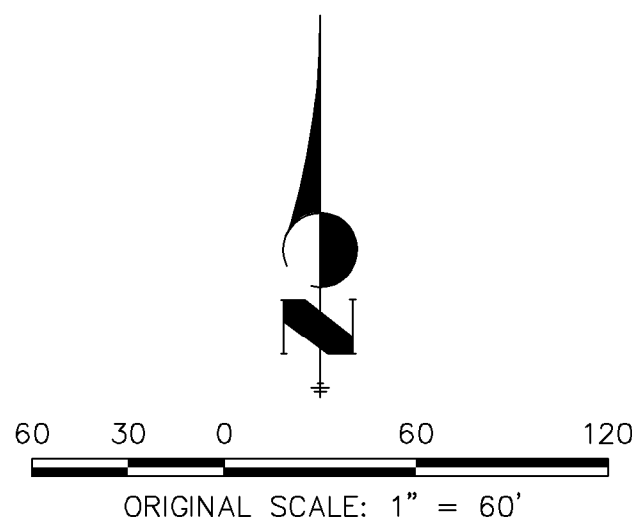
COYOTE CREEK FILING NO. 4

POTABLE WATER SYSTEM MAP



COLOR CODING LEGEND

- 6" Ø PROPOSED WATER LINE (FIRE HYDRANT)
- 8" Ø PROPOSED WATER MAIN
- 12" Ø PROPOSED WATER MAIN
- 8" Ø EXISTING WATER MAIN
- 12" Ø EXISTING WATER MAIN
- 18" Ø EXISTING WATER MAIN



POTABLE WATER SYSTEM MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1



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Project Name Coyote Creek Filing No. 4
 Project Number 16093.00
 Date 11/8/2021
 By SWW

Fort Lupton Criteria	
	Potable
Avg Day Demand (gpud)	524
Max Day Factor	2.5
Max Hour Factor	4
Fire Flow (gpm)	1500

Potable Water Demand							
Junction	Surface Elevation	TOP Elevation	No. DU Served	Demand (gpm)			
				Average Day	Max Day	Fire Flow	Peak Hour
J-2	4917.09	4912.09	8	2.91	7.28		11.64
J-3	4920.18	4915.18	4	1.46	3.64		5.82
J-5	4924.81	4919.81	6	2.18	5.46		8.73
J-6	4929.84	4924.84	5	1.82	4.55	1500	7.28
J-7	4924.15	4919.15	5	1.82	4.55		7.28
J-8	4925.01	4920.01	4	1.46	3.64	1500	5.82
J-9	4921.81	4916.81	6	2.18	5.46		8.73
J-10	4918.37	4913.37	5	1.82	4.55		7.28
J-12	4915.35	4910.35	3	1.09	2.73		4.37
J-13	4917.40	4912.40	4	1.46	3.64		5.82
J-14	4916.18	4911.18	4	1.46	3.64		5.82
J-15	4914.92	4909.92	5	1.82	4.55	1500	7.28
Total			59	21.47	53.67		85.88

TABLE B105.1(2) REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) ^b	FLOW DURATION (hours)
Type IA and IB ^a	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

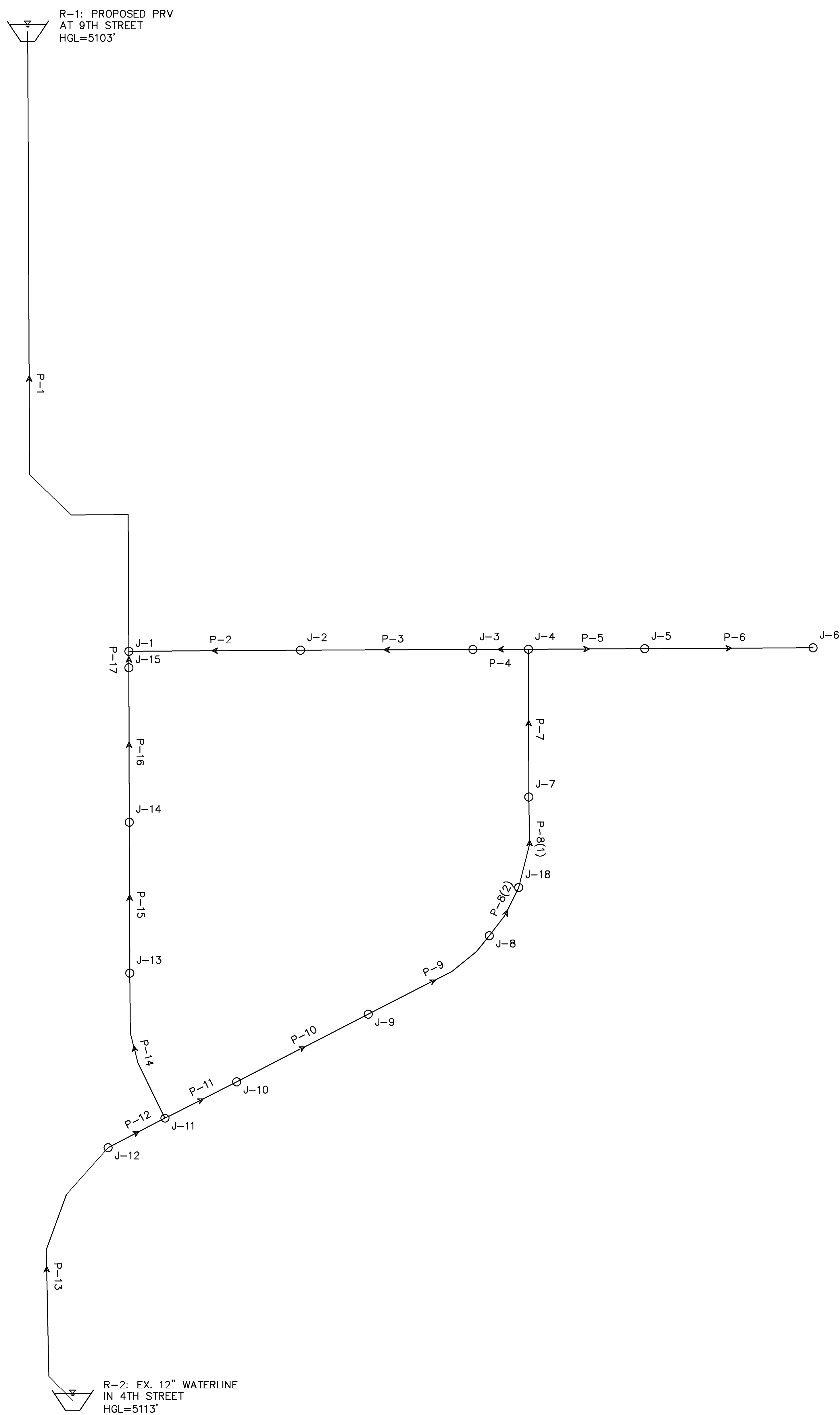
For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

COYOTE CREEK FILING NO. 4

POTABLE WATERCAD MAP



POTABLE WATERCAD MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1



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Potable - Maximum Hour + Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-1	756	8	PVC	130	773	4.93	0.011
P-13	307	12	PVC	130	886	2.51	0.002
P-12	70	12	PVC	130	881	2.5	0.002
P-14	166	12	PVC	130	687	1.95	0.001
P-15	164	12	PVC	130	681	1.93	0.001
P-16	168	12	PVC	130	675	1.92	0.001
P-17	18	12	PVC	150	668	1.9	0.001
P-11	87	8	PVC	130	194	1.24	0.001
P-10	161	8	PVC	130	187	1.19	0.001
P-9	159	8	PVC	130	178	1.14	0.001
P-8(2)	62	8	PVC	130	172	1.1	0.001
P-8(1)	100	8	PVC	130	145	0.93	0.001
P-7	161	8	PVC	130	138	0.88	0
P-4	60	8	PVC	130	122	0.78	0
P-3	187	8	PVC	130	116	0.74	0
P-2	187	8	PVC	130	105	0.67	0
P-5	126	12	PVC	130	16	0.05	0
P-6	183	12	PVC	130	7	0.02	0

Potable - Maximum Hour + Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-12	4,910.35	4.37	5,112.69	88
J-1	4,909.79	0	5,111.91	87
J-11	4,911.49	0	5,112.55	87
J-13	4,912.40	5.82	5,112.34	87
J-14	4,911.18	5.82	5,112.14	87
J-15	4,909.92	7.28	5,111.93	87
J-2	4,912.09	11.64	5,111.97	86
J-10	4,913.37	7.28	5,112.47	86
J-3	4,915.18	5.82	5,112.03	85
J-4	4,916.20	0	5,112.05	85
J-9	4,916.81	8.73	5,112.34	85
J-5	4,919.81	8.73	5,112.05	83
J-7	4,919.15	7.28	5,112.13	83
J-8	4,920.01	5.82	5,112.22	83
J-18	4,919.68	26.95	5,112.18	83
J-6	4,924.84	7.28	5,112.05	81

Potable - Maximum Day + Fire Flow (J-14) and Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-13	307	12	PVC	130	2,076.77	5.89	0.01
P-12	70	12	PVC	130	2,074.04	5.88	0.01
P-14	166	12	PVC	130	1,740.23	4.94	0.007
P-15	164	12	PVC	130	1,736.59	4.93	0.007
P-1	756	8	PVC	130	506.26	3.23	0.005
P-11	87	8	PVC	130	333.81	2.13	0.002
P-10	161	8	PVC	130	329.26	2.1	0.002
P-9	159	8	PVC	130	323.8	2.07	0.002
P-8(2)	62	8	PVC	130	320.16	2.04	0.002
P-8(1)	100	8	PVC	130	303.32	1.94	0.002
P-7	161	8	PVC	130	298.77	1.91	0.002
P-4	60	8	PVC	130	288.77	1.84	0.002
P-3	187	8	PVC	130	285.13	1.82	0.002
P-2	187	8	PVC	130	277.85	1.77	0.002
P-16	168	12	PVC	130	232.95	0.66	0
P-17	18	12	PVC	150	228.4	0.65	0
P-5	126	12	PVC	130	10.01	0.03	0
P-6	183	12	PVC	130	4.55	0.01	0

Potable - Maximum Day + Fire Flow (J-14) and Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-12	4,910.35	2.73	5,110.30	87
J-11	4,911.49	0	5,109.62	86
J-1	4,909.79	0	5,107.26	85
J-2	4,912.09	7.28	5,107.58	85
J-10	4,913.37	4.55	5,109.41	85
J-13	4,912.40	3.64	5,108.45	85
J-14	4,911.18	1,503.64	5,107.29	85
J-15	4,909.92	4.55	5,107.27	85
J-3	4,915.18	3.64	5,107.92	83
J-4	4,916.20	0	5,108.03	83
J-9	4,916.81	5.46	5,109.04	83
J-7	4,919.15	4.55	5,108.34	82
J-8	4,920.01	3.64	5,108.68	82
J-18	4,919.68	16.84	5,108.54	82
J-5	4,919.81	5.46	5,108.03	81
J-6	4,924.84	4.55	5,108.03	79

Potable - Maximum Day + Fire Flow (J-6) and Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-13	307	12	PVC	130	2,085.76	5.92	0.01
P-12	70	12	PVC	130	2,083.03	5.91	0.01
P-2	187	8	PVC	130	807.36	5.15	0.012
P-3	187	8	PVC	130	800.09	5.11	0.012
P-4	60	8	PVC	130	796.45	5.08	0.012
P-11	87	8	PVC	130	748.59	4.78	0.011
P-10	161	8	PVC	130	744.04	4.75	0.011
P-9	159	8	PVC	130	738.59	4.71	0.01
P-8(2)	62	8	PVC	130	734.95	4.69	0.01
P-8(1)	100	8	PVC	130	718.11	4.58	0.01
P-7	161	8	PVC	130	713.56	4.55	0.01
P-5	126	12	PVC	130	1,510.01	4.28	0.005
P-6	183	12	PVC	130	1,504.55	4.27	0.005
P-14	166	12	PVC	130	1,334.44	3.79	0.004
P-15	164	12	PVC	130	1,330.80	3.78	0.004
P-16	168	12	PVC	130	1,327.16	3.76	0.004
P-17	18	12	PVC	150	1,322.61	3.75	0.003
P-1	756	8	PVC	130	515.25	3.29	0.005

Potable - Maximum Day + Fire Flow (J-6) and Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-11	4,911.49	0	5,109.59	86
J-12	4,910.35	2.73	5,110.28	86
J-1	4,909.79	0	5,107.39	85
J-13	4,912.40	3.64	5,108.88	85
J-14	4,911.18	3.64	5,108.17	85
J-15	4,909.92	4.55	5,107.45	85
J-2	4,912.09	7.28	5,105.10	84
J-10	4,913.37	4.55	5,108.66	84
J-9	4,916.81	5.46	5,106.96	82
J-3	4,915.18	3.64	5,102.83	81
J-4	4,916.20	0	5,102.11	80
J-7	4,919.15	4.55	5,103.68	80
J-8	4,920.01	3.64	5,105.31	80
J-18	4,919.68	16.84	5,104.67	80
J-5	4,919.81	5.46	5,101.42	79
J-6	4,924.84	1,504.55	5,100.43	76

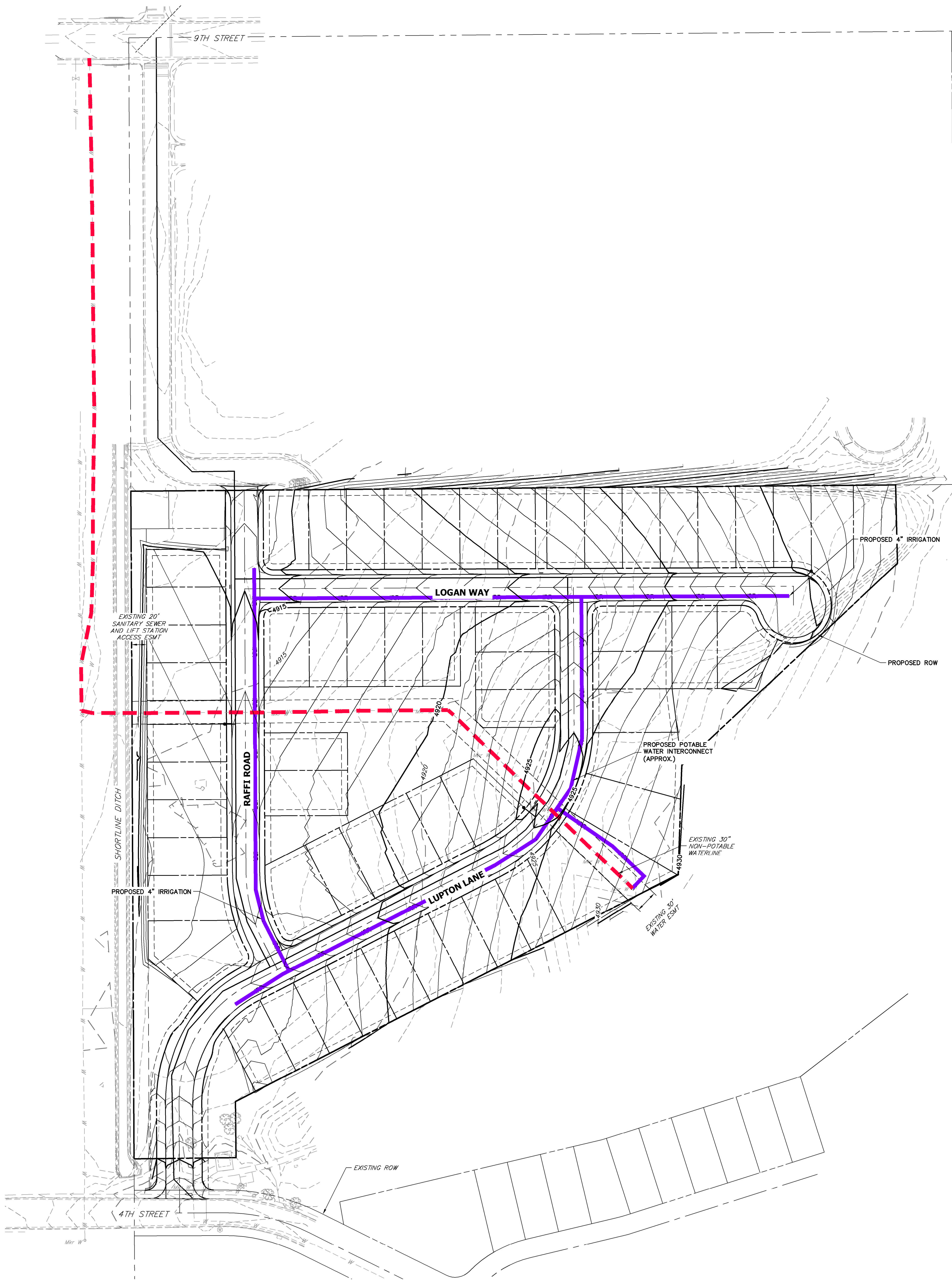
Potable - Maximum Day + Fire Flow (J-8) and Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-11	87	8	PVC	130	957.86	6.11	0.017
P-10	161	8	PVC	130	953.31	6.08	0.017
P-9	159	8	PVC	130	947.86	6.05	0.017
P-13	307	12	PVC	130	2,114.37	6	0.01
P-12	70	12	PVC	130	2,111.64	5.99	0.01
P-2	187	8	PVC	130	598.1	3.82	0.007
P-3	187	8	PVC	130	590.82	3.77	0.007
P-4	60	8	PVC	130	587.18	3.75	0.007
P-7	161	8	PVC	130	577.17	3.68	0.007
P-8(1)	100	8	PVC	130	572.62	3.65	0.007
P-8(2)	62	8	PVC	130	555.78	3.55	0.006
P-1	756	8	PVC	130	543.86	3.47	0.006
P-14	166	12	PVC	130	1,153.78	3.27	0.003
P-15	164	12	PVC	130	1,150.14	3.26	0.003
P-16	168	12	PVC	130	1,146.50	3.25	0.003
P-17	18	12	PVC	150	1,141.95	3.24	0.002
P-5	126	12	PVC	130	10.01	0.03	0
P-6	183	12	PVC	130	4.55	0.01	0

Potable - Maximum Day + Fire Flow (J-8) and Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.79	0	5,107.82	86
J-11	4,911.49	0	5,109.50	86
J-12	4,910.35	2.73	5,110.20	86
J-15	4,909.92	4.55	5,107.86	86
J-13	4,912.40	3.64	5,108.95	85
J-14	4,911.18	3.64	5,108.41	85
J-2	4,912.09	7.28	5,106.50	84
J-10	4,913.37	4.55	5,108.02	84
J-3	4,915.18	3.64	5,105.21	82
J-4	4,916.20	0	5,104.80	82
J-9	4,916.81	5.46	5,105.33	82
J-5	4,919.81	5.46	5,104.80	80
J-7	4,919.15	4.55	5,103.74	80
J-8	4,920.01	1,503.64	5,102.71	79
J-18	4,919.68	16.84	5,103.09	79
J-6	4,924.84	4.55	5,104.80	78

Appendix C
Non-Potable Water System Demands, Model Map,
and WaterCAD Map & Results

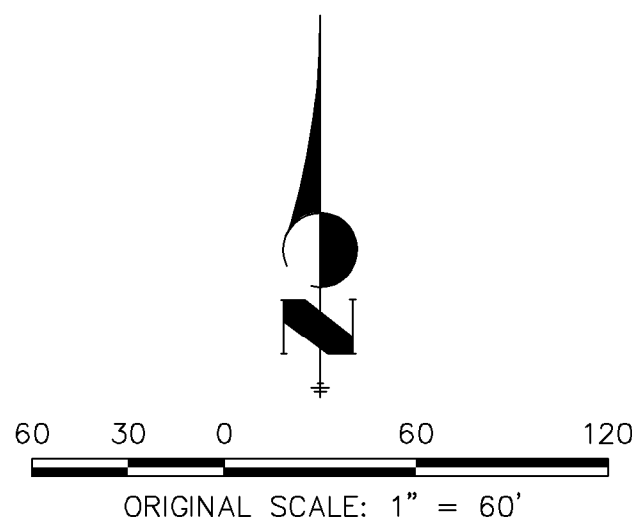
COYOTE CREEK FILING NO. 4

NON-POTABLE WATER SYSTEM MAP



COLOR CODING LEGEND

- 4" Ø PROPOSED IRRIGATION MAIN
- 30" Ø PROPOSED IRRIGATION MAIN



NON-POTABLE WATER
SYSTEM MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1



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Project Name Coyote Creek Filing No. 4
 Project Number 16093.00
 Date 11/8/2021
 By SWW

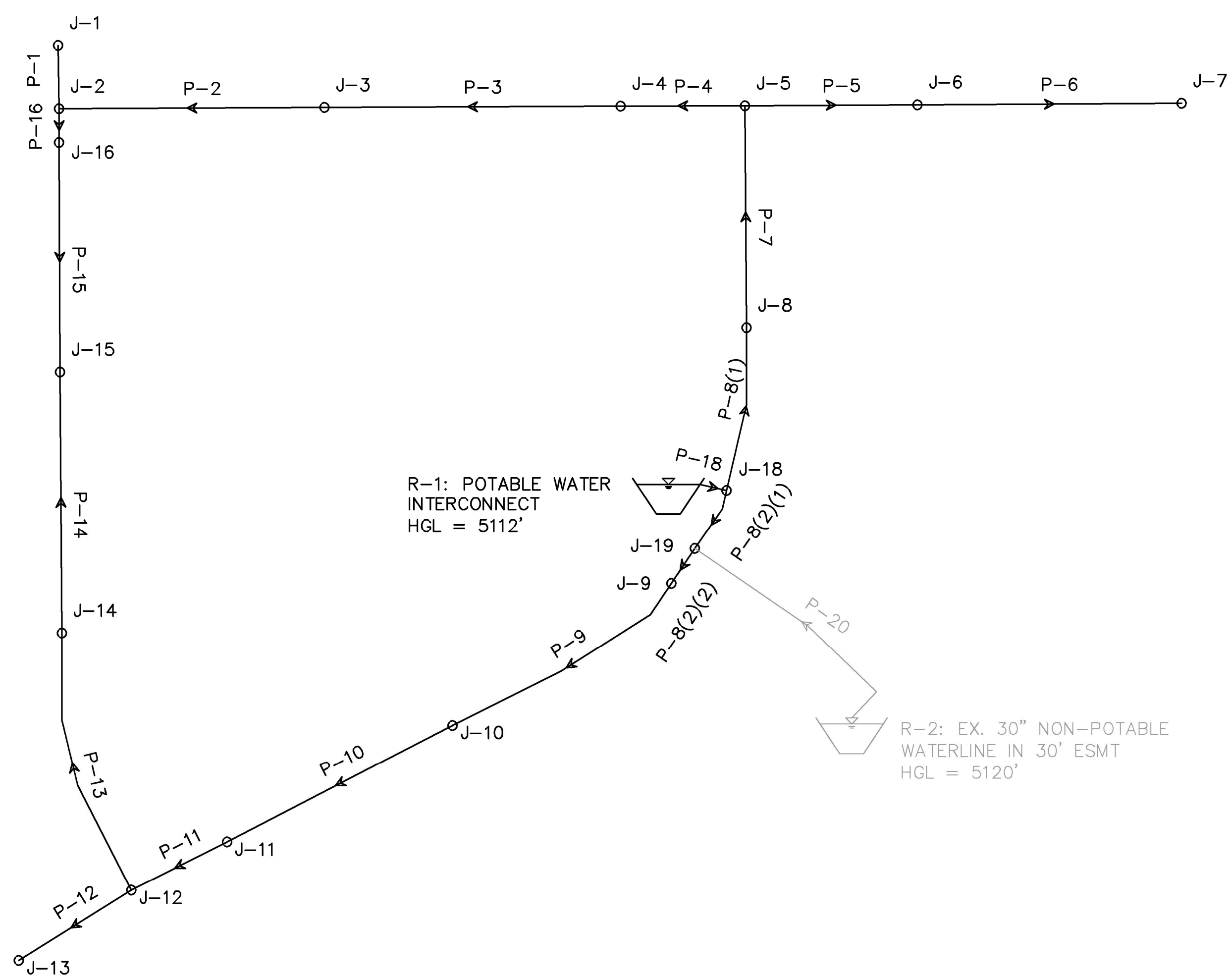
Fort Lupton Criteria	
	Non-Potable
Avg Day Demand (gpm/acre)*	1.55
Max Day Factor	2.5
Max Hour Factor	4

*From the SACWSD Design & Construction Standards

Non-Potable Water Demand										
Junction	Surface Elevation	TOP Elevation	No. DU Served	No. 50'x105' Lots	No. 60'x105' Lots**	Park Area (acres)	Total Irrigated Area (acre)	Demand (gpm)		
								Average Day	Max Day	Peak Hour
			45% Irrigated			75% Irrigated				
J-3	4916.97	4911.97	8	8	0		0.434	0.67	1.68	2.69
J-4	4920.06	4915.06	4	3	1		0.228	0.35	0.88	1.41
J-6	4924.70	4919.70	6	4	2		0.347	0.54	1.35	2.15
J-7	4929.42	4924.42	5	2	3.6		0.343	0.53	1.33	2.13
J-8	4924.09	4919.09	5	3	2.4		0.319	0.49	1.24	1.98
J-9	4924.99	4919.99	4	1	4.2		0.328	0.51	1.27	2.03
J-10	4921.79	4916.79	6	6	0		0.325	0.50	1.26	2.02
J-11	4918.35	4913.35	5	4	1.3		0.302	0.47	1.17	1.87
J-13	4915.35	4910.35	3	1	2.6		0.223	0.35	0.87	1.39
J-14	4917.28	4912.28	4	2	2		0.239	0.37	0.92	1.48
J-15	4916.07	4911.07	4	4	0	1	0.967	1.50	3.75	6.00
J-16	4914.98	4909.98	5	3	2		0.293	0.45	1.13	1.82
Total			59	41	21	1	4.35	6.74	16.84	26.95

**Includes lots that are larger than 60'x105', expressed as a multiple of 60'x105' lots based on lot area

COYOTE CREEK FILING NO. 4
NON-POTABLE WATERCAD MAP
WITH POTABLE WATER INTERCONNECT



NON-POTABLE WATERCAD MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 2

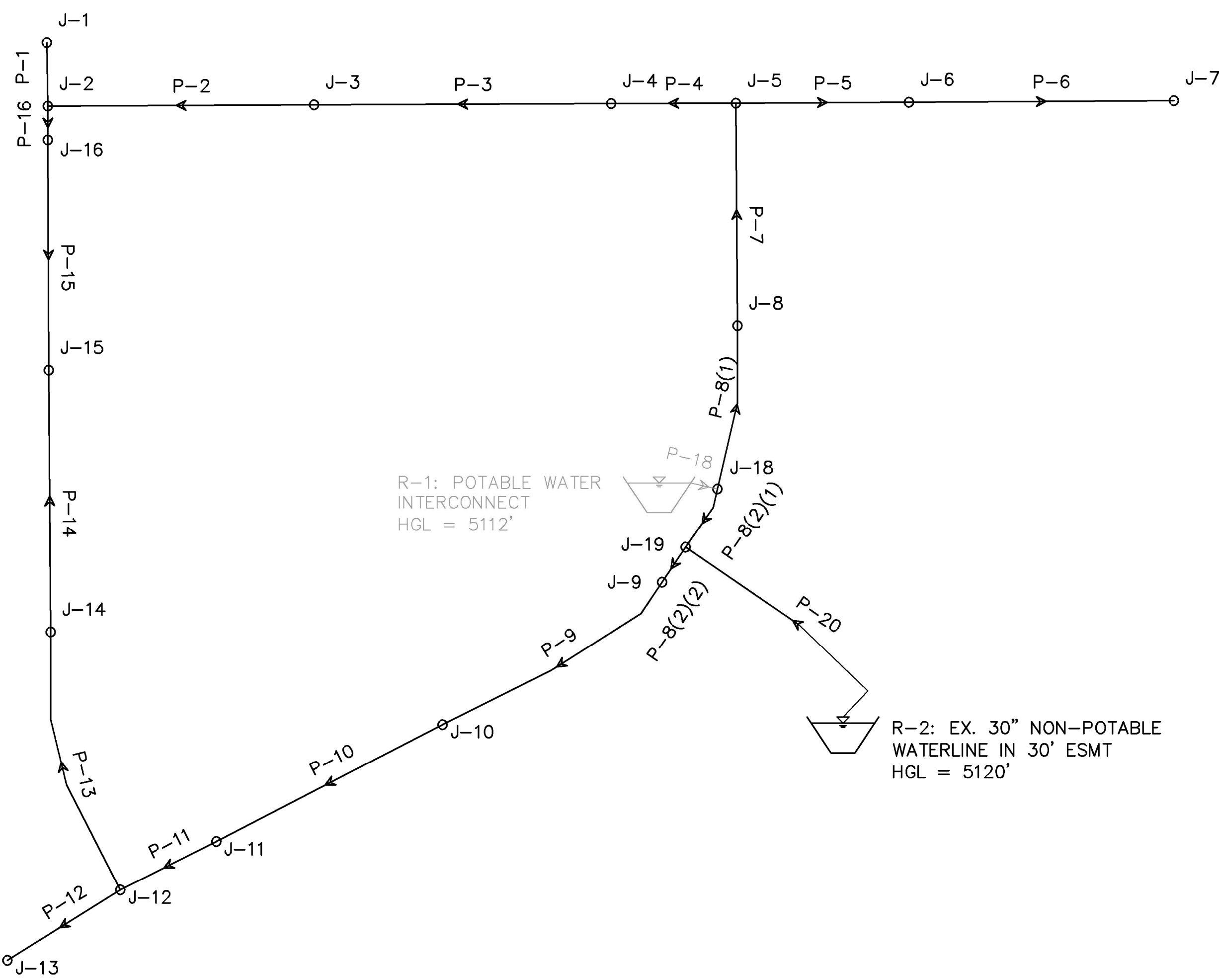


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COYOTE CREEK FILING NO. 4

NON-POTABLE WATERCAD MAP

WITH CONNECTION TO EXISTING 30" NON-POTABLE WATERLINE IN 30' ESMT



NON-POTABLE WATERCAD MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 2 OF 2



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Irrigation w/ Potable Interconnect - Maximum Hour (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-18	17	4	PVC	130	26.97	0.69	0.001
P-8(1)	104	4	PVC	130	14.05	0.36	0
P-8(2)(1)	42	4	PVC	130	12.92	0.33	0
P-8(2)(2)	27	4	PVC	130	12.92	0.33	0
P-7	140	4	PVC	130	12.07	0.31	0
P-9	167	4	PVC	130	10.89	0.28	0
P-10	160	4	PVC	130	8.87	0.23	0
P-4	78	4	PVC	130	7.79	0.2	0
P-11	68	4	PVC	130	7	0.18	0
P-3	187	4	PVC	130	6.38	0.16	0
P-13	172	4	PVC	130	5.61	0.14	0
P-5	109	4	PVC	130	4.28	0.11	0
P-14	165	4	PVC	130	4.13	0.11	0
P-2	167	4	PVC	130	3.69	0.09	0
P-16	21	4	PVC	130	3.69	0.09	0
P-6	167	4	PVC	130	2.13	0.05	0
P-15	145	4	PVC	130	1.87	0.05	0
P-12	84	4	PVC	130	1.39	0.04	0
P-1	40	4	PVC	130	0	0	0
P-20	169	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Potable Interconnect - Maximum Hour (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,112.22	88
J-2	4,909.82	0	5,112.22	88
J-3	4,911.97	2.69	5,112.22	87
J-12	4,911.90	0	5,112.23	87
J-13	4,910.35	1.39	5,112.23	87
J-14	4,912.28	1.48	5,112.22	87
J-15	4,911.07	6	5,112.22	87
J-16	4,909.98	1.82	5,112.22	87
J-11	4,913.35	1.87	5,112.23	86
J-4	4,915.06	1.41	5,112.23	85
J-5	4,916.47	0	5,112.24	85
J-10	4,916.79	2.02	5,112.25	85
J-8	4,919.09	1.98	5,112.26	84
J-6	4,919.70	2.15	5,112.23	83
J-9	4,919.99	2.03	5,112.27	83
J-18	4,920.36	0	5,112.28	83
J-19	4,921.74	0	5,112.27	82
J-7	4,924.42	2.13	5,112.23	81

Irrigation w/ Potable Interconnect - Maximum Day (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-18	17	4	PVC	130	16.85	0.43	0
P-8(1)	104	4	PVC	130	8.78	0.22	0
P-8(2)(1)	42	4	PVC	130	8.07	0.21	0
P-8(2)(2)	27	4	PVC	130	8.07	0.21	0
P-7	140	4	PVC	130	7.54	0.19	0
P-9	167	4	PVC	130	6.8	0.17	0
P-10	160	4	PVC	130	5.54	0.14	0
P-4	78	4	PVC	130	4.86	0.12	0
P-11	68	4	PVC	130	4.37	0.11	0
P-3	187	4	PVC	130	3.98	0.1	0
P-13	172	4	PVC	130	3.5	0.09	0
P-5	109	4	PVC	130	2.68	0.07	0
P-14	165	4	PVC	130	2.58	0.07	0
P-2	167	4	PVC	130	2.3	0.06	0
P-16	21	4	PVC	130	2.3	0.06	0
P-6	167	4	PVC	130	1.33	0.03	0
P-15	145	4	PVC	130	1.17	0.03	0
P-12	84	4	PVC	130	0.87	0.02	0
P-1	40	4	PVC	130	0	0	0
P-20	169	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Potable Interconnect - Maximum Day (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,112.26	88
J-2	4,909.82	0	5,112.26	88
J-16	4,909.98	1.13	5,112.26	88
J-3	4,911.97	1.68	5,112.26	87
J-12	4,911.90	0	5,112.26	87
J-13	4,910.35	0.87	5,112.26	87
J-14	4,912.28	0.92	5,112.26	87
J-15	4,911.07	3.75	5,112.26	87
J-11	4,913.35	1.17	5,112.27	86
J-4	4,915.06	0.88	5,112.27	85
J-5	4,916.47	0	5,112.27	85
J-10	4,916.79	1.26	5,112.27	85
J-8	4,919.09	1.24	5,112.28	84
J-6	4,919.70	1.35	5,112.27	83
J-9	4,919.99	1.27	5,112.28	83
J-18	4,920.36	0	5,112.29	83
J-19	4,921.74	0	5,112.28	82
J-7	4,924.42	1.33	5,112.27	81

Irrigation w/ Connection to Ex. 30" - Maximum Hour (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-20	169	4	PVC	130	26.97	0.69	0.001
P-8(2)(2)	27	4	PVC	130	13.56	0.35	0
P-8(1)	104	4	PVC	130	13.41	0.34	0
P-8(2)(1)	42	4	PVC	130	13.41	0.34	0
P-7	140	4	PVC	130	11.43	0.29	0
P-9	167	4	PVC	130	11.53	0.29	0
P-10	160	4	PVC	130	9.51	0.24	0
P-11	68	4	PVC	130	7.64	0.2	0
P-4	78	4	PVC	130	7.15	0.18	0
P-13	172	4	PVC	130	6.25	0.16	0
P-3	187	4	PVC	130	5.74	0.15	0
P-14	165	4	PVC	130	4.77	0.12	0
P-5	109	4	PVC	130	4.28	0.11	0
P-2	167	4	PVC	130	3.05	0.08	0
P-16	21	4	PVC	130	3.05	0.08	0
P-6	167	4	PVC	130	2.13	0.05	0
P-12	84	4	PVC	130	1.39	0.04	0
P-15	145	4	PVC	130	1.23	0.03	0
P-1	40	4	PVC	130	0	0	0
P-18	17	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Connection to Ex. 30" - Maximum Hour (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,119.83	91
J-2	4,909.82	0	5,119.83	91
J-13	4,910.35	1.39	5,119.84	91
J-16	4,909.98	1.82	5,119.83	91
J-3	4,911.97	2.69	5,119.83	90
J-12	4,911.90	0	5,119.84	90
J-14	4,912.28	1.48	5,119.83	90
J-15	4,911.07	6	5,119.83	90
J-4	4,915.06	1.41	5,119.84	89
J-11	4,913.35	1.87	5,119.84	89
J-5	4,916.47	0	5,119.84	88
J-10	4,916.79	2.02	5,119.86	88
J-6	4,919.70	2.15	5,119.84	87
J-8	4,919.09	1.98	5,119.86	87
J-9	4,919.99	2.03	5,119.88	86
J-18	4,920.36	0	5,119.88	86
J-19	4,921.74	0	5,119.89	86
J-7	4,924.42	2.13	5,119.84	85

Irrigation w/ Connection to Ex. 30" - Maximum Day (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-20	169	4	PVC	130	16.85	0.43	0
P-8(2)(2)	27	4	PVC	130	8.47	0.22	0
P-8(1)	104	4	PVC	130	8.38	0.21	0
P-8(2)(1)	42	4	PVC	130	8.38	0.21	0
P-7	140	4	PVC	130	7.14	0.18	0
P-9	167	4	PVC	130	7.2	0.18	0
P-10	160	4	PVC	130	5.94	0.15	0
P-11	68	4	PVC	130	4.77	0.12	0
P-4	78	4	PVC	130	4.46	0.11	0
P-13	172	4	PVC	130	3.9	0.1	0
P-3	187	4	PVC	130	3.58	0.09	0
P-14	165	4	PVC	130	2.98	0.08	0
P-5	109	4	PVC	130	2.68	0.07	0
P-2	167	4	PVC	130	1.9	0.05	0
P-16	21	4	PVC	130	1.9	0.05	0
P-6	167	4	PVC	130	1.33	0.03	0
P-12	84	4	PVC	130	0.87	0.02	0
P-15	145	4	PVC	130	0.77	0.02	0
P-1	40	4	PVC	130	0	0	0
P-18	17	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Connection to Ex. 30" - Maximum Day (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,119.93	91
J-2	4,909.82	0	5,119.93	91
J-13	4,910.35	0.87	5,119.93	91
J-16	4,909.98	1.13	5,119.93	91
J-3	4,911.97	1.68	5,119.93	90
J-12	4,911.90	0	5,119.93	90
J-14	4,912.28	0.92	5,119.93	90
J-15	4,911.07	3.75	5,119.93	90
J-4	4,915.06	0.88	5,119.93	89
J-11	4,913.35	1.17	5,119.94	89
J-5	4,916.47	0	5,119.93	88
J-10	4,916.79	1.26	5,119.94	88
J-6	4,919.70	1.35	5,119.93	87
J-8	4,919.09	1.24	5,119.94	87
J-9	4,919.99	1.27	5,119.95	87
J-18	4,920.36	0	5,119.95	86
J-19	4,921.74	0	5,119.95	86
J-7	4,924.42	1.33	5,119.93	85

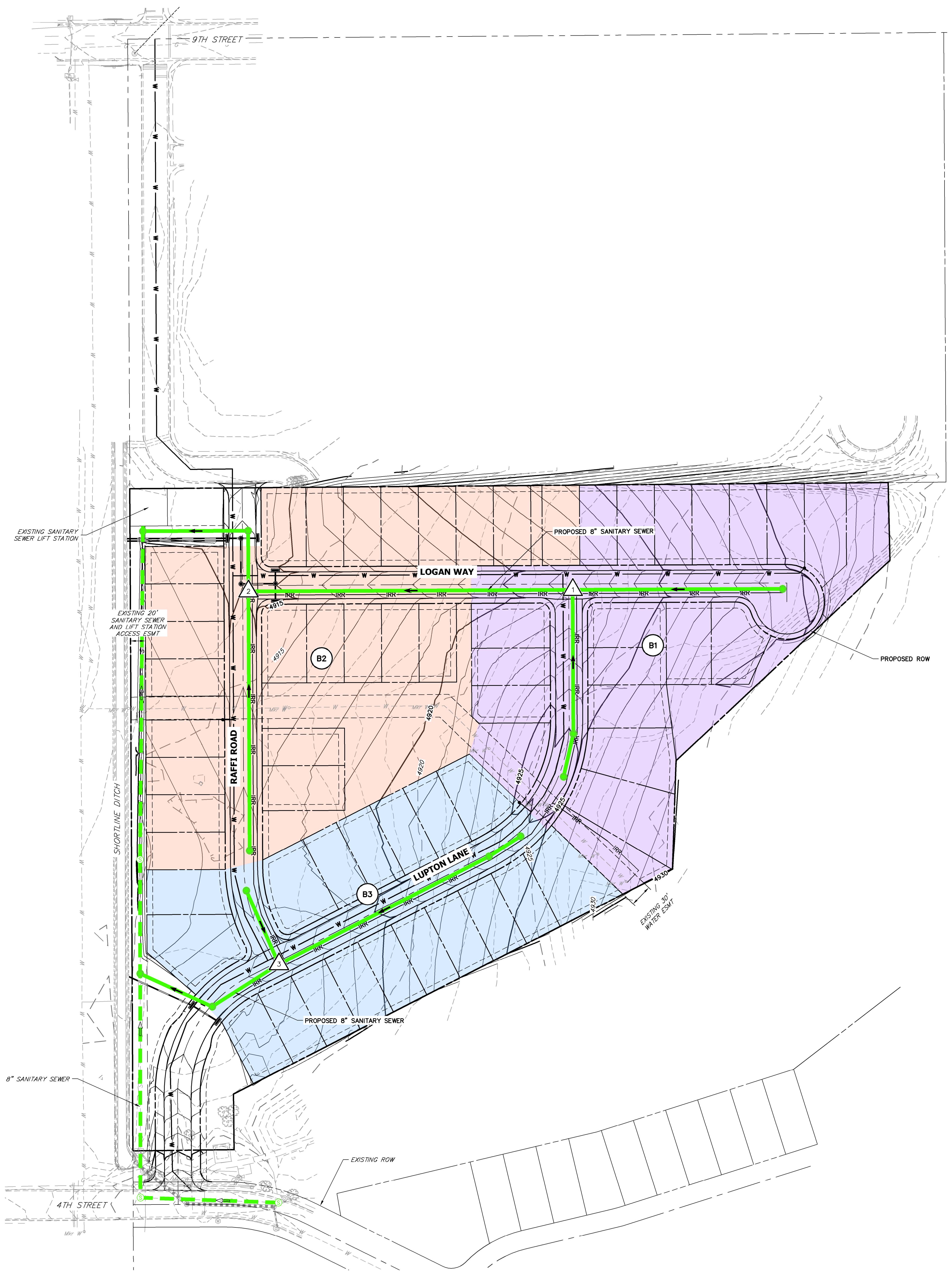
Irrigation w/ Connection to Ex. 30", Minimum System Pressure - Maximum Hour (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-20	169	4	PVC	130	26.97	0.69	0.001
P-8(2)(2)	27	4	PVC	130	13.56	0.35	0
P-8(1)	104	4	PVC	130	13.41	0.34	0
P-8(2)(1)	42	4	PVC	130	13.41	0.34	0
P-9	167	4	PVC	130	11.53	0.29	0
P-7	140	4	PVC	130	11.43	0.29	0
P-10	160	4	PVC	130	9.51	0.24	0
P-11	68	4	PVC	130	7.64	0.2	0
P-4	78	4	PVC	130	7.15	0.18	0
P-13	172	4	PVC	130	6.25	0.16	0
P-3	187	4	PVC	130	5.74	0.15	0
P-14	165	4	PVC	130	4.77	0.12	0
P-5	109	4	PVC	130	4.28	0.11	0
P-2	167	4	PVC	130	3.05	0.08	0
P-16	21	4	PVC	130	3.05	0.08	0
P-6	167	4	PVC	130	2.13	0.05	0
P-12	84	4	PVC	130	1.39	0.04	0
P-15	145	4	PVC	130	1.23	0.03	0
P-1	40	4	PVC	130	0	0	0
P-18	17	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Connection to Ex. 30", Minimum System Pressure - Maximum Day (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-15	4,911.07	6	5,039.83	56
J-13	4,910.35	1.39	5,039.84	56
J-16	4,909.98	1.82	5,039.83	56
J-2	4,909.82	0	5,039.83	56
J-1	4,909.51	0	5,039.83	56
J-11	4,913.35	1.87	5,039.84	55
J-14	4,912.28	1.48	5,039.83	55
J-3	4,911.97	2.69	5,039.83	55
J-12	4,911.90	0	5,039.84	55
J-4	4,915.06	1.41	5,039.84	54
J-10	4,916.79	2.02	5,039.86	53
J-5	4,916.47	0	5,039.84	53
J-18	4,920.36	0	5,039.88	52
J-9	4,919.99	2.03	5,039.88	52
J-6	4,919.70	2.15	5,039.84	52
J-8	4,919.09	1.98	5,039.86	52
J-19	4,921.74	0	5,039.89	51
J-7	4,924.42	2.13	5,039.84	50

Appendix C
Sanitary Sewer System Loading, Basin Map,
and FlowMaster Results

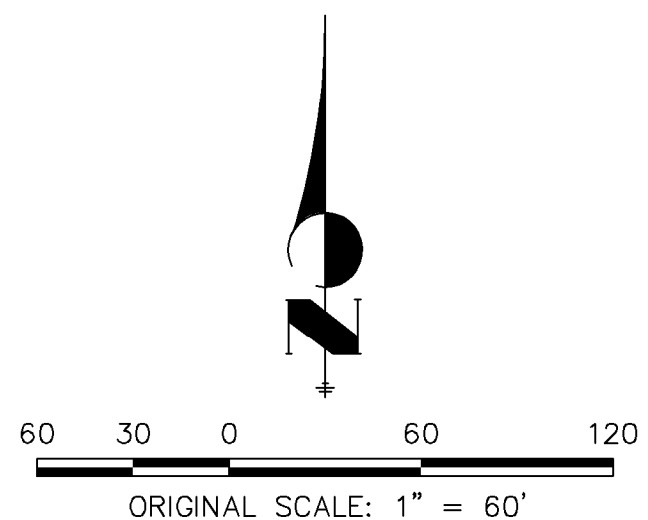
COYOTE CREEK FILING NO. 4

SANITARY SEWER SYSTEM MAP



COLOR CODING LEGEND

- 8" $\varnothing$ PROPOSED SANITARY SEWER MAIN
- 12" $\varnothing$ PROPOSED SANITARY SEWER MAIN
- 8" $\varnothing$ EXISTING SANITARY SEWER MAIN
- PROPOSED SANITARY DRAINAGE ARROW
- EXISTING SANITARY DRAINAGE ARROW
- DESIGN POINT
- SANITARY BASIN DESIGNATION



SANITARY SEWER SYSTEM MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

Project Name Coyote Creek Filing No. 4
 Project Number 16093.00
 Date 11/8/2021
 By SWW

Fort Lupton Criteria	
Residential Population Density (people/unit)	2.90
Average Daily Flow (gpd/person)	70
Peak Factor	3.0
Infiltration and Inflow Rate (gpad)	1000

Onsite Sanitary Sewer Loadings							
Basin	Land Use	Acres	No. DU's	Flow Rate (gpm)			
				Average Day	Peak Day	Infiltration & Inflow	PDF + I&I
B1	Single-Family Residential	4.15	18	2.54	7.61	2.88	10.49
B2	Single-Family Residential	4.63	23	3.24	9.73	3.21	12.94
B3	Single-Family Residential	3.22	18	2.54	7.61	2.23	9.85
Total	PA-4	13.25	59	8.32	24.95		33.28

Worksheet for DP-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.028 ft/ft
Diameter	8.0 in
Discharge	0.02 cfs
Results	
Normal Depth	0.6 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.4 in
Top Width	0.36 ft
Critical Depth	0.8 in
Percent Full	8.1 %
Critical Slope	0.010 ft/ft
Velocity	1.76 ft/s
Velocity Head	0.05 ft
Specific Energy	0.10 ft
Froude Number	1.619
Maximum Discharge	1.87 cfs
Discharge Full	1.74 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	8.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 in
Critical Depth	0.8 in
Channel Slope	0.028 ft/ft
Critical Slope	0.010 ft/ft

Worksheet for DP-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.015 ft/ft
Diameter	8.0 in
Discharge	0.05 cfs
Results	
Normal Depth	1.1 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.5 ft
Hydraulic Radius	0.7 in
Top Width	0.46 ft
Critical Depth	1.2 in
Percent Full	13.8 %
Critical Slope	0.009 ft/ft
Velocity	1.80 ft/s
Velocity Head	0.05 ft
Specific Energy	0.14 ft
Froude Number	1.261
Maximum Discharge	1.38 cfs
Discharge Full	1.28 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	13.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.1 in
Critical Depth	1.2 in
Channel Slope	0.015 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for DP-3

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.017 ft/ft
Diameter	8.0 in
Discharge	0.02 cfs
Results	
Normal Depth	0.7 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.5 in
Top Width	0.38 ft
Critical Depth	0.8 in
Percent Full	8.9 %
Critical Slope	0.010 ft/ft
Velocity	1.44 ft/s
Velocity Head	0.03 ft
Specific Energy	0.09 ft
Froude Number	1.262
Maximum Discharge	1.45 cfs
Discharge Full	1.35 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	8.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.7 in
Critical Depth	0.8 in
Channel Slope	0.017 ft/ft
Critical Slope	0.010 ft/ft

**COYOTE CREEK FILING NO. 4
FINAL UTILITY STUDY**

December 2021

Prepared For:
Lupton Land, LLC
10221 Prestwick Trail
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Contact: Bob Quinette

Prepared By:
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Centennial, Colorado 80112
303-740-9393
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(Project No. 16093.00)

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Appendices

A: Vicinity Map

B: Potable Water Demand Table, Model Map, WaterCAD Map & Results

C: Non-Potable Water Demand Table, Model Map, WaterCAD Map & Results

D: Sanitary Sewer Loading, Basin Map, FlowMaster Results

CERTIFICATION STATEMENT

This Utility Report for the design of the Coyote Creek Filing No. 4 development was prepared by me or under my direct supervision in accordance with the City of Fort Lupton's Standards and Specifications and acceptable professional practices of the industry. We acknowledge that the City of Fort Lupton's review of this Utility Study is only for general conformance with submittal requirements, current design criteria and standard engineering principles and practices. We are also aware of the provisions of the City Code of the City of Fort Lupton.

Andrew J. Hugill, Registered Professional Engineer
Colorado Professional Engineer No. 57007
For and on behalf of JR Engineering, LLC

I. INTRODUCTION

Project Location and Description

Coyote Creek Filing No. 4 is a proposed single-family residential Planned Unit Development (PUD) located within Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, Weld County, Colorado.

The approximately 13-acre site is bounded by the Shortline Ditch regional channel to the west, Twombly Elementary School to the north, and Coyote Creek Golf Course to the southeast. A vicinity map is included in Appendix A.

This report presents the utility system analysis for the potable water, non-potable water, and sanitary sewer systems for Coyote Creek Filing No. 4.

II. POTABLE WATER SYSTEM

Existing System and Proposed System

Potable water for Coyote Creek Filing No. 4 will be supplied by the City of Fort Lupton. There is an existing 18" high-pressure potable water mainline within 9th Street, and an existing 12" potable water mainline within 4th Street with an 8" stub north into the site.

An 8" proposed waterline will connect to the 18" potable water mainline in 9th Street by means of a PRV and will continue south along the existing road west of Twombly Elementary School. An 8" and 12" waterline will loop through the proposed development and connect with the existing 12" water mainline in 4th Street. A non-potable water interconnect is proposed on the potable waterline within Lupton Lane. A map of the existing and proposed potable water system is included in Appendix B.

Calculated Potable Water Demands and Design Flow Requirements

The basis of the design for this study was set forth in Chapter 3 of the City of Fort Lupton *Standards and Specifications for the Design and Construction of Public Improvements*, 2014. The following is a summary of the applicable criteria for Coyote Creek Filing No. 4, a single-family detached residential development:

Criteria for Establishing Potable Water Demands

Zoning	Type of Development	People per Unit	Per Capita Demand
R-1 to R-5	Single Family Detached	2.62	200 gallons

Maximum Day Factor 2.5

Peak Hour Factor 4.0

Criteria for Operating Pressures and Sizing of Mains

	Minimum Pressure	Maximum Head Loss	Maximum Velocity	Hazen-Williams "C" Coefficient
Peak Hour Demand	50 psi	2 ft/1000 ft	5 ft/s	130
Maximum Day Demand + Fire Flow	20 psi	N/A	7 ft/s	

Fire Flow Demand

Single Family Detached* 1,500 gpm

*Per IFC Table B105.1(2) for assumed Type V-B and total building area < 3,600 SF

The total potable water demand for Coyote Creek Filing No. 4 is shown **Table 1** below.

Table 1: Coyote Creek Filing No. 4 Total Potable Demand Summary Table

Dwelling Units	Unit Demand (gpd/DU)	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Peak Hour Demand (gpd)
59	524	30,916	77,290	123,664

A non-potable water interconnect is proposed on the potable waterline within Lupton Lane. The total non-potable interconnect maximum day demand is 24,256 gpd, and the peak-hour demand is 38,809 gpd. The interconnect demand corresponds to the amount of water drawn out of interconnect reservoir, which is fed by the potable water system, to supply the non-potable water network in the event that the non-potable system is down. The demands for each modeled junction within Coyote Creek Filing No. 4 are shown in Appendix B.

Hydraulic Analysis

Bentley's WaterCAD V.8 was used to model and analyze the proposed potable water distribution system. Using the flow pressure test results supplied by the City, HGLs of 5132' and 5095' were applied to the boundary conditions at 4th Street and 9th Street, respectively. The following assumptions were used in developing the WaterCAD model:

- There is an unlimited water supply, provided to the site from the two connection points to the existing water lines in 4th Street and 9th Street.
- Water demand for the each proposed residential lot is taken at the node nearest the center of the lot.
- Existing and proposed water lines are assumed to be 5' in depth.

WaterCAD scenarios were set up to analyze maximum hour demand plus peak irrigation flow, and maximum daily demand plus peak irrigation flow and fire flow. A separate scenario was run for each of the three proposed hydrant locations.

The design of the water distribution system is based on the maximum daily demand plus peak irrigation flow and fire flow scenarios, which were the higher demand scenarios compared to the maximum hour demand plus peak irrigation flow scenario. In order to keep maximum daily demand plus fire flow velocities below 7 ft/s, the 8" stub off of the waterline in 4th Street cannot be utilized and a 12" connection is being proposed instead. Results of the hydraulic analysis and a map of the WaterCAD pipes and nodes are included in Appendix B.

Conclusions

This study presents the results of the analysis performed for the potable water system associated with the proposed Coyote Creek Filing No. 4 development. The design and layout of the potable water system as shown and discussed in this study and in the Appendices conform to the Fort Lupton design standards and requirements for fire protection, minimum pressures and maximum velocities.

III. NON-POTABLE WATER SYSTEM

Existing and Proposed System

Non-potable water for the Coyote Creek Filing No. 4 development will be supplied by the City of Fort Lupton via an existing 30" non-potable waterline that bisects the Filing No. 4 site.

A 4" non-potable waterline is proposed to loop through the Filing No. 4 development and connect to the existing 30" non-potable waterline through a metered tap on the southeast corner of the site. A potable water interconnect is also proposed within Lupton Lane. A map of the existing and proposed non-potable water system is included in Appendix C.

Calculated Non-Potable Water Demands and Design Flow Requirements

The basis of design for this study was set forth in Chapter 3 of the City of Fort Lupton *Standards and Specifications for the Design and Construction of Public Improvements*, 2014. The following is a summary of the applicable water system criteria and assumed parameters used to establish the non-potable water demand and design:

Land Use	Assumed Percentage of Total Area to be Irrigated	Average Day Demand*
Single-Family Residential	45%	1.55 gpm/acre
Park	75%	

*Established using the SACWSD Design Standards and Criteria

Maximum Day Factor 2.5

Peak Hour Factor 4.0

Criteria for Operating Pressures and Sizing of Mains

	Minimum Pressure	Maximum Head Loss	Maximum Velocity	Hazen-Williams "C" Coefficient
Peak Hour Demand and Maximum Day Demand	50 psi	2 ft/1000 ft	5 ft/s	130

Coyote Creek Filing No. 4 is comprised of 59 single-family detached residential lots, with 41 lots sized 50'x105' and 18 lots sized 60'x105' or slightly larger, and a total residential land use area of approximately 8 acres. There is also a proposed 1-acre park in the center of the development.

The total non-potable water demand for Coyote Creek Filing No. 4 is shown **Table 2** below.

Table 2: Coyote Creek Filing No. 4 Total Non-Potable Demand Summary Table

Total Area (Acres)		Total Irrigated Area (Acres)	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Peak Hour Demand (gpd)
Single-Family (45% Irrigated)	Park (75% Irrigated)				
8	1	4.35	9,702	24,256	38,809

Hydraulic Analysis

Bentley's WaterCAD V.8 was used to model and analyze the proposed non-potable water distribution system for two separate scenarios. In one scenario, the non-potable water was supplied solely by the potable water interconnect in Lupton Lane. The potable water interconnect was assigned an HGL of 5116', determined from the potable water model. In the second scenario, the non-potable water was only supplied by the connection to the existing 30" non-potable waterline, and an HGL of 5120' was estimated under the assumption of an 85 psi system pressure. The minimum operating pressure for the system to still meet City criteria was determined to be 50 psi, which corresponds to an HGL of 5040'. The non-potable network was not modeled in a scenario where it was supplied by both non-potable water connections, because at any given time, the non-potable water system will only ever be supplied by one of the two.

The following assumptions were used in developing the WaterCAD model:

- There is an unlimited water supply in each scenario, provided to the site from either the proposed potable water connection in Lupton Lane, or the existing 30" non-potable waterline.
- Existing and proposed non-potable water lines are assumed to be 5' in depth.

Each of the two scenarios was analyzed using maximum hour demand and maximum day demand. Results of the hydraulic analysis and a map of the WaterCAD pipes and nodes for each scenario are included in Appendix C.

Conclusions

This study presents the results of the analysis performed for the non-potable water system associated with the proposed Coyote Creek Filing No. 4 Development. The design and layout of the non-potable water system as shown and discussed in this study and in the Appendices conform to the Fort Lupton design standards and requirements for minimum pressures and maximum velocities.

IV. SANITARY SEWER SYSTEM

Existing and Proposed System

The Coyote Creek Filing No. 4 sanitary sewer will be serviced by the existing Fort Lupton 8" sanitary sewer that runs north along the site's western property boundary to an existing lift station located in the northwest corner of the site.

The proposed 8" Coyote Creek Filing No. 4 sanitary sewer network will tie into the existing 8" sanitary pipe with new manholes two locations—one in the southwest corner of the development, north of 4th Street, and one in the northwest corner of the development, just south of the existing lift station. A map of the existing and proposed sanitary sewer system is included in Appendix D.

Calculated Wastewater Flows and Design Flow Requirements

The basis of design for this study was set forth in Chapter 4 of the City of Fort Lupton *Standards and Specifications for the Design and Construction of Public Improvements*, 2014. The following is a summary of the criteria used to establish the wastewater flows and preliminary sanitary sewer design:

Criteria for Establishing Wastewater Flows

Single-Family Residential Population Density:	2.90 People/Unit
Residential Average Use:	70 Gallons/Capita/Day
Peak Factor:	3.0
Infiltration and Inflow Rate (for all uses):	1000 Gallons/Acre/Day

Design Requirements

Diameter	Minimum Slope	Maximum Slope	Minimum Flow Velocity (at peak design flow, and n=0.015)
8 in (minimum)	0.50%	19%	2 ft/s

The proposed Coyote Creek Filing No. 4 development has a total area of approximately 13.25 acres, comprised of 59 single-family detached residential lots. This corresponds to an estimated total population of 171 and an estimated population density of 13 people per acre. The total wastewater design flows calculated for Coyote Creek Filing No. 4 are shown in **Table 3** below.

Table 3: Coyote Creek Filing No. 4 Total Wastewater Design Flows Summary Table

Acres	DU's	Flow Rate (gpd)			
		Average Day	Peak Day	Infiltration and Inflow	Peak Day Flow + Infiltration and Inflow
13.25	59	11,977	35,931	13,250	49,181

Wastewater from Coyote Creek Filing No. 4 will be ordinary domestic sewage from single-family residences, and will not contain industrial waste.

Hydraulic Analysis

Given the proposed grade and proposed sanitary sewer layout, the site was divided into three basins and analyzed at three design points, illustrated in the sanitary sewer system map in Appendix D. The sanitary wastewater loading calculations for each basin can also be found in Appendix D.

Bentley's FlowMaster hydraulic analysis software was used to analyze the proposed sanitary sewer system, and the results are included in Appendix D. Note that the flow velocities range from 1.44 ft/s to 1.80 ft/s, which fall below the minimum flow velocity criteria of 2 ft/s. The low velocities are typical considering the low number of lots contributing to the sewer system. The proposed 8" sanitary sewer pipes are the minimum size allowed, and steeper slopes are not feasible given depth constraints set by the existing sanitary sewer line downstream.

Conclusions

This study presents the results of the analysis performed for the sanitary sewer system associated with the proposed Coyote Creek Filing No. 4 Development. The design and layout of the sanitary sewer system as shown and discussed in this study and Appendices conform to the Fort Lupton design standards.

V. CONCLUSION

This study presents the results of the analyses performed for the potable water, non-potable water, and sanitary sewer systems associated with the Coyote Creek Filing No. 4 development. The design of the systems as shown and discussed is in conformance with the Fort Lupton design standards and requirements.

VI. REFERENCES

1. 2018 International Fire Code; 2018
2. City of Fort Lupton, Standards and Specifications for the Design and Construction of Public Improvements; 2014
3. City of Fort Lupton and Clear Water Solutions, Inc., 2018 Municipal Water Efficiency Plan; 2018

Appendix A Vicinity Map



500 250 0 500
 ORIGINAL SCALE: 1" = 500'

APPENDIX A
 VICINITY MAP
 JOB NO. 16093.00
 2021-11-10
 SHEET 1 OF 1



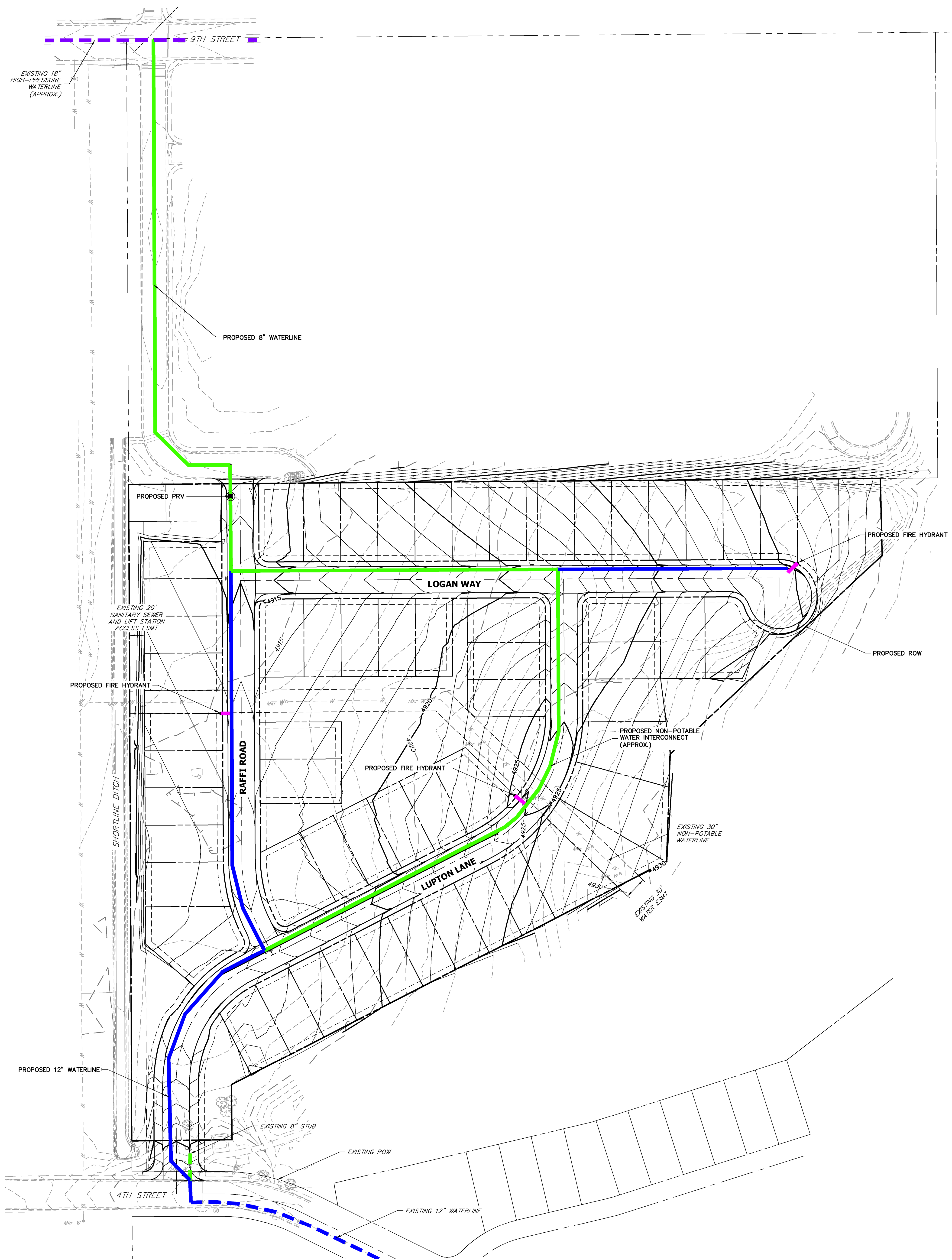
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Appendix B
Potable Water System Demands, Model Map,
and WaterCAD Map & Results

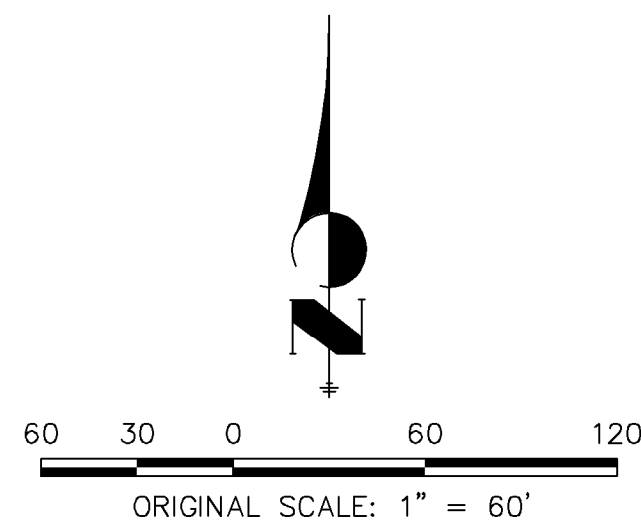
COYOTE CREEK FILING NO. 4

POTABLE WATER SYSTEM MAP



COLOR CODING LEGEND

- 6" Ø PROPOSED WATER LINE (FIRE HYDRANT)
- 8" Ø PROPOSED WATER MAIN
- 12" Ø PROPOSED WATER MAIN
- 8" Ø EXISTING WATER MAIN
- 12" Ø EXISTING WATER MAIN
- 18" Ø EXISTING WATER MAIN



POTABLE WATER SYSTEM MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1



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Project Name Coyote Creek Filing No. 4
 Project Number 16093.00
 Date 11/8/2021
 By SWW

Fort Lupton Criteria	
	Potable
Avg Day Demand (gpud)	524
Max Day Factor	2.5
Max Hour Factor	4
Fire Flow (gpm)	1500

Potable Water Demand							
Junction	Surface Elevation	TOP Elevation	No. DU Served	Demand (gpm)			
				Average Day	Max Day	Fire Flow	Peak Hour
J-2	4917.09	4912.09	8	2.91	7.28		11.64
J-3	4920.18	4915.18	4	1.46	3.64		5.82
J-5	4924.81	4919.81	6	2.18	5.46		8.73
J-6	4929.84	4924.84	5	1.82	4.55	1500	7.28
J-7	4924.15	4919.15	5	1.82	4.55		7.28
J-8	4925.01	4920.01	4	1.46	3.64	1500	5.82
J-9	4921.81	4916.81	6	2.18	5.46		8.73
J-10	4918.37	4913.37	5	1.82	4.55		7.28
J-12	4915.35	4910.35	3	1.09	2.73		4.37
J-13	4917.40	4912.40	4	1.46	3.64		5.82
J-14	4916.18	4911.18	4	1.46	3.64		5.82
J-15	4914.92	4909.92	5	1.82	4.55	1500	7.28
Total			59	21.47	53.67		85.88

TABLE B105.1(2) REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) ^b	FLOW DURATION (hours)
Type IA and IB ^a	Type IIA and IIIA ^a	Type IV and V-A ^a	Type IIB and IIIB ^a	Type V-B ^a		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

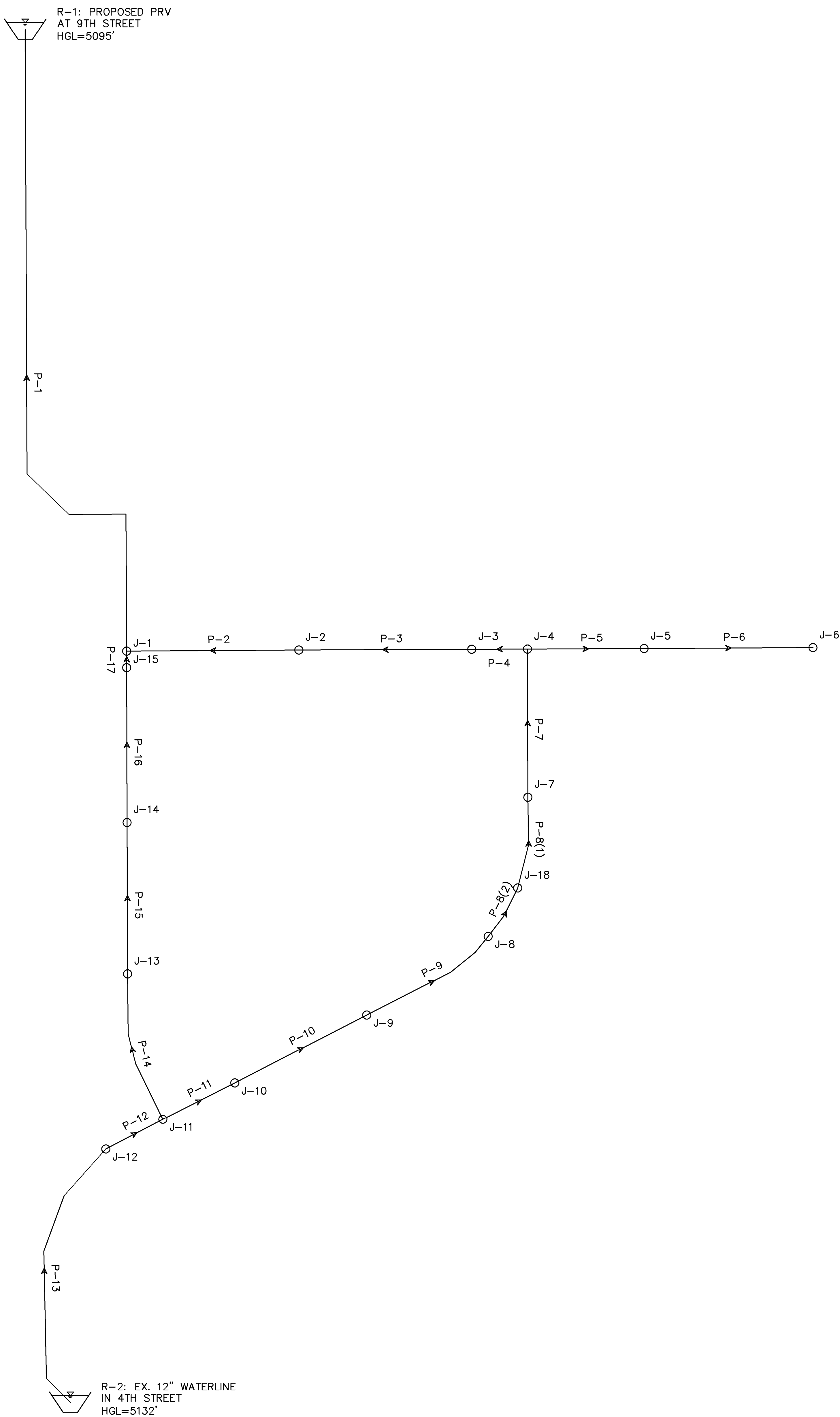
For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

COYOTE CREEK FILING NO. 4

POTABLE WATERCAD MAP



POTABLE WATERCAD MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1



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Potable - Maximum Hour + Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-1	756	8	PVC	130	1,580.91	10.09	0.043
P-13	307	12	PVC	130	1,693.74	4.8	0.007
P-12	70	12	PVC	130	1,689.37	4.79	0.007
P-14	166	12	PVC	130	1,347.77	3.82	0.004
P-15	164	12	PVC	130	1,341.95	3.81	0.004
P-16	168	12	PVC	130	1,336.13	3.79	0.004
P-17	18	12	PVC	150	1,328.85	3.77	0.003
P-11	87	8	PVC	130	341.6	2.18	0.003
P-10	161	8	PVC	130	334.32	2.13	0.002
P-9	159	8	PVC	130	325.59	2.08	0.002
P-8(2)	62	8	PVC	130	319.77	2.04	0.002
P-8(1)	100	8	PVC	130	292.82	1.87	0.002
P-7	161	8	PVC	130	285.54	1.82	0.002
P-4	60	8	PVC	130	269.53	1.72	0.002
P-3	187	8	PVC	130	263.7	1.68	0.002
P-2	187	8	PVC	130	252.06	1.61	0.001
P-5	126	12	PVC	130	16.01	0.05	0
P-6	183	12	PVC	130	7.28	0.02	0

Potable - Maximum Hour + Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-12	4,910.35	4.37	5,129.46	95
J-11	4,911.49	0	5,128.99	94
J-1	4,909.79	0	5,126.76	94
J-15	4,909.92	7.28	5,126.82	94
J-14	4,911.18	5.82	5,127.55	94
J-13	4,912.40	5.82	5,128.26	93
J-10	4,913.37	7.28	5,128.77	93
J-2	4,912.09	11.64	5,127.03	93
J-3	4,915.18	5.82	5,127.32	92
J-9	4,916.81	8.73	5,128.39	92
J-4	4,916.20	0	5,127.41	91
J-7	4,919.15	7.28	5,127.70	90
J-18	4,919.68	26.95	5,127.89	90
J-8	4,920.01	5.82	5,128.02	90
J-5	4,919.81	8.73	5,127.41	90
J-6	4,924.84	7.28	5,127.41	88

Potable - Maximum Day + Fire Flow (J-14) and Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-1	756	8	PVC	130	1,379.84	8.81	0.033
P-13	307	12	PVC	130	2,950.35	8.37	0.019
P-12	70	12	PVC	130	2,947.62	8.36	0.019
P-14	166	12	PVC	130	2,467.34	7	0.014
P-15	164	12	PVC	130	2,463.70	6.99	0.013
P-11	87	8	PVC	130	480.28	3.07	0.005
P-10	161	8	PVC	130	475.73	3.04	0.005
P-9	159	8	PVC	130	470.27	3	0.005
P-8(2)	62	8	PVC	130	466.64	2.98	0.004
P-8(1)	100	8	PVC	130	449.8	2.87	0.004
P-7	161	8	PVC	130	445.25	2.84	0.004
P-4	60	8	PVC	130	435.24	2.78	0.004
P-3	187	8	PVC	130	431.6	2.75	0.004
P-16	168	12	PVC	130	960.06	2.72	0.002
P-17	18	12	PVC	150	955.52	2.71	0.002
P-2	187	8	PVC	130	424.32	2.71	0.004
P-5	126	12	PVC	130	10.01	0.03	0
P-6	183	12	PVC	130	4.55	0.01	0

Potable - Maximum Day + Fire Flow (J-14) and Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-12	4,910.35	2.73	5,125.76	93
J-11	4,911.49	0	5,124.45	92
J-10	4,913.37	4.55	5,124.04	91
J-13	4,912.40	3.64	5,122.21	91
J-1	4,909.79	0	5,119.58	91
J-15	4,909.92	4.55	5,119.61	91
J-14	4,911.18	1,503.64	5,120.01	90
J-2	4,912.09	7.28	5,120.28	90
J-9	4,916.81	5.46	5,123.30	89
J-3	4,915.18	3.64	5,121.00	89
J-4	4,916.20	0	5,121.24	89
J-7	4,919.15	4.55	5,121.89	88
J-18	4,919.68	16.84	5,122.31	88
J-8	4,920.01	3.64	5,122.58	88
J-5	4,919.81	5.46	5,121.24	87
J-6	4,924.84	4.55	5,121.24	85

Potable - Maximum Day + Fire Flow (J-6) and Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-1	756	8	PVC	130	1,373.69	8.77	0.033
P-13	307	12	PVC	130	2,944.21	8.35	0.019
P-12	70	12	PVC	130	2,941.48	8.34	0.019
P-14	166	12	PVC	130	2,100.68	5.96	0.01
P-15	164	12	PVC	130	2,097.04	5.95	0.01
P-16	168	12	PVC	130	2,093.40	5.94	0.01
P-17	18	12	PVC	150	2,088.85	5.93	0.008
P-11	87	8	PVC	130	840.8	5.37	0.013
P-10	161	8	PVC	130	836.25	5.34	0.013
P-9	159	8	PVC	130	830.79	5.3	0.013
P-8(2)	62	8	PVC	130	827.16	5.28	0.013
P-8(1)	100	8	PVC	130	810.32	5.17	0.012
P-7	161	8	PVC	130	805.77	5.14	0.012
P-2	187	8	PVC	130	715.16	4.56	0.01
P-3	187	8	PVC	130	707.88	4.52	0.01
P-4	60	8	PVC	130	704.24	4.5	0.01
P-5	126	12	PVC	130	1,510.01	4.28	0.005
P-6	183	12	PVC	130	1,504.55	4.27	0.005

Potable - Maximum Day + Fire Flow (J-6) and Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-12	4,910.35	2.73	5,125.78	93
J-11	4,911.49	0	5,124.48	92
J-13	4,912.40	3.64	5,122.82	91
J-14	4,911.18	3.64	5,121.18	91
J-10	4,913.37	4.55	5,123.32	91
J-15	4,909.92	4.55	5,119.51	91
J-1	4,909.79	0	5,119.37	91
J-2	4,912.09	7.28	5,117.54	89
J-9	4,916.81	5.46	5,121.21	88
J-3	4,915.18	3.64	5,115.74	87
J-8	4,920.01	3.64	5,119.15	86
J-4	4,916.20	0	5,115.16	86
J-18	4,919.68	16.84	5,118.36	86
J-7	4,919.15	4.55	5,117.13	86
J-5	4,919.81	5.46	5,114.47	84
J-6	4,924.84	1,504.55	5,113.48	82

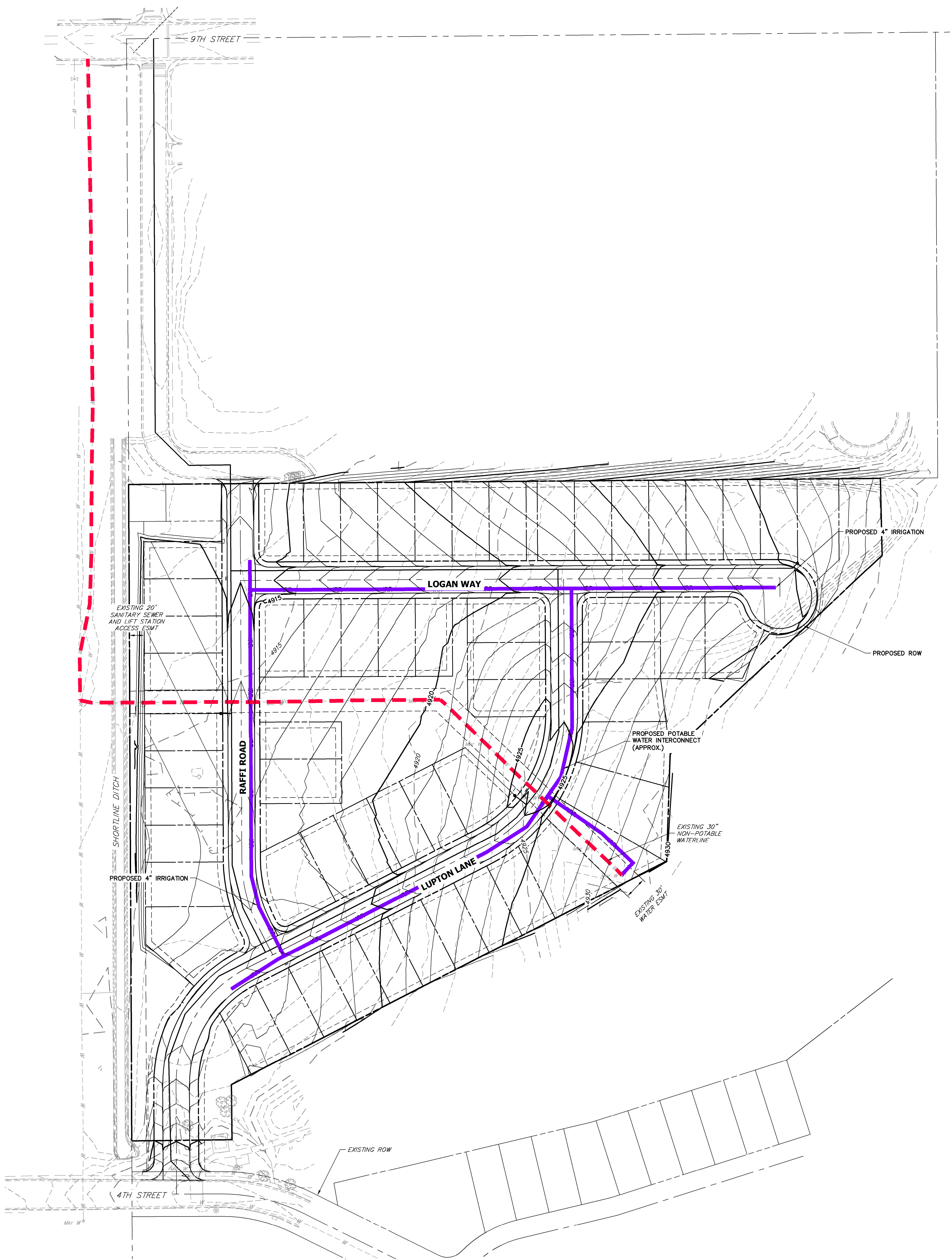
Potable - Maximum Day + Fire Flow (J-8) and Irrigation (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-1	756	8	PVC	130	1,394.89	8.9	0.034
P-13	307	12	PVC	130	2,965.40	8.41	0.019
P-12	70	12	PVC	130	2,962.68	8.4	0.019
P-11	87	8	PVC	130	1,048.59	6.69	0.02
P-10	161	8	PVC	130	1,044.04	6.66	0.02
P-9	159	8	PVC	130	1,038.58	6.63	0.02
P-14	166	12	PVC	130	1,914.09	5.43	0.008
P-15	164	12	PVC	130	1,910.45	5.42	0.008
P-16	168	12	PVC	130	1,906.81	5.41	0.008
P-17	18	12	PVC	150	1,902.26	5.4	0.006
P-2	187	8	PVC	130	507.37	3.24	0.005
P-3	187	8	PVC	130	500.09	3.19	0.005
P-4	60	8	PVC	130	496.45	3.17	0.005
P-7	161	8	PVC	130	486.44	3.1	0.005
P-8(1)	100	8	PVC	130	481.90	3.08	0.005
P-8(2)	62	8	PVC	130	465.06	2.97	0.004
P-5	126	12	PVC	130	10.01	0.03	0
P-6	183	12	PVC	130	4.55	0.01	0

Potable - Maximum Day + Fire Flow (J-8) and Irrigation (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-12	4,910.35	2.73	5,125.70	93
J-11	4,911.49	0	5,124.38	92
J-13	4,912.40	3.64	5,122.99	91
J-14	4,911.18	3.64	5,121.61	91
J-1	4,909.79	0	5,120.09	91
J-15	4,909.92	4.55	5,120.20	91
J-10	4,913.37	4.55	5,122.64	91
J-2	4,912.09	7.28	5,119.12	90
J-3	4,915.18	3.64	5,118.17	88
J-9	4,916.81	5.46	5,119.46	88
J-4	4,916.20	0	5,117.87	87
J-5	4,919.81	5.46	5,117.87	86
J-7	4,919.15	4.55	5,117.10	86
J-18	4,919.68	16.84	5,116.62	85
J-8	4,920.01	1,503.64	5,116.35	85
J-6	4,924.84	4.55	5,117.87	84

Appendix C
Non-Potable Water System Demands, Model Map,
and WaterCAD Map & Results

COYOTE CREEK FILING NO. 4

NON-POTABLE WATER SYSTEM MAP



Project Name Coyote Creek Filing No. 4
Project Number 16093.00
Date 11/8/2021
By SWW

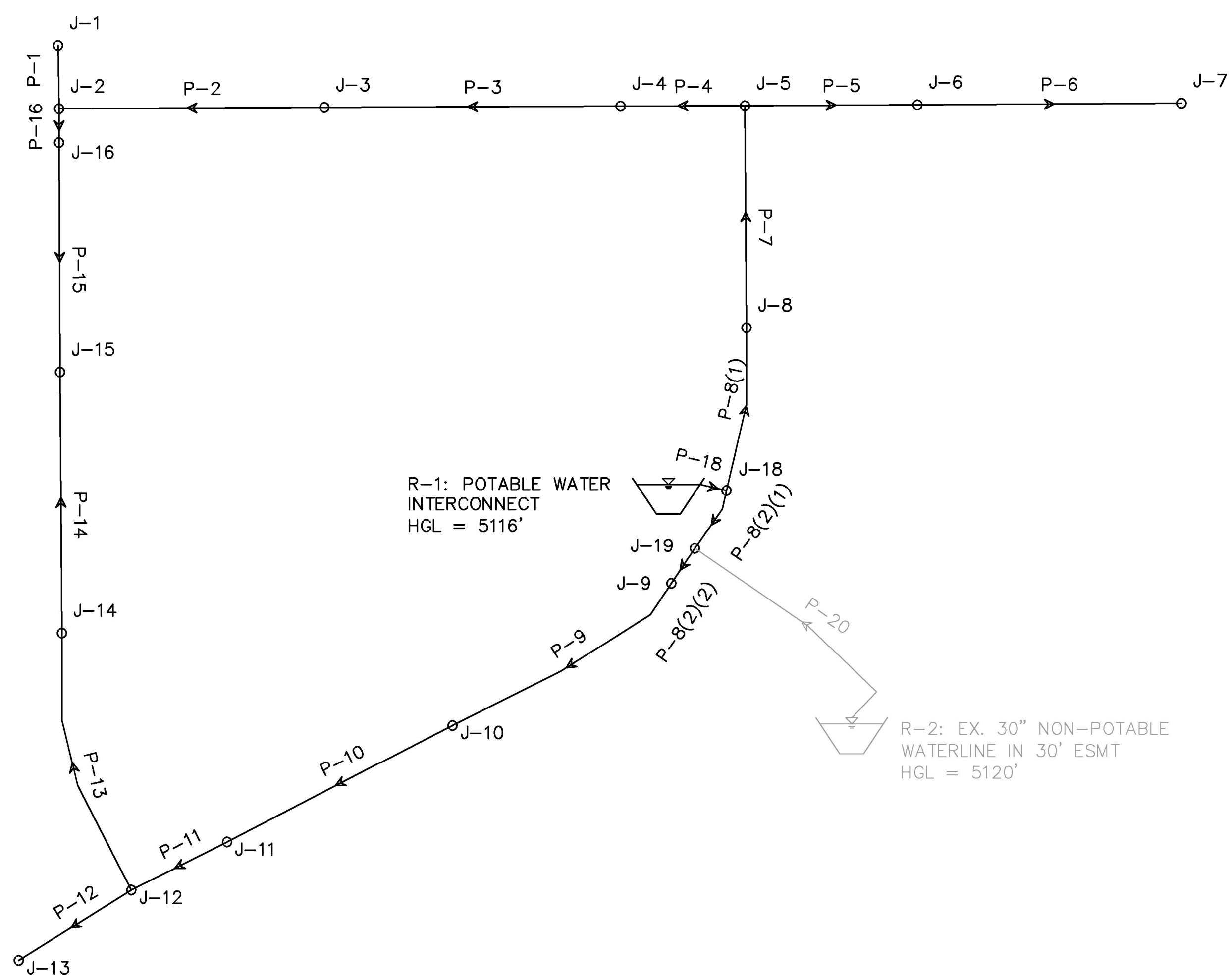
Fort Lupton Criteria	
	Non-Potable
Avg Day Demand (gpm/acre)*	1.55
Max Day Factor	2.5
Max Hour Factor	4

*From the SACWSD Design & Construction Standards

Non-Potable Water Demand										
Junction	Surface Elevation	TOP Elevation	No. DU Served	No. 50'x105' Lots	No. 60'x105' Lots**	Park Area (acres)	Total Irrigated Area (acre)	Demand (gpm)		
								45% Irrigated		75% Irrigated
J-3	4916.97	4911.97	8	8	0		0.434	0.67	1.68	2.69
J-4	4920.06	4915.06	4	3	1		0.228	0.35	0.88	1.41
J-6	4924.70	4919.70	6	4	2		0.347	0.54	1.35	2.15
J-7	4929.42	4924.42	5	2	3.6		0.343	0.53	1.33	2.13
J-8	4924.09	4919.09	5	3	2.4		0.319	0.49	1.24	1.98
J-9	4924.99	4919.99	4	1	4.2		0.328	0.51	1.27	2.03
J-10	4921.79	4916.79	6	6	0		0.325	0.50	1.26	2.02
J-11	4918.35	4913.35	5	4	1.3		0.302	0.47	1.17	1.87
J-13	4915.35	4910.35	3	1	2.6		0.223	0.35	0.87	1.39
J-14	4917.28	4912.28	4	2	2		0.239	0.37	0.92	1.48
J-15	4916.07	4911.07	4	4	0	1	0.967	1.50	3.75	6.00
J-16	4914.98	4909.98	5	3	2		0.293	0.45	1.13	1.82
Total			59	41	21	1	4.35	6.74	16.84	26.95

**Includes lots that are larger than 60'x105', expressed as a multiple of 60'x105' lots based on lot area

COYOTE CREEK FILING NO. 4
NON-POTABLE WATERCAD MAP
WITH POTABLE WATER INTERCONNECT



NON-POTABLE WATERCAD MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 2

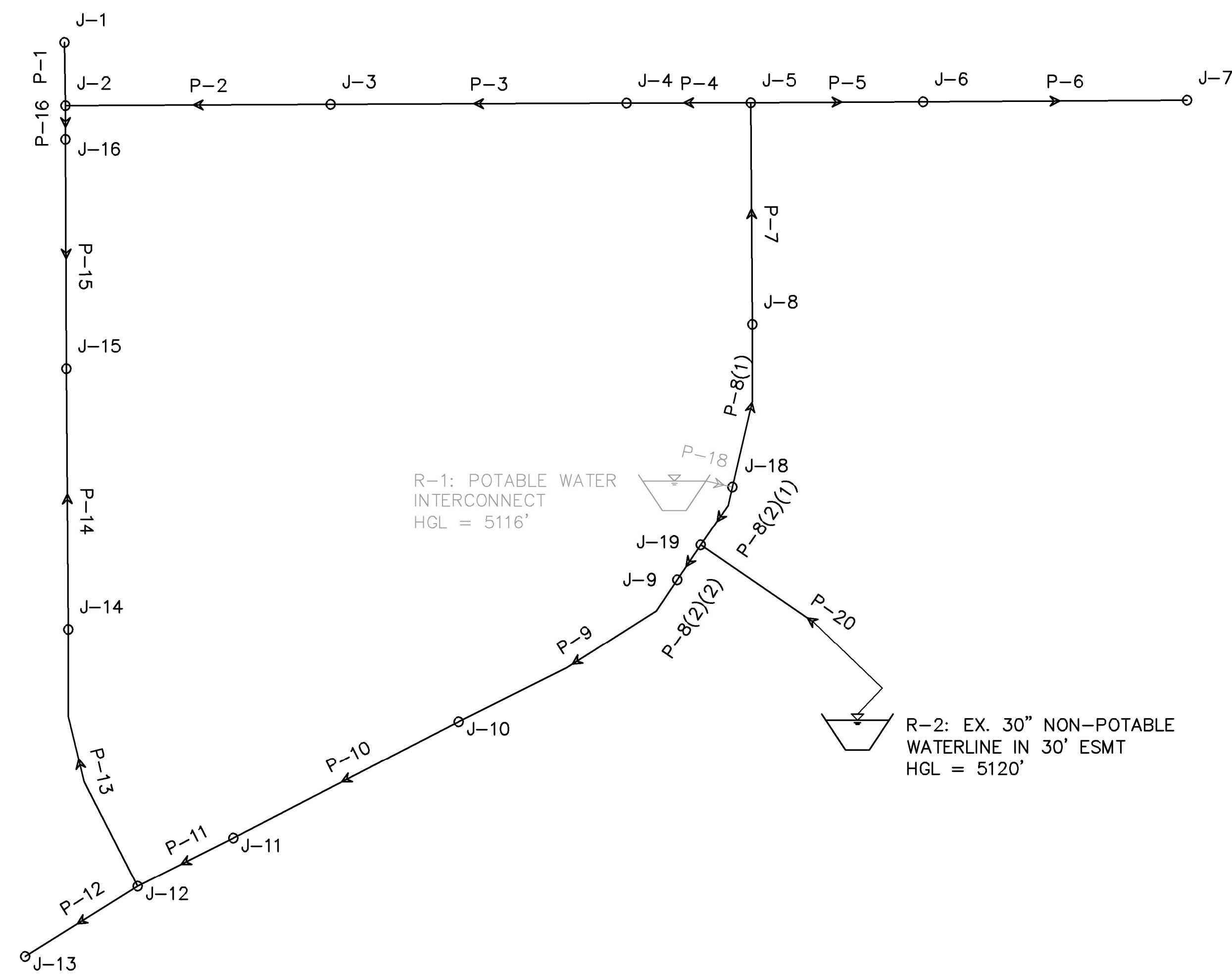


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COYOTE CREEK FILING NO. 4

NON-POTABLE WATERCAD MAP

WITH CONNECTION TO EXISTING 30" NON-POTABLE WATERLINE IN 30' ESMT



NON-POTABLE WATERCAD MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 2 OF 2

Irrigation w/ Potable Interconnect - Maximum Hour (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-18	17	4	PVC	130	26.97	0.69	0.001
P-8(1)	104	4	PVC	130	14.05	0.36	0
P-8(2)(1)	42	4	PVC	130	12.92	0.33	0
P-8(2)(2)	27	4	PVC	130	12.92	0.33	0
P-7	140	4	PVC	130	12.07	0.31	0
P-9	167	4	PVC	130	10.89	0.28	0
P-10	160	4	PVC	130	8.87	0.23	0
P-4	78	4	PVC	130	7.79	0.2	0
P-11	68	4	PVC	130	7	0.18	0
P-3	187	4	PVC	130	6.38	0.16	0
P-13	172	4	PVC	130	5.61	0.14	0
P-5	109	4	PVC	130	4.28	0.11	0
P-14	165	4	PVC	130	4.13	0.11	0
P-2	167	4	PVC	130	3.69	0.09	0
P-16	21	4	PVC	130	3.69	0.09	0
P-6	167	4	PVC	130	2.13	0.05	0
P-15	145	4	PVC	130	1.87	0.05	0
P-12	84	4	PVC	130	1.39	0.04	0
P-1	40	4	PVC	130	0	0	0
P-20	169	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Potable Interconnect - Maximum Hour (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,115.93	89
J-2	4,909.82	0	5,115.93	89
J-16	4,909.98	1.82	5,115.93	89
J-13	4,910.35	1.39	5,115.94	89
J-15	4,911.07	6	5,115.93	89
J-12	4,911.90	0	5,115.94	88
J-3	4,911.97	2.69	5,115.93	88
J-14	4,912.28	1.48	5,115.93	88
J-11	4,913.35	1.87	5,115.94	88
J-4	4,915.06	1.41	5,115.94	87
J-5	4,916.47	0	5,115.95	86
J-10	4,916.79	2.02	5,115.96	86
J-8	4,919.09	1.98	5,115.97	85
J-6	4,919.70	2.15	5,115.94	85
J-9	4,919.99	2.03	5,115.98	85
J-18	4,920.36	0	5,115.99	85
J-19	4,921.74	0	5,115.98	84
J-7	4,924.42	2.13	5,115.94	83

Irrigation w/ Potable Interconnect - Maximum Day (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-18	17	4	PVC	130	16.85	0.43	0
P-8(1)	104	4	PVC	130	8.78	0.22	0
P-8(2)(1)	42	4	PVC	130	8.07	0.21	0
P-8(2)(2)	27	4	PVC	130	8.07	0.21	0
P-7	140	4	PVC	130	7.54	0.19	0
P-9	167	4	PVC	130	6.8	0.17	0
P-10	160	4	PVC	130	5.54	0.14	0
P-4	78	4	PVC	130	4.86	0.12	0
P-11	68	4	PVC	130	4.37	0.11	0
P-3	187	4	PVC	130	3.98	0.1	0
P-13	172	4	PVC	130	3.5	0.09	0
P-5	109	4	PVC	130	2.68	0.07	0
P-14	165	4	PVC	130	2.58	0.07	0
P-2	167	4	PVC	130	2.3	0.06	0
P-16	21	4	PVC	130	2.3	0.06	0
P-6	167	4	PVC	130	1.33	0.03	0
P-15	145	4	PVC	130	1.17	0.03	0
P-12	84	4	PVC	130	0.87	0.02	0
P-1	40	4	PVC	130	0	0	0
P-20	169	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Potable Interconnect - Maximum Day (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,115.97	89
J-2	4,909.82	0	5,115.97	89
J-16	4,909.98	1.13	5,115.97	89
J-13	4,910.35	0.87	5,115.97	89
J-15	4,911.07	3.75	5,115.97	89
J-12	4,911.90	0	5,115.97	88
J-3	4,911.97	1.68	5,115.97	88
J-14	4,912.28	0.92	5,115.97	88
J-11	4,913.35	1.17	5,115.98	88
J-4	4,915.06	0.88	5,115.98	87
J-5	4,916.47	0	5,115.98	86
J-10	4,916.79	1.26	5,115.98	86
J-8	4,919.09	1.24	5,115.99	85
J-6	4,919.70	1.35	5,115.98	85
J-9	4,919.99	1.27	5,115.99	85
J-18	4,920.36	0	5,116.00	85
J-19	4,921.74	0	5,115.99	84
J-7	4,924.42	1.33	5,115.98	83

Irrigation w/ Connection to Ex. 30" - Maximum Hour (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-20	169	4	PVC	130	26.97	0.69	0.001
P-8(2)(2)	27	4	PVC	130	13.56	0.35	0
P-8(1)	104	4	PVC	130	13.41	0.34	0
P-8(2)(1)	42	4	PVC	130	13.41	0.34	0
P-7	140	4	PVC	130	11.43	0.29	0
P-9	167	4	PVC	130	11.53	0.29	0
P-10	160	4	PVC	130	9.51	0.24	0
P-11	68	4	PVC	130	7.64	0.2	0
P-4	78	4	PVC	130	7.15	0.18	0
P-13	172	4	PVC	130	6.25	0.16	0
P-3	187	4	PVC	130	5.74	0.15	0
P-14	165	4	PVC	130	4.77	0.12	0
P-5	109	4	PVC	130	4.28	0.11	0
P-2	167	4	PVC	130	3.05	0.08	0
P-16	21	4	PVC	130	3.05	0.08	0
P-6	167	4	PVC	130	2.13	0.05	0
P-12	84	4	PVC	130	1.39	0.04	0
P-15	145	4	PVC	130	1.23	0.03	0
P-1	40	4	PVC	130	0	0	0
P-18	17	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Connection to Ex. 30" - Maximum Hour (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,119.83	91
J-2	4,909.82	0	5,119.83	91
J-13	4,910.35	1.39	5,119.84	91
J-16	4,909.98	1.82	5,119.83	91
J-3	4,911.97	2.69	5,119.83	90
J-12	4,911.90	0	5,119.84	90
J-14	4,912.28	1.48	5,119.83	90
J-15	4,911.07	6	5,119.83	90
J-4	4,915.06	1.41	5,119.84	89
J-11	4,913.35	1.87	5,119.84	89
J-5	4,916.47	0	5,119.84	88
J-10	4,916.79	2.02	5,119.86	88
J-6	4,919.70	2.15	5,119.84	87
J-8	4,919.09	1.98	5,119.86	87
J-9	4,919.99	2.03	5,119.88	86
J-18	4,920.36	0	5,119.88	86
J-19	4,921.74	0	5,119.89	86
J-7	4,924.42	2.13	5,119.84	85

Irrigation w/ Connection to Ex. 30" - Maximum Day (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-20	169	4	PVC	130	16.85	0.43	0
P-8(2)(2)	27	4	PVC	130	8.47	0.22	0
P-8(1)	104	4	PVC	130	8.38	0.21	0
P-8(2)(1)	42	4	PVC	130	8.38	0.21	0
P-7	140	4	PVC	130	7.14	0.18	0
P-9	167	4	PVC	130	7.2	0.18	0
P-10	160	4	PVC	130	5.94	0.15	0
P-11	68	4	PVC	130	4.77	0.12	0
P-4	78	4	PVC	130	4.46	0.11	0
P-13	172	4	PVC	130	3.9	0.1	0
P-3	187	4	PVC	130	3.58	0.09	0
P-14	165	4	PVC	130	2.98	0.08	0
P-5	109	4	PVC	130	2.68	0.07	0
P-2	167	4	PVC	130	1.9	0.05	0
P-16	21	4	PVC	130	1.9	0.05	0
P-6	167	4	PVC	130	1.33	0.03	0
P-12	84	4	PVC	130	0.87	0.02	0
P-15	145	4	PVC	130	0.77	0.02	0
P-1	40	4	PVC	130	0	0	0
P-18	17	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Connection to Ex. 30" - Maximum Day (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	4,909.51	0	5,119.93	91
J-2	4,909.82	0	5,119.93	91
J-13	4,910.35	0.87	5,119.93	91
J-16	4,909.98	1.13	5,119.93	91
J-3	4,911.97	1.68	5,119.93	90
J-12	4,911.90	0	5,119.93	90
J-14	4,912.28	0.92	5,119.93	90
J-15	4,911.07	3.75	5,119.93	90
J-4	4,915.06	0.88	5,119.93	89
J-11	4,913.35	1.17	5,119.94	89
J-5	4,916.47	0	5,119.93	88
J-10	4,916.79	1.26	5,119.94	88
J-6	4,919.70	1.35	5,119.93	87
J-8	4,919.09	1.24	5,119.94	87
J-9	4,919.99	1.27	5,119.95	87
J-18	4,920.36	0	5,119.95	86
J-19	4,921.74	0	5,119.95	86
J-7	4,924.42	1.33	5,119.93	85

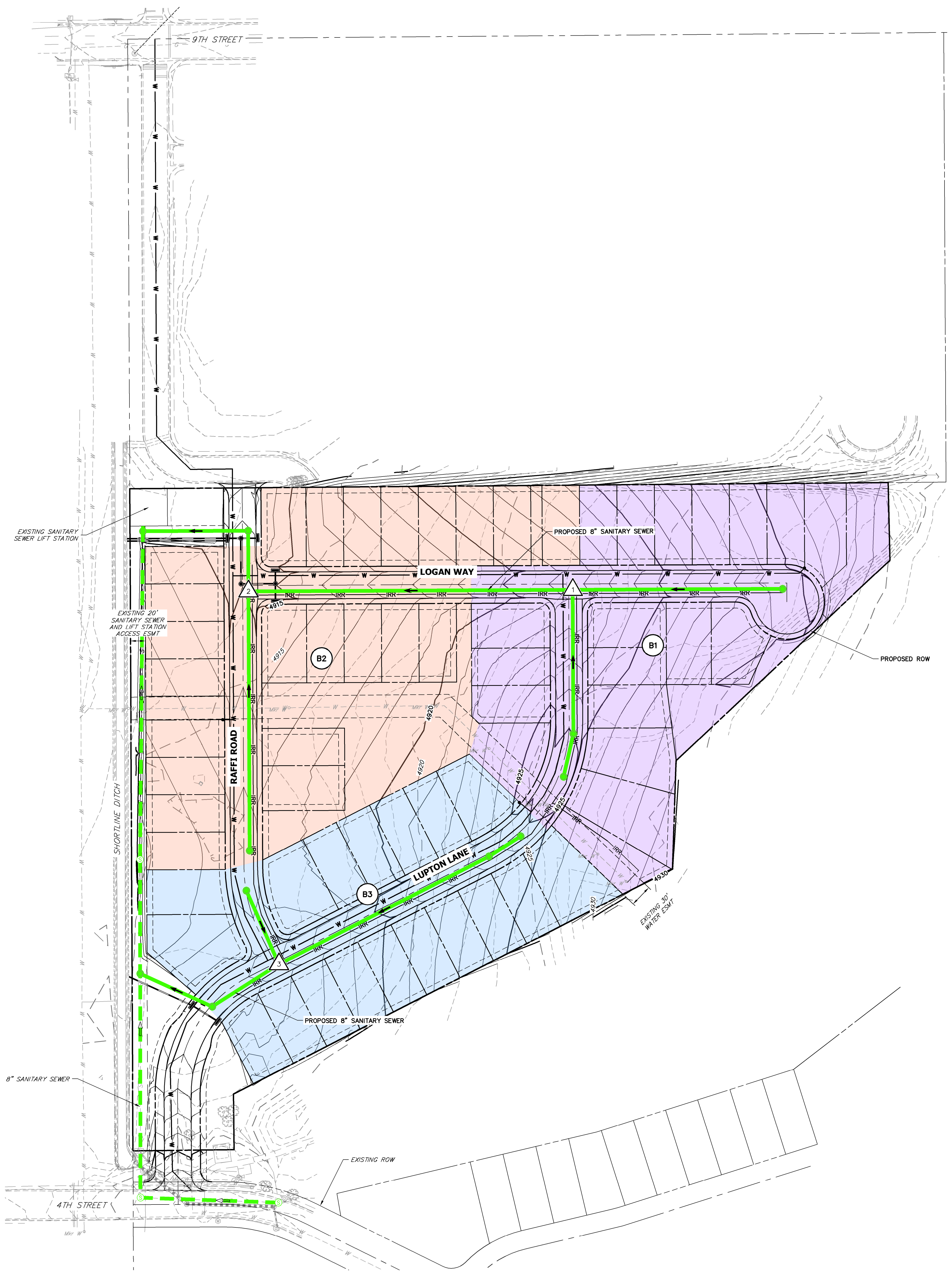
Irrigation w/ Connection to Ex. 30", Minimum System Pressure - Maximum Hour (Pipe)							
Label	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (Maximum) (ft/s)	Headloss Gradient (ft/ft)
P-20	169	4	PVC	130	26.97	0.69	0.001
P-8(2)(2)	27	4	PVC	130	13.56	0.35	0
P-8(1)	104	4	PVC	130	13.41	0.34	0
P-8(2)(1)	42	4	PVC	130	13.41	0.34	0
P-9	167	4	PVC	130	11.53	0.29	0
P-7	140	4	PVC	130	11.43	0.29	0
P-10	160	4	PVC	130	9.51	0.24	0
P-11	68	4	PVC	130	7.64	0.2	0
P-4	78	4	PVC	130	7.15	0.18	0
P-13	172	4	PVC	130	6.25	0.16	0
P-3	187	4	PVC	130	5.74	0.15	0
P-14	165	4	PVC	130	4.77	0.12	0
P-5	109	4	PVC	130	4.28	0.11	0
P-2	167	4	PVC	130	3.05	0.08	0
P-16	21	4	PVC	130	3.05	0.08	0
P-6	167	4	PVC	130	2.13	0.05	0
P-12	84	4	PVC	130	1.39	0.04	0
P-15	145	4	PVC	130	1.23	0.03	0
P-1	40	4	PVC	130	0	0	0
P-18	17	4	PVC	130	(N/A)	(N/A)	(N/A)

Irrigation w/ Connection to Ex. 30", Minimum System Pressure - Maximum Day (Junction)				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-15	4,911.07	6	5,039.83	56
J-13	4,910.35	1.39	5,039.84	56
J-16	4,909.98	1.82	5,039.83	56
J-2	4,909.82	0	5,039.83	56
J-1	4,909.51	0	5,039.83	56
J-11	4,913.35	1.87	5,039.84	55
J-14	4,912.28	1.48	5,039.83	55
J-3	4,911.97	2.69	5,039.83	55
J-12	4,911.90	0	5,039.84	55
J-4	4,915.06	1.41	5,039.84	54
J-10	4,916.79	2.02	5,039.86	53
J-5	4,916.47	0	5,039.84	53
J-18	4,920.36	0	5,039.88	52
J-9	4,919.99	2.03	5,039.88	52
J-6	4,919.70	2.15	5,039.84	52
J-8	4,919.09	1.98	5,039.86	52
J-19	4,921.74	0	5,039.89	51
J-7	4,924.42	2.13	5,039.84	50

Appendix C
Sanitary Sewer System Loading, Basin Map,
and FlowMaster Results

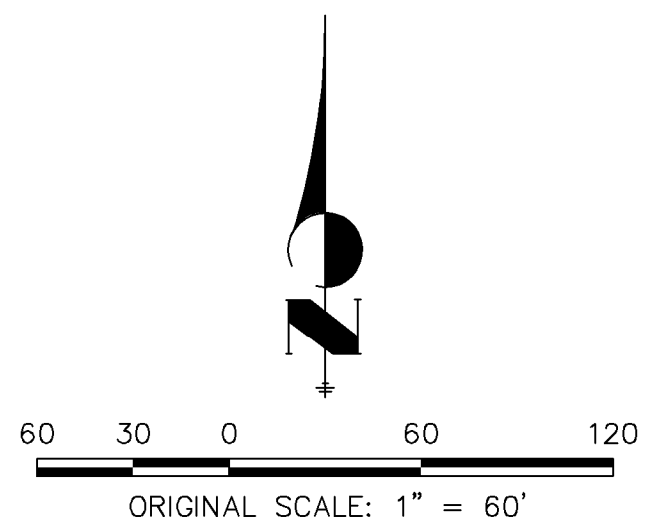
COYOTE CREEK FILING NO. 4

SANITARY SEWER SYSTEM MAP



COLOR CODING LEGEND

- 8" $\varnothing$ PROPOSED SANITARY SEWER MAIN
- 12" $\varnothing$ PROPOSED SANITARY SEWER MAIN
- 8" $\varnothing$ EXISTING SANITARY SEWER MAIN
- PROPOSED SANITARY DRAINAGE ARROW
- EXISTING SANITARY DRAINAGE ARROW
- DESIGN POINT
- SANITARY BASIN DESIGNATION



SANITARY SEWER SYSTEM MAP
COYOTE CREEK FILING NO. 4
JOB NO. 1609300
2021-11-17
SHEET 1 OF 1

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Fort Collins 970-491-9888 • www.jrengineering.com

Project Name Coyote Creek Filing No. 4
 Project Number 16093.00
 Date 11/8/2021
 By SWW

Fort Lupton Criteria	
Residential Population Density (people/unit)	2.90
Average Daily Flow (gpd/person)	70
Peak Factor	3.0
Infiltration and Inflow Rate (gpad)	1000

Onsite Sanitary Sewer Loadings							
Basin	Land Use	Acres	No. DU's	Flow Rate (gpm)			
				Average Day	Peak Day	Infiltration & Inflow	PDF + I&I
B1	Single-Family Residential	4.15	18	2.54	7.61	2.88	10.49
B2	Single-Family Residential	4.63	23	3.24	9.73	3.21	12.94
B3	Single-Family Residential	3.22	18	2.54	7.61	2.23	9.85
Total	PA-4	13.25	59	8.32	24.95		33.28

Worksheet for DP-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.028 ft/ft
Diameter	8.0 in
Discharge	0.02 cfs
Results	
Normal Depth	0.6 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.4 in
Top Width	0.36 ft
Critical Depth	0.8 in
Percent Full	8.1 %
Critical Slope	0.010 ft/ft
Velocity	1.76 ft/s
Velocity Head	0.05 ft
Specific Energy	0.10 ft
Froude Number	1.619
Maximum Discharge	1.87 cfs
Discharge Full	1.74 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	8.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 in
Critical Depth	0.8 in
Channel Slope	0.028 ft/ft
Critical Slope	0.010 ft/ft

Worksheet for DP-2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.015 ft/ft
Diameter	8.0 in
Discharge	0.05 cfs
Results	
Normal Depth	1.1 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.5 ft
Hydraulic Radius	0.7 in
Top Width	0.46 ft
Critical Depth	1.2 in
Percent Full	13.8 %
Critical Slope	0.009 ft/ft
Velocity	1.80 ft/s
Velocity Head	0.05 ft
Specific Energy	0.14 ft
Froude Number	1.261
Maximum Discharge	1.38 cfs
Discharge Full	1.28 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	13.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.1 in
Critical Depth	1.2 in
Channel Slope	0.015 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for DP-3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.017 ft/ft
Diameter	8.0 in
Discharge	0.02 cfs
Results	
Normal Depth	0.7 in
Flow Area	0.0 ft ²
Wetted Perimeter	0.4 ft
Hydraulic Radius	0.5 in
Top Width	0.38 ft
Critical Depth	0.8 in
Percent Full	8.9 %
Critical Slope	0.010 ft/ft
Velocity	1.44 ft/s
Velocity Head	0.03 ft
Specific Energy	0.09 ft
Froude Number	1.262
Maximum Discharge	1.45 cfs
Discharge Full	1.35 cfs
Slope Full	0.000 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	8.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.7 in
Critical Depth	0.8 in
Channel Slope	0.017 ft/ft
Critical Slope	0.010 ft/ft

COYOTE CREEK FILING NO. 4
STORM WATER MANAGEMENT PLAN

November 2021

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(Project No. 16093.00)

CERTIFICATION

I hereby affirm that this Stormwater Management Plan for the Coyote Creek Filing No. 4 project was prepared under my direct supervision in accordance with the provisions of the Colorado Water Quality Control Act and the City of Fort Lupton. JR Engineering does not and will not assume liability for the implementation of the methods, requirements and standards set forth in this report.

Andrew Jonathan Hugill, P.E.
For and On Behalf of JR Engineering

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- A. Figures
 - i. Vicinity Map
 - ii. Soils Map
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- B. Erosion Control Plans

1.0 SITE DESCRIPTION

1.1.Introduction

This report represents the Stormwater Management Plan for construction of Coyote Creek Filing No. 4. It was prepared to meet the regulatory requirements of the Colorado Department of Health, Water Quality Control Division in compliance with the provisions of the Colorado Water Quality Control Act, and the Federal Water Pollution Control Act.

This plan serves as a consolidated document for information on water quality protection for the subject site and areas immediately adjacent. It should also be noted that this plan is a living document that will need to be updated and maintained throughout the construction process. The intent of this plan is to provide the contractor a tool to consolidate records, logs, permits, applications, etc. as well as guidance on water quality protection. The plan incorporates elements that can be found in the contract plans and specifications as well as in the City of Fort Lupton Design Criteria Manual and Construction Specifications.

1.2.Current Conditions

Coyote Creek Filing No. 4 is a proposed single-family residential Planned Unit Development (PUD) located within Section 5, Township 1 North, Range 66 West of the 6th Principal Meridian, City of Fort Lupton, Weld County, Colorado.

The approximately 13-acre site is bounded by the Shortline Ditch regional channel to the west, Twombly Elementary School to the north, and Coyote Creek Golf Course to the southeast and 4th St. to the south. The site is located roughly 1,000 feet north of 1st St. and 600 feet south of 9th St. A vicinity map is included in Appendix A. The site is located within the Coyote Creek Subdivision with the Vincents East Subdivision directly to the west.

The site is composed of type B soils which are characterized as having a moderate infiltration rate when thoroughly wet. Approximately 90 percent of the site is covered in native grasses with the ground generally sloping from east to west between zero and 3 percent.

The proposed use for this site will be a residential subdivision composed of 59 single-family detached units with a local park. There is a 30" irrigation line bisecting the approximate center of the site from east to west.

1.3.Nature and Purpose of Construction

The proposed 4th Filing improvements will consist of 59 single family residential lots, including roadways, sidewalks, and utilities including, but not limited to, sanitary sewer, potable water, non-potable water and storm sewer.

1.4.Wetlands and Receiving Waters

The contributing area is composed of on-site basins. The contributing area has slopes of 0.5% to 5% with the whole range distributed throughout the entire site. All of the proposed 4th Filing development will be routed directly to a regional detention facility constructed by the City of Fort Lupton. The proposed system will consist of overland flow across proposed lots to various low points and a subsurface piped storm system. The site will be developed with access off of both 4th and 9th St. The site will consist of 59 single family-lots. The majority of the runoff from the site will be conveyed west of the site to the existing Shortline Ditch. From there on, stormwater will be routed north to a regional detention pond. There are no major basin problems affecting the site.

The site lies within Zone X, which delineates areas determined to be outside the flood plain with 0.2% annual chance of flooding. The FEMA FIRMETTE MAP can be seen in Appendix A.

1.5.Rainfall Erodibility & Erosion Sediment Control Methods

Attached at the end of the this report is a drawing that describes the proposed site conditions, as well as the locations of the erosion control Best Management Practices (BMPs). The Erosion Control Plan depicts the anticipated drainage patterns after major grading activities and the anticipated locations for BMPs such as silt fence, inlet protection, and staging areas. It has been assumed that the majority of the surrounding areas will remain in their present state during the construction of this project.

The Contractor will be responsible for implementing and maintaining the erosion and sediment control measures described in the document and the accompanying design drawings. The Contractor may designate these tasks to certain subcontractors as he sees fit, but the ultimate responsibility for implementing these controls and their proper function at each phase of the project remains with the Contractor. The order of major activities will be as follows:

1. Install vehicle tracking control and other perimeter soil erosion control measures.
2. Clear and rough grade for improvements.
3. Excavate and install improvements including underground piping, manholes, and drainage structures.
4. Fine grading.
5. Final stabilization.
6. Clean up.

Construction Sequence Chart

	Mobilization	Demolition	Grading	Utilities Installation	Flat work Installation	Vertical Installation	Landscape	Demobilization
Best Management Practices (BMPs)								
Structural "Installation"								
Silt Fence Barriers*								
Vehicle Tracking Pad*								
Inlet Filter Bags*	Any prior inlets that could use protecting							
Rock Bags*	Any prior inlets that could use protecting							
Rip Rap								
Collecting Asphalt / Concrete Saw Cutting Waste								
*All BMPs to be Removed once Construction is Complete.								
Vegetative								
Temporary Seeding Planting		Any time the site will sit dormant longer than 30 Days.						
Mulching/Sealant		Any time the site will sit dormant longer than 30 Days.						
Permanent Seeding Planting								
Sod Installation								
Rolled Products : Netting/Blankets/Mats		Any time the site will sit dormant longer than 30 Days.						

1.6.Non-Stormwater Discharge

Non-stormwater discharges will be eliminated or reduced to the fullest extent feasible. This plan does not cover construction dewatering. Pumping or draining groundwater that has infiltrated into an excavation requires a general permit for construction dewatering, regardless of the size of the project. Stormwater that mixes with groundwater in an excavation is also subject to the controls in the general permit for Construction Dewatering.

No materials shall be discharged in quantities that will have an adverse effect on the receiving waters. The measures listed below will be implemented to achieve these objectives.

- Proper and lawful disposal of all waste materials.
- Control any spills and leaks that may occur and clean up (mitigate).
- Use of designated areas for equipment repair and cleaning.
- Careful application of irrigation water.

All potential pollutants used during construction other than sediment, will be handled and disposed of in a manner that does not contaminate storm water.

All materials used during construction, which have the potential to impact storm water quality will be stored, managed, used and disposed of in a manner that minimizes the potential for releases to the environment, especially storm water.

2.0 STORMWATER MANAGEMENT CONTROLS

2.1.Controls Overview

During construction, several controls and measures shall be implemented under the direction of the General Contractor to prevent offsite discharge of contaminated storm water. Controls for this project include erosion, sedimentation, stabilization, and other BMPs. Specifications and engineering drawings for the selected BMPs can be found on the drawing included in the back pocket of this report.

The contractor shall comply with the attached plans and guidelines as a minimum. Field conditions and unforeseen circumstances will dictate modifications to or additions to this Stormwater Management Plan. Where storm water pollution potential exists, appropriate preventative measures (BMPs) must be utilized and documented, whether such measures are identified in this report or not.

2.2.Erosion and Sediment Controls

The objective of erosion control is to limit the amount of erosion occurring on disturbed areas until the site is stabilized. The objective of sediment control is to capture the soil that has been eroded before it leaves the construction site. Despite the use of both erosion and sediment control measures, it is recognized that some sediment could remain in runoff leaving the construction site. This should be minimized to the maximum extent practicable.

The BMPs scheduled for use during the construction of this site can be divided into Structural and Non-Structural Practices. Section 2.2.1 of this report discusses the proposed structural BMPs to be utilized. Section 2.2.2 discusses the non-structural practices.

2.2.1. Structural Practices (See drawings for locations)

Structural BMPs are structural site management practices that will minimize erosion and sediment transport. Such practices may include silt fences, drainage swales, inlet protections, outlet protection, etc. The goal of structural BMPs on this project is to protect areas downstream of the site from turbid water, sediment, oils and other contaminants, which may mobilize during storm water flows. The structural BMPs that may be utilized on the subject site are depicted in the Drainage and Erosion Control Plan and are described in more detail as follows:

Silt Fence:

- A temporary vertical barrier of filter fabric attached to and supported by posts and entrenched into the ground.
- Utilized to intercept sediment from disturbed areas during construction operations.
- Used to filter shallow sheet flow.
- Typically used along the toe of fills, in transition areas between cut and fills, and adjacent to streams.
- Generally installed prior to or immediately following land-disturbance activity.
- Shall be inspected periodically and after each rain or snowfall event and repaired when necessary. Sediment shall be removed from behind the fence when it accumulates to one-half the exposed fabric height. Sediments removed must be properly disposed.
- Utilized as a temporary feature.

Inlet Protection:

- A barrier across or around a storm drain drop inlet, a curb inlet, or a culvert inlet.
- Utilized to intercept and filter sediment-laden runoff and prevent it from entering storm drainage systems.
- Not to be utilized in place of a sediment-trapping device. Used as a secondary control device.
- Do not use where ponded water might flow onto the roadway.
- Blocking of the inlet should not be watertight.
- Generally installed prior to land-disturbance activity on existing inlets and immediately after the construction of new inlets.
- Shall be inspected periodically and after each rain or snowfall event and repaired when necessary. Accumulated sediment shall be removed and properly disposed.
- Utilized as a temporary feature.

Outlet Protection:

- A structurally lined apron (generally with riprap, grouted rip rap, or concrete) placed at the outlet of pipes or paved channel sections.
- Used as an energy dissipation device to prevent scour and erosion at the outlet by reducing the velocity and energy of concentrated flow.
- Shall be installed immediately following the construction of the upstream conveyance element.
- Inspection shall be performed after high flows for scour and dislodged stones. Repairs shall be made immediately.
- Utilized as a permanent feature.

Grading Techniques:

- Soil surface roughening, terracing and rounding at tops of cuts, transitions and roadway ditches to facilitate plant establishment and minimize erosion.
- Utilized to temporarily stabilize disturbed areas and protect from wind and water erosion immediately after grading activities have ceased.
- Used as a temporary practice during construction.
- Inspection and maintenance must be provided periodically and after each rain or snowfall event that causes runoff to ensure roughened state is maintained.
- Rills developed should be filled and the area re-graded immediately.

Erosion control measures are the responsibility of the General Contractor to inspect and maintain. Any existing erosion control devices that are removed in order to complete the construction of the utilities shall be replaced immediately following the construction that required its removal unless directed otherwise by the *construction plans*.

2.2.2. Non-Structural Practices (See drawings for locations)

Non-Structural BMPs are both interim and permanent stabilization practices. Such practices may include temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, tree protection, preservation of mature vegetation, etc. The non-structural BMPs that may be utilized on the subject site are described in more detail as follows:

Temporary and Permanent Seeding:

- Soil preparation, seeding, mulch tackifier and/or mulching shall be required for all disturbed areas that are not hardscaped, paved, stabilized.
- Exposed soils, which are not part of the active grading and/or construction activity, shall be stabilized.
- Seeded areas shall be inspected frequently. If the seeded areas fail to establish, provide adequate ground coverage. If seeded areas are disturbed, the area should be re-seeded.
- Permanent landscaping and vegetative cover is depicted on the Landscaping plans.

Mulching:

- Application of plant residues to the soil surface. Typical mulching material includes certified weed free hay or straw, certified under the Colorado Department of Agriculture Weed Free Forage Certification Program as regulated by the Weed Free Forage Act, Title 35, Article 27.5, CRS and wood cellulose fiber.
- Utilized in combination with mulch tackifier for temporary erosion control (i.e., incomplete slopes, detour slopes, stockpiles).
- Utilized in combination with mulch tackifier for temporary erosion control on slopes when seeding is not allowed due to seasonal constraints.
- Used to cover permanent or temporary seed areas. Hydromulch shall not be done in the presence of free surface water.

- Inspect frequently and reapply mulching in areas where the mulching has been loosened or removed. Mulch tackifier must be applied with additional applications of mulching.

Mulch Tackifier:

- An organic soluble powder adhesive used as a water slurry to adhere native hay, straw, hydromulch, or seed to a surface and together.
- Used to cover disturbances as temporary cover for wind erosion.
- Mulch movement indicates poor application and procedure mixture.
- Proper application will bond mulch material together and to soil.
- Inspect by touching mulch surface to determine if adhesion has occurred.

Maintain Existing Vegetation:

- Existing vegetation should be preserved where possible to prevent the migration of sediment.
- Should be inspected regularly.
- Establish and maintain buffers.
- Areas beginning to show signs of erosion or soil transport may require additional emergency BMPs.

2.2.3. Other Controls (See drawings for location)

Vehicle Tracking Control / Construction Entrance:

- A temporary stabilized layer of aggregate underlined with geotextile or gravel located where traffic enters or exits the construction site.
- The structure shall be constructed prior to any construction activity and maintained daily.
- Stone shall be added and repairs performed as conditions require.
- When mud is present and not easily removed by a tracking pad, tire washing should be implemented as needed. Tire washing operations should occur near the construction exit on a stabilized stone pad. Implementation of a tire washing area should include provisions for collecting wash water and directing it to an onsite pond.

Tracking of Sediment onto Roads and Streets:

- Public and private roadways shall be kept clear of accumulated sediment. Bulk clearing of accumulated sediment shall not include flushing the area with water. Sediment will be shoveled and or swept from the street and disposed of in a manner that prevents contamination of storm water or surface water runoff.

2.3.SWMP Administrator

Implementation and management of the environmental aspects of this project under this SWMP Plan are the responsibilities of the General Contractor. The General Contractor shall ensure the all contractors providing services on the project have

access to a copy of the SWMP Plan and appropriate training regarding storm water pollution prevention. The General Contractor, Building Contractor, Utility Installations Contractor, Grading Contractor and all other contractors and subcontractors shall be familiar with the SWMP Plan and their responsibilities on the plan.

2.4.Materials Management

2.4.1. Potential Pollution Sources

It is anticipated that this construction project will not utilize any abnormal or atypical hazardous materials. The construction site will operate much like other typical construction projects. The following materials or substances are expected to be present onsite during construction:

Concrete/Additives/Wastes	Cleaning solvents
Detergents	Petroleum based products
Paints/Solvents	Pesticides
Acids	Fertilizers
Solid and construction wastes	Sanitary wastes
Soil stabilization additives	

Activities on the site that may have an impact on stormwater include the following:

- Equipment and/or vehicle washing
- Fertilizers, chemicals, or other material storage
- Vehicle maintenance or fueling
- Waste incineration, treatment, storage or disposal
- Off-site vehicle tracking
- Loading/unloading areas
- Concrete truck washout

As construction progresses, specific areas shall be designated for vehicle maintenance and refueling, material and waste storage, construction equipment staging, and bathroom facilities. Management measures and procedures for these facilities are discussed later in the plan.

2.4.2. Pollution Prevention Measures

Pollution prevention measures shall be utilized to prevent construction materials with the potential of polluting stormwater, such as those listed above, from coming in contact with runoff. Measures include good housekeeping and proper disposal of construction and demolition debris, equipment fuel, lubricants, paints and solvents, asphalt, concrete, topsoil and other materials, as well as controls which prevent

sediments from being tracked off-site by construction vehicles, and proper control of any non-stormwater flows on-site.

As previously stated, Best Management Practices (BMPs) are schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce pollution of public waters. BMPs also control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. With regard to construction, these may include structural controls and nonstructural practices that are designed to prevent pollutants from entering water or direct the flow of water away from potential sources of pollution.

For construction sites, there are three main types of BMPs, those that prevent erosion and sediment transport, others that prevent pollutants from construction materials from mixing with stormwater, and those that trap pollutants before they can be discharged. BMPs for most common construction materials and wastes with the greatest potential for adversely affecting stormwater quality are as follows:

BMPs for Disturbed and Stored Soils:

- Seeding and mulching should be completed for the site
- Soil preparation, seeding, mulch tackifier and/or mulching shall be required for all disturbed areas that are not surfaced.
- Exposed soils, which are not part of the active grading and/or construction activity, shall be stabilized.
- Seeded areas shall be inspected frequently. If the seeded areas fail to establish, provide adequate ground coverage. If seeded areas are disturbed, the area should be re-seeded.
- Permanent landscaping and vegetative cover is depicted on the Landscaping plans.

BMPs for Vehicle Tracking of Sediment:

- Use vehicle tracking pads at the entrances of construction
- Public and private roadways shall be kept clear of accumulated sediment. Bulk clearing of accumulated sediment shall not include flushing the area with water. Sediment will be shoveled and or swept from the street and disposed of in a manner that prevents contamination of storm water or surface water runoff.
- A temporary stabilized layer of aggregate underlined with geotextile or gravel located where traffic enters or exits the construction site.
- The structure shall be constructed prior to any construction activity and maintained daily.
- Stone shall be added and repairs performed as conditions require.
- When mud is present and not easily removed by a tracking pad, tire washing should be implemented as needed. Tire washing operations should occur near the construction exit on a stabilized stone pad. Implementation of a tire washing area should include provisions for collecting wash water and directing it to an onsite pond

BMPs for Management of Contaminated Soils:

- Have equipment to contain and clean up spills of hazardous materials in the vicinity of where these materials are to be stored or used.
- Contain and clean up spills immediately after they occur. Contact State or Local solid waste regulatory agency concerning information and procedures necessary to treat or dispose of contaminated soils.
- Keep materials in a dry covered area and elevated from the ground.

BMPs for Loading and Unloading Operations:

- Select a loading and unloading area for the site

BMPs for Outdoor Storage Activities:

- Select an outdoor storage area for the site
- When possible store equipment and material in covered areas

BMPs for Equipment Maintenance and Fueling:

- Fueling operations shall occur in a designated area.
- Have equipment to contain and clean up petroleum spills in fuel storage areas or on board maintenance and fueling vehicles.
- Where possible, store petroleum products and fuel vehicles in covered areas and construct dikes to contain spills.
- Contain and clean up spills immediately.
- Use preventive maintenance for onsite equipment such as checking for and fixing gas and oil leaks in construction vehicles on a regular basis.
- Follow proper procedure for the handling and application of asphaltic substances.
- Oversee all filling operations.
- Fueling equipment and area shall be fenced and valving locked to prevent vandalism.

BMPs for Significant Particulate Generating:

- Use silt fence and inlet protection to protect the areas downstream of the site
- Maintain and clean out any sediment that builds up around the inlet protection and silt fence

BMPs for On-Site Waste Management:

- Select a designated waste collection area onsite.
- Provide an adequate number of containers with lids or covers that can be placed over the containers prior to rainfall.
- When possible, locate containers in a covered area.
- Arrange for waste collection before containers overflow.
- If a container does spill, provide cleanup immediately.
- Plan for additional containers and more frequent pickups during the demolition phase of construction.

- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.
- Check with local solid waste management agency for specific guidance.
- Trash, debris and spoils shall be properly contained at the END of EACH day.

BMPs for residual Concrete disposal:

- Emptying or wash out of excess concrete may be allowed on site. Excess concrete and wash water should be disposed of in a manner that prevents contact between these materials and stormwater discharges from the site.
- Residual concrete shall be discharged in specifically designated dike areas, which have been prepared to prevent contact between the concrete and/or washout and stormwater discharged from the site and/or ground water.
- The hardened residue from the dike areas shall be disposed of in the same manner as other non-hazardous construction waste materials or may be broke up and utilized as deemed appropriate by the contractor.
- The use of the washout area shall be temporary (less than one year).
- Washing of trucks and masonry equipment is to be performed only at a designated concrete washout. No burying of wastes.

BMPs for Sanitary/Septic Wastes:

- Sanitary or septic wastes that are generated onsite should be treated or disposed of in accordance with State or local requirements.
- If self-contained, temporary facilities are utilized, the domestic waste haulers should be contracted to regularly remove the sanitary and septic wastes and to maintain the facilities in good working order.
- Any facilities to be connected to a sanitary sewer system should be properly hooked to the sanitary sewer system to prevent illicit discharges.
- Untreated, raw sewage should never be discharged or buried onsite.
- Contact local government and State regulatory agencies to ensure the compliance with State or local requirements.
- If sewage is being discharged to the sanitary sewer, the local treatment works authority should be contacted.

BMPs for pesticides:

- Store pesticides in a dry covered area and elevate above the ground.
- Provide curbs or dikes to contain possible spills.
- Have measures on site to contain and clean up spills.
- Strictly follow recommended application rates and recommended application methods.
- Only a Certified Applicator shall use pesticides.

BMPs for Fertilizers/Detergents:

- Limit the application of fertilizers to the minimum area and minimum recommended amounts.

- Reduce exposure of nutrients to storm water runoff by working the fertilizer deep into the soil.
- Apply fertilizer more frequently, but at lower application rates.
- Hydro seeding, where lime and fertilizers are applied to the ground surface in one application should be limited, where possible.
- Limit the use of detergents onsite: wash water containing detergents should not be discharged to the storm system.
- Implement good erosion and sediment control to help reduce the amount of fertilizers that can leave the site as well as sediments.
- Fertilizers and detergents shall be stored in dry and covered area and elevated above the ground.
- Berming shall be provided around the storage area to avoid contact with stormwater runoff.

BMPs for Hazardous Wastes Disposal:

- Check with local waste management authorities to determine what the requirements are for disposing of hazardous materials.
- Use the entire product before disposing of the container.
- Do not remove the original product label from the container. It contains important information.
- Do not mix products together unless specifically recommended by the manufacturer.
- The correct disposal of these products varies with the product utilized. Follow the manufacturers recommended method, which is often found on the label.

2.5.Spill Management

Construction site supervisors should create and adopt a spill control plan that includes measures and procedures to stop the source of the spill, contain the spill, clean up, and disposal of contaminated materials. Key personnel shall be identified and trained to be responsible for spill prevention and control. The following measures would be appropriate for a spill prevention and response plan:

- Store and handle materials to prevent spills.
 - Tightly seal containers.
 - Make sure all containers are clearly labeled.
 - Stack containers neatly and securely
 - Where possible, store containers on pallets in a covered area.
- Reduce stormwater contact if there is a spill.
 - Have cleanup procedures clearly posted.
 - Have cleanup materials readily available.
 - Contain any liquid.
 - Stop the source of the spill.
 - Cover spill with absorbent material.
- Dispose of contaminated materials according to manufacturer's instructions or according to State or local requirements.

- Identify personnel responsible for responding to a spill of toxic or hazardous materials.
 - Provide personnel spill response training.
 - Post names of spill response personnel.
- Keep the spill area well ventilated.

Additionally, records of spills, leaks, or overflows that result in the discharge of pollutants must be documented and maintained. Information such as the time and date, weather conditions, response procedure taken, response personnel involved, reasons for the spill, etc., shall be recorded for all occurrences in the SWMP Plan and on the map.

Spill Categories are as follows:

Minor Spills

- Any event that involves 5 gallons or more and or involves the following:
- Less than the reportable quantity
- Stays within the permitted area
- Does not threaten any stormwater conveyances

Significant Spills

- Reportable Quantity (SARA title III List of Lists, available from EPA for reportable quantity)
- Any amount leaving the permitted area
- And/or threatens any water conveyances.

Hazardous Spills

- Any substance requiring a MSDS response.
- Procedure shall include but limited to:
 - Secure the area
 - Provide first aid
 - Notify emergency response personnel

Some spills may need to be reported to the Division of Water Quality and the City of Fort Lupton immediately. Specifically significant spills that are, a release of any chemical, oil, petroleum product, sewage, etc., which may enter waters of the State of Colorado (which include surface water, ground water and dry gullies or storm sewers leading to surface water), any spill that exceeds the reportable quantity, and any amount that leaves the permitted area must be reported. The Division's toll-free 24-hour environmental emergency spill reporting line is 1-877-518-5608. Written documentation to both the CDPHE (Division) and the City of Fort Lupton of significant spills should be provided within 5 days.

3.0 Dry Land Vegetation

3.1. Soil and Surface Conditions

The Coyote Creek Filing No. 4 site consists of Nelson fine sandy loams and Olney fine sandy loams, which the USDA-NSCS classifies as Type B soils. Type B soils have a moderated infiltration rate when thoroughly wet and chiefly consist of soils that have moderately fine texture to moderately coarse texture. See Appendix A for the soil map.

3.2. Seed Mixes

A standard City of Fort Lupton seed mix should be used for the site. If a standard mix is not used than a request to the City must be submitted of the preferred seed mix with the application rates.

3.3. Mulches

Typical mulching material includes certified weed free hay or straw, certified under the Colorado Department of Agriculture Weed Free Forage Certification Program as regulated by the Weed Free Forage Act, Title 35, Article 27.5, CRS and wood cellulose fiber. Mulch should be utilized in combination with mulch tackifier for temporary erosion control (i.e., incomplete slopes, detour slopes, stockpiles) when seeding is not allowed due to seasonal constraints. Mulch is also used to cover permanent or temporary seed areas. The mulch should be inspected frequently and reapplied in areas where the mulch has been loosened or removed. Mulch tackifier must be applied with additional applications of mulching.

4.0 Detailed Sequence of Construction Activities

Sequence of Land Disturbing Activity Chart

	<i>Mobilization</i>	<i>Demolitio n</i>	<i>Gradin g</i>	<i>Utilities Installatio n</i>	<i>Flat work Installatio n</i>	<i>Vertical Installatio n</i>	<i>Landscape</i>	<i>Demobilizatio n</i>
Best Management Practices (BMPs)								
Structural "Installation"								
Silt Fence Barriers*								
Vehicle Tracking Pad*								
Inlet Filter Bags*	Any prior inlets that could use protecting							
Rock Bags*	Any prior inlets that could use protecting							
Rip Rap								

Collecting Asphalt / Concrete Saw Cutting Waste								
*All BMPs to be Removed once Construction is Complete.								
Vegetative								
Temporary Seeding Planting		Any time the site will sit dormant longer than 30 Days.						
Mulching/Sealant		Any time the site will sit dormant longer than 30 Days.						
Permanent Seeding Planting								
Sod Installation								
Rolled Products : Netting/Blankets/Mats		Any time the site will sit dormant longer than 30 Days.						

5.0 Inspection and Maintenance

5.1. Inspection and Maintenance Overview

A site inspection of all erosion control facilities shall be conducted at least once every two weeks and immediately following any significant precipitation or snowmelt event that could cause surface erosion and every 30 days for inactive construction projects. The inspection must determine if there is evidence of, or the potential for, pollutants entering the drainage system, and BMPs should be reviewed to determine if they still meet the design and operational criteria in the SWMP Plan and that they continue to adequately control pollutants at the site. The construction site perimeter, disturbed areas, discharge points and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the storm drainage system. Erosion and sediment control measures identified in this SWPM Plan and on the construction plans shall be observed to ensure that they are operating correctly. Any other structural BMPs that may require maintenance, such as secondary containment around fuel tanks or the conditions of spill response kits shall also be inspected. Stormwater items to be inspected include the following:

- Condition & failures of structural & non-structural BMPs
- Perimeter and outfall structure
- Evidence of spills, upsets & discharges
- Maintaining accurate SWMP Plan documentation
- Material Handling and storage
- Good Housekeeping
- Site Stabilization
- Meet authorities during inspections
- Update permit disturbed acreage
- Equipment and vehicle storage area
- Maintenance records of equipment, systems & operations

The project site and the adjacent streets impacted by the construction shall be kept neat, clean and free of debris. The control measures and facilities need to be maintained in good working order. Any items that are not functioning properly or are inadequate should be promptly repaired or upgraded. The site shall be inspected by responsible personnel who are familiar with the site. Inspection and monitoring will follow the procedures outlined below:

Minimum Monitoring (Inspection) Requirements:

- Inspections of the construction site shall be conducted by the contractor (or agent) every two weeks and after significant storm events.
- The qualified site superintendent familiar with this SWMP Plan /BMP shall perform the inspections.
- The contractor shall certify the site is in compliance with the SWMP Plan /BMP and the permit by:
 - Ensuring that areas contributing significant storm water discharges related to the construction activities have been identified.
 - Evaluating preventive measures required by the SWMP Plan /BMP to insure they are adequate and has been properly implemented.
 - Points of discharge from the site will be inspected to check for signs of pollutant discharge.
 - Certifying the grade elevations and capacity of permanent sedimentation facilities.
 - Determining if additional control measures will need to be implemented.
 - Updating this SWMP Plan if new measures are implemented or existing controls are deleted.

Based on the results of the inspection, the description of potential pollutant sources, and the pollution prevention and control measures that are identified within this plan shall be revised and modified as appropriate and as soon as practicable after such inspection. Typically corrective action shall commence immediately when a deficiency is observed.

In addition to the inspections performed at least every 7 days, several daily inspections will be required. Each day when any type of construction activity has taken place onsite, qualified personnel provided by the General Contractor shall:

- Inspect all onsite areas where petroleum products are stored, used or handled for spills and leaks from vehicles and equipment.
- Inspect all onsite locations where vehicle enter or exit the site for evidence of offsite sediment tracking.

5.2.Final Stabilization and Long Term Stormwater Management

Permanent stabilization will be achieved by establishing a vegetative cover on all disturbed areas. The vegetative cover will be as specified on the Landscape Plan. Final stabilization shall be considered complete when all paving and landscaping are completed and the vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels (including shrubs and trees).

In general spring and fall encouraged whenever possible. Temporary and permanent seeding shall be completed within 14 days after grading has ceased and left to idle for more than 30 days. Care should be taken to complete seeding activities prior to November 1st for disturbed land intending to remain inactive for the winter months.

Roughening and scarifying disturbed areas is allowed as a temporary stabilization with the following conditions:

- During winter activity
- Intended to seeded in the spring fall seasons
- Intended to be active within 2-3 months of inactivity (with Stormwater approval)

Management of storm water after completion of construction will be accomplished by utilizing the practices listed below:

- Upon completion of construction, the site shall be inspected to ensure that all equipment, waste materials, and debris have been removed.
- The site will be inspected to make certain that all graded surfaces have been landscaped or seeded with an appropriate ground cover.
- Upon acceptance of final stabilization measures, all temporary BMP's shall be removed and proper function of inlets, drainage ways, or other storm water conveyance elements shall be restored.
- The storm sewer systems and the detention pond will be returned to full capacity and the outlet structures will be checked to assure they are unclogged and in working order.

The General Contractor shall be responsible for maintaining the storm water controls in good working order including removal measures until the Inactivation Notice is filed with the State. The state requires the Inactivation Notice be filed within 3 months of the proposed end of construction. Alternatively, permit responsibilities may be transferred or reassigned by submitting a Notice of Transfer and Acceptance of Terms or a Reassignment of Coverage if control of a portion of the site changes parties.

6.0 CONCLUSION

This Stormwater Management Plan has been prepared in accordance with the criteria and methods described in the “State of Colorado General Permit Application and Stormwater Management Plan Guidance for Stormwater Discharges Associated with Construction Activity.” The drainage system has been designed to comply with the regulatory requirements of the City of Fort Lupton Design Criteria Manual and Construction Specifications. All temporary and permanent erosion and sediment control BMPs shall be inspected, maintained and repaired by the General Contractor as needed to ensure continued performance of their intended function.

The General Contractor shall remove all temporary erosion and sediment control BMPs after stabilization is achieved or after temporary BMPs are no longer needed. Trapped sediment will be removed by the General Contractor or stabilized onsite. Disturbed soil areas resulting from removal of BMPs will be to be permanently stabilized with vegetation as soon as possible.

7.0 REFERENCES

1. Urban Storm Drainage Criteria Manual (Volumes 1, 2, and 3), Urban Drainage and Flood Control District, (Rev. April 2008)
2. “Hydrologic Group Rating for Larimer County Area, Colorado”, USDA-Natural Resources Conservation Service, National Cooperative Soil Survey. Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>.

APPENDIX A
Figures



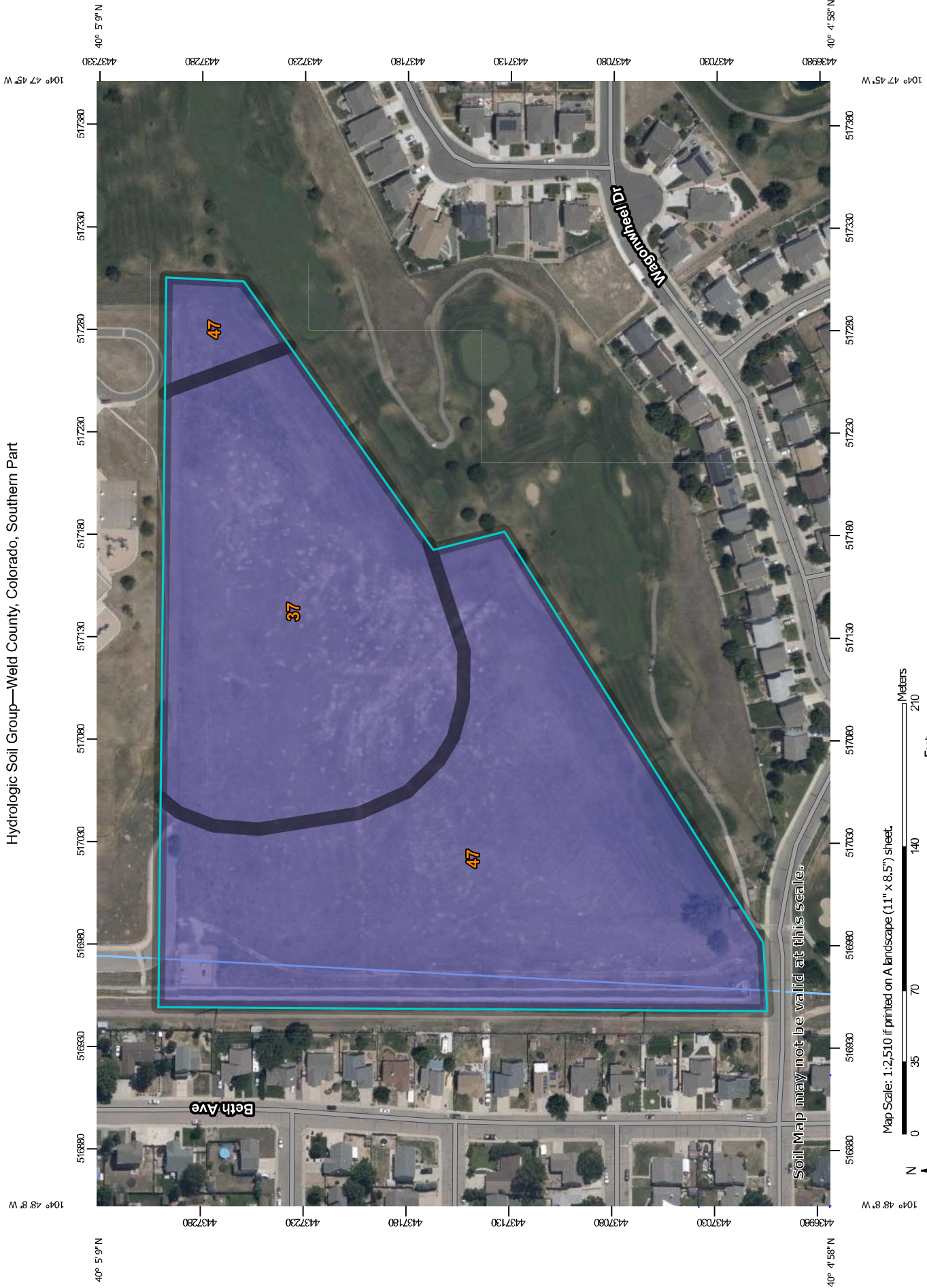
500 250 0 500
ORIGINAL SCALE: 1" = 500'

APPENDIX A
VICINITY MAP
JOB NO. 16093.00
2021-11-10
SHEET 1 OF 1



J-R ENGINEERING
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com



Map Scale: 1:2,510 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

C

C/D

D

Not rated or not available

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 20, Aug 31, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
37	Nelson fine sandy loam, 0 to 3 percent slopes	B	6.7	41.0%
47	Olney fine sandy loam, 1 to 3 percent slopes	B	9.6	59.0%
Totals for Area of Interest			16.2	100.0%

Description

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.

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.

Rating Options

Aggregation Method: Dominant Condition

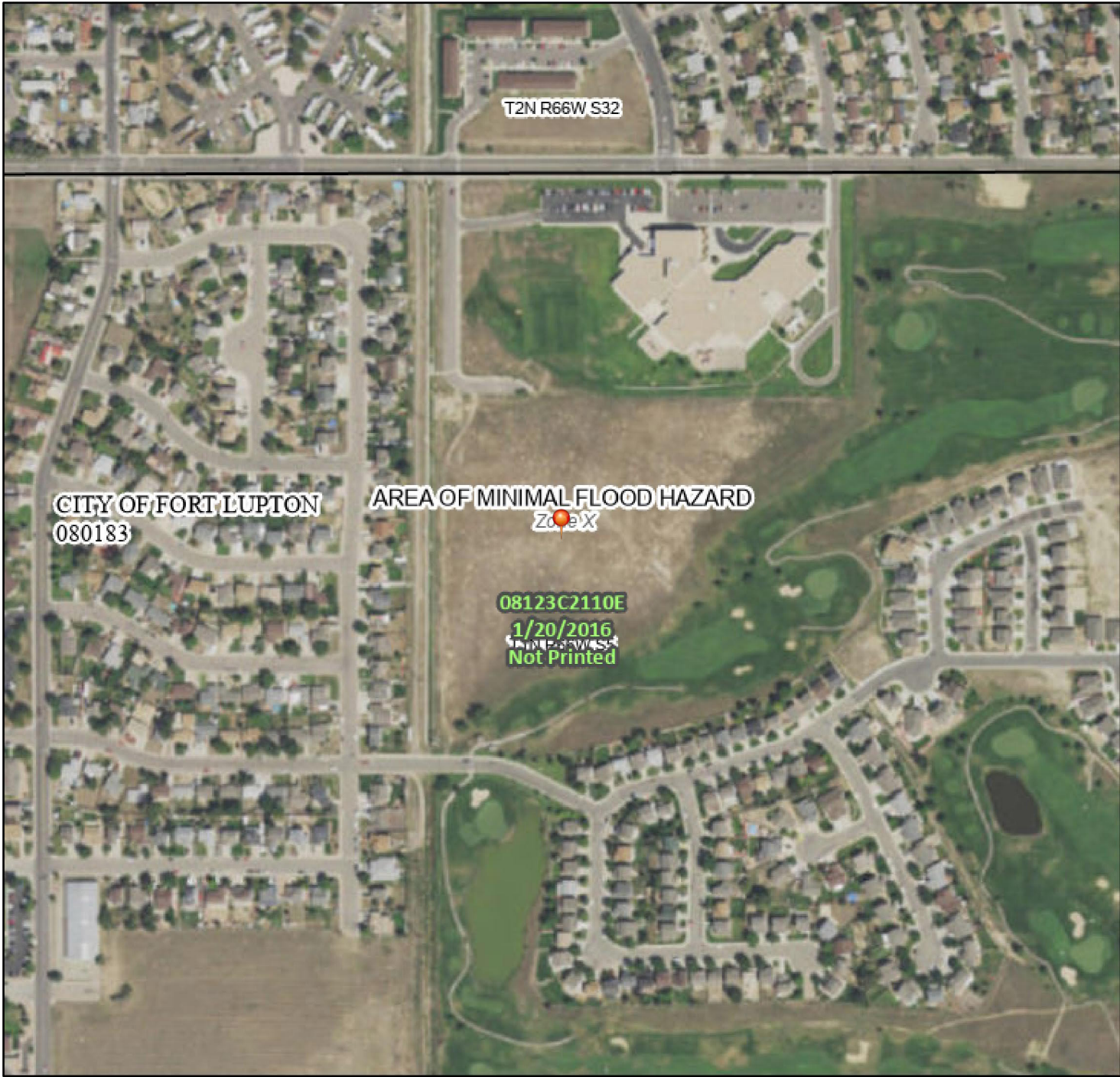
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMMette



104°48'18"W 40°5'19"N



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 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

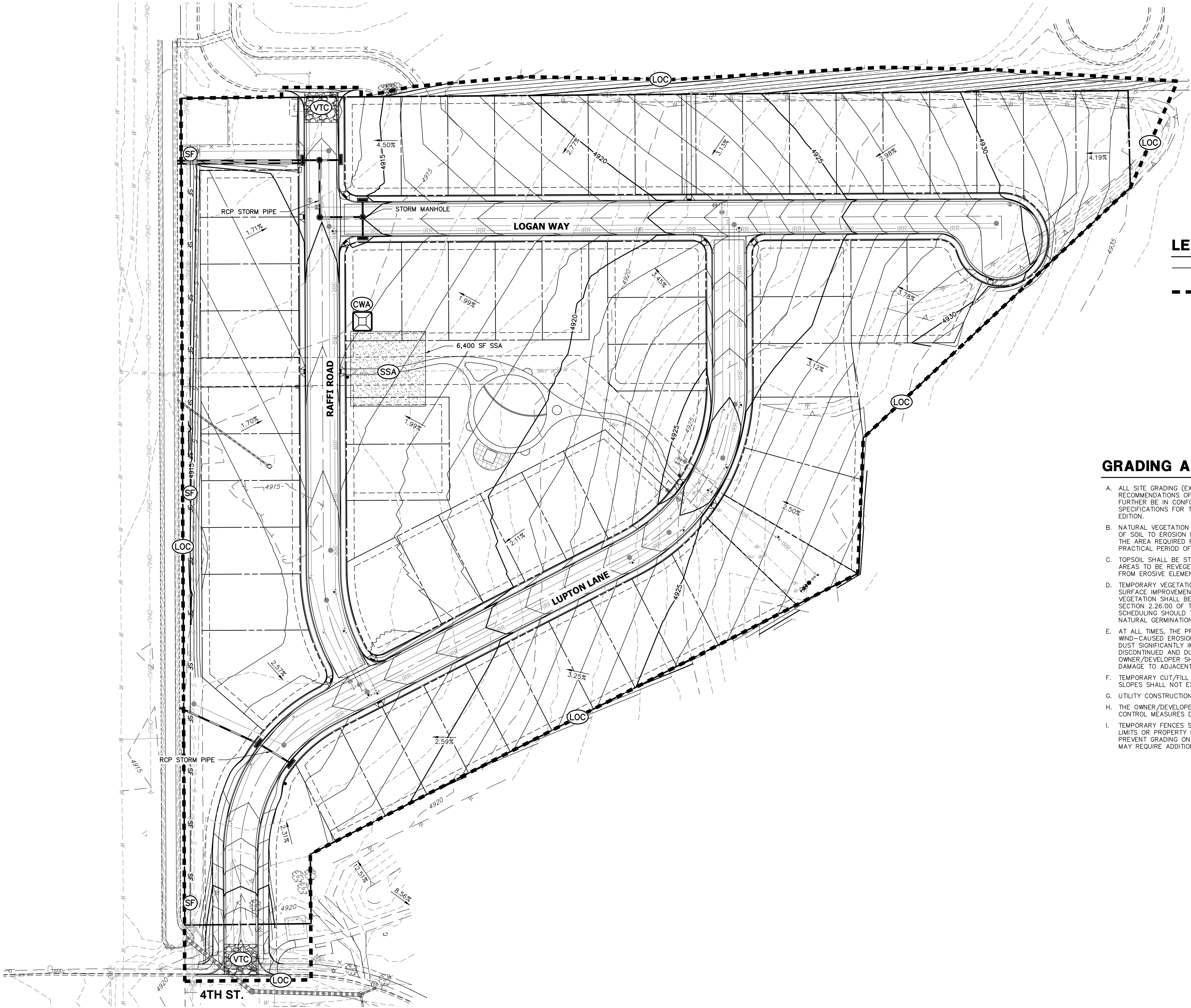
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/16/2021 at 11:30 AM 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.

APPENDIX B
Erosion Control Plans

COYOTE CREEK FILING NO. 4

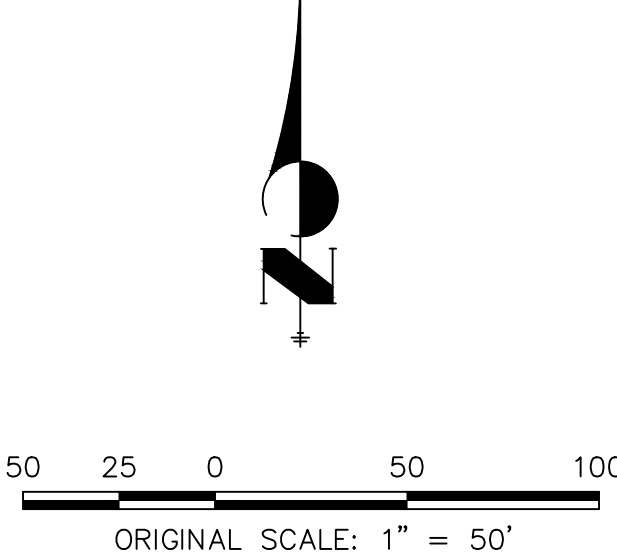


LEGEND

- SF — SF — SF — SILT FENCE
- LOC --- LIMITS OF CONSTRUCTION
- VTC VEHICLE TRACKING CONTROL
- CWA CONCRETE WASHOUT AREA
- IP INLET PROTECTION
- SCL SEDIMENT CONTROL LOG
- SSA STABILIZED STAGING AREA

GRADING AND EROSION CONTROL NOTES

- A. ALL SITE GRADING (EXCAVATION, EMBANKMENT, AND COMPACTION) SHALL CONFORM TO THE RECOMMENDATIONS OF THE LATEST SOILS INVESTIGATION FOR THIS PROPERTY AND SHALL FURTHER BE IN CONFORMANCE WITH THE CITY OF FORT LUPTON'S "STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS," LATEST EDITION.
- B. NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATION AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
- C. TOPSOIL SHALL BE STOCKPILED TO THE EXTENT PRACTICABLE ON THE SITE FOR USE ON AREAS TO BE REVEGETATED. ANY AND ALL STOCKPILES SHALL BE LOCATED AND PROTECTED FROM EROSION ELEMENTS.
- D. TEMPORARY VEGETATION SHALL BE INSTALLED ON ALL DISTURBED AREAS WHERE PERMANENT SURFACE IMPROVEMENTS ARE NOT SCHEDULED FOR INSTALLATION WITHIN THREE MONTHS. VEGETATION SHALL BE A VIGOROUS, DROUGHT TOLERANT, NATIVE SPECIES MIX. (REFER TO SECTION 2.26.00 OF THESE STANDARDS AND SPECIFICATIONS FOR SEEDING MIX.) PROJECT SCHEDULING SHOULD TAKE ADVANTAGE OF SPRING OR FALL PLANTING SEASONS FOR NATURAL GERMINATION, BUT SEEDED AREAS SHALL BE IRRIGATED, IF CONDITIONS SO MERIT.
- E. AT ALL TIMES, THE PROPERTY SHALL BE MAINTAINED AND/OR WATERED TO PREVENT WIND-CAUSED EROSION. EARTHWORK OPERATIONS SHALL BE DISCONTINUED WHEN FUGITIVE DUST SIGNIFICANTLY IMPACTS ADJACENT PROPERTY. IF EARTHWORK IS COMPLETE OR DISCONTINUED AND DUST FROM THE SITE CONTINUES TO CREATE PROBLEMS, THE OWNER/DEVELOPER SHALL IMMEDIATELY INSTITUTE MITIGATIVE MEASURES AND SHALL CORRECT DAMAGE TO ADJACENT PROPERTY.
- F. TEMPORARY CUT/FILL SLOPES SHALL NOT EXCEED A STEEPNESS OF 2:1 (2H:1V). PERMANENT SLOPES SHALL NOT EXCEED 4:1 (4H:1V) IN AREAS TO BE SEEDED OR SODDED.
- G. UTILITY CONSTRUCTION IS NOT APPROVED UNDER THIS PLAN.
- H. THE OWNER/DEVELOPER SHALL PROVIDE ANY ADDITIONAL DUST ABATEMENT AND EROSION CONTROL MEASURES DEEMED NECESSARY BY THE CITY, SHOULD CONDITIONS MERIT THEM.
- I. TEMPORARY FENCES SHALL BE INSTALLED ALONG ALL BOUNDARIES OF THE CONSTRUCTION LIMITS OR PROPERTY LINES AS SHOWN ON THE APPROVED EROSION CONTROL PLAN, TO PREVENT GRADING ON PROPERTY NOT OWNED BY THE DEVELOPER. IN ADDITION, THE CITY MAY REQUIRE ADDITIONAL TEMPORARY FENCES IF FIELD CONDITIONS SO MERIT THEM.



UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, OR ENGINEERING APPROVES THEIR USE, THESE DRAWINGS ARE DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
P-303.587.1966

J.R. ENGINEERING
A Western Company

Central 303-740-9888 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET	OF	JOB NO.
1"=50'	N/A	11/17/21	AUH	CRB		4	27	16093.00
COYOTE CREEK FILING NO. 4								
PRELIMINARY GRADING & EROSION CONTROL PLAN								



WILL SERVE LETTER

November 11, 2021

Lupton Land LLC
10221 Prestwick Trail
Lone Tree, CO 80124

Re: Coyote Creek Golf Course: Filing Four

Dear Bob Quinette,

This letter is to confirm that Xcel Energy is your utility provider for natural gas. In accordance with our tariffs, on file with and approved by the Colorado Public Utilities Commission, gas facilities can be made available to serve the project at Coyote Creek Golf Course, Filing Four. The cost, and whether any reinforcements or extensions are required, for the Company to provide those facilities will be determined by your designer upon receipt of application and project plans.

Your utility service(s) will be provided after the following steps are completed:

- ***Application submitted to Xcel Energy's "Builders Call Line (BCL)"*** – once your application is accepted you will be assigned a design department representative who will be your primary point of contact
- ***Utility design is completed*** – you must provide your design representative with the site plan, the one - line diagrams, and panel schedules for electric and gas loads if applicable
- ***All documents provided by design representative are signed and returned***
- ***Payment is received*** (Residential Service Laterals if applicable)
- ***Required easements are granted*** - you must sign and return applicable easement documents to your Right-of-Way agent
- ***Site is ready for utility construction*** - the site ready information can be found on our website at may be viewed at [Construction and Inspection | Xcel Energy](https://www.xcelenergy.com/ConstructionAndInspection).

An estimated scheduled in-service date will be provided once these requirements have been met. It is important to keep in mind that the terms and conditions of utility service, per our tariffs, require that you provide adequate space and an easement on your property for all gas and electric facilities required to serve your project, including but not limited to gas and electrical lines and meters, transformers, and pedestals. General guidelines for requirements can be found on our website at [xcelenergy.com/InstallAndConnect](https://www.xcelenergy.com/InstallAndConnect).

Xcel Energy looks forward to working with you on your project and if I can be of further assistance, please contact me at the phone number or email listed below.

Sincerely,

Amy Caswell
Xcel Energy Technician

Mailing address: Public Service Company of Colorado
5460 W 60th Ave
Arvada, CO 80003



November 16, 2021

Lee Eisenheim
Challenger Homes
8605 Exploerer Dr Suite 250
Colorado Springs, CO 80920

Dear Lee Eisenheim:

United Power is the provider of electric service in the area to the proposed Subdivision Coyote Creek, located in the Town of Fort Lupton, County of Weld, state of Colorado.

There is electrical distribution in the area that may or may not need to be upgraded, depending on the requirements of the site, in order to provide capacity and safe reliable power to the area. Service will be provided according to the rules, regulations, and policies in effect by United Power at the time service is requested.

We look forward to this opportunity to provide electric service. If you have any questions, please give me a call at 303-618-2987.
Sincerely,

Michael Neu

Michael Neu
Project Manager - West District
MKN: mz



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: 12/22/2021

Project name: Coyote Creek Filing No. 4

Project address: Parcel: 147105100053, Fort Lupton, CO 80621

FLFPD Project # R2021-0043

Plan reviewer: Taw Tamlin, Fire Marshal

The Fire District has reviewed the submittal for **Coyote Creek Filing No. 4** located at **Parcel: 147105100053**, 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.
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.
 - 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 and parking areas.
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.

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.
 - 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.
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.

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.
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.
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



Fort Lupton Fire Protection District

1121 Denver Avenue • Fort Lupton, Colorado 80621

Office: (303)857-4603 • Fax: (303)857-6619 • Website: www.fortluptonfire.org

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.

Please contact Fire Marshal, Taw Tamlin at 303-857-4603 or ttamlin@ftluptonfire.com if you have questions or need further assistance.



Turning Performance Analysis

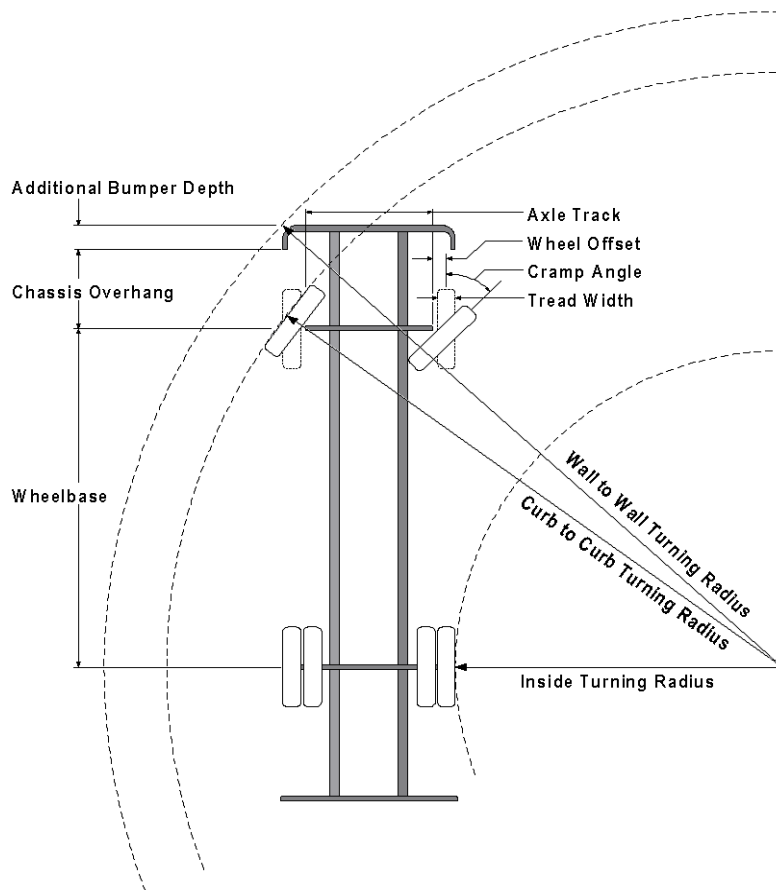
12/6/2012

Bid Number: 299

Department:

Chassis: Arrow-XT Chassis, PAP/SkyArm/Midmount MUX, 2010

Body: Aerial, Platform 100', Alum Body



Parameters:

Inside Cramp Angle:	45°
Axle Track:	82.92 in.
Wheel Offset:	5.25 in.
Tread Width:	17.4 in.
Chassis Overhang:	68.99 in.
Additional Bumper Depth:	19 in.
Front Overhang:	156.6 in.
Wheelbase:	247 in.

Calculated Turning Radii:

Inside Turn:	19 ft. 5 in.
Curb to curb:	35 ft. 6 in.
Wall to wall:	44 ft. 2 in.

Comments:

CategoryID	Category Description	OptionCode	OptionDescription
6	Axle, Front, Custom	0018453	Axle, Front, Oshkosh TAK-4, Non Drive, 22,800 lb, DLX/Enf/Qtm/AXT
30	Wheels, Front	0001656	Wheels, Front, 22.50" x 12.25", Steel, Hub Pilot
31	Tires, Front	0594821	Tires, Front, Goodyear, G296 MSA, 425/65R22.50, 20 ply
38	Bumpers	0550016	Bumper, 19" Extended, AXT, Dash CF
437	Aerial Devices	0592931	Aerial, 100' Pierce Platform, 50 MPH Wind Rating, 150lb Tip Load Allowance

Notes:

Actual Inside Cramp Angle may be less due to highly specialized options.

Curb to Curb turning radius calculated for a 9.00 inch curb.



Turning Performance Analysis

12/6/2012

Bid Number: 299

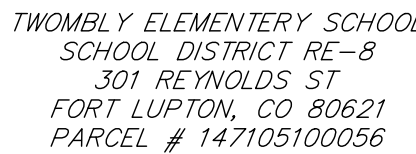
Department:

Chassis: Arrow-XT Chassis, PAP/SkyArm/Midmount MUX, 2010

Body: Aerial, Platform 100', Alum Body

Definitions:

Inside Cramp Angle	Maximum turning angle of the front inside tire.
Axle Track	King-pin to King-pin distance of the front axle.
Wheel Offset	Offset from the center-line of the wheel to the king-pin.
Tread Width	Width of the tire tread.
Chassis Overhang	Distance of the center-line of the front axle to the front edge of the cab. This does not include the bumper depth.
Additional Bumper Depth	Depth that the bumper assembly adds to the front overhang.
Wheelbase	Distance between the center lines of the vehicle's front and rear axles.
Inside Turning Radius	Radius of the smallest circle around which the vehicle can turn.
Curb to Curb Turning Radius	Radius of the smallest circle inside of which the vehicle's tires can turn. This measurement assumes a curb height of 9 inches.
Wall to Wall Turning Radius	Radius of the smallest circle inside of which the entire vehicle can turn. This measurement takes into account any front overhang due to chassis, bumper extensions and/or aerial devices.



Know what's **below**.
Call before you dig.

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C1	90°00'00"	13.00'	20.42'	S45°16'07"E 18.38'
C2	28°31'44"	50.00'	24.90'	N76°00'15"W 24.64'
C3	40°06'33"	50.00'	35.00'	N41°14'07"W 34.29'
C4	40°06'33"	50.00'	35.00'	N01°34'34"W 34.29'
C5	25°52'35.4"	50.00'	221.13'	N36°25'51"E 80.18'
C8	73°23'54"	20.00'	25.62'	N53°34'09"W 23.90'
C9	90°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C10	90°00'00"	13.00'	20.42'	N45°16'07"W 18.38'
C11	11°0'19"	175.00'	3.58'	N00°19'03"E 3.58'
C12	2°46'17"	225.00'	10.88'	N01°07'02"E 10.88'
C13	13°56'57"	225.00'	54.78'	N09°28'39"E 54.64'
C14	38°23'55"	175.00'	117.28'	N20°06'10"E 115.10'
C15	63°06'55"	175.00'	192.77'	N31°17'21"E 183.17'
C17	63°06'55"	225.00'	247.85'	N31°17'21"E 235.51'
C18	13°58'29"	225.00'	54.88'	N23°26'23"E 54.74'
C19	8°00'31"	225.00'	31.45'	N34°25'53"E 31.42'
C20	13°41'21"	225.00'	53.76'	N45°16'49"E 53.63'
C21	23°32'40"	175.00'	71.91'	N51°04'28"E 71.41'
C22	10°43'19"	225.00'	42.10'	N57°29'09"E 42.04'
C23	23°30'43"	150.00'	61.55'	S51°05'27"W 61.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C24	29°55'48"	150.00'	78.36'	S47°52'54"W 77.47'
C25	6°25'05"	150.00'	16.80'	S36°07'33"W 16.79'
C26	27°40'04"	32.00'	15.45'	S19°04'59"W 15.30'
C27	17°37'16"	36.00'	11.07'	N14°03'55"E 11.03'
C28	23°08'19"	145.00'	58.56'	S11°18'03"W 58.16'
C29	24°48'28"	205.00'	88.76'	S12°08'07"W 88.07'
C30	27°59'58"	42.00'	20.52'	S38°32'20"W 20.32'
C31	20°50'59"	15.00'	5.46'	N42°06'50"E 5.43'
C32	9°23'19"	200.00'	32.77'	S36°22'59"W 32.74'
C34	31°09'28"	200.00'	108.76'	S47°16'04"W 107.43'
C35	21°46'10"	200.00'	75.99'	S51°57'44"W 75.53'
C36	9°00'00"	13.00'	20.42'	N17°50'48"E 18.38'
C37	9°00'00"	13.00'	20.42'	S44°43'53"W 18.38'
C37	9°00'00"	13.00'	20.42'	S72°09'12"E 18.38'
C38	26°53'05"	175.00'	82.11'	S13°42'39"E 81.36'
C40	10°34'57"	225.00'	41.56'	S21°51'43"E 41.50'
C41	26°53'05"	225.00'	105.58'	S13°42'39"E 104.61'
C42	15°29'53"	225.00'	60.86'	S08°49'19"E 60.67'
C43	0°48'16"	225.00'	3.16'	S00°40'14"E 3.16'

PREPARED FOR

LUPTON LAND, LLC
10221 PRESTWICK TRAIL
LONE TREE, CO 80124
BOB QUINETTE
303-587-1966

J·R ENGINEERING
A Westrian Company



Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE
	1"=50'		
	V-SCALE		
	1"=X'		
	DATE		
	DESIGNED BY		
	DRAWN BY		
	CHECKED BY		

COYOTE CREEK FILING NO. 4

PUD FINAL PLAT

SHEET 4 OF 46

JOB NO. 16093.00

Magaly Morales-Tejada

From: Jake Freier
Sent: Tuesday, January 4, 2022 10:21 AM
To: Magaly Morales-Tejada
Cc: Maria Lancto; Todd Hodges; Alyssa Knutson; Roy Vestal
Subject: RE: Referral Response Request - Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032)

Magaly and Planning Staff,

Per our discussion in our staff meeting pertaining to the street names in Coyote Creek No. 4:

Before recording, the developer needs to work with staff to solidify the naming of streets in the subdivision. As of this moment, there is no duplication of the development's proposed street names. However, the names Logan and Lupton are currently reserved as part of a proposed street naming strategy for the outlying arterial County Roads. We request that these street names be changed before recording of the plat.

Furthermore, we request that north-south oriented streets be called "Avenue" and east-west oriented streets be called "Street".

Thanks,
Jake Freier



From: Magaly Morales-Tejada <MMTejada@Fortluptonco.gov>
Sent: Monday, December 13, 2021 11:09 AM
Cc: Maria Lancto <MLancto@Fortluptonco.gov>; Todd Hodges <thodges@Fortluptonco.gov>; Alyssa Knutson <AKnutson@Fortluptonco.gov>
Subject: Referral Response Request - Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032)

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/643>.

Any comments you consider relevant to this request would be appreciated. Please reply by **January 3, 2022**, 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, January 13, 2022 at 6:00 PM; and
- City Council: Tuesday, February 1, 2022 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



Magaly Morales-Tejada

From: Tyler Tarpley
Sent: Tuesday, January 4, 2022 11:05 AM
To: Todd Hodges; Magaly Morales-Tejada
Subject: Coyote Creek Filing 4

Hi Todd and Megaly,

As we discussed on the phone, I have some concerns about the setbacks and the general issue of golf balls and houses. It appears the setbacks are too close and will result in issues similar to what we have seen in the past. We also have a rain shelter that is partially off our property, will that need to be removed? Finally, construction wise we need to plan that the construction process and planning will include Mike Mcnay and myself to ensure the flow of golfers as well as golf course equipment (irrigation equipment) is not disturbed.

Thanks!

Tyler Tarpley, PGA
General Manager
Coyote Creek Golf Course
Office: 720-466-6189
Pro Shop: 303-857-6152

Magaly Morales-Tejada

From: John Fryar
Sent: Monday, December 13, 2021 12:02 PM
To: Magaly Morales-Tejada
Subject: RE: Referral Response Request - Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032)

I don't see any LE issues.



Chief John Fryar

From: Magaly Morales-Tejada <MMTejada@Fortluptonco.gov>
Sent: Monday, December 13, 2021 11:09 AM
Cc: Maria Lancto <MLancto@Fortluptonco.gov>; Todd Hodges <thodges@Fortluptonco.gov>; Alyssa Knutson <AKnutson@Fortluptonco.gov>
Subject: Referral Response Request - Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032)

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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





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
CC: Andrew Hugill (JR Engineering)
From: Roy Vestal
Date: December 29, 2021
Subject: Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032)
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. Plat

- a. The existing utilities in 9th Street - Line labeled as IRR is the gravity potable water main. The existing water lines at 9th Street and College need to be sorted out. The nonpotable well line is not connecting to the indicated water line (see attached).

2. Site Plan

- a. The water line will require an easement dedication, 20' wide.
- b. Site Plan A-1 – Please move the gate from 14th Street entry to the property line. Need to leave adequate room for truck to park out of the street to open gate.

3. Drainage

- a. Final Drainage Study as submitted is acceptable.
- b. The low point at 4th Street on the golf course may include a culvert. We need to include a tie-in with your inlet just north of 4th Street.

4. Transportation

- a. The Traffic Study as submitted is acceptable.

5. 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.

- b. Grading offsite to the north shall be coordinated and approved with RE-8 School District.
- c. Review proposed landscape plans at street locations and evaluate for sight triangle conflicts.

6. Utilities

a. Utility Study

- i. Pg 3 - delete any discussion of interconnect of nonpotable and potable water mains
- ii. Please include a network hydraulic modeling of the proposed development. We need to ensure the distribution system proposed will be adequate for future city growth.

b. Water - Chapter 3

- i. You may want to place the PRV on the south side of the development off of the connection to 4th Street. The pressures in the high pressure line throughout Coyote Creek require individual PRV's at each house. Regulating the pressure to the 9th Street line pressure should eliminate this requirement for each lot.
- ii. Sht 10 - Interconnect between nonpotable and potable water mains is not allowed. Please remove.
- iii. 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.
- iv. Please specify pipe materials on the drawings. DIP as labeled is OK, but you may find PVC C900 for water lines less expensive.
- v. Specify "Red Mueller Super Centurion" hydrants in final construction drawings.
- vi. Sht 17 - Caution on service locations, Meter pits shall not be located in the driveway concrete. Water service must maintain a 10-foot separation from IRR. The ones I checked look good, but don't let the contractor get sloppy. Be sure builder's site plans will accommodate the driveway without getting within 4-feet of driveway.

c. Non Potable Irrigation

- i. Where possible, the irrigation line should maintain a 10-foot separation from sanitary. Where there is not room, the irrigation line may be closer to the sanitary, but always the potable water main requires 10-foot separation.
- ii. Cross connection interconnect to the potable water main is not allowed.

- iii. Designate material as "PURPLE PIPE". May be HDPE or PVC C900 same standards as potable water lines. Service lines to be purple tubing.
- iv. The main feed must be from a master metered vault location.

d. Storm Sewer - Chapter 5

- i. If there is any way to reconfigure Logan and Raffi to allow better separation between irrigation line and sanitary sewer would be appreciated. Consider south inlet connect to north inlet

e. Roadway - Chapter 6

- i. Preliminary Soils Report indicates presence of swelling soils, collapsible soils and shallow groundwater. The recommendations from the 2002 report were not greatly successful in this area. The pavement Design report will be required prior to paving. Soil stabilization measures will be required and a composite section for the pavement required.

f. Traffic Control - Chapter 8

- i. The Traffic Study as submitted is acceptable.
- ii. Sht 22 - Add City standard street sign. - City street sign standard is New City street signs are 2-sided Engineer Grade Reflective Aluminum, Green with white trim. I am attaching the City Logo



I have been ordering from RoadTrafficSigns.com

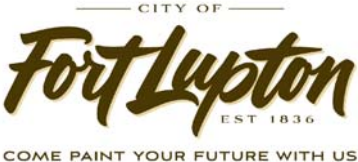
- 7. Final Construction Drawings should include City Standard Details as needed.
 - a. Add standard detail W7, W8, W9 and W30.
- 8. **Public Improvement Agreement** – A Subdivision Improvements Agreement will be required for the construction of roadways, water, sewer and nonpotable water systems. See attached template.
- 9. A Geotechnical report for final pavement design will be required prior to paving.

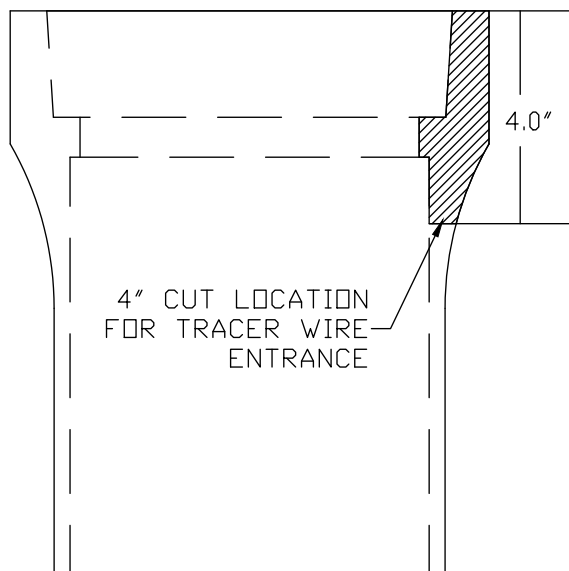
There may be additional concerns as this design develops.

GENERAL NOTES

1. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, PARKING AREAS, SIDEWALKS, OR CONCRETE. EDGE OF METER PIT LID SHALL NOT BE CLOSER THAN 4' FROM EDGE OF DRIVEWAY.
2. IF SURFACE IS NOT TO OFFICIAL GRADE WHEN THE METER IS INSTALLED, THE OWNER MUST RAISE OR LOWER THE PIT, METER SETTER AND ALL OTHER APPURTENANCES TO THE FINAL APPROVED GRADE.
3. METER SHALL BE SET WITHIN PUBLIC R.O.W OR PUBLIC EASEMENT.
4. NO CONCRETE FLOOR TO BE LAID IN METER PIT.
5. METER PIT SHALL BE CONSTRUCTED OF MODIFIED HI-DENSITY POLYETHELENE.
6. ADJUSTMENT RINGS SHALL BE 2", 3", 4" OR 6" IN HEIGHT AND SHALL BE INSERTED ABOVE THE POLYETHYLENE METER PIT.
7. FOR WATER SERVICE LINES 1" AND LARGER: IF THE METER PIT IS NOT INSTALLED WITHIN THE PUBLIC R.O.W. THEN A CURB STOP AND BOX SHALL BE INSTALLED WITHIN THE PUBLIC R.O.W.

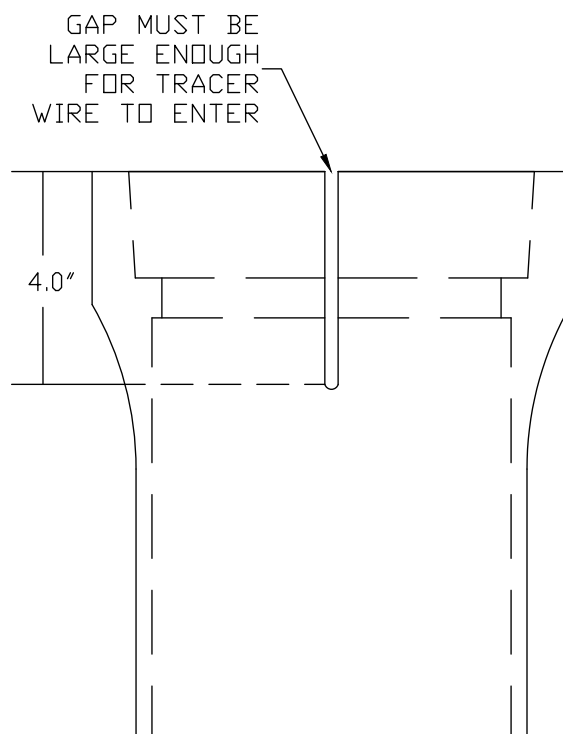
(PAGE 2 OF 2)

	DESIGN STANDARDS	STANDARD DRAWING
	3/4" & 1" METER NOTES	W9
		DATE: 8/15/14



4" CUT LOCATION
FOR TRACER WIRE
ENTRANCE

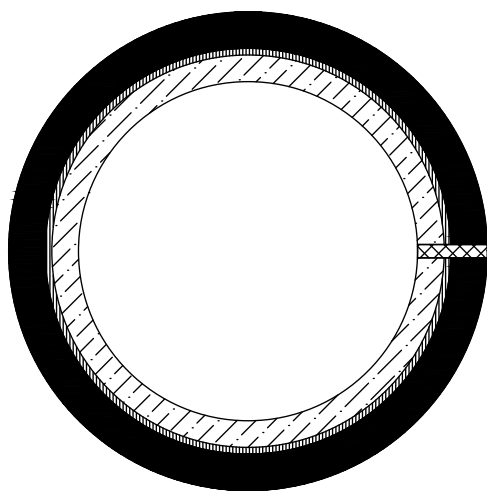
FRONT VIEW



GAP MUST BE
LARGE ENOUGH
FOR TRACER
WIRE TO ENTER

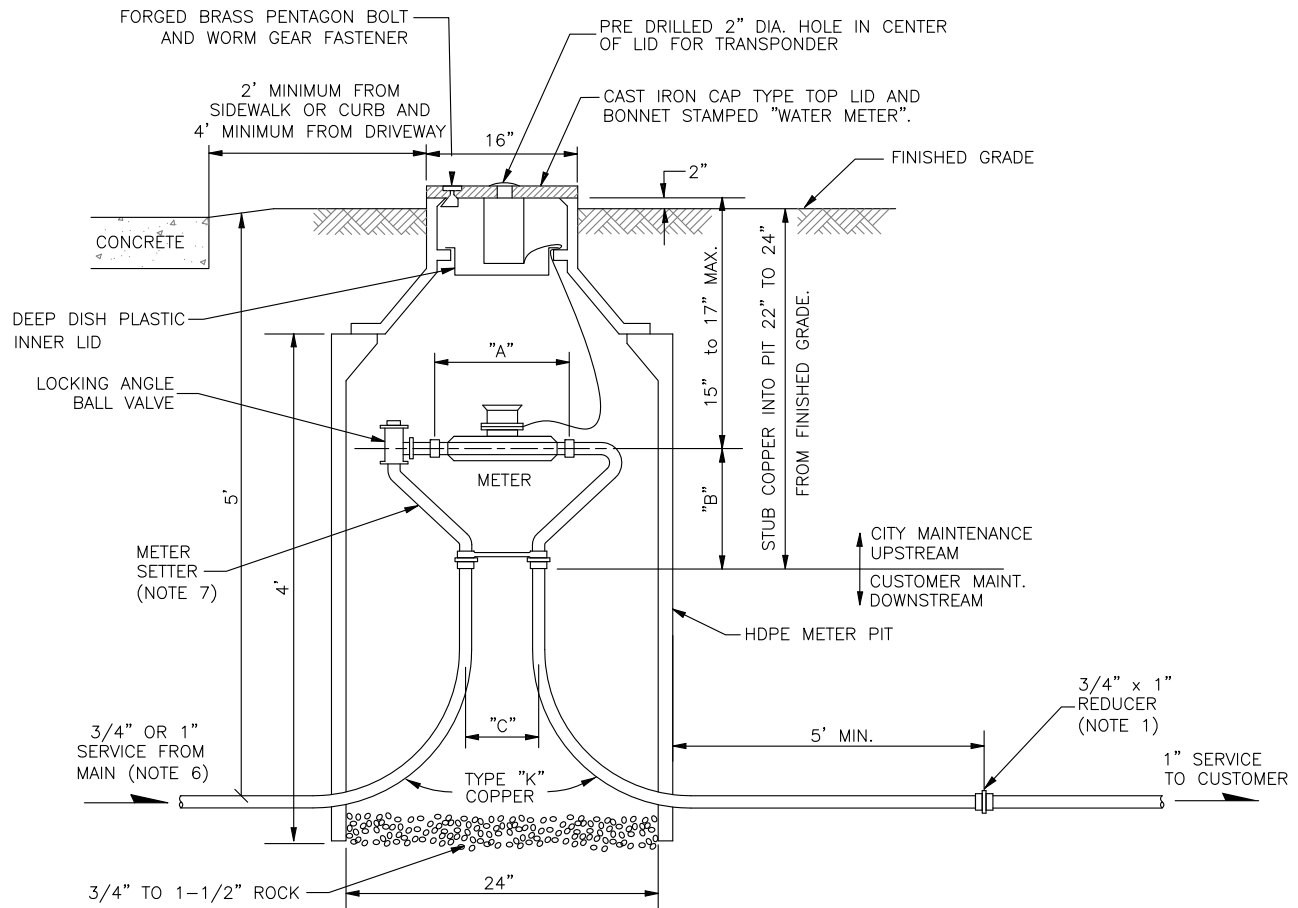
4.0"

SIDE VIEW



4" CUT LOCATION
FOR TRACER WIRE
ENTRANCE

TOP VIEW



METER SIZE	A	B	C
3/4"	9"	9"	5"
1"	10-3/4"	10"	6"

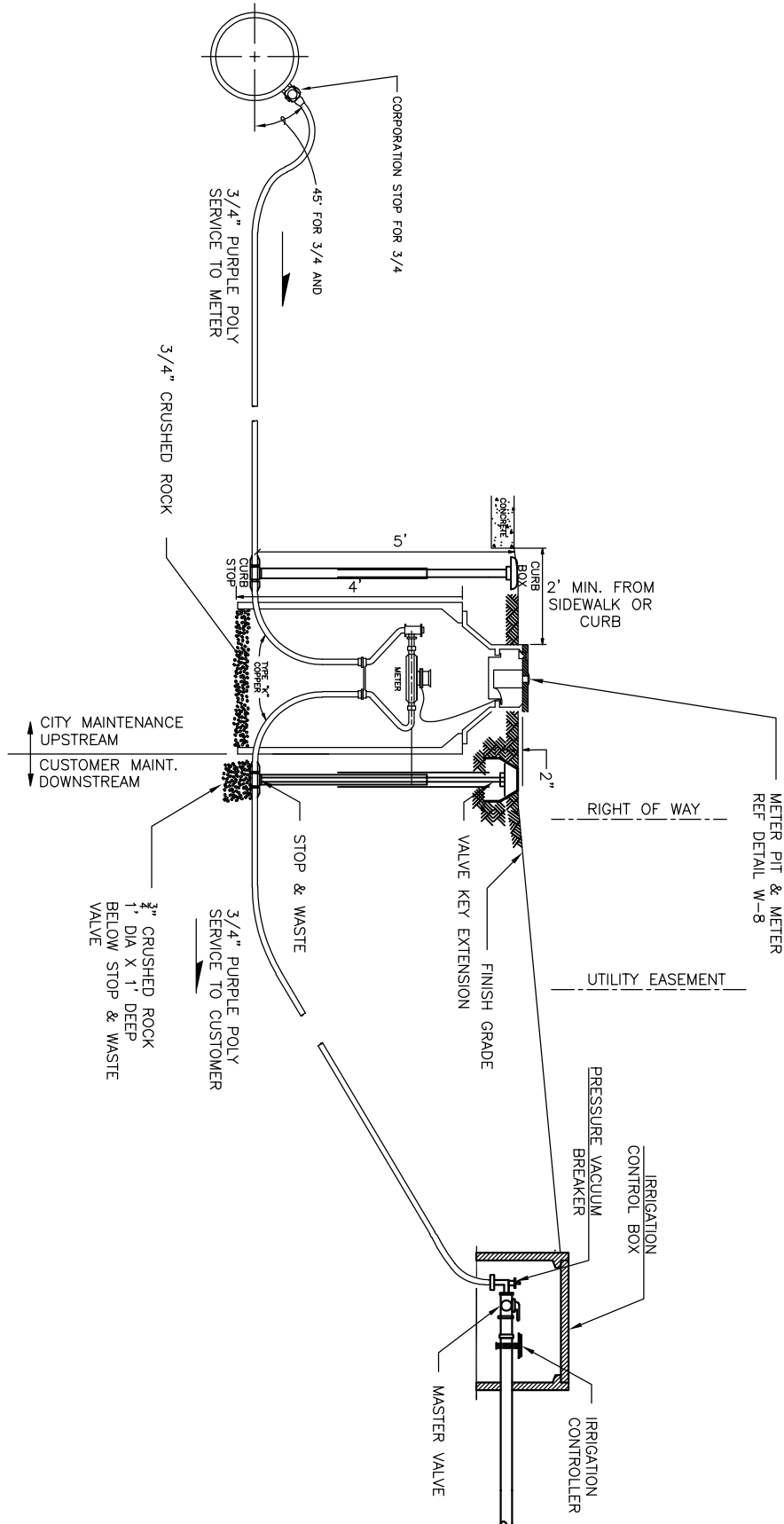
NOTES:

1. UPSIZING OF SERVICE PIPES AFTER THE METER REQUIRES THE APPROVAL OF THE BUILDING DEPARTMENT. FOR SERVICE PIPES UPSIZED FROM 3/4" TO 1", A REDUCER SHALL BE INSTALLED AS SHOWN ON THIS DETAIL.
2. ONLY COMPRESSION FITTINGS WILL BE ALLOWED ON COPPER SERVICE PIPES. FOR APPROVED MANUFACTURERS AND MODEL NUMBERS OF FITTINGS, REFER TO CHAPTER 3 OF THE CITY STANDARDS.
3. THIS DETAIL IS NOT INTENDED FOR INSTALLATION IN STREETS, DRIVEWAYS, OR CONCRETE AREAS.
4. METER PIT SHALL NE LOCATED IN A SOD OR MULCH AREA WITH A 10' MIN. WIDTH UTILITY EASEMENT. NO TREES, SHRUBS, OR STRUCTURES SHALL BE LOCATED IN THE EASEMENT.
5. SERVICE LINES TO THE METER PIT SHALL BE INSTALLED PERPENDICULAR TO THE WATER MAIN.
6. FOR 3/4" RESIDENTIAL METER INSTALLATIONS, NEWLY INSTALLED SERVICE LINES FROM MAIN SHALL BE 1". EXISTING 3/4" SERVICE LINES MUST BE REVIEWED AND APPROVED FOR CONFORMANCE WITH RESIDENTIAL FIRE SPRINKLER SYSTEM REQUIREMENTS.
7. PROPER METER SETTERS SHALL BE INSTALLED TO ACCOMMODATE SERVICE LINE SIZES FROM MAIN AND TO CUSTOMER. REFER TO SECTION 3.63.08 OF THE CITY WATER SYSTEM STANDARDS FOR ACCEPTABLE SETTER MODEL NUMBERS.

 CITY OF Fort Lupton EST 1836 COME PAINT YOUR FUTURE WITH US	DESIGN STANDARDS	STANDARD DRAWING
	3/4" & 1" DOMESTIC METER SETS	W8
		DATE: 8/15/14

DESIGN STANDARDS
 3/4" & 1" IRRIGATION METER SETS

STANDARD DRAWING
 W30
 DATE: 10/30/20



NOTES:

1. IRRIGATION METER PIT SHALL BE LOCATED IN A LANDSCAPE AREA WITHIN THE RIGHT-OF-WAY. NO TREES, SHRUBS, OR STRUCTURES SHALL BE LOCATED WITHIN 5- FEET.
2. SERVICE LINES TO THE METER PIT SHALL BE INSTALLED PERPENDICULAR TO THE NON-POTABLE WATER MAIN.
3. IRRIGATION SERVICE LINE WILL NOT ENTER THE STRUCTURE. NO CONNECTION TO POTABLE PLUMBING FIXTURES IS ALLOWED



Your Touchstone Energy® Cooperative 

December 16, 2021

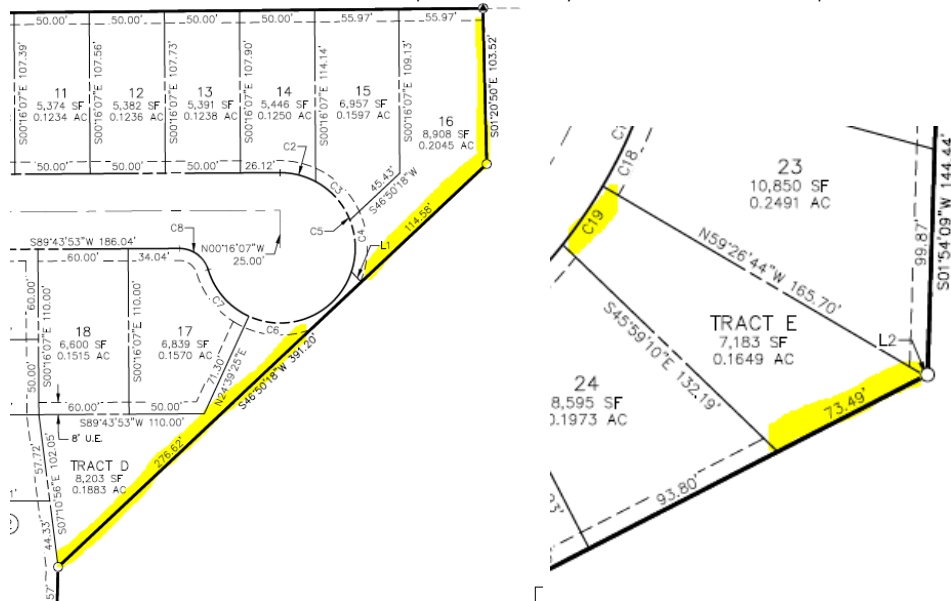
Fort Lupton Planning Department
130 S. McKinley Avenue
Fort Lupton, CO 80621
www.fortlupton.org

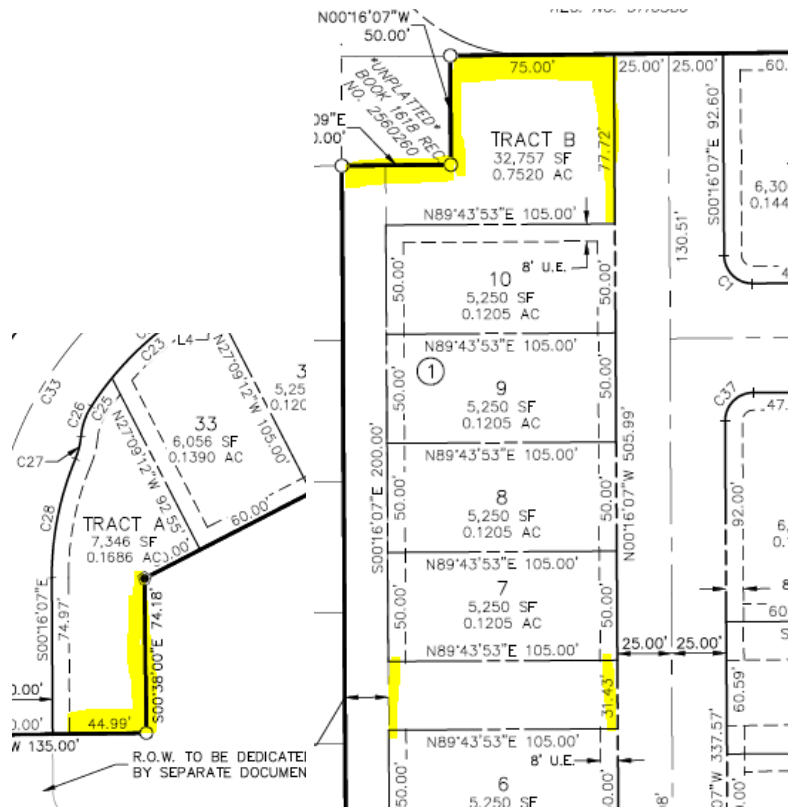
Re: Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032)

Dear Magaly Morales-Tejada:

On behalf of United Power, Inc., thank you for inviting us to review and comment on the Coyote Creek Filing No. 4 Preliminary and Final Plat (LUP2021-0032). After review of the information, we have the following comments:

- **Tracts** – We will need utilities added to each tract OR place 8'-10' wide dry utilities around the tracts – see pictures below.





- 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



Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: **303.571.3306**
Facsimile: 303. 571. 3284
donna.l.george@xcelenergy.com

January 3, 2022

City of Fort Lupton Planning Department
130 South McKinley Avenue
Fort Lupton, CO 80621

Attn: Alyssa Knutson and Todd Hodges

Re: Coyote Creek Filing No. 4, Case # LUP2021-0032

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the preliminary and final plat for **Coyote Creek Filing No. 4**. 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.

PSCo also has existing electric *transmission* facilities and associated land rights abutting the west property line. Should there be any activities in this area, the property owner/developer/contractor must contact our Siting and Land Rights Department at either of the following:

website: www.xcelenergy.com/rightofway

email: coloradorightofway@xcelenergy.com

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

Colorado Community Media
750 W. Hampden Ave. Suite 225
Englewood, CO 80110

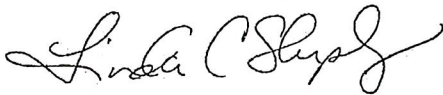
City of Fort Lupton Legals***
130 S McKinley Avenue
Fort Lupton CO 80621

Description: FLP489 Public Hearing Notice - Coyote Creek

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 12/29/2021, 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.



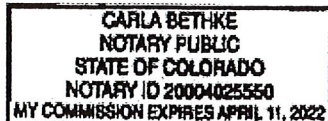
For the Fort Lupton Press

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 12/29/2021. Linda Shapley has verified to me that she has adopted an electronic signature to function as her signature on this document.

20004025550-289673

Carla Bethke
Notary Public
My commission ends April 11, 2022



Public Notice

CITY OF FORT LUPTON NOTICE OF PUBLIC HEARING

Notice is hereby given that the City of Fort Lupton is in receipt of an application for a Preliminary and Final Plat known as the Coyote Creek Filing No. 4 Preliminary and Final Plat, located approximately 0.11 miles south of 9th St. and approximately 0.25 miles west of Northrup Avenue within the City of Fort Lupton, pursuant to the City of Fort Lupton Municipal Code Notice Requirements.

The public hearings are to be held before the Planning Commission on **Thursday, January 13, 2022, at 6:00 P.M.**, and before the City Council on **Tuesday, February 1, 2022, 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.

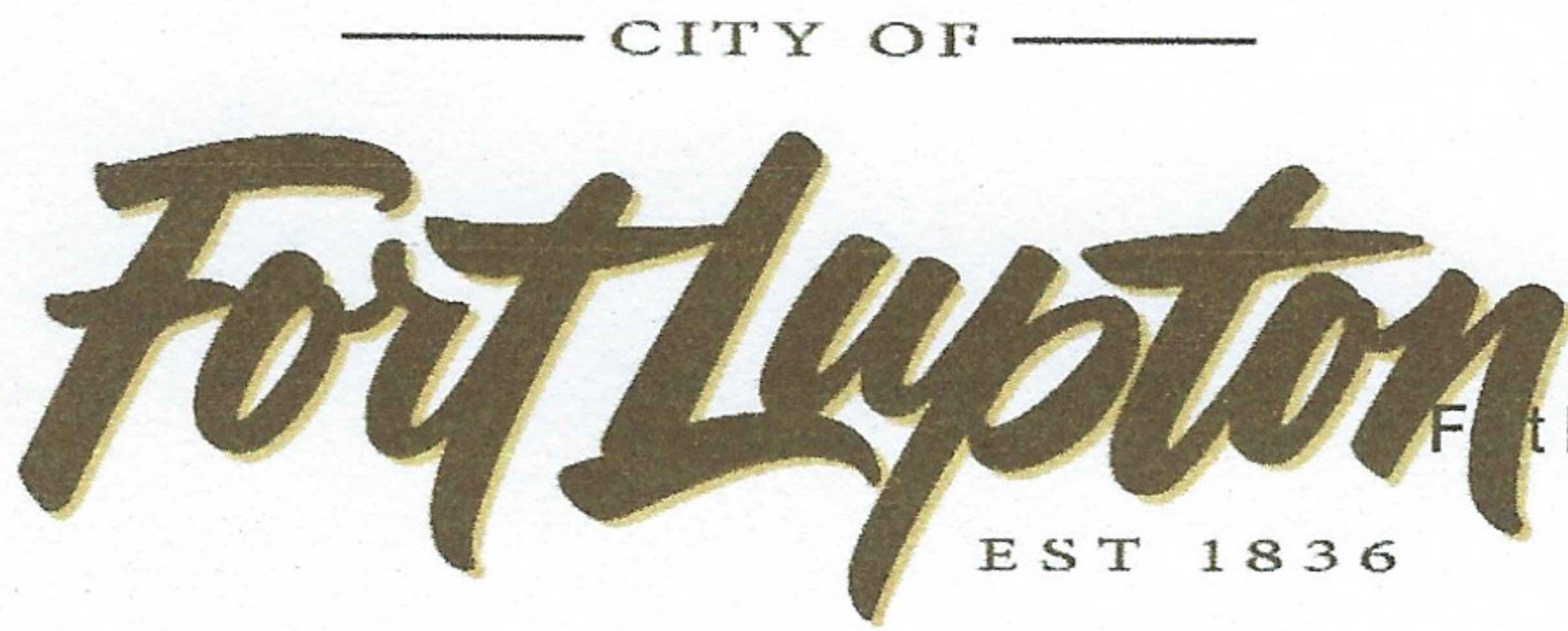
ALL INTERESTED PERSONS MAY ATTEND

LEGAL DESCRIPTION

A PORTION OF LAND IN THE CITY OF FORT LUPTON, COLORADO, LOCATED IN THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, AND MORE PARTICULARLY DESCRIBED AS FOLLOWS: BASIS OF BEARINGS: THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED AT THE CENTER 1/4 CORNER BY A 3-1/4" ALUMINUM CAP STAMPED "LS 13155" AND AT THE NORTH 1/4 CORNER BY A 3-1/4" ALUMINUM CAP STAMPED "LS 14823" BEARING N00°16'07" A DISTANCE OF 2595.44 FEET AS REFERENCED TO COLORADO STATE PLANE NORTH ZONE, NAD(83), COMMENCING AT CENTER 1/4 CORNER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN; THENCE ON THE WEST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 5, N00°16'17" A DISTANCE OF 1,111.96 TO THE POINT OF BEGINNING; THENCE CONTINUING ON SAID WEST LINE, N00°16'07"W A DISTANCE OF 833.49 FEET, TO A POINT ON THE SOUTHERLY LINE OF THAT LIFT STATION SITE RECORDED IN BOOK 1618 AT RECEPTION NO. 2560260, IN THE RECORDS OF THE WELD COUNTY CLERK AND RECORDER; THENCE ON THE SOUTHERLY AND EASTERLY LINES OF SAID LIFT STATION SITE, THE FOLLOWING TWO (2) COURSES: 1. N89°32'09"E A DISTANCE OF 50.00 FEET; 2. N00°16'07"W A DISTANCE OF 50.00 FEET, TO A POINT ON THE SOUTHERLY LINE OF THE TWOMBLY SCHOOL PROPERTY RECORDED IN BOOK 990 RECEPTION NOS. 1919362-1919366; THENCE ON SAID SOUTHERLY LINE, N89°32'09"E A DISTANCE OF 961.94 FEET; THENCE DEPARTING SAID SOUTHERLY LINE, THE FOLLOWING SIX (6) COURSES: 1. S01°20'50"E A DISTANCE OF 103.52 FEET; 2. S46°50'18"W A DISTANCE OF 391.20 FEET; 3. S01°54'09"W A DISTANCE OF 144.44 FEET; 4. S52°50'48"W A DISTANCE OF 658.46 FEET; 5. S00°38'00"E A DISTANCE OF 74.18 FEET; 6. S89°20'49"W A DISTANCE OF 135.00 FEET, TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 574,520 SQUARE FEET OR 13.1892 ACRES.

Legal Notice No. FLP489
First Publication: December 29, 2021
Last Publication: December 29, 2021
Publisher: Fort Lupton Press



Planning & Building

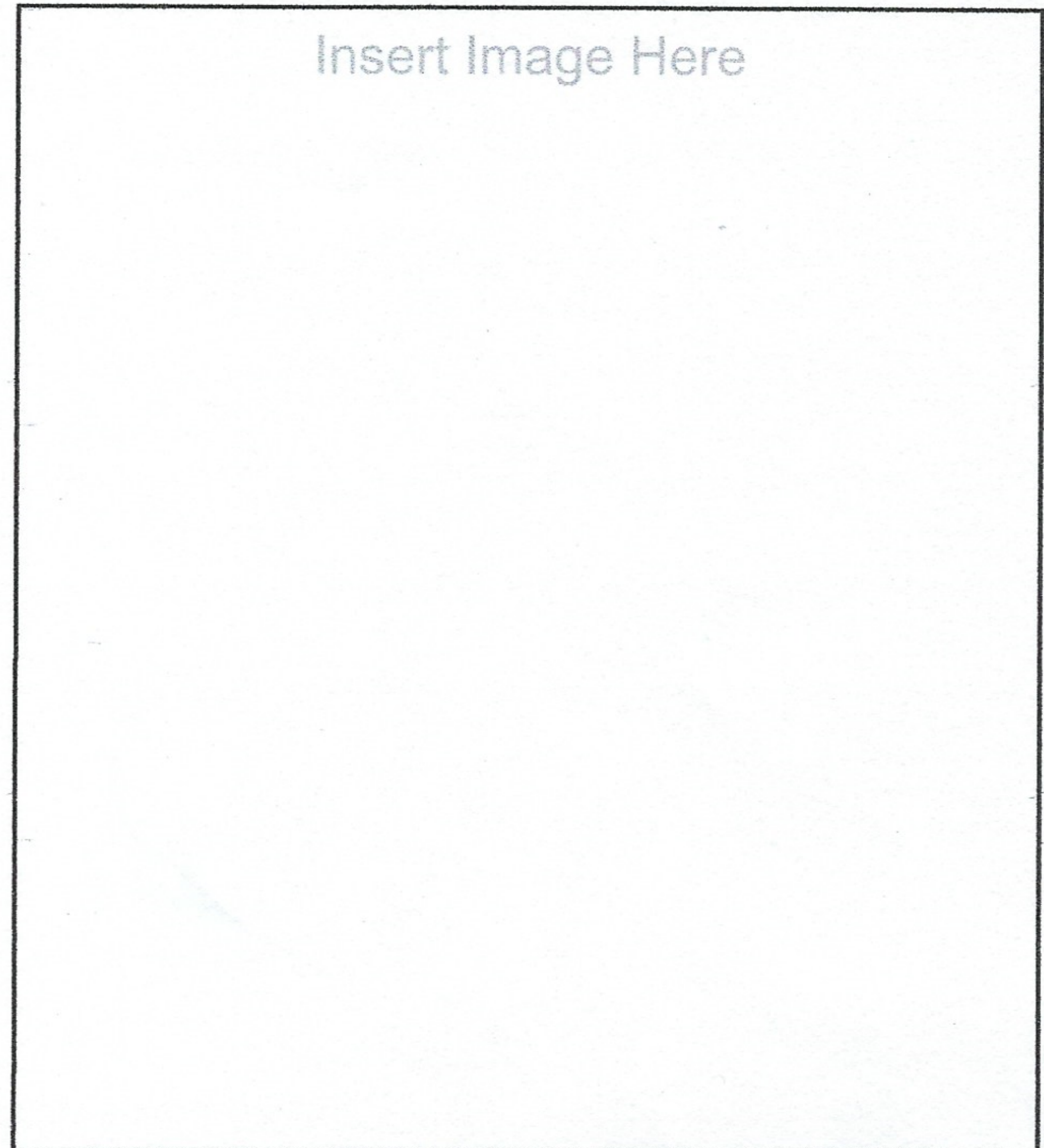
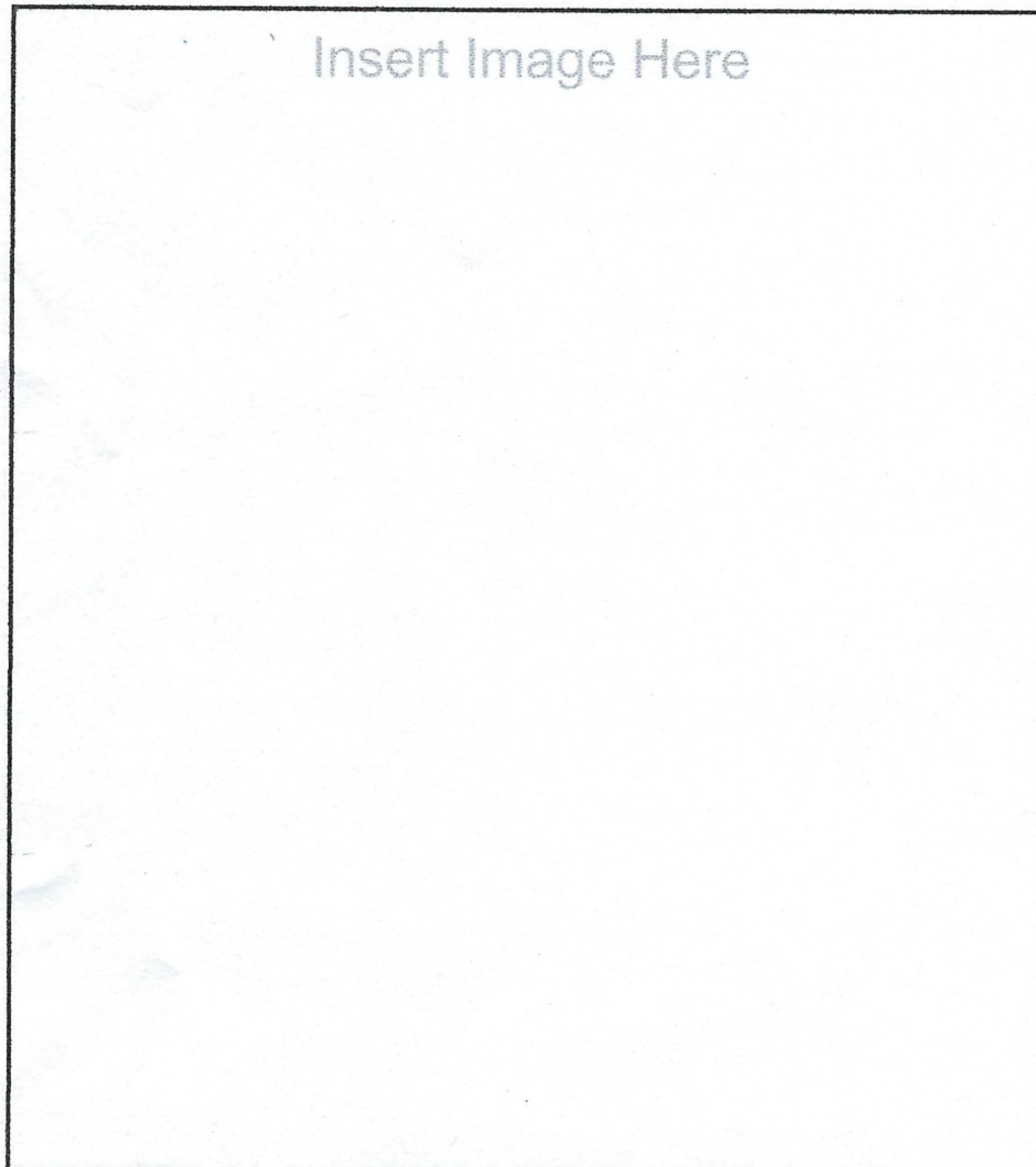
130 S. McKinley Avenue
Fort Lupton, CO 80621

Phone: 303.857.6694
Fax: 303.857.0351

www.fortluptonco.gov

Sign Posting Affidavit

Coyote Creek Filing No. 4 Preliminary and Final Plat
Project No. LUP2021-0032 Plan Nos. PPL2021-0005 & FPL2021-0006



Facing _____

Facing _____

I, Robert Quinette hereby acknowledge that the aforementioned property was posted in accordance with City Codes. Said public hearing notice was posted on this 29th Day of December 2021

Robert Quinette

Signature of Owner or Owner's Representative

The foregoing instrument was acknowledged before me by Robert Quinette, this 06 day of JAN, 2022. Witness my hand and seal.

My commission expires 07-20-2024

Catherine C Barney

Notary Public

(SEAL)

CATHERINE C BARNEY
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20014005356
MY COMMISSION EXPIRES 07/20/2024



PUBLIC NOTICE
A LAND USE APPLICATION FOR
THIS PROPERTY IS UNDER REVIEW
BY THE CITY OF FORD LAUREN.
PUBLIC HEARINGS ARE BEING HELD FOR
PLANNING COMMISSION, KANSAS CITY, MISSOURI
CITY COUNCIL, FORD LAUREN, MISSOURI
THE TOPIC
LOCATION: CHURCH ROAD AND WALKER
CONTACT THE PLANNING DEPARTMENT AT
[PHONE NUMBER]

PRIVATE PROPERTY
NO TRESPASSING

CERTIFICATE OF MAILING

I, the undersigned, hereby certify that on the 22nd day of December 2021, a true and correct copy of the foregoing Notice of Public Hearings and Map for the Sagebrush Apartments Site Plan was sent via U.S. Mail, postage pre-paid, to the following addresses:

ROWLEY DOWNS LAND COMPANY
260 KRAMERIA ST
DENVER, CO 80220

SCHOOL DISTRICT RE-8
301 REYNOLDS ST
FORT LUPTON, CO 80621

SARAH J FRANK
1659 WAGONWHEEL DR
FORT LUPTON, CO 80621

LUIS H SANDOVAL
1653 WAGONWHEEL DR
FORT LUPTON, CO 80621

PATRICK J MCLAIN
14924 VINE ST
THORNTON, CO 80602

NANCY D BONAR
1641 WAGONWHEEL DR
FORT LUPTON, CO 80621

RICHARD N OLIVER
1635 WAGONWHEEL DR
FORT LUPTON, CO 80621

JESUS A RIVERA
1629 WAGONWHEEL DR
FORT LUPTON, CO 80621

JASMINE C CARR
1623 WAGONWHEEL DR
FORT LUPTON, CO 80621

JOHN CAMERON WARMUTH
1617 WAGONWHEEL DR
FORT LUPTON, CO 80621

JAMES THURSTIN
1611 WAGONWHEEL DR
FORT LUPTON, CO 80621

ROBERT MACKELL
14005 DOGLE LN
BROOMFIELD, CO 80023

KELLIE CELESTE WRIGHT
1599 WAGONWHEEL DR
FORT LUPTON, CO 80621

GILBERT DEHERRERA
1593 WAGONWHEEL DR
FORT LUPTON, CO 80621

TIMOTHY N TURNER
1587 WAGONWHEEL DR
FORT LUPTON, CO 80621

CRAIG HOWARD GIBBS
1581 WAGONWHEEL DR
FORT LUPTON, CO 80621

PAUL G PETIT
1575 WAGONWHEEL DR
FORT LUPTON, CO 80621

COLE JOSEPH LECHMAN
1569 4TH ST
FORT LUPTON, CO 80621

COYOTE CREEK MASTER
ASSOCIATION
PO BOX 30
FREDERICK, CO 80530

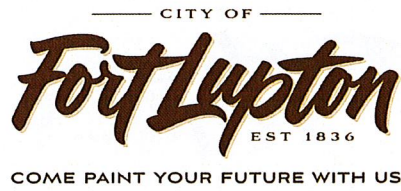
PAUL R LUIZ
309 WAGONWHEEL DR
FORT LUPTON, CO 80621

SANDRA L SMITH
305 WAGONWHEEL DR
FORT LUPTON, CO 80621

DESTINY HILLIS
301 WAGONWHEEL DR
FORT LUPTON, CO 80621

JOHN M ROSS
297 WAGONWHEEL DR
FORT LUPTON, CO 80621

RANDALL L PRESCOTT
293 WAGONWHEEL DR
FORT LUPTON, CO 80621



RALPH C MATTHEWS
289 WAGONWHEEL DR
FORT LUPTON, CO 80621

THEODORE D WOODS
1604 WAGONWHEEL DR
FORT LUPTON, CO 80621

MANUEL J ORONA
1610 WAGONWHEEL DR
FORT LUPTON, CO 80621

PAOLA RAMIREZ
1616 WAGONWHEEL DR
FORT LUPTON, CO 80621

BRANDON S SIMMONS
1622 WAGONWHEEL DR
FORT LUPTON, CO 80621

THOMAS E LECHLEITNER
1628 WAGONWHEEL DR
FORT LUPTON, CO 80621

JEFFREY SCOTT COOKE
1634 WAGONWHEEL DR
FORT LUPTON, CO 80621

CARLOS J MORALES
1640 WAGONWHEEL DR
FORT LUPTON, CO 80621

CARRIE L MCBROOM
334 PONDEROSA PL
FORT LUPTON, CO 80621

ANTONIO PEREZ
303 BIGHORN TER
FORT LUPTON, CO 80621

BRIAN D CALZIA
1592 WAGONWHEEL DR
FORT LUPTON, CO 80621

CHRISTINA E MCCULLOUGH
1586 WAGONWHEEL DR
FORT LUPTON, CO 80621

OLIVIA LUNA
308 WAGONWHEEL DR
FORT LUPTON, CO 80621

CYNTHIA LANGLEY
304 WAGONWHEEL DR
FORT LUPTON, CO 80621

JULIE RENEE MERCADO
300 WAGONWHEEL DR
FORT LUPTON, CO 80621

KEITH VITALE
296 WAGONWHEEL DR
FORT LUPTON, CO 80621

DUMISANI OLIVER SIBANDA
1702 WAGONWHEEL DR
FORT LUPTON, CO 80621

JAMES BLUE
1723 HOMESTEAD DR
FORT LUPTON, CO 80621

TYLER JAMES PAGEL
1727 HOMESTEAD DR
FORT LUPTON, CO 80621

ISAAC LEON ESCOBEDO
1733 HOMESTEAD DR
FORT LUPTON, CO 80621

BRAEDEN H DOSCO
1737 HOMESTEAD DR
FORT LUPTON, CO 80621

CHARLES R MARTIN
1743 HOMESTEAD DR
FORT LUPTON, CO 80621

ABIU DELGADO
1747 HOMESTEAD DR
FORT LUPTON, CO 80621

JACK E CLANCY
1753 HOMESTEAD DR
FORT LUPTON, CO 80621

MARTIN VIEROW
1757 HOMESTEAD DR
FORT LUPTON, CO 80621

JOSE M GONZALEZ
1763 HOMESTEAD DR
FORT LUPTON, CO 80621

TRAVIS WINDERS
1767 HOMESTEAD DR
FORT LUPTON, CO 80621

MARY HOFF
1773 HOMESTEAD DR
FORT LUPTON, CO 80621

JARED J DURAN
1736 HOMESTEAD DR
FORT LUPTON, CO 80621

EMILIANA JACOBO
1338 4TH ST
FORT LUPTON, CO 80621

DUANE A FIELDS
742 COPPER AVE
FORT LUPTON, CO 80621

ALAN ROGERS
734 COPPER AVE
FORT LUPTON, CO 80621

REYNALDO RODRIGUEZ
1704 SILVERADO LN
FORT LUPTON, CO 80621

FRANCISCO BARRON
720 COPPER AVE
FORT LUPTON, CO 80621

ALLEN BARTON
712 COPPER AVE
FORT LUPTON, CO 80621

JOSHUA THOMPSON
704 COPPER AVE
FORT LUPTON, CO 80621

CLARENCE JESS ISGAR
741 BETH AVE
FORT LUPTON, CO 80621

BRANDON WINTERMEYER
733 BETH AVE
FORT LUPTON, CO 80621

DAVID MATHISEN
725 BETH AVE
FORT LUPTON, CO 80621

RONALD NASH
717 BETH AVE
FORT LUPTON, CO 80621

JAKEOB KIRKPATRICK
709 BETH AVE
FORT LUPTON, CO 80621

1413 7TH ST LLC
1536 MOUNT MEEKER AVE
BERTHOUD, CO 80513

CINDY SAVAGE
711 COPPER AVE
FORT LUPTON, CO 80621

MONTY VELASQUEZ
703 COPPER AVE
FORT LUPTON, CO 80621

FRANK L BUSCHMAN
1431 8TH ST
FORT LUPTON, CO 80621

MARIA D REYES
800 BETH AVE
FORT LUPTON, CO 80621

CHRISTOPHER MONTOYA
748 BETH AVE
FORT LUPTON, CO 80621

GENA GILLHAM
740 BETH AVE
FORT LUPTON, CO 80621

BRUCE R TAYLOR
732 BETH AVE
FORT LUPTON, CO 80621

ARTURO CEBALLOS
724 BETH AVE
FORT LUPTON, CO 80621

ALVA PADILLA
716 BETH AVE
FORT LUPTON, CO 80621

CRYSTAL M ALEXANDER
708 BETH AVE
FORT LUPTON, CO 80621

TIMOTHY C WILLIAMS
638 BETH AVE
FORT LUPTON, CO 80621

LAURIE J HAFFNERS
630 BETH AVE
FORT LUPTON, CO 80621

MATTHEW STOLL
622 BETH AVE
FORT LUPTON, CO 80621

URIEL RAMIREZ JIMENEZ
11626 NUCLA ST
COMMERCE CITY, CO 80022

WENDELL EAGAN
606 BETH AVE
FORT LUPTON, CO 80621

TIMOTHY BROWNE
528 BETH AVE
FORT LUPTON, CO 80621

JOE L PATE
520 BETH AVE
FORT LUPTON, CO 80621

MICHAEL T LONG
512 BETH AVE
FORT LUPTON, CO 80621

DANIEL A LECRONE
1408 4TH ST
FORT LUPTON, CO 80621

HENRY I FIELDS
1416 4TH ST
FORT LUPTON, CO 80621

CECILE JEAN PIERCE
1424 4TH ST
FORT LUPTON, CO 80621

VENESSA FOSTER
1425 4TH ST
FORT LUPTON, CO 80621

BRANDON C TURNER
1417 4TH ST
FORT LUPTON, CO 80621

LAURA E GONZALEZ
1409 4TH ST
FORT LUPTON, CO 80621

MARY SUSAN TORRES
1339 4TH ST
FORT LUPTON, CO 80621

DANIELLE RAE ROJAS
1331 4TH ST
FORT LUPTON, CO 80621

MANUEL B ARAGON
1332 5TH ST
FORT LUPTON, CO 80621

STEPHANIE M VALDEZ
1340 5TH ST
FORT LUPTON, CO 80621

SALVADOR SERGIO CARO
1402 5TH ST
FORT LUPTON, CO 80621

PAULA K MCGUIGAN
1410 5TH ST
FORT LUPTON, CO 80621

ADRIAN VASQUEZ
1418 5TH ST
FORT LUPTON, CO 80621

TERAN MORRISON
1417 5TH ST
FORT LUPTON, CO 80621

EFREN MARTINEZ
1409 5TH ST
FORT LUPTON, CO 80621

DANIEL A BARRERA
1401 5TH ST
FORT LUPTON, CO 80621

JOHN A MONTOYA
1325 5TH ST
FORT LUPTON, CO 80621

ROBERT CAMPBELL
1336 6TH ST
FORT LUPTON, CO 80621

ISABEL CRISTINA DIAZ
1406 6TH ST
FORT LUPTON, CO 80621

VICTOR JIMENEZ
1414 6TH ST
FORT LUPTON, CO 80621

RAYMUNDO BOCANEGRA
1422 6TH ST
FORT LUPTON, CO 80621

JORGE ADAN GONZALEZ
1423 6TH ST
FORT LUPTON, CO 80621

STEVEN MCGUINN
1415 6TH ST
FORT LUPTON, CO 80621

TYLER INGRAM
1407 6TH ST
FORT LUPTON, CO 80621

JOSE ESPIRIDION MENDOZA
1337 6TH ST
FORT LUPTON, CO 80621

CAMERON JASON HOBBS
1332 7TH ST
FORT LUPTON, CO 80621

MARICELA PEÑA
1400 7TH ST
FORT LUPTON, CO 80621

HUMBERTO ROJAS
1408 7TH ST
FORT LUPTON, CO 80621

SEVERINA RETANA
1416 7TH ST
FORT LUPTON, CO 80621

CHRISTOPHER MAY
750 COPPER AVE
FORT LUPTON, CO 80621

MOLLIE ELLIS
504 BETH AVE
FORT LUPTON, CO 80621

JUAN M RAMOS
426 BETH AVE
FORT LUPTON, CO 80621

DAVID SANDOVAL OCHOA
418 BETH AVE
FORT LUPTON, CO 80621

BRENDA L WILLIS
410 BETH AVE
FORT LUPTON, CO 80621

KIETH JACKEL
402 BETH AVE
FORT LUPTON, CO 80621

MARK SHIBAO
316 BETH AVE
FORT LUPTON, CO 80621

ANTHONY P WOOGT
8990 LILLY DR
THORNTON, CO 80229

ROLANDO AGUILAR
300 BETH AVE
FORT LUPTON, CO 80621

PATRICIA B SUDHOLT
1457 3RD ST
FORT LUPTON, CO 80621

RODRIGO CHAVEZ
4490 OXBOW DR
BRIGHTON, CO 80601

ROBERTO MARTINEZ
1437 3RD ST
FORT LUPTON, CO 80621

MARK E BORNSCHEIN
1427 3RD ST
FORT LUPTON, CO 80621

DARNAY P UN
1436 3RD ST
FORT LUPTON, CO 80621

RUSSELL D MALLORY
1456 3RD ST
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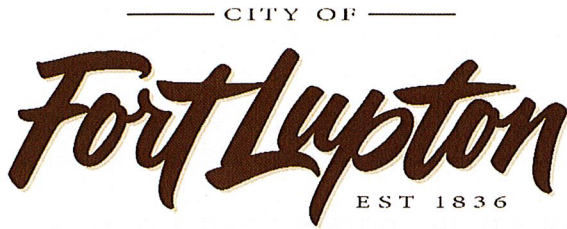
MARY L ICKLER
1436 3RD ST
FORT LUPTON, CO 80621

YOHAIKA CASTEL CARMONA
212 BETH AVE
FORT LUPTON, CO 80621

JOSE G DIAZ
208 BETH AVE
FORT LUPTON, CO 80621



City Official



Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621
www.fortluptonco.gov

Phone: 303.857.6694
Fax: 303.857.0351

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**ADDITIONAL INFORMATION AND DOCUMENTS ON THIS APPLICATION CAN BE FOUND AT
BIT.LY/FLDEVELOPMENT AND SCROLLING DOWN TO THE ROW TITLED: COYOTE CREEK PRELIMINARY AND
FINAL PLAT**

ALL INTERESTED PERSONS MAY ATTEND

LEGAL DESCRIPTION

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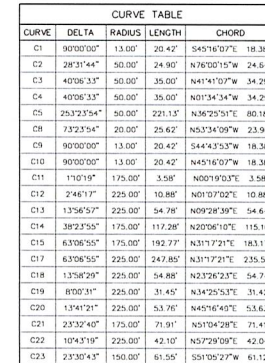
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6. S89°20'49"W A DISTANCE OF 135.00 FEET, TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 574,520 SQUARE FEET OR 13.1892 ACRES.

**LOCATED IN THE NORTHEAST QUARTER SECTION 5,
TOWNSHIP 1 NORTH, RANGE 66 WEST OF THE 6TH
PRINCIPAL MERIDIAN, CITY OF FORT LUPTON,
COUNTY OF WELD, STATE OF COLORADO
13.19 ACRES-59 LOTS/ 6 TRACTS**



LINE TABLE		
LINE	BEARING	DISTANCE
L1	S43°09'42"E	9.51'
L2	N62°50'48"E	1.17'
L3	S62°50'48"W	8.14'
L4	S62°50'48"W	0.16'
L5	N62°50'48"E	1.29'
L6	N27°09'12"W	4.67'
L7	N27°09'12"W	4.67'
L9	N45°59'10"W	13.12'

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	CHORD
C24	29°55'48"	150.00'	78.36'	54°52'54" 77.47'
C25	6°25'00"	150.00'	86.00'	53°07'33" 16.79'
C26	27°40'04"	32.00'	15.45'	51°04'50" 15.30'
C27	17°37'16"	36.00'	11.07'	51°40'35" 11.03'
C28	23°08'19"	145.00'	58.56'	51°18'03" 58.16'
C29	24°48'28"	200.00'	88.76'	52°08'07" 88.07'
C30	27°59'58"	42.00'	20.52'	53°38'20" 20.33'
C31	20°50'50"	15.00'	5.46'	54°26'00" 5.43'
C32	9°23'19"	200.00'	32.77'	53°22'59" 32.74'
C34	31°09'28"	200.00'	108.76'	54°16'04" 107.43'
C35	17°46'00"	200.00'	75.99'	50°53'54" 75.53'
C36	26°50'00"	115.00'	57.99'	49°50'56" 57.53'
C37	9°00'00"	15.00'	20.42'	52°29'09" 18.36'
C38	26°53'00"	175.00'	82.11'	51°34'29" 81.36'
C40	10°34'53"	225.00'	45.56'	52°51'43" 41.50'
C41	26°53'00"	225.00'	105.58'	51°34'29" 104.63'
C42	15°29'53"	225.00'	60.86'	50°49'19" 60.67'
C43	0°48'16"	225.00'	3.16'	50°40'14" 3.16'

50 25 0 50
ORIGINAL SCALE: 1" = 50'

COYOTE CREEK FILING NO. 4
JOB NO. 16093.00
DECEMBER 13, 2021
SHEET 2 OF 2



Centennial 303-740-9393 • Colorado Springs 719-593-2593

Page 478 of 483



Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621

Phone: 303.857.6694

Fax: 303.857.0351

www.fortluptonco.gov

To: Planning Commission
From: Maria Lancto, Planner
CC: Todd Hodges, Planning Director
Date: January 7, 2022
Subject: Continuance Request for the Sagebrush Apartments Site Plan

Staff is requesting a continuance of the public hearing for the Sagebrush Apartments Site Plan to February 10, 2022. This request is to allow time to properly notice the change of zone and comprehensive plan amendment associated with this project that need to be reviewed by Planning Commission prior to review of the site plan application.

The City Council public hearing will be continued to February 15, 2021.



Planning & Building

130 S. McKinley Avenue
Fort Lupton, CO 80621

Phone: 303.857.6694

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www.fortluptonco.gov

To: Planning Commission
From: Maria Lancto, Planner
CC: Todd Hodges, Planning Director
Date: January 7, 2022
Subject: Withdrawal of the SB Weakland Investments Amended Site Plan

Staff is requesting a cancellation of the scheduled public hearings for the SB Weakland Investments Amended Site Plan. The applicants have formally withdrawn their applications. A copy of the withdrawal letter is attached.

No further action by Planning Commission is required.

Maria Lancto

From: Mezarina, Al <al.mezarina@maxar.com>
Sent: Thursday, January 6, 2022 5:16 PM
To: Maria Lancto
Cc: Todd Hodges; Hernandez, Ramon; 'Scott Weakland'; Bryan Fry/USA
Subject: RE: Status of SB Weakland Investments Amended Site Plan

My apologies for the delayed reply Maria. Yes, Maxar will be looking to go elsewhere as too many difficulties have presented themselves. Please consider this email formal request to withdraw our application..

Thank you

Al Mezarina

Al Mezarina

Alberto Mezarina
Program Manager
Corporate Project Delivery
1300 W. 120th Ave
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C: +1.720.713.9953

al.mezarina@maxar.com

MAXAR



From: Maria Lancto <MLancto@Fortluptonco.gov>
Sent: Thursday, January 6, 2022 1:58 PM
To: Mezarina, Al <al.mezarina@maxar.com>
Cc: Todd Hodges <thodges@Fortluptonco.gov>
Subject: FW: Status of SB Weakland Investments Amended Site Plan
Importance: High

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Al,

Please provide an update of the SB Weakland Investments Amended Site Plan. If it is Maxar's intention to withdraw, we will need the withdrawal request in writing. It is highly preferred that we receive this by tomorrow morning. I will be publishing the agenda and packet tomorrow morning for Planning Commissioners to begin their review. If we do not receive a withdrawal request before then, I will publish the entire SB Weakland Investments Site Plan packet, and

Commissioners will begin to review it for approval/denial. Obviously, I do not want to ask them to conduct their review if there is no intention of moving the project forward. A withdrawal request is not necessary if you do plan to move forward with what was previously submitted, but we would appreciate confirmation of your intentions.

Thank you,

Maria Lancto

Planner I

130 S. McKinley Ave.
Fort Lupton, CO 80621
Office: 303.857.6694
Extension: 6107
Cell: 303.718.0172

From: Chadwin Cox @ Western ECI [<mailto:chadwin.cox@westerneci.com>]

Sent: Tuesday, January 4, 2022 11:01 AM

To: Maria Lancto <MLancto@Fortluptonco.gov>; 'Scott Weakland' <sweakland@rlwsand.com>; 'Mezarina, Al' <al.mezarina@maxar.com>

Cc: Todd Hodges <thodges@Fortluptonco.gov>

Subject: Re: Status of SB Weakland Investments Amended Site Plan

Morning Maria,

I talked with Scott yesterday and he said he was going to reach out to Maxar to have them provide the written request for withdrawal as they had indicated to him they were not proceeding.

Thank you,

Chad

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From: Maria Lancto <MLancto@Fortluptonco.gov>

Sent: Tuesday, January 4, 2022 10:55:19 AM

To: Chadwin Cox @ Western ECI <chadwin.cox@westerneci.com>; 'Scott Weakland' <sweakland@rlwsand.com>; 'Mezarina, Al' <al.mezarina@maxar.com>

Cc: Todd Hodges <thodges@Fortluptonco.gov>

Subject: Status of SB Weakland Investments Amended Site Plan

Hello,

I am reaching out because the Planning Commission public hearing for SB Weakland Investments Amended Site Plan was continued for January 13, 2022, therefore we are putting together the agenda and packet this week. As we have not seen an updated layout, city staff and external referral agencies will not have time to adequately review any potential changes. At this point, we are recommending withdrawal of the application. We can discuss the future of the site at a Pre-Application meeting to determine how to move forward.

In order to withdraw the application, please provide us with a written request of the withdrawal.

If you wish to move forward with what was previously submitted and reviewed, please let me know and can have that ready to go for next week.

Thank you,

Maria Lancto

Planner I

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