June 27, 2024

Town of Erie
645 Holbrook St.
Erie, CO 80516
Attention: Planning Department

Re: Mountain View Fire Rescue – Station 15 (Meadow Sweet)
SW Corner of Erie Parkway and Meadow View Parkway
Traffic Impact Letter

Dear Planning Department,

Strategic Site Designs, LLC is drafting this letter to address site generated traffic for the proposed fire station to be constructed on Tract G of the Flatiron Meadows Subdivision. The Mountain View Fire Rescue is currently planning one principle full movement access onto Meadow Sweet Drive on the south side of the project site. In addition to the Meadow Sweet connection, a new apron is planned along Erie Parkway for emergency response vehicle exit only. All normal, non-emergent responses will depart the Meadow Sweet Lane.

To assess the stations' impact to the local roadway network, our review will primarily focus on the operation of the existing intersection of Meadow View Parkway and Erie Parkway. Today, the intersection is configured as a two-way stop-controlled access with Erie Parkway being the major through street.

Our team has reviewed the original Flatiron Meadows Traffic Impact Analysis (TIA) for Flatiron Meadows prepared by LSC Transportation Consultants, Inc. dated January 28, 2008 and the Technical Memorandum prepared by Aldridge Transportation Consultants, LLC dated December 13, 2011.

The original TIA was prepared for the overall subdivision which included 237 townhomes, 635 single-family residential units and a 900-student school/park. In total, the subdivision was anticipated to generate 8,627 trips. Two primary connections were proposed to Erie Parkway (referred to then as "Leon Wurl Parkway") at 111th and Meadow View Parkway. As described in prior paragraphs, the Meadow View Parkway and Erie Parkway is the principle focus of this letter. The LSC report described and reached the following conclusion regarding this intersection:

"The northbound approach of this unsignalized intersection is expected to operate at a good Level of Service (LOS "C" of better) for all movements during both the morning and evening peak hours without the addition of site generated traffic through 2010. With the addition of site-generated traffic, the southbound approach of this intersection will operate at Level of Service "E" during the morning peak hour and Level of Service "D" during the evening peak hour of Year 2010. By the Year 2025, the northbound and southbound approaches of this intersection will operate at a poor Level of Service "F". Delays commensurate with Level of Service "E" or "F" are typical for minor street movements at Stop sign-controlled intersections along arterial streets during the peak hours. Traffic signal warrants are not expected to be met at this intersection."

The LSC study also recommended that a westbound left turn deceleration lane be installed at the Meadow View Parkway and Erie Parkway which is currently in place.

In December of 2011, Aldridge Transportation Consultants (ATC) prepared a technical memorandum which expanded upon the original LSC Study. The primary purpose of this memorandum was to reassess the recommendations of the original study and provide additional discussion on the phasing of the improvements. The ATC memorandum discusses the overall subdivision being broken into 12 distinct phases. The proposed site lies within Phase 2 which ATC defines as Partition 1, which also includes Phase 1,2 and 3 with a total of 200 units. The ATC Conclusions for the build-out of Partition 1 suggest that a 200-foot westbound left turn lane be constructed at the Meadow View Parkway and Erie Parkway Intersection. The conclusion aligns with the recommendations in the LSC Study. It should be noted that the existing left turn has approximately 150-feet of storage with 150-feet of taper.

With this turn lane in place, ATC's study suggests that the Intersection will operate at LOS C in the short-term horizon. With the buildout of Partition 2, or the remaining 9 phases, ATC recommends an extension of the left turn lane from 200-feet to 350-feet. Under this scenario (2030 Horizon), the existing intersection will operate at LOS F. ATC indicated in their Operations Analysis Summary that this is normal under peak hour conditions. LSC made the same statement in their conclusions for this intersection.

July 1, 2024

Town of Erie
645 Holbrook St
Erie, CO 80516
Attention: Planning Department

Re: Mountain View Fire Rescue – Station #15
Erie Parkway and Meadow View Parkway
Wildlife Impact Report

Dear Planning Department,

Our team is drafting this letter to address the wildlife impacted by the development of Mountain View Fire Rescue's new Fire Station #15 located on the SW Corner of Erie Parkway and Meadow View Parkway.

This proposed site has been disturbed on multiple occasions are part of the overall subdivision's development. However, due the lack of disturbance in recent years, our team has reviewed existing resources that identify threatened and endangered species to ensure that no new species or designations have been mapped within the project area.

As shown on the attached readouts available from the US Fish and Wildlife Service's "Critical Habitat for Threatened & Endangered Species" GIS catalogs, there are no threatened or endangered species identified within the project area. SSD also completed a site visit approximately two (2) weeks ago and did not note any critical habitat, nests, or other visual evidence of existing wildlife impacting the site.

IN addition to the Threatened and Endangered Species review, our team also reviewed the National Wetlands Inventory. As shown on the attached map, there are not wetlands or other aquatic sustaining wetlands within the limits of the project site.

Given the sites location in an urban environment, the prior disturbances that have occurred to date and our review of available resources, there are no perceived impacts to any threatened or endangered species that will result from this project's development.

Should you have any questions or require additional information, please don't hesitate to contact me directly at CPerdue@ssdeng.com or (720) 206-6931.

Sincerely,
Strategic Site Designs, LLC

Christopher L. Perdue, P.E., M.B.A.
Owner

CP

Attachments: ECOS Environmental Conservation Online System – Map
National Wetlands Inventory - Map

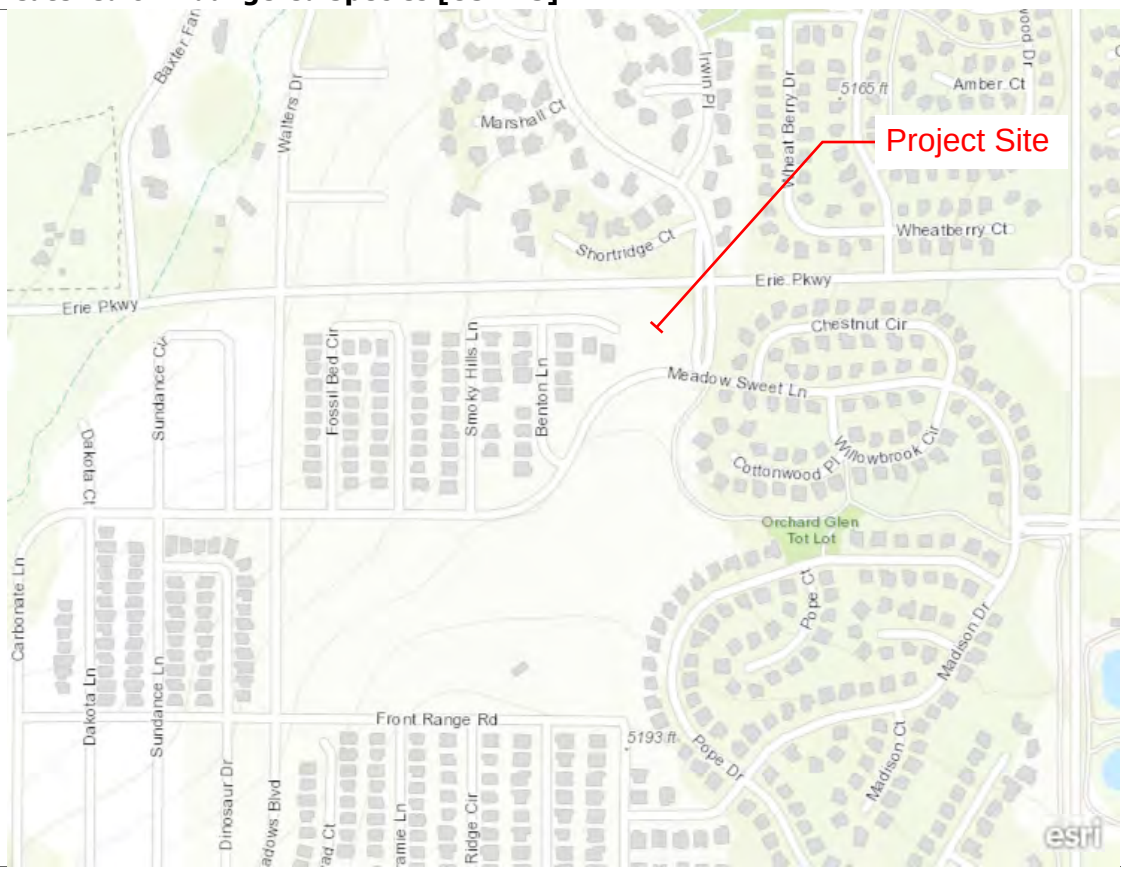
Critical Habitat for Threatened & Endangered Species [USFWS]

Final Polygon Features

Final Linear Features

Proposed Polygon Features

Proposed Linear Features



A specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Boulder County, City and County of Broomfield, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA

U.S. Fish and Wildlife Service
National Wetlands Inventory

Mountain View Meadow Sweet Wetlands

July 1, 2024

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

The proposed fire station will not have any public facilities such as community rooms and thus the main traffic generator (excluding emergency responses) is the fire station's crew at shift change. The 11th Edition of the ITE Trip Generation Manual includes figures for a Fire and Rescue Station but there is limited studies and only the "Weekday Peak Hour of Adjacent Street Traffic" is provided. As such, our team usually relies on the station's staffing and operation information to establish an estimate for non-emergency and determine impacts on the adjacent roadways. In this case, the station will be staffed by five (5) fire fighters with a shift change occurring at 7:00 am every 48 hours. As such, we can reasonably assume that this station will generate five (5) AM trips entering the site and five (5) AM trips exiting the site every other day onto Meadow Sweet Lane. For the purposes of this analysis, we have assumed that all non-emergency traffic entering and exiting the station will use the Erie Parkway and Meadow View Parkway intersection. All emergency response vehicles will depart from the station northbound onto Erie Parkway and return to the station via the Meadow Sweet Lane public access.

Given that the station is only generating 5 trips to the Meadow View and Erie Parkway intersection, no additional adverse impacts are expected to occur at that intersection given that it already operates at a LOS F in the peak hour based on two former studies and their future projections. ATC projected 174 trips using the northbound approach (which we consider the most impacted movement due to the stop control), thus this project is only adding an additional 2.8% assuming all existing vehicles use Meadow View Parkway.

As part of the development plan for the fire station, there are a couple of considerations necessary to safely permit access onto Erie Parkway which should be addressed as part of the Planning and Construction Documents.

There is an existing pedestrian crossing located on the west side of the Meadow View and Erie Parkway intersection. This crossing is largely used by school children traveling north and south to and from Meadowlark Elementary School. Given the crossing's proximity to the proposed fire station exit apron, that crossing should be relocated to the west. The final location should be determined based on connectivity to the existing subdivision and the sidewalk and trail network offering the most effective route for pedestrians flowing south. The pedestrian crossing shall be designed with a, raised refuge island in the median along with a HAWK Signal system to stop traffic on Erie Parkway allowing pedestrians to cross safely.

Additional warning signage will also be required on Erie Parkway to address emergency response vehicles entering Erie Parkway. At a minimum, we recommend installation of Emergency Vehicle Warning Systems on the east bound and west bound approach and one at the northbound approach on Meadow View Parkway to Erie Parkway. We recommend installation of the TS50 manufactured by Traffic Safety Corporation or an approved equivalent. These systems have multiple means of activation including the optical emitters installed in most fire stations. Each Warning System should include flashing lights to alert motorists of emergency vehicles entering the roadway/intersection.

Other than the items outlined herein, there are no other traffic items to address that are not covered in the scope of the civil construction documents. Should you require additional information, please don't hesitate to contact me directly via email at mcleary@ssdeng.com or via phone at (720) 633-0219.

Sincerely,
Strategic Site Designs, LLC

Michael D. Cleary, P.E.
Project Manager

November 1, 2024

Town of Erie, Community Development
2203 North 111th Street
Erie, CO 80516
Attention: Harry Brennan, Senior Planner

Re: Abridged Utility Infrastructure Analysis Report

Dear Harry,

Within, or attached to, this report, you will find the necessary information that evaluated the proposed development's impact on the Town's utility infrastructure. This report will include the basis for line sizing, maximum daily demand (MDD) estimates, and fire flow calculations.

Mountain View Fire Rescue Station 15 Infrastructure:

The proposed plans for the Fire Station Facility necessitate the inclusion of numerous lavatories and a fire suppression sprinkler system. To this end, the applicant intends to establish a connection of a 1.5-inch domestic service line to the existing water main in Meadow Sweet Lane. Additionally, a 6-inch fire line is slated to connect to the same water main to accommodate the building's automatic fire suppression system. Furthermore, a new hydrant is proposed to be positioned within close proximity, specifically within 100 feet of the FDC, situated to the north of these two connections.

Based on the water demand estimate and meter sizing utilizing fixture values from *AWWA M22 Manual, Second Edition*, the Maximum Daily Demand (MDD) is determined to be 49 gallons per minute (gpm), with a total combined fixture count of 78. See below for water demand calculations.

In the assessment, SSD applied the 2021 International Fire Code (IFC) to determine the required fire flow and fire hydrants count for the site, applying Table B105.01, Table B105.2 and Table C102.1.

Area (sq. ft.)	Construction Type	Suppressed?	Required Fire Flow (GPM)	Hydrants Required	Hydrants Available
12,709	Type IB	Yes	1,000*	1	1

**Set at the minimum per IFC Appendix B105.2,*

We ask that you review the information provided and consider this letter as sufficient to demonstrate the proposed impacts on the Town's utility infrastructures.

Should you require additional information, please feel free to reach out to me directly at (720) 633-0219 or via email at MCleary@strategicsitedesigns.com

Sincerely,

Strategic Site Designs, LLC

Michael Cleary, PE

Senior Project Engineer

Attachments:

Water Demand Estimate and Meter Sizing using Fixture Values

Fire Flow and Hydrant Spacing Requirements

Water Demand Estimate and Meter Sizing Using Fixture Values

(Based on AWWA M22 Manual, Second Edition)

Project Number	2321
Building address or number	Station 15
Residential or Non-Residential	Non-Residential
Pressure Zone at Project	60

Fixture or Appliance	Fixture Value (at 60 psi)	Number of Fixtures	Subtotal Fixture Value
Toilet (tank)	4	8	32
Toilet (flush valve)	35		0
Urinal (wall or stall)	16		0
Urinal (flush valve)	35		0
Bidet	2		0
Shower (single head)	2.5	6	15
Sink (lavatory)	1.5	8	12
Kitchen Sink	2.2	2	4.4
Utility Sink	4	3	12
Dishwasher	2	1	2
Bathtub	8		0
Clothes Washer	6	0	0
Hose connections (with 50 ft of hose)			
1/2 in.	5	3	15
5/8 in.	9		0
3/4 in.	12		0
Miscellaneous			
Bedpan washers	10		0
Drinking fountains	2	2	4
Dental units	2		0
Combined Fixture Value			96.4
Demand (gpm)			49
Pressure Adjustment Factor			1
Total Adjusted demand (gpm)			**49**
Preliminary Demand Size			1 1/2"
Velocity (fps)			**8.9**
Required Meter Size			**1-1/2"**

Fire Flow and Hydrant Spacing Requirements

Project: MVFR Station 15

Date: 10/31/2024

Building ID: Building 1

Area: 12,709 *sq. ft.*
Construction Type: IB
Flow: 2,500 *per Table B105.1(2)*
Sprinklered?: Yes
Req'd Fire Flow: 1,000 *gpm (min = 1,000)*
# of Hydrants: 1 *minimum*
Max Distance: 337.5 *ft. (Street frontage to hydrant)*
675 *ft. (Spacing)*

Building ID:

Area: *sq. ft.*
Construction Type:
Flow: *per Table B105.1(2)*
Sprinklered?:
Req'd Fire Flow: *gpm (min = 1,500)*
# of Hydrants:
Max Distance:

Building ID:

Area: *sq. ft.*
Construction Type:
Flow: *per Table B105.1(2)*
Sprinklered?:
Req'd Fire Flow: *gpm (min = 1,500)*
# of Hydrants:
Max Distance:

FIRE-FLOW CALCULATION AREA (square feet)						
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}	FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	
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	2
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	
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	3
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	
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	4
—	—	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	

Min = 1000	*903.3.1.1 NFPA 13 sprinkler systems*
Min = 1500	*903.3.1.2 NFPA 13R sprinkler systems - Group R occupancies*

Fire Flow and Hydrant Spacing Requirements

Building ID: _____

Area: _____ *sq. ft.*
Construction Type: _____
Flow: _____ *per Table B105.1(2)*
Sprinklered?: _____
Req'd Fire Flow: _____ *gpm (min = 1,500)*
# of Hydrants: _____
Max Distance: _____

FIRE FLOW REQ.	MIN # HYD.	AVG. SPACING BETWEEN HYD.	MIN. DISTANCE FROM ANY POINT ON STREET
1,750 or less	1	500	250
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751–3,250	3	400	225
3,251–4,000	4	350	210
4,001–5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001–7,000	7	250	150
7,001 or more	8 or more^{e}	200	120

A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the International Fire Code.

A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the International Fire Code or Section P2904 of the International Residential Code.

Phase III Drainage Report

for

Mountain View Fire Rescue Station 15

Flatirons Meadows Master Plat Tract G

S 1/2 of Section 23, T1N, R69W of the 6th P.M.
Town of Erie, County of Boulder, State of Colorado

SDD Project Number: 2321-001

Prepared by:
Strategic Site Designs, LLC
88 Inverness Circle East, Suite B101
Englewood, CO 80112
Contact: Michael Cleary, PE
(720) 633-0219

Drainage Report Prepared for:
Town of Erie Planning & Development Department
645 Holbrook St
Erie, CO 80516
Contact: Harry Brennan, Senior Planner
(303) 926-2770

Initial Submittal:	June 28, 2024
Resubmittal:	November 1, 2024
Resubmittal (If required):	
Resubmittal:	
For Signatures:	

Table of Contents

Appendices

Certifications

Engineer's Certification

*"I hereby certify that this **Phase III drainage report** for the design of MVFR – Station 15 was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Erie Standards and Specifications for Design and Construction for the owners thereof. I understand that the Town of Erie does not and will not assume liability for drainage facilities designed by others, including the designs presented in this report."*

(AFFIX SEAL)

Signature: _____

Michael Cleary, P.E.
Registered Professional Engineer State of Colorado No. 60575

Town Acceptance

This report has been reviewed and found to be in general compliance with *the Town of Erie Standards and Specifications for Design and Construction* and other Town requirements. **THE ACCURACY AND VALIDITY OF THE ENGINEERING DESIGN, DETAILS, DIMENSIONS, QUANTITIES, AND CONCEPTS IN THIS REPORT REMAINS THE SOLE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.**

Accepted by: _____ _____

Town Engineer or designee Date

Scope and Purpose

The purpose of this report is to support the projected patterns of development proposed within Tract G of Flatiron Meadows development. The development features existing regional stormwater infrastructure designed and approved to serve the subject property. This report includes analysis and design of existing inlets and storm systems intended to demonstrate compliance with the approved master study and the assumptions made therein.

Section I – Introduction

1.1 Site Location

The subject property and proposed development are located within the planned development identified as Flatiron Meadows Subdivision, located in the S 1/2 of section 23 and NW 1/4 of section 24, township 1 north, range 69 west.

The Project Site is located within the NE portion of the subdivision, adjacent and west of Meadow View Parkway, south of Erie Parkway.

1.2 Description of Property Site

The property is currently vacant and undeveloped, covering 1.56 acres, surrounded by single family residential development. The property is covered with native grasses with agricultural soils and, in general, slopes gradually to the south-southwest with gentle to moderate slopes.

The geotechnical report made available to us during the design process did not allude to any significant geological hazards within the property. A summary of the on-site soils is provided in the table below based on NRCS information made publicly available.

Map Unit Symbol	Map Unit Name	% of AOI	Hydrologic Soil Group
AcA	Ascalon sandy loam, 0 to 3% slopes	83.5	B
MdD	Manter sandy loam, 3 to 9% slopes	16.5	A

The predominant soil type for each of the sections included in the development area is Hydrologic Group Type “B.” Additional soil information is available in the custom soils report in the appendices. A review of the FEMA map database, the subject property is represented on panel 08013C0437J, with a revised date of December 18th, 2012, indicates that the site does not lie within a major floodplain and is in an area of minimal flood hazard (Zone X).

1.3 General Description of Proposed Development

- When the development was platted, Tract G was created and allotted for the development of a future fire station.
- A 12,000 sq. ft. firehouse will be centrally located within the subject property with access to both Erie Parkway and Meadow Sweet Lane.

- Adjacent storm sewer infrastructure is limited and surface grading, curb and gutter, and landscape swales will direct runoff toward the adjacent roadway as assumed in the development's master drainage plan.

Section II – Drainage Basins

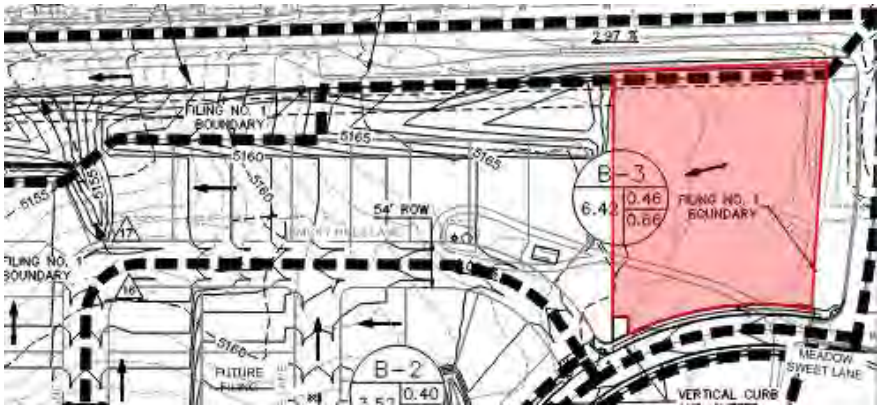
2.1 Major Basins Description

Tract G is located within the limits of the Town of Erie Outfall Systems Plan, West of Coal Creek (OSP).

2.1 Minor-Basins Description

The subject property has been platted as Tract G of the Flatiron Meadows Master Plat. In the *Phase III Drainage Report for Flatiron Meadows Filing No.1, completed* by Calibre Engineering, Inc in 2012, Tract G is shown as being located within the Filing No. 2, which is described in Section 4.4 of that report as being tributary to regional detention facilities.

More specifically, the subject property was identified as being located within basin B-3 and shown to be tributary to an interim detention pond. Later the interim pond was replaced by a permanent regional detention facility – pond 1029. Refer to Appendix C for excerpts from the relevant maps and analysis.



Section III – Drainage Design Criteria

3.1 Regulations

All storm drainage analysis and design in connection with this Project has been executed in accordance with all applicable design criteria including:

- *Town of Erie 2024 Standards & Specifications Section 800 (2024)*
- *Urban Drainage and Flood Control District's (MHFD) Technical Criteria Manual - Volumes I, II, III.*

3.2 Drainage Studies, Outfall Systems Plans, Site Constraints

As furnished by the Town of Erie, the following drainage studies are relevant to the subject property.

- *Phase III Drainage Report for Flatiron Meadows Filing No.1* – Calibre Engineering, Inc (2012).

The referenced reports and addendums outline the stormwater analysis and designs for the area that includes the subject property, as approved by the Town of Erie, have been reviewed by SSD engineers and the relevant portions have been considered and referenced in the analysis outlined herein.

3.3 Hydrological Criteria

All hydrologic calculations were completed in accordance with Section 800 of the Town standards, using the rational method utilizing MHFD UD-Rationale Software. Given the size of the site, the rational method is an appropriate methodology and sufficient to deliver accurate results because the limit of the application of the Rational Method is approximately 160 acres. Each basin was identified based on the relevant topographic features and those variables (flow path length, basin slope, composite impervious percentage, etc.) were to calculate a flow rate for the desired storm event. The Runoff Coefficients and rainfall depth data utilized were obtained from *Section 813.00 of the Town of Erie Standards and Specifications.* (See Appendix A).

Rainfall	Design Storm Return Period		
	2-year	5-year	100-year
1-hr Depth	0.81	1.11	2.68

** Per Table 800-1 and 800-2 Town of Erie Standards and Specifications*

3.4 Hydraulic Criteria

Stormwater is to be captured and conveyed using surface grading, street section geometry, and existing curb inlets. Conveyance systems have been analyzed in accordance with the approved master study and *Section 800 of the Town of Erie Standards and Specifications.*

Methods used are likely to include High Flood District's MHFD-Inlet V5.03 for street and inlet capacities and Stormwater Studio software for hydraulic modeling/analysis of proposed storm sewer. Hydraulic modeling input and output can be found in Appendix B.

Section IV – Drainage Facility Design

4.1 Existing Stormwater System Description

The previously approved *Phase III Drainage Report for Flatiron Meadows Filing No.1 – Calibre Engineering, LLC (2012)* outlines a regional stormwater management system for the development. Much of the infrastructure is already in place and was initially designed to include development within Tract G. With the construction of Filing Nos. 1, 3 & 5, the development of the subdivision included a detention pond that has been constructed.

The regional detention pond, located in the NW portion of the development, serves to capture flows from most Filings within the subdivision as well as some offsite areas. The area tributary to pond consists of single-family residential, roadways, commercial, and open space mostly within the Flatiron Meadows subdivision. The facility was designed and adequately sized to capture, detain, and release the required storm events in compliance with local jurisdictional requirements and the Mile High Flood District Criteria.

According to Calibre's report, the subject property was accounted for as flowing overland to the Smoky Hill Lane right-of-way and carried west to a curb inlet. assuming an area of 1.78 acres with an imperviousness of 70%. However, changes to the local street layout in the adjacent residential areas and improvements made to Erie Parkway result in a slightly different distribution and conveyance of runoff originating from the Tract G. According to Calibre's report, the regional detention pond will be built in a subsequent phase. A temporary drainage pond will provide service for the project site and is stated to be capable of providing capacity until the regional detention pond is in place.

4.2 Proposed Stormwater System Description

In the development plan for the fire station, an effort was made to align with the overall development plans, to the extent possible, while recognizing the changes that have been made since the Calibre report was approved.

Development plans proposed for Tract G will continue to promote surface runoff to the adjacent streets, using the existing curb and gutter to convey flows to existing curb inlets and be conveyed west to the regional pond. Based on the site configuration and proposed grading of the fire station, four drainage sub-basins have been delineated within the property of Tract G:

Basin ID	Description	Area (ac)	% Imp.	Drainage Pattern	Q5 (cfs)	Q100 cfs)	Design Pt.
A1	Building roof and open space areas along the northwest portion of site	0.28	33.9%	Surface runoff flowing west to Smoky Hill Lane and conveyed to an existing curb inlet.	0.27	1.45	1
A2	Portion of northern driveway and open space	0.17	79.0%	Surface runoff flowing north to Erie Parkway and conveyed west to an existing curb inlet.	0.42	1.23	2
A3	Building roof, driveway, and open space areas.	1.00	59.6%	Surface runoff flowing south to Meadow Sweet Lane an conveyed west to an existing curb inlet.	1.30	4.53	3
A4	Portion northeast open space	0.10	2.0%	Surface runoff flowing east to an existing sump inlet in Meadow View Parkway.	0.004	0.32	4

The total area (1.55 acres) and combined imperviousness (53.4%) within the subject property, post-development were both determined to be lower than those values assumed in the Filing No. 1 report.

	Area	% Imp
Calibre Filing No. 1 Report	1.78	70
This Report	1.55	53

However, to account for the street layout changes and subsequent Erie Parkway infrastructure improvements, new basin boundaries for the existing inlets expected to receive flow from the subject property. Effectively, Basin B-1, B-3 and B-6 from the Calibre report have been re-delineated and re-evaluated, along with adjacent basins, under current conditions (Table 4.2) and then accounting for changes resulting from the proposed fire station development (Table 4.3).

Table 4.2

EXISTING BASIN SUMMARY TABLE - OVERALL							
BASIN ID	DESIGN POINT	AREA (ac)	% IMPERVIOUS	C5	C100	Q5	Q100
E1	17	1.24	21.0%	0.16	0.52	0.36	2.93
E2	5	6.96	31.4%	0.29	0.61	5.68	28.88
E3	5.1	0.89	48.7%	0.43	0.68	1.45	5.53
E4	5A	1.21	40.1%	0.36	0.65	1.65	7.13
E5	5A.1	0.48	36.8%	0.33	0.63	0.46	2.12
E6	5B	0.64	47.5%	0.38	0.65	0.92	3.76
E7	25	0.15	80.4%	0.68	0.80	0.38	1.09
E8	21	3.55	30.4%	0.28	0.61	2.48	12.89
E9	22	2.79	28.8%	0.22	0.56	1.60	9.77

Table 4.3

PROPOSED BASIN SUMMARY TABLE - Overall (Post Development of Tract G)							
BASIN ID	**DESIGN POINT**	**AREA (ac)**	**% IMPERVIOUS**	**C5**	**C100**	**Q5**	**Q100**
P1	17	1.02	31.2%	0.31	0.62	0.84	4.05
P2	5	6.42	42.8%	0.38	0.66	7.01	29.08
P7	25	0.39	47.2%	0.38	0.65	0.50	2.04
P8	21	3.55	34.1%	0.27	0.58	2.38	12.66

Flows from the subject property and adjacent basins are conveyed within the existing roadway curb and gutter to an existing series of curb inlets and storm sewer to the regional pond to the west. Inlets within Erie Parkway, Flat Iron Meadow and Meadow Sweet Lane were evaluated storm network and determined to be sufficient to capture the tributary flows.

Table 4.4

CARRYOVER SUMMARY TABLE						
BASIN ID	**DESIGN POINT**	**Q100 (CFS)**	**% CAPTURE (100 YR - CFS)**	**INLET INTERCEPTION CAPACITY (CFS)**	**CARYOVER RECIEVED (CFS)**	**CARRYOVER OUT (CFS)**
P1	17	4.05	60.0%	2.4	0	1.6
P8	21	12.66	60.0%	7.6	0	5.10
E9	22	9.77	SUMP	35.9	5.10	0
P7	25	2.04	83.0%	1.7	0	0.3
P2	5	29.08	38.0%	10.9	0	18.2
E3	5.1	5.53	SUMP	17.2	18.2	14.2
E4	5A	7.13	45.0%	9.6	14.2	11.8
E5	5A.1	2.12	SUMP	17.2	11.8	0
E6	5B	3.76	SUMP	54.9	0	0

5.1 Conclusions and Recommendations

As shown in the analysis provided above, the grading changes and anticipated development proposed for Tract G of Flatirons Meadows Subdivision result in conditions that remain consistent with those used in the master drainage study. As such, it is our opinion that the fire station proposal will not result in any increase in required storage volume for the regional pond and would not adversely impact the conveyance infrastructure or neighboring properties.

References

1. *Town of Erie Design Standards and Specifications (2024)*
2. *Urban Storm Drainage Criteria Manual, Urban Drainage and Flood Control District, Volume 1 revised March 2017, Volume 2 revised September 2017, Volume 3 Revised November 2010*

Appendix	Title	Included Material
Appendix A	Hydrology	• Imperviousness Calculation • Rational Method Runoff Calculations
Appendix B	Hydraulics	• Street Cross-Section Capacities • Storm Inlet Capacity
Appendix C	Reference Material	• FIRM Map Index – Panel 08013C0437J • Flatiron Meadows Filing Map – Calibre Engineering, Inc (2012) • Flatiron Meadows Filing Map – Calibre Engineering, Inc (2017) • Page 8 of Phase III Drainage Report – Calibre Engineering, Inc (2012) • Flatiron Meadows Sheet GE1 (4 of 29) • Flatiron Meadows Filing No.1 Proposed Drainage Exhibit – Calibre Engineering, Inc (2012). • Town of Erie Sub-Basin Map • Town of Erie Standards and Specifications Section 800 pages 6-7 • Storm Drainage System Inlet Design Information – Calibre Engineering, Inc (2012)
Appendix D	Drainage Maps	• Drainage Maps
Appendix E	Soils Information	• Web Soil Survey Report

Appendix A

Hydrology

Impervious Percentage Calculations

Flatirons Meadows Tract G
Erie, CO

Designer *Andres S*
Company *SSD*
Date *6/17/2024*
Project *Flatiron Meadows Fire Station*
Location *Erie, CO*

Overall Inputs	
Land Use	% Impervious
Commercial Area	95%
Neighborhood Areas	75%
Residential	45%
Parks, Cemeteries	10%
Playgrounds	25%
Schools	55%
Paved Streets	100%
Gravel (packed)	40%
Railroad Yard Access	50%
Public/Institutional	50%
Roofs	90%
Lawns, Sandy Soil	2%
Lawns, Clay Soil	2%
Greenbelts, Agricultural	2%
Offsite Flow	45%
Undeveloped Historic Flow A	2%

*Table 800-3

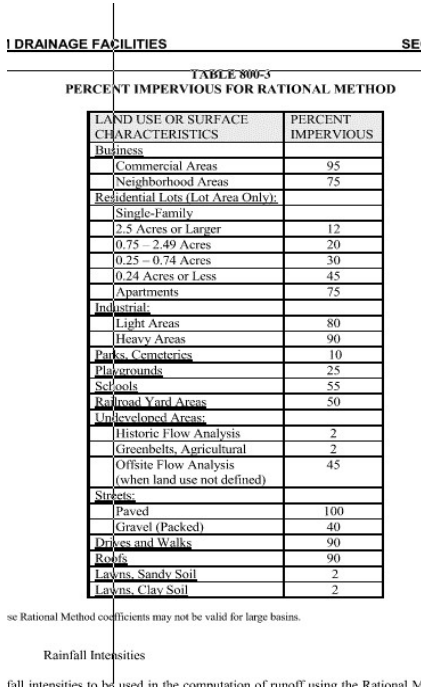


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TABLE 800-3
PERCENT IMPERVIOUS FOR RATIONAL METHOD

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS
Business	
Commercial Areas	95
Neighborhood Areas	75
Residential Lots (Lot Area Only):	
Single-Family	
2.5 Acres or Larger	12
0.75 – 2.49 Acres	20
0.25 – 0.74 Acres	30
0.24 Acres or Less	45
Apartments	75
Industrial:	
Light Areas	80
Heavy Areas	90
Parks, Cemeteries	10
Playgrounds	25
Schools	55
Railroad Yard Areas	50
Undeveloped Areas:	
Historic Flow Analysis	2
Greenbelts, Agricultural	2
Offsite Flow Analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (Packed)	40
Drives and Walks	90
Roofs	90
Lawns, Sandy Soil	2
Lawns, Clay Soil	2

se Rational Method coefficients may not be valid for large basins.

Rainfall Intensities

fall intensities to be used in the computation of runoff using the Rational M

Subcatchment Name	Total Area (ac)	NRCS Hydrologic Soil Group	Open Space/Lawn Area (ac)	Roadways /Pavement Area (ac)	Residential Area (ac)	Institutional Area (ac)	Building Roof Area (ac)	% Check	Percent Impervious
A1	0.28	B	0.18	0.03			0.07	100%	33.9%
A2	0.17	B	0.04	0.13				100%	79.0%
A3	1.00	B	0.39	0.39			0.22	100%	59.6%
A4	0.10	B	0.10					100%	2.0%
	1.55								**53.4%**
E1	1.24	B	1.00	0.24				100%	21.0%
E2	6.96	C	3.74	1.20	2.02			100%	31.4%
E3	0.89	C	0.15	0.18	0.57			100%	48.7%
E4	1.21	C	0.44	0.24	0.54			100%	40.1%
E5	0.48	C	0.23	0.11	0.14			100%	36.8%
E6	0.64	B	0.23	0.21	0.19			100%	47.5%
E7	0.15	B	0.03	0.12				100%	80.4%
E8	3.55	C	2.52	1.03				100%	30.4%
E9	2.79	B	2.48	0.31	1.00			136%	28.8%

Impervious Percentage Calculations

Flatirons Meadows Tract G
Erie, CO

P1	1.02	C	0.71	0.24			0.07	100%	31.2%
P2	6.42	C	2.59	1.60	2.02		0.22	100%	42.8%
P7	0.39	B	0.21	0.18				100%	47.2%
P8	3.55	B	2.39	1.16				100%	34.1%

Calculation of Peak Runoff using Rational Method

Designer: Andres S
Company: SSD
Date: 10/31/2024
Project: Flatiron Meadows Subdivision
Location: Erie

Version 2.00 released May 2017

Cells of this color are for required user-input
Cells of this color are for optional override values
Cells of this color are for calculated results based on overrides

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{minimum}$ = 5 (urban)
$t_{minimum}$ = 10 (non-urban)

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.82	1.11	1.39	1.86	2.29	2.68	4.16
	a	b	c				
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786				

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A1	0.28	B	33.9	0.24	0.26	0.33	0.46	0.52	0.58	0.66	20.00	5172.31	5171.81	0.025	4.99	83.00	5171.81	5169.70	0.025	20	3.19	0.43	5.42	20.87	5.42	2.71	3.68	4.61	6.17	7.60	8.89	13.81	0.18	0.27	0.43	0.80	1.10	1.45	2.55
A2	0.17	B	79.0	0.63	0.66	0.69	0.75	0.77	0.79	0.83	0.00	5172.20	5172.19	100.000	0.00	100.81	5172.19	5171.25	0.009	20	1.93	0.87	0.87	13.44	5.00	2.77	3.76	4.71	6.31	7.77	9.09	14.11	0.30	0.42	0.56	0.80	1.02	1.23	1.98
A3	1.00	B	57.4	0.44	0.47	0.52	0.61	0.65	0.69	0.75	27.00	5172.14	5171.89	0.009	6.08	267.52	5171.89	5167.94	0.015	5	0.61	7.34	13.42	18.40	13.42	1.95	2.65	3.32	4.45	5.47	6.41	9.94	0.85	1.24	1.73	2.71	3.55	4.44	7.42
A4	0.10	B	2.0	0.01	0.01	0.07	0.26	0.34	0.44	0.54	48.42	5172.45	5170.66	0.037	8.88	0.00			0.000	5	0.05	0.00	8.88	25.66	10.00	2.21	3.00	3.76	5.03	6.20	7.25	11.25	0.00	0.004	0.03	0.13	0.21	0.32	0.61
E1	1.24	B	21.0	0.13	0.16	0.23	0.38	0.45	0.52	0.61	191.00	5170.84	5170.00	0.004	30.86	509.00	5170.00	5155.00	0.029	20	3.43	2.47	33.33	26.57	26.57	1.37	1.87	2.34	3.13	3.86	4.51	7.00	0.23	0.36	0.66	1.48	2.13	2.93	5.32
E2	6.96	C	31.4	0.23	0.29	0.36	0.49	0.55	0.61	0.69	29.00	5170.60	5167.00	0.124	3.43	1305.00	5167.00	5145.00	0.017	20	2.60	8.38	11.80	33.17	11.80	2.06	2.81	3.51	4.70	5.79	6.78	10.52	3.26	5.68	8.87	16.19	22.09	28.88	50.28
E3	0.89	C	48.7	0.37	0.43	0.49	0.59	0.63	0.68	0.74	0.00			0.000	0.17	311.00	5160.00	5152.00	0.026	20	3.21	1.62	1.79	19.76	5.00	2.77	3.76	4.71	6.31	7.77	9.09	14.11	0.92	1.45	2.06	3.32	4.38	5.53	9.31
E4	1.21	C	40.1	0.30	0.36	0.43	0.54	0.59	0.65	0.71	0.00			0.000	0.06	486.00	5160.00	5145.00	0.031	20	3.51	2.31	2.37	22.34	5.00	2.77	3.76	4.71	6.31	7.77	9.09	14.11	1.00	1.65	2.43	4.15	5.56	7.13	12.20
E5	0.48	C	36.8	0.27	0.33	0.40	0.53	0.57	0.63	0.70	116.00	5153.00	5149.00	0.034	9.89	196.00	5149.00	5145.00	0.020	20	2.86	1.14	11.03	21.36	11.03	2.12	2.89	3.61	4.84	5.96	6.97	10.82	0.28	0.46	0.70	1.22	1.64	2.12	3.66
E6	0.64	B	47.5	0.35	0.38	0.44	0.55	0.59	0.65	0.71	0.00			0.000	0.06	258.00	5150.00	5144.00	0.023	20	3.05	1.41	1.47	19.73	5.00	2.77	3.76	4.71	6.31	7.77	9.09	14.11	0.62	0.92	1.33	2.21	2.95	3.76	6.41
E7	0.15	B	80.4	0.65	0.68	0.71	0.75	0.78	0.80	0.83	0.00			0.000	0.03	52.00	5170.20	5169.80	0.008	20	1.75	0.49	0.53	12.82	5.00	2.77	3.76	4.71	6.31	7.77	9.09	14.11	0.27	0.38	0.50	0.71	0.90	1.09	1.76
E8	3.55	C	30.4	0.22	0.28	0.36	0.49	0.54	0.61	0.68	45.00	5172.00	5171.00	0.022	7.61	1571.00	5171.00	5129.00	0.027	20	3.27	8.01	15.61	32.91	15.61	1.82	2.47	3.10	4.14	5.10	5.97	9.27	1.41	2.48	3.91	7.20	9.84	12.89	22.49
E9	2.79	B	28.8	0.19	0.22	0.29	0.43	0.49	0.56	0.64	90.00	5144.00	5141.00	0.033	10.12	653.00	5141.00	5129.00	0.018	20	2.71	4.01	14.13	27.26	14.13	1.90	2.59	3.24	4.34	5.35	6.26	9.71	1.04	1.60	2.62	5.21	7.29	9.77	17.38
P1	1.02	C	33.8	0.25	0.31	0.38	0.51	0.56	0.62	0.69	103.90	5172.30	5169.90	0.023	11.02	509.00	5169.90	5155.00	0.029	20	3.42	2.48	13.50	23.86	13.50	1.94	2.65	3.31	4.43	5.46	6.39	9.91	0.49	0.84	1.29	2.30	3.12	4.05	7.02
P2	6.42	C	42.8	0.32	0.38	0.45	0.56	0.60	0.66	0.72	29.00	5170.60	5167.00	0.124	3.03	1305.00	5167.00	5145.00	0.017	20	2.60	8.38	11.41	29.90	11.41	2.09	2.85	3.56	4.77	5.87	6.87	10.67	4.32	7.01	10.22	17.11	22.79	29.08	49.51
P7	0.39	B	47.2	0.35	0.38	0.44	0.55	0.59	0.65	0.71	67.00	5172.21	5170.16	0.031	7.37	0.00			0.000	5	0.05	0.00	7.37	17.98	7.37	2.47	3.35	4.20	5.62	6.92	8.10	12.57	0.33	0.50	0.72	1.20	1.60	2.04	3.48
P8	3.55	B	34.1	0.24	0.27	0.33	0.46	0.52	0.58	0.66	45.00	5172.80	5171.40	0.031	6.95	1571.00	5171.40	5129.00	0.027	20	3.29	7.97	14.92	31.77	14.92	1.86	2.53	3.16	4.23	5.21	6.10	9.47	1.57	2.38	3.73	6.96	9.59	12.66	22.21

Flatirons Meadows Tract G
Erie, CO

Designer	*Andres S*
Company	*SSD*
Date	*6/24/2024*
Project	*Flatirons Meadows Tract G*
Location	*Erie, CO*

BASIN SUMMARY TABLE - Tract G							
BASIN ID	**DESIGN POINT**	**AREA (ac)**	**% IMPERVIOUS**	**C5**	**C100**	**Q5**	**Q100**
A1	1	0.28	33.9%	0.26	0.58	0.27	1.45
A2	2	0.17	79.0%	0.66	0.79	0.42	1.23
A3	3	1.00	59.6%	0.47	0.69	1.24	4.44
A4	4	0.10	2.0%	0.47	0.44	0.004	0.32

EXISTING BASIN SUMMARY TABLE - Overall							
BASIN ID	**DESIGN POINT**	**AREA (ac)**	**% IMPERVIOUS**	**C5**	**C100**	**Q5**	**Q100**
E1	17	1.24	21.0%	0.16	0.52	0.36	2.93
E2	5	6.96	31.4%	0.29	0.61	5.68	28.88
E3	5.1	0.89	48.7%	0.43	0.68	1.45	5.53
E4	5A	1.21	40.1%	0.36	0.65	1.65	7.13
E5	5A.1	0.48	36.8%	0.33	0.63	0.46	2.12
E6	5B	0.64	47.5%	0.38	0.65	0.92	3.76
E7	25	0.15	80.4%	0.68	0.80	0.38	1.09
E8	21	3.55	30.4%	0.28	0.61	2.48	12.89
E9	22	2.79	28.8%	0.22	0.56	1.60	9.77

PROPOSED BASIN SUMMARY TABLE - Overall (Post Development of Tract G)							
BASIN ID	**DESIGN POINT**	**AREA (ac)**	**% IMPERVIOUS**	**C5**	**C100**	**Q5**	**Q100**
P1	17	1.02	31.2%	0.31	0.62	0.84	4.05
P2	5	6.42	42.8%	0.38	0.66	7.01	29.08
P7	25	0.39	47.2%	0.38	0.65	0.50	2.04
P8	21	3.55	34.1%	0.27	0.58	2.38	12.66

Appendix B

Hydraulics

MHFD-Inlet, Version 5.03 (August 2023)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP 17	DP 21	DP 22	DP 25	DP 5	DP 5.1	DP 5A	DP 5A.1	DP 5B
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	In Sump	On Grade	On Grade	In Sump	On Grade	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows									
Minor $Q_{Upstream}$ (cfs)	0.8	2.4	1.6	0.5	7.0	1.5	1.7	0.5	0.9
Major $Q_{Upstream}$ (cfs)	4.1	12.7	9.8	2.0	29.1	5.5	7.1	2.1	3.8

Bypass (Carry-Over) Flow from Upstream	Inlets must be organized from upstream (left) to downstream (right) in order for bypass flows to be linked.								
Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	DP 21	No Bypass Flow Received	No Bypass Flow Received	DP 5	User-Defined	DP 5A	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0	0.0	0.0	1.4	2.5	0.2	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	5.1	0.0	0.0	18.2	14.2	11.8	0.0

Watershed Characteristics									
Subcatchment Area (acres)									
Percent Impervious									
NRCS Soil Type									

Watershed Profile									
Overland Slope (ft/ft)									
Overland Length (ft)									
Channel Slope (ft/ft)									
Channel Length (ft)									

Minor Storm Rainfall Input									
Design Storm Return Period, T_r (years)									
One-Hour Precipitation, P_1 (inches)									

Major Storm Rainfall Input									
Design Storm Return Period, T_r (years)									
One-Hour Precipitation, P_1 (inches)									

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**0.8**	**2.4**	**1.6**	**0.5**	**7.0**	**2.9**	**4.2**	**0.6**	**0.9**
Major Total Design Peak Flow, Q (cfs)	**4.1**	**12.7**	**14.9**	**2.0**	**29.1**	**23.7**	**21.3**	**13.9**	**3.8**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	N/A	0.0	1.4	N/A	0.2	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	1.6	5.1	N/A	0.3	18.2	N/A	11.8	N/A	N/A

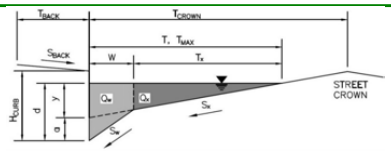
MHFD-Inlet, Version 5.03 (August 2023)

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

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

Project:

Inlet ID: **DP 17**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	16.3	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.022	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.3	16.3	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☑	☑	

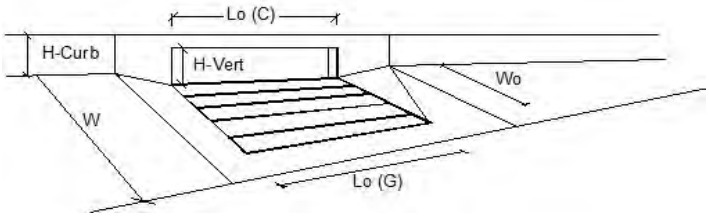
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**23.9**	**125.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.84 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.05 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.8**	**2.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.6**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**60**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.8 cfs and Qmajor = 2.7 cfs)

MHFD-Inlet, Version 5.03 (August 2023)

Worksheet Protected

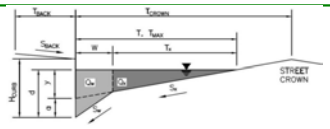
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

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

Project:

Inlet ID: **DP 21**

Quick Links
INTRO
Q-Peak
Inlet Management



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	37.9	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.030	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

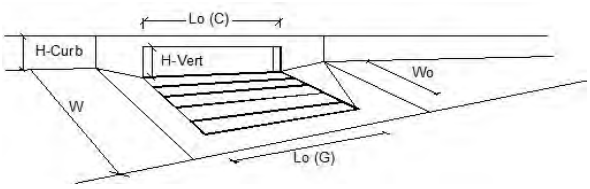
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	27.9	37.8	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**21.8**	**158.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.38 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 12.66 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

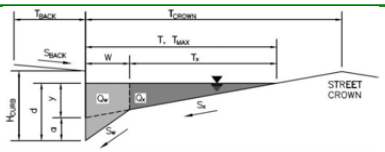
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.4**	**7.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**5.1**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**60**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 2.4 cfs and Qmajor = 8 cfs)

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

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

DP 22



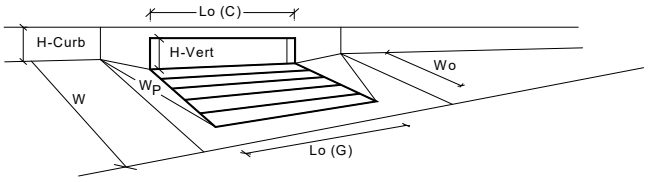
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	22.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.5	22.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.7	24.0	☑ Override Depths
Grate Information		MINOR	MAJOR	
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
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.31	1.83	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.92	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**7.3**	**35.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.6	14.9	cfs

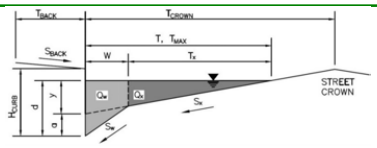
MHFD-Inlet, Version 5.03 (August 2023)

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

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

Project:

Inlet ID: **DP 25**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.8	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☑	☑	

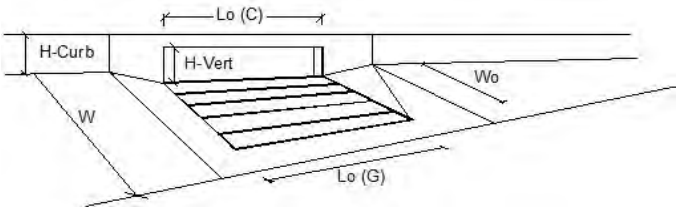
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**22.4**	**103.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.50 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.04 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.5**	**1.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.3**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**83**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.5 cfs and Qmajor = 1.8 cfs)

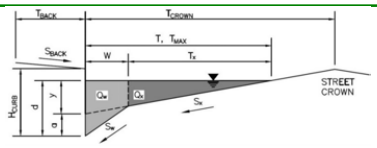
MHFD-Inlet, Version 5.03 (August 2023)

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

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

Project:

Inlet ID: **DP 5**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.030	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

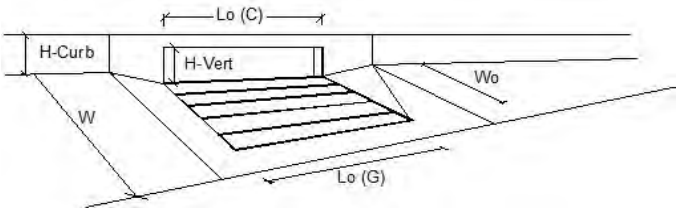
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**12.1**	**26.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 7.01 cfs on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design peak flow of 29.08 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.6**	**10.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.4**	**18.2**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**80**	**38**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 5.8 cfs and Qmajor = 11.6 cfs)

MHFD-Inlet, Version 5.03 (August 2023)

Worksheet Protected

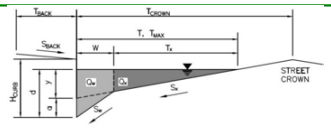
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

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

Project:

Inlet ID: **DP 5.1**

Quick Links
INTRO
Q-Peak
Inlet Management



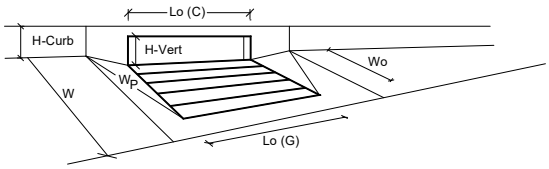
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	☑ Override Depths
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	24.0	inches
Grate Information		MINOR	MAJOR	
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
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	1.83	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.9**	**17.2**	**cfs**
WARNING: Inlet Capacity < Q Peak for Minor and Major Storms	$Q_{PEAK\ REQUIRED}$ =	2.9	23.7	cfs

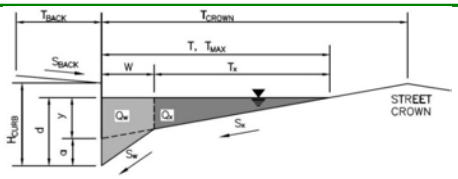
The Ponding Depths default to the minimum of the depth values for maximum allowable depth (cells D29:E29) or the depth based on allowable spread (cells D36:E36). You can override these default values by checking the 'Override Depths' checkbox.

MHFD-Inlet, Version 5.03 (August 2023)

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

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

DP 5A

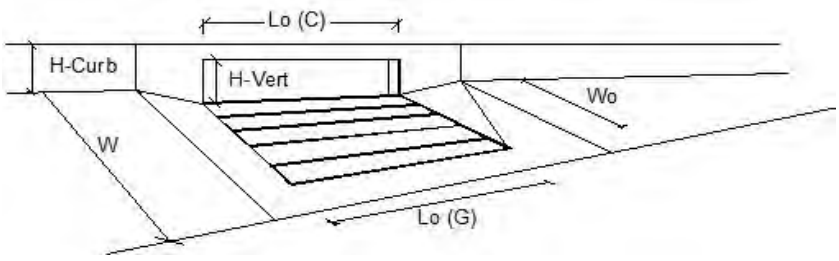


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.030		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**12.1**	**26.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.15 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 21.33 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.0**	**9.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**11.8**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**96**	**45**	**%**

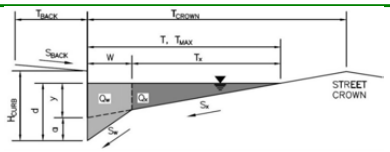
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 4.1 cfs and Qmajor = 10.1 cfs)

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

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

Project:

Inlet ID: **DP 5A.1**



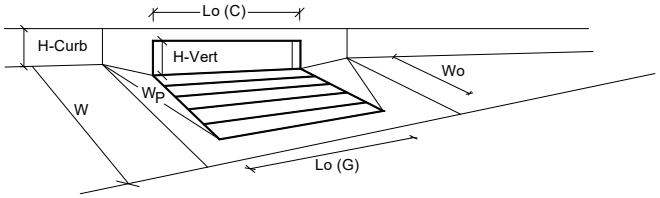
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	24.0	☑ Override Depths
Grate Information		MINOR	MAJOR	
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
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	1.83	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.9**	**17.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.6	13.9	cfs

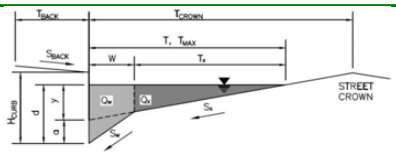
MHFD-Inlet, Version 5.03 (August 2023)

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

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

Project:

Inlet ID: **DP 5B**



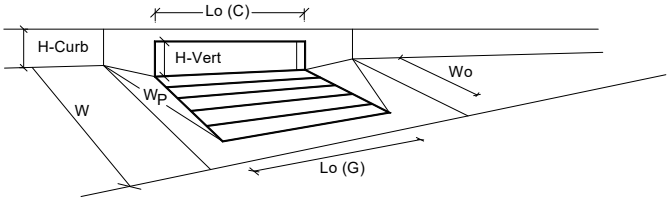
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

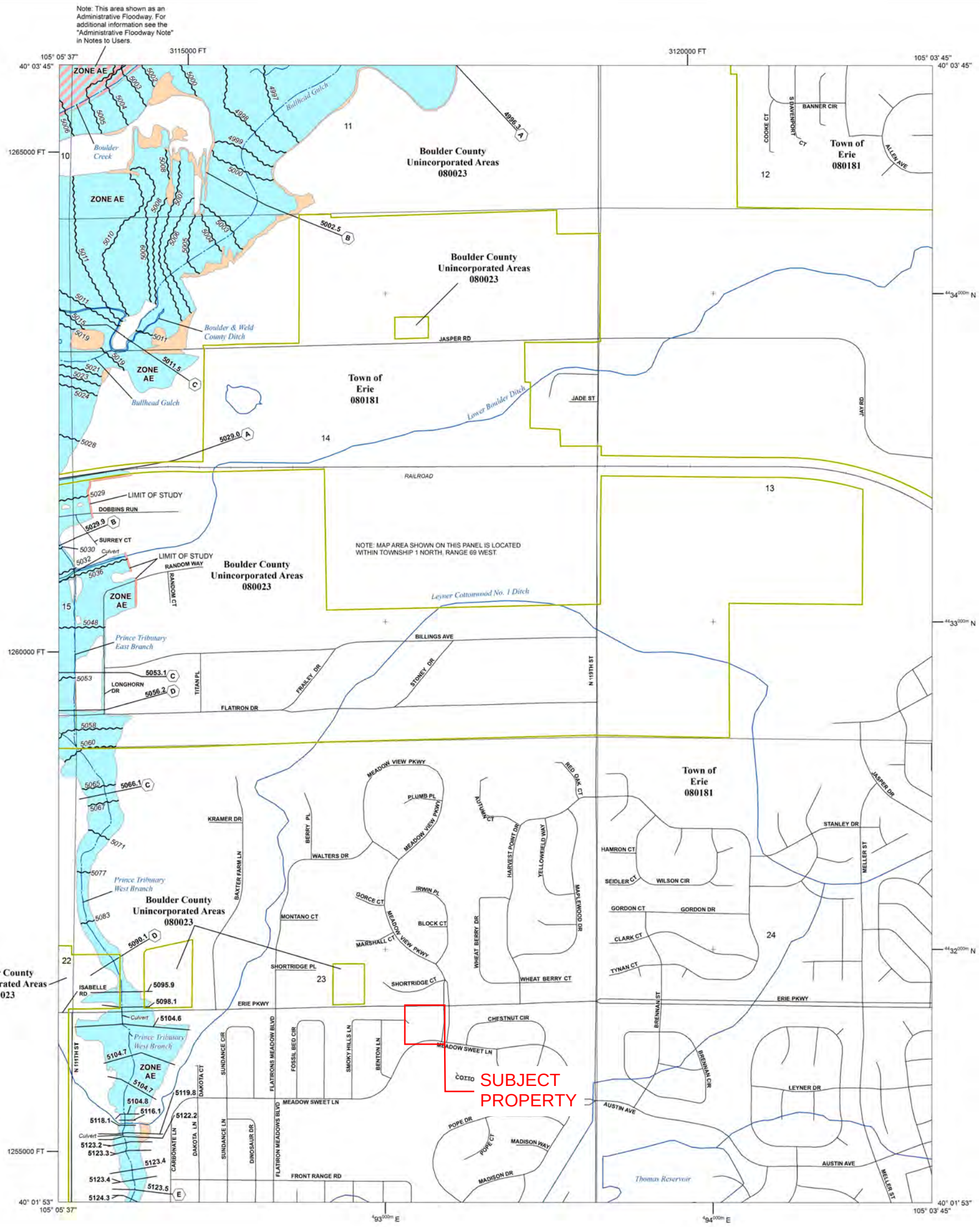
MHFD-Inlet, Version 5.03 (August 2023)



CDOT Type R Curb Opening

Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	☑ Override Depths
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	24.0	
Grate Information		MINOR	MAJOR	
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
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	1.83	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.69	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.6**	**54.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.9	3.8	cfs

Appendix C
Reference Material



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

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*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on the FIRM was derived from the Bureau of Land Management, dated 2011, the Boulder County Geospatial Open Data site, dated 2019, and the US Department of Agriculture Natural Resources Conservation, dated 2014.

ADMINISTRATIVE FLOODWAY: Check with your local community floodplain administrator to obtain more information.

SCALE

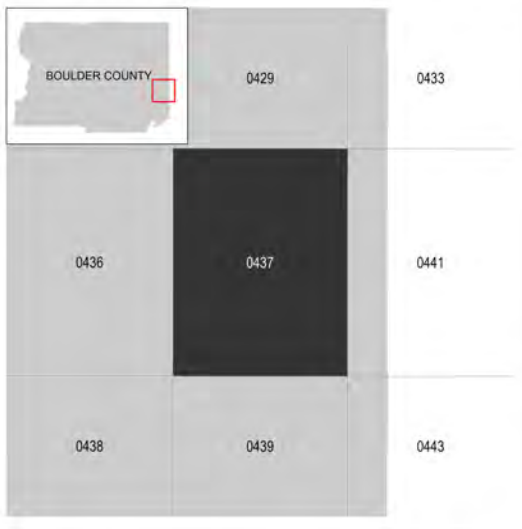
Map Projection:
Universal Transverse Mercator (UTM) Zone 13N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

BOULDER COUNTY, COLORADO
and Incorporated Areas

PANEL 437 OF 615

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOULDER COUNTY	080023	0437	K
ERIE, TOWN OF	080181	0437	K

VERSION NUMBER
2.5.3.6

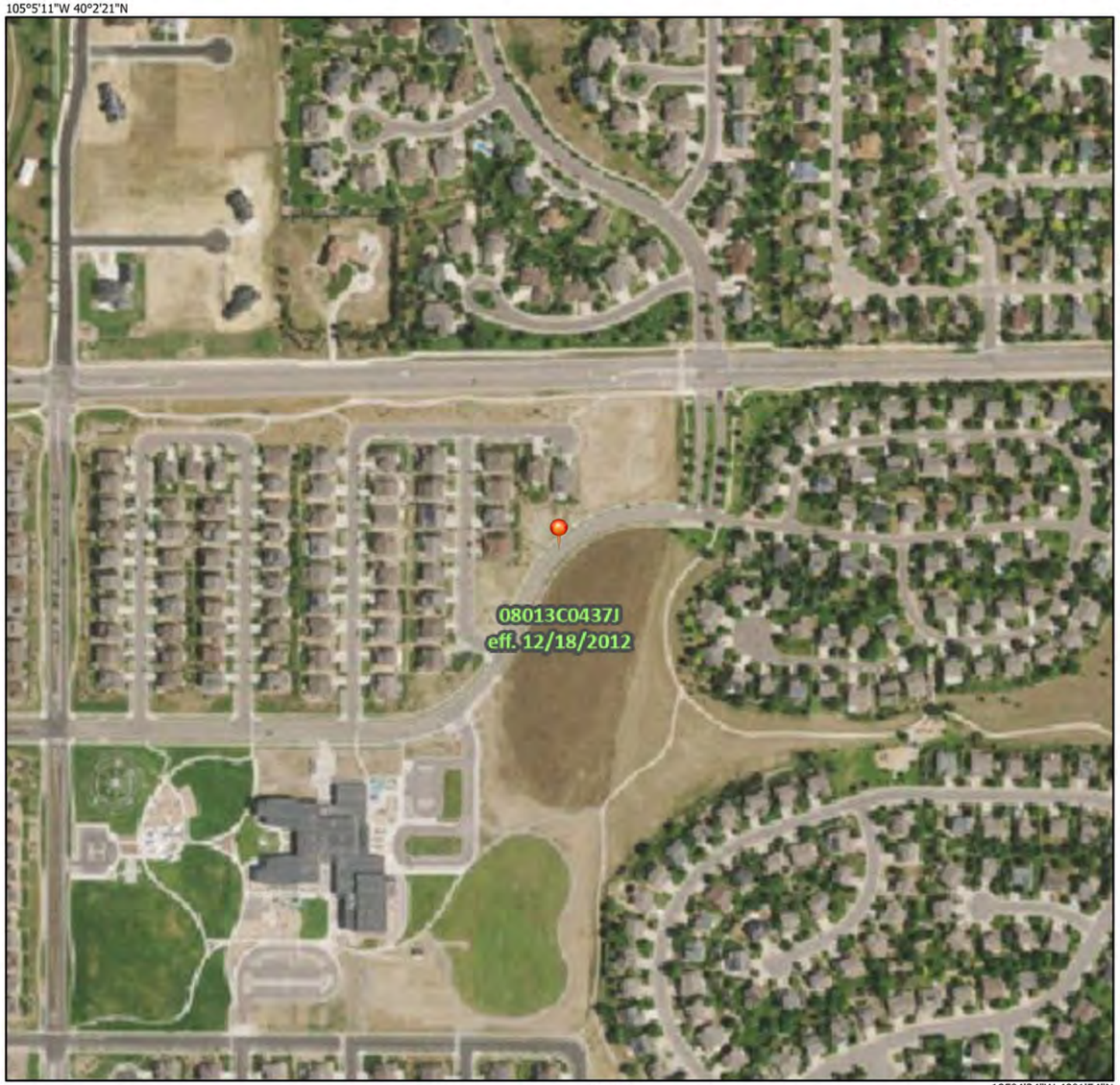
MAP NUMBER
08013C0437K

MAP REVISED
OCTOBER 24, 2024

National Flood Hazard Layer FIRMette

FEMA

105°5'11"W 40°2'21"N



105°4'34"W 40°1'54"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

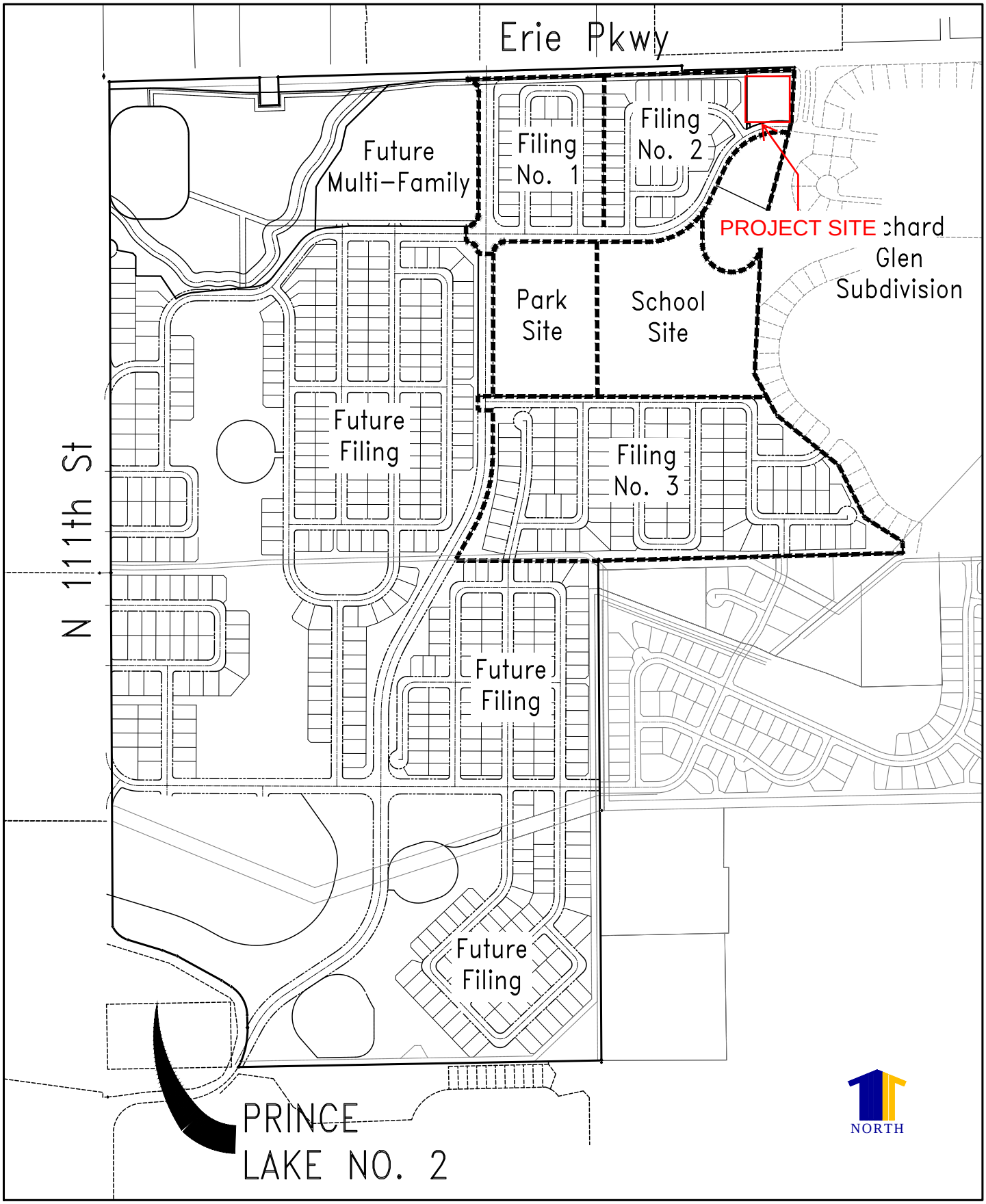
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/14/2024 at 5:22 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



DRAWING NAME: 10DR-FILING MAP.dwg PATH: P:\WORTH FLATIRON\CADD\Exhibits\ PLOTTED BY: khouse XREFS: 10EMA, 33BASE, 32BASE, 10base

Calibre
Calibre Engineering, Inc.
9090 South Ridgeline Boulevard, Suite 105
Highlands Ranch, CO 80129 (303) 730-0434
www.calibre-engineering.com
Construction Management Civil Engineering Surveying

FLATIRON MEADOWS
FILING MAP

SHEET

SCALE: 1" = 700'

DATE: JANUARY 2012

of the future multi-family parcel depicted as Tract D on the Flatiron Meadows Master Plat.

4.4 Detention Pond Storage and Outlet Design

- An interim detention and water quality pond is proposed for Filing No. 1, Filing No. 2 and Filing No. 3.
- Ultimately Filing No. 1 will drain to the regional detention facility and water quality pond to the west – ponds 1034 and 1029.
- Design calculations for the interim pond, including the outlet and trash rack are in Appendix D.
- As stated previously the interim pond outfall pipe crossing the Leyner Cottonwood Ditch was sized to convey developed flows from future multi-family parcel.

4.5 Maintenance Access & Easements and Tracts

- Storm sewer systems will be accessed from the proposed roads onsite.
- Easements and tracts will be used for drainage purposes in specific locations where flooding in the 100-year storm may occur.
- Other storm sewer will be kept within the right-of-way to minimize special drainage easements and tracts.

4.6 Impact on Downstream Properties & Existing Floodplains

- Downstream properties should not be affected by the development of the proposed site. The interim detention and water quality pond will provide the appropriate detention to control the release from the Flatiron Meadows Development to the downstream properties to the north.

5.0 BEST MANAGEMENT PRACTICES

5.1 Construction BMP's

- Trash receptacles will have covers preventing precipitation from entering and regular trash pick-up to occur when receptacles are near full capacity.
- Portable toilets will be cleaned regularly and securely pinned down to the ground.
- Chemical substances on site shall be identified, listed and the Material Safety Data Sheet (MSDS) obtained for each.
- Containers shall be labeled to show the name and type of substance, stock number, expiration date, health hazards including reactivity, corrosivity, ignitability and toxicity, suggestions for handling, and first aid information.

BOULDER CREEK TRIBUTARIES

BULLHEAD GULCH OFFSITE
SEE FIGURE: 3

MATCHLINE SEE FIGURE 12c

STUDY AREA BOUNDARY

SCALE: 1"=1500'

LEGEND

- CATCHMENT I.D. (800 / 80.5 CATCHMENT ACRE)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DETENTION AREA (2000)
- UDSWM CHANNEL/PIPE ELEMENT (2000)
- OFFSITE CATCHMENT (800 / SWMM CATCHMENT SOURCE)
- DESIGN POINT/NODE (902)

SHEET INDEX

- FIGURE: 12c
- FIGURE: 12b
- FIGURE: 12a — STUDY AREA

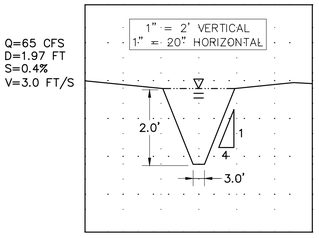
MATCHLINE SEE FIGURE 12a

BULLHEAD GULCH/
PRINCE TRIBUTARY

COAL CREEK
TRIBUTARIES

FILING NO. 1
FLATIRON
MEADOWS

Lore & Associates, Inc. water resource	DESIGNED: RJP DRAWN: DM CHECKED: DJL DATE: 02-01	TOWN OF ERIE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT	ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING	OUTFALL SYSTEMS MAP	Figure 12b Page V - 4



Q=65 CFS
D=1.97 FT
S=0.4%
V=3.0 FT/S

SECTION A-A
TYPICAL LOW FLOW CHANNEL

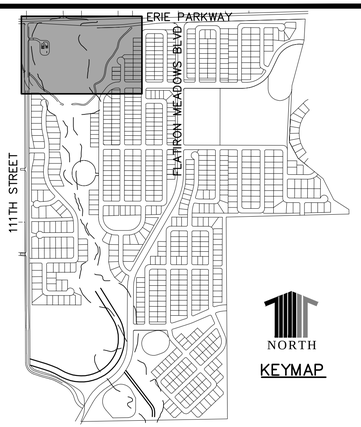
REGIONAL POND 1029

RIPRAP
EX. 18" RCP
EX. 24" RCP
CONSTRUCTED WITH ERIE PARKWAY PHASE II IMPROVEMENT PLANS
ERIE PARKWAY
MAINTENANCE ACCESS
EXISTING LIFT STATION TO BE ABANDONED
ENERGY DISSIPATER & FOREBAY
CONSTRUCTED WITH ERIE PARKWAY PHASE II IMPROVEMENT PLANS
36" RCP
(2) 9'W X 6'H RCB
WQCV OUTLET STRUCTURE
CONSTRUCTED WITH ERIE PARKWAY PHASE II IMPROVEMENT PLANS
EX OIL/GAS SETBACK
EXISTING UTILITIES CONTRACTOR SHALL COORDINATE WORK AROUND UTILITIES WITH UTILITY OWNER
GROUTED STEPPED BOULDER DROP
5' BERM SEPARATING IRRIGATION FROM MAIN POND
LIMITS OF WETLANDS
IRRIGATION BYPASS SWALE
LOW FLOW TRICKLE CHANNEL
ENERGY DISSIPATER & FOREBAY
EURV WSEL
PROPOSED FLOODPLAIN =5102.5
INTERIM DETENTION POND TO BE REGRADED WITH FUTURE FILING NO. 5
LEYNER COTTONWOOD IRRIGATION DITCH
111TH STREET
PROPOSED FLOODPLAIN =5102.5
LOW FLOW CHANNEL
EXISTING OIL/GAS FACILITIES
EX OIL/GAS SETBACK
EXISTING FEMA FLOODPLAIN
EXISTING GAS LINE TO BE RELOCATED BY OTHERS
5' DITCH EASEMENT
FUTURE REGIONAL TRAIL
FUTURE FILING NO. 5
REMOVE EX. LOW TAILWATER BASIN, 66" FES, AND 66" RCP.
66" RCP
5' BERM SEPARATING IRRIGATION FROM MAIN POND
LOW FLOW TRICKLE CHANNEL
ENERGY DISSIPATER

SEE SHEET GE2

NORTH

UNCC CALL BEFORE YOU DIG 811 OR 1-800-922-1987
Utility Notification Center of Colorado



KEYMAP

GENERAL NOTES:

1. WHERE CONSTRUCTION DETAILS AND SPECIFICATIONS ARE NOTED ON THESE PLANS USE THE TOWN OF ERIE STANDARD SPECIFICATIONS FOR DESIGN AND CONSTRUCTION.
2. SEE SHEET T1 FOR BENCHMARK, BASIS OF BEARINGS.
3. SEE GN1 SHEET FOR GENERAL NOTES RELATED TO THESE PLANS.
4. SEE DT SHEETS FOR DETAILS.
5. SEE SHEET DT7 FOR LOW FLOW TRICKLE CHANNEL SECTION.
6. SEE SHEETS CH2, CH3 AND CH4 FOR CHECK STRUCTURES

CONSTRUCTION NOTES:

1. THE LOW FLOW CHANNEL SHOULD BE SEEDED WITH A WETLAND SEED MIX, SEE MAINTENANCE SITE PLAN (SM1) FOR DETAILS.

WETLAND NOTES:

1. THE REGIONAL DRAINAGE IMPROVEMENTS WILL IMPACT JURISDICTIONAL WATERS OF THE US AS REGULATED UNDER SECTION 404 OF THE CLEAN WATER ACT. A WETLAND DELINEATION REPORT HAS BEEN PREPARED FOR THIS AREA MAPPING AND IDENTIFYING ALL WATERS OF THE US AND JURISDICTIONAL FIELD VERIFICATION FROM THE US ARMY CORPS OF ENGINEERS (USACE) DENVER REGULATORY OFFICE HAS BEEN COMPLETED WITH THE LIMITS TO JURISDICTIONAL WATERS SHOWN.
2. UNDER SECTION 404 OF THE CLEAN WATER ACT GENERALLY ANY PROPOSED PLACEMENT OF FILL AND/OR IMPACT TO JURISDICTIONAL WATERS OF THE US MUST RECEIVE PRIOR AUTHORIZATION THROUGH THE US ARMY CORPS OF ENGINEERS PERMIT REVIEW PROCESS. AS PART OF THE PERMIT REVIEW PROCESS ANY IMPACT TO JURISDICTIONAL WATERS OF THE US REQUIRE COMPENSATORY MITIGATION AT 1:1 REPLACEMENT RATIO. A COMPENSATORY MITIGATION PLAN WAS PREPARED AND APPROVED UNDER THE PERMIT REVIEW PROCESS. OFF-SITE WETLANDS WILL BE PURCHASED AS MITIGATION FOR DISTURBANCE AT THE FLATIRON MEADOWS SITE.

LEGEND:

- SF — SILT FENCE EROSION BARRIER
- VTC — TRACKING CONTROL PAD
- SSA — STABLIZED STAGING AREA
- CWA — CONCRETE WASHOUT AREA
- IP, OP — INLET/OUTLET PROTECTION
- MU — MULCHING
- PS — PERMANENT SEEDING (PER TOWN REQUIREMENTS)
- LOC — LIMITS OF CONSTRUCTION
- PROPOSED CONTOURS — 4925
- EXISTING CONTOURS — 4925
- PROPOSED FLOODPLAIN (100-YEAR WSEL)
- EURV WSEL

6		
5		
4		
3		
2		
3/31/16	1	APPROVED FOR CONSTRUCTION
DATE		REVISION DESCRIPTION

Hines

Drawing Name: 101GE1.dwg
Job Number: WORTH FLATIRON
Prepared For: HT FLATIRON LP
1 inch = 60 ft. Horizontal
Designer: KLH | Drafter: KLH | Checked: BKM

COLORADO LICENSED GOOD THROUGH 12/31/16 37660 03-31-16 PROFESSIONAL ENGINEER

Calibre
Calibre Engineering, Inc.
9090 South Ridgeline Blvd., Suite 105
Highlands Ranch, CO 80129 (303) 730-0434
www.calibre-engineering.com
Municipal Engineering Development Surveying

FLATIRON MEADOWS
REGIONAL DETENTION POND IMPROVEMENT PLANS
GRADING & EROSION CONTROL PLAN

Sheet GE1 4 of 29
Date MARCH 31, 2016

PATH: P:\WORTH FLATIRON\CADD\Civil\101 Regional Pond - AS BUILTS\101GE1.dwg
PLOTTED BY: LAiff PLOT DATE: Aug 23, 2016 4:03pm
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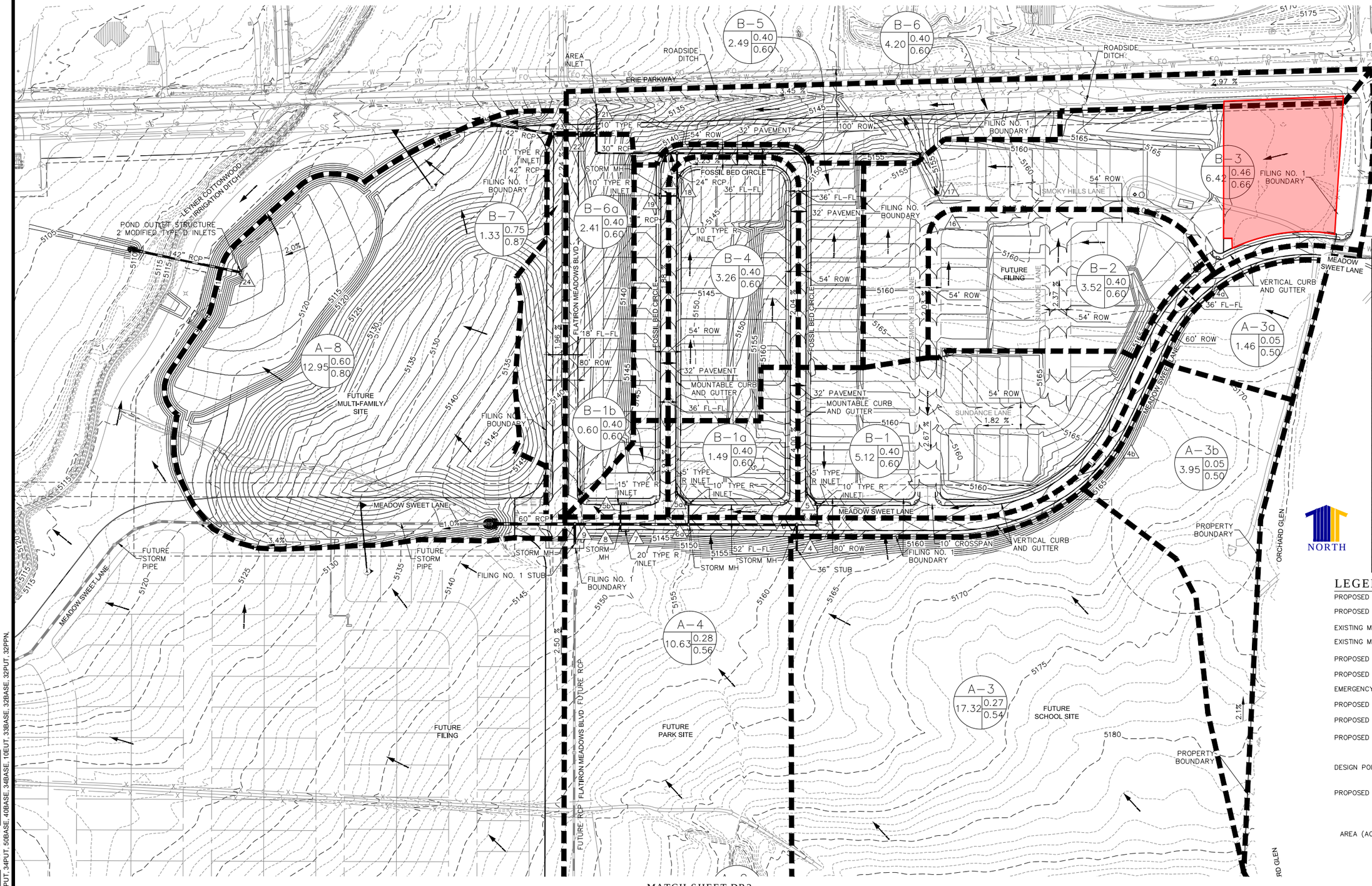


SUMMARY RUNOFF TABLE

DESIGN PT.	TOTAL AREA (AC RES)	TOTAL Q_5 (CFS)	TOTAL Q_{100} (CFS)
	DEVELOPED		
1	32.13	28.1	112.5
2	4.41	6.4	21.9
2a	0.89	1.9	5.4
3	37.23	33.0	127.1
4	17.32	10.7	56.0
7	16.04	7.4	39.8
5	5.12	5.8	23.3
6	22.44	15.0	73.5
5a	1.49	2.0	8.0
6a	23.93	16.3	78.3
5b	0.60	0.8	3.2
8	35.16	23.2	114.8
9	77.80	53.6	226.2
16	3.52	3.4	13.5
17	9.94	9.6	37.6
18	3.26	3.1	12.3
19	2.49	2.3	9.1
20	5.75	5.3	21.1
21	4.20	4.5	17.9
22	22.30	20.2	79.8
23	23.63	21.8	86
24	12.95	21.3	76.1
	INTERIM		
4	13.79	1.5	40.3
5	5.12	3.2	20.6
6	18.91	4.2	57.8
5a	1.49	2.0	8.0
6a	20.40	5.5	62.7
5b	0.60	0.8	3.2
7	20.68	4.2	58.1
8	23.58	9.0	51.4
16	3.52	0.4	11.3
17	8.42	0.0	7.8
18	3.26	3.1	12.3
19	2.49	2.3	9.1
20	18.12	5.3	21.1
21	3.73	2.2	15.5
22	21.83	9.3	84
23	22.89	10.9	83.6
24	12.95	0.0	18.2

LEGEND

- PROPOSED MAJOR CONTOUR (5') — 5250
- PROPOSED MINOR CONTOUR (1')
- EXISTING MAJOR CONTOUR (5') — 5250
- EXISTING MINOR CONTOUR (1')
- PROPOSED BASIN LINE
- PROPOSED FLOW ARROW
- EMERGENCY OVERFLOW PATH
- PROPOSED STORM DRAIN PIPE
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED TYPE R INLET
- DESIGN POINT (4)
- PROPOSED BASIN LABEL: 200 / AREA (AC.) 100.0 / .40 / .50 — BASIN DESIGNATION, MINOR RUNOFF COEF., MAJOR RUNOFF COEF.

MATCH SHEET DR2

DATE	REVISION DESCRIPTION
6	
5	
4	
3	
2	
1	

Drawing Name: 32DR.dwg
Job Number: WORTH FLATIRON
Prepared For: WORTHMORE CAPITAL, LLC
1 inch = 100 ft. Horizontal
Designer: KLH | Drafter: KLH | Checked: BKM

Calibre
Calibre Engineering, Inc.
9090 South Ridgeline Boulevard, Suite 105
Highlands Ranch, CO 80129 (303) 730-0434
www.calibre-engineering.com
Construction Management Civil Engineering Surveying

FLATIRON MEADOWS
FILING NO. 1
PROPOSED DRAINAGE EXHIBIT

Sheet DR1 of 44
Date JANUARY 27, 2012

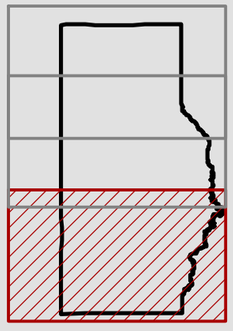
PATH: P:\WORTH FLATIRON\CADD\EXHIBITS\32DR.DWG
PLOTTED BY: Kristine House PLOT DATE: 1/27/2012 11:03 AM
XREFS: 10EPN, 40PUT, 33PUT, 34PUT, 50BASE, 40BASE, 34BASE, 10EUT, 33BASE, 32BASE, 32PUT, 32PPN,

LEGEND

- Study Area Boundary
- Town of Erie
- City of Lafayette
- Subbasin Boundary
- Major Watershed Boundary
- Regional Detention Ponds

XXX — Subbain ID
XX | X X — % Impervious (Existing Land Use) / % Impervious (Future Land Use)
Area (Acres)

KEY MAP



N
W E
S

0 750 1,500 3,000 Feet

1 " = 1,500 FT

M:\2234\GIS\2234.MXD - 12/12/12 - NRT

WRC ENGINEERING, INC.
950 SOUTH CHERRY STREET, SUITE 404
DENVER, COLORADO 80246
PHONE: 303-757-8513
FAX: 303-758-3208

TOWN OF ERIE
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

TOWN OF ERIE OUTFALL SYSTEMS PLAN (WEST OF COAL CREEK)

SUBBASIN MAP

FIGURE B-2

813.03 Runoff Computations, Colorado Urban Hydrograph Procedure (CUHP)

The CUHP method is generally applicable to drainage basins greater than 90 acres. However, the CUHP is required for watershed areas larger than 160-acres. The procedures for the CUHP, as explained in the Urban Storm Drainage Criteria Manual, shall be followed in the preparation of drainage reports and storm drainage facility designs in the Town. The CUHP program requires the input of a design storm, either as a detailed hyetograph or as a 1-hour rainfall depth. The program for the latter using the 2-hour storm distribution recommended in the Urban Storm Drainage Criteria Manual generates a detailed hyetograph distribution. The 1-hour rainfall depths for the Town of Erie are presented in Table 800-2.

Table 800-2
TOWN OF ERIE
ONE-HOUR RAINFALL DEPTH

Design Storm	Rainfall Depth (in.)
2-Year	0.81
5-Year	1.11
10-Year	1.39
25-Year	1.84
50-Year	2.24
100-Year	2.68
500-Year	3.89

The hydrograph from the CUHP program must be routed through any proposed conveyance facility using the Storm Water Management Model (SWMM) or a similar method approved by the Town Engineer.

813.04 Runoff Computations, Rational Method

The Rational Method will be utilized for sizing storm sewers and for determining runoff magnitude from un-sewered areas. The limit of application of the Rational Method is approximately 160 acres. When the drainage basin exceeds 160 acres, the CUHP method shall be used.
The procedures for the Rational Method, as explained in the Urban Storm Drainage Criteria Manual, shall be followed in the preparation of drainage reports in the Town.

813.05 Runoff Coefficients

Rational method runoff coefficients: The runoff coefficient (C) to be used in conjunction with the Rational Method will be calculated using the percent imperviousness shown in Table 800-3 as explained in the Urban Storm Drainage Criteria Manual.

TABLE 800-3
PERCENT IMPERVIOUS FOR RATIONAL METHOD

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS
Business	
Commercial Areas	95
Neighborhood Areas	75
Residential Lots (Lot Area Only):	
Single-Family	
2.5 Acres or Larger	12
0.75 – 2.49 Acres	20
0.25 – 0.74 Acres	30
0.24 Acres or Less	45
Apartments	75
Industrial:	
Light Areas	80
Heavy Areas	90
Parks, Cemeteries	10
Playgrounds	25
Schools	55
Railroad Yard Areas	50
Undeveloped Areas:	
Historic Flow Analysis	2
Greenbelts, Agricultural	2
Offsite Flow Analysis (when land use not defined)	45
Streets:	
Paved	100
Gravel (Packed)	40
Drives and Walks	90
Roofs	90
Lawns, Sandy Soil	2
Lawns, Clay Soil	2

Note: These Rational Method coefficients may not be valid for large basins.

813.06 Rainfall Intensities

The rainfall intensities to be used in the computation of runoff using the Rational Method shall be obtained from the Rainfall Intensity Duration Curves for the Town of Erie, included in these STANDARDS AND SPECIFICATIONS, or can be computed using the following equation.

Calibre

STORM DRAINAGE SYSTEM DESIGN

INLET DESIGN INFORMATION

Calc. by: KLH

Chk'd by: BKM

LOCATION: FILING NO. 1 FLATIRON MEADOWS TOWN OF ERIE Date: 1/26/2012

Design Point	Q2 (cfs)	Q100 (cfs)	Inlet Size	On-Grade or Sump	Ponding Depth 2 Year (in)	Inlet Capacity 2 Year (cfs)	Carryover 2 Years (cfs)	Ponding Depth 100 Year (in)	Inlet Capacity 100 Year (cfs)	Carrryover 100 Year (cfs)	Comments
5	5.8	23.3	10' Type R	On-Grade	N/A	5.3	0.5	N/A	10.9	12.4	Carryover to DP 5a
5a	2.0	8.0	10' Type R	On-Grade	N/A	2.5	0.0	N/A	10.2	10.2	Carryover to DP 5b
5b	0.8	3.2	15' Type R	Sump	0.00	13.5	0.0	1.3	34.0	0.0	Captures 100 Year Flow
7	7.4	39.6	20' Type R	Sump	0.00	18.1	0.0	1.3	45.8	0.0	Captures 100 Year Flow
18	3.1	12.3	10' Type R	Sump	0.00	3.1	0.0	1.1	13.3	0.0	Captures 100 Year Flow
19	2.3	9.1	10' Type R	Sump	0.00	3.1	0.0	1.1	13.3	0.0	Captures 100 Year Flow
21	4.5	17.9	Type C	Sump	N/A	14.0	0.0	N/A	20.0	0.0	Captures 100 Year Flow
22	2.1	8.4	10' Type R	On-Grade	0.00	2.1	0.0	0.0	6.6	1.8	Carryover to DP 24
23	2.1	6.6	10' Type R	On-Grade	0.00	2.1	0.0	0.0	5.7	0.9	Carryover to DP 24
INTERIM CONDITIONS											
5	3.2	20.6	10' Type R	On-Grade	N/A	3.2	0.0	N/A	10.3	10.3	Carryover to DP 5a
5a	2.0	8.0	10' Type R	On-Grade	N/A	2.0	0.0	N/A	9.7	8.6	Carryover to DP 5b
5b	0.8	3.2	15' Type R	Sump	0.00	13.5	0.0	1.3	34.0	0.0	Captures 100 Year Flow (2)
7	4.1	58.1	20' Type R	Sump	0.00	18.1	0.0	1.3	45.8	12.3	Captures 100 Year Flow (2)

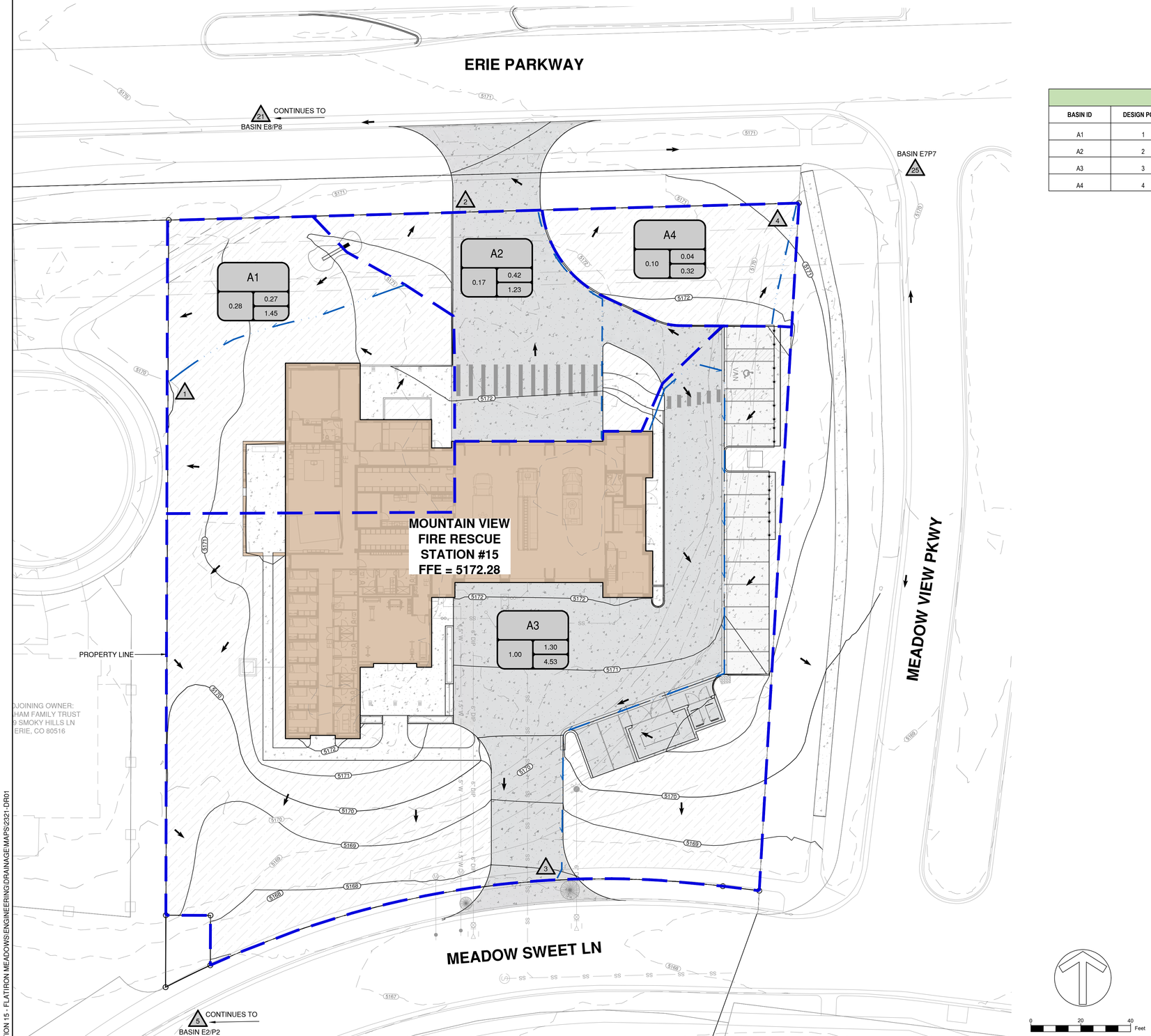
NOTES:

1 Inlet capacities determined by UD-Inlet Spreadsheets using 4" depth for Minor Storm Event and ROW Elevation for Major Storm Event Ponding detpth is at crown of street

2 Design Points 5b and 7 share a sump and flows will overtop the crown of the road in the 100-year event, therefore it is assumed that the total runoff tributary to these two points can be split between the two inlets.

Appendix D

Drainage Maps



BASIN SUMMARY TABLE - Tract G							
BASIN ID	DESIGN POINT	AREA (ac)	% IMPERVIOUS	C5	C100	Q5	Q100
A1	1	0.28	33.9%	0.26	0.58	0.27	1.45
A2	2	0.17	79.0%	0.66	0.79	0.42	1.23
A3	3	1.00	59.6%	0.49	0.70	1.30	4.53
A4	4	0.10	2.0%	0.49	0.44	0.004	0.32

DRAINAGE MAP LEGEND

- DESIGN POINT (OUTFALL)
- DRAINAGE DIVIDE
- FLOW PATH

BASIN ID
AREA | Q5 / Q100

0 20 40 Feet

PROPOSED DRAINAGE MAP

SCALE: 1" = 20'

CONTACT INFORMATION
88 INVERNESS CIRCLE EAST, SUITE B-101
ENGLEWOOD, CO 80112
STRATEGIC SITE DESIGNS (720) 206-6931
CPERDUE@STRATEGICSITEDESIGNS.COM
ATTENTION: CHRISTOPHER PERDUE, P.E., M.B.A.

FLATIRONS MEADOWS FIRE STATION ERIE, CO COUNTY

PROPOSED DRAINAGE MAP

REV	DESCRIPTION	BY	DATE

JOB NO:	2321-001
ORIGINAL ISSUE:	6/17/24
DESIGN BY:	AS
CHECKED BY:	MDC
SCALE:	1" = 20'
SHEET NUMBER	DR-01

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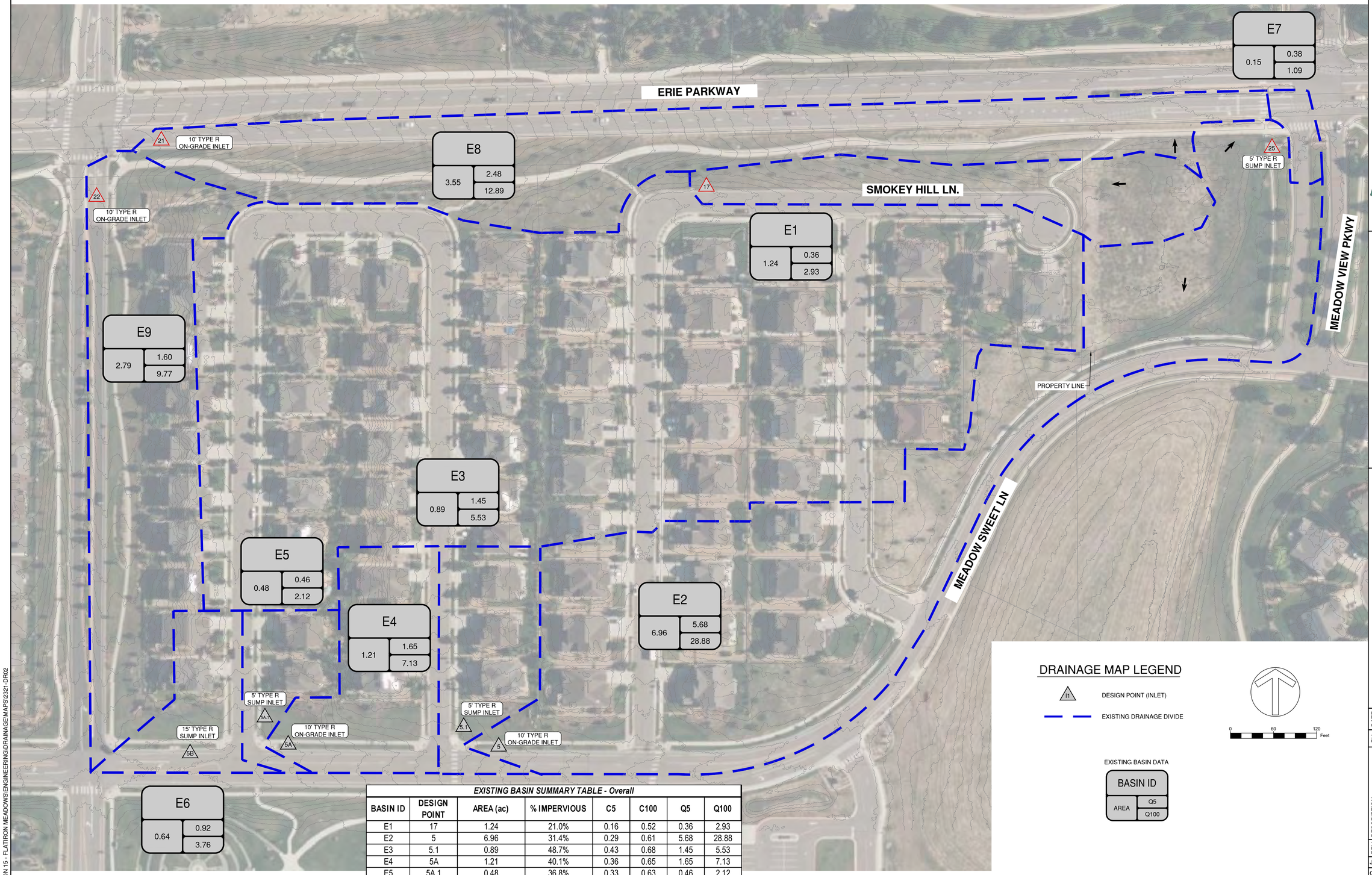

EXISTING BASIN SUMMARY TABLE - Overall

BASIN ID	DESIGN POINT	AREA (ac)	% IMPERVIOUS	C5	C100	Q5	Q100
E1	17	1.24	21.0%	0.16	0.52	0.36	2.93
E2	5	6.96	31.4%	0.29	0.61	5.68	28.88
E3	5.1	0.89	48.7%	0.43	0.68	1.45	5.53
E4	5A	1.21	40.1%	0.36	0.65	1.65	7.13
E5	5A.1	0.48	36.8%	0.33	0.63	0.46	2.12
E6	5B	0.64	47.5%	0.38	0.65	0.92	3.76
E7	25	0.15	80.4%	0.68	0.80	0.38	1.09
E8	21	3.55	30.4%	0.28	0.61	2.48	12.89
E9	22	2.79	28.8%	0.22	0.56	1.60	9.77

DRAINAGE MAP LEGEND

- I1 — DESIGN POINT (INLET)
- EXISTING DRAINAGE DIVIDE

0 60 120 Feet

EXISTING BASIN DATA

BASIN ID
AREA | Q5 / Q100

CONTACT INFORMATION
88 INVERNESS CIRCLE EAST, SUITE B-101
ENGLEWOOD, CO 80112
(720) 206-6931
CPERDUE@STRATEGICSITEDESIGNS.COM
ATTENTION: CHRISTOPHER PERDUE, P.E., M.B.A.
STRATEGIC SITE DESIGNS

FLATIRONS MEADOWS FIRE STATION ERIE, CO COUNTY

FLATIRON MEADOWS DRAINAGE MAP EXISTING OVERALL

REV	DESCRIPTION	BY	DATE
	2ND SUB - TOWN COMMENTS	AS	11/1/24

JOB NO: 2321-001
ORIGINAL ISSUE: 6/17/24
DESIGN BY: AS
CHECKED BY: MDC
SCALE: 1" = 60'
SHEET NUMBER
DR-02

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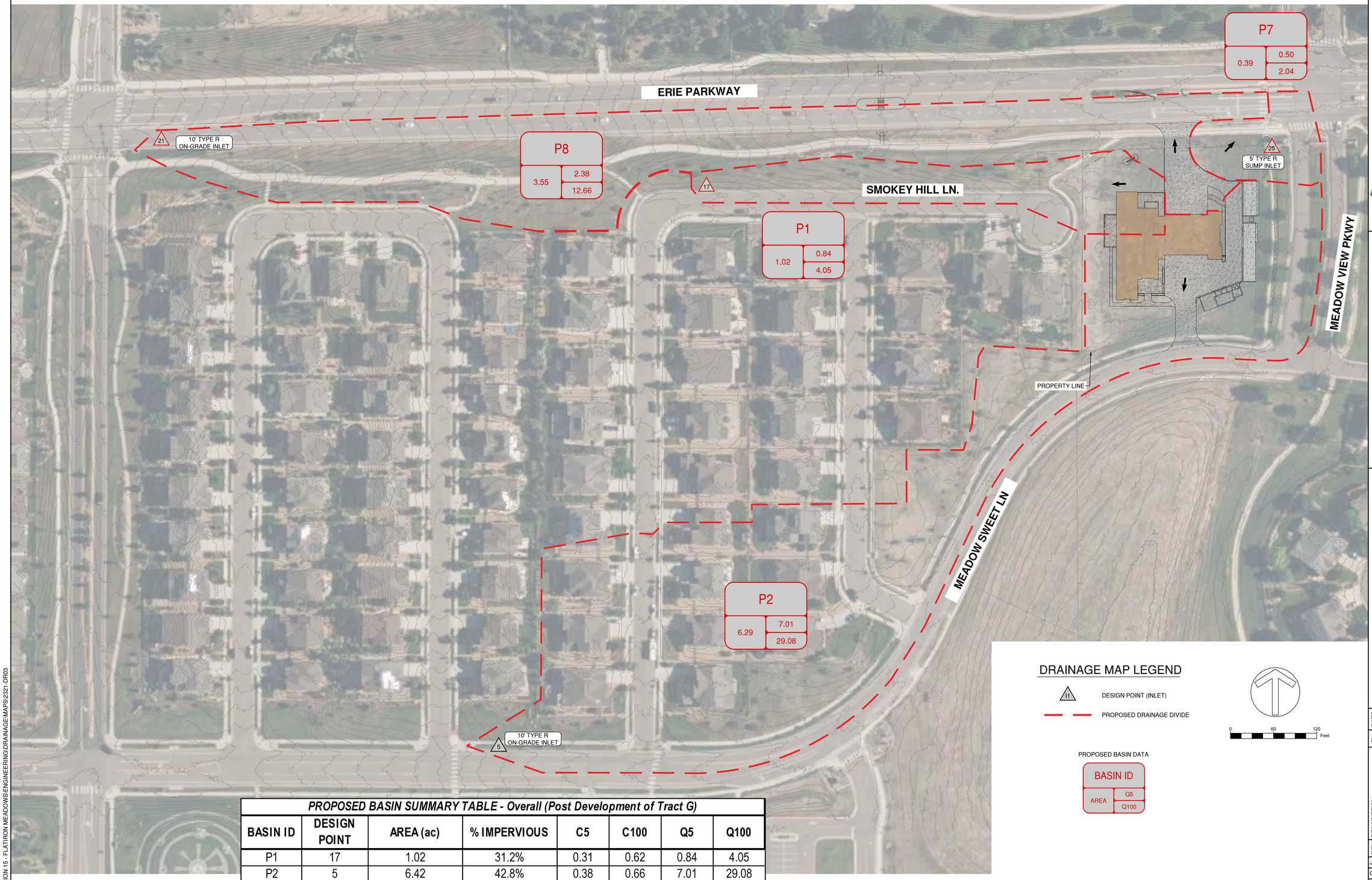


DRAINAGE MAP LEGEND

I1 DESIGN POINT (INLET)

PROPOSED DRAINAGE DIVIDE

0 60 120 Feet

PROPOSED BASIN DATA

BASIN ID
AREA | Q5 | Q100

PROPOSED BASIN SUMMARY TABLE - Overall (Post Development of Tract G)

BASIN ID	DESIGN POINT	AREA (ac)	% IMPERVIOUS	C5	C100	Q5	Q100
P1	17	1.02	31.2%	0.31	0.62	0.84	4.05
P2	5	6.42	42.8%	0.38	0.66	7.01	29.08
P7	25	0.39	47.2%	0.38	0.65	0.50	2.04
P8	21	3.55	34.1%	0.27	0.58	2.38	12.66

CONTACT INFORMATION
88 INVERNESS CIRCLE EAST, SUITE B-101
ENGLEWOOD, CO 80112
(720) 206-6931
CPERDUE@STRATEGICSITEDESIGNS.COM
ATTENTION: CHRISTOPHER PERDUE, P.E., M.B.A.
STRATEGIC SITE DESIGNS

FLATIRONS MEADOWS FIRE STATION ERIE, CO COUNTY

FLATIRON MEADOWS DRAINAGE MAP PROPOSED OVERALL

REV	DESCRIPTION	BY	DATE
	2ND SUB - TOWN COMMENTS	AS	1/1/24

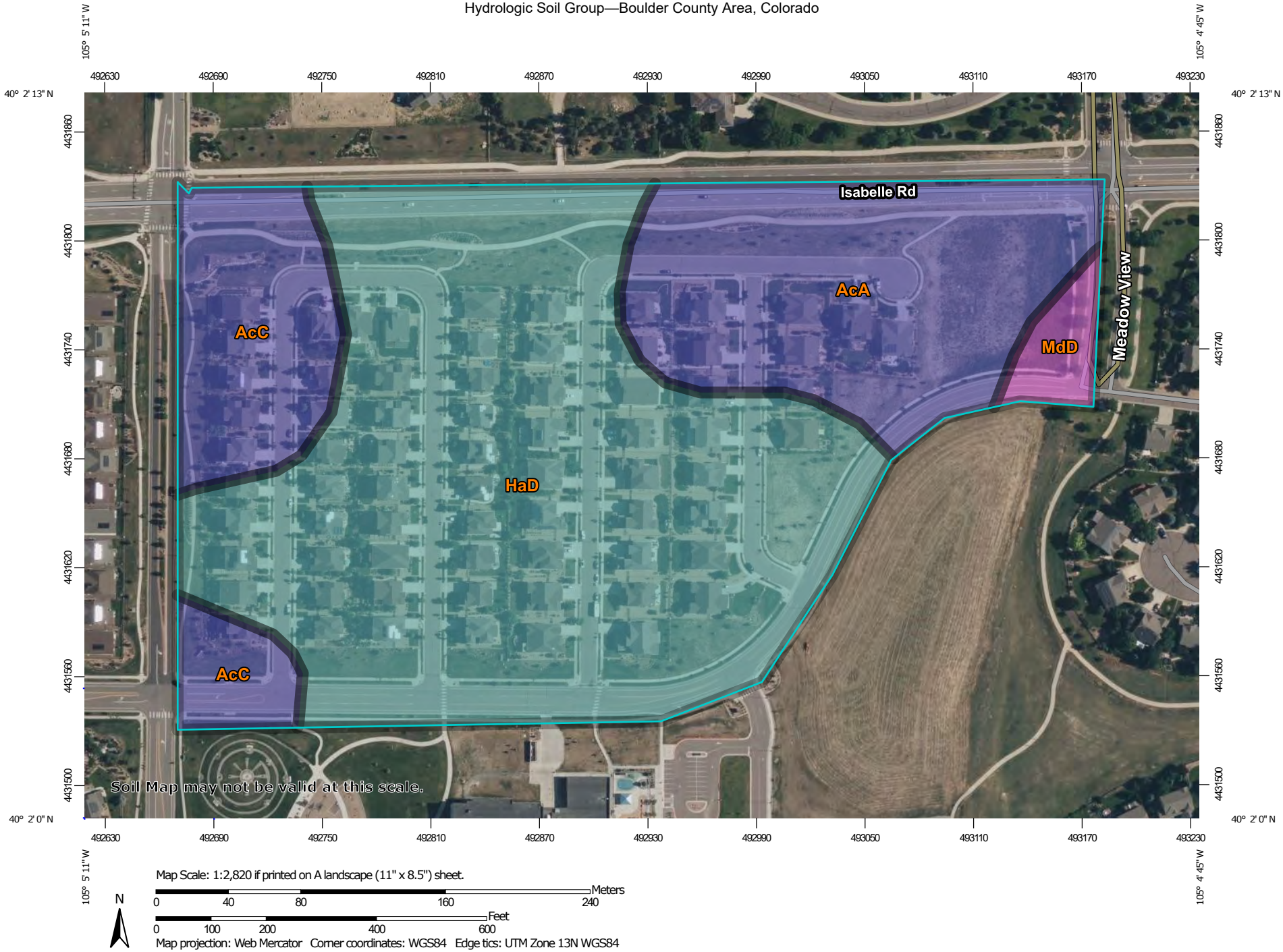
JOB NO:	2321-001
ORIGINAL ISSUE:	6/17/24
DESIGN BY:	AS
CHECKED BY:	MDC
SCALE:	1" = 60'

SHEET NUMBER
DR-03

P:\P2321 - NVFR STATION 15 - FLATIRON MEADOWS\ENGINEERING\DRAINAGE\MAPS\2321-DR03

Appendix E

Web Soil Survey


105° 5' 11" W
105° 4' 45" W
40° 2' 13" N
40° 2' 0" N
492630
492690
492750
492810
492870
492930
492990
493050
493110
493170
493230
4431860
4431800
4431740
4431680
4431620
4431560
4431500
Isabelle Rd
Meadow View
AcA
AcC
AcC
HaD
MdD
Soil Map may not be valid at this scale.
Map Scale: 1:2,820 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 40 80 160 240
Feet
0 100 200 400 600
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

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Boulder County Area, Colorado
Survey Area Data: Version 20, Aug 24, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

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
AcA	Ascalon sandy loam, 0 to 3 percent slopes	B	7.2	23.1%
AcC	Ascalon sandy loam, 3 to 5 percent slopes	B	4.3	13.7%
HaD	Hargreave fine sandy loam, 3 to 9 percent slopes	C	19.0	60.9%
MdD	Manter sandy loam, 3 to 9 percent slopes	A	0.7	2.3%
Totals for Area of Interest			**31.2**	**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

existence or function of a ditch. If a variance is requested to the Town Engineer for use of a ditch as an outfall, it is the design engineer's responsibility to complete all studies and designs deemed necessary by the Town Engineer to support the use of the ditch as well as a secondary drainage design should the ditch cease to exist.

Expressed written approval must be obtained from the managing organization for irrigation ditches being considered for crossing or easements.

813.00 Design Methods

813.01 Initial and Major Design Storms

Every urban area has two separate and distinct drainage systems whether or not they are actually planned for and designed. One is the initial system corresponding to the initial (or ordinary) storm recurring at regular intervals. The other is the major system corresponding to the major (or extraordinary storm), which is unlikely to occur more often than once in 100 or more years. Since the effects and routing of storm waters for the major storm may not be the same as for the initial storm, all storm drainage plans submitted for acceptance will detail two separate systems; one indicating the effects of the initial storm and the other showing the effects of the major storm.

A. *Initial storm provisions:* The objectives of such drainage system planning are to minimize inconvenience, to protect against recurring minor damage, to reduce rising maintenance costs, and to create an orderly drainage system. The initial storm drainage system may include such facilities as curb and gutter, storm sewer, swales, and other open drainageways and detention facilities.

B. *Major storm provisions:* The major storm will be considered the 100-year storm. The objectives of the major storm planning are to eliminate substantial property damage or loss of life and will be as directed and accepted by the Town Engineer. Major drainage systems may include storm sewers, open drainageways and detention facilities. The correlation between the initial and major storm system will be analyzed to insure a well-coordinated drainage system.

813.02 Storm Return Periods

The initial and major storm design return periods will not be less than those found in Table 800-1:

TABLE 800-1
DESIGN STORM RETURN PERIODS

Land Use or Zoning	Design Storm Return Period	
	Initial Storm	Major Storm
Residential	2-year	100-year
Commercial and Business	5-year	100-year
Public Building Areas	5-year	100-year
Parks, Greenbelts, etc.	2-year	100-year