



~~LOT 1, BLOCK 1, THE POINT AT MEADOW PEAK SUBDIVISION, FILING NO. 1~~

CITY OF AURORA, COUNTY OF ARAPAHOE, STATE OF COLORADO  
SITUATED IN THE W1/2 OF SECTION 9, TOWNSHIP 5\_SOUTH  
RANGE 66 WEST OF THE 6<sup>TH</sup> PRINCIPAL MERIDIAN

**PRELIMINARY DRAINAGE REPORT**

"Lakeview Terrace Subdivision Filing #1" per plat

Subdivision information updated

ESC JN: **1010.04**

Original Report Date: **July 6, 2020**

Revision (1):

Prepared for:

**Mr. Mostafa Kargarzadeh  
Justin & Dylan, LLC  
16089 E. Maplewood Drive  
Centennial, CO 80016-3053**  
Phone: (720) 429-3476  
Email: mkargarzadeh@yahoo.com

Green comments provided by COA Public Works Reviewer Jared Coleman (jcoleman@auroragov.org)

This PDR approval required prior to Civil Plan approval

Prepared by:

Acknowledged



ENGINEERING SERVICE COMPANY

**David R. Addor, PE**  
Vice President | Project Manager

14190 East Evans Avenue  
Aurora, Colorado 80014

P 303.337.1393, x-105  
F 303.337.7481  
T/F 1.877.273.0659

daddor@engineeringserviceco.com  
engineeringserviceco.com

**APPROVED FOR ONE YEAR FROM THIS DATE**

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**City Engineer** \_\_\_\_\_ **Date** \_\_\_\_\_

---

**Water Department** \_\_\_\_\_ **Date** \_\_\_\_\_

Informational note: Section / Chapter references marked as X.XX.X.XX.X refer to COA Roadway Design and Construction Specifications and Errata, most current edition. All other call outs should be called out directly: COA Storm Drain Design and Technical Criteria (SDDTC) and Urban Drainage and Flood Control District's Drainage Criteria Manual (UDFCD / USDCM). All comments are typical to all sheets/pages where applicable.

A comment response plan set with Engineer responses placed next to City responses on the PDF is highly encouraged to expedite reviews, but is optional. This can be submitted as misc. documents with a title of "Civil Plan/Review Response" for example. Without a comment response to reference, comments may be duplicated and treated as unresolved. This could hold up approvals.

Acknowledged

Please also refer to returned "Checklist" in submittal portal for additional items looked for during reviews by Public Works. Please address unmarked or insufficient items as applicable.

General note: License Agreements are required for any private infrastructure in public easements or ROW or when connecting private utilities to public infrastructure unless otherwise addressed, excluding private structures within a pond's drainage easement. LAs are submitted through a separate document. Please contact Grace Gray at 303-739-7277 to begin the LA process if not done so already.

Please contact Andy Niquette (303) 739-7325 to start the process for all proposed easements by separate documents.

LAs and Easement are to be completed prior to Civil Plan approval. **It is highly recommended** that these processes are begun at the Preliminary Drainage stage. Easements are approximately an 8 week process

Acknowledged

Easements include but are not limited to:  
Drainage easement for pond and access to pond

License include but are not limited to:  
Portions of walls within existing utility easement

Published by:

**ENGINEERING SERVICE COMPANY, INC.**

14190 East Evans Avenue

Aurora, CO 80014-1431

www.engineeringserviceco.com

(303) 337-1393 phone | (303) 337-7481 fax

Toll Free (877) 273-0659

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HELP SAVE PAPER!  
THIS DOCUMENT WAS PRINTED TWO-SIDED.

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## A. INTRODUCTION

### 1. Location

- a. Adjacent streets, subdivision name, lot and block, site plan name (if any)

The proposed project is a 0.92± acre site located on the east side of S. Pitkin Street in the West 1/2 of Section 9, Township 5 South, Range 66 West of the 6<sup>th</sup> Principal Meridian (City of Aurora, County of Adams, State of Colorado).

It is further defined as Lot 1, Block 1, The Peak at Meadow Point Subdivision Filing No. 1.

- b. Vicinity map



Provide cross streets for locating site. Include vicinity map scale, minimum 1"=2000'

Streets in this vicinity now shown more clearly. A scale is shown

- c. Surrounding developments

The subject property is part of the Meadow Point Condominium site with three of the 4 planned buildings having been constructed in 1984. The existing buildings lie to the west and north of the proposed 4<sup>th</sup> building. To the west side of S. Pitkin Street are single family homes. To the south and east of the Meadow Point property are multifamily townhome developments.

### 2. Proposed Development

- a. Property description - soils, topography, hydrologic soil groups, etc.

The subject property has been developed with the driveway and parking that is associated with the proposed building. The building site is open with a heavy covering of grasses and weeds. The site sloped primarily from west to east at moderate cross slopes with steeper slopes along the existing parking.



Runoff for the overall Meadow Point Condominium site is directed to the drive aisles. The onsite drive aisles are graded with a central swale. The site for the new building drains to the drive aisle on the east side of the property. All of drainage is directed to the northeast corner of the site where there is an existing detention area within the parking lot. This detention area is drained by a curb open inlet set in the low **pint** at the extreme northeast corner of the drive.

**Corrected**

There is a overflow swale behind the inlet that carries any excess flow to the north and west into the Quincy Reservoir bypass channel. The storm sewer continues to the northwest and then west and daylights into the bypass channel at the low end of the Grandview Dog Park. This all discharges into West Toll Gate Creek.

**C. DESIGN CRITERIA**

**1. List References**

- a. Existing drainage reports for surrounding properties
  - Final Drainage Report for Meadow Point Condominiums, prepared for U. S. Homes by EMK Consultants, Inc., dated November, 1983, City of Aurora approval C8-2-1623.
- b. Manuals
  - City of Aurora, "Storm Drainage Design & Technical Criteria", latest edition
  - Urban Drainage & Flood Control District, "Criteria Manual: Volumes 1-3", latest edition
- c. City Master Plan and floodplain studies
  - None referenced.

**2. Hydrologic Criteria**

- a. Rainfall source and P1 identified
  - The source for rainfall data is per equation 5.5, section 5.22, Chapter 5 of the City of Aurora "Storm Drainage Design and Technical Criteria". One-hour rainfall depth was taken Figures RA-1 and RA-6 from the UDFCD Manual, 2-yr, 1-hr 0.95", and 100-yr, 1-hr 2.60".
- b. Calculation method
  - Rational Method. The rational method was used to calculate runoff from the proposed development since it is less than 160 acres.

The following formula was used to determine the runoff values:

$$Q_n = C_n i_n A$$

Where  $Q_n$  = Storm runoff, cubic feet per second (CFS) ('n' storm frequency interval)

$C_n$  = Runoff coefficient ('n' storm frequency interval)

$i_n$  = Storm intensity, inches per hour ('n' storm frequency interval)

A = Drainage area, acres

- c. Detention volume computation method
  - No detention required for this new site. However, some detention is required for the existing building. See Final Drainage Report for the Meadow Point Condominiums.

Per the pre-app notes, detention IS required. Existing detention pond volumes and capacity will need to be verified.  
Please discuss detention approach with the City prior to next review. See comments in plans

- d. Design frequencies
  - Design frequencies are given in the City of Aurora "Storm Drainage Design and Technical Criteria" for Minor and Major Storms. The design storm frequency for the minor storm is one hundred (100) years and the design storm frequency for the major storm is one hundred (100) years.

This comment is no longer relevant based on the **APPROVED** variance. Reference Appendix D of the updated Report.

**3. Hydraulic Criteria**

- a. Reference sources other than USDCM

See Reference section of this report for a full listing of all reference materials. The above mentioned design frequencies will be used to evaluate all drainage features.

- b. Water surface profile method

None used.

- c. Major drainageways

The site lies within the Toll Gate Creek drainage basin.

## **D. DRAINAGE PLAN**

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### **1. General Concept**

- a. Conveyance of off-site drainage; proposed downstream outfall

Not applicable.

- b. Coordination with surrounding developments

Development of this site will have no impact to the surrounding property. The grading for the proposed building will be essentially the same as anticipated on the Final Grading Plan for the Meadow Point Condos construction plans prepared by EMK Consultants, Inc.

- c. Detention ponding/water quality BMP plan, identify ownership/maintenance responsibilities

There are two existing detention areas on the existing site. The proposed building is tributary to the primary detention pond at the northeast corner of the overall Meadow Point Condominium site. No additional detention is required.

The west and north sides of the building will be drained by a combination of concrete and grass swales. The outfall for all this drainage will be in a grass swale along the north side of the new building. This swale also collects drainage from the parking area to the west between the front two existing buildings. This swale will provide primary stormwater quality enhancement for much of the area covered by the new building as well as a portion of the existing developed site.

The existing detention area as well as the grass swale are part of the limited common area and is owned and maintained by the Homeowners Association.

### **2. Specific Details**

- a. Discuss each basin or sub-basin including land use and minor and major storm flow patterns through the basin. When there is a minor storm sewer system available/proposed it must be considered plugged for the major storm. Therefore, the report must present the minor and major flow routing.

The new building is part of Basin B within the Final Drainage Report for the Meadow Point Condominiums. It will continue to drain similarly to the original Final Drainage Study. The runoff calculations in the original report assumed a 2-yr coefficient of runoff of 0.67 for multifamily property with a multiplier of 1.25 for the 100-yr storm. This is quite conservative. A calculation is included in the appendix for the overall site for this new building. This shows a 2-yr coefficient of 0.58 and 100-yr coefficient of 0.64. Actual runoff from the site will be slightly less than under the original report.

There is only one sub-basin identified for this site. The surface flows from the west side of the building are directed to the north in a concrete pan. This pan discharges into the grass swale along the north side of the new building. The discharge of runoff from the building on the west. This basin is shown in order to insure sufficient discharge capacity. Flows are minor with the 2-yr discharge of only 0.26 cfs and 1.04 cfs for the 100-yr storm.

This sentence may need to be reworded a bit. I believe what you're trying to say is that trying to get flows from the west side of the building was difficult due to the existing building and grading

New language

- b. Detention pond location and outfall.

The existing detention pond is located off-site to the new building site. It falls within the parking and drive area at the northeast corner of the overall Meadow Point property.

- c. Emergency overflow paths for sump inlets and detention ponds. Sump inlet emergency overflow paths may be done with the individual basin/sub-basin discussion above.

Emergency overflow is at the swale behind the inlet at the low end of the detention pond. This swale carries the flow to the northeast and off site into the Quincy Reservoir bypass channel.

- d. Solutions to problems encountered. **New language**

The key difficulty for this building was to provide adequate drainage from the west side of the building where is was confirmed between the proposed building and the existing retaining wall and grading to the west.

- e. Discuss the proposed permanent BMPs.

Water quality will be provided in the grass swale along the north side of the building and some other minor grass swales on this site. ←

Each grass swale used for WQ will need its own easement. Show these easements in the PD

- f. Phasing of construction and provisions for drainage during phasing. **Acknowledged**

It is the intent of the developer to construct all improvements associated with this project in a single phase.

- g. Discuss open channel concepts, whether they preserve an undisturbed cross-section or are an improved channel.

Not applicable.

- h. Discuss stabilization requirements for any roadside ditches.

Not applicable.

- i. Discuss how the requirements set forth in the approved Outfall Systems Plan have been met, if applicable.

Not applicable.

- j. Any other information deemed necessary to the project.

The proposed grading is shown on the Drainage and Grading Plan.

## E. CONCLUSIONS

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- 1. Compliance with Standards

The drainage for this site complies with all City of Aurora Standards.

- 2. Summary of Concept

- a. Degree of protection to existing site

The proposed site will be protected from drainage related damage during both the initial and major storm events. Runoff will continue along historic routes and will be released in a controlled manner at the natural discharge locations.

- b. Measures taken to provide adequate on-site drainage and enhancement to stormwater quality

On-site drainage has been controlled in the proposed concrete drainage pans. Stormwater quality has been addressed with the grass swale along the north side of the site.

- c. Effect of proposed development on adjacent, upstream, and downstream sites under both existing and future buildout conditions

There are no indications that this proposed development will have an adverse impact to either existing or future buildout conditions adjacent to, upstream of, or downstream of the subject property.

## **F. LIST OF REFERENCES**

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"[Storm Drainage Design and Technical Criteria](#)", City of Aurora, Colorado. Revised October 2010.

"[Urban Storm Drainage Criteria Manual - Volumes 1, 2, and 3](#)", Urban Drainage and Flood Control District, Denver, Colorado. Published June 2016, latest edition.

"[Soil Map – Adams County, Colorado](#)", United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey v2.2.

"[Flood Insurance Rate Map](#)", Federal Emergency Management Agency: National Flood Insurance Program, Map Number 08005C0193K, Last Revised December 17, 2010.

"Final Drainage Report for Meadow Point Condominiums, Lakeview Terrace Subdivision Filing No. 1, by EMK Consultants, Inc., dated November, 1983, COA #C8-2-1623.



# APPENDIX A

HYDROLOGIC COMPUTATIONS

Existing?  
"Developed" now used and western portion designated

**DRAINAGE BASIN (DEVELOPMENT CONDITION)**

Project: **The Peak at Meadow Point**  
Location: 4470 S. Pitkin Street

Basin Designation:  Developed Whole Site  
Basin Area:  Sq. Ft.  Acres  
Design Point:

**Composite Coefficient of Runoff:** Hydrologic Soil Group: B

Surface	Area	% of Site	C <sub>2</sub> value	C <sub>5</sub> value	C <sub>10</sub> value	C <sub>100</sub> value	Imp.
Drives & Walks	15,610	38.82%	0.87	0.87	0.88	0.89	0.96
Building	10,625	26.42%	0.87	0.88	0.90	0.93	1.00
Landscaping	13,980	34.76%	0.05	0.06	0.08	0.17	0.02

Note: C's and %imp in this line are from "asphalt" values rather than building/roof values. Can keep if desired

Acknowledged

Figures are from Table 1, City of Aurora Storm Drainage Design & Technical Criteria  
Formula: (% of Site)(C Value)+(% of Site)(C Value)+(% of Site)(C Value) = CC

C<sub>2</sub>: 0.58  
C<sub>5</sub>: 0.59  
C<sub>10</sub>: 0.61  
C<sub>100</sub>: 0.65

Please include slopes range (i.e. 2% in this case)

0.1 per SDDTC Table 1. Appears this is from Type "C" soils.  
Updated

**Developed Basin Imperviousness**

I= 64.4 %

Now showing 2% lawn slope

Include a existing drainage exhibit in this PDR as an appendix. Size to 11x17 max.

NB: Proposed maps should be separated out from the PDR, do not include existing maps with the proposed maps.

Existing Drainage Exhibit included in the appendices. Proposed Drainage plan attached separately

### DRAINAGE BASIN (DEVELOPMENT CONDITIONS)

Project: **The Peak at Meadow Point**  
Location: 4470 S. Pitkin Street

Basin Designation: **1** Developed  
Basin Area: **12,700** Sq. Ft. **0.2916** Acres  
Design Point: **1**

#### Composite Coefficient of Runoff:

Hydrologic Soil Group: **B**

Surface	#DIV/0!	% of Site	Use 6" weir	C <sub>s</sub> value	5345.57	C <sub>100</sub> value	Imp.
Drives & Walks	<b>2,145</b>	<b>16.89%</b>	0.50	0.75	0.77	0.81	0.90
Roof	<b>3,900</b>	<b>30.71%</b>	0.73	0.75	0.77	0.81	0.90
Landscaping	<b>6,655</b>	<b>52.40%</b>	0.01	0.01	0.01	0.13	0.02

Figures are from Table 1, City of Aurora Storm Drainage Design & Technical Criteria  
Formula: (% of Site)(C Value)+(% of Site)(C Value)+(% of Site)(C Value) = CC

C<sub>2</sub>: **0.31**  
C<sub>5</sub>: **0.36**  
C<sub>10</sub>: **0.37**  
C<sub>100</sub>: **0.45**

#### Developed Basin Imperviousness:

I= **43.9** %

??  
**Updated**

Not really sure where these values are coming from. USDCM? Utilize SDDTC C and % imp values and update composite values  
**Updated**

More basin detail is needed for this report. Basin 0 appears to be the entire site but doesn't appear comparable to what is show in the previous drainage report. Basin 0 is also not shown anywhere as far as I can tell. Basin 1 is portions of the proposed and existing site and seems only for WQ calculations but doesn't include the entire proposed site.

Basins for the the entire proposed site are required; it is recommended that they are relatable to approved basins. Also appears there are offsite basins that were not previously accounted for that must be now.

Any excerpts from previous studies should be included as an appendix with the pertinent information boxed/highlighted

The basin configuration including historic designations have been updated



## TIME OF CONCENTRATION (T<sub>c</sub>): DEVELOPED CONDITIONS

Project: **The Peak at Meadow Point**

Location: 4470 S. Pitkin St.

Land Surface	Conveyance Coefficient, C <sub>v</sub> *
Heavy Meadow	2.5
Tillage/Field	8
Short Pasture	7
Nearly Bare Gound	10
Grassed Waterway	15
Paved Area	20

NRCS Hydrologic Soil Grp: **B**

\* Values taken from Urban Drainage and Flood Control District "Drainage Criteria Manual Volume 1"

Basin	Area	Overland Sheet Flow		Shallow Concentrated Flow			CK			FINAL		
		Length	Slope	Lenth	Slope	Cv	C5	Ti <sup>1</sup>	Tt <sup>2</sup>	Tt <sup>3</sup>	Tc	Tc
<b>1</b>	0.29	40	3.0%	190	1.0%	20	0.36	5.9	1.6	11.1	7.4	<b>7.4</b>

$${}^1T_i = (0.395 * (1.1 - C_5) * L^{0.50}) / S^{0.33} \text{ (Eq. 5.3)}$$

$${}^2T_t = L / (C_v * S_w^{0.50}) * (1/60) \text{ (Eq. 6-4)}$$

$${}^3T_t = (L/180) + 10 \text{ (Eq. 5.4)}$$

Max Length of Overland Sheet Flow: 500'

Minor note: 300' in urbanized basins such as this one

Noted and changed





**TABLE 1**  
**RUNOFF COEFFICIENTS AND PERCENTS IMPERVIOUS**

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	FREQUENCY			
		2	5	10	100
<u>Business:</u>					
Commercial Areas	95	.87	.87	.88	.89
Neighborhood Areas	85	.60	.65	.70	.80
<u>Residential:</u>					
Single-Family (**)	(*)	.40	.45	.50	.60
Multi-Unit (detached)	60	.45	.50	.60	.70
Multi-Unit (attached)	75	.60	.65	.70	.80
1/2 Acre Lot or Larger	(*)	.30	.35	.40	.60
Apartments	80	.65	.70	.70	.80
<u>Industrial:</u>					
Light Areas	80	.71	.72	.76	.82
Heavy Areas	90	.80	.80	.85	.90
<u>Parks, Cemeteries</u>	5	.10	.10	.35	.60
<u>Playgrounds</u>	10	.15	.25	.35	.65
<u>Schools</u>	50	.45	.50	.60	.70
<u>Railroad Yard Areas</u>	15	.40	.45	.50	.60
<u>Undeveloped Areas:</u>					
Historic Flow Analysis, Greenbelts, Agricultural	2	(See "Lawns")			
Off-Site Flow Analysis (when land use not defined)	45	.43	.47	.55	.65

**TABLE 1** (continued)

**RUNOFF COEFFICIENTS AND PERCENTS IMPERVIOUS**

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	FREQUENCY			
		2	5	10	100
<u>Streets:</u>					
Paved	100	.87	.88	.90	.93
Gravel	40	.15	.25	.35	.65
<u>Concrete Drive and Walks</u>	96	.87	.87	.88	.89
<u>Roofs</u>	90	.80	.85	.90	.90
<u>Lawns, Sandy Soil (A and B Soils):</u>	2				
2% Slope		.05	.06	.08	.10
2-7% Slope		.10	.11	.13	.15
>7% Slope		.15	.16	.18	.20
<u>Lawns, Clay Soil (C and D Soils):</u>	5				
2% Slope		.13	.14	.15	.17
2-7% Slope		.18	.19	.20	.22
>7% Slope		.25	.27	.30	.35

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

(\*)See Figures *RO-3 through RO-5* of USDCM Volume 1 for percent impervious.

(\*\*)Up to 5 units per acre. Single-family with more than 5 units per acre, use values for multi-unit/detached

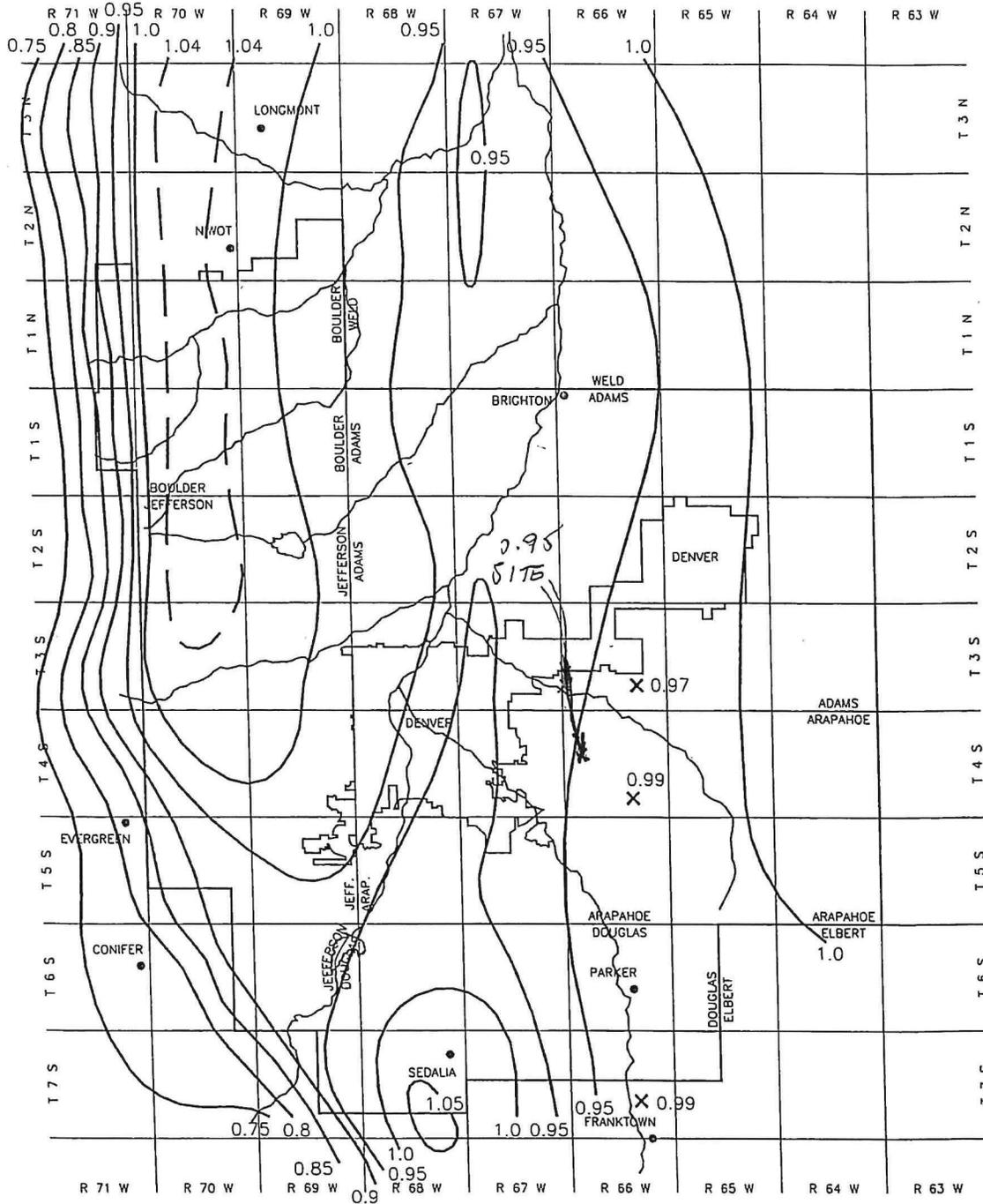


FIGURE RA-1

Rainfall Depth-Duration-Frequency: 2-Year, 1-Hour Rainfall

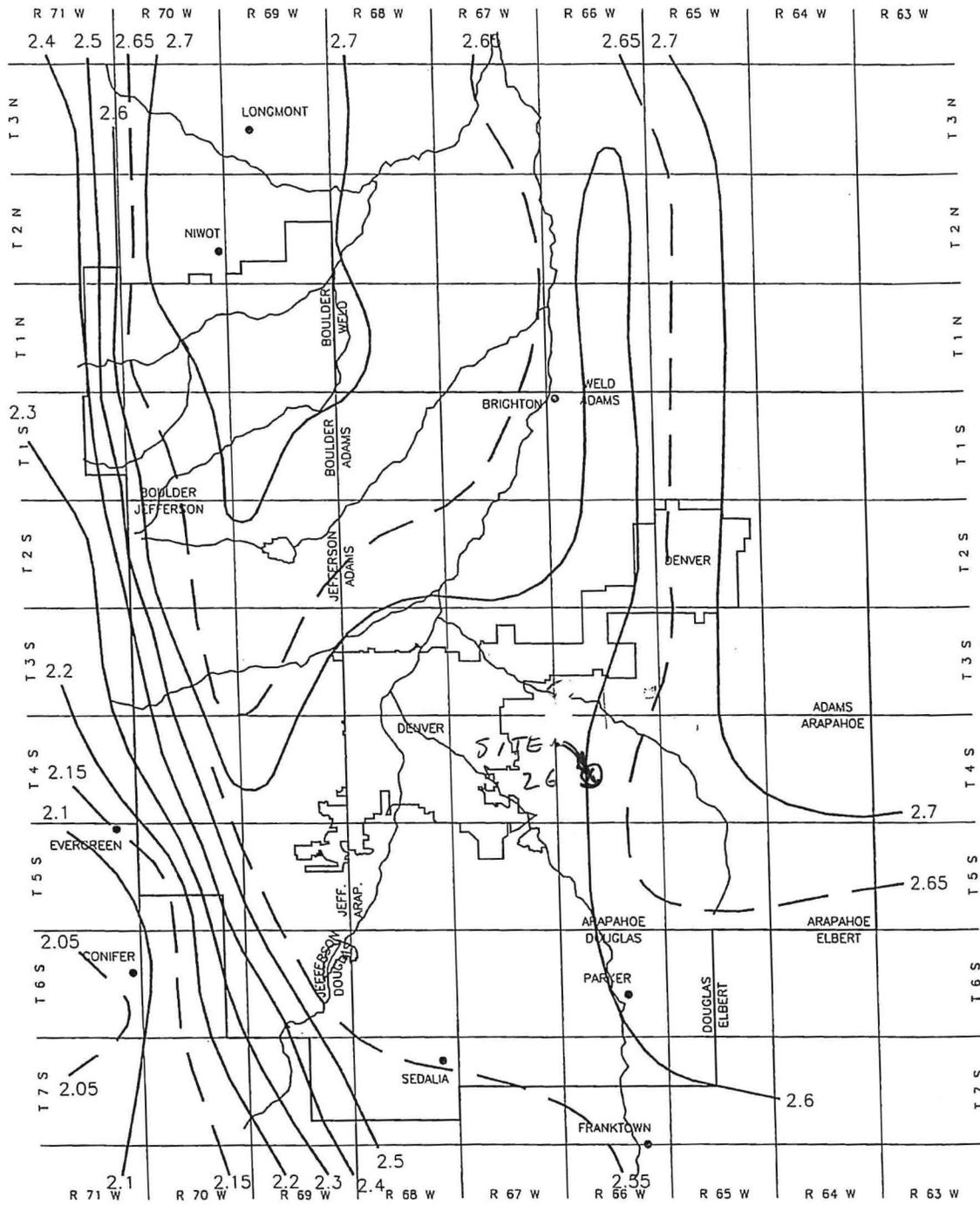


FIGURE RA-6

Rainfall Depth-Duration-Frequency: 100-Year, 1-Hour Rainfall

**APPENDIX B**

Remove. Will be included in the FDR

Noted

Designer: David Addor  
 Company: Engineering Service Co.  
 Date: June 25, 2020  
 Project: The Peak at Meadow Point  
 Location: 4470 S. Pitkin Street

1. Design Discharge for 2-Year Return Period	$Q_2 =$ <u>0.60</u> cfs
2. Hydraulic Residence Time A) : Length of Grass Swale B) Calculated Residence Time (based on design velocity below)	$L_S =$ <u>120.0</u> ft $T_{HR} =$ <u>4.8</u> minutes
3. Longitudinal Slope (vertical distance per unit horizontal) A) Available Slope (based on site constraints) B) Design Slope	$S_{avail} =$ <u>0.030</u> ft / ft $S_D =$ <u>0.023</u> ft / ft
4. Swale Geometry A) Channel Side Slopes (Z = 4 min., horiz. distance per unit vertical) B) Bottom Width of Swale (enter 0 for triangular section)	$Z =$ <u>6.00</u> ft / ft $W_B =$ <u>3.00</u> ft
5. Vegetation A) Type of Planting (seed vs. sod, affects vegetal retardance factor)	Choose One <input type="radio"/> Grass From Seed <input checked="" type="radio"/> Grass From Sod
6. Design Velocity (0.4 ft / s maximum for desirable 5-minute residence time)	$V_2 =$ <u>0.42</u> ft / s
7. Design Flow Depth (1 foot maximum) A) Flow Area B) Top Width of Swale C) Froude Number (0.50 maximum) D) Hydraulic Radius E) Velocity-Hydraulic Radius Product for Vegetal Retardance F) Manning's n (based on SCS vegetal retardance curve D for sodded grass) G) Cumulative Height of Grade Control Structures Required	$D_2 =$ <u>0.30</u> ft $A_2 =$ <u>1.4</u> sq ft $W_T =$ <u>6.6</u> ft $F =$ <u>0.16</u> $R_H =$ <u>0.22</u> $VR =$ <u>0.09</u> $n =$ <u>0.200</u> $H_D =$ <u>0.80</u> ft
8. Underdrain (Is an underdrain necessary?)	Choose One <input type="radio"/> YES <input checked="" type="radio"/> NO
9. Soil Preparation (Describe soil amendment)	   
10. Irrigation	Choose One <input type="radio"/> Temporary <input checked="" type="radio"/> Permanent

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# **APPENDIX C**

**MAP POCKET (FIRM, SOILS, PLANS)**

# National Flood Hazard Layer FIRMMette



39°38'21.12"N



## Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped



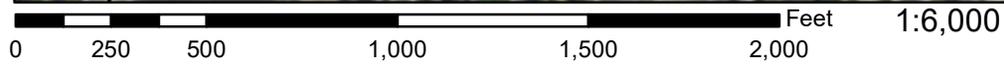
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

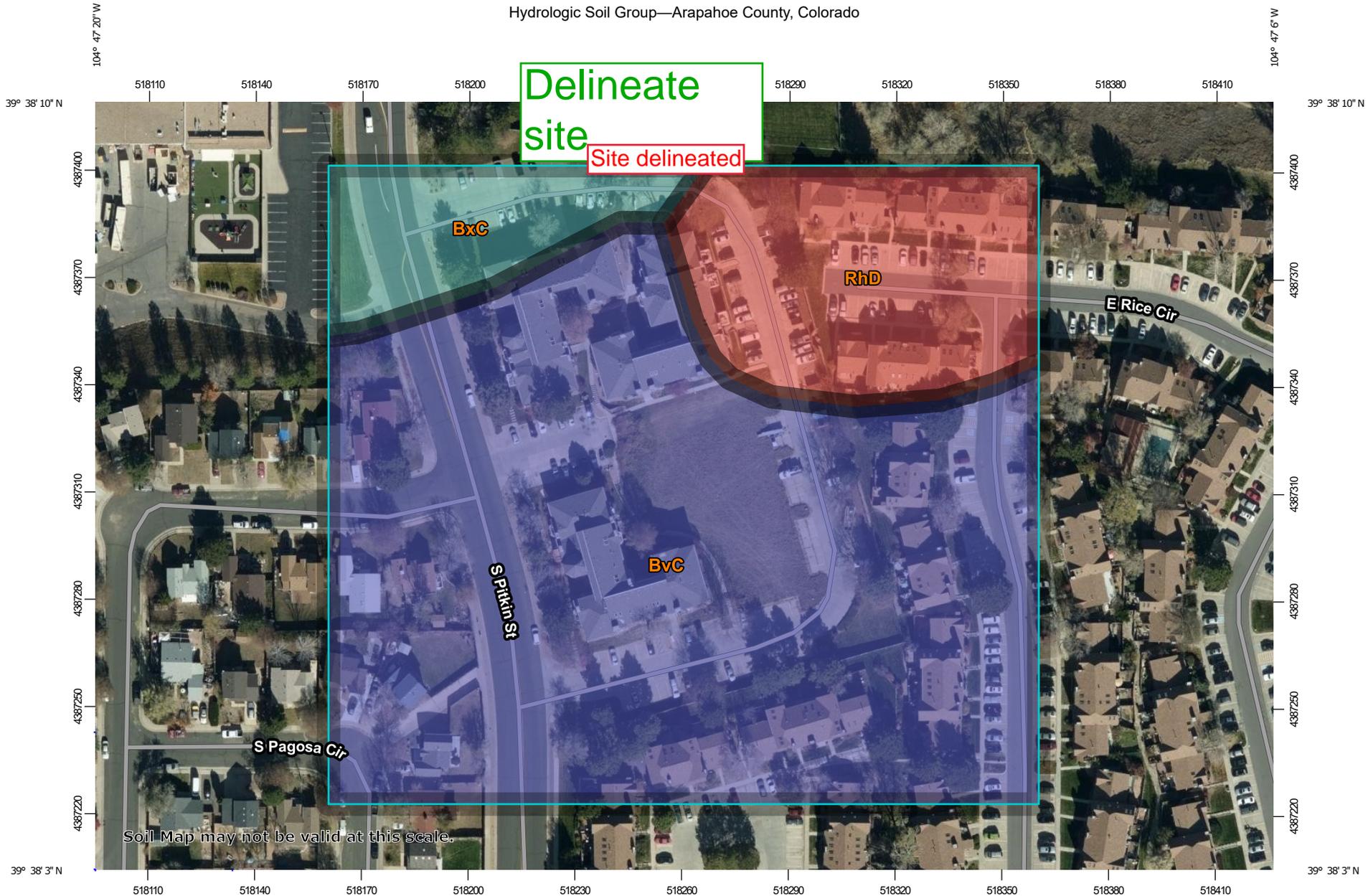
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/10/2020 at 6:26:24 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.

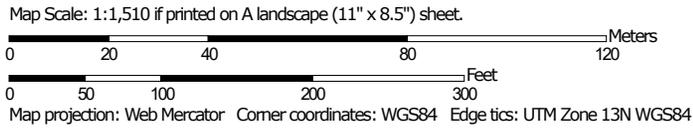
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory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

USGS The National Map: Orthoimagery. Data refreshed April, 2019.





Soil Map may not be valid at this scale.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 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: Arapahoe County, Colorado  
 Survey Area Data: Version 15, Sep 12, 2019

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

Date(s) aerial images were photographed: Oct 3, 2018—Dec 4, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BvC	Bresser-Truckton sandy loams, 3 to 5 percent slopes	B	6.5	73.7%
BxC	Buick loam, 3 to 5 percent slopes	C	0.8	8.8%
RhD	Renohill-Buick loams, 3 to 9 percent slopes	D	1.6	17.6%
<b>Totals for Area of Interest</b>			<b>8.8</b>	<b>100.0%</b>

### 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.

Separate out this map as its own document to include with the report. Do not include a copy of proposed maps in report. A copy of the existing site with proposed site delineated should be included in the report sized to 11x17 max

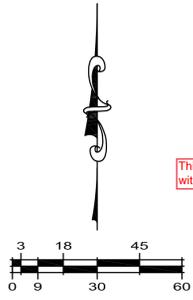
Existing Condition Drainage Map and Proposed Conditions Drainage Map provided at 11"x17" in the REPORT, and full size (24"x36") provided as "own document".

# THE PEAK AT MEADOW POINT PRELIMINARY DRAINAGE PLAN

THE PEAK AT MEADOW POINT SUBDIVISION FILING NO. 1  
SITUATED IN THE NW 1/4 OF SECTION 9, T.5S., R.66W. OF THE 6TH P.M.  
CITY OF AURORA, COUNTY OF ARAPAHOE, STATE OF COLORADO

Per 2.03.7 Label adjacent subdivision names and their City of Aurora six digit Engineering Drawing Number (EDN) Civil Plan Approval numbers or Lot and Block numbers if EDN is unavailable (typical all plan sheets)

City of Aurora EDN Numbers were not found on Aurora Property Info map, so used Lot and Block, typ.



LEGEND	
---5.300---	EXISTING CONTOUR LINE
—5300—	PROPOSED CONTOUR LINE
—	BOUNDARY
—	PROPOSED CURB AND GUTTER
—	EXISTING CURB AND GUTTER
---	EXISTING EASEMENT
---	PROPOSED EASEMENT
→	FLOW ARROW
LS	LANDSCAPING AREA
- - - -	PROPOSED BASIN BOUNDARY
△	DESIGN POINT
PROP. BASIN DESIGNATION	
1	BASIN DESIGNATION
0.29	BASIN AREA IN ACRES
0.31	
0.45	

Show/provide drainage easement. Easement will need to encompass 100yr WSEL, outlet structure, and connect to ROW via another drainage or access easement.  
This easement will not need to be provided with new drainage situation

Refer to rest of drainage report and correspondence to city for new drainage situation

Increase the scale of this plan, more detail is needed specifically for the sidewalk and wall areas.  
Note: 30 scale is the minimum scale, the City reserves the right to request larger scales when more detail is needed.

Refer to rest of drainage report and correspondence to city for new drainage situation

General wall comment: Walls over 4 ft or cast-in-place walls of any height will require structural calculations during the first review of the Civil Plans. These calcs are sent out for peer review and delay in receiving them may hold up Civil Plan approval.  
Label wall and max height of walls in plan  
Noted, will obtain structural calcs prior to civil submittal. Wall details with max height now on this sheet

Note for Civils: Walls exceed 4 ft in this location. Tiered walls will be required unless approved by the City Engineer and Planning.

Noted, will obtain structural calcs prior to civil submittal. Wall details with max height now on this sheet

This area appears to be a sump. Hard to tell at current scale. If this is a sump, then an emergency overflow path must be provided and labeled. Minimum of 1 ft of freeboard required between emergency WSEL and adj. FFEs. Otherwise an inlet will be required and required to be sized to 2x 100yr storm with a 50% clogging factor. This would be a variance.  
This is a wall cut. Water will enter the pan at the bottom of the wall as seen in the wall details and head north, eventually to the swale.

Looks like there is some kind of pan behind walls? Label what this is. 0.5% slope minimum for concrete pan, label slope. Drainage will need to be collected prior to flowing over walls (typ both walls)

A detail depicts this wall now. Slopes are now shown in the bottom of the pan

Appears the sidewalk is on the low side of both walls and is the low point of drainage? This creates sort of a trench and is an long and drainage concern, even more so since this is the ADA path. Are such extensive walls needed and can this be reconfigured to not be in this trench-like scenario? More detail is needed to assess drainage impacts of this area

City of Aurora EDN Numbers were not found on Aurora Property Info map, so used Lot and Block, typ.

Incorrect. The south/west edge of the sidewalk is higher than the area on the north/east side of the sidewalk. A preliminary wall detail is provided to show how this concept will work.

Extend contours 50' beyond property/basins, or more, to clearly show drainage patterns per 2.08.1.02 and SDDTC 2.22. Contours are available on the City website and should be used if no survey data is available. (typ around whole site)  
Contours extended and noted on the plan

Note: Parking/drive aisle depths will need to be confirmed in the FDR. Max 1 ft in parking areas, 1.5 ft in drive aisles.  
Refer to rest of drainage report and correspondence to city for new drainage situation

Please note the City requires WQCVs be increase by 20% in all cases. If any portion of the WQCV is to be treated in the pond the pond's 100yr volume will be required to be 100yr+1.2WQCV

Add FFE  
Ex. building FFE added

Minimum of 1 ft freeboard required in swale. Provide a cross section with 100yr

Swale cross-slope with 100-year WSEL now in appendices, approximately 1.25' of freeboard is provided.

Advisory note for CPs: Portion of wall within easement will require a license agreement  
Acknowledged

Note: Roof drain downspouts are not allowed to drain over sidewalks, a chase or connection to a storm system must be provided.

Acknowledged. Roof drains along the east face the building are now captured in an underground pipe headers system; roof drains along the west wall discharge onto landscaping and the runoff is captured in gutter along the uphill side of the sidewalk. The captured runoff within the gutter flows north, and under intersecting sidewalks via 8" PVC. No runoff drains over sidewalks.

There is offsite flow. Show offsite basins tributary to site and include in the analysis. This doesn't appear to have been previously accounted for  
Accounted for now, Re: rest of report

Show/label pond emergency overflow location with a unique and prominent arrow

Refer to rest of drainage report and correspondence to city for new drainage situation

Per the pre-app notes, detention is required for the proposed site and detention volumes will need to be confirmed for this pond. Please note modification to this pond to bring it into conformance or other detention approaches may be required. Please discuss detention intents with the City.  
This pond must meet City and USDCM freeboard requirements per SDDTC 6.32 and USDCM Chap 12 Sec 5.3. 1 ft of freeboard is required between the "100yr" WSEL and the emergency overflow weir and 1 ft of freeboard between the emergency overflow WSEL and the top of the pond, a minimum of 1 ft of freeboard was required between the emergency overflow WSEL and adj. FFEs  
Refer to rest of drainage report and correspondence to city for new drainage situation

Refer to rest of drainage report and correspondence to city for new drainage situation

A pond certification for this pond will be required regardless if modifications are made to the pond. An I&M plan will also be required as a part of the Civil Plans  
Refer to rest of drainage report and correspondence to city for new drainage situation

Include a basin summary table with major/minor routed and unrouted flows, minor and major storm runoff coefficients, and percent impervious for each basin  
Includes 3 tables now: Imperviousness and runoff coefficients, 1-hour rainfall depths, and flow rates for various storms

Please refrain from using this space for internal and pre-approval revisions and submissions. This space should be reserved for revisions to approved plans.  
Removed text

Refer to rest of drainage report and correspondence to city for new drainage situation

Removed

Per pre-app notes WQ for site is required, GS can provide WQ, but needs to be shown that this will adequately handle WQ for proposed site in the PDR. Easements for WQ devices/swales are required  
Refer to rest of drainage report and correspondence to city for new drainage situation

Show/label roof drains/scuppers. State in general note that these are designed for the 100 yr storm. WQ must be accounted for site for entire proposed site  
NO. 2233789

There are proposed downspouts shown in the architectural plans. The locations of these downspouts are now labeled. On the east side of the building the downspouts will be connected to a PVC pipe underground that connects to proposed storm line.

Provide generic slope callouts along with drainage arrows. Can be paired with drainage arrows (typ).  
Slope values added to all slope arrows.

Per 2.03.7 Label adjacent subdivision names and their City of Aurora six digit Engineering Drawing Number (EDN) (C8-2-1623) Civil Plan Approval numbers or Lot and Block numbers if EDN is unavailable (typical all plan sheets)

City of Aurora EDN Numbers were not found on Aurora Property Info map, so used Lot and Block, typ.

Basins should cover all proposed work and be included in the report analysis.  
Refer to rest of drainage report and correspondence to city for new drainage situation

Please add the following note to the cover sheet and all sheets showing a permanent Detention Pond per SDDTC 3.63: The developer shall have a licensed Professional Engineer certify each stormwater detention pond and/or water quality BMP is built according to the approved plans and specifications and the required detention volume, including the WQCV when used, is met. The certification shall also verify all pertinent dimensions, elevations, required outlet orifice plates for detention and WQCV and other permanent BMPs requirements are installed per the approved plans and specifications, and shall show the as-built design volumes (WQCV, 10-year, 100-year, EUW) and other pertinent dimensions, elevations and capacity requirements associated with the WQ BMP used. The certification shall be provided to the City of Aurora Engineering Control Section Principal Engineer. An approved pond certificate shall be required prior to the return of any Fiscal Security Deposit (as well as satisfying other conditions of the stormwater permit) for sites that do not require a certificate of occupancy. Examples of these sites include but are not limited to: sites without vertical construction, oil and gas well pads, outdoor storage, and tow yards. An approved pond certificate shall be required prior to commencement of business operations. In no case shall a Certificate of Occupancy or Temporary Certificate of Occupancy be issued without an approved pond certificate.  
Refer to rest of drainage report and correspondence to city for new drainage situation - No proposed onsite pond

Add COA signature block for City Engineer and Aurora Water in lower right corner of sheet  
Signature block added

## PRELIMINARY DRAINAGE PLAN KEYNOTE LEGEND:

- EXISTING ITEMS (E)
- PROPOSED ITEMS (P)
- 0.1 DETENTION POND AREA
- 1.1 GRASS SWALE
- 1.2 CONCRETE PAN
- 1.3 8-INCH PVC

## GENERAL NOTES:

- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION, SIZE, NUMBER, AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON MEASUREMENTS TAKEN IN THE FIELD AND RECORDS OF THE VARIOUS UTILITY COMPANIES. THIS INFORMATION IS NOT TO BE RELIED ON TO BE COMPLETE OR EXACT. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION TO REQUEST UTILITIES BE LOCATED AND MARKED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THIS PLAN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING IMPROVEMENTS AND UTILITIES AND SHALL REPAIR ANY DAMAGE AT HIS EXPENSE.
- ALL CONSTRUCTION OR CONSTRUCTION SHALL BE DONE PER THE SIG The Peak at Meadow CIVIL CONSTRUCTION PLANS. ENGINEERING SERVICES SHALL BE RESPONSIBLE FOR ANY DISCREPANCIES BETWEEN ANY BID SUBMISSION NOW VIA CONSTRUCTION PLANS AND THE APPROVED CIVIL CONSTRUCTION PLANS.

## DRAINAGE PLAN NOTES

- CONTRACTOR SHALL MAINTAIN A MINIMUM 0.5% GRADE AT FLOW LINE INTO SUMP INLETS
- THE CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOBSITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NOT RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THIS DOCUMENT.
- CONTRACTOR AND OWNER SHALL ENSURE THAT THE PROVISIONS OF CRS 37-92-602 AS AMENDED BY SENATE BILL 15-212 REGARDING NOTIFICATION OF DOWNSTREAM WATER RIGHTS HOLDERS ARE UPHOLD.
- THE DEVELOPER SHALL HAVE A LICENSED PROFESSIONAL ENGINEER CERTIFY EACH STORMWATER DETENTION POND AND/OR WATER QUALITY BMP IS BUILT ACCORDING TO THE APPROVED PLANS AND SPECIFICATIONS AND THE REQUIRED DETENTION VOLUME, INCLUDING THE WQCV WHEN USED, IS MET. THE CERTIFICATION SHALL ALSO VERIFY ALL PERTINENT DIMENSIONS, ELEVATIONS, REQUIRED OUTLET ORIFICE PLATES FOR DETENTION AND WQCV AND OTHER PERMANENT BMPS REQUIREMENTS ARE INSTALLED PER THE APPROVED PLANS AND SPECIFICATIONS, AND SHALL SHOW THE AS-BUILT VOLUMES FOR THE 100-YEAR, 10-YEAR STORM EVENTS, AND FOR THE WQCV AND OTHER PERTINENT DIMENSIONS, ELEVATIONS AND CAPACITY REQUIREMENTS ASSOCIATED WITH THE WQ BMP USED. THE CERTIFICATION SHALL BE PROVIDED TO THE CITY OF AURORA ENGINEERING CONTROL SECTION SENIOR ENGINEER BEFORE A CERTIFICATE OF OCCUPANCY WILL BE ISSUED.
- ALL PROPOSED STORM SEWER TO BE PRIVATE AND MAINTAINED BY THE PROPERTY OWNER. IT IS SIZED FOR THE 100-YEAR EVENT UNLESS OTHERWISE NOTED.

**BENCHMARK:**  
CITY OF AURORA BM 556608NW003- 3" DIAM. BRASS CAP ATOP NW CORNER OF THE CURB OPENING INLET AT THE NW CORNER OF S. QUINTERO ST. AND E. TUFTS AVENUE. ELEVATION: 5754.22 FEET (NAVD 1988 DATUM).

Know what's below.  
Call before you dig.  
CALL 811  
WWW.CALL811.COM  
1-800-922-1987

Date:	Description:	No.:
2020-07-17	INITIAL SUBMITTAL	

14190 East Evans Avenue  
Aurora, Colorado 80014  
P 303.337.1393  
F 303.337.7481  
T/F 1.877.273.0659

**ENGINEERING SERVICE COMPANY**  
Creative Solutions Since 1964  
CIVIL ENGINEERS | LAND SURVEYORS  
engineers@serviceco.com

**PRELIMINARY DRAINAGE PLAN**  
THE PEAK AT MEADOW POINT PRELIMINARY DRAINAGE PLAN  
4470 SOUTH PITKIN STREET  
SITUATED IN THE NW 1/4 OF SECTION 9, T.5S., R.66W. OF THE 6TH P.M.  
CITY OF AURORA, COUNTY OF ARAPAHOE, STATE OF COLORADO

**JUSTIN AND DYLAN LLC**  
16885 EAST MAPLEWOOD DRIVE  
CENTENNIAL, COLORADO 80016  
PHONE: (303) 297-7750  
ATTN: MOSTAFA KARGARZADEH

**FOR REVIEW ONLY**  
Not for construction

Designed by:	Engineering No.:
DRA	E-20-010
Drawn by:	Date:
JB, JP	2020-07-17
Checked by:	Scale:
DRA	Horz.: 1" = 30'
	Vert.: N/A
Sheet No.:	
	1