



October 15, 2021

City of Aurora
Planning and Development Service Department
15151 E Alameda Pkwy, 2nd Floor
Aurora, Colorado 80012

Re: Murphy Creek Filing PA 9C, 13, and 14
Application for Variances

To whom it may concern,

On behalf of Meritage Homes of Colorado, LLC, developer of the proposed Murphy Creek Parcel PA 9C, 13, and 14, we respectfully request four variances to the city standards. The first is to allow runoff from offsite areas in excess of twice the area of a lot to flow through lots on the eastern side of the project. The second is to allow an exception for water quality treatment from an on-site area of 0.41 acres plus a section of R.O.W. adjacent to the project site with an area 0.55 acres. The third is to apply an exemption to runoff detention. The fourth is to allow a higher pond release rate (as a direct result of the exemption from 100-year detention).

Murphy Creek PA 9C, 13, and 14 is a proposed single family residential home community. The property consists of 39.0 Acres, of which approximately 3.2 acres will be dedicated to the detention ponds, 0.4 acres will be dedicated to the water quality pond, and 2.7 acres are occupied by the existing drainage channel Murphy Creek East Tributary 3000E (DBO). The remainder of the site is proposed to include local roads, 132 single-family detached units, and associated supporting infrastructure.

Roadway Design and Construction Specifications Section 2.08.2.03 : Lot Drainage

"No more than two lots may drain through any one lot."

A variance from this section is being requested for the lots on the eastern boundary of the site (block 1, lots 13 – 38) adjacent to the unplatted land occupied by Public Service Company of Colorado (PSCO). Due to the existing grading, each of the proposed lots accepts runoff flows from an area of land more than twice its own size.

Because it is occupied by PSCO and includes various existing utilities, the area of land between Harvest Road and the project site will remain undeveloped. A local high point in Harvest Road (approximately 225' east of lots 34 and 35) ensures that flows in Harvest Road will not overtop the curb, even in an emergency condition. In the 100-year storm event, flows entering each lot are approximately 1.15 CFS at the worst case. Total routed flows through each lot are 1.54 CFS which includes the half lot runoff from each adjacent lot. Side slopes of swales between lots vary between 10% minimum and 25% maximum. Thus, in the 100-year storm event, the normal depth of the flow coming into the lot swale varies between 3.2 inches (10% side slopes) and 4.6 inches (25% side slopes); and the normal depth of the outgoing flow from the lot swale varies between 3.6 inches and 5.1 inches. There is a 1-foot vertical separation between the flowline of the lot swale

and the top-of-foundation (TOF) of the adjacent buildings as required by standard geotechnical recommendations. Thus, there is always a minimum of 6+ inches of clearance between the water surface elevation (WSE) and the TOF of any adjacent building in the 100-year storm event. Furthermore, finished floor elevations (FFE) are typically 1 foot above TOF. Therefore, FFEs are a minimum of 1.5+ feet above WSE. Please refer the attached exhibit and swale calculations.

The proposed drainage variance will not adversely affect the proposed lots nor the proposed infrastructure near this area. The flows from off-site basins OSA1 and OSA2 shall be directed to Pond A, and flows from off-site basin OSB2 shall be directed to Pond B. For more information on drainage, please see the *Preliminary Drainage Report for Murphy Creek PA 9C, 13, & 14*.

Water Quality Variance as Requested by Review

A variance from this section is being requested for the proposed drainage Basin A11 and offsite drainage Basin OS1. Basin A-11 is comprised of the east portion of one lot and the northern slope of the berm containing Pond A. Basin OS1 is the adjacent portion of South Flatrock Trail. Due to the elevation of the site with the pond higher than these basins, neither of these basins is available for capture and conveyance to Pond A. Both basins drain to an existing 15' CDOT Type-R Inlet at the intersection of South Flatrock Trail and Harvest Road. Basin OS1 drains to this inlet as an existing condition. In the 100-year storm event, proposed flows to the existing 15' inlet total 11.46 CFS. The inlet releases to a grassed swale on the north side of the intersection of South Flatrock Trail and Harvest Road which provides water quality for Basin OS1 as an existing condition.

The proposed drainage variance will not adversely any proposed or existing lots nor the proposed infrastructure near this area.

City of Aurora Storm Drainage Design and Technical Criteria Section 3.64: Exemptions

"Exemptions from the detention requirement may be granted at the option of the City under the following conditions:

- 1. Storm runoff is discharged directly into an improved major drainageway or regional detention pond which has capacity for developed flows and results in no adverse impacts.*
- 2. Runoff from single-family developments which have five dwelling units per acre or less, discharge to an improved publicly dedicated storm drain facility, and result in no adverse impacts."*

The project area south of the Murphy Creek East Tributary drainageway, consisting of 4.2 acres, is constrained by the channel to the north, E. Jewell Avenue to the south, the Fire Station to the southwest, and S. Flatrock Trail to the west. The street entry location into this area is set by the development under construction on the west side of S. Flatrock Trail. The low point of this area would be located immediately north of the street entry, adjacent to the drainageway, however because the street entry location is set, this area is too small to be used for detention.

There are 11 proposed units, which corresponds to a residential density of 2.6 du/ac. The Murphy Creek East Tributary drainageway is being improved with the Murphy Creek East project (design by others) and therefore qualifies as an improved major drainageway. Based on the allowable exemptions for detention, per Section 3.64 of the aforementioned criteria manual, only water quality and EURV treatment are proposed for this area, as provided by Water Quality Pond C. In addition, neither water quality nor 100-yr detention was provided in the Master Drainage Plan for Murphy Creek (EDN 980080) for the project area; therefore, this design is in compliance with that Master Drainage Plan.

City of Aurora Storm Drainage Design and Technical Criteria Section 6.33: Volume and Release Rates

" ...

Allowable release rates for detention ponds - CFS/ACRE

SCS Hydrologic Soil Group			
Storm Frequency	A	B	C&D
10-year	0.13	0.23	0.30
100-year	0.50	0.85	1.00

..."

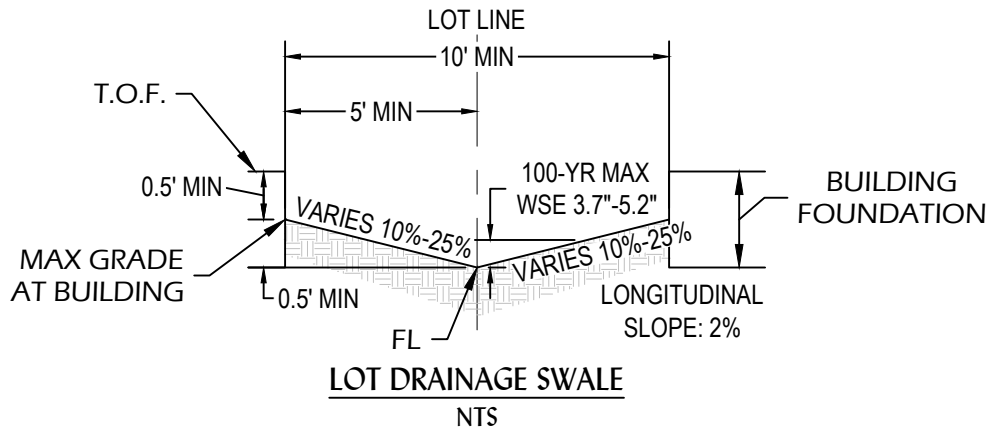
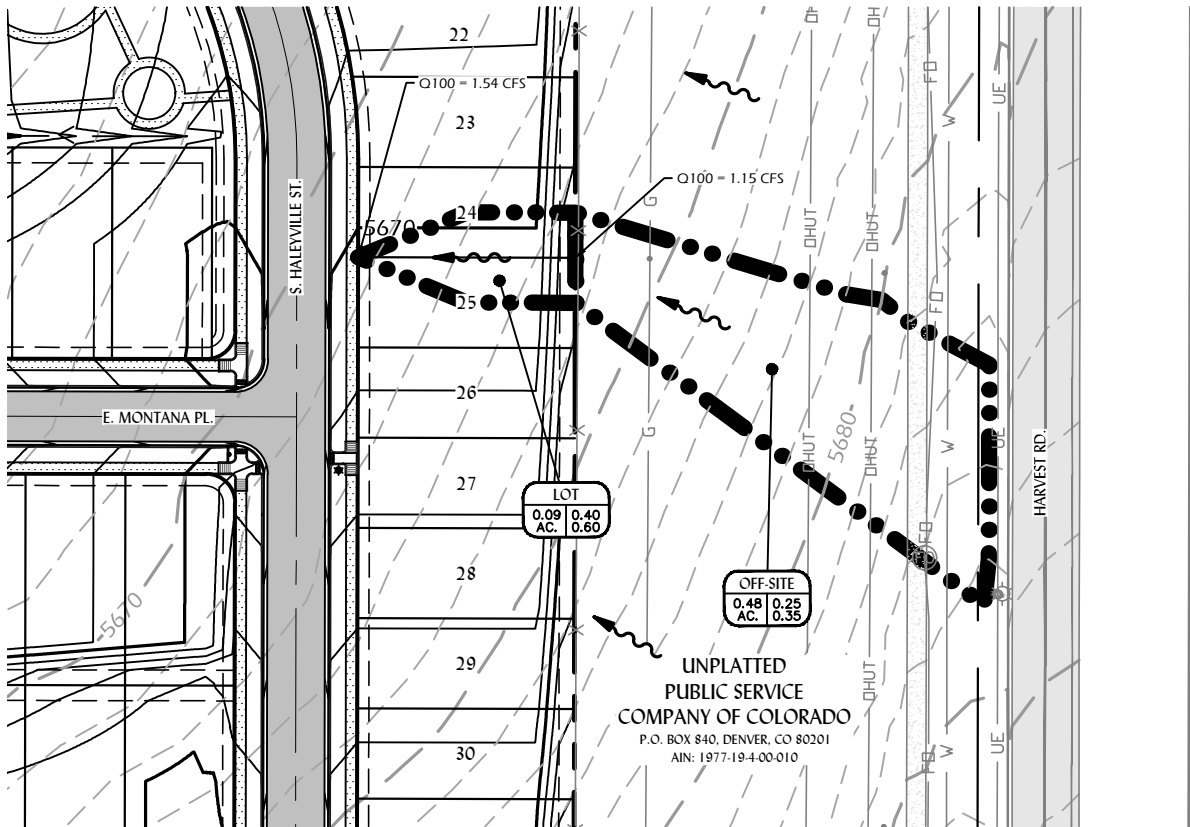
Because Water Quality Pond C does not provide 100-year detention, the total 100-yr peak flow rate does not comply with the Aurora standard for Type C/D soils of 1 cfs/acre. The peak 100-yr flow from the pond is estimated (without routing) to be 19.49 cfs, which is in excess of the allowable release rate of 4.20 cfs. There is no way to meet with criteria without providing 100-year detention and therefore this variance request is a direct result of the prior variance request for exemption of the 100-yr detention volume. As previously stated, the original Master Drainage Plan for Murphy Creek did not include detention for the project site and therefore this variance is in compliance with that report.

Please feel free to contact me with any questions or comments regarding this request.

Respectfully,



Xylina Warren-Laird, PE
Project Manager



Incoming to Lot Swale - 10% Side Slope

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	2.000 %
Left Side Slope	10.000 %
Right Side Slope	10.000 %
Discharge	1.15 cfs
Results	
Normal Depth	3.2 in
Flow Area	0.7 ft ²
Wetted Perimeter	5.4 ft
Hydraulic Radius	1.6 in
Top Width	5.40 ft
Critical Depth	2.9 in
Critical Slope	3.636 %
Velocity	1.58 ft/s
Velocity Head	0.04 ft
Specific Energy	0.31 ft
Froude Number	0.756
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.2 in
Critical Depth	2.9 in
Channel Slope	2.000 %
Critical Slope	3.636 %

Incoming to Lot Swale - 25% Side Slope

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	2.000 %
Left Side Slope	25.000 %
Right Side Slope	25.000 %
Discharge	1.15 cfs
Results	
Normal Depth	4.6 in
Flow Area	0.6 ft ²
Wetted Perimeter	3.2 ft
Hydraulic Radius	2.2 in
Top Width	3.07 ft
Critical Depth	4.2 in
Critical Slope	3.328 %
Velocity	1.96 ft/s
Velocity Head	0.06 ft
Specific Energy	0.44 ft
Froude Number	0.788
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	4.6 in
Critical Depth	4.2 in
Channel Slope	2.000 %
Critical Slope	3.328 %

Outgoing from Lot Swale - 10% Side Slope

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	2.000 %
Left Side Slope	10.000 %
Right Side Slope	10.000 %
Discharge	1.54 cfs
Results	
Normal Depth	3.6 in
Flow Area	0.9 ft ²
Wetted Perimeter	6.1 ft
Hydraulic Radius	1.8 in
Top Width	6.03 ft
Critical Depth	3.3 in
Critical Slope	3.497 %
Velocity	1.70 ft/s
Velocity Head	0.04 ft
Specific Energy	0.35 ft
Froude Number	0.771
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.6 in
Critical Depth	3.3 in
Channel Slope	2.000 %
Critical Slope	3.497 %

Outgoing from Lot Swale - 25% Side Slope

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.035
Channel Slope	2.000 %
Left Side Slope	25.000 %
Right Side Slope	25.000 %
Discharge	1.54 cfs
Results	
Normal Depth	5.1 in
Flow Area	0.7 ft ²
Wetted Perimeter	3.5 ft
Hydraulic Radius	2.5 in
Top Width	3.42 ft
Critical Depth	4.7 in
Critical Slope	3.201 %
Velocity	2.10 ft/s
Velocity Head	0.07 ft
Specific Energy	0.50 ft
Froude Number	0.802
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.1 in
Critical Depth	4.7 in
Channel Slope	2.000 %
Critical Slope	3.201 %