PRELIMINARY DRAINAGE REPORT

Harvest Crossing Subdivision, Filing No. 3

Aurora, Colorado

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Approved For One Year From This Date
Aurora Water - Drainage Department Date

Advisory Note – Preliminary Drainage Report is required prior to Civil Plan Approval

Kimley»Horn

Project #: 196284001

Prepared: March 2024

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ENGINEER'S CERTIFICATION

This report and plan for the drainage design of Harvest Crossing, Filing 3 was prepared by me (or under my direct supervision) in accordance with the provisions of City of Aurora Storm Drainage Design and Technical Criteria and was designed to comply with the provisions thereof.

Keegan McCormack, P.E.

Registered Professional Engineer

State of Colorado No. 61443

A. Introduction

The purpose of this preliminary drainage report is to outline the drainage design for the proposed Harvest Crossing Subdivision Filing 3 Development (The Site or the Project), located at the northeastern corner of Harvest Road and E Yale Avenue.

The purpose of this report is to demonstrate that the proposed residential project conforms to the established drainage patterns set forth in the *Master Drainage Report Harvest Crossing/Villages at Murphy Creek* (The MDR), EDN 221085, prepared by Innovative Land Consultants, Inc. approved April 5, 2021.

The Master Drainage Report and Maps for Harvest Crossing/Villages at Murphy Creek Development referenced herein is EDN 221085, completed by Innovative Land Consultants, Inc. approved April 5, 2021. The drainage design will also conform to the current *City of Aurora Storm Drainage and Technical Criterial Manual* (The Criteria) which supplements the Mile High Flood District *Urban Storm Drainage Criteria Manual* (The Manual).

1. Location

The Harvest Crossing Subdivision Filing 3 is located in the west half of section 29, township 4 south, range 65 west of the sixth principle meridian, county of Arapahoe, State of Colorado. The site is bounded by existing E Warren Avenue to the North, proposed Harvest Road to the West, proposed Kewaunee Road to the East, and proposed E Yale Avenue to the South. See **Figure 1** below for the Vicinity Map of the Site.

Figure 1: Vicinity Map (Not to Scale)

2. *Proposed Development*

Majority of the Site is currently zoned as R-2 (medium density residential) and contains planning areas PA-5, PA6 and PA-7 of the Villages at Murphy Creek Framework Development Plan, see **Appendix C**. The proposed Site located in planning area will consist of approximately a total of 414 residential single-family lots. Open space and neighborhood parks are proposed at various locations within the Harvest Crossing community.

The planned design includes routing the developed runoff from the Site through grading and storm drain design to the proposed Ponds A1 & B4 consistent with the master drainage report. Pond A1 is in the southwest corner of the Site and will be constructed as part of the proposed Harvest Crossing Filing 3 Development. Pond B4 is located toward the west in and will be constructed as a part of the Harvest Crossing Filing 3 Development. The Site has been split into five major drainage Basins, Basin A1, Basin B4, Basin C, Basin D and Basin E. The major drainage Basins A1 & B4 correspond to Ponds A1 & B4 per the MDR. The major drainage Basin C, Basin D and Basin E are conveyed via storm drain to existing storm infrastructure constructed as part of the Harvest Crossing Filing 1 Development. Basin A1 is split between on-site Filing 3 area and off-site area. Basin A1 has a total tributary area of 88.01 acres with an imperviousness of 46.0%, the Filing 3 on-site area contributes 59.22 acres with an imperviousness of 63.4% to Basin A1 and the off-site area contributes 28.78 acres with an imperviousness of 10.1% to Basin A1. Basin B4 has a total tributary area of 23.14 acres with an imperviousness of 63.6%. Basin C corresponds to Basin OB in the Harvest Crossing Filing No. 1 (EDN 222212) and has a total tributary area of 13.48 acres with an imperviousness of 70.1%. Basin D corresponds to Basin OA2 in the Harvest Crossing Filing No. 1 (EDN 222212) and has a total tributary area of 12.83 acres with an imperviousness of 63.6%. Basin E corresponds to Basin OA1 in the Harvest Crossing Filing No. 1 (EDN 222212) and has a total tributary area of 4.85 acres with an imperviousness of 71.6%. Please refer to **Appendix A & B** for hydrologic and hydraulic calculations. There are no irrigation canals or ditches located on the property.

This Preliminary Drainage Report includes the preliminary analysis of the drainage related to the site layout and grading of Harvest Crossing, Filing 3. A Final Drainage Report for this site will be prepared with subsequent development submittals to ensure that storm drainage infrastructure is appropriately sized to serve the overall development at full build out.

Existing Geotechnical & Geologic Features

A Geotechnical Site Development Study dated May 28, 2021, was prepared by A.G. Wassenaar, Inc.

Per this report, site development considerations should include provisions for the presence of expansive clays, shallow claystone bedrock and moderately to well cemented sandstone.

According to a USDA web soil report accessed March 26, 2024, the site is majority hydrologic soil group C and D soils. USDA web soil report is referenced in **Appendix E**.

Requested Variances

1. **The project is requesting a variance to the inlet location requirements outlined in SDDTCM Section 6.3.3.1 to not propose an inlet at the following intersection corners due to the potential intersection warping and small tributary areas resulting in an insignificant 100-year storm flow: the southeast corner of the intersection of Warren Avenue & South Ider Way, the southwest corner of the intersection of Warren Avenue & South Jackson Gap Street, the southwest corner of the intersection of Warren Avenue & South Jamestown Court, the northeast corner of East Caspian Avenue & South Ider Way, the southeast corner of East Caspian Avenue & South Jackson Gap Way, the southeast and northeast corners of East Harvard Avenue & South Jamestown Court, and the northeast corner of East Yale Avenue & South Jackson Gap Street.**
2. **The project is requesting a variance to not provide flow routing calculations for storm junctions in the Preliminary Drainage Report. The proposed storm infrastructure for the Site outfall to onsite ponds as opposed to adjacent, existing storm lines, therefore no comparisons are necessary. The pond emergency overflow section calculations are using the Mile High Flood District Detention spreadsheet peak inflows as opposed to routed flows. There are also no proposed sump inlets that have multiple tributary overland basins; therefore the routed flow rates are not needed for the sump inlet emergency overflow calculations.**
3. **The project is requesting a variance to the minimum maintenance path radii requirement outlined in SDDTCM Section 7.3.6.1 to be less than 50'. The proposed maintenance paths radii is greater than 30' in all areas and vehicle tracking analysis has been provided in Appendix C to show that a tandem axle dump truck can adequately maneuver the proposed maintenance paths.**

B. Historic Drainage

1. Overall Sub-Basin Description

Currently, the Site consists of undeveloped land. A natural ridgeline running north/south roughly dividing the site in half. This natural ridge splits historic flow. The majority of the Site flows south toward the intersection of Harvest Road and East Yale Avenue, ultimately conveyed to Murphy Creek. The remainder of the site flows north to offsite existing storm infrastructure and/or west toward the intersection of Harvest Road and Warren Avenue, ultimately conveyed to Coal Creek. Currently the site is covered by natural grasses and slopes on site are roughly between 0% - 25%.

The northeastern portion of the Site falls within Zone X according to FEMA FIRM Map number 08005CO212K Panel 212, dated December 17, 2010. The southern and western portions of the Site fall within Zone X according to FEMA Firm Map 0800CO062L Panel 62, dated February 17, 2017. The FEMA FIRM Maps are referenced in **Appendix E**.

2. Drainage Patterns Through Property

The Master Drainage Report identifies five existing drainage Basins A, B2, C3 and OS-911. Basins A, B2, B3 and OS-911 flow to the west and are tributary to Murphy Creek. Basin C3 flows to the east and is tributary to Coal Creek. In the existing conditions, majority of the Site sheet flows to two swales located on-site – Design Points 3 and 7. There are two swales on the west side of the Site. Basins C3 and B2 sheet flow to existing offsite basins. Basin OS-911 sheet flows into a swale within Basin A. The swales located on the boundary of the Site carry flow off the Site to the ultimate outfall. There is no existing storm infrastructure onsite capturing any flow. See **Figure 2** below for the historic basins located onsite per the Master Drainage Plan.

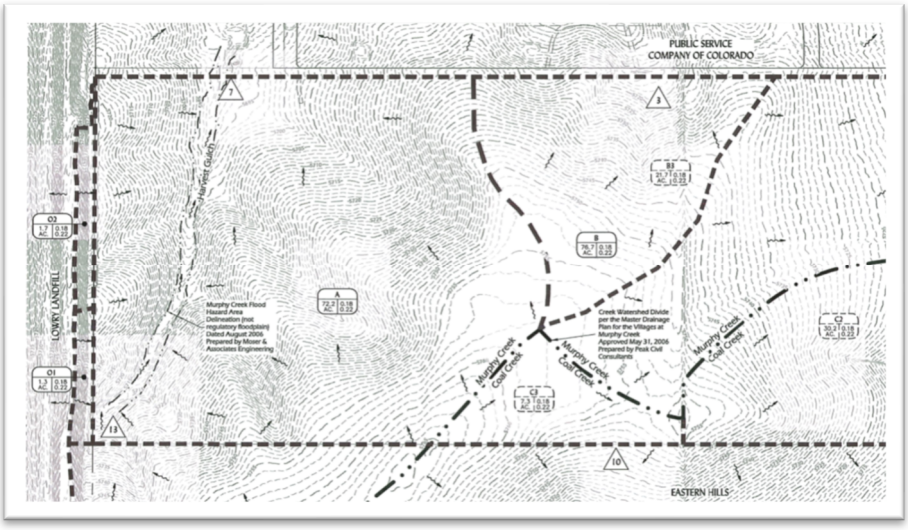

Figure 2: Master Drainage Map - Existing Drainage Patterns (Not to Scale)

3. Outfalls Downstream from Property

Murphy Creek is approximately 0.44 miles to the west. The stormwater in Basin A1 drains to Pond A1 then through the proposed outlet structure into the proposed Harvest Gulch, ultimately routed to the west discharging into Murphy Creek. This drainage pattern follows historical drainage patterns. The stormwater in Basin B4 drains to Pond B4 then through the proposed outlet structure to an existing storm drain network located in Harvest Road developed in the Murphy Creek Subdivision Filing No. 9 Development to the west, ultimately routed and discharging to Murphy Creek. This drainage pattern follows historical drainage patterns. The stormwater in Basins D and E drains to existing storm infrastructure northwest to Pond A that were constructed as part of Harvest Crossing Filing No. 1 Development, ultimately routed to the east via storm drain discharging into Murphy Creek.

Coal Creek is approximately 1.00 miles to the east. The stormwater in Basin C drains to existing storm infrastructure northeast to Pond B that were constructed as part of Harvest Crossing Filing No. 1 Development, ultimately routed to the north via storm drain discharging into Coal Creek.

C. Drainage Design Criteria

1. List References

The “City of Aurora Storm Drainage Design and Technical Criteria”, revised November 2023 (the Criteria) and the “Urban Storm Drainage Criteria Manual” Volumes 1, 2, and 3 (The Manual), with latest revisions, were used when preparing the storm calculations. This report is intended to serve as a Site-Specific Preliminary Drainage Report for the Harvest Crossing Filing 3 Development.

This Preliminary Drainage Report also utilizes previous drainage studies in the area including:

- The *Master Drainage Report & Plan Harvest Crossing/Villages at Murphy Creek* (The MDR), EDN 221085, prepared by Innovative Land Consultants, Inc. approved April 5, 2021.
- The *Villages at Murphy Creek Master Drainage Report & Plan*, EDN 206111, prepared by Peak Civil Consultants approved May 31, 2006.
- The *Harvest Crossing Subdivision Filing No. 1 Final Drainage Report & Plan*, EDN 222212, prepared by Innovative Land Consultants, Inc. approved August 19, 2022.
- The *Murphy Creek East (Harvest Ridge) Subdivision Filing No. 1, 2, 3, 4 Master Drainage Report & Plan*, EDN 220220, prepared by CVL Consultants of Colorado, Inc. approved November 30, 2020.

2. *Hydrologic Criteria*

Rainfall and Storm Design Frequencies

According to the Criteria section 3.31, the design storms for the Project are the 2-year and 100-year frequency events.

The Chapter 5 of the Criteria was used to determine the time of concentrations, rainfall intensities, and runoff coefficients to calculate the peak runoff for each storm event.

NOAA Atlas 14 was used to determine the rainfall P1 values for the rainfall intensity values. One-hour rainfall depths used for the calculations at the site are as outlined below along with **Appendix A**:

Table 1: Rainfall Depths						
	2-year	5-year	10-year	25-year	50-year	100-year
1-hr	0.86”	1.14”	1.40”	1.79”	2.12”	2.47”

Calculation Method

The Standard Form Rational Method computations were conducted for each sub-basin to size the proposed storm sewers infrastructure (inlets, pipe network, etc.) and to check the emergency overflow weir freeboard requirements.

The rational method was used to calculate sub-basin run-off coefficients and 2-yr and 100-yr flows. Thirteen land uses were used for the rational method calculations: Paved Street, Concrete, Roofs, Gravel – Pedestrian Use, Gravel – Maintenance Paths, Landscaping, Open Water & WQCV, Native Grasses & Open Space, Single-Family (High Density), Multi-Family (Medium Density), Commercial, School, Neighborhood Parks.

The 2-yr Run-off Coefficients used in calculations: 0.78 (Paved Street), 0.78 (Concrete), 0.78 (Roofs), 0.30 (Gravel – Pedestrian Use), 0.47 (Gravel – Maintenance Paths), 0.14 (Landscaping), 0.83 (Open Water & WQCV), 0.03 (Native Grasses & Open Space), 0.51 (Single-Family), 0.51 (Multi-Family), 0.65 (Commercial), 0.42 (School) and 0.10 (Neighborhood Parks) per the Runoff Coefficient Equations Based on NRCS Soil Group and the Criteria.

The 100-yr Run-off Coefficients used in calculations: 0.87 (Paved Street), 0.87 (Concrete), 0.87 (Roofs), 0.65 (Gravel – Pedestrian Use), 0.73 (Gravel – Maintenance Paths), 0.57 (Landscaping), 0.89 (Open Water & WQCV), 0.50 (Native Grasses & Open Space), 0.75 (Single-Family), 0.75 (Multi-Family), 0.81 (Commercial), 0.71 (School) and 0.55 (Neighborhood Parks) per the Runoff Coefficient Equations Based on NRCS Soil Group and the Criteria. See **Appendix A** for Runoff Coefficient table and Imperviousness results.

Detention Volume Computation Method

The required detention volume was calculated using the City of Aurora drainage criteria outlined in section 10.4. The total required volume is equal to the 100-yr runoff volume. The water quality event and EURV were calculated using the methods outlined in Volume 2 of the Mile High Flood District drainage criteria manual. Per the Criteria the water quality and EURV were designed to be nested within the 100 yr detention volume rather than in addition to. The 100-year required storage was calculated using the Mile High Flood District criteria. See **Appendix B** for results. Both Pond A1 and Pond B4 were designed in accordance with the Criteria's volume and release rate within the MFHD-Detention Spreadsheet. See **Appendix B** for MFHD-Detention Version 4.06 sizing spread sheets.

3. Hydraulic Criteria

The storm sewer layout will be designed horizontally along with inlet locations to gravity-flow in the 2-year storm and to convey the 100-year storm with the HGLs 1 foot below the rim elevations of the storm structures. The HGLs associated with the 2-year and 100-year storm events will be modeled in AutoCAD Civil 3D Hydraflow Storm Sewers Extension and will be provided within a future Final Drainage Report. An emergency overtopping route has been designed to allow these flows to reach the Ponds if the underground infrastructure becomes clogged. The emergency outfall elevation is outlined and hatched in the separate Preliminary Drainage Plan.

D. Drainage Plan

1. General Concept

The stormwater onsite is split roughly through the center with a highpoint located from south to north and the majority of it will either flow west (Basin B4) or south (Basin A1) collected by inlets and piped west or south. The portion of the Site that flows west through the proposed pipe network is routed via proposed roads to the west and outfall into a detention pond (Pond B4). Pond B4 will control the outlet of flow into an existing storm network discharging to Murphy Creek, following historic drainage patterns. The remaining majority of the stormwater will flow south into a detention pond (Pond A1) immediately to the southeast corner of Harvest Road and Yale Avenue. Pond A1 will control the outlet of flow into a proposed storm network discharging to Murphy Creek, following historic drainage patterns. Both detention ponds will detain flows before releasing through an outlet structure at flow rates required by the Criteria and Manual. The minority of the stormwater onsite that flows north from the central highpoint of the Site will flow to three (3) major basins C, D and E draining to existing storm infrastructure that will be constructed as part of the Harvest Crossing Filing No. 1 Development.

Offsite runoff enters the site from six sub-basins around different areas of the site, which are discussed in further detail in the Basins A-O1, A-O2, A-O3, A-O4, A-O5, and O-O1.

Offsite Basins are remaining largely undisturbed, and flows will be incorporated into future development.

Per conversations with the City of Aurora, both Ponds A1 and B4 are private, but will be maintained by the Metro District. The property owner is responsible for maintaining the proposed storm infrastructure within the property.

2. Specific Details

A. Project Phasing

The Harvest Crossing Filing No. 3 will be split into four (4) project phases. Phase One will include all the storm infrastructure within the limits Phase One and all Pond B4 infrastructure. Phase One will provide three (3) storm sewer stubs for Future Phase Four connections located within East Caspian Avenue, South Jackson Gap Court and Warren Avenue. Based on the existing topography, portions of Future Phases Two and Four will flow towards Phase One. Erosion control measures will be placed along the boundary of Phase One to route flows towards local street right-of-ways.

Phase Two will include all storm infrastructure within the limits of Phase Two, all Pond A1 infrastructure and the Harvest Gulch infrastructure. There will be necessary storm infrastructure constructed through a portion of Phase Three to connect storm drain along Yale Avenue into the Pond A1 inflows. There will be two (2) storm sewer stubs for Future Phase Three located at East Harvard Avenue and East Harvard Place. Based on existing topography, a small portion of Future Phase Four will flow towards Phase Two. Erosion control measures will be placed along the boundary of Phase Two to route flows towards local street right-of-ways.

Phase Three will build off the completed construction of Phase Two and the associated Phase Three flows will contribute to Pond A1's tributary area. Based on the existing topography, a small portion of Future Phase Four will flow towards Phase Three. Erosion control measures will be placed along the boundary of Phase Three to route flows towards local street right-of-ways. Phase Four will complete the construction of Harvest Crossing Filing No. 3 and the flows will tie into the existing infrastructure completed as part of the Harvest Crossing Filing No. 1 Deevlopment. Please note, Interim Phasing Plans and Exhibits will be provided as part of the Civil Review Process along with the Final Drianage Plan and Report.

B. Sub-Basin Description & E. Emergency Overflow Path

A standalone Preliminary Drainage Plan has been provided in this submittal, to illustrate the sub-basins proposed with this project. Individual sub-basin details such as runoff, coefficient calculations, and imperviousness percentages are provided in Appendix C. The 2-year and 100-year peak flows are provided below with full calculations provided in **Appendix A**.

On-Site Subbasins to Basin A

Sub-basin A-2

Sub-basin A-2 is 2.22 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southwestern boundary Site. This sub-basin flows to design point A2, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A2 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the roadway crown allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point A2 is a sump curb inlet in series with design point A10. The A2 overflow weir was evaluated using the greater 100-year storm flow of the two areas, which was from design point A2 (10.07-cfs). The roadway crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5702.49', the 100-year storm flow passes over the crown at a depth of 0.23' resulting in an elevation of 5702.72' providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5719.37). Please see Section A-A Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-4

Sub-basin A-4 is 0.50 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southwestern boundary Site. This sub-basin flows to design point A4, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A4 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the sidewalk allowing water to flow directly in Pond A in the event of the 100-year storm in a fully clogged condition. Design point A4 is a sump curb inlet in series with design point A2 and A10. The A4 overflow weir was evaluated using the greater 100-year storm flow of the three areas, which was from design point A2 (10.07-cfs). The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5703.19', the 100-year storm flow passes over the crown at a depth of 0.27' resulting in an elevation of 5703.42 providing more than one-foot of freeboard to the lowest point of entry to nearest the home (LPE: 5719.37). Please see Section B-B Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The

Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-6

Sub-basin A-6 is 1.33 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southwestern boundary Site. This sub-basin flows to design point A6, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-8

Sub-basin A-8 is 0.58 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southwestern boundary Site. This sub-basin flows to design point A8, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-10

Sub-basin A-10 is 1.68 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southwestern boundary Site. This sub-basin flows to design point A10, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A10 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the sidewalk allowing water to flow directly to sub-basin A2 in the event of the 100-year storm in a fully clogged condition. The A10 overflow weir was evaluated using the 100-year storm flow from design point A10 (9.32-cfs). The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5717.46', the 100-year storm flow passes over the crown at a depth of 0.34' resulting in an elevation of 5717.80' providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5719.37). Please see Section C-C Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-12

Sub-basin A-12 is 0.1.36 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southern area Site. This sub-basin flows to design point A12, which is

an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-14

Sub-basin A-12 is 2.14 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southern area of the Site. This sub-basin flows to design point A14, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-16

Sub-basin A-16 is 0.14 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the center of the Site. This sub-basin flows to design point A14, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-18

Sub-basin A-18 is 0.14 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the center of the Site. This sub-basin flows to design point A18, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-20

Sub-basin A-18 is 1.14 acres, located in the southwestern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the center of the Site. This sub-basin flows to design point A20, which is an area inlet. This sub-basin will utilize sheet flow and swale to facilitate flow to proposed public storm sewer.

Design point A20 is an area inlet, and the emergency overflow path was analyzed in the event of 100-year storm with the inlet in a fully clogged condition. No upstream sub-basins contribute to the tributary area for the 100-year overflow section resulting in a total 100-year flow of 4.06-cfs at design point A20 that must pass the emergency overflow weir. The stormwater will pond and overtop the sidewalk allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5730.00', the 100-year storm flow passes over the sidewalk at a depth of 0.35' resulting in an elevation of 5730.35' providing more than one-foot of freeboard to the lowest point of entry to nearest the home (LPE: 5731.85). Please see Section D-D Emergency Overflow Weir computations in **Appendix B** that have been provided and the

Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-22

Sub-basin A-22 is 0.95 acres, located in the western boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A22, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-24

Sub-basin A-24 is 1.72 acres, located in the western boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A24, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-26

Sub-basin A-26 is 0.29 acres, located in the western boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A26, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-28

Sub-basin A-28 is 1.80 acres, located in the western boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A28, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-30

Sub-basin A-30 is 1.57 acres, located in the western boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A30, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-32

Sub-basin A-32 is 0.18 acres, located in the western boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A

along the western boundary of the Site. This sub-basin flows to design point A32, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-34

Sub-basin A-34 is 0.28 acres, located in the western area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A34, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-36

Sub-basin A-36 is 1.54 acres, located in the western area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A36, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-38

Sub-basin A-38 is 0.91 acres, located in the western area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A38, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-40

Sub-basin A-40 is 0.36 acres, located in the western area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A40, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-42

Sub-basin A-42 is 1.15 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A42, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-44

Sub-basin A-44 is 1.84 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along

the western boundary of the Site. This sub-basin flows to design point A44, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-46

Sub-basin A-46 is 0.34 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the western boundary of the Site. This sub-basin flows to design point A46, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-48

Sub-basin A-48 is 0.64 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A48, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-50

Sub-basin A-50 is 0.29 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A50, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-52

Sub-basin A-52 is 0.51 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A52, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-54

Sub-basin A-54 is 0.16 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A54, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-56

Sub-basin A-56 is 1.48 acres, located in the eastern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along

the southwestern boundary Site. This sub-basin flows to design point A56, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A56 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the roadway crown allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The A56 overflow weir was evaluated using the 100-year storm flow (6.97-cfs). The roadway crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5751.71, the 100-year storm flow passes over the crown at a depth of 0.36' resulting in an elevation of 5752.07 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5753.97). Please see Section E-E Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-58

Sub-basin A-58 is 0.98 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A58, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-60

Sub-basin A-60 is 1.61 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A60, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-62

Sub-basin A-62 is 1.00 acres, located in the central area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A62, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-64

Sub-basin A-64 is 0.19 acres, located in the eastern boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A

within the eastern edge of the Site. This sub-basin flows to design point A64, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-66

Sub-basin A-66 is 0.69 acres, located in the eastern boundary of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the eastern edge of the Site. This sub-basin flows to design point A66, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-68

Sub-basin A-66 is 0.16 acres, located in the center of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A68, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-70

Sub-basin A-70 is 0.24 acres, located in the center of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A70, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-72

Sub-basin A-72 is 1.41 acres, located in the center of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A72, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-74

Sub-basin A-74 is 0.97 acres, located in the center of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the center of the Site. This sub-basin flows to design point A74, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-76

Sub-basin A-76 is 0.15 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within

the southeastern area of the Site. This sub-basin flows to design point A76, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-78

Sub-basin A-78 is 0.78 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A78, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-80

Sub-basin A-80 is 0.19 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A80, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-82

Sub-basin A-82 is 0.82 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A82, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-84

Sub-basin A-84 is 0.68 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A84, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-86

Sub-basin A-86 is 1.68 acres, located in the eastern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southwestern boundary Site. This sub-basin flows to design point A86, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A86 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the roadway crown allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged

condition. The A86 overflow weir was evaluated using the 100-year storm flow (8.87-cfs). The roadway crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5735.97, the 100-year storm flow passes over the crown at a depth of 0.32' resulting in an elevation of 5736.29 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5738.61). Please see Section F-F Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-88

Sub-basin A-88 is 1.11 acres, located in the southeastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A88, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-90

Sub-basin A-90 is 0.30 acres, located in the southern area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A90, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-92

Sub-basin A-92 is 0.63 acres, located in the southern area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A92, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-94

Sub-basin A-94 is 0.59 acres, located in the southern area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A94, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-96

Sub-basin A-96 is 0.20 acres, located in the southern area of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A96, which

is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-98

Sub-basin A-98 is 1.51 acres, located in the southern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southern boundary Site. This sub-basin flows to design point A98, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A98 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the roadway crown allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point A98 is a sump curb inlet in series with design point A86. The A98 overflow weir was evaluated using the greater 100-year storm flow of the two areas, which was from design point A86 (8.87-cfs). The roadway crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5732.11', the 100-year storm flow passes over the crown at a depth of 0.21' resulting in an elevation of 5732.32' providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5733.76). Please see Section G-G Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-100

Sub-basin A-100 is 1.37 acres, located in the southern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southern boundary Site. This sub-basin flows to design point A100, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A100 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the sidewalk allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point A100 is a sump curb inlet in series with design point A86 and A98. The A100 overflow weir was evaluated using the greater 100-year storm flow of the three areas, which was from design point A86 (8.87-cfs). The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5732.10', the 100-year storm flow passes over the crown at a depth of 0.19' resulting in an elevation of 5732.29' providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5733.82). Please see Section H-H Emergency Overflow Weir computations in **Appendix B** that have

been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-102

Sub-basin A-102 is 0.15 acres, located in the southeastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A102, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-104

Sub-basin A-104 is 0.63 acres, located in the southeastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A104, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-106

Sub-basin A-106 is 2.68 acres, located in the southern portion of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A along the southern boundary Site. This sub-basin flows to design point A106, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point A106 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the sidewalk allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The A106 overflow weir was evaluated using the 100-year storm flow (13.21-cfs). The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5733.22', the 100-year storm flow passes over the crown at a depth of 0.36' resulting in an elevation of 5733.58' providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5735.13). Please see Section I-I Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin A-108

Sub-basin A-108 is 0.68 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within

the southeastern area of the Site. This sub-basin flows to design point A108, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-110

Sub-basin A-110 is 0.39 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southeastern area of the Site. This sub-basin flows to design point A108, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-112

Sub-basin A-112 is 3.79 acres, located in the southern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A112, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-114

Sub-basin A-112 is 2.55 acres, located in the southern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A114, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Off-Site Subbasins to Basin A

Sub-basin A-O1

Sub-basin A-O1 is 11.71 acres, located in the southeastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A-O1, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-O2

Sub-basin A-O2 is 6.37 acres, located in the southeastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A-O2, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-O3

Sub-basin A-O3 is 1.39 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A-O3, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-O4

Sub-basin A-O4 is 4.42 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A-O4, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin A-O5

Sub-basin A-O5 is 4.89 acres, located in the eastern edge of the Site and is one of the 63 sub-basins on the Site that drains via public storm drains to Pond A within the southern area of the Site. This sub-basin flows to design point A-O5, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

On-Site Subbasins to Basin B

Sub-basin B-2

Sub-basin B-2 is 0.69 acres, located in the northwestern portion of the Site and is one of the 25 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of the Site. This sub-basin flows to design point B2, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B2 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the sidewalk allowing water to flow directly in Pond B in the event of the 100-year storm in a fully clogged condition. Design point B2 is a sump curb inlet in series with design point B4. The B2 overflow weir was evaluated using the greater 100-year storm flow of the two areas, which was from design point B4 (10.36-cfs). The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5728.68', the 100-year storm flow passes over the crown at a depth of 0.28' resulting in an elevation of 5728.96 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5730.29). Please see Section J-J Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage

Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-4

Sub-basin B-4 is 2.14 acres, located in the northwestern portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of Site. This sub-basin flows to design point B4, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B4 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The B4 overflow weir was evaluated using the 100-year storm flow (10.36-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5728.54', the 100-year storm flow passes over the crown at a depth of 0.24' resulting in an elevation of 5728.78 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5730.29). Please see Section K-K Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-6

Sub-basin B-6 is 1.13 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B6, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-8

Sub-basin B-8 is 0.45 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B8, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-10

Sub-basin B-10 is 1.29 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B10,

which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-12

Sub-basin B-12 is 1.13 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B12, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-14

Sub-basin B-14 is 1.89 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B14, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-16

Sub-basin B-16 is 0.42 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B16, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-18

Sub-basin B-18 is 0.31 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B18, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-19

Sub-basin B-19 is 0.36 acres, located in the Northwestern edge of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B19, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-20

Sub-basin B-20 is 1.59 acres, located in the southwestern portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond A along the center of the Site. This sub-basin flows to design point B20, which is

an area inlet. This sub-basin will utilize sheet flow and swale to facilitate flow to proposed public storm sewer.

Design point A20 is an area inlet, and the emergency overflow path was analyzed in the event of 100-year storm with the inlet in a fully clogged condition. No upstream sub-basins contribute to the tributary area for the 100-year overflow section resulting in a total 100-year flow of 5.41-cfs at design point A20 that must pass the emergency overflow weir. The stormwater will pond and overtop the sidewalk allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5744.98', the 100-year storm flow passes over the sidewalk at a depth of 0.41' resulting in an elevation of 5745.39' providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5746.89). Please see Section L-L Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-22

Sub-basin B-22 is 0.60 acres, located in the Northern area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B22, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-24

Sub-basin B-24 is 2.14 acres, located in the northern portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of Site. This sub-basin flows to design point B24, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B24 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The B24 overflow weir was evaluated using the 100-year storm flow (4.50-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5749.40', the 100-year storm flow passes over the crown at a depth of 0.29' resulting in an elevation of 5749.69 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5751.64). Please see Section M-M Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the

ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-26

Sub-basin B-26 is 0.61 acres, located in the Northern area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B26, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-28

Sub-basin B-28 is 0.40 acres, located in the northern portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of Site. This sub-basin flows to design point B28, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B28 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The B28 overflow weir was evaluated using the 100-year storm flow (2.39-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5754.98', the 100-year storm flow passes over the crown at a depth of 0.17' resulting in an elevation of 5755.15 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5757.15). Please see Section N-N Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 16 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-30

Sub-basin B-30 is 0.50 acres, located in the Northern area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B30, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-32

Sub-basin B-32 is 0.47 acres, located in the Northern area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B32, which

is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-34

Sub-basin B-34 is 1.30 acres, located in the northern portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of Site. This sub-basin flows to design point B34, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B34 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The B34 overflow weir was evaluated using the 100-year storm flow (6.88-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5739.88', the 100-year storm flow passes over the crown at a depth of 0.38' resulting in an elevation of 5740.26 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5742.20). Please see Section O-O Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-36

Sub-basin B-36 is 0.24 acres, located in the Northern area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B36, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-38

Sub-basin B-38 is 0.24 acres, located in the western portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the western area of the Site. This sub-basin flows to design point B38, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B38 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow directly to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point B38 is a sump curb inlet in series with design

point's B42 and B48. The B38 overflow weir was evaluated using the greater 100-year storm flow of the three areas, which was from design point B42 (8.37-cfs). The roadway crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5723.70', the 100-year storm flow passes over the crown at a depth of 0.21' resulting in an elevation of 5723.91 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5726.20). Please see Section P-P Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-40

Sub-basin B-40 is 1.25 acres, located in the Northern area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B40, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-42

Sub-basin B-42 is 1.49 acres, located in the western portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of Site. This sub-basin flows to design point B42, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B42 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point B42 is a sump curb inlet in series with design points B48. The B36 overflow weir was evaluated using the greater 100-year storm flow of the two areas, which was from design point B42 (8.37-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5724.10', the 100-year storm flow passes over the crown at a depth of 0.33' resulting in an elevation of 5724.43 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5726.69). Please see Section Q-Q Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin B-44

Sub-basin B-44 is 0.32 acres, located in the western area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B44, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-46

Sub-basin B-46 is 0.96 acres, located in the western area of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B within the northwestern area of the Site. This sub-basin flows to design point B46, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin B-48

Sub-basin B-48 is 1.05 acres, located in the western portion of the Site and is one of the 26 sub-basins on the Site that drains via public storm drains to Pond B along the northwestern area of Site. This sub-basin flows to design point B48, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B48 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The B48 overflow weir was evaluated using the 100-year storm flow (5.85-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5724.10', the 100-year storm flow passes over the crown at a depth of 0.33' resulting in an elevation of 5724.43 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5733.27). Please see Section Q-Q Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

On-Site Subbasins to Basin C

Please Note: Filing No. 3 Basin C corresponds to Filing No.1 Basin OB, please see Table 2: Filing No. 1 vs. Filing No. 3 Basin Summary that has been provided.

Sub-basin C-2

Sub-basin C-2 is 0.29 acres, located in the northeastern portion of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to existing

storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C48, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point B48 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point C2 is a sump curb inlet in series with design point's C12, C18 and C24. The C2 overflow weir was evaluated using the greater 100-year storm flow of the three areas, which was from design point C18 (4.91-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5730.96', the 100-year storm flow passes over the crown at a depth of 0.22' resulting in an elevation of 5731.18 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5734.85). Please see Section R-R Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin C-4

Sub-basin C-4 is 1.40 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C4, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-6

Sub-basin C-6 is 1.10 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C6, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-8

Sub-basin C-8 is 0.45 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C8, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-10

Sub-basin C-10 is 0.15 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C10, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-12

Sub-basin C-12 is 0.73 acres, located in the eastern portion of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point C12 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The C12 overflow weir was evaluated using the 100-year storm flow (3.94-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5744.14', the 100-year storm flow passes over the crown at a depth of 0.25' resulting in an elevation of 5744.39 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5746.31). Please see Section S-S Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin C-14

Sub-basin C-14 is 0.18 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C14, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-16

Sub-basin C-16 is 0.73 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C16, which is an

on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-18

Sub-basin C-18 is 0.93 acres, located in the eastern portion of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point C18 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The C18 overflow weir was evaluated using the 100-year storm flow (5.15-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5744.14', the 100-year storm flow passes over the crown at a depth of 0.25' resulting in an elevation of 5744.39 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5750.87). Please see Section T-T Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin C-20

Sub-basin C-20 is 0.27 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-20, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-22

Sub-basin C-22 is 0.77 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-22, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-24

Sub-basin C-24 is 0.28 acres, located in the eastern portion of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point C24 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The C24 overflow weir was evaluated using the 100-year storm flow (1.42-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5751.29', the 100-year storm flow passes over the crown at a depth of 0.12' resulting in an elevation of 5751.41 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5754.64). Please see Section U-U Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin C-26

Sub-basin C-26 is 0.89 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-26, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-28

Sub-basin C-28 is 1.32 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-28, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-30

Sub-basin C-30 is 0.18 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-30, which is an

on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-32

Sub-basin C-32 is 0.87 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-32, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-34

Sub-basin C-34 is 0.49 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-34, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-36

Sub-basin C-36 is 0.53 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-36, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-38

Sub-basin C-38 is 0.18 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-38, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-40

Sub-basin C-40 is 0.74 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-40, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-42

Sub-basin C-42 is 0.47 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-42, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin C-44

Sub-basin C-44 is 0.54 acres, located in the eastern area of the Site and is one of the 22 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and Kewaunee St along the northeastern area of Site. This sub-basin flows to design point C-44, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

On-Site Subbasins to Basin D

Please Note: Filing No. 3 Basin D corresponds to Filing No.1 Basin OA2, please see Table 2: Filing No. 1 vs. Filing No. 3 Basin Summary that has been provided.

Sub-basin D-2

Sub-basin D-2 is 0.29 acres, located in the north portion of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the north area of Site. This sub-basin flows to design point D2, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point D2 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. Design point D2 is a sump curb inlet in series with design point's D18 and D28. The D2 overflow weir was evaluated using the greater 100-year storm flow of the three areas, which was from design point D28 (7.07-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5727.64', the 100-year storm flow passes over the crown at a depth of 0.20' resulting in an elevation of 5727.84 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5729.89). Please see Section V-V Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin D-4

Sub-basin D-4 is 0.78 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D4, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-6

Sub-basin D-6 is 0.79 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D6, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-8

Sub-basin D-8 is 0.76 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D8, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-10

Sub-basin D-10 is 0.57 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D10, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-12

Sub-basin D-12 is 1.71 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D12, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-14

Sub-basin D-14 is 0.45 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D14, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-16

Sub-basin D-16 is 0.66 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D16, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-18

Sub-basin D-18 is 0.64 acres, located in the north portion of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the north area of Site. This sub-basin flows to design point D18, which is a sump curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Design point D18 is a sump curb inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the crown of the road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The D18 overflow weir was evaluated using the 100-year storm flow (4.18-cfs). The crown was analyzed as an irregular broad crested weir with the breakout point at elevation 5748.90', the 100-year storm flow passes over the crown at a depth of 0.26' resulting in an elevation of 5749.16 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5751.75). Please see Section W-W Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

Sub-basin D-20

Sub-basin D-20 is 0.20 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap

along the northern area of Site. This sub-basin flows to design point D20, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-22

Sub-basin D-22 is 2.33 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D22, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-24

Sub-basin D-24 is 2.53 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D24, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-26

Sub-basin D-26 is 2.53 acres, located in the northern area of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the northern area of Site. This sub-basin flows to design point D26, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin D-28

Sub-basin D-18 is 0.64 acres, located in the north portion of the Site and is one of the 14 sub-basins on the Site that drains via public storm drains to existing storm infrastructure at the intersection of Warren Av and S Jackson Gap along the north area of Site. This sub-basin flows to design point D18, which is a sump area inlet. This sub-basin will utilize sheet flow and swales to facilitate flow to proposed public storm sewer.

Design point D28 is a sump area inlet, and the emergency overflow path was analyzed in the event of a 100-year storm with the inlet in a fully clogged condition. The stormwater will pond and overtop the sidewalk road allowing water to flow to the next downstream inlet in the event of the 100-year storm in a fully clogged condition. The D28 overflow weir was evaluated using the 100-year storm flow (7.07-cfs). The sidewalk was analyzed as an irregular broad crested weir with the breakout point at elevation 5737.74', the 100-year storm flow passes over the

crown at a depth of 0.37' resulting in an elevation of 5738.11 providing more than one-foot of freeboard to the lowest point of entry to the nearest home (LPE: 5741.44). Please see Section X-X Emergency Overflow Weir computations in **Appendix B** that have been provided and the Overflow Weir Profile on Sheet 17 of the Preliminary Drainage Plan. The Preliminary Drainage Plan displays the ponding depth that would occur at the inlet in the fully clogged condition prior to the breakout point.

On-Site Subbasins to Basin E

Please Note: Filing No. 3 Basin E corresponds to Filing No.1 Basin OA1, please see Table 2: Filing No. 1 vs. Filing No. 3 Basin Summary that has been provided.

Sub-basin E-2

Sub-basin E-2 is 1.89 acres, located in the Northwestern area of the Site and is one of the 3 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Ider way along the northwestern area of Site. This sub-basin flows to design point E2, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin E-4

Sub-basin E-4 is 1.32 acres, located in the Northwestern area of the Site and is one of the 3 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Ider way along the northwestern area of Site. This sub-basin flows to design point E4, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Sub-basin E-6

Sub-basin E-6 is 1.63 acres, located in the Northwestern area of the Site and is one of the 3 sub-basins on the Site that drains via public storm drains to drains to existing storm infrastructure at the intersection of Warren Av and S Ider way along the northwestern area of Site. This sub-basin flows to design point E6, which is an on-grade curb inlet. This sub-basin will utilize sheet flow and curb & gutter to facilitate flow to proposed public storm sewer.

Table 2: Filing No. 1 vs. Filing No. 3 Basin Summary					
Basin ID	Area (AC)	C2	C100	Q2 (CFS)	Q100 (CFS)
C (Filing No. 3)	13.48	0.57	0.77	18.69	73.53
OB (Filing No. 1)	16.14	0.39	0.60	15.03	61.97
D (Filing No. 3)	12.38	0.51	0.74	18.09	67.47
OA2 (Filing No. 1)	13.37	0.33	0.62	10.94	54.79
E (Filing No. 3)	4.85	0.58	0.78	8.22	26.90
OA1 (Filing No. 1)	4.17	0.39	0.59	3.67	14.75

Off-Site Subbasins to Offsite

Sub-basin O-01

Sub-basin O-01 is 13.41 acres, located in the Southwestern area of the Site and is one of the 1 sub-basins on the Site that drains via sheet flow to existing swale. This sub-basin flows to design point O-01, which is an existing channel.

C. TOD & Urban Centers

Not Applicable

D. Detention Ponds Location & Outfalls

The proposed drainage of the Project will adhere to the existing drainage pattern of the Site. The stormwater onsite is split roughly through the center with a highpoint located from south to north and the majority of it will either flow west (Basin B4) or south (Basin A1) collected by inlets and piped west or south. The portion of the Site that flows west through the proposed pipe network is routed via proposed roads to the west and outfall into a detention pond (Pond B4). Pond B4 will control the outlet of flow into an existing storm network discharging to Murphy Creek, following historic drainage patterns. The remaining majority of the stormwater will flow south into a detention pond (Pond A1) immediately to the southeast corner of Harvest Road and Yale Avenue. Pond A1 will control the outlet of flow into a proposed storm network discharging to Murphy Creek, following historic drainage patterns. Both detention ponds will detain flows before releasing through an outlet structure at flow rates required by the Criteria and Manual.

Onsite flows within Basins A1 and B4 will be conveyed via public storm drain to the proposed detention ponds located in the southeast corner and along the western boundary

of the Site. Basin A1 has a total tributary area of 88.01 acres with an imperviousness of 46.01%. Pond A1 has been sized to attenuate the WQCV, EURV and 100-year events, providing 9.324 acre-feet of storage. Basin B4 has a total tributary area of 23.14 acres with an imperviousness of 63.60%. Pond B4 has been sized to attenuate the WQCV, EURV and 100-year events, providing 2.545 acre-feet of storage.

After the water has been detained, Pond A1 will be routed into the proposed Harvest Gulch channel located to the south of the pond, ultimately discharging into Murphy Creek through the development to the west. Note, the maximum release rate for Pond A1 using MHFD release rate computation methods was calculated to be 136.22 cfs however, the maximum release rate per the MDR is 72.70 cfs and will be met. The emergency overflow route for Pond A1 continues into the proposed Harvest Gulch channel. After the water has been detained, Pond B4 will be routed into an existing storm drain routing the outfall flows to development to the west of the Site ultimately discharging into Murphy Creek. The existing storm drain will be constructed as part of the adjacent Murphy Creek Filing No. 9 Development. Note, that the maximum release rate of 38.51 cfs for Pond B4 was calculated using MHFD release rate computation methods however, the maximum release rate of 21.70 cfs will be met per the MDR. Both Ponds will incorporate the use of forebay structures, trickle channels and micropools designed in accordance with the manual. Ponds A1 and B4 will retain the WQCV for at least 40 hrs along with the EURV and 100-year for 72 hrs. Preliminary sizing calculations for both of the detention ponds are provided in **Appendix B**.

E. Emergency Overflow Path for Sumps

Included in Section 2.A.D with discussion of overflow paths for sumps within each sub-basin description.

F. Solutions to Problems Encountered

No additional solutions to note.

G. Permanent BMPs

Not Applicable

H. Open Channels

Harvest Gulch

The High-Functioning Low-Maintenance Design Method for the proposed channel (Harvest Gulch) in Harvest Crossing, Filing No. 3 was sized using the criteria in Mile High Flood District (MHFD) Vol. 1, Chapters 7 & 8. The preliminary channel design adheres to MHFD Chapter 8, Table 8-3 “Design parameter for naturalized channels.” The cross-section of the channel was sized using the maximum tributary area for the entire length. The areas tributary to the channel are as follows: Pond A1 and O-O1, resulting in a total of acres. The tributary area results in the following storm event flow values:

Table 3: Harvest Gulch Design Flows			
Design Storm Event	Pond A Total Inflow (CFS)	O-O1 Flow (CFS)	Gulch Design Flow (CFS)
2-Year	49.90	1.31	51.21
5-Year	81.10	3.42	84.52
10-Year	115.40	7.98	123.38
100-Year	289.70	49.46	339.16

The bankfull channel was sized using the greater value of 70% of the 2-Year Storm Event Flow (35.85 CFS) or 10% of the 100-Year Storm Event Flow (33.92 CFS) per MHFD Chapter 8, Section 5.3. The bankfull channel was sized using MHFD Equation 8-2 with the three bankfull channels assessed:

- Wide Bankfull Channel = 16.17’
- Average Bankfull Channel = 12.57’
- Narrow Bankfull Channel = 8.98’

In an effort to minimize the increased channel size throughout the Site, the narrow bankfull channel was selected. A bankfull channel cross-section was then developed to adhere to MHFD Chapter 8, Table 8-2 “Minimum dimension for naturalized channels” and to adhere to MHFD Chapter 8, Equation 8-3 “Mean Depth Ratio.” The bankfull channel dimensions that convey 70% of the 2-Year Storm Event Flow and adhere to the above criteria is as follows:

- 16.0’ Bottom Width
- 1.33’ Depth with 2.5:1 Side Slopes
- 22.65’ Top Width
- Maximum 0.20% Slope
- Manning’s for Native Grass = 0.050 per MHFD Table 8-5, Recommend Values When Assessing Water Surface Elevation and Water Depth

This bankfull channel section conveys the bankfull channel design flow at a depth of 1.317’ and a velocity of 1.41 FPS. The bankfull section Mean Depth Ratio (MDR) is 22.65’/1.33’ = 17.03, which is greater than the minimum MDR of 9. The minimum floodplain terrace for a 1.5-ft bankfull channel depth is an average of 10’ for each side of the floodplain, therefore the minimum of 10’ on each side was used for the channel with maximum channel side slopes of 4:1. The full channel section was assessed for the 5-Year, 10-Year and 100-Year Storm Events:

Table 4: Harvest Gulch Storm Event Results				
Storm Event	Flow (CFS)	Total Depth (FT)	Depth above Bankfull (FT)	Velocity (FPS)
5-Year	84.52	2.01	0.68	1.48
10-Year	123.38	2.33	1.00	1.68
100-Year	339.16	3.61	2.28	2.34

The floodplain terrace meets adheres to the floodplain depth less than two (2) times the bankfull depth for the flood prone water surface. The two times bankfull depth results in the flood prone channel width at 63.93' for the channel. The entrenchment ratio defined by MHFD Chapter 8, Equation 8-4 is equal to the flood prone channel width divided by the bankfull channel width. The entrenchment ratio for the proposed channel is 3.99 (63.93'/16.0'=3.99) which adheres to the minimum of three.

The sinuosity of the channel was determined using factors defined in MHFD Chapter 8. The radius of curvature selected was 40' exceeding the minimum of 2.5 times the bankfull channel width (equaling 16.0'). The bankfull sinuosity defined in MHFD Chapter 8, Equation 8-5 as the bankfull channel length (actual length of the channel centerline) divided by the valley length (length measure along the valley – in our case is straight line culvert to culvert). The sinuosity needs to be between 1.1 and 1.3, using the radius of curvature of 40', the resulting bankfull channel length is 994' while the valley length is 820' resulting in a sinuosity of 1.21 adhering to the design criteria.

The final channel design is as follows:

- *Bankfull Channel*
  - 16.0' Bottom Width
  - 1.33' Depth with 2.5:1 Side Slopes
  - 22.65' Top Width
- *Floodplain Terrace*
  - 10' on Each Side of the Bankfull Channel (Total Width of 42.65' at floodplain terrace)
  - 4:1 Side Slopes for Minimum 3' Depth
- *Channel*
  - 0.20% Slope
  - Manning's = 0.050 for Native Grass per MHFD Table 8-5, Recommend Values When Assessing Water Surface Elevation and Water Depth

Table 5: Harvest Gulch Design Parameters for Naturalized Channels		
Design Parameter	Required Value	Design Value
Max. 100-year depth outside of bankfull channel	5 FT	2.08 FT
Roughness Values	Per Table 8-5	0.050 for Native Grass
Max. 5-Year Velocity, Main Channel (within bankfull channel width)	5 FPS	1.48 FPS
Max. 100-Year Velocity, Main Channel (within bankfull channel width)	7 FPS	2.34 FPS
Froude No., 5-Year, Main Channel (within bankfull channel width)	0.7	Final Drainage Report
Froude No., 100-Year, Main Channel (within bankfull channel width)	0.8	Final Drainage Report
Max. Shear Stress, 100-Year, Main Channel (withing bankfull channel width)	1.2 lb/sf	Final Drainage Report
Min. bankfull capacity of bankfull channel	70% of 2-Year Discharge or 10% of 100-Year Discharge, whichever is greater	35.85 CFS
Min. bankfull channel geometry	Per Table 8-2	16.0’ Bottom Width 1.33’ Depth 22.65’ Top Width
Min. bankfull channel width/depth ratio (Equation 8-3)	9	17.03
Min. entrenchment ratio (Equation 8-4)	3	3.99
Max. longitudinal slope of low flow channel (assuming unlined, unvegetated low flow channel)	0.20%	0.20%
Bankfull channel sinuosity (Equation 8-5)	1.1 to 1.3	1.21
Max. overbank side slope	4 (H): 1 (V)	4 (H): 1 (V)
Max. bankfull side slope	2.5 (H): 1 (V)	2.5 (H): 1 (V)
Min. radius of curvature	2.5 times top width	40’ (2.50 times top width)

Swale B20

Swale B20 is a triangular swale collecting overland flow from sub-basin B20, the neighborhood park located in the northern central portion of the Site. Swale B20 will flow from North to South to design point B20, which is a sump grate inlet ultimately discharging to a concrete forebay in Pond B4. Swale B20 was designed using Bentleys FlowMaster and sized to convey the 100-year design storm. Swale B20 has a bottom slope of 2.00% with 5:1 maximum side slopes and total depth of 1.33’. The total amount of flow conveyed in the 100-year storm is 5.41-cfs resulting in a 100-year flow depth of 0.32’. Please see the Swale B20 computations in **Appendix B** that have been provided and the Open Channel Cross Sections on Sheet 17 of the Preliminary Drainage Plan.

I. Roadside Ditch Stabilization & J. Outfall Systems Plan Requirements

Not Applicable

K. Additional Info – Water Quality and Detention

The site is proposing two on-site facilities, Ponds A1 & B4, will be designed as full spectrum extended detention ponds to provide water quality and detention for Basins A1 & B4, respectively. The ponds were sized using MHFD-Detention v. 4.05. Below is a summary of the required versus provided ponds volumes and release rates, the preliminary detention sizing calculations for Ponds A1 & B4 are included in **Appendices A & B**.

Table 6: Pond Properties Summary		
	Pond A1	**Pond B4**
Area	88.01 Acres	23.14 Acres
Imperviousness	46.01 %	63.60 %
Pond A1 Summary		
Description	**Required**	**Provided**
WQCV	1.435 AC-FT	1.441 AC-FT
EURV	3.806 AC-FT	3.812 AC-FT
100-Yr Detention Volume	7.374 AC-FT	9.324 AC-FT
100-Yr Release Rate	72.70 CFS	69.20 CFS
Pond B4 Summary		
Description	**Required**	**Provided**
WQCV	0.480 AC-FT	0.482 AC-FT
EURV	1.419 AC-FT	1.421 AC-FT
100-Yr Detention Volume	2.435 AC-FT	2.545 AC-FT
100-Yr Release Rate	21.70 CFS	21.40 CFS

K. Additional Information – Maintenance and Access of Drainage Facilities

Per conversations with the City of Aurora, both Ponds A1 and B4 are private, but will be maintained by the Metro District. The property owner is responsible for maintaining the proposed storm infrastructure within the property.

The maintenance access for Pond A1 will occur from the north side of the pond around the perimeter of the entire pond providing access to all three (3) proposed concrete forebays and proposed outlet structure. The access road will connect to East Yale Avenue to the north. Maintenance access to the pond bottom is provided along a gravel path this is designed to accordance with the criteria, having minimum width of 12' and a maximum longitudinal slope of 10%. Please see **Appendix C** for the exhibit that shows that a tandem axle dump truck can adequately maneuver the proposed Pond A1 maintenance path. The outfall for the pond includes proposed storm sewer that discharges into the proposed Harvest Gulch.

The maintenance access road for Pond B4 will occur from both the east and west sides of the pond. The maintenance access road travels around the perimeter of the pond to the south providing access to both proposed concrete forebays and proposed outlet structure. The access road will connect to Harvest Road to the west and connect to South Ider Way to the east. Maintenance access to the pond bottom is provided along a gravel path this is designed to accordance with the criteria, having minimum width of 12' and a maximum longitudinal slope of 10%. Please see **Appendix C** for the exhibit that shows that a tandem axle dump truck can adequately maneuver the proposed Pond B4 maintenance path. The outfall for the pond includes proposed storm sewer that is conveyed along Harvest Road into an existing storm drain network and discharges into Murphy Creek.

E. Conclusion

1. Compliance with Standards

The project complies with the City of Aurora criteria for storm drainage design. City of Aurora Storm Drainage Design and Technical Criteria and the Urban Storm Drainage Criteria Manual Volumes 1, 2, and 3 have been adhered to in the design of the storm sewer system as well as Best Management Practices.

2. Summary of Concept

The project's runoff generated within the site will be collected using curb and gutter, swales, sheet flow and storm drain systems that will convey stormwater runoff to the proposed ponds, Pond A1 and Pond B4. Stormwater will be detained and released at a rate consistent with MHFD and City of Aurora Criteria Manual to the existing swale and storm drain system and comply with the applicable master plans and outfall systems planning studies as noted previously in this report.

List of References

Storm Drainage Design and Technical Criteria, City of Aurora; November 2023.

Urban Storm Drainage Criteria Manual, Volumes 1-3, Urban Drainage and Flood Control District; Updated January 2021.

Flood Insurance Rate Map, Map Number 08005CO062L, Panel 62, Federal Emergency Management Agency; February 17, 2017.

Flood Insurance Rate Map, Map Number 08005CO212K, Panel 212, Federal Emergency Management Agency; December 17, 2010.

Custom Soil Resource Report, Natural Resources Conservation Service, United States Department of Agriculture Web Soil Survey; March 8, 2022.

Master Drainage Report & Plan Harvest Crossing/Villages at Murphy Creek (the MDR), EDN 221085, Innovative Land Consultants, Inc.; April 5, 2021.

Villages at Murphy Creek Master Drainage Report & Plan, EDN 206111, Peak Civil Consultants; May 31,2006.

Harvest Crossing Subdivision Filing No. 1 Final Drainage Report & Plan, EDN 222212, Innovative Land Consultants, Inc.; August 19, 2022.

Murphy Creek East (Harvest Ridge) Subdivision Filing No. 1, 2, 3, 4 Master Drainage Plan & Report, EDN 220220, CVL Consultants of Colorado, Inc.; November 30, 2020.

Murphy Creek East (Harvest Ridge) Subdivision Filing No.1 Offsite Infrastructure Plan Final Plan & Report, EDN 2201064, Westwood Professional Services; April 5, 2022.

Appendix A – Hydrologic Computations

Table 5-5. Land Use Based Imperviousness Values for Master Planning

Land Use/Density	Recommended Imperviousness (Roads Included)
Residential	
Rural SFH (0 - 3 du/ac)	35%
Low & Medium-Density SFH (3 - 5 du/ac)	55%
Manufactured Housing (>= 10 du/ac)	65%
Medium-Density MFH/High Density SFH (5 - 20 du/ac)	65%
High-Density MFH (>20 du/ac)	70%
Commercial	
Low-Density Commercial	65%
Medium- to High-Density Commercial	80%
Urban Core Commercial	90%
Industrial/Institutional	
Schools	55%
Office/Institutional	65%
Industrial Areas	75%
Solar Farm, Gravel Cover[#*]	60%
Solar Farm, Grass Cover[#*]	45%
Parks and Open Space	
Open Space	5%
Community Parks	25%
Neighborhood Parks	15%
Golf Courses	30%
Cemeteries	25%

Note: Imperviousness values shown in the table are the minimum imperviousness values for a specific land use in Master Drainage Plans and Master Drainage Reports (MDRs). For the Preliminary Drainage Report (PDR), imperviousness values must be calculated based on land cover types, Table 5-6. If the Engineer and/or Master Developer be aware of a proposed denser product type that would increase the imperviousness values beyond what is in this table, the MDR should take this into account. Imperviousness values at the PDR stage that exceed those used in the MDR may require amending the MDR. If existing downstream infrastructure has already been constructed, the increase in imperviousness may not be permitted, and any approved or in process plans would require revisions.

[#]Use these values at master planning stage when specific layout of panels is not known. Use values in Table 5-6 at site planning and design stage when orientation of panels relative to contours is known.

[*]Assumes 1:1 ratio of panels to aisles. See MHFD's Technical Memorandum regarding Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values for additional information on procedures to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

Table 5-6. Imperviousness Values for Urban Surfaces for Site and Small Watershed Analysis

Surface Type		Imperviousness
Paved Streets		100%
Concrete Drive and Walks		90%
Roofs		90%
Gravel	No Traffic Areas (pedestrian use)	40%
	Low Traffic Areas (maintenance paths and substations)	60%
	High Traffic Areas (roadways and parking)	80%
Landscaping (including water-wise vegetation, active turf, uncompacted gravel, planting beds, residential artificial turf, etc.)		20%
Artificial Turf (non-residential)	Landscape applications (with subgrade drainage layer)	25 - 45%
	Sport fields withs underdrain pipe system	65%
Open Water Areas, including footprint of WQCV		100%
Solar Panels Gravel Cover, Rows Parallel to Contours[#]		50%
Solar Panels, Gravel Cover, Rows Diagonal to Contours[#]		60%
Solar Panels, Gravel Cover, Rows Perpendicular to Contours[#]		75%
Solar Panels, Grass Cover, Rows Parallel to Contours[#]		5%
Solar Panels, Grass Cover, Rows Diagonal to Contours[#]		20%
Solar Panels, Grass Cover, Rows Perpendicular to Contours[#]		45%
Historic Flow Analysis, Undisturbed Native Grasses, Agricultural		5%

[#]Assumes 1:1 ratio of panels to aisles. See MHFD's Technical Memorandum regarding Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values for additional information on procedures to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

5.3.2 Runoff Coefficients for Rational Method

To determine runoff coefficients for use in the Rational Method, use the imperviousness of the land use/ground cover draining to the point of interest from Table 5-5 or 5-6 depending on how advanced design is. This information, combined with the hydrologic soil group (HSG) can be used to look up runoff coefficients using tables and charts in the Runoff Chapter of the MHFD Manual based on imperviousness, HSG, and event frequency.

In addition to the tables and charts in the Runoff Chapter of the MHFD Manual, Table 5-7 provides the equations for calculating runoff coefficients, based on the most up to date information from the MHFD Manual as of the date of publication of this manual. It is the responsibility of the applicant to confirm that the most current runoff coefficient equations from MHFD are used.

Table 5-7. Runoff Coefficient Equations Based on NRCS Soil Group and Storm Return Period (MHFD Manual)

NRCS Soil Group	Storm Return Period						
	2-year	5-year	10-year	25-year	50-year	100-year	500-year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.88i^{1.124}$	$C_A = 0.85i + 0.025$	$C_A = 0.78i + 0.110$	$C_A = 0.65i + 0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i + 0.057$	$C_B = 0.63i + 0.249$	$C_B = 0.56i + 0.328$	$C_B = 0.47i + 0.426$	$C_B = 0.37i + 0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i + 0.035$	$C_{C/D} = 0.74i + 0.132$	$C_{C/D} = 0.56i + 0.319$	$C_{C/D} = 0.49i + 0.393$	$C_{C/D} = 0.41i + 0.484$	$C_{C/D} = 0.32i + 0.588$

Where:

i = % imperviousness (expressed as a decimal)

C_A = Runoff coefficient for Natural Resources Conservation Service (NRCS) HSG A soils

C_B = Ruoff coefficient for NRCS HSG B soils

$C_{C/D}$ = Runoff coefficient for NRCS HSG C and D soils.

5.3.3 Runoff Modeling Inputs for CUHP

CUHP does not use Rational Method runoff coefficients. Instead CUHP calculates runoff based on watershed imperviousness and Horton infiltration parameters. Enter the imperviousness from Tables 5-5 and 5-6, depending on the stage of planning and design. To determine Horton infiltration parameters including the initial infiltration rate, final infiltration rate, and decay coefficient, see the Runoff Chapter of the MHFD Manual to look up these values based on the HSG. CUHP inputs for depression storage losses also are included in the MHFD Runoff Chapter.

5.4 OFFSITE STORM FLOW ANALYSIS

Offsite storm flow analysis must consider fully developed conditions in the contributing watershed. Offsite analysis must address the minor and major storm events as well as emergency overflows from offsite areas. When an offsite area is developed, determine runoff parameters using the land use based imperviousness and runoff coefficients in the MHFD Manual unless values from other approved studies are available. Where drainage reports exist for adjacent sites, the reports must be reviewed and coordinated with the analysis for the proposed development. The applicant is responsible for obtaining and reviewing drainage reports and plans for adjacent sites.

For undeveloped off-site areas, determine the existing or most probable future zoning and select land use based runoff coefficients from Table 5-5 assuming fully developed conditions. If an area has not yet been planned, the applicant must consult with Aurora Water during the pre-application meeting to define appropriate assumptions for future land use.

On-site detention facilities will normally be disregarded in the analysis of offsite flows and management of emergency overflows through an area. Only detention facilities that have

NOAA Atlas 14, Volume 8, Version 2
Location name: Aurora, Colorado, USA*
Latitude: 39.6801°, Longitude: -104.6931°
Elevation: 5689 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.228** (0.185-0.284)	**0.284** (0.229-0.353)	**0.381** (0.307-0.475)	**0.469** (0.376-0.587)	**0.600** (0.468-0.787)	**0.709** (0.538-0.938)	**0.825** (0.604-1.12)	**0.950** (0.665-1.32)	**1.13** (0.757-1.60)	**1.27** (0.826-1.81)
10-min	**0.334** (0.271-0.416)	**0.415** (0.336-0.517)	**0.559** (0.450-0.696)	**0.687** (0.550-0.860)	**0.879** (0.685-1.15)	**1.04** (0.788-1.37)	**1.21** (0.884-1.63)	**1.39** (0.974-1.92)	**1.65** (1.11-2.34)	**1.86** (1.21-2.65)
15-min	**0.408** (0.330-0.507)	**0.507** (0.410-0.630)	**0.681** (0.549-0.849)	**0.838** (0.671-1.05)	**1.07** (0.836-1.40)	**1.27** (0.961-1.67)	**1.47** (1.08-1.99)	**1.70** (1.19-2.35)	**2.01** (1.35-2.85)	**2.26** (1.48-3.23)
30-min	**0.558** (0.451-0.693)	**0.691** (0.559-0.859)	**0.927** (0.747-1.16)	**1.14** (0.912-1.42)	**1.46** (1.13-1.91)	**1.72** (1.30-2.27)	**2.00** (1.46-2.70)	**2.30** (1.61-3.18)	**2.72** (1.83-3.86)	**3.06** (2.00-4.37)
60-min	**0.696** (0.564-0.865)	**0.857** (0.692-1.06)	**1.14** (0.920-1.42)	**1.40** (1.12-1.75)	**1.79** (1.40-2.35)	**2.12** (1.61-2.81)	**2.47** (1.81-3.34)	**2.85** (2.00-3.95)	**3.39** (2.28-4.81)	**3.82** (2.49-5.46)
2-hr	**0.835** (0.680-1.03)	**1.02** (0.831-1.26)	**1.36** (1.10-1.68)	**1.66** (1.34-2.07)	**2.13** (1.68-2.78)	**2.52** (1.93-3.32)	**2.95** (2.17-3.95)	**3.40** (2.40-4.68)	**4.06** (2.75-5.71)	**4.58** (3.01-6.48)
3-hr	**0.922** (0.753-1.13)	**1.12** (0.914-1.38)	**1.48** (1.20-1.82)	**1.81** (1.46-2.24)	**2.32** (1.83-3.01)	**2.74** (2.10-3.59)	**3.20** (2.37-4.28)	**3.70** (2.63-5.06)	**4.42** (3.01-6.19)	**5.00** (3.30-7.03)
6-hr	**1.11** (0.913-1.35)	**1.34** (1.10-1.63)	**1.75** (1.43-2.14)	**2.13** (1.73-2.61)	**2.70** (2.14-3.47)	**3.18** (2.46-4.12)	**3.70** (2.76-4.90)	**4.26** (3.04-5.77)	**5.06** (3.47-7.02)	**5.71** (3.80-7.96)
12-hr	**1.37** (1.13-1.65)	**1.64** (1.36-1.99)	**2.13** (1.75-2.58)	**2.56** (2.10-3.11)	**3.20** (2.55-4.06)	**3.73** (2.90-4.78)	**4.29** (3.22-5.62)	**4.90** (3.52-6.56)	**5.75** (3.97-7.89)	**6.43** (4.31-8.89)
24-hr	**1.67** (1.39-2.00)	**1.99** (1.66-2.39)	**2.55** (2.11-3.07)	**3.03** (2.50-3.66)	**3.74** (2.99-4.68)	**4.30** (3.36-5.45)	**4.90** (3.69-6.33)	**5.52** (4.00-7.31)	**6.39** (4.44-8.66)	**7.07** (4.78-9.69)
2-day	**1.97** (1.65-2.35)	**2.34** (1.95-2.78)	**2.95** (2.46-3.52)	**3.47** (2.88-4.16)	**4.22** (3.39-5.23)	**4.82** (3.78-6.03)	**5.43** (4.12-6.94)	**6.06** (4.42-7.94)	**6.93** (4.86-9.30)	**7.61** (5.19-10.3)
3-day	**2.15** (1.81-2.55)	**2.53** (2.13-3.00)	**3.17** (2.66-3.77)	**3.72** (3.10-4.44)	**4.50** (3.63-5.54)	**5.12** (4.03-6.37)	**5.75** (4.38-7.31)	**6.40** (4.68-8.34)	**7.30** (5.13-9.73)	**7.99** (5.48-10.8)
4-day	**2.28** (1.93-2.70)	**2.68** (2.26-3.17)	**3.35** (2.81-3.97)	**3.92** (3.27-4.66)	**4.72** (3.82-5.78)	**5.35** (4.23-6.64)	**6.00** (4.59-7.60)	**6.68** (4.90-8.66)	**7.60** (5.36-10.1)	**8.31** (5.71-11.2)
7-day	**2.62** (2.22-3.07)	**3.05** (2.58-3.59)	**3.78** (3.19-4.45)	**4.40** (3.69-5.19)	**5.26** (4.28-6.40)	**5.94** (4.72-7.31)	**6.63** (5.10-8.34)	**7.35** (5.42-9.45)	**8.32** (5.91-11.0)	**9.06** (6.28-12.1)
10-day	**2.91** (2.48-3.41)	**3.38** (2.87-3.95)	**4.15** (3.51-4.87)	**4.80** (4.04-5.65)	**5.71** (4.65-6.91)	**6.42** (5.12-7.86)	**7.14** (5.51-8.93)	**7.88** (5.84-10.1)	**8.88** (6.34-11.6)	**9.65** (6.71-12.8)
20-day	**3.78** (3.24-4.39)	**4.32** (3.70-5.02)	**5.21** (4.44-6.06)	**5.94** (5.04-6.94)	**6.96** (5.70-8.32)	**7.74** (6.21-9.38)	**8.53** (6.62-10.5)	**9.32** (6.96-11.8)	**10.4** (7.47-13.5)	**11.2** (7.85-14.7)
30-day	**4.50** (3.86-5.19)	**5.12** (4.40-5.92)	**6.14** (5.25-7.10)	**6.97** (5.93-8.09)	**8.10** (6.66-9.62)	**8.95** (7.21-10.8)	**9.80** (7.64-12.0)	**10.7** (7.98-13.4)	**11.8** (8.49-15.1)	**12.6** (8.88-16.5)
45-day	**5.38** (4.64-6.18)	**6.15** (5.30-7.07)	**7.38** (6.34-8.50)	**8.37** (7.15-9.68)	**9.69** (7.98-11.4)	**10.7** (8.61-12.7)	**11.6** (9.07-14.1)	**12.5** (9.42-15.6)	**13.7** (9.93-17.5)	**14.5** (10.3-18.9)
60-day	**6.12** (5.29-7.00)	**7.04** (6.08-8.07)	**8.50** (7.32-9.75)	**9.65** (8.26-11.1)	**11.2** (9.20-13.1)	**12.2** (9.90-14.5)	**13.3** (10.4-16.1)	**14.3** (10.8-17.7)	**15.5** (11.3-19.7)	**16.4** (11.7-21.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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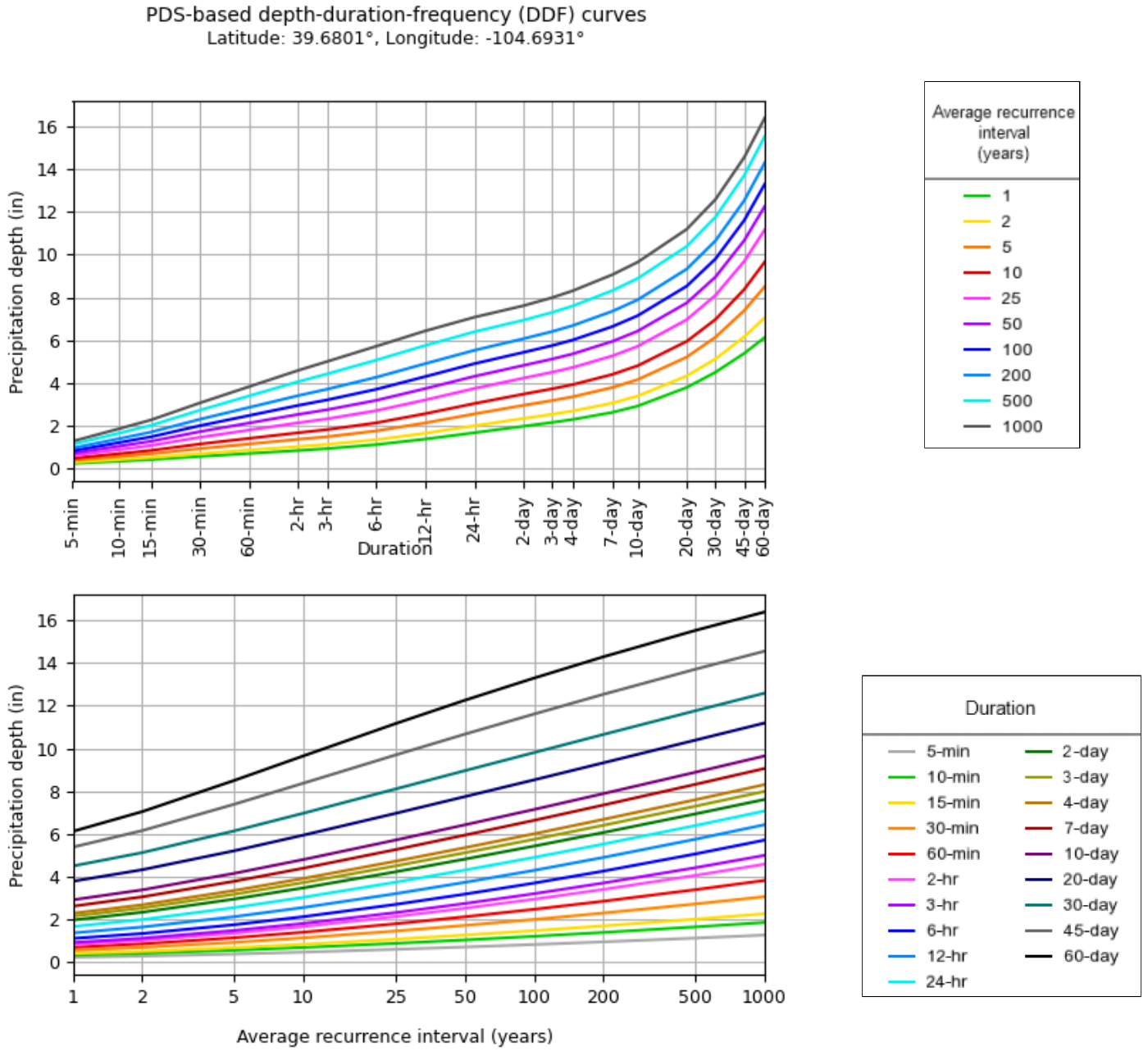
PF graphical



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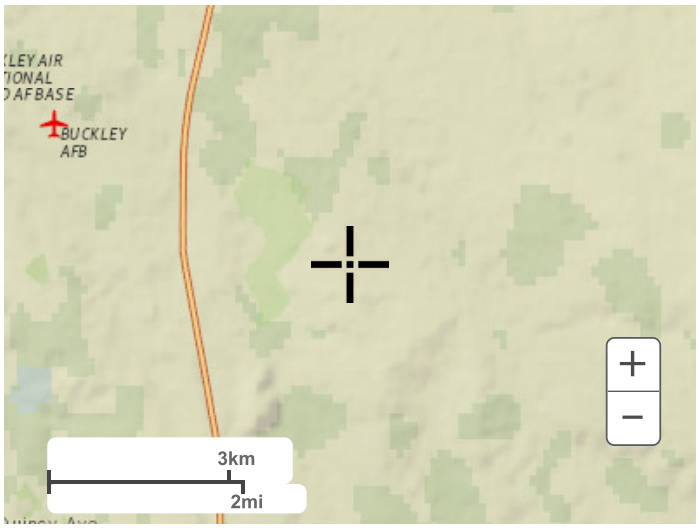
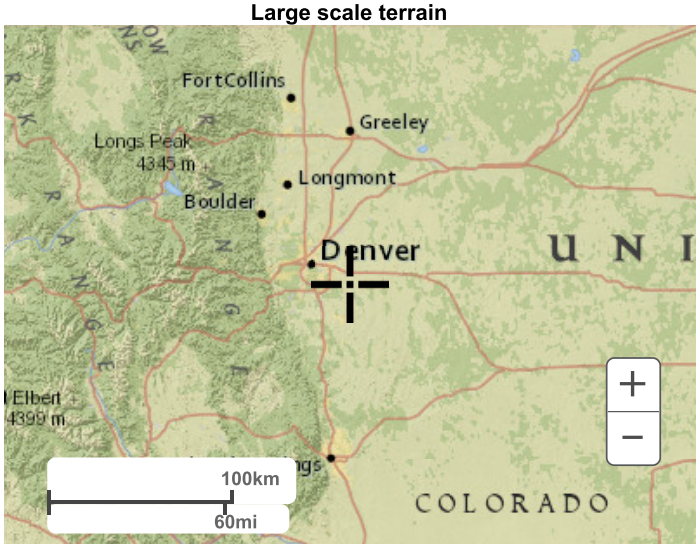
Maps & aerials

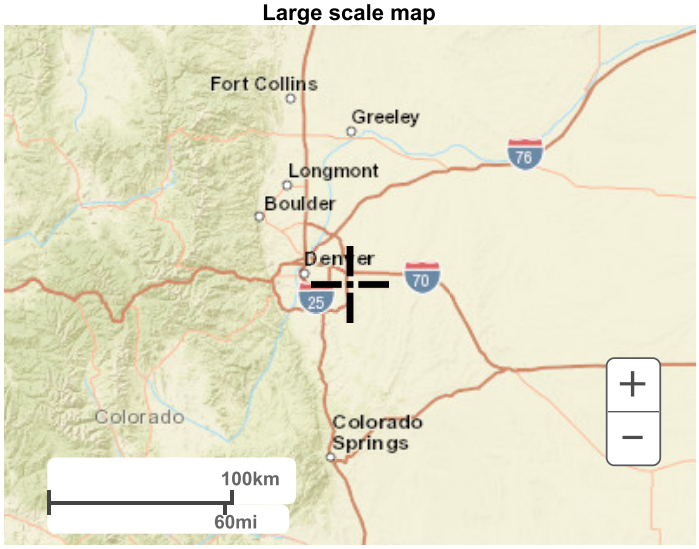
Small scale terrain



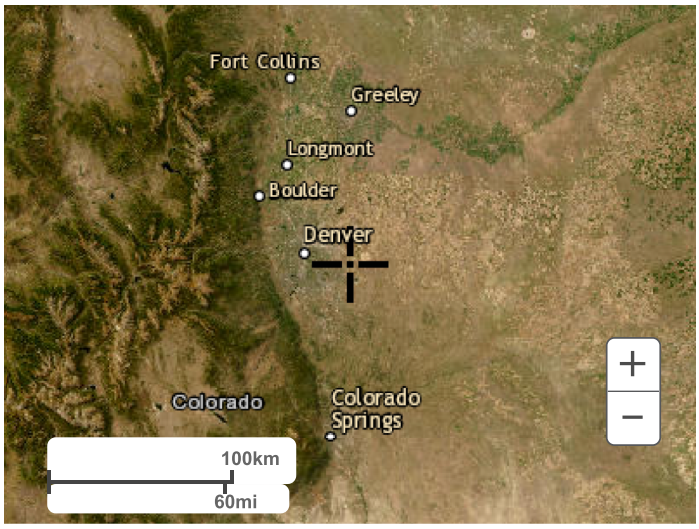
Large scale terrain



Large scale map



Large scale aerial



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Disclaimer

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024

SOIL: D

LAND USE:	Paved Streets AREA	Concrete Drive and Walks AREA	Roofs AREA	Gravel - Pedestrian Use AREA	Gravel - Maintenance Paths AREA	Landscaping AREA	Open Water & WQCV AREA	Native Grasses & Open Space AREA	Single-Family (High Density) AREA	Multi-Family (Medium Density) AREA	Commerical AREA	School AREA	Neighborhood Parks AREA
2-YEAR COEFF.	0.78	0.78	0.78	0.30	0.47	0.14	0.83	0.03	0.51	0.51	0.65	0.42	0.10
5-YEAR COEFF.	0.81	0.81	0.81	0.36	0.53	0.20	0.86	0.08	0.57	0.57	0.69	0.49	0.16
10-YEAR COEFF.	0.84	0.84	0.84	0.43	0.58	0.28	0.87	0.17	0.61	0.61	0.72	0.54	0.24
100-YEAR COEFF.	0.87	0.87	0.87	0.65	0.73	0.57	0.89	0.50	0.75	0.75	0.81	0.71	0.55
IMPERVIOUS %	95%	95%	95%	40%	60%	20%	100%	5%	65%	65%	80%	55%	15%

DESIGN BASIN	DESIGN POINT	Paved Streets AREA (AC)	Concrete Drive and Walks AREA (AC)	Roofs AREA (AC)	Gravel - Pedestrian Use AREA (AC)	Gravel - Maintenance Paths AREA (AC)	Landscaping AREA (AC)	Open Water & WQCV AREA (AC)	Native Grasses & Open Space AREA (AC)	Single-Family (High Density) AREA (AC)	Multi-Family (Medium Density) AREA (AC)	Commerical AREA (AC)	School AREA (AC)	Neighborhood Parks AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(10)	C(100)	Imp %
On-Site Subbasins to Basin B4																				
B2	B2	0.21	0.13	0.15	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.69**	0.60	0.64	0.68	0.79	74.2%
B4	B4	0.21	0.21	0.98	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.14**	0.56	0.60	0.64	0.77	69.1%
B6	B6	0.48	0.19	0.20	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.13**	0.63	0.67	0.70	0.80	77.3%
B8	B8	0.18	0.11	0.05	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.45**	0.62	0.65	0.69	0.79	75.5%
B10	B10	0.16	0.14	0.54	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.29**	0.56	0.60	0.64	0.77	68.7%
B12	B12	0.16	0.12	0.52	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.13**	0.59	0.63	0.67	0.78	72.8%
B14	B14	0.15	0.11	0.29	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	1.11	**1.89**	0.30	0.35	0.42	0.64	38.9%
B16	B16	0.20	0.11	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.42**	0.62	0.66	0.70	0.80	76.3%
B18	B18	0.09	0.05	0.02	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.31**	0.50	0.54	0.59	0.74	62.1%
B19	B19	0.09	0.05	0.02	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.29**	0.50	0.54	0.59	0.74	62.1%
B20	B20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.59	**1.59**	0.10	0.16	0.24	0.55	15.0%
B22	B22	0.08	0.07	0.27	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.60**	0.58	0.63	0.66	0.78	72.0%
B24	B24	0.10	0.10	0.38	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.93**	0.54	0.58	0.63	0.76	66.7%
B26	B26	0.09	0.07	0.27	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.61**	0.59	0.63	0.66	0.78	72.0%
B28	B28	0.13	0.08	0.03	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.40**	0.53	0.57	0.62	0.75	65.8%
B30	B30	0.07	0.05	0.18	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.50**	0.52	0.57	0.61	0.75	64.7%
B32	B32	0.07	0.05	0.17	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.47**	0.54	0.58	0.63	0.76	66.9%
B34	B34	0.14	0.13	0.55	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.30**	0.54	0.58	0.63	0.76	66.9%
B36	B36	0.11	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.24**	0.62	0.66	0.70	0.80	76.3%
B38	B38	0.14	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.24**	0.65	0.69	0.72	0.81	80.0%
B40	B40	0.13	0.12	0.61	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.25**	0.58	0.62	0.66	0.78	71.9%
B42	B42	0.16	0.14	0.72	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.49**	0.58	0.62	0.66	0.78	71.9%
B44	B44	0.14	0.05	0.06	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.32**	0.63	0.67	0.71	0.80	77.7%
B46	B46	0.13	0.11	0.43	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.96**	0.59	0.63	0.67	0.78	72.2%
B48	B48	0.15	0.12	0.46	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.05**	0.59	0.63	0.67	0.78	72.3%
POND B4	POND B4	0.00	0.00	0.00	0.00	0.00	0.78	0.67	0.00	0.00	0.00	0.00	0.00	0.00	**1.46**	0.46	0.50	0.55	0.72	57.0%
BASIN B4 TOTAL		**3.58**	**2.42**	**6.91**	**0.00**	**0.00**	**6.86**	**0.67**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.70**	**23.14**	**0.51**	**0.56**	**0.60**	**0.74**	**63.6%**
		15%	**10%**	**30%**	**0%**	**0%**	**30%**	**3%**	**0%**	**0%**	**0%**	**0%**	**0%**	**12%**	**100%**					
On-Site Subbasins to Basin A1																				
A2	A2	0.51	0.19	0.17	0.00	0.00	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.22**	0.39	0.44	0.50	0.69	49.6%
A4	A4	0.30	0.11	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.50**	0.65	0.69	0.72	0.81	80.0%
A6	A6	0.41	0.17	0.00	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.33**	0.42	0.46	0.52	0.70	52.4%
A8	A8	0.34	0.12	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.58**	0.65	0.69	0.72	0.81	80.0%
A10	A10	0.20	0.17	0.80	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.68**	0.59	0.63	0.67	0.78	72.1%
A12	A12	0.18	0.15	0.58	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.36**	0.57	0.61	0.65	0.77	70.2%
A14	A14	0.19	0.18	1.03	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.14**	0.56	0.60	0.64	0.77	68.9%
A16	A16	0.07	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.14**	0.62	0.66	0.70	0.80	76.3%
A18	A18	0.07	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.14**	0.62	0.66	0.70	0.80	76.3%
A20	A20	0.00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.14**	0.14	0.20	0.28	0.57	20.0%
A22	A22	0.23	0.15	0.31	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.95**	0.60	0.64	0.68	0.79	73.9%
A24	A24	0.23	0.19	0.78	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.72**	0.59	0.63	0.67	0.78	72.1%
A26	A26	0.17	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.29**	0.65	0.69	0.72	0.81	80.0%
A28	A28	0.16	0.15	0.93	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.80**	0.59	0.63	0.67	0.78	72.2%
A30	A30	0.19	0.15	0.76	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.57**	0.59	0.63	0.67	0.78	72.5%
A32	A32	0.11	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**	0.65	0.69	0.72	0.81	80.0%
A34	A34	0.14	0.08	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.28**	0.62	0.66	0.70	0.80	76.3%
A36	A36	0.14	0.16	0.58	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.54**	0.51	0.55	0.60	0.74	63.1%
A38	A38	0.17	0.12	0.36	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.91**	0.60	0.64	0.67	0.78	73.2%
A40	A40	0.11	0.07	0.03	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.36**	0.52	0.56	0.61	0.75	64.3%
A42	A42	0.18	0.14	0.49	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.15**	0.59	0.63	0.67	0.78	72.1%
A44	A44	0.17	0.19	0.71	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.84**	0.51	0.56	0.60	0.75	63.8%
A46	A46	0.11	0.06	0.02	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.34**	0.52	0.56	0.61	0.75	64.4%
A48	A48	0.10	0.07	0.26	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.64**	0.57	0.61	0.66	0.77	70.7%
A50	A50	0.09	0.06	0.03	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.29**	0.53	0.58	0.62	0.75	66.0%
A52	A52	0.07	0.06	0.22	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.51**	0.58	0.63	0.66	0.78	72.0%
A54	A54	0.07	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**	0.60	0.64	0.68	0.79	74.0%
A56	A56	0.15	0.14	0.68	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.48**	0.56	0.60	0.65	0.77	69.5%
A58	A58	0.14	0.11	0.44	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.98**	0.59	0.63	0.67	0.78	72.1%

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024

SOIL: D

LAND USE:	Paved Streets AREA	Concrete Drive and Walks AREA	Roofs AREA	Gravel - Pedestrian Use AREA	Gravel - Maintenance Paths AREA	Landscaping AREA	Open Water & WQCV AREA	Native Grasses & Open Space AREA	Single-Family (High Density) AREA	Multi-Family (Medium Density) AREA	Commerical AREA	School AREA	Neighborhood Parks AREA
2-YEAR COEFF.	0.78	0.78	0.78	0.30	0.47	0.14	0.83	0.03	0.51	0.51	0.65	0.42	0.10
5-YEAR COEFF.	0.81	0.81	0.81	0.36	0.53	0.20	0.86	0.08	0.57	0.57	0.69	0.49	0.16
10-YEAR COEFF.	0.84	0.84	0.84	0.43	0.58	0.28	0.87	0.17	0.61	0.61	0.72	0.54	0.24
100-YEAR COEFF.	0.87	0.87	0.87	0.65	0.73	0.57	0.89	0.50	0.75	0.75	0.81	0.71	0.55
IMPERVIOUS %	95%	95%	95%	40%	60%	20%	100%	5%	65%	65%	80%	55%	15%

DESIGN BASIN	DESIGN POINT	Paved Streets AREA (AC)	Concrete Drive and Walks AREA (AC)	Roofs AREA (AC)	Gravel - Pedestrian Use AREA (AC)	Gravel - Maintenance Paths AREA (AC)	Landscaping AREA (AC)	Open Water & WQCV AREA (AC)	Native Grasses & Open Space AREA (AC)	Single-Family (High Density) AREA (AC)	Multi-Family (Medium Density) AREA (AC)	Commerical AREA (AC)	School AREA (AC)	Neighborhood Parks AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(10)	C(100)	Imp %
A60	A60	0.24	0.19	0.66	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.61**	0.57	0.61	0.65	0.77	70.5%
A62	A62	0.15	0.12	0.43	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.00**	0.59	0.63	0.67	0.78	72.2%
A64	A64	0.07	0.04	0.02	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.19**	0.62	0.65	0.69	0.79	75.5%
A66	A66	0.08	0.06	0.34	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.69**	0.59	0.63	0.67	0.78	72.6%
A68	A68	0.08	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.16**	0.62	0.66	0.70	0.80	76.3%
A70	A70	0.09	0.05	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.24**	0.51	0.55	0.60	0.74	63.0%
A72	A72	0.14	0.13	0.70	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.41**	0.58	0.62	0.66	0.78	71.4%
A74	A74	0.13	0.11	0.43	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.97**	0.59	0.63	0.67	0.78	72.1%
A76	A76	0.07	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**	0.62	0.66	0.70	0.80	76.3%
A78	A78	0.13	0.09	0.30	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.78**	0.58	0.62	0.66	0.77	70.9%
A80	A80	0.09	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.19**	0.62	0.66	0.70	0.80	76.3%
A82	A82	0.09	0.08	0.40	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.82**	0.59	0.63	0.67	0.78	72.6%
A84	A84	0.21	0.08	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.68**	0.41	0.46	0.52	0.70	52.0%
A86	A86	0.26	0.20	0.63	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.72**	0.54	0.59	0.63	0.76	67.1%
A88	A88	0.20	0.15	0.37	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.11**	0.56	0.60	0.64	0.77	68.9%
A90	A90	0.11	0.06	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.30**	0.52	0.56	0.60	0.75	63.9%
A92	A92	0.10	0.08	0.22	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.63**	0.55	0.59	0.63	0.76	67.6%
A94	A94	0.08	0.07	0.22	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.59**	0.54	0.59	0.63	0.76	67.1%
A96	A96	0.08	0.04	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.20**	0.52	0.57	0.61	0.75	64.9%
A98	A98	0.17	0.15	0.68	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.51**	0.57	0.61	0.65	0.77	69.9%
A100	A100	0.20	0.17	0.43	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.37**	0.52	0.56	0.61	0.75	64.1%
A102	A102	0.07	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**	0.62	0.66	0.70	0.80	76.3%
A104	A104	0.09	0.07	0.27	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.63**	0.59	0.63	0.66	0.78	72.0%
A106	A106	0.35	0.30	1.04	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.68**	0.55	0.59	0.63	0.76	67.4%
A108	A108	0.22	0.08	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.68**	0.42	0.47	0.52	0.70	52.7%
A110	A110	0.13	0.05	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.39**	0.43	0.48	0.53	0.70	53.7%
A112	A112	0.88	0.47	0.00	0.00	0.00	2.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**3.79**	0.37	0.42	0.48	0.67	46.5%
A114	A114	0.58	0.38	0.00	0.00	0.00	0.20	0.00	1.39	0.00	0.00	0.00	0.00	0.00	**2.55**	0.32	0.36	0.43	0.65	40.1%
POND A1	POND A1	0.00	0.00	0.00	0.00	0.00	2.34	1.45	0.00	0.00	0.00	0.00	0.00	0.00	**3.79**	0.40	0.45	0.51	0.69	50.7%
ON-SITE BASIN A1		**10.08**	**6.59**	**16.35**	**0.00**	**0.00**	**23.35**	**1.45**	**1.39**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**59.22**	**0.51**	**0.56**	**0.60**	**0.74**	**63.4%**
		17%	**11%**	**28%**	**0%**	**0%**	**39%**	**2%**	**2%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**					
Off-Site Subbasins to Basin A1																				
A-O1	A-O1	0.27	0.11	0.00	0.00	0.00	0.47	0.00	10.85	0.00	0.00	0.00	0.00	0.00	**11.71**	0.06	0.11	0.20	0.52	8.6%
A-O2	A-O2	0.23	0.08	0.00	0.00	0.00	0.08	0.00	5.98	0.00	0.00	0.00	0.00	0.00	**6.37**	0.07	0.11	0.20	0.52	9.6%
A-O3	A-O3	0.13	0.05	0.00	0.00	0.00	0.04	0.00	1.16	0.00	0.00	0.00	0.00	0.00	**1.39**	0.13	0.17	0.26	0.55	17.0%
A-O4	A-O4	0.11	0.04	0.00	0.00	0.00	0.04	0.00	4.23	0.00	0.00	0.00	0.00	0.00	**4.42**	0.06	0.10	0.19	0.52	8.3%
A-O5	A-O5	0.36	0.13	0.00	0.00	0.00	0.12	0.00	4.28	0.00	0.00	0.00	0.00	0.00	**4.89**	0.11	0.15	0.24	0.54	14.3%
BASIN A1 TOTAL		**11.20**	**7.00**	**16.35**	**0.00**	**0.00**	**24.10**	**1.45**	**27.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**88.01**	**0.37**	**0.41**	**0.47**	**0.67**	**46.0%**
		13%	**8%**	**19%**	**0%**	**0%**	**27%**	**2%**	**32%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**					

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024

SOIL: D

LAND USE:	Paved Streets AREA	Concrete Drive and Walks AREA	Roofs AREA	Gravel - Pedestrian Use AREA	Gravel - Maintenance Paths AREA	Landscaping AREA	Open Water & WQCV AREA	Native Grasses & Open Space AREA	Single-Family (High Density) AREA	Multi-Family (Medium Density) AREA	Commerical AREA	School AREA	Neighborhood Parks AREA
2-YEAR COEFF.	0.78	0.78	0.78	0.30	0.47	0.14	0.83	0.03	0.51	0.51	0.65	0.42	0.10
5-YEAR COEFF.	0.81	0.81	0.81	0.36	0.53	0.20	0.86	0.08	0.57	0.57	0.69	0.49	0.16
10-YEAR COEFF.	0.84	0.84	0.84	0.43	0.58	0.28	0.87	0.17	0.61	0.61	0.72	0.54	0.24
100-YEAR COEFF.	0.87	0.87	0.87	0.65	0.73	0.57	0.89	0.50	0.75	0.75	0.81	0.71	0.55
IMPERVIOUS %	95%	95%	95%	40%	60%	20%	100%	5%	65%	65%	80%	55%	15%

DESIGN BASIN	DESIGN POINT	Paved Streets AREA (AC)	Concrete Drive and Walks AREA (AC)	Roofs AREA (AC)	Gravel - Pedestrian Use AREA (AC)	Gravel - Maintenance Paths AREA (AC)	Landscaping AREA (AC)	Open Water & WQCV AREA (AC)	Native Grasses & Open Space AREA (AC)	Single-Family (High Density) AREA (AC)	Multi-Family (Medium Density) AREA (AC)	Commerical AREA (AC)	School AREA (AC)	Neighborhood Parks AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(10)	C(100)	Imp %
On-Site Subbasins to Basin C																				
C2	C2	0.14	0.05	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.29**	0.56	0.60	0.64	0.77	69.2%
C4	C4	0.12	0.12	0.72	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.40**	0.58	0.62	0.66	0.78	71.6%
C6	C6	0.12	0.11	0.53	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.10**	0.58	0.62	0.66	0.78	71.9%
C8	C8	0.18	0.06	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.45**	0.48	0.53	0.58	0.73	60.1%
C10	C10	0.07	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.15**	0.62	0.66	0.70	0.80	76.3%
C12	C12	0.10	0.08	0.32	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.73**	0.59	0.63	0.67	0.78	72.2%
C14	C14	0.11	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**	0.65	0.69	0.72	0.81	80.0%
C16	C16	0.10	0.08	0.32	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.73**	0.59	0.63	0.67	0.78	72.2%
C18	C18	0.35	0.20	0.13	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.93**	0.61	0.65	0.69	0.79	75.1%
C20	C20	0.16	0.06	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.27**	0.65	0.69	0.72	0.81	80.0%
C22	C22	0.07	0.07	0.40	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.77**	0.58	0.62	0.66	0.78	71.6%
C24	C24	0.10	0.06	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.28**	0.51	0.56	0.60	0.74	63.5%
C26	C26	0.12	0.10	0.40	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.89**	0.59	0.63	0.67	0.78	72.2%
C28	C28	0.12	0.12	0.65	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.32**	0.57	0.61	0.65	0.77	70.6%
C30	C30	0.08	0.05	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**	0.62	0.66	0.70	0.80	76.3%
C32	C32	0.09	0.08	0.44	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.87**	0.59	0.63	0.67	0.78	72.5%
C34	C34	0.06	0.05	0.20	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.49**	0.55	0.60	0.64	0.76	68.3%
C36	C36	0.08	0.06	0.20	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.53**	0.56	0.60	0.64	0.77	68.9%
C38	C38	0.09	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.18**	0.62	0.66	0.70	0.80	76.3%
C40	C40	0.09	0.07	0.36	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.74**	0.59	0.63	0.67	0.78	72.7%
C42	C42	0.14	0.05	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.47**	0.40	0.45	0.50	0.69	50.3%
C44	C44	0.17	0.06	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.54**	0.41	0.46	0.51	0.70	51.6%
BASIN C TOTAL		**2.67**	**1.66**	**4.67**	**0.00**	**0.00**	**4.48**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**13.48**	**0.57**	**0.61**	**0.65**	**0.77**	**70.1%**
		20%	**12%**	**35%**	**0%**	**0%**	**33%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**					
On-Site Subbasins to Basin D																				
D2	D2	0.28	0.10	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.57**	0.56	0.61	0.65	0.77	69.6%
D4	D4	0.12	0.09	0.35	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.78**	0.59	0.63	0.67	0.78	72.9%
D6	D6	0.11	0.09	0.36	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.79**	0.59	0.63	0.67	0.78	72.9%
D8	D8	0.09	0.07	0.36	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.76**	0.59	0.63	0.67	0.78	72.7%
D10	D10	0.27	0.15	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.57**	0.62	0.66	0.70	0.80	76.3%
D12	D12	0.18	0.16	0.86	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.71**	0.59	0.63	0.67	0.78	72.5%
D14	D14	0.08	0.06	0.18	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.45**	0.59	0.63	0.67	0.78	72.3%
D16	D16	0.07	0.06	0.33	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.66**	0.59	0.63	0.67	0.78	72.6%
D18	D18	0.11	0.08	0.26	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.64**	0.59	0.63	0.67	0.78	72.6%
D20	D20	0.10	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.20**	0.62	0.66	0.70	0.80	76.3%
D22	D22	0.25	0.21	1.17	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.33**	0.59	0.63	0.67	0.78	72.5%
D24	D24	0.33	0.25	1.10	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2.53**	0.57	0.61	0.65	0.77	69.9%
D26	D26	0.17	0.06	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.41**	0.50	0.54	0.59	0.74	61.7%
D28	D28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08	**2.08**	0.10	0.16	0.24	0.55	15.0%
BASIN D TOTAL		**2.16**	**1.44**	**4.96**	**0.00**	**0.00**	**3.83**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.08**	**14.46**	**0.51**	**0.56**	**0.60**	**0.74**	**63.6%**
		15%	**10%**	**34%**	**0%**	**0%**	**26%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**14%**	**100%**					
On-Site Subbasins to Basin E																				
E2	E2	0.48	0.20	0.52	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.89**	0.55	0.59	0.63	0.76	67.8%
E4	E4	0.26	0.18	0.51	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.32**	0.60	0.64	0.68	0.78	73.4%
E6	E6	0.55	0.33	0.30	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.63**	0.61	0.65	0.68	0.79	74.5%
BASIN E TOTAL		**1.29**	**0.71**	**1.33**	**0.00**	**0.00**	**1.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.85**	**0.58**	**0.62**	**0.66**	**0.78**	**71.6%**
		27%	**15%**	**27%**	**0%**	**0%**	**31%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**					
Off-Site Subbasins Draining Offsite																				
O-O1	O-O1	0.00	0.26	0.00	0.00	0.00	0.96	0.00	12.19	0.00	0.00	0.00	0.00	0.00	**13.41**	0.05	0.10	0.19	0.52	7.8%
OFFSITE TOTAL		**0.00**	**0.26**	**0.00**	**0.00**	**0.00**	**0.96**	**0.00**	**12.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**13.41**	**0.05**	**0.10**	**0.19**	**0.52**	**7.8%**
		0%	**2%**	**0%**	**0%**	**0%**	**7%**	**0%**	**91%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**					

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: **Harvest Crossing Filing 3**
PROJECT NUMBER: **19684001**
CALCULATED BY: **JBP**
CHECKED BY: **KJM**
DATE: March 2024

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE ft/ft (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE ft/ft (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	Tc Min. (17)	Min.
On-Site Subbasins to Basin B4														
B2	0.69	0.643	87	0.020	6.2	447	0.022	20.0	2.9	2.5	8.7	534	13.0	8.7
B4	2.14	0.601	160	0.020	9.2	431	0.022	20.0	3.0	2.4	11.6	591	13.3	11.6
B6	1.13	0.669	165	0.020	8.1	568	0.018	20.0	2.7	3.5	11.6	733	14.1	11.6
B8	0.45	0.654	158	0.020	8.2	373	0.034	20.0	3.7	1.7	9.8	531	13.0	9.8
B10	1.29	0.598	140	0.014	9.7	346	0.034	20.0	3.7	1.6	11.3	486	12.7	11.3
B12	1.13	0.632	150	0.014	9.4	314	0.008	20.0	1.8	2.9	12.3	464	12.6	12.3
B14	1.89	0.354	29	0.021	5.8	391	0.008	20.0	1.8	3.6	9.4	420	12.3	9.4
B16	0.42	0.660	45	0.017	4.5	518	0.034	20.0	3.7	2.3	6.8	563	13.1	6.8
B18	0.31	0.544	35	0.019	4.8	197	0.034	20.0	3.7	0.9	5.7	232	11.3	5.7
B19	0.29	0.544	42	0.017	5.5	187	0.034	20.0	3.7	0.8	6.4	229	11.3	6.4
B20	1.59	0.158	256	0.020	21.9	96	0.020	7.0	1.0	1.6	23.5	352	12.0	12.0
B22	0.60	0.625	106	0.014	8.0	168	0.013	20.0	2.3	1.2	9.2	274	11.5	9.2
B24	0.93	0.582	165	0.017	10.2	154	0.013	20.0	2.3	1.1	11.3	319	11.8	11.3
B26	0.61	0.625	107	0.012	8.5	159	0.008	20.0	1.8	1.5	10.0	266	11.5	10.0
B28	0.40	0.575	72	0.070	4.3	183	0.008	20.0	1.8	1.7	6.0	255	11.4	6.0
B30	0.50	0.565	112	0.013	9.6	104	0.008	20.0	1.8	1.0	10.5	216	11.2	10.5
B32	0.47	0.584	101	0.010	9.5	128	0.008	20.0	1.8	1.2	10.7	229	11.3	10.7
B34	1.30	0.583	169	0.043	7.6	241	0.020	20.0	2.8	1.4	9.0	410	12.3	9.0
B36	0.24	0.660	42	0.014	4.7	275	0.020	20.0	2.8	1.6	6.3	317	11.8	6.3
B38	0.24	0.691	45	0.017	4.2	135	0.012	20.0	2.2	1.0	5.2	180	11.0	5.2
B40	1.25	0.625	127	0.023	7.4	292	0.050	20.0	4.5	1.1	8.5	419	12.3	8.5
B42	1.49	0.624	155	0.035	7.1	277	0.050	20.0	4.5	1.0	8.2	432	12.4	8.2
B44	0.32	0.672	50	0.020	4.4	181	0.039	20.0	3.9	0.8	5.2	231	11.3	5.2
B46	0.96	0.627	109	0.027	6.5	288	0.028	20.0	3.3	1.4	7.9	397	12.2	7.9
B48	1.05	0.628	120	0.025	7.0	291	0.028	20.0	3.3	1.4	8.4	411	12.3	8.4
POND B4	1.46	0.503	84	0.100	4.7	215	0.010	20.0	2.0	1.8	6.4	299	11.7	6.4
On-Site Subbasins to Basin A1														
A2	2.22	0.442	198	0.060	9.3	120	0.008	20.0	1.8	1.1	10.5	318	11.8	10.5
A4	0.50	0.691	60	0.020	4.6	105	0.008	20.0	1.8	1.0	5.6	165	10.9	5.6
A6	1.33	0.465	70	0.020	7.7	174	0.014	20.0	2.4	1.2	9.0	244	11.4	9.0
A8	0.58	0.691	59	0.025	4.2	427	0.014	20.0	2.4	3.0	7.3	486	12.7	7.3
A10	1.68	0.626	113	0.019	7.5	207	0.024	20.0	3.1	1.1	8.6	320	11.8	8.6
A12	1.36	0.611	106	0.028	6.6	358	0.039	20.0	3.9	1.5	8.1	464	12.6	8.1
A14	2.14	0.600	138	0.025	7.9	400	0.039	20.0	3.9	1.7	9.6	538	13.0	9.6
A16	0.14	0.660	31	0.017	3.8	149	0.039	20.0	3.9	0.6	4.4	180	11.0	5.0
A18	0.14	0.660	40	0.017	4.3	159	0.039	20.0	3.9	0.7	4.9	199	11.1	5.0
A20	1.14	0.199	186	0.020	17.9	102	0.020	7.0	1.0	1.7	19.6	288	11.6	11.6
A22	0.95	0.641	57	0.020	5.0	561	0.018	20.0	2.7	3.5	8.5	618	13.4	8.5
A24	1.72	0.626	128	0.020	7.8	540	0.018	20.0	2.7	3.4	11.2	668	13.7	11.2
A26	0.29	0.691	26	0.005	4.8	170	0.042	20.0	4.1	0.7	5.5	196	11.1	5.5
A28	1.80	0.627	164	0.020	8.8	392	0.020	20.0	2.8	2.3	11.2	556	13.1	11.2
A30	1.57	0.630	160	0.033	7.3	265	0.020	20.0	2.8	1.6	8.9	425	12.4	8.9
A32	0.18	0.691	26	0.015	3.3	148	0.021	20.0	2.9	0.9	4.2	174	11.0	5.0
A34	0.28	0.660	52	0.015	5.1	320	0.039	20.0	3.9	1.4	6.4	372	12.1	6.4
A36	1.54	0.552	168	0.037	8.4	289	0.039	20.0	3.9	1.2	9.6	457	12.5	9.6
A38	0.91	0.635	29	0.020	3.6	414	0.019	20.0	2.8	2.5	6.1	443	12.5	6.1
A40	0.36	0.563	114	0.025	7.8	182	0.019	20.0	2.8	1.1	8.9	296	11.6	8.9
A42	1.15	0.627	117	0.013	8.6	381	0.030	20.0	3.5	1.8	10.5	498	12.8	10.5
A44	1.84	0.558	125	0.016	9.6	377	0.030	20.0	3.5	1.8	11.4	502	12.8	11.4
A46	0.34	0.563	103	0.017	8.4	176	0.020	20.0	2.8	1.0	9.4	279	11.6	9.4
A48	0.64	0.615	80	0.020	6.3	257	0.030	20.0	3.5	1.2	7.6	337	11.9	7.6
A50	0.29	0.576	38	0.010	5.9	193	0.030	20.0	3.5	0.9	6.9	231	11.3	6.9
A52	0.51	0.625	91	0.017	7.0	144	0.021	20.0	2.9	0.8	7.8	235	11.3	7.8

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: **Harvest Crossing Filing 3**
PROJECT NUMBER: **19684001**
CALCULATED BY: **JBP**
CHECKED BY: **KJM**
DATE: March 2024

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE ft/ft (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE ft/ft (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	Tc Min. (17)	Min.
A54	0.15	0.642	30	0.015	4.0	143	0.022	20.0	2.9	0.8	4.8	173	11.0	5.0
A56	1.48	0.605	146	0.010	11.0	303	0.022	20.0	3.0	1.7	12.7	449	12.5	12.5
A58	0.98	0.626	111	0.022	7.1	285	0.022	20.0	2.9	1.6	8.7	396	12.2	8.7
A60	1.61	0.613	52	0.025	4.7	514	0.030	20.0	3.5	2.5	7.2	566	13.1	7.2
A62	1.00	0.627	121	0.021	7.4	278	0.030	20.0	3.5	1.3	8.8	399	12.2	8.8
A64	0.19	0.654	41	0.015	4.6	147	0.009	20.0	1.9	1.3	5.9	188	11.0	5.9
A66	0.69	0.630	122	0.018	7.8	134	0.009	20.0	1.9	1.2	9.0	256	11.4	9.0
A68	0.16	0.660	27	0.015	3.7	158	0.015	20.0	2.4	1.1	4.7	185	11.0	5.0
A70	0.24	0.552	36	0.020	4.8	160	0.015	20.0	2.5	1.1	5.9	196	11.1	5.9
A72	1.41	0.620	162	0.050	6.5	264	0.028	20.0	3.3	1.3	7.9	426	12.4	7.9
A74	0.97	0.626	99	0.028	6.1	294	0.029	20.0	3.4	1.4	7.6	393	12.2	7.6
A76	0.15	0.660	29	0.015	3.8	144	0.019	20.0	2.8	0.9	4.7	173	11.0	5.0
A78	0.78	0.616	76	0.020	6.1	262	0.194	20.0	8.8	0.5	6.6	338	11.9	6.6
A80	0.19	0.660	25	0.170	1.6	222	0.019	20.0	2.8	1.3	2.9	247	11.4	5.0
A82	0.82	0.630	119	0.018	7.7	195	0.019	20.0	2.8	1.2	8.9	314	11.7	8.9
A84	0.68	0.461	105	0.010	12.0	343	0.018	20.0	2.7	2.1	14.2	448	12.5	12.5
A86	1.72	0.585	90	0.017	7.5	456	0.029	20.0	3.4	2.2	9.7	546	13.0	9.7
A88	1.11	0.600	70	0.100	3.6	472	0.028	20.0	3.3	2.4	5.9	542	13.0	5.9
A90	0.30	0.559	86	0.020	7.3	180	0.014	20.0	2.3	1.3	8.6	266	11.5	8.6
A92	0.63	0.589	98	0.017	7.8	125	0.014	20.0	2.3	0.9	8.7	223	11.2	8.7
A94	0.59	0.585	91	0.015	7.9	146	0.015	20.0	2.4	1.0	8.9	237	11.3	8.9
A96	0.20	0.567	54	0.017	6.0	121	0.015	20.0	2.4	0.8	6.8	175	11.0	6.8
A98	1.51	0.608	126	0.019	8.2	283	0.029	20.0	3.4	1.4	9.6	409	12.3	9.6
A100	1.37	0.561	108	0.015	9.0	176	0.030	20.0	3.5	0.8	9.8	284	11.6	9.8
A102	0.15	0.660	38	0.010	5.0	163	0.021	20.0	2.9	0.9	5.9	201	11.1	5.9
A104	0.63	0.626	116	0.015	8.2	140	0.020	20.0	2.8	0.8	9.0	256	11.4	9.0
A106	2.68	0.588	130	0.020	8.5	418	0.022	20.0	2.9	2.4	10.9	548	13.0	10.9
A108	0.68	0.467	112	0.015	10.7	319	0.024	20.0	3.1	1.7	12.4	431	12.4	12.4
A110	0.39	0.475	92	0.023	8.3	230	0.028	20.0	3.3	1.1	9.5	322	11.8	9.5
A112	3.79	0.416	179	0.080	8.4	621	0.014	20.0	2.3	4.4	12.8	800	14.4	12.8
A114	2.55	0.363	145	0.020	12.9	720	0.014	20.0	2.4	5.1	18.0	865	14.8	14.8
POND A1	3.79	0.450	155	0.100	6.9	274	0.050	20.0	4.5	1.0	7.9	429	12.4	7.9
Off-Site Subbasins to Basin A1														
A-O1	11.71	0.105	982	0.070	29.9	271	0.014	20.0	2.3	1.9	31.8	1253	17.0	17.0
A-O2	6.37	0.114	1173	0.020	49.1	352	0.014	20.0	2.4	2.5	51.6	1525	18.5	18.5
A-O3	1.39	0.174	610	0.060	23.1	260	0.028	20.0	3.3	1.3	24.4	870	14.8	14.8
A-O4	4.42	0.103	642	0.060	25.5	213	0.024	20.0	3.1	1.1	26.6	855	14.8	14.8
A-O5	4.89	0.153	227	0.070	13.7	488	0.024	20.0	3.1	2.6	16.3	715	14.0	14.0

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: **Harvest Crossing Filing 3**
PROJECT NUMBER: **19684001**
CALCULATED BY: **JBP**
CHECKED BY: **KJM**
DATE: March 2024

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE ft/ft (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE ft/ft (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	Tc Min. (17)	Min.
On-Site Subbasins to Basin C														
C2	0.29	0.603	94	0.015	7.7	94	0.010	20.0	2.0	0.8	8.5	188	11.0	8.5
C4	1.40	0.622	110	0.020	7.3	262	0.035	20.0	3.7	1.2	8.5	372	12.1	8.5
C6	1.10	0.625	115	0.015	8.2	264	0.035	20.0	3.7	1.2	9.3	379	12.1	9.3
C8	0.45	0.528	49	0.025	5.4	288	0.030	20.0	3.5	1.4	6.8	337	11.9	6.8
C10	0.15	0.660	22	0.020	3.0	176	0.015	20.0	2.4	1.2	4.2	198	11.1	5.0
C12	0.73	0.627	115	0.015	8.1	140	0.014	20.0	2.4	1.0	9.1	255	11.4	9.1
C14	0.18	0.691	39	0.020	3.7	135	0.011	20.0	2.1	1.1	4.8	174	11.0	5.0
C16	0.73	0.627	52	0.020	5.0	206	0.015	20.0	2.4	1.4	6.4	258	11.4	6.4
C18	0.93	0.651	119	0.017	7.5	208	0.015	20.0	2.4	1.4	8.9	327	11.8	8.9
C20	0.27	0.691	113	0.030	5.5	196	0.010	20.0	2.0	1.6	7.2	309	11.7	7.2
C22	0.77	0.622	124	0.017	8.2	168	0.008	20.0	1.8	1.6	9.7	292	11.6	9.7
C24	0.28	0.556	77	0.010	8.8	108	0.008	20.0	1.8	1.0	9.8	185	11.0	9.8
C26	0.89	0.627	112	0.015	8.0	217	0.008	20.0	1.8	2.0	10.0	329	11.8	10.0
C28	1.32	0.614	120	0.017	8.2	277	0.008	20.0	1.8	2.6	10.8	397	12.2	10.8
C30	0.18	0.660	21	0.018	3.0	159	0.017	20.0	2.6	1.0	4.1	180	11.0	5.0
C32	0.87	0.630	115	0.016	7.9	222	0.018	20.0	2.7	1.4	9.3	337	11.9	9.3
C34	0.49	0.595	98	0.017	7.7	128	0.008	20.0	1.8	1.2	8.9	226	11.3	8.9
C36	0.53	0.600	99	0.013	8.4	122	0.008	20.0	1.8	1.1	9.5	221	11.2	9.5
C38	0.18	0.660	21	0.020	2.9	184	0.018	20.0	2.7	1.2	4.1	205	11.1	5.0
C40	0.74	0.631	126	0.017	8.1	168	0.017	20.0	2.6	1.1	9.2	294	11.6	9.2
C42	0.47	0.447	87	0.050	6.5	254	0.016	20.0	2.5	1.7	8.2	341	11.9	8.2
C44	0.54	0.458	75	0.030	7.1	294	0.022	20.0	3.0	1.7	8.7	369	12.1	8.7
On-Site Subbasins to Basin D														
D2	0.57	0.606	88	0.017	7.1	164	0.008	20.0	1.8	1.5	8.7	252	11.4	8.7
D4	0.78	0.633	46	0.018	4.8	209	0.030	20.0	3.5	1.0	5.8	255	11.4	5.8
D6	0.79	0.633	46	0.015	5.1	208	0.028	20.0	3.3	1.0	6.1	254	11.4	6.1
D8	0.76	0.631	89	0.010	8.1	214	0.020	20.0	2.8	1.3	9.4	303	11.7	9.4
D10	0.57	0.660	68	0.018	5.5	418	0.023	20.0	3.0	2.3	7.8	486	12.7	7.8
D12	1.71	0.630	125	0.018	7.9	376	0.023	20.0	3.0	2.1	10.0	501	12.8	10.0
D14	0.45	0.628	91	0.017	6.9	114	0.023	20.0	3.0	0.6	7.5	205	11.1	7.5
D16	0.66	0.630	126	0.013	8.9	133	0.023	20.0	3.0	0.7	9.6	259	11.4	9.6
D18	0.64	0.630	118	1.800	1.7	197	148.000	20.0	243.3	0.0	1.7	315	11.8	5.0
D20	0.20	0.660	27	0.010	4.2	230	0.014	20.0	2.4	1.6	5.8	257	11.4	5.8
D22	2.33	0.630	114	0.017	7.7	609	0.030	20.0	3.5	2.9	10.6	723	14.0	10.6
D24	2.53	0.609	116	0.018	8.0	618	0.030	20.0	3.5	3.0	11.0	734	14.1	11.0
D26	0.41	0.541	63	0.015	7.1	299	0.008	20.0	1.8	2.8	9.9	362	12.0	9.9
D28	2.08	0.158	259	0.020	22.1	92	0.020	7.0	1.0	1.5	23.6	351	12.0	12.0

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: **Harvest Crossing Filing 3**
PROJECT NUMBER: **19684001**
CALCULATED BY: **JBP**
CHECKED BY: **KJM**
DATE: March 2024

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE ft/ft (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE ft/ft (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	Tc Min. (17)	Min.
On-Site Subbasins to Basin E														
E2	1.89	0.591	100	0.040	5.9	212	0.026	20.0	3.2	1.1	7.0	312	11.7	7.0
E4	1.32	0.637	37	0.020	4.1	402	0.003	20.0	1.0	6.6	10.7	439	12.4	10.7
E6	1.63	0.646	107	0.018	7.1	312	0.026	20.0	3.2	1.6	8.7	419	12.3	8.7
Off-Site Basins Draining Offsite														
O-O1	13.41	0.099	595	0.080	22.4	642	0.020	7.0	1.0	10.8	33.2	1237	16.9	16.9

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}} \qquad t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t} \qquad t_c = \frac{L'}{180} + 10$$

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 2 YEAR EVENT

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024
P_1 (1-Hour Rainfall) = 0.86

STORM LINE		DESIGN POINT	DIRECT RUNOFF							
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		B2	B2	0.69	0.60	8.73	0.42	2.44	1.01
		B4	B4	2.14	0.56	11.60	1.20	2.18	2.61
		B6	B6	1.13	0.63	11.59	0.71	2.18	1.56
		B8	B8	0.45	0.62	9.85	0.28	2.33	0.65
		B10	B10	1.29	0.56	11.30	0.72	2.20	1.58
		B12	B12	1.13	0.59	12.31	0.67	2.12	1.42
		B14	B14	1.89	0.30	9.39	0.57	2.37	1.36
		B16	B16	0.42	0.62	6.85	0.26	2.65	0.69
		B18	B18	0.31	0.50	5.73	0.15	2.79	0.43
		B19	B19	0.29	0.50	6.38	0.15	2.71	0.39
		B20	B20	1.59	0.10	11.96	0.16	2.15	0.34
		B22	B22	0.60	0.58	9.24	0.35	2.38	0.84
		B24	B24	0.93	0.54	11.35	0.50	2.20	1.11
		B26	B26	0.61	0.59	9.95	0.36	2.32	0.83
		B28	B28	0.40	0.53	5.98	0.21	2.76	0.58
		B30	B30	0.50	0.52	10.52	0.26	2.27	0.59
		B32	B32	0.47	0.54	10.70	0.25	2.25	0.57
		B34	B34	1.30	0.54	8.99	0.70	2.41	1.69
		B36	B36	0.24	0.62	6.29	0.15	2.72	0.40
		B38	B38	0.24	0.65	5.24	0.16	2.86	0.45
		B40	B40	1.25	0.58	8.53	0.73	2.46	1.79
		B42	B42	1.49	0.58	8.18	0.87	2.49	2.16
		B44	B44	0.32	0.63	5.17	0.20	2.87	0.58
		B46	B46	0.96	0.59	7.93	0.56	2.52	1.42
		B48	B48	1.05	0.59	8.43	0.62	2.47	1.52
		POND B4	POND B4	1.46	0.46	6.45	0.67	2.70	1.80
		A2	A2	2.22	0.39	10.46	0.87	2.27	1.98
		A4	A4	0.50	0.65	5.59	0.33	2.81	0.93
		A6	A6	1.33	0.42	8.96	0.55	2.41	1.34
		A8	A8	0.58	0.65	7.25	0.38	2.60	0.99
		A10	A10	1.68	0.59	8.57	0.98	2.45	2.42
		A12	A12	1.36	0.57	8.06	0.78	2.51	1.95
		A14	A14	2.14	0.56	9.62	1.19	2.35	2.80
		A16	A16	0.14	0.62	5.00	0.09	2.90	0.26
		A18	A18	0.14	0.62	5.00	0.09	2.90	0.26
		A20	A20	1.14	0.14	11.60	0.15	2.18	0.34
		A22	A22	0.95	0.60	8.53	0.57	2.46	1.41
		A24	A24	1.72	0.59	11.17	1.01	2.21	2.23
		A26	A26	0.29	0.65	5.51	0.19	2.83	0.53
		A28	A28	1.80	0.59	11.15	1.06	2.21	2.34
		A30	A30	1.57	0.59	8.89	0.93	2.42	2.24
		A32	A32	0.18	0.65	5.00	0.12	2.90	0.35
		A34	A34	0.28	0.62	6.43	0.18	2.70	0.48
		A36	A36	1.54	0.51	9.63	0.78	2.35	1.83
		A38	A38	0.91	0.60	6.14	0.54	2.74	1.49
		A40	A40	0.36	0.52	8.85	0.19	2.42	0.45

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 2 YEAR EVENT

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024
P_1 (1-Hour Rainfall) = **0.86**

STORM LINE		DESIGN POINT	DIRECT RUNOFF						
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		A42	A42	1.15	0.59	10.48	0.68	2.27	1.54
		A44	A44	1.84	0.51	11.42	0.95	2.19	2.08
		A46	A46	0.34	0.52	9.42	0.17	2.37	0.41
		A48	A48	0.64	0.57	7.55	0.37	2.56	0.94
		A50	A50	0.29	0.53	6.85	0.15	2.65	0.40
		A52	A52	0.51	0.58	7.79	0.30	2.54	0.75
		A54	A54	0.15	0.60	5.00	0.09	2.90	0.26
		A56	A56	1.48	0.56	12.49	0.83	2.11	1.76
		A58	A58	0.98	0.59	8.67	0.58	2.44	1.41
		A60	A60	1.61	0.57	7.21	0.92	2.60	2.40
		A62	A62	1.00	0.59	8.78	0.59	2.43	1.43
		A64	A64	0.19	0.62	5.87	0.11	2.77	0.32
		A66	A66	0.69	0.59	9.00	0.40	2.41	0.98
		A68	A68	0.16	0.62	5.00	0.10	2.90	0.29
		A70	A70	0.24	0.51	5.87	0.12	2.77	0.34
		A72	A72	1.41	0.58	7.86	0.82	2.53	2.07
		A74	A74	0.97	0.59	7.59	0.57	2.56	1.46
		A76	A76	0.15	0.62	5.00	0.09	2.90	0.26
		A78	A78	0.78	0.58	6.63	0.45	2.67	1.20
		A80	A80	0.19	0.62	5.00	0.12	2.90	0.35
		A82	A82	0.82	0.59	8.92	0.48	2.42	1.16
		A84	A84	0.68	0.41	12.49	0.28	2.11	0.59
		A86	A86	1.72	0.54	9.75	0.94	2.34	2.19
		A88	A88	1.11	0.56	5.91	0.62	2.77	1.71
		A90	A90	0.30	0.52	8.59	0.15	2.45	0.38
		A92	A92	0.63	0.55	8.66	0.34	2.44	0.84
		A94	A94	0.59	0.54	8.86	0.32	2.42	0.78
		A96	A96	0.20	0.52	6.83	0.10	2.65	0.28
		A98	A98	1.51	0.57	9.56	0.86	2.35	2.02
		A100	A100	1.37	0.52	9.82	0.71	2.33	1.65
		A102	A102	0.15	0.62	5.91	0.09	2.77	0.26
		A104	A104	0.63	0.59	9.01	0.37	2.41	0.89
		A106	A106	2.68	0.55	10.86	1.46	2.24	3.27
		A108	A108	0.68	0.42	12.39	0.29	2.12	0.60
		A110	A110	0.39	0.43	9.47	0.17	2.36	0.39
		A112	A112	3.79	0.37	12.82	1.38	2.09	2.89
		A114	A114	2.55	0.32	14.81	0.82	1.95	1.60
		POND A1	POND A1	3.79	0.40	7.90	1.53	2.52	3.85
		A-O1	A-O1	11.71	0.06	16.96	0.68	1.83	1.24
		A-O2	A-O2	6.37	0.07	18.47	0.43	1.75	0.75
		A-O3	A-O3	1.39	0.13	14.83	0.18	1.95	0.35
		A-O4	A-O4	4.42	0.06	14.75	0.25	1.96	0.48
		A-O5	A-O5	4.89	0.11	13.97	0.52	2.01	1.05
		O-O1	O-O1	13.41	0.05	16.87	0.69	1.83	1.26
		C2	C2	0.29	0.56	8.51	0.16	2.46	0.40
		C4	C4	1.40	0.58	8.46	0.81	2.46	2.00
		C6	C6	1.10	0.58	9.34	0.64	2.38	1.53
		C8	C8	0.45	0.48	6.80	0.22	2.65	0.57
		C10	C10	0.15	0.62	5.00	0.09	2.90	0.27
		C12	C12	0.73	0.59	9.11	0.43	2.40	1.02
		C14	C14	0.18	0.65	5.00	0.12	2.90	0.35
		C16	C16	0.73	0.59	6.37	0.43	2.71	1.15
		C18	C18	0.93	0.61	8.95	0.57	2.41	1.37
		C20	C20	0.27	0.65	7.16	0.18	2.61	0.46
		C22	C22	0.77	0.58	9.74	0.45	2.34	1.05
		C24	C24	0.28	0.51	9.76	0.14	2.33	0.34
		C26	C26	0.89	0.59	10.05	0.52	2.31	1.20
		C28	C28	1.32	0.57	10.76	0.76	2.25	1.70
		C30	C30	0.18	0.62	5.00	0.11	2.90	0.32
		C32	C32	0.87	0.59	9.29	0.51	2.38	1.21

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 2 YEAR EVENT

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024
P_1 (1-Hour Rainfall) = 0.86

STORM LINE		DESIGN POINT	DIRECT RUNOFF						
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		C34	C34	0.49	0.55	8.87	0.27	2.42	0.66
		C36	C36	0.53	0.56	9.50	0.30	2.36	0.70
		C38	C38	0.18	0.62	5.00	0.11	2.90	0.33
		C40	C40	0.74	0.59	9.17	0.44	2.39	1.04
		C42	C42	0.47	0.40	8.20	0.19	2.49	0.46
		C44	C44	0.54	0.41	8.72	0.22	2.44	0.54
		D2	D2	0.57	0.56	5.78	0.32	2.79	0.89
		D4	D4	0.78	0.59	6.11	0.46	2.74	1.27
		D6	D6	0.79	0.59	9.37	0.47	2.37	1.11
		D8	D8	0.76	0.59	7.76	0.45	2.54	1.13
		D10	D10	0.57	0.62	9.99	0.35	2.31	0.82
		D12	D12	1.71	0.59	7.54	1.01	2.56	2.58
		D14	D14	0.45	0.59	9.59	0.26	2.35	0.62
		D16	D16	0.66	0.59	5.00	0.39	2.90	1.13
		D18	D18	0.64	0.59	5.81	0.38	2.78	1.05
		D20	D20	0.20	0.62	10.64	0.12	2.26	0.28
		D22	D22	2.33	0.59	10.95	1.38	2.23	3.07
		D24	D24	2.53	0.57	9.89	1.43	2.32	3.33
		D26	D26	0.41	0.50	0.00	0.20	3.99	0.81
		D28	D28	2.08	0.10	0.00	0.21	3.99	0.82
		E2	E2	1.89	0.55	10.67	1.04	2.25	2.34
		E4	E4	1.32	0.60	8.70	0.79	2.44	1.93
		E6	E6	1.63	0.61	0.00	0.99	3.99	3.95

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024
P_1 (1-Hour Rainfall) = **2.48**

STORM LINE		DESIGN POINT	DIRECT RUNOFF						
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	t_c (min)	C*A(ac)	I (in/hr)	Q (cfs)
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		B2	B2	0.69	0.79	8.73	0.54	7.06	3.84
		B4	B4	2.14	0.77	11.60	1.64	6.32	10.36
		B6	B6	1.13	0.80	11.59	0.91	6.32	5.74
		B8	B8	0.45	0.79	9.85	0.36	6.75	2.43
		B10	B10	1.29	0.77	11.30	0.98	6.39	6.29
		B12	B12	1.13	0.78	12.31	0.89	6.16	5.46
		B14	B14	1.89	0.64	9.39	1.22	6.87	8.38
		B16	B16	0.42	0.80	6.85	0.33	7.68	2.56
		B18	B18	0.31	0.74	5.73	0.23	8.11	1.83
		B19	B19	0.29	0.74	6.38	0.21	7.85	1.68
		B20	B20	1.59	0.55	11.96	0.87	6.24	5.41
		B22	B22	0.60	0.78	9.24	0.47	6.92	3.26
		B24	B24	0.93	0.76	11.35	0.71	6.37	4.50
		B26	B26	0.61	0.78	9.95	0.48	6.72	3.20
		B28	B28	0.40	0.75	5.98	0.30	8.00	2.39
		B30	B30	0.50	0.75	10.52	0.37	6.57	2.45
		B32	B32	0.47	0.76	10.70	0.36	6.53	2.32
		B34	B34	1.30	0.76	8.99	0.98	6.99	6.88
		B36	B36	0.24	0.80	6.29	0.19	7.88	1.50
		B38	B38	0.24	0.81	5.24	0.20	8.31	1.63
		B40	B40	1.25	0.78	8.53	0.97	7.12	6.92
		B42	B42	1.49	0.78	8.18	1.16	7.23	8.37
		B44	B44	0.32	0.80	5.17	0.25	8.34	2.12
		B46	B46	0.96	0.78	7.93	0.75	7.31	5.48
		B48	B48	1.05	0.78	8.43	0.82	7.15	5.85
		POND B4	POND B4	1.46	0.72	6.45	1.05	7.82	8.18
		A2	A2	2.22	0.69	10.46	1.53	6.59	10.07
		A4	A4	0.50	0.81	5.59	0.41	8.16	3.34
		A6	A6	1.33	0.70	8.96	0.93	7.00	6.51
		A8	A8	0.58	0.81	7.25	0.47	7.54	3.57
		A10	A10	1.68	0.78	8.57	1.31	7.11	9.32
		A12	A12	1.36	0.77	8.06	1.05	7.27	7.65
		A14	A14	2.14	0.77	9.62	1.64	6.81	11.16
		A16	A16	0.14	0.80	5.00	0.11	8.41	0.96
		A18	A18	0.14	0.80	5.00	0.11	8.41	0.96
		A20	A20	1.14	0.57	11.60	0.64	6.32	4.06
		A22	A22	0.95	0.79	8.53	0.75	7.12	5.35
		A24	A24	1.72	0.78	11.17	1.34	6.42	8.62
		A26	A26	0.29	0.81	5.51	0.23	8.19	1.90
		A28	A28	1.80	0.78	11.15	1.40	6.42	9.00
		A30	A30	1.57	0.78	8.89	1.23	7.02	8.62

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024
P_1 (1-Hour Rainfall) = 2.48

STORM LINE		DESIGN POINT	DIRECT RUNOFF						
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	t_c (min)	C*A(ac)	I (in/hr)	Q (cfs)
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		A32	A32	0.18	0.81	5.00	0.15	8.41	1.25
		A34	A34	0.28	0.80	6.43	0.23	7.83	1.77
		A36	A36	1.54	0.74	9.63	1.14	6.81	7.77
		A38	A38	0.91	0.78	6.14	0.72	7.94	5.68
		A40	A40	0.36	0.75	8.85	0.27	7.03	1.88
		A42	A42	1.15	0.78	10.48	0.90	6.59	5.93
		A44	A44	1.84	0.75	11.42	1.37	6.36	8.74
		A46	A46	0.34	0.75	9.42	0.25	6.87	1.73
		A48	A48	0.64	0.77	7.55	0.49	7.43	3.66
		A50	A50	0.29	0.75	6.85	0.22	7.68	1.66
		A52	A52	0.51	0.78	7.79	0.40	7.36	2.92
		A54	A54	0.15	0.79	5.00	0.12	8.41	0.98
		A56	A56	1.48	0.77	12.49	1.14	6.12	6.97
		A58	A58	0.98	0.78	8.67	0.77	7.08	5.43
		A60	A60	1.61	0.77	7.21	1.25	7.55	9.42
		A62	A62	1.00	0.78	8.78	0.78	7.05	5.51
		A64	A64	0.19	0.79	5.87	0.15	8.05	1.18
		A66	A66	0.69	0.78	9.00	0.54	6.99	3.75
		A68	A68	0.16	0.80	5.00	0.13	8.41	1.07
		A70	A70	0.24	0.74	5.87	0.18	8.05	1.46
		A72	A72	1.41	0.78	7.86	1.10	7.33	8.04
		A74	A74	0.97	0.78	7.59	0.76	7.42	5.63
		A76	A76	0.15	0.80	5.00	0.12	8.41	0.97
		A78	A78	0.78	0.77	6.63	0.61	7.75	4.70
		A80	A80	0.19	0.80	5.00	0.15	8.41	1.29
		A82	A82	0.82	0.78	8.92	0.64	7.01	4.47
		A84	A84	0.68	0.70	12.49	0.48	6.12	2.91
		A86	A86	1.72	0.76	9.75	1.31	6.78	8.87
		A88	A88	1.11	0.77	5.91	0.85	8.03	6.82
		A90	A90	0.30	0.75	8.59	0.22	7.11	1.58
		A92	A92	0.63	0.76	8.66	0.48	7.09	3.38
		A94	A94	0.59	0.76	8.86	0.45	7.03	3.15
		A96	A96	0.20	0.75	6.83	0.15	7.68	1.14
		A98	A98	1.51	0.77	9.56	1.17	6.83	7.96
		A100	A100	1.37	0.75	9.82	1.02	6.76	6.91
		A102	A102	0.15	0.80	5.91	0.12	8.03	0.97
		A104	A104	0.63	0.78	9.01	0.49	6.98	3.43
		A106	A106	2.68	0.76	10.86	2.03	6.49	13.21
		A108	A108	0.68	0.70	12.39	0.48	6.14	2.93
		A110	A110	0.39	0.70	9.47	0.28	6.85	1.89
		A112	A112	3.79	0.67	12.82	2.56	6.05	15.48
		A114	A114	2.55	0.65	14.81	1.65	5.66	9.35
		POND A1	POND A1	3.79	0.69	7.90	2.62	7.32	19.21
		A-O1	A-O1	11.71	0.52	13.97	6.08	5.82	35.38
		A-O2	A-O2	6.37	0.52	16.87	3.34	5.32	17.75
		A-O3	A-O3	1.39	0.55	0.00	0.77	11.57	8.88
		A-O4	A-O4	4.42	0.52	0.00	2.29	11.57	26.49
		A-O5	A-O5	4.89	0.54	8.51	2.65	7.13	18.93
		O-O1	O-O1	13.41	0.52	8.46	6.92	7.14	49.46
		C2	C2	0.29	0.77	8.51	0.22	7.13	1.60
		C4	C4	1.40	0.78	8.46	1.09	7.14	7.76
		C6	C6	1.10	0.78	9.34	0.86	6.89	5.92
		C8	C8	0.45	0.73	6.80	0.33	7.70	2.52
		C10	C10	0.15	0.80	5.00	0.12	8.41	1.02
		C12	C12	0.73	0.78	9.11	0.57	6.95	3.94

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM

DATE: March 2024
P_1 (1-Hour Rainfall) = 2.48

STORM LINE		DESIGN POINT	DIRECT RUNOFF						
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	t_c (min)	C*A(ac)	I (in/hr)	Q (cfs)
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		C14	C14	0.18	0.81	5.00	0.15	8.41	1.26
		C16	C16	0.73	0.78	6.37	0.57	7.85	4.45
		C18	C18	0.93	0.79	8.95	0.74	7.00	5.15
		C20	C20	0.27	0.81	7.16	0.22	7.57	1.65
		C22	C22	0.77	0.78	9.74	0.60	6.78	4.08
		C24	C24	0.28	0.74	9.76	0.21	6.77	1.42
		C26	C26	0.89	0.78	10.05	0.69	6.70	4.64
		C28	C28	1.32	0.77	10.76	1.02	6.52	6.67
		C30	C30	0.18	0.80	5.00	0.14	8.41	1.18
		C32	C32	0.87	0.78	9.29	0.68	6.90	4.67
		C34	C34	0.49	0.76	8.87	0.38	7.02	2.64
		C36	C36	0.53	0.77	9.50	0.41	6.84	2.79
		C38	C38	0.18	0.80	5.00	0.14	8.41	1.21
		C40	C40	0.74	0.78	9.17	0.58	6.94	4.00
		C42	C42	0.47	0.69	8.20	0.32	7.23	2.33
		C44	C44	0.54	0.70	8.72	0.38	7.07	2.66
		D2	D2	0.57	0.77	8.65	0.43	7.09	3.08
		D4	D4	0.78	0.78	5.78	0.61	8.08	4.95
		D6	D6	0.79	0.78	6.11	0.62	7.95	4.91
		D8	D8	0.76	0.78	9.37	0.59	6.88	4.07
		D10	D10	0.57	0.80	7.76	0.45	7.37	3.35
		D12	D12	1.71	0.78	9.99	1.33	6.71	8.95
		D14	D14	0.45	0.78	7.54	0.35	7.44	2.60
		D16	D16	0.66	0.78	9.59	0.52	6.82	3.51
		D18	D18	0.64	0.78	5.00	0.50	8.41	4.18
		D20	D20	0.20	0.80	5.81	0.16	8.07	1.29
		D22	D22	2.33	0.78	10.64	1.82	6.54	11.93
		D24	D24	2.53	0.77	10.95	1.95	6.47	12.61
		D26	D26	0.41	0.74	9.89	0.30	6.74	2.04
		D28	D28	2.08	0.55	11.95	1.13	6.24	7.07
		E2	E2	1.89	0.76	6.97	1.44	7.63	10.99
		E4	E4	1.32	0.78	10.67	1.04	6.54	6.79
		E6	E6	1.63	0.79	8.70	1.29	7.07	9.12

Kimley»Horn

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM
DATE: March 2024

RATIONAL CALCULATIONS SUMMARY

DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	PEAK FLOWS (CFS)		RUNOFF COEFFICIENTS		PERCENT IMPERVIOUS
			Q2	Q100	2-YR	100-YR	
On-Site Subbasins to Basin B4							
B2	B2	0.69	1.01	3.84	0.60	0.79	74.2%
B4	B4	2.14	2.61	10.36	0.56	0.77	69.1%
B6	B6	1.13	1.56	5.74	0.63	0.80	77.3%
B8	B8	0.45	0.65	2.43	0.62	0.79	75.5%
B10	B10	1.29	1.58	6.29	0.56	0.77	68.7%
B12	B12	1.13	1.42	5.46	0.59	0.78	72.8%
B14	B14	1.89	1.36	8.38	0.30	0.64	38.9%
B16	B16	0.42	0.69	2.56	0.62	0.80	76.3%
B18	B18	0.31	0.43	1.83	0.50	0.74	62.1%
B19	B19	0.29	0.39	1.68	0.50	0.74	62.1%
B20	B20	1.59	0.34	5.41	0.10	0.55	15.0%
B22	B22	0.60	0.84	3.26	0.58	0.78	72.0%
B24	B24	0.93	1.11	4.50	0.54	0.76	66.7%
B26	B26	0.61	0.83	3.20	0.59	0.78	72.0%
B28	B28	0.40	0.58	2.39	0.53	0.75	65.8%
B30	B30	0.50	0.59	2.45	0.52	0.75	64.7%
B32	B32	0.47	0.57	2.32	0.54	0.76	66.9%
B34	B34	1.30	1.69	6.88	0.54	0.76	66.9%
B36	B36	0.24	0.40	1.50	0.62	0.80	76.3%
B38	B38	0.24	0.45	1.63	0.65	0.81	80.0%
B40	B40	1.25	1.79	6.92	0.58	0.78	71.9%
B42	B42	1.49	2.16	8.37	0.58	0.78	71.9%
B44	B44	0.32	0.58	2.12	0.63	0.80	77.7%
B46	B46	0.96	1.42	5.48	0.59	0.78	72.2%
B48	B48	1.05	1.52	5.85	0.59	0.78	72.3%
POND B4	POND B4	1.46	1.80	8.18	0.46	0.72	57.0%
Basin B4 - Total		**23.14**	**28.37**	**119.03**	**0.51**	**0.74**	**63.6%**
On-Site Subbasins to Basin A							
A2	A2	2.22	1.98	10.07	0.39	0.69	49.6%
A4	A4	0.50	0.93	3.34	0.65	0.81	80.0%
A6	A6	1.33	1.34	6.51	0.42	0.70	52.4%
A8	A8	0.58	0.99	3.57	0.65	0.81	80.0%
A10	A10	1.68	2.42	9.32	0.59	0.78	72.1%
A12	A12	1.36	1.95	7.65	0.57	0.77	70.2%
A14	A14	2.14	2.80	11.16	0.56	0.77	68.9%
A16	A16	0.14	0.26	0.96	0.62	0.80	76.3%
A18	A18	0.14	0.26	0.96	0.62	0.80	76.3%
A20	A20	1.14	0.34	4.06	0.14	0.57	20.0%
A22	A22	0.95	1.41	5.35	0.60	0.79	73.9%
A24	A24	1.72	2.23	8.62	0.59	0.78	72.1%
A26	A26	0.29	0.53	1.90	0.65	0.81	80.0%
A28	A28	1.80	2.34	9.00	0.59	0.78	72.2%
A30	A30	1.57	2.24	8.62	0.59	0.78	72.5%
A32	A32	0.18	0.35	1.25	0.65	0.81	80.0%
A34	A34	0.28	0.48	1.77	0.62	0.80	76.3%
A36	A36	1.54	1.83	7.77	0.51	0.74	63.1%
A38	A38	0.91	1.49	5.68	0.60	0.78	73.2%
A40	A40	0.36	0.45	1.88	0.52	0.75	64.3%
A42	A42	1.15	1.54	5.93	0.59	0.78	72.1%
A44	A44	1.84	2.08	8.74	0.51	0.75	63.8%
A46	A46	0.34	0.41	1.73	0.52	0.75	64.4%
A48	A48	0.64	0.94	3.66	0.57	0.77	70.7%
A50	A50	0.29	0.40	1.66	0.53	0.75	66.0%
A52	A52	0.51	0.75	2.92	0.58	0.78	72.0%
A54	A54	0.15	0.26	0.98	0.60	0.79	74.0%
A56	A56	1.48	1.76	6.97	0.56	0.77	69.5%
A58	A58	0.98	1.41	5.43	0.59	0.78	72.1%
A60	A60	1.61	2.40	9.42	0.57	0.77	70.5%
A62	A62	1.00	1.43	5.51	0.59	0.78	72.2%
A64	A64	0.19	0.32	1.18	0.62	0.79	75.5%
A66	A66	0.69	0.98	3.75	0.59	0.78	72.6%
A68	A68	0.16	0.29	1.07	0.62	0.80	76.3%
A70	A70	0.24	0.34	1.46	0.51	0.74	63.0%
A72	A72	1.41	2.07	8.04	0.58	0.78	71.4%
A74	A74	0.97	1.46	5.63	0.59	0.78	72.1%
A76	A76	0.15	0.26	0.97	0.62	0.80	76.3%
A78	A78	0.78	1.20	4.70	0.58	0.77	70.9%
A80	A80	0.19	0.35	1.29	0.62	0.80	76.3%
A82	A82	0.82	1.16	4.47	0.59	0.78	72.6%
A84	A84	0.68	0.59	2.91	0.41	0.70	52.0%
A86	A86	1.72	2.19	8.87	0.54	0.76	67.1%
A88	A88	1.11	1.71	6.82	0.56	0.77	68.9%
A90	A90	0.30	0.38	1.58	0.52	0.75	63.9%
A92	A92	0.63	0.84	3.38	0.55	0.76	67.6%
A94	A94	0.59	0.78	3.15	0.54	0.76	67.1%
A96	A96	0.20	0.28	1.14	0.52	0.75	64.9%
A98	A98	1.51	2.02	7.96	0.57	0.77	69.9%
A100	A100	1.37	1.65	6.91	0.52	0.75	64.1%
A102	A102	0.15	0.26	0.97	0.62	0.80	76.3%
A104	A104	0.63	0.89	3.43	0.59	0.78	72.0%

Kimley»Horn

PROJECT NAME: Harvest Crossing Filing 3
PROJECT NUMBER: 19684001
CALCULATED BY: JBP
CHECKED BY: KJM
DATE: March 2024

RATIONAL CALCULATIONS SUMMARY

DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	PEAK FLOWS (CFS)		RUNOFF COEFFICIENTS		PERCENT IMPERVIOUS
			Q2	Q100	2-YR	100-YR	
A106	A106	2.68	3.27	13.21	0.55	0.76	67.4%
A108	A108	0.68	0.60	2.93	0.42	0.70	52.7%
A110	A110	0.39	0.39	1.89	0.43	0.70	53.7%
A112	A112	3.79	2.89	15.48	0.37	0.67	46.5%
A114	A114	2.55	1.60	9.35	0.32	0.65	40.1%
POND A1	POND A1	3.79	3.85	19.21	0.40	0.69	50.7%
Onsite Basin A1		**59.22**	**72.59**	**304.15**	**0.51**	**0.74**	**63.4%**
Off-Site Subbasins to Basin A1							
A-O1	A-O1	11.71	1.24	35.38	0.06	0.52	8.6%
A-O2	A-O2	6.37	0.75	17.75	0.07	0.52	9.6%
A-O3	A-O3	1.39	0.35	8.88	0.13	0.55	17.0%
A-O4	A-O4	4.42	0.48	26.49	0.06	0.52	8.3%
A-O5	A-O5	4.89	1.05	18.93	0.11	0.54	14.3%
Basin A1 - Total		**88.01**	**76.47**	**411.58**	**0.37**	**0.67**	**46.0%**
On-Site Subbasins to Basin C							
C2	C2	0.29	0.40	1.60	0.56	0.77	69.2%
C4	C4	1.40	2.00	7.76	0.58	0.78	71.6%
C6	C6	1.10	1.53	5.92	0.58	0.78	71.9%
C8	C8	0.45	0.57	2.52	0.48	0.73	60.1%
C10	C10	0.15	0.27	1.02	0.62	0.80	76.3%
C12	C12	0.73	1.02	3.94	0.59	0.78	72.2%
C14	C14	0.18	0.35	1.26	0.65	0.81	80.0%
C16	C16	0.73	1.15	4.45	0.59	0.78	72.2%
C18	C18	0.93	1.37	5.15	0.61	0.79	75.1%
C20	C20	0.27	0.46	1.65	0.65	0.81	80.0%
C22	C22	0.77	1.05	4.08	0.58	0.78	71.6%
C24	C24	0.28	0.34	1.42	0.51	0.74	63.5%
C26	C26	0.89	1.20	4.64	0.59	0.78	72.2%
C28	C28	1.32	1.70	6.67	0.57	0.77	70.6%
C30	C30	0.18	0.32	1.18	0.62	0.80	76.3%
C32	C32	0.87	1.21	4.67	0.59	0.78	72.5%
C34	C34	0.49	0.66	2.64	0.55	0.76	68.3%
C36	C36	0.53	0.70	2.79	0.56	0.77	68.9%
C38	C38	0.18	0.33	1.21	0.62	0.80	76.3%
C40	C40	0.74	1.04	4.00	0.59	0.78	72.7%
C42	C42	0.47	0.46	2.33	0.40	0.69	50.3%
C44	C44	0.54	0.54	2.66	0.41	0.70	51.6%
Basin C- Total		**13.48**	**18.69**	**73.53**	**0.57**	**0.77**	**70.1%**
On-Site Subbasins to Basin D							
D2	D2	0.57	0.89	3.08	0.56	0.77	69.6%
D4	D4	0.78	1.27	4.95	0.59	0.78	72.9%
D6	D6	0.79	1.11	4.91	0.59	0.78	72.9%
D8	D8	0.76	1.13	4.07	0.59	0.78	72.7%
D10	D10	0.57	0.82	3.35	0.62	0.80	76.3%
D12	D12	1.71	2.58	8.95	0.59	0.78	72.5%
D14	D14	0.45	0.62	2.60	0.59	0.78	72.3%
D16	D16	0.66	1.13	3.51	0.59	0.78	72.6%
D18	D18	0.64	1.05	4.18	0.59	0.78	72.6%
D20	D20	0.20	0.28	1.29	0.62	0.80	76.3%
D22	D22	2.33	3.07	11.93	0.59	0.78	72.5%
D24	D24	2.53	3.33	12.61	0.57	0.77	69.9%
D26	D26	0.41	0.81	2.04	0.50	0.74	61.7%
D28	D28	2.08	0.82	7.07	0.10	0.55	15.0%
Basin D - Total		**12.38**	**18.09**	**67.47**	**0.51**	**0.74**	**63.6%**
On-Site Subbasins to Basin E							
E2	E2	1.89	2.34	10.99	0.55	0.76	67.8%
E4	E4	1.32	1.93	6.79	0.60	0.78	73.4%
E6	E6	1.63	3.95	9.12	0.61	0.79	74.5%
Basin E - Total		**4.85**	**8.22**	**26.90**	**0.58**	**0.78**	**71.6%**
Subbasins Draining to Offsite							
O-O1	O-O1	13.41	1.26	49.46	0.05	0.52	7.8%
Offsite - Total		**13.41**	**1.26**	**49.46**	**0.05**	**0.52**	**7.84%**

Appendix B – Hydraulic Computations

MHFD 100-YEAR RELEASE RATE COMPUTATIONS

Pond A1 Release Rate		
P	2.47	in
S	0.040	ft/ft
L	2250	ft
A	3833715.60	ft^2
C_1	1.3053	
C_2	0.1651	
C_3	-0.3490	
q	1.720	cfs/acre

Pond B4 Release Rate		
P	2.47	in
S	0.040	ft/ft
L	1040	ft
A	1007978.40	ft^2
C_1	1.3053	
C_2	0.1651	
C_3	-0.3490	
q	1.849	cfs/acre

$$q = P_1 C_1 S^{C_2} \left(\frac{L^2}{A} \right)^{C_3}$$ Equation 12-5

Where:

q = peak unit flow rate (cfs/acre)
P = one-hour precipitation depth (in) from NOAA Atlas 14
S = watershed flow path slope (ft/ft)
L = watershed flow path length (ft)
A = area of tributary (ft^2)
C_1, C_2, C_3 = coefficients dependent on event frequency (see Tables12-6, 12-7, and 12-8)

Pond A1 Release Rate		
a	88.01	acres
q	1.720	cfs/acre
Q	136.22	cfs

Pond B4 Release Rate		
a	23.14	acres
q	1.849	cfs/acre
Q	38.51	cfs

$$Q = 0.9aq$$ Equation 12-6

Where:

Q = Allowable 100-year release rate (cfs)
a = Area of watershed (acres)
q = weighted average unit release rate based on relative proportions of watershed soil types (cfs/acre)

Unless otherwise recommended in an approved master plan, the maximum releases rates described in this section are for all full spectrum detention facilities.

MHFD Computed 100-Year Release Rates > MDR 100-Year Release Rates

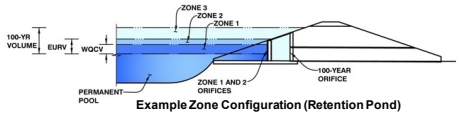
Therefore, Pond A1 100-Year Release Rate shall adhere to 72.70 CFS.
Pond B4 100-Year Release Rate shall adhere to 21.70 CFS.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Harvest Crossing - Filing 3

Basin ID: Pond A1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	88.01	acres
Watershed Length =	2,250	ft
Watershed Length to Centroid =	900	ft
Watershed Slope =	0.040	ft/ft
Watershed Imperviousness =	46.01%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.435 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	3.806 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.86 in.) =	2.574 acre-feet	0.86	inches
5-yr Runoff Volume (P1 = 1.14 in.) =	4.034 acre-feet	1.14	inches
10-yr Runoff Volume (P1 = 1.4 in.) =	5.717 acre-feet	1.40	inches
25-yr Runoff Volume (P1 = 1.79 in.) =	8.838 acre-feet	1.79	inches
50-yr Runoff Volume (P1 = 2.12 in.) =	11.276 acre-feet	2.12	inches
100-yr Runoff Volume (P1 = 2.47 in.) =	14.164 acre-feet	2.47	inches
500-yr Runoff Volume (P1 = 3.39 in.) =	21.123 acre-feet	3.39	inches
Approximate 2-yr Detention Volume =	2.417 acre-feet		
Approximate 5-yr Detention Volume =	3.853 acre-feet		
Approximate 10-yr Detention Volume =	4.627 acre-feet		
Approximate 25-yr Detention Volume =	5.631 acre-feet		
Approximate 50-yr Detention Volume =	6.153 acre-feet		
Approximate 100-yr Detention Volume =	7.374 acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.435	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.371	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.569	acre-feet
Total Detention Basin Volume =	7.374	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

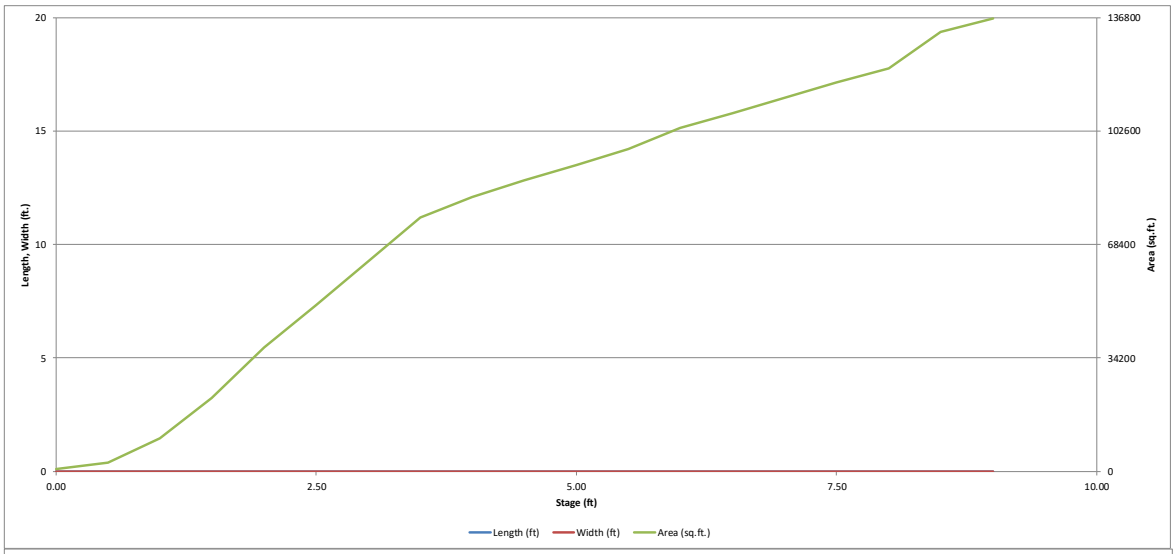
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

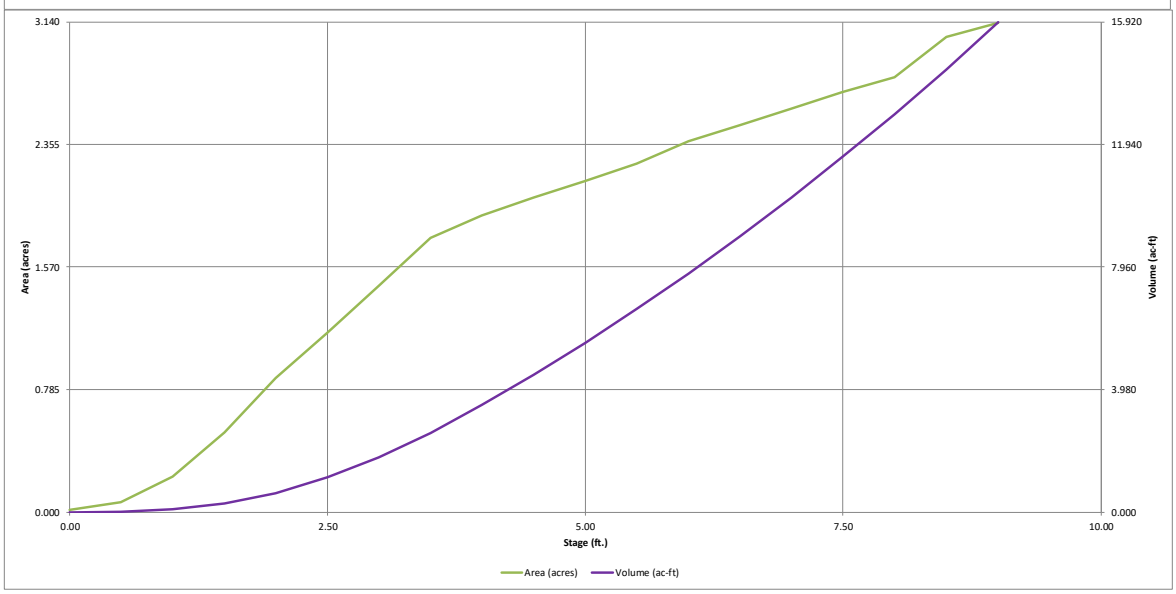
Depth Increment = 0.50 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	706	0.016		
5695.5	--	0.50	--	--	--	2,717	0.062	856	0.020
5696	--	1.00	--	--	--	9,919	0.228	4,015	0.092
5696.5	--	1.50	--	--	--	22,216	0.510	12,048	0.277
5697	--	2.00	--	--	--	37,447	0.860	26,964	0.619
5697.5	--	2.50	--	--	--	50,101	1.150	48,851	1.121
5698	--	3.00	--	--	--	63,118	1.449	77,156	1.771
5698.5	--	3.50	--	--	--	76,509	1.756	112,062	2.573
5699	--	4.00	--	--	--	82,709	1.899	151,867	3.486
5699.5	--	4.50	--	--	--	87,708	2.013	194,471	4.464
5700	--	5.00	--	--	--	92,344	2.120	239,484	5.498
5700.5	--	5.50	--	--	--	97,208	2.232	286,872	6.586
5701	--	6.00	--	--	--	103,414	2.374	337,028	7.737
5701.5	--	6.50	--	--	--	107,963	2.478	389,872	8.950
5702	--	7.00	--	--	--	112,470	2.582	444,980	10.215
5702.5	--	7.50	--	--	--	117,094	2.688	502,371	11.533
5703	--	8.00	--	--	--	121,366	2.786	561,986	12.901
5703.5	--	8.50	--	--	--	132,495	3.042	625,451	14.358
5704	--	9.00	--	--	--	136,549	3.135	692,712	15.902

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



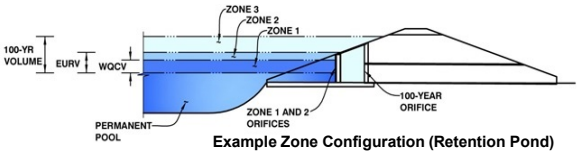


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Harvest Crossing - Filing 3

Basin ID: Pond A1



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.76	1.435	Orifice Plate
Zone 2 (EURV)	4.17	2.371	Orifice Plate
Zone 3 (100-year)	5.85	3.569	Weir&Pipe (Restrict)
Total (all zones)		7.374	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	4.17	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	16.80	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.39	2.78					
Orifice Area (sq. inches)	6.75	6.75	5.75					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.17	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.17	N/A	feet
Overflow Weir Front Edge Length =	10.00	N/A	feet	Overflow Weir Slope Length =	10.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	11.38	N/A	
Horiz. Length of Weir Sides =	10.00	N/A	feet	Overflow Grate Open Area w/o Debris =	69.60	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	34.80	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	6.12	N/A	ft^2
Outlet Pipe Diameter =	48.00	N/A	inches	Outlet Orifice Centroid =	1.13	N/A	feet
Restrictor Plate Height Above Pipe Invert =	23.50		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.55	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	7.20	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.78	feet
Spillway Crest Length =	150.00	feet	Stage at Top of Freeboard =	8.98	feet
Spillway End Slopes =	10.00	H:V	Basin Area at Top of Freeboard =	3.13	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	15.84	acre-ft

Calculated Parameters for Spillway

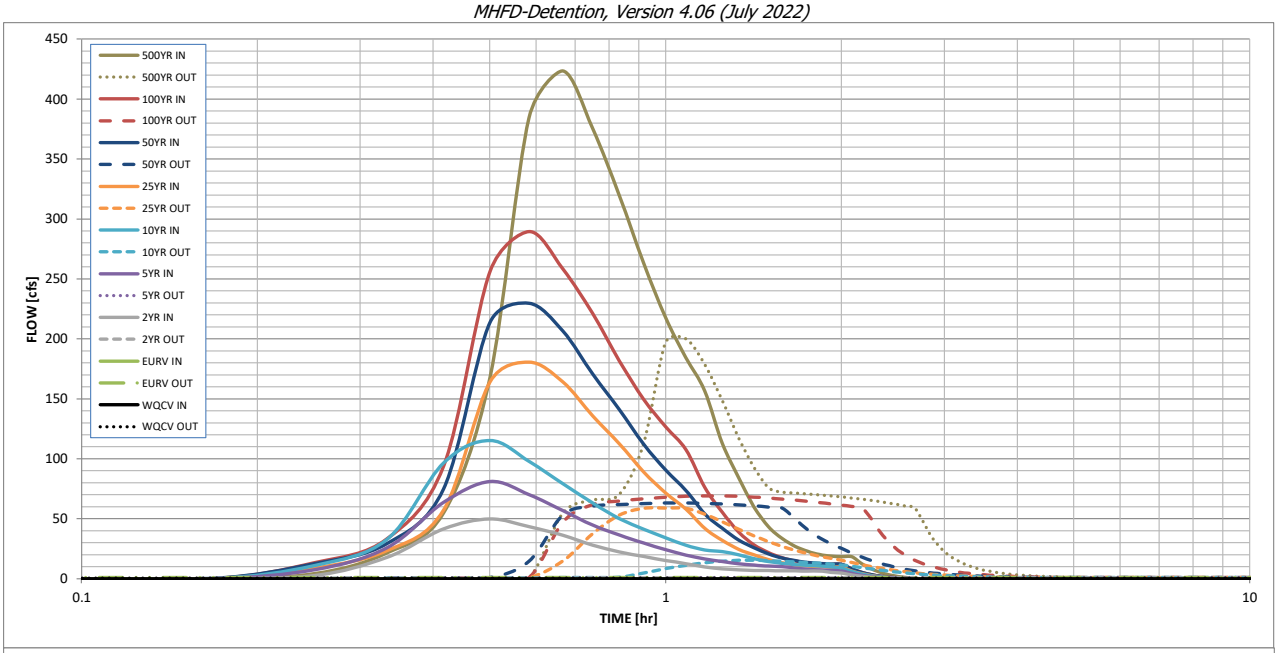
Routed Hydrograph Results

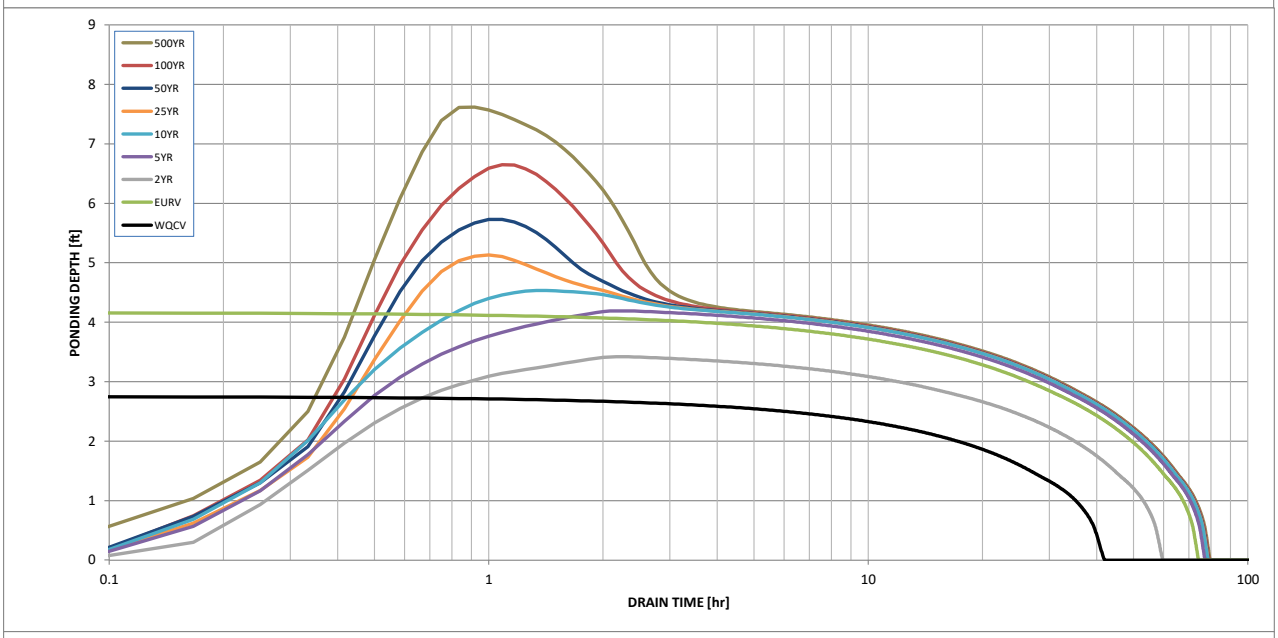
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

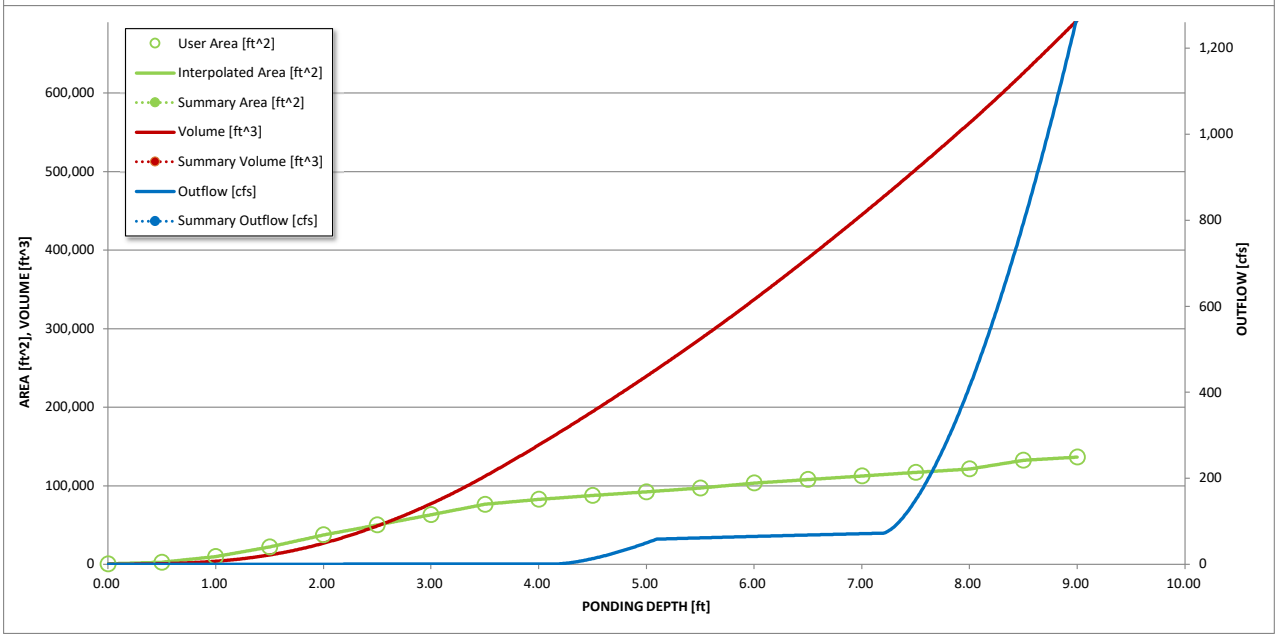
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.86	1.14	1.40	1.79	2.12	2.47	3.39
CUHP Runoff Volume (acre-ft) =	1.435	3.806	2.574	4.034	5.717	8.838	11.276	14.164	21.123
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.574	4.034	5.717	8.838	11.276	14.164	21.123
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.4	16.7	39.7	92.0	127.0	167.2	262.7
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.19	0.45	1.05	1.44	1.90	2.99
Peak Inflow Q (cfs) =	N/A	N/A	49.9	81.1	115.4	180.8	229.9	289.7	423.4
Peak Outflow Q (cfs) =	0.6	1.1	0.9	1.3	15.4	58.9	63.2	69.2	200.1
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.4	0.6	0.5	0.4	0.8
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.0	0.2	0.8	0.9	1.0	1.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	66	54	69	68	64	62	60	55
Time to Drain 99% of Inflow Volume (hours) =	**40**	71	57	74	74	72	71	70	67
Maximum Ponding Depth (ft) =	2.76	4.17	3.42	4.19	4.54	5.13	5.73	6.65	7.62
Area at Maximum Ponding Depth (acres) =	1.31	1.94	1.71	1.94	2.02	2.15	2.30	2.51	2.71
Maximum Volume Stored (acre-ft) =	1.441	3.812	2.434	3.851	4.525	5.775	7.106	9.324	11.830

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	4.21
	0:15:00	0.00	0.00	2.73	7.43	11.01	8.83	12.61	13.24	21.65
	0:20:00	0.00	0.00	17.88	25.89	32.88	23.51	29.52	33.35	54.93
	0:25:00	0.00	0.00	41.58	63.81	96.66	57.31	75.12	94.00	167.76
	0:30:00	0.00	0.00	49.91	81.14	115.42	164.21	213.91	256.13	384.62
	0:35:00	0.00	0.00	43.48	70.28	97.88	180.78	229.90	289.70	423.44
	0:40:00	0.00	0.00	36.31	56.88	79.42	164.13	206.65	258.35	375.48
	0:45:00	0.00	0.00	28.14	44.77	63.19	136.00	170.84	221.23	319.69
	0:50:00	0.00	0.00	22.44	36.48	50.30	112.71	141.14	181.81	263.34
	0:55:00	0.00	0.00	18.61	29.82	41.49	89.18	112.37	149.76	217.72
	1:00:00	0.00	0.00	15.35	24.28	34.21	71.61	90.72	126.80	184.46
	1:05:00	0.00	0.00	12.66	19.72	27.98	58.08	73.82	107.80	156.67
	1:10:00	0.00	0.00	9.88	16.64	24.15	42.12	54.18	76.33	112.86
	1:15:00	0.00	0.00	8.32	14.31	22.68	32.04	42.14	55.42	84.41
	1:20:00	0.00	0.00	7.54	12.52	20.05	24.57	32.28	39.03	59.85
	1:25:00	0.00	0.00	7.10	11.38	16.73	19.92	25.99	28.22	43.44
	1:30:00	0.00	0.00	6.87	10.64	14.46	15.97	20.75	21.89	33.74
	1:35:00	0.00	0.00	6.70	10.17	12.93	13.35	17.26	17.60	27.11
	1:40:00	0.00	0.00	6.58	8.95	11.90	11.75	15.12	14.85	22.92
	1:45:00	0.00	0.00	6.51	8.03	11.22	10.66	13.65	13.11	20.22
	1:50:00	0.00	0.00	6.48	7.42	10.73	10.07	12.83	12.34	18.97
	1:55:00	0.00	0.00	5.49	7.01	10.01	9.72	12.36	12.05	18.44
	2:00:00	0.00	0.00	4.73	6.53	8.92	9.54	12.12	11.97	18.32
	2:05:00	0.00	0.00	3.24	4.45	6.07	6.53	8.28	8.23	12.56
	2:10:00	0.00	0.00	2.11	2.89	3.97	4.26	5.40	5.38	8.19
	2:15:00	0.00	0.00	1.37	1.85	2.56	2.77	3.51	3.48	5.29
	2:20:00	0.00	0.00	0.83	1.14	1.58	1.70	2.15	2.13	3.22
	2:25:00	0.00	0.00	0.48	0.70	0.95	1.06	1.34	1.32	2.00
	2:30:00	0.00	0.00	0.25	0.39	0.50	0.58	0.73	0.72	1.08
	2:35:00	0.00	0.00	0.10	0.17	0.20	0.25	0.31	0.30	0.44
	2:40:00	0.00	0.00	0.03	0.04	0.04	0.05	0.06	0.06	0.08
	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

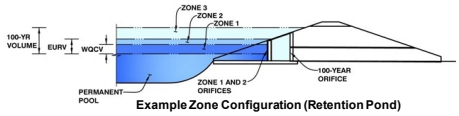
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Harvest Crossing - Filing 3

Basin ID: Pond B4



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	23.14	acres
Watershed Length =	1,040	ft
Watershed Length to Centroid =	470	ft
Watershed Slope =	0.040	ft/ft
Watershed Imperviousness =	63.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.480	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.419	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.86 in.) =	0.941	acre-feet	0.86	inches
5-yr Runoff Volume (P1 = 1.14 in.) =	1.377	acre-feet	1.14	inches
10-yr Runoff Volume (P1 = 1.4 in.) =	1.836	acre-feet	1.40	inches
25-yr Runoff Volume (P1 = 1.79 in.) =	2.627	acre-feet	1.79	inches
50-yr Runoff Volume (P1 = 2.12 in.) =	3.261	acre-feet	2.12	inches
100-yr Runoff Volume (P1 = 2.47 in.) =	3.985	acre-feet	2.47	inches
500-yr Runoff Volume (P1 = 3.39 in.) =	5.786	acre-feet	3.39	inches
Approximate 2-yr Detention Volume =	0.917	acre-feet		
Approximate 5-yr Detention Volume =	1.370	acre-feet		
Approximate 10-yr Detention Volume =	1.649	acre-feet		
Approximate 25-yr Detention Volume =	1.970	acre-feet		
Approximate 50-yr Detention Volume =	2.135	acre-feet		
Approximate 100-yr Detention Volume =	2.435	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.480	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.940	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.016	acre-feet
Total Detention Basin Volume =	2.435	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

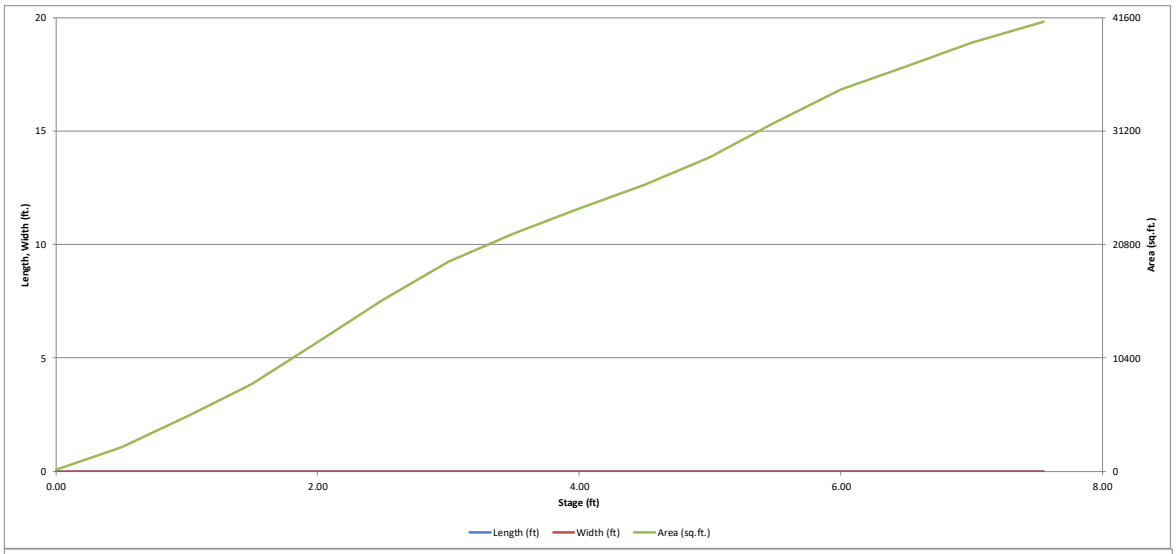
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

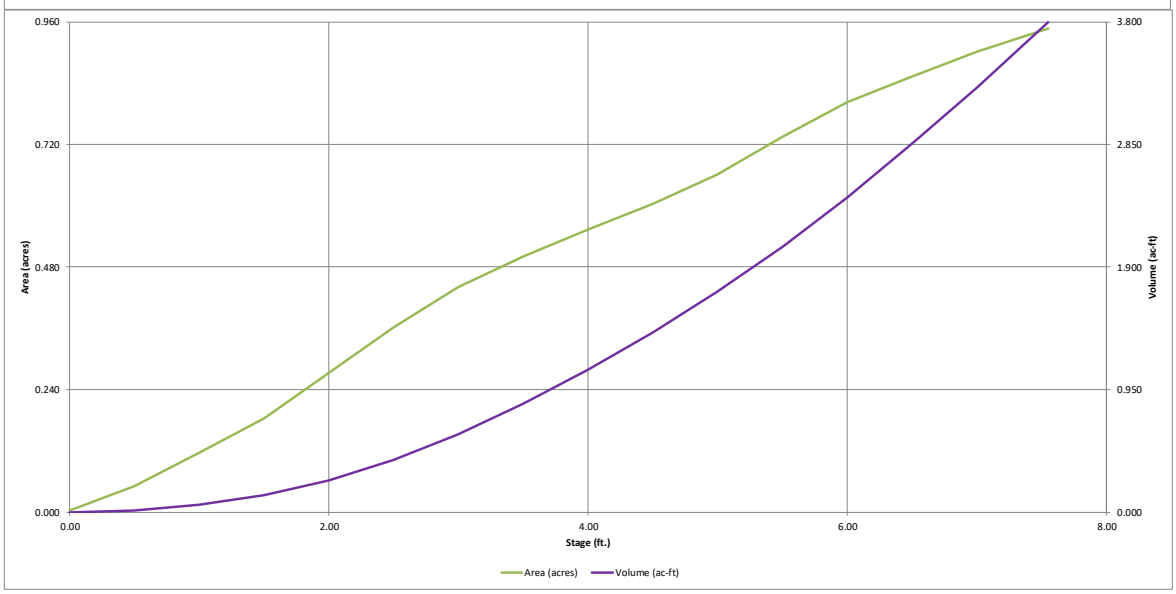
Depth Increment = 1.00 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	177	0.004		
5719.5	--	0.50	--	--	--	2,223	0.051	600	0.014
5720	--	1.00	--	--	--	5,027	0.115	2,412	0.055
5720.5	--	1.50	--	--	--	7,994	0.184	5,668	0.130
5721	--	2.00	--	--	--	11,846	0.272	10,628	0.244
5721.5	--	2.50	--	--	--	15,724	0.361	17,520	0.402
5722	--	3.00	--	--	--	19,205	0.441	26,252	0.603
5722.5	--	3.50	--	--	--	21,807	0.501	36,505	0.838
5723	--	4.00	--	--	--	24,068	0.553	47,974	1.101
5723.5	--	4.50	--	--	--	26,280	0.603	60,561	1.390
5724	--	5.00	--	--	--	28,761	0.660	74,321	1.706
5724.5	--	5.50	--	--	--	32,028	0.735	89,519	2.055
5725	--	6.00	--	--	--	34,965	0.803	106,267	2.440
5725.5	--	6.50	--	--	--	37,121	0.852	124,288	2.853
5726	--	7.00	--	--	--	39,250	0.901	143,381	3.292
5726.55	--	7.55	--	--	--	41,227	0.946	165,512	3.800

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



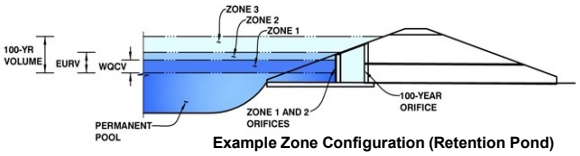


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Harvest Crossing - Filing 3**

Basin ID: **Pond B4**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.71	0.480	Orifice Plate
Zone 2 (EURV)	4.55	0.940	Circular Orifice
Zone 3 (100-year)	6.00	1.016	Weir&Pipe (Restrict)
Total (all zones)		2.435	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	2.71	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	10.80	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.90	1.81					
Orifice Area (sq. inches)	2.00	1.95	1.95					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected			Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.71	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.00	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	4.55	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.02	N/A	feet
Vertical Orifice Diameter =	0.45	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.55	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.55	N/A	feet
Overflow Weir Front Edge Length =	6.00	N/A	feet	Overflow Weir Slope Length =	6.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	13.29	N/A	
Horiz. Length of Weir Sides =	6.00	N/A	feet	Overflow Grate Open Area w/o Debris =	25.06	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	12.53	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.88	N/A	ft^2
Outlet Pipe Diameter =	30.00	N/A	inches	Outlet Orifice Centroid =	0.59	N/A	feet
Restrictor Plate Height Above Pipe Invert =	12.25		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.39	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.15	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.39	feet
Spillway Crest Length =	105.00	feet	Stage at Top of Freeboard =	7.54	feet
Spillway End Slopes =	50.00	H:V	Basin Area at Top of Freeboard =	0.95	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	3.79	acre-ft

Calculated Parameters for Spillway

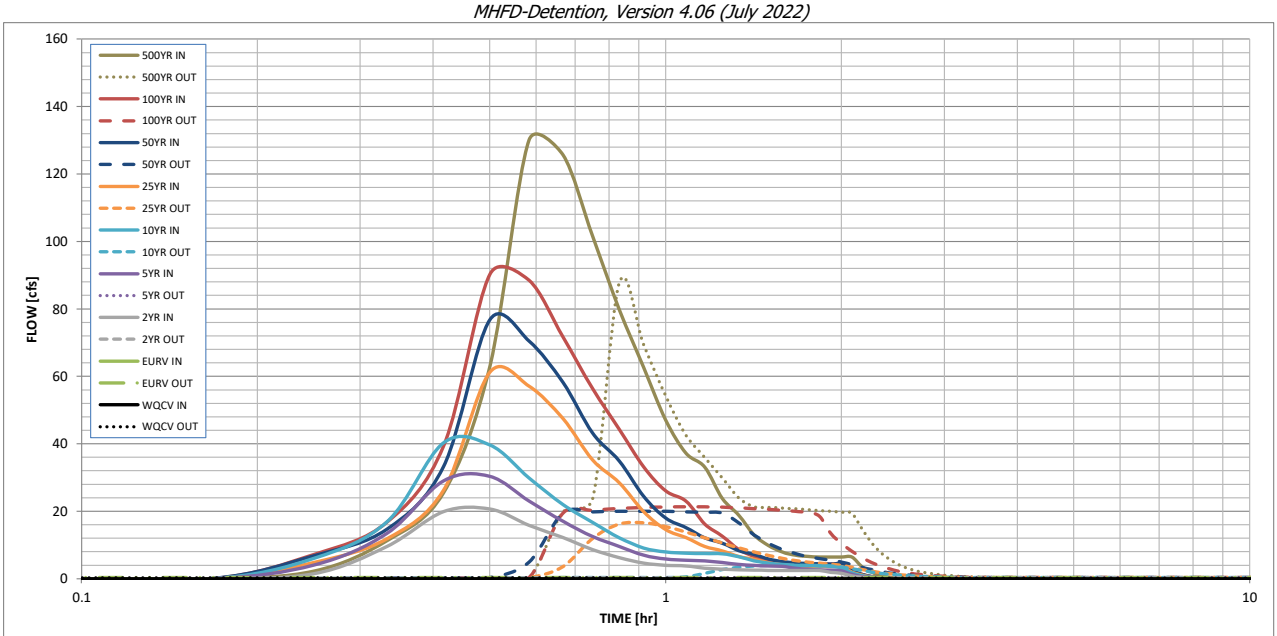
Routed Hydrograph Results

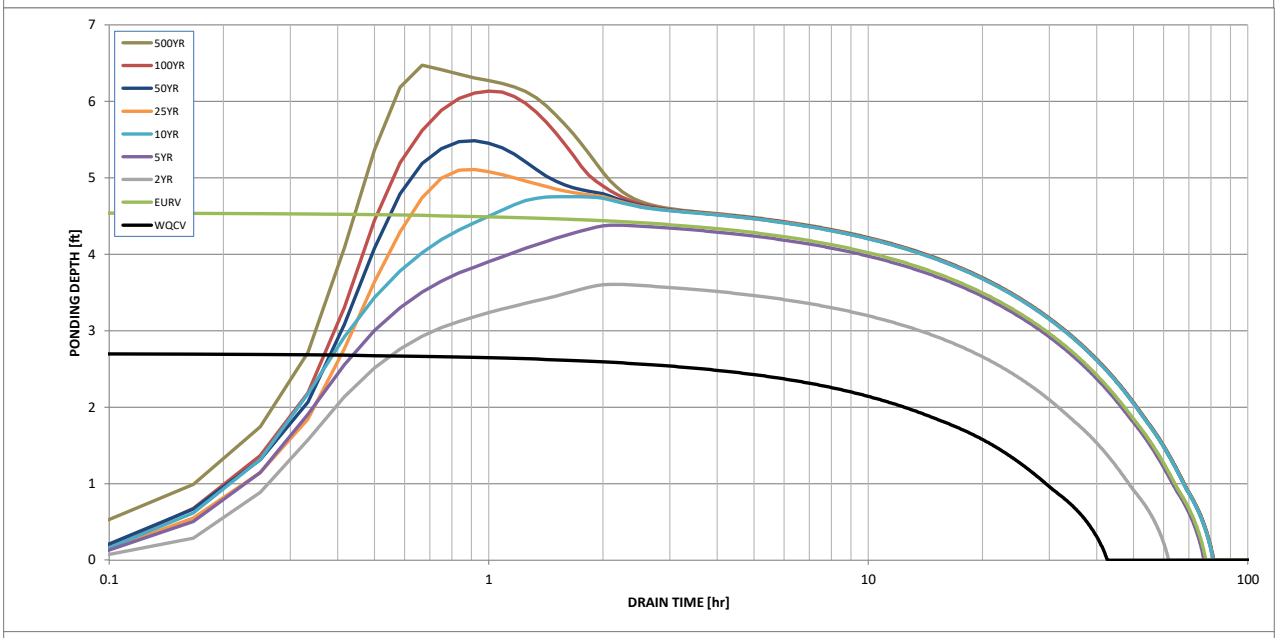
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

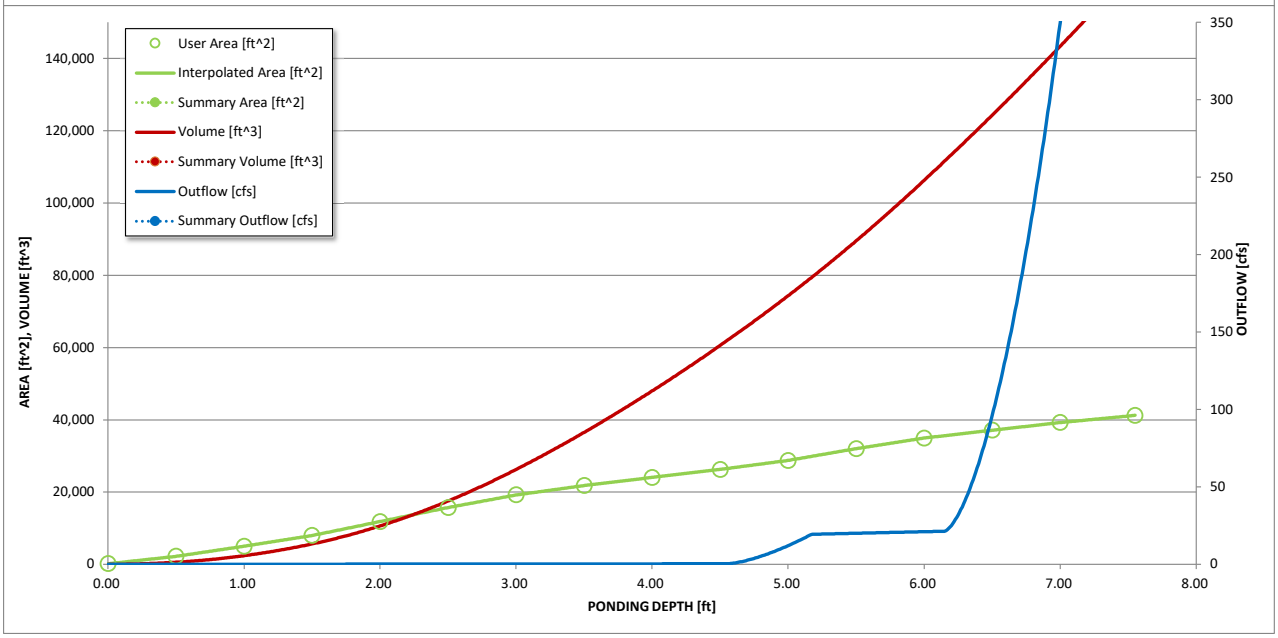
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.86	1.14	1.40	1.79	2.12	2.47	3.39
CUHP Runoff Volume (acre-ft) =	0.480	1.419	0.941	1.377	1.836	2.627	3.261	3.985	5.786
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.941	1.377	1.836	2.627	3.261	3.985	5.786
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.4	4.7	10.7	24.9	34.1	44.8	70.4
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.20	0.46	1.07	1.47	1.94	3.04
Peak Inflow Q (cfs) =	N/A	N/A	20.7	30.4	40.3	61.3	76.9	90.3	130.1
Peak Outflow Q (cfs) =	0.3	0.4	0.3	0.4	4.0	16.6	20.1	21.4	87.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.4	0.7	0.6	0.5	1.2
Structure Controlling Flow =	Vertical Orifice 1	Overflow Weir 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.6	0.8	0.8	0.9
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	66	54	66	68	65	63	61	56
Time to Drain 99% of Inflow Volume (hours) =	**40**	72	58	72	75	73	72	71	68
Maximum Ponding Depth (ft) =	2.71	4.55	3.61	4.38	4.76	5.11	5.49	6.14	6.48
Area at Maximum Ponding Depth (acres) =	0.39	0.61	0.51	0.59	0.63	0.68	0.73	0.82	0.85
Maximum Volume Stored (acre-ft) =	0.482	1.421	0.889	1.319	1.545	1.780	2.040	2.545	2.828

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	2.30
	0:15:00	0.00	0.00	1.52	4.11	6.08	4.86	6.90	7.25	11.36
	0:20:00	0.00	0.00	9.64	13.48	16.88	11.92	14.77	16.78	25.58
	0:25:00	0.00	0.00	19.92	29.08	40.32	26.30	33.30	39.37	63.13
	0:30:00	0.00	0.00	20.72	30.38	39.69	61.28	76.91	90.34	130.08
	0:35:00	0.00	0.00	15.91	23.07	29.94	57.12	70.49	88.50	125.78
	0:40:00	0.00	0.00	12.23	17.06	22.08	47.53	58.28	71.77	101.53
	0:45:00	0.00	0.00	8.66	12.57	16.74	35.26	43.19	56.36	79.83
	0:50:00	0.00	0.00	6.28	9.61	12.18	28.51	34.92	44.30	62.70
	0:55:00	0.00	0.00	4.70	7.02	9.14	19.92	24.48	33.24	47.10
	1:00:00	0.00	0.00	4.03	5.89	7.95	14.59	18.02	26.07	37.28
	1:05:00	0.00	0.00	3.82	5.50	7.61	12.23	15.23	23.07	33.17
	1:10:00	0.00	0.00	3.19	5.35	7.48	9.63	12.14	16.29	23.84
	1:15:00	0.00	0.00	2.88	4.82	7.44	8.30	10.57	12.67	18.87
	1:20:00	0.00	0.00	2.69	4.28	6.55	6.63	8.36	8.74	13.00
	1:25:00	0.00	0.00	2.59	3.98	5.36	5.82	7.26	6.67	9.89
	1:30:00	0.00	0.00	2.53	3.81	4.66	4.75	5.88	5.37	7.95
	1:35:00	0.00	0.00	2.49	3.71	4.26	4.18	5.14	4.73	6.99
	1:40:00	0.00	0.00	2.49	3.14	4.03	3.88	4.74	4.51	6.63
	1:45:00	0.00	0.00	2.49	2.84	3.90	3.73	4.54	4.41	6.48
	1:50:00	0.00	0.00	2.49	2.66	3.86	3.66	4.46	4.41	6.48
	1:55:00	0.00	0.00	1.95	2.57	3.68	3.63	4.42	4.41	6.48
	2:00:00	0.00	0.00	1.64	2.36	3.22	3.63	4.42	4.41	6.48
	2:05:00	0.00	0.00	0.90	1.30	1.79	2.02	2.46	2.45	3.59
	2:10:00	0.00	0.00	0.49	0.72	0.98	1.12	1.36	1.36	1.99
	2:15:00	0.00	0.00	0.23	0.37	0.49	0.57	0.70	0.69	1.02
	2:20:00	0.00	0.00	0.10	0.17	0.22	0.28	0.34	0.33	0.49
	2:25:00	0.00	0.00	0.03	0.05	0.06	0.09	0.10	0.10	0.15
	2:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

Harvest Gulch Low Flow Channel Sizing

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.050
Channel Slope	0.002 ft/ft
Left Side Slope	2.500 H:V
Right Side Slope	2.500 H:V
Bottom Width	16.00 ft
Discharge	35.85 cfs

Results	
Normal Depth	15.8 in
Flow Area	25.3 ft²
Wetted Perimeter	23.1 ft
Hydraulic Radius	13.2 in
Top Width	22.57 ft
Critical Depth	6.3 in
Critical Slope	0.047 ft/ft
Velocity	1.41 ft/s
Velocity Head	0.03 ft
Specific Energy	1.35 ft
Froude Number	0.235
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	15.8 in
Critical Depth	6.3 in
Channel Slope	0.002 ft/ft
Critical Slope	0.047 ft/ft

Harvest Gulch 5-YR Storm Event

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.002 ft/ft
Discharge	84.52 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	4.33
0+12	1.30
0+22	1.30
0+25	0.00
0+41	0.00
0+45	1.30
0+55	1.30
0+67	4.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 4.33)	(0+67, 4.33)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	24.1 in
Roughness Coefficient	0.050
Elevation	2.01 ft
Elevation Range	0.0 to 4.3 ft
Flow Area	57.3 ft²
Wetted Perimeter	48.9 ft
Hydraulic Radius	14.0 in
Top Width	48.25 ft
Normal Depth	24.1 in
Critical Depth	10.9 in
Critical Slope	0.040 ft/ft
Velocity	1.48 ft/s
Velocity Head	0.03 ft
Specific Energy	2.04 ft

Harvest Gulch 5-YR Storm Event

Results	
Froude Number	0.239
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	24.1 in
Critical Depth	10.9 in
Channel Slope	0.002 ft/ft
Critical Slope	0.040 ft/ft

Harvest Gulch 10-YR Storm Event

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.002 ft/ft
Discharge	123.38 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	4.33
0+12	1.30
0+22	1.30
0+25	0.00
0+41	0.00
0+45	1.30
0+55	1.30
0+67	4.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 4.33)	(0+67, 4.33)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	28.0 in
Roughness Coefficient	0.050
Elevation	2.33 ft
Elevation Range	0.0 to 4.3 ft
Flow Area	73.4 ft²
Wetted Perimeter	51.6 ft
Hydraulic Radius	17.1 in
Top Width	50.83 ft
Normal Depth	28.0 in
Critical Depth	16.2 in
Critical Slope	0.043 ft/ft
Velocity	1.68 ft/s
Velocity Head	0.04 ft
Specific Energy	2.38 ft

Harvest Gulch 10-YR Storm Event

Results	
Froude Number	0.247
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	28.0 in
Critical Depth	16.2 in
Channel Slope	0.002 ft/ft
Critical Slope	0.043 ft/ft

Harvest Gulch 100-YR Storm Event

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.002 ft/ft
Discharge	339.16 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	4.33
0+12	1.30
0+22	1.30
0+25	0.00
0+41	0.00
0+45	1.30
0+55	1.30
0+67	4.33

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 4.33)	(0+67, 4.33)	0.050

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	43.4 in
Roughness Coefficient	0.050
Elevation	3.61 ft
Elevation Range	0.0 to 4.3 ft
Flow Area	144.9 ft²
Wetted Perimeter	62.0 ft
Hydraulic Radius	28.0 in
Top Width	60.97 ft
Normal Depth	43.4 in
Critical Depth	23.7 in
Critical Slope	0.035 ft/ft
Velocity	2.34 ft/s
Velocity Head	0.09 ft
Specific Energy	3.70 ft

Harvest Gulch 100-YR Storm Event

Results	
Froude Number	0.268
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	43.4 in
Critical Depth	23.7 in
Channel Slope	0.002 ft/ft
Critical Slope	0.035 ft/ft

Hydraulic Analysis Report

Project Data

Project Title: Harvest Crossing Filing 3

Designer:

Project Date: Monday, March 25, 2024

Project Units: U.S. Customary Units

Notes:

Weir Analysis: A-2

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5702.79
52.31	5702.49
118.00	5702.83

Tailwater (above crest): 0.00 ft

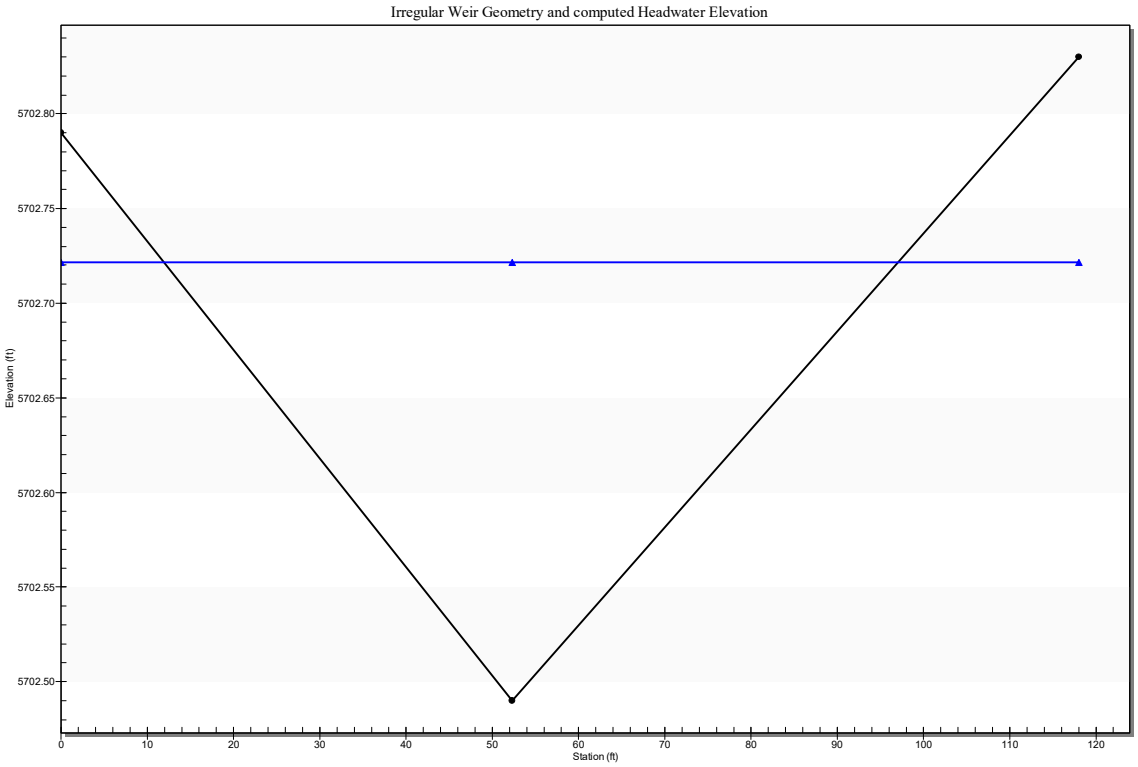
Applied Coefficients

0	3
1	3

Flow: 10.0700 cfs

Result Parameters

Head: 0.2317 ft
Elevation Head: 5702.72
Adjacent LPE: 5719.37 (FREEBOARD: 16.65')



Weir Analysis: A-4

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5704.29
75.00	5703.31
101.17	5703.19
179.00	5703.64

Tailwater (above crest): 0.00 ft

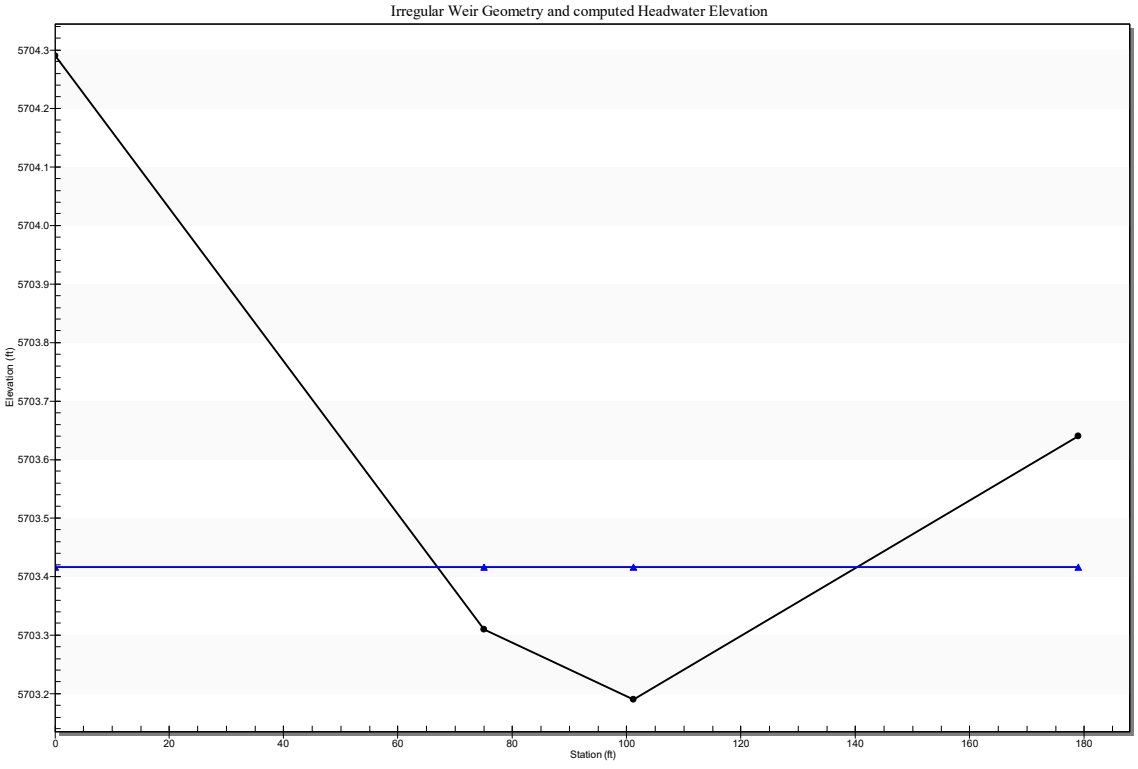
Applied Coefficients

0	3
1	3
2	3

Flow: 10.0700 cfs

Result Parameters

Head: 0.2261 ft
Elevation Head: 5703.42
Adjacent LPE: 5719.37 (FREEBOARD: 15.95')



Weir Analysis: A-10

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5717.92
31.14	5717.46
58.00	5717.87

Tailwater (above crest): 0.00 ft

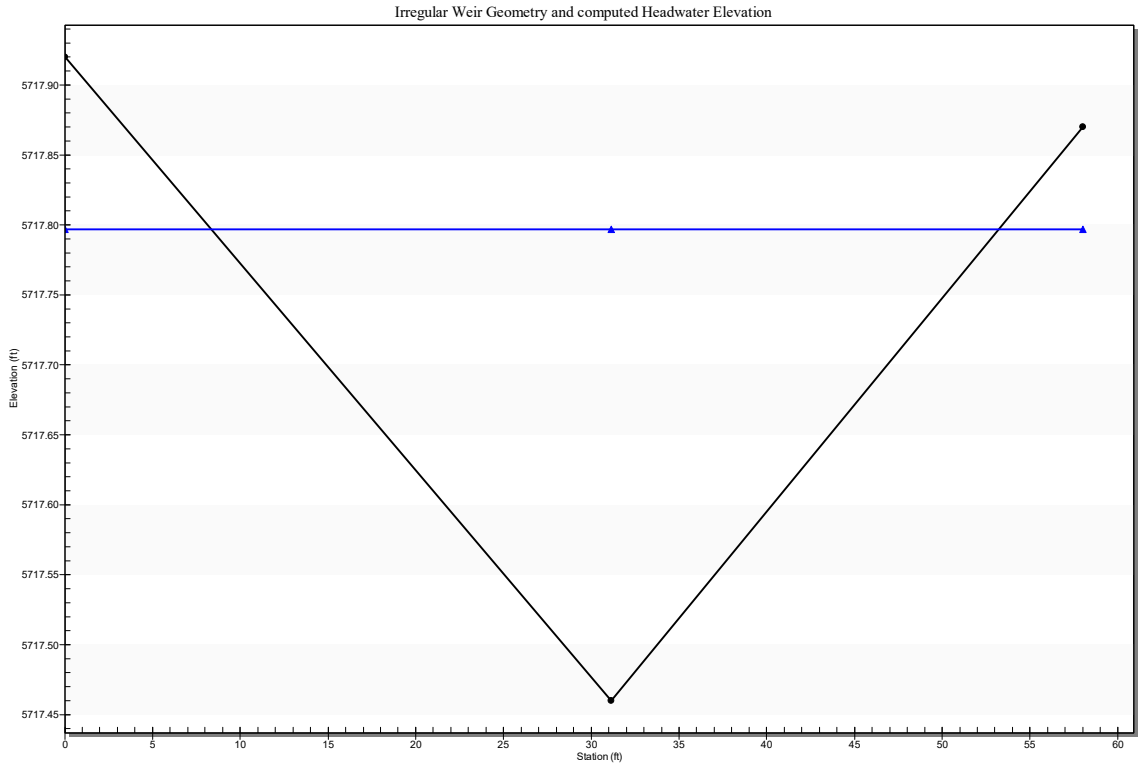
Applied Coefficients

0	3
1	3

Flow: 9.3200 cfs

Result Parameters

Head: 0.3371 ft
Elevation Head: 5717.80
Adjacent LPE: 5719.37 (FREEBOARD: 1.57')



Weir Analysis: A-20

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5732.28
58.38	5730.00
84.00	5731.00

Tailwater (above crest): 0.00 ft

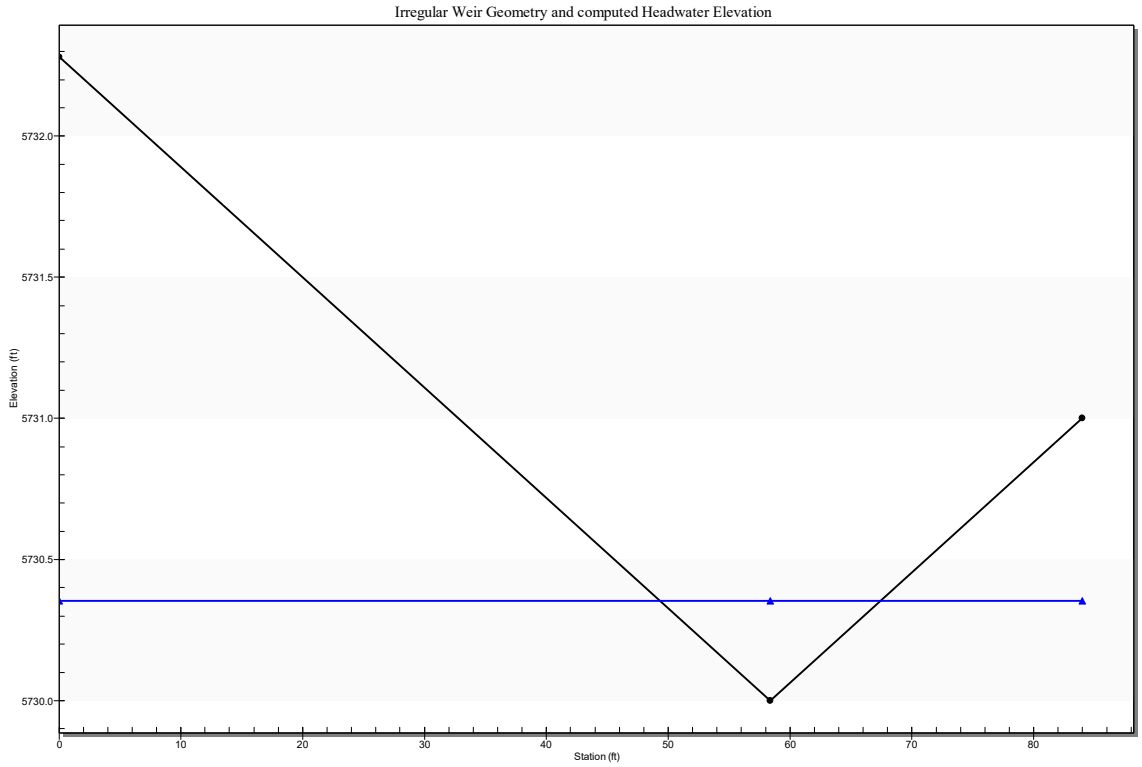
Applied Coefficients

0	3
1	3

Flow: 4.0600 cfs

Result Parameters

Head: 0.3542 ft
Elevation Head: 5730.35
Adjacent LPE: 5731.85 (FREEBOARD:1.5')



Weir Analysis: A-56

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5753.13
59.70	5751.71
90.00	5752.45

Tailwater (above crest): 0.00 ft

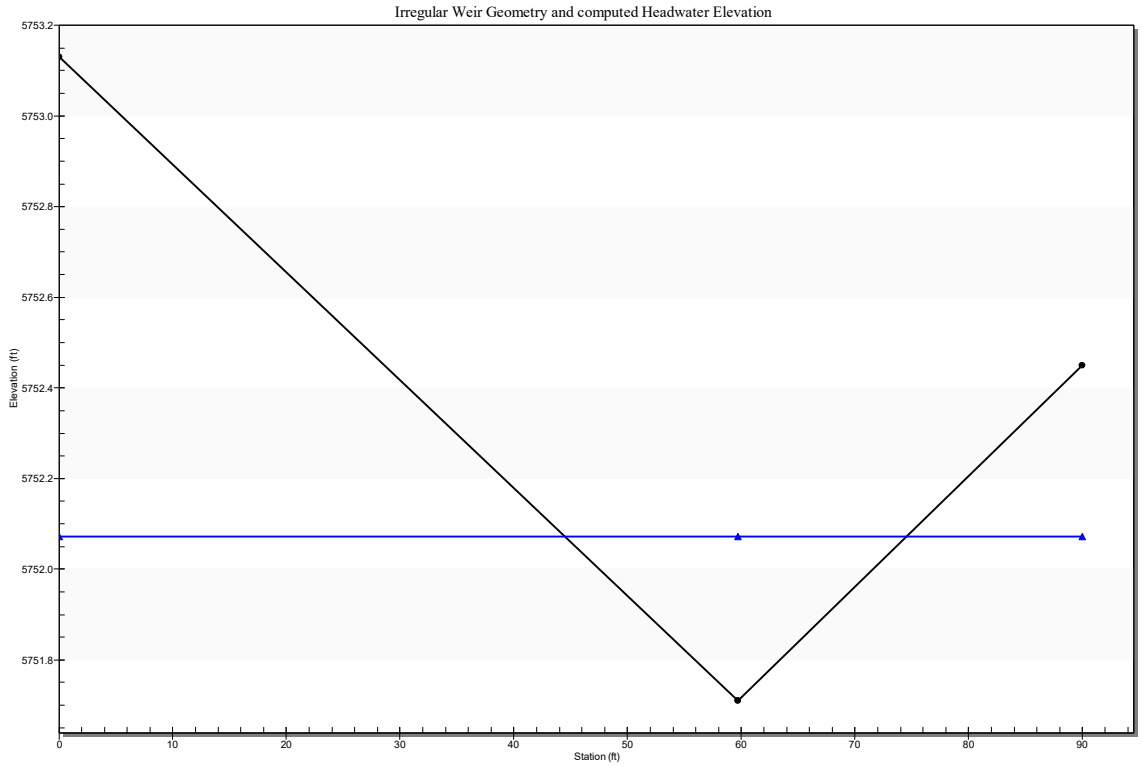
Applied Coefficients

0	3
1	3

Flow: 6.9700 cfs

Result Parameters

Head: 0.3626 ft
Elevation Head: 5752.07
Adjacent LPE: 5753.97 (FREEBOARD:1.9')



Weir Analysis: A-86

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5737.96
60.11	5736.15
77.91	5735.97
95.00	5736.38

Tailwater (above crest): 0.00 ft

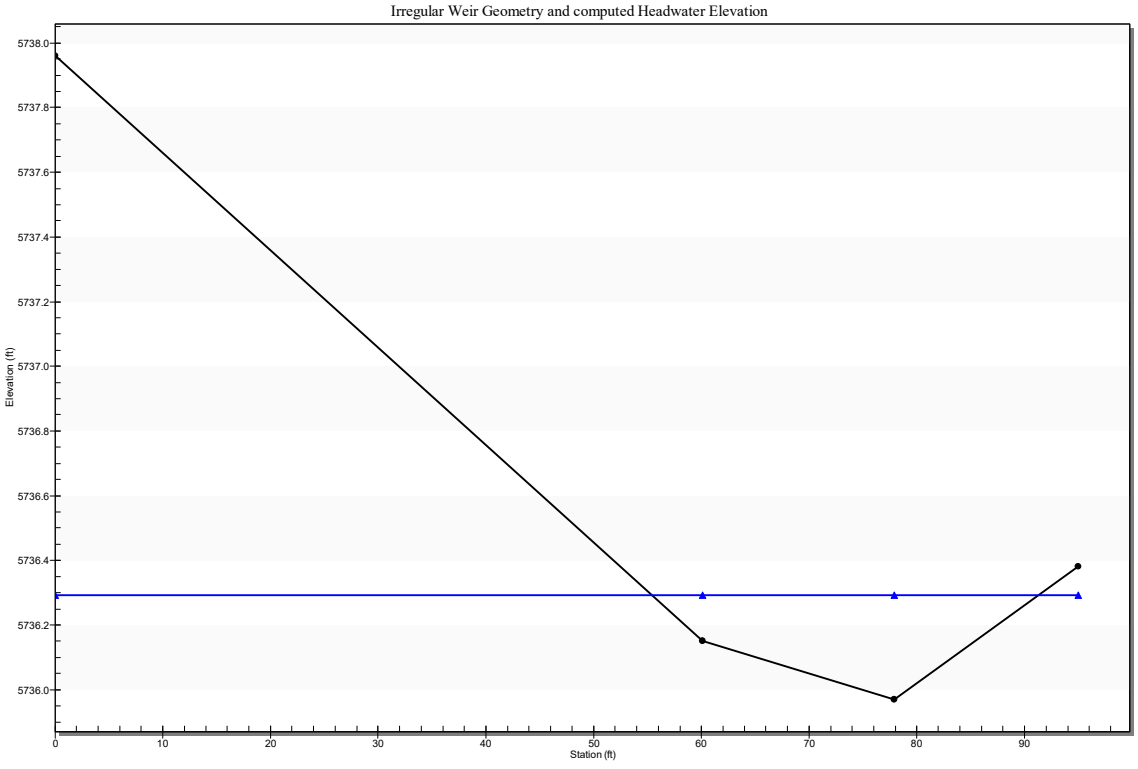
Applied Coefficients

0	3
1	3
2	3

Flow: 8.8700 cfs

Result Parameters

Head: 0.3225 ft
Elevation Head: 5736.29
Adjacent LPE: 5738.61 (FREEBOARD:2.32')



Weir Analysis: A-98

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5732.37
50.14	5732.11
99.00	5732.34

Tailwater (above crest): 0.00 ft

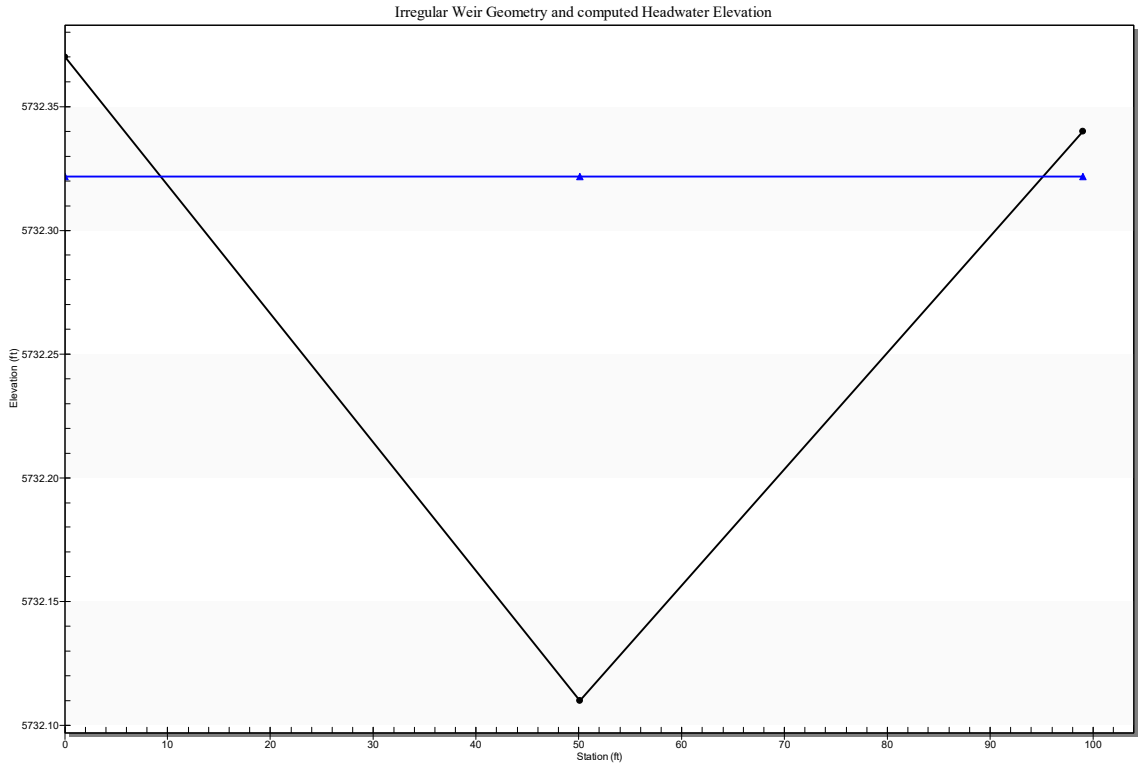
Applied Coefficients

0	3
1	3

Flow: 8.8700 cfs

Result Parameters

Head: 0.2118 ft
Elevation Head: 5732.32
Adjacent LPE: 5733.76 (FREEBOARD 1.44')



Weir Analysis: A-100

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5732.45
50.00	5732.10
126.75	5732.31
200.00	5732.97

Tailwater (above crest): 0.00 ft

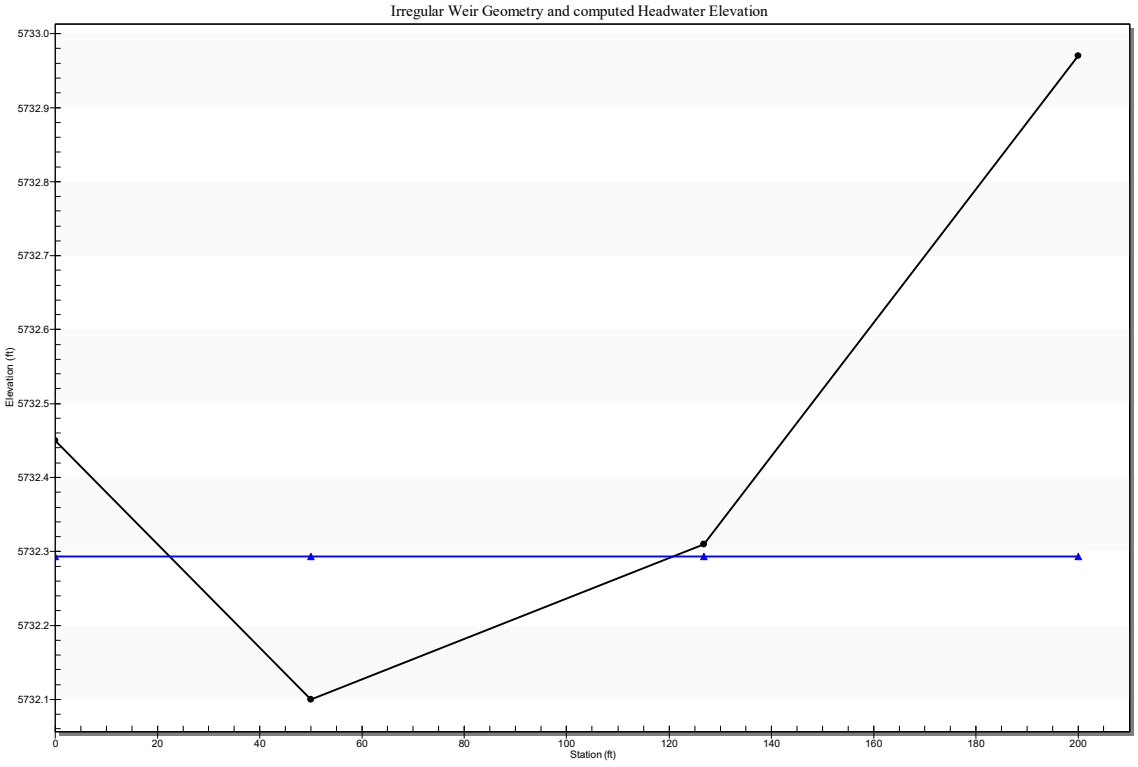
Applied Coefficients

0	3
1	3
2	0

Flow: 8.8700 cfs

Result Parameters

Head: 0.1934 ft
Elevation Head: 5732.29
Adjacent LPE: 5733.82 (FREEBOARD: 1.53')



Weir Analysis: A-106

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5734.06
80.82	5733.22
130.00	5734.04

Tailwater (above crest): 0.00 ft

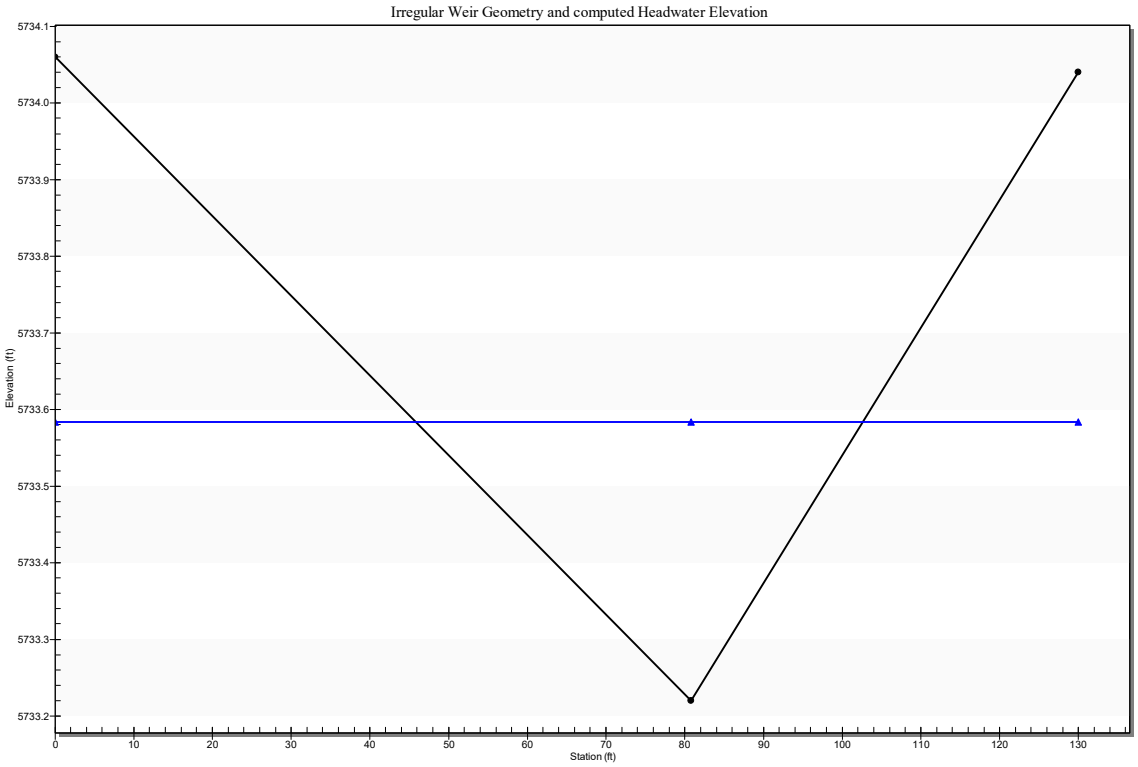
Applied Coefficients

0	3
1	3

Flow: 13.2100 cfs

Result Parameters

Head: 0.3636 ft
Elevation Head: 5733.58
Adjacent LPE: 5735.13 (FREEBOARD: 1.55')



Weir Analysis: B-2

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5729.03
59.83	5728.68
120.00	5729.04

Tailwater (above crest): 0.00 ft

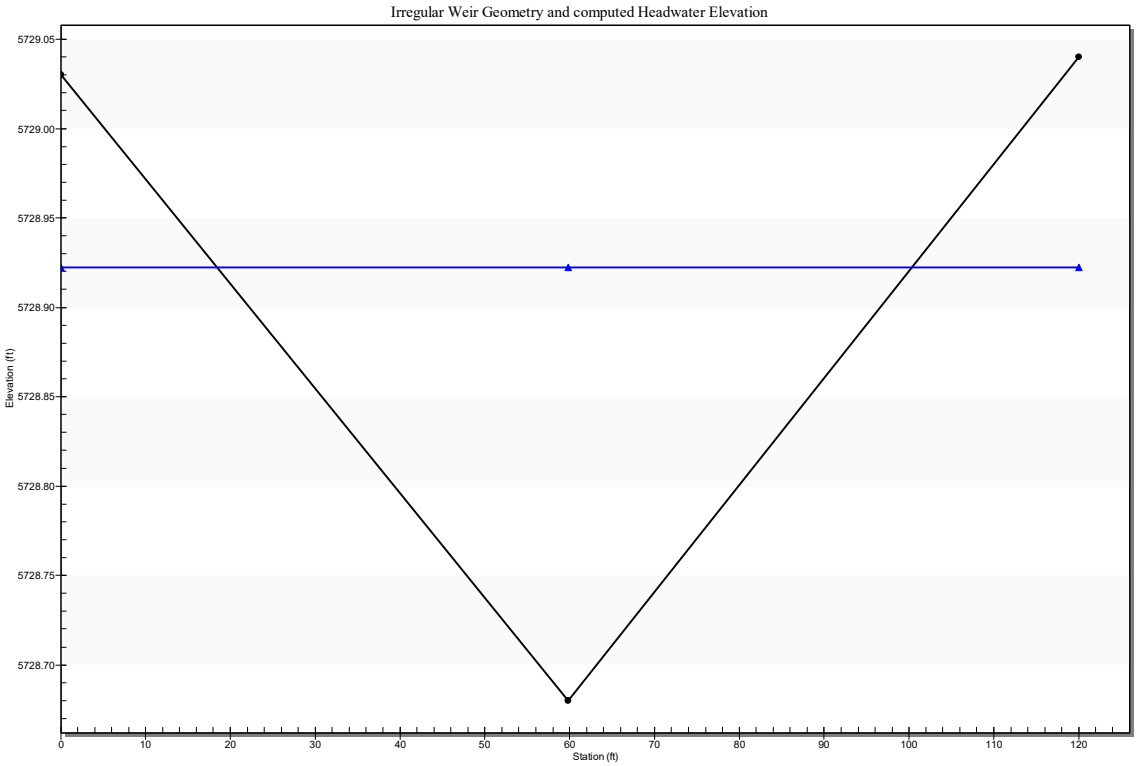
Applied Coefficients

0	3
1	3

Flow: 10.3600 cfs

Result Parameters

Head: 0.2423 ft
Elevation Head: 5728.92
Adjacent LPE: 5730.29 (FREEBOARD: 3.37)



Weir Analysis: B-4

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5728.90
58.31	5728.54
120.00	5728.89

Tailwater (above crest): 0.00 ft

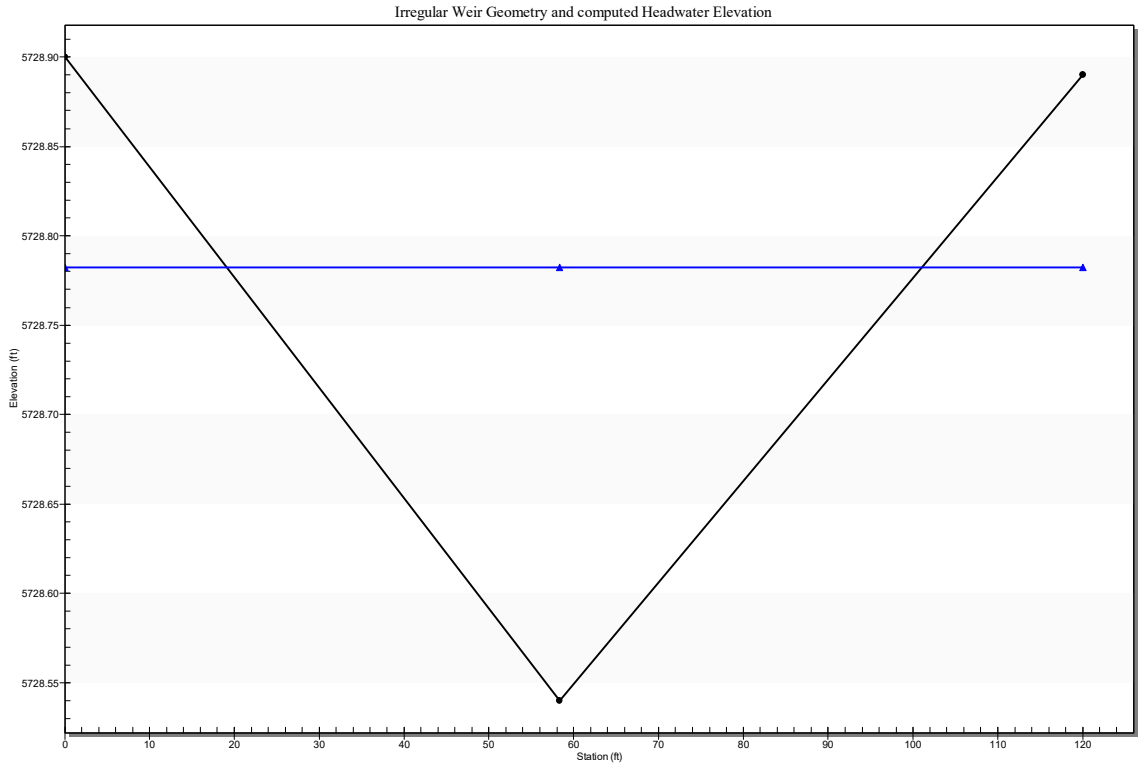
Applied Coefficients

0	3
1	3

Flow: 10.3600 cfs

Result Parameters

Head: 0.2422 ft
Elevation Head: 5728.78
Adjacent LPE: 5730.29 (FREEBOARD: 1.51')



Weir Analysis: B-20

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5746.54
45.75	5744.98
56.00	5745.58

Tailwater (above crest): 0.00 ft

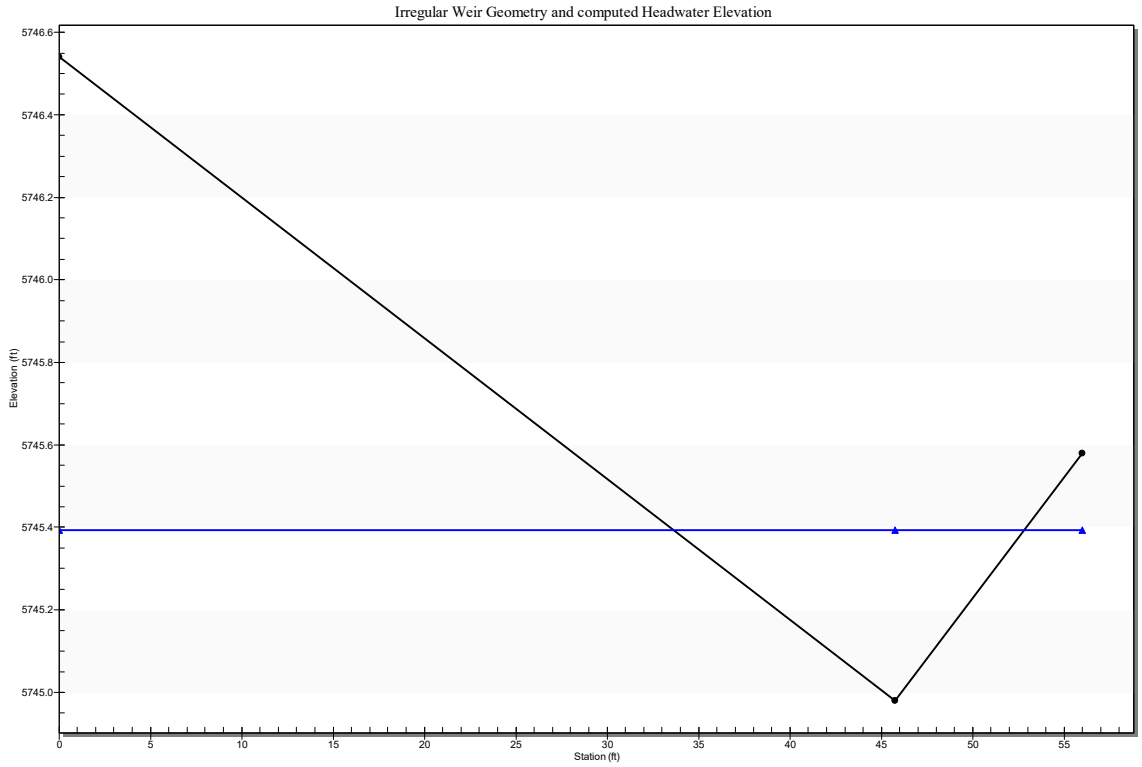
Applied Coefficients

0	3
1	3

Flow: 5.4100 cfs

Result Parameters

Head: 0.4133 ft
Elevation Head: 5745.39
Adjacent LPE: 5746.89 (FREEBOARD: 1.5')



Weir Analysis: B-24

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5750.13
44.34	5749.40
80.00	5750.51

Tailwater (above crest): 0.00 ft

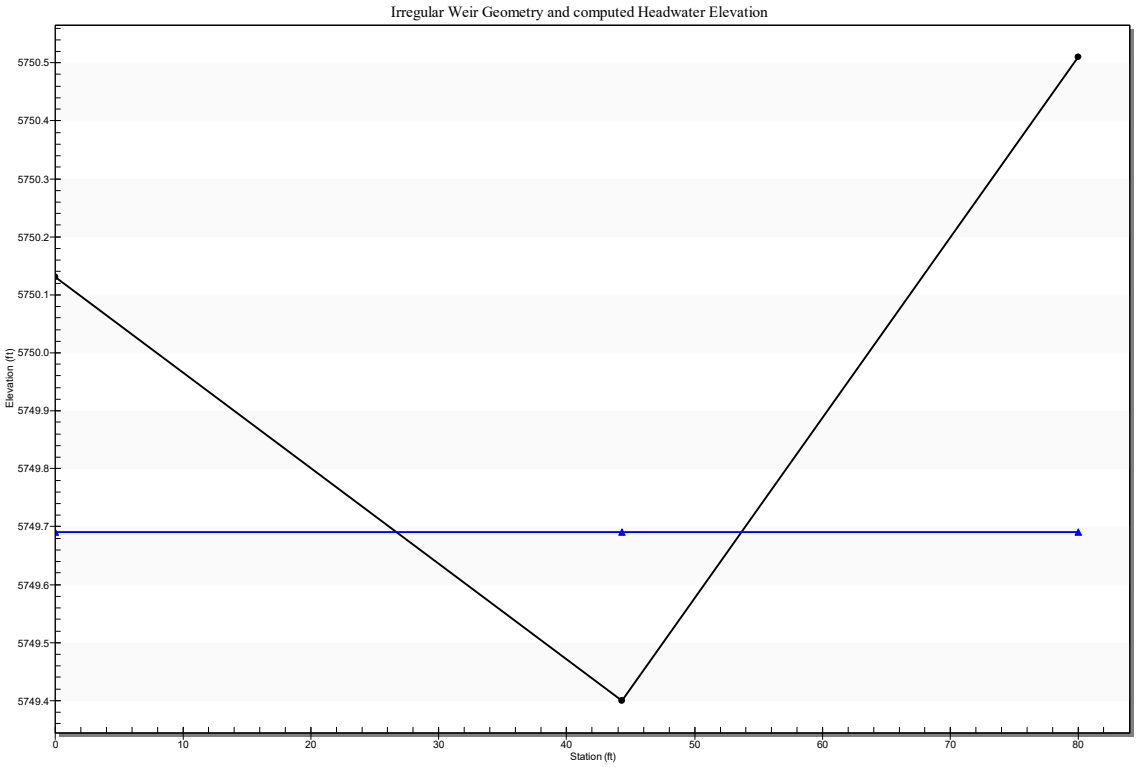
Applied Coefficients

0	3
1	3

Flow: 4.5000 cfs

Result Parameters

Head: 0.2910 ft
Elevation Head: 5749.69
Adjacent LPE: 5751.64 (FREEBOARD 1.95')



Weir Analysis: B-28

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5755.46
59.62	5754.98
90.00	5755.45

Tailwater (above crest): 0.00 ft

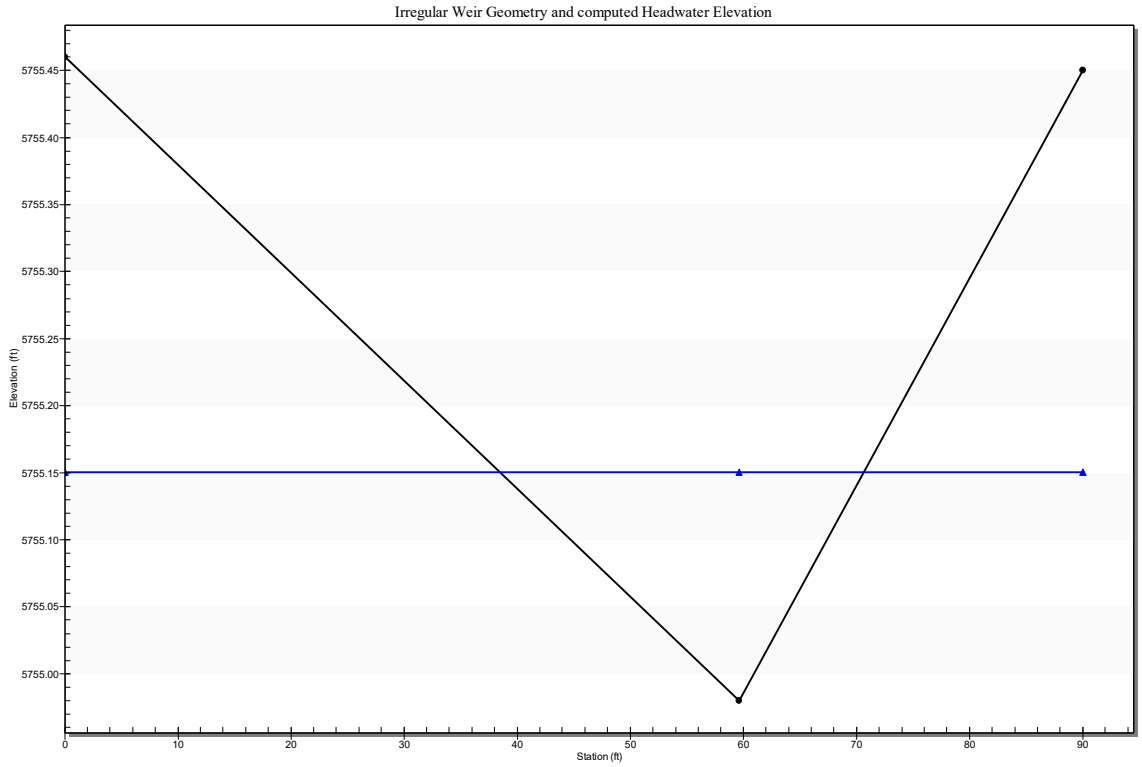
Applied Coefficients

0	3
1	3

Flow: 2.3900 cfs

Result Parameters

Head: 0.1701 ft
Elevation Head: 5755.15
Adjacent LPE: 5757.15 (FREEBOARD: 2.0')



Weir Analysis: B-34

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5741.24
60.63	5739.88
90.00	5740.95

Tailwater (above crest): 0.00 ft

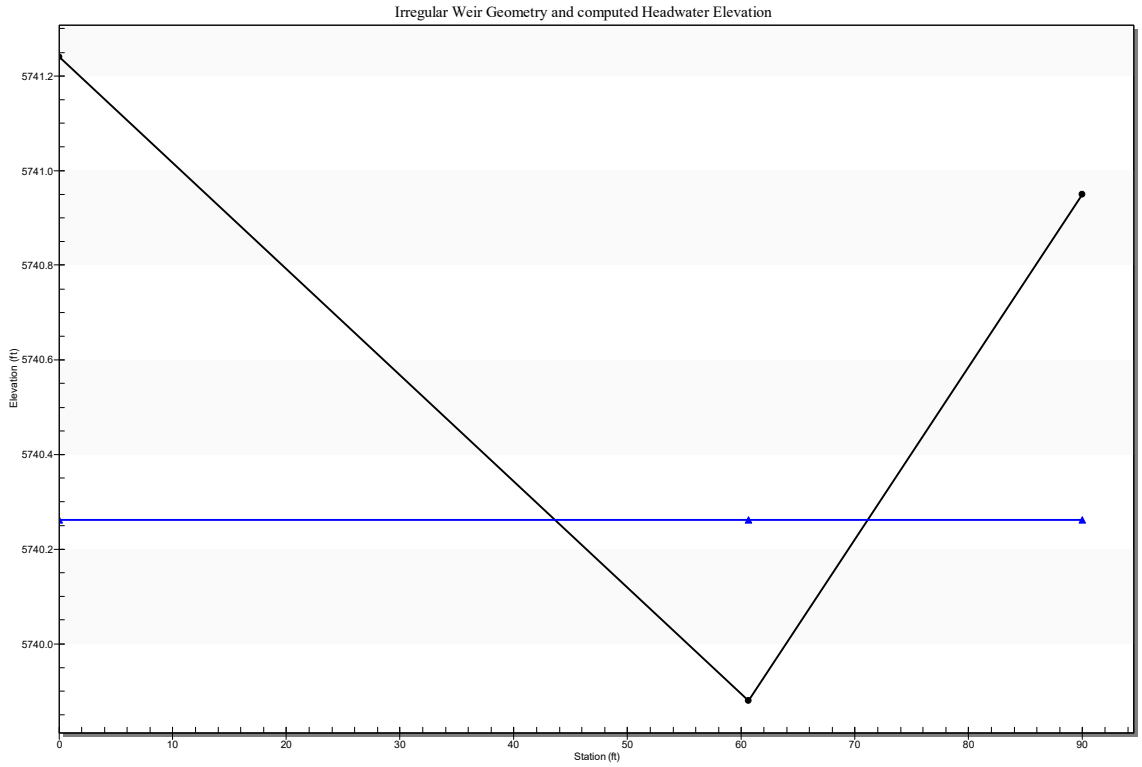
Applied Coefficients

0	3
1	3

Flow: 6.8800 cfs

Result Parameters

Head: 0.3817 ft
Elevation Head: 5740.26
Adjacent LPE: 5742.20 (FREEBOARD: 1.94')



Weir Analysis: B-38

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5723.98
50.48	5723.70
100.00	5723.94

Tailwater (above crest): 0.00 ft

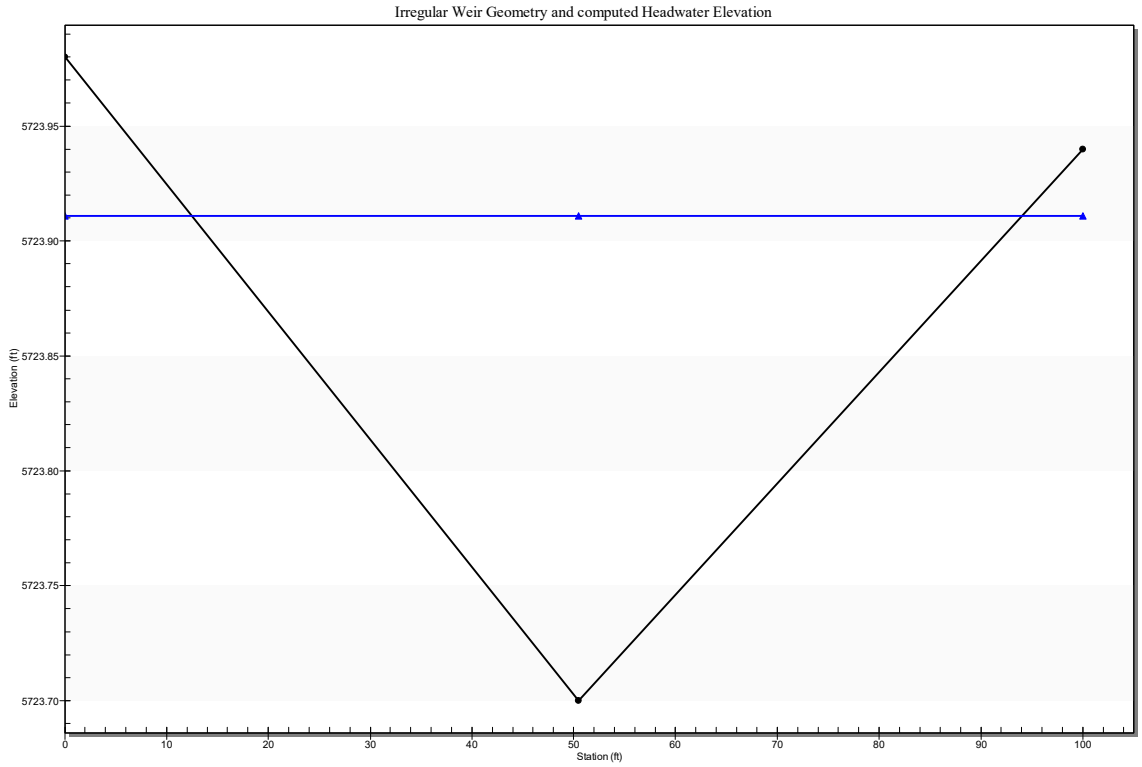
Applied Coefficients

0	3
1	3

Flow: 8.3700 cfs

Result Parameters

Head: 0.2108 ft
Elevation Head: 5723.91
Adjacent LPE: 5726.20 (FREEBOARD: 2.29')



Weir Analysis: B-42

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5725.17
34.88	5724.23
49.33	5724.10
100.00	5726.61

Tailwater (above crest): 0.00 ft

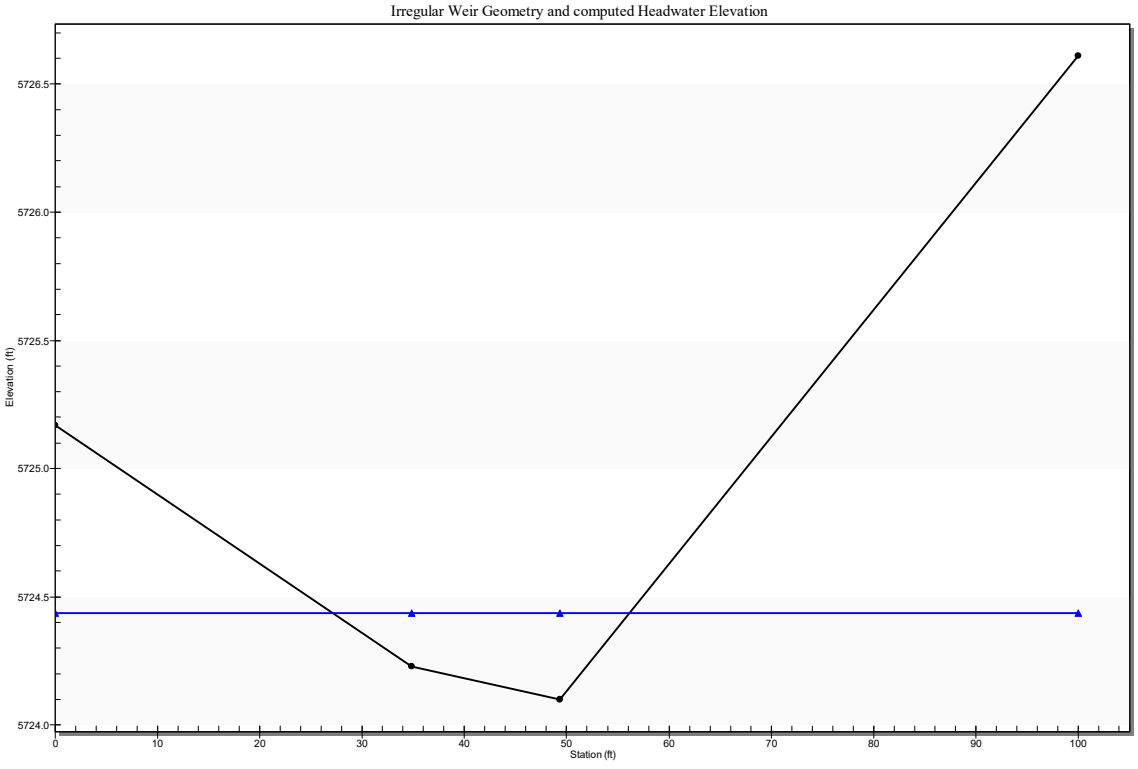
Applied Coefficients

0	3
1	3
2	3

Flow: 8.3700 cfs

Result Parameters

Head: 0.3377 ft
Elevation Head: 5724.43
Adjacent LPE: 5726.69 (FREEBOARD: 2.26')



Weir Analysis: B-48

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5733.24
27.42	5732.74
51.75	5731.17
100.00	5732.65

Tailwater (above crest): 0.00 ft

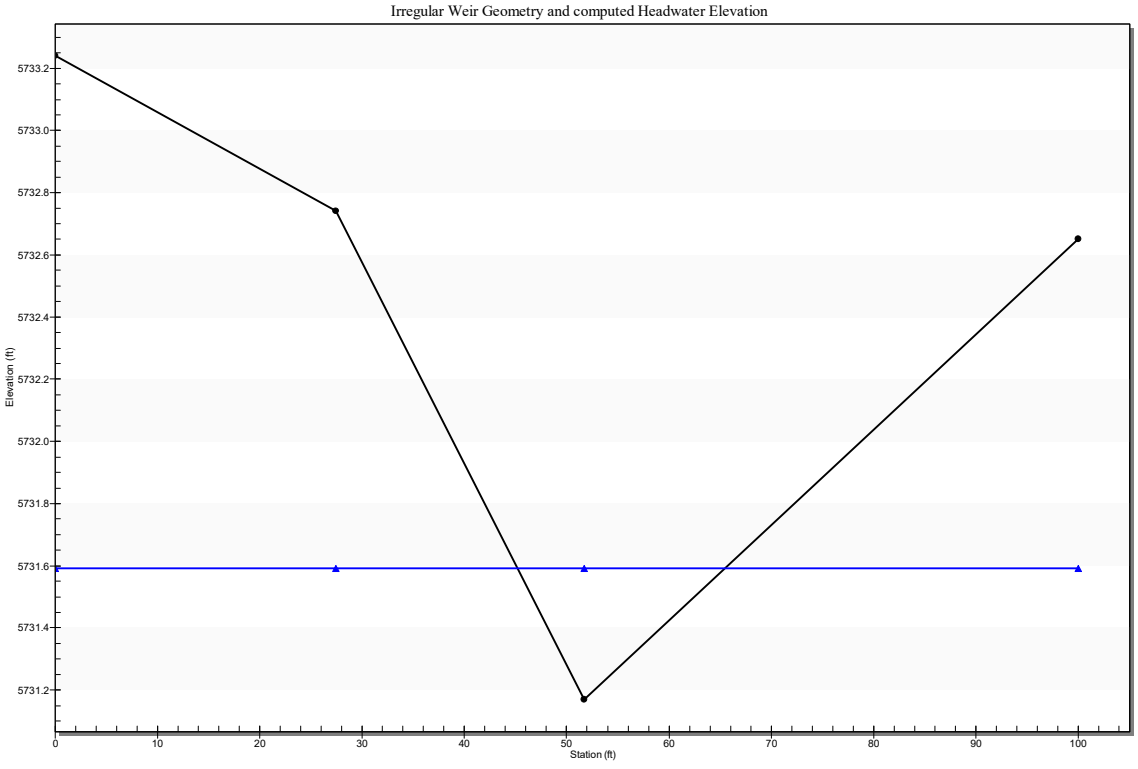
Applied Coefficients

0	0
1	3
2	3

Flow: 5.8500 cfs

Result Parameters

Head: 0.4203 ft
Elevation Head: 5731.59
Adjacent LPE: 5733.27 (FREEBOARD: 1.68')



Weir Analysis: C-2

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5731.60
65.65	5730.96
105.00	5731.38

Tailwater (above crest): 0.00 ft

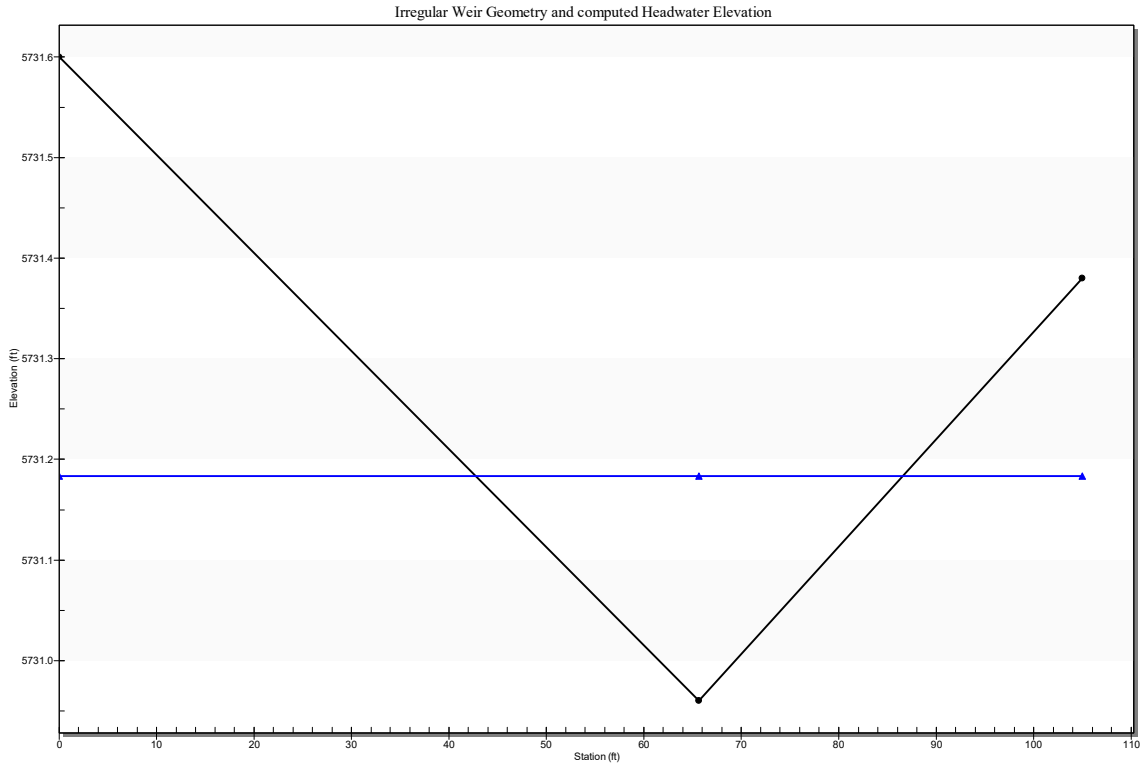
Applied Coefficients

0	3
1	3

Flow: 4.9100 cfs

Result Parameters

Head: 0.2234 ft
Elevation Head: 5731.18
Adjacent LPE: 5734.85 (FREEBOARD: 3.67')



Weir Analysis: C-12

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5744.96
57.21	5744.14
85.05	5744.80

Tailwater (above crest): 0.00 ft

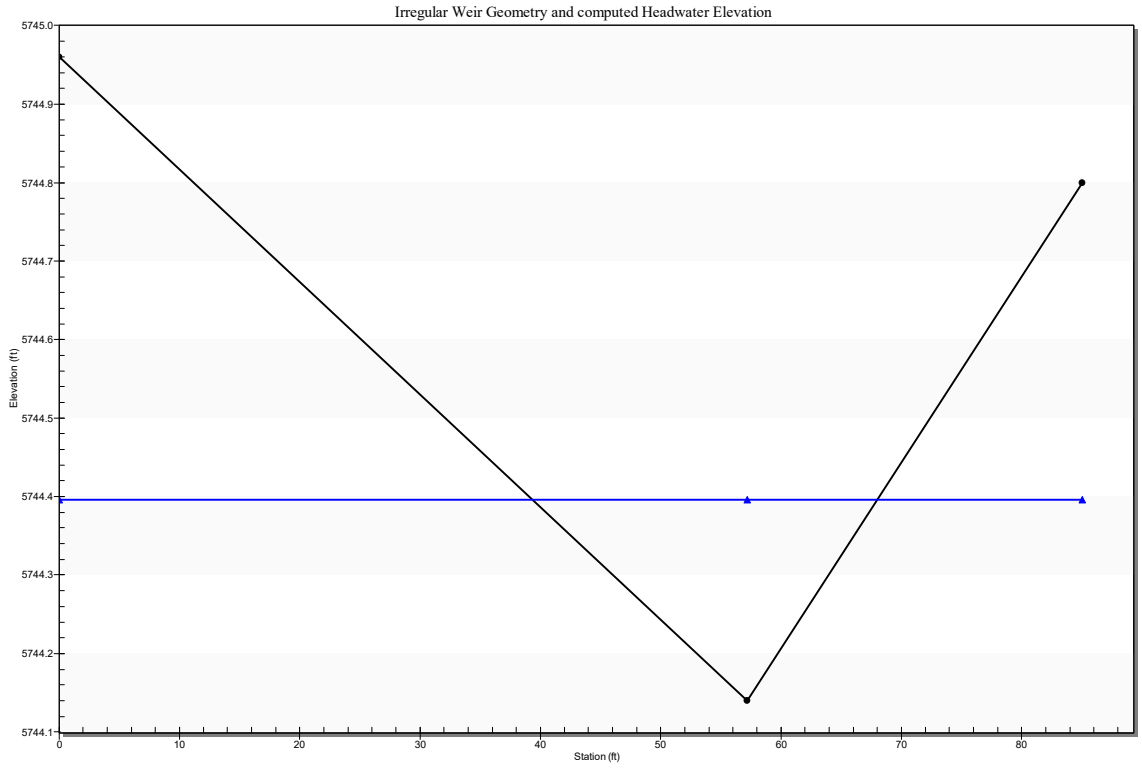
Applied Coefficients

0	3
1	3

Flow: 3.9400 cfs

Result Parameters

Head: 0.2560 ft
Elevation Head: 5744.39
Adjacent LPE: 5746.31 (FREEBOARD: 1.92')



Weir Analysis: C-18

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5749.49
53.26	5748.70
69.04	5748.59
87.00	5748.98

Tailwater (above crest): 0.00 ft

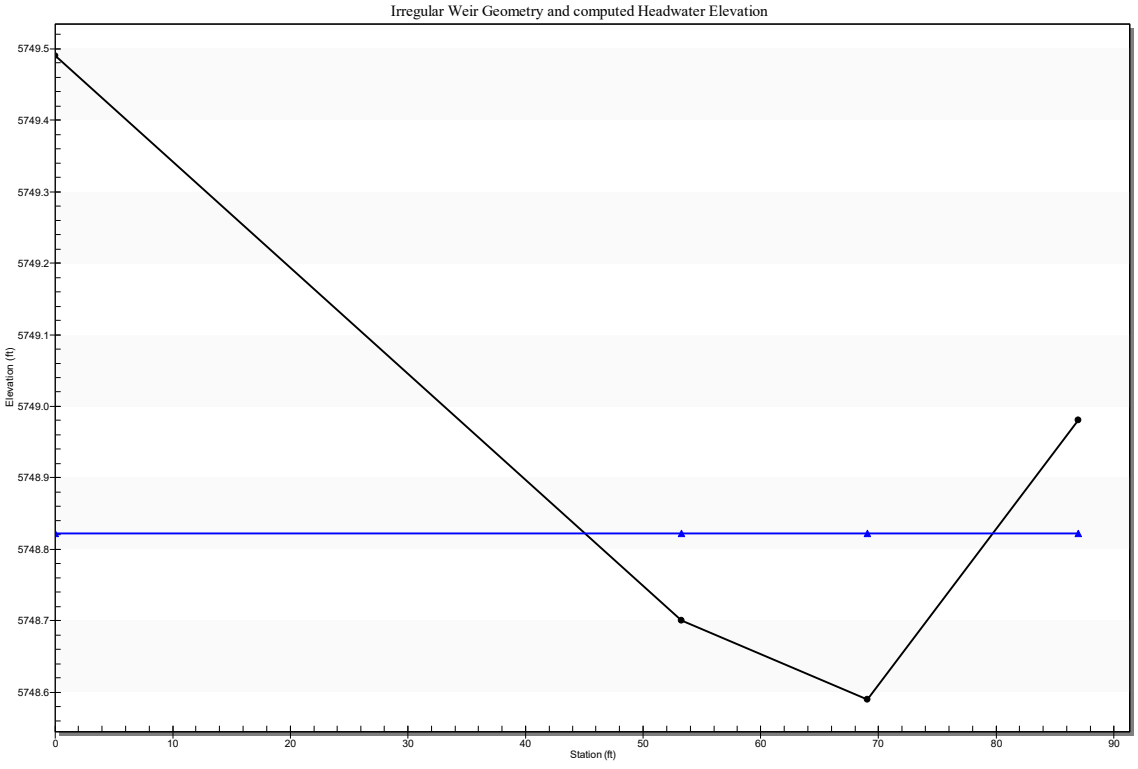
Applied Coefficients

0	3
1	3
2	3

Flow: 5.1500 cfs

Result Parameters

Head: 0.2317 ft
Elevation Head: 5748.82
Adjacent LPE: 5750.87 (FREEBOARD: 2.05')



Weir Analysis: C-24

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5751.77
44.68	5751.40
66.63	5751.29
87.00	5751.72

Tailwater (above crest): 0.00 ft

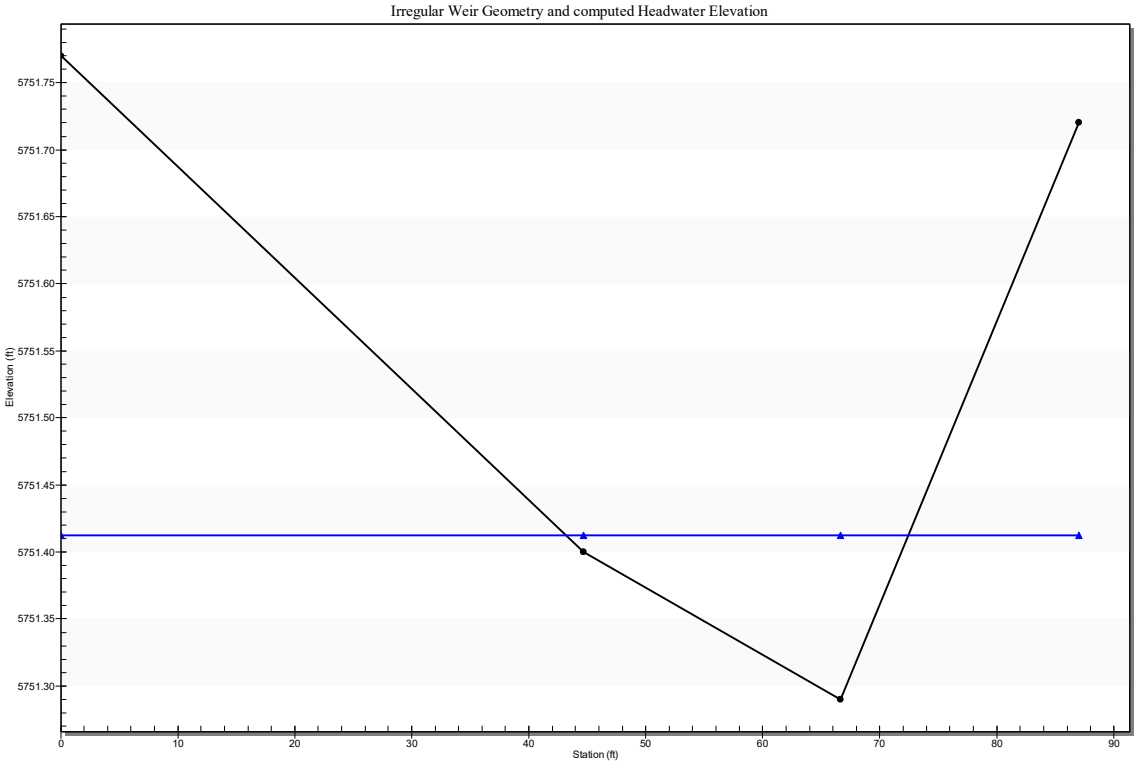
Applied Coefficients

0	3
1	3
2	3

Flow: 1.4200 cfs

Result Parameters

Head: 0.1225 ft
Elevation Head: 5751.41
Adjacent LPE: 5754.64 (FREEBOARD: 3.23')



Weir Analysis: D-2

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5728.13
75.13	5727.64
150.00	5728.04

Tailwater (above crest): 0.00 ft

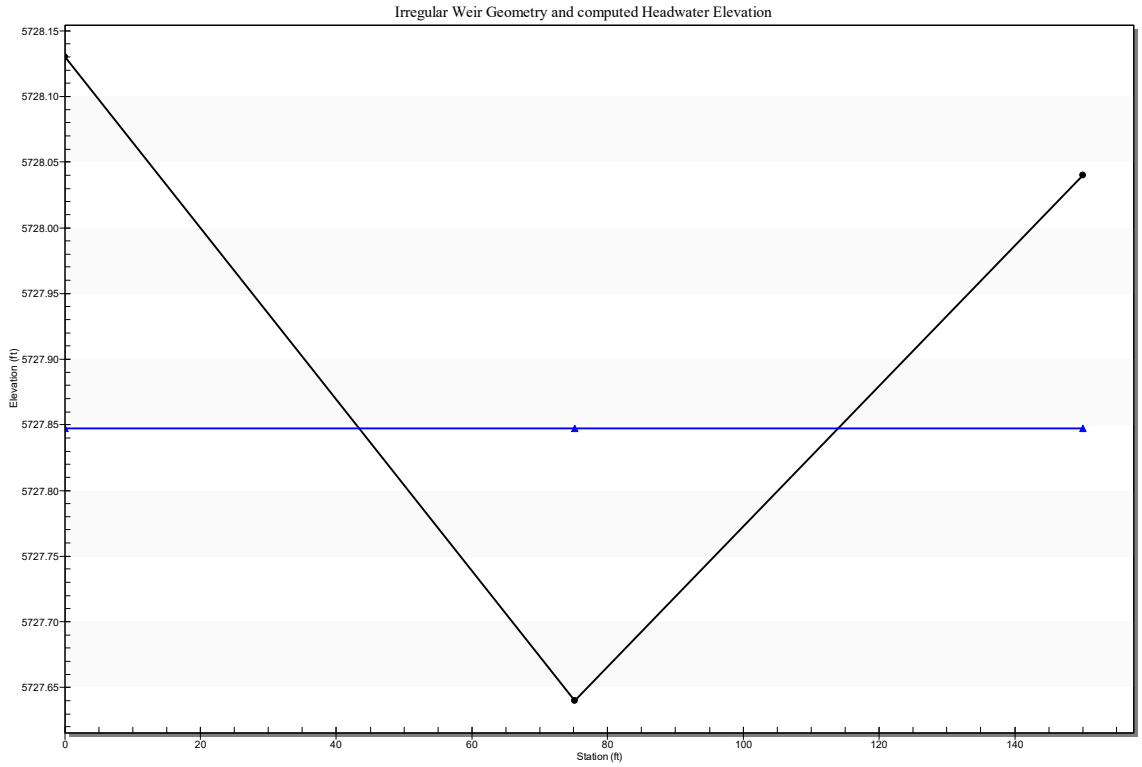
Applied Coefficients

0	3
1	3

Flow: 7.0700 cfs

Result Parameters

Head: 0.2073 ft
Elevation Head: 5727.84
Adjacent LPE: 5729.89 (FREEBOARD: 2.05')



Weir Analysis: D-18

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5749.94
47.68	5748.90
94.00	5749.58

Tailwater (above crest): 0.00 ft

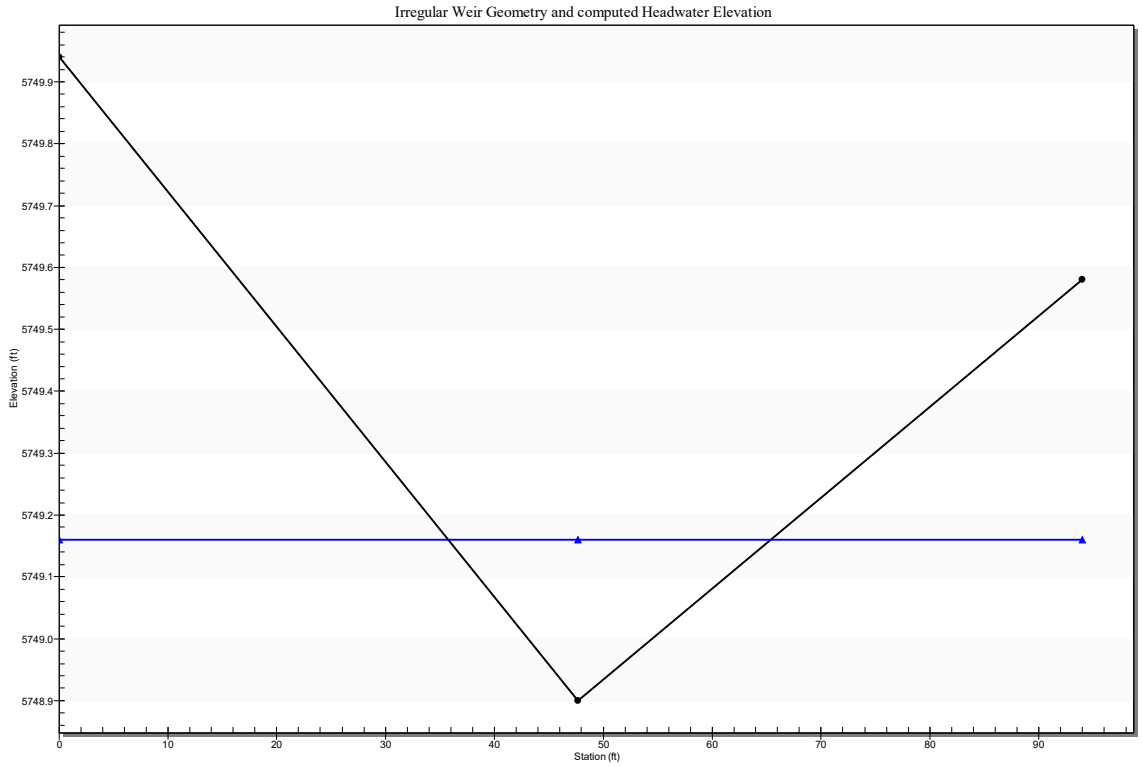
Applied Coefficients

0	3
1	3

Flow: 4.1800 cfs

Result Parameters

Head: 0.2603 ft
Elevation Head: 5749.16
Adjacent LPE: 5751.75 (FREEBOARD: 2.59')



Weir Analysis: D-28

Notes:

Input Parameters

Irregular Weir
Coefficient: 3.0000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	5738.70
37.63	5737.74
77.00	5738.75

Tailwater (above crest): 0.00 ft

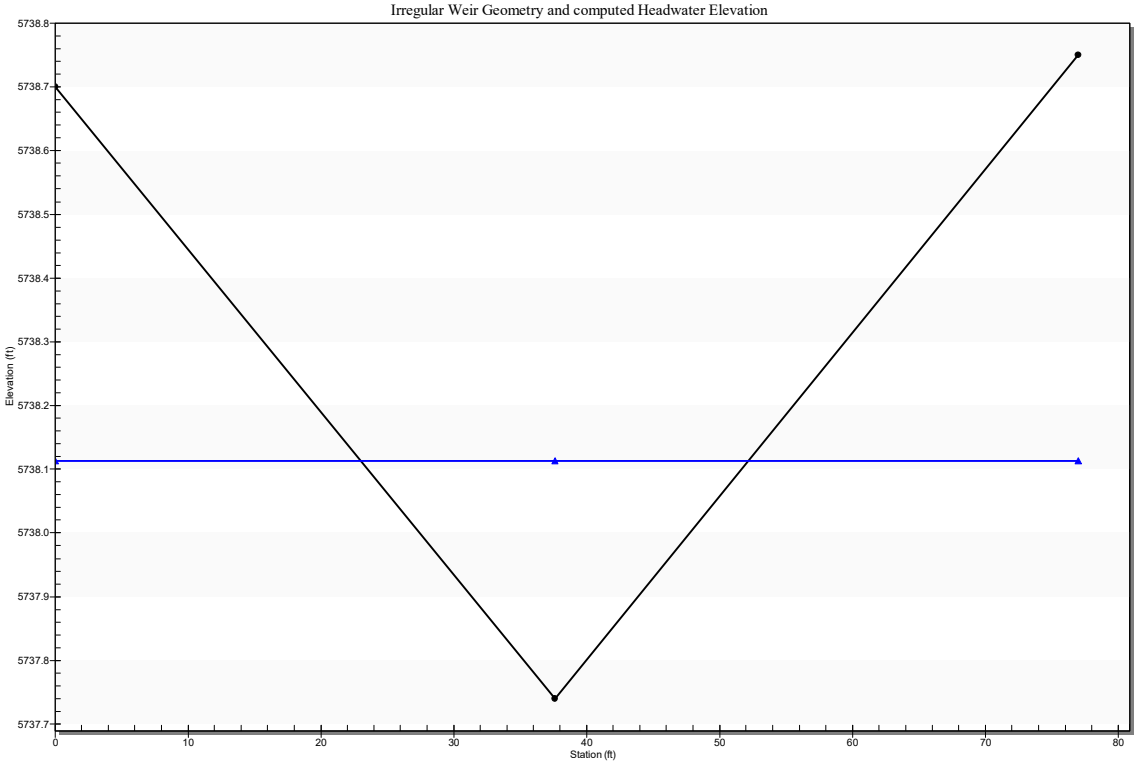
Applied Coefficients

0	3
1	3

Flow: 7.0700 cfs

Result Parameters

Head: 0.3735 ft
Elevation Head: 5738.11
Adjacent LPE: 5741.44 (FREEBOARD: 3.33')



Swale B20 (100-YR Depth)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.200 ft/ft
Left Side Slope	5.000 H:V
Right Side Slope	12.000 H:V
Discharge	5.41 cfs

Results	
Normal Depth	3.8 in
Flow Area	0.8 ft²
Wetted Perimeter	5.4 ft
Hydraulic Radius	1.9 in
Top Width	5.35 ft
Critical Depth	5.7 in
Critical Slope	0.021 ft/ft
Velocity	6.42 ft/s
Velocity Head	0.64 ft
Specific Energy	0.96 ft
Froude Number	2.854
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.8 in
Critical Depth	5.7 in
Channel Slope	0.200 ft/ft
Critical Slope	0.021 ft/ft

Swale B20 (Max. Discharge)

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.200 ft/ft
Normal Depth	16.0 in
Left Side Slope	5.000 H:V
Right Side Slope	12.000 H:V

Results	
Discharge	254.04 cfs
Flow Area	15.1 ft²
Wetted Perimeter	22.9 ft
Hydraulic Radius	7.9 in
Top Width	22.67 ft
Critical Depth	26.8 in
Critical Slope	0.013 ft/ft
Velocity	16.81 ft/s
Velocity Head	4.39 ft
Specific Energy	5.73 ft
Froude Number	3.630
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.0 in
Critical Depth	26.8 in
Channel Slope	0.200 ft/ft
Critical Slope	0.013 ft/ft

Appendix C – Vehicle Tracking Analysis

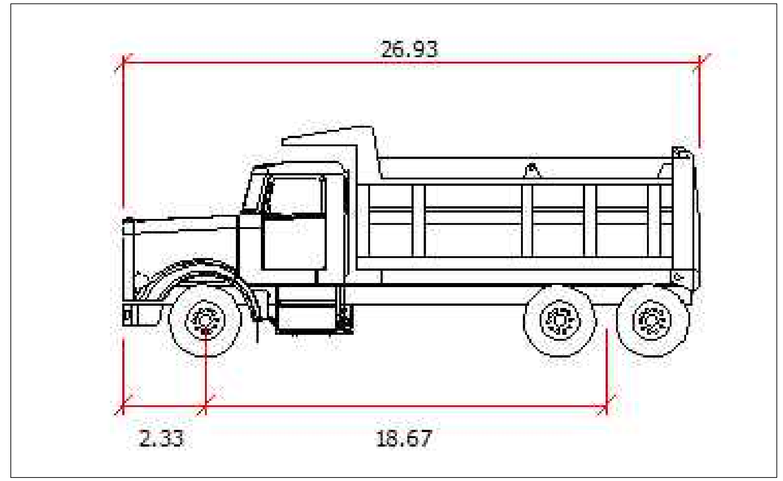
PUBLIC SERVICE COMPANY OF COLORADO
UNINCORPORATED ARAPAHOE COUNTY
UNPLATTED

HARVEST ROAD
(COLLECTOR)

TRACT F
1.47 AC

PROPOSED
POND B4

EAST CASPIAN AVENUE
(LOCAL)



HARVEST CROSSING
FILING NO. 3
AUTOTURN EXHIBIT
POND B4
MARCH 27, 2024

Kimley»Horn

6200 South Syracuse Way, Suite 300, Greenwood Village, CO 80111
PHONE: 303-228-2300

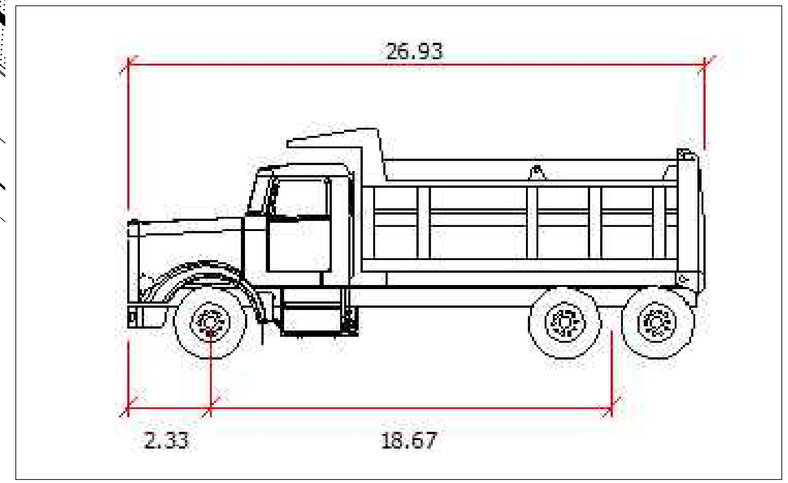
K:\DEN_Civil\196284001 - Harvest Crossing\CADD\PA5\References\xAUTOTURN-84001-PA5.dwg

EAST YALE AVENUE
(LOCAL)

PUBLIC SERVICE COMPANY
OF COLORADO
UNINCORPORATED
ARAPAHOE COUNTY
UNPLATTED

TRACT U
3.81 AC

PROPOSED
POND A1



PROPOSED
HARVEST GULCH
(REFERENCE DRAINAGE REPORT AND PLAN FOR MORE DETAIL
CONCEPTUAL PLAN AND PROFILE PROVIDED ON PDP)

HARVEST CROSSING
FILING NO. 3
AUTOTURN EXHIBIT
POND A1
MARCH 27, 2024

Kimley»Horn

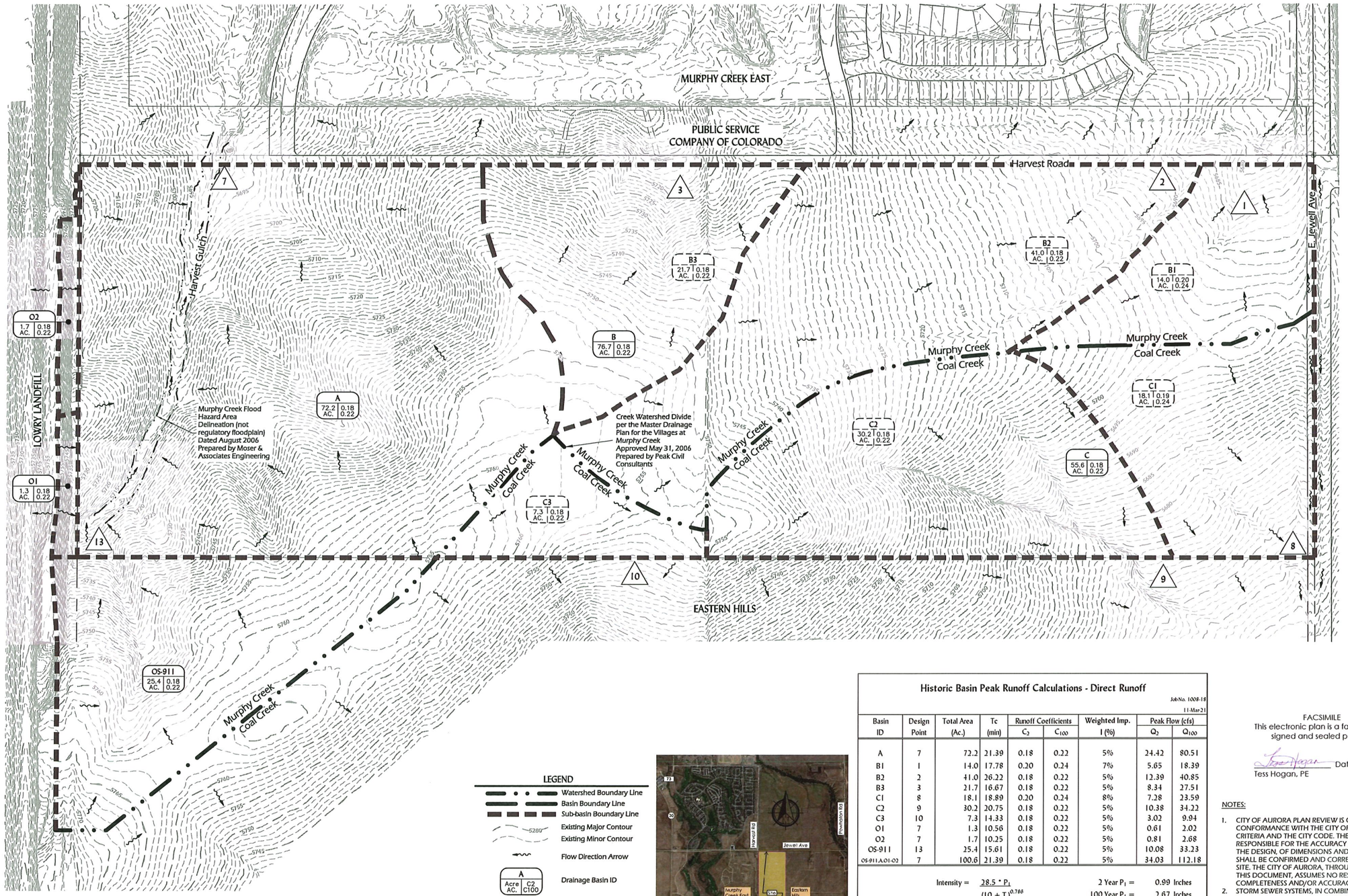
6200 South Syracuse Way, Suite 300, Greenwood Village, CO 80111
PHONE: 303-228-2300

K:\DEN_Civil\196284001 - Harvest Crossing\CADD\PA5\References\xAUTOTURN-84001-PA5.dwg

Appendix D – Drainage Maps

1

221085



LEGEND

- Watershed Boundary Line
- Basin Boundary Line
- Sub-basin Boundary Line
- Existing Major Contour (5280)
- Existing Minor Contour
- Flow Direction Arrow
- Drainage Basin ID (A: Acre AC. | C2 | C100)
- Drainage Sub-basin ID (A1: Area AC. | C2 | C100)

Vicinity Map
Scale: NTS

Historic Basin Peak Runoff Calculations - Direct Runoff

Job No. 1008-18
11-Mar-21

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	Runoff Coefficients C_{100}	Weighted Imp. I (%)	Peak Flow (cfs) Q_2	Peak Flow (cfs) Q_{100}
A	7	72.2	21.39	0.18	0.22	5%	24.42	80.51
B1	1	14.0	17.78	0.20	0.24	7%	5.65	18.39
B2	2	41.0	26.22	0.18	0.22	5%	12.39	40.85
B3	3	21.7	16.67	0.18	0.22	5%	8.34	27.51
C1	8	18.1	18.89	0.20	0.24	8%	7.28	23.59
C2	9	30.2	20.75	0.18	0.22	5%	10.38	34.22
C3	10	7.3	14.33	0.18	0.22	5%	3.02	9.94
O1	7	1.3	10.56	0.18	0.22	5%	0.61	2.02
O2	7	1.7	10.25	0.18	0.22	5%	0.81	2.68
OS-911	13	25.4	15.61	0.18	0.22	5%	10.08	33.23
OS-911,A,O1-O2	7	100.6	21.39	0.18	0.22	5%	34.03	112.18

Intensity = $\frac{28.5 * P_1}{(10 + T_d)^{0.786}}$ 2 Year P_1 = 0.99 Inches; 100 Year P_1 = 2.67 Inches

FACSIMILE
This electronic plan is a facsimile of the signed and sealed pdf set

Tess Hogan, PE Date: 03/31/2021

NOTES:

1. CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.
2. STORM SEWER SYSTEMS, IN COMBINATION WITH THE STREETS, WILL BE SIZED FOR THE 100 YEAR STORM EVENT.

PROJECT BENCHMARK: GGS

CITY OF AURORA BENCHMARK #4S6518SW001 (AZTEC #407). RECOVERED A 3" BRASS CAP STAMPED "M-095" LOCATED ON THE NORTH SIDE OF E. MISSISSIPPI AVE. 300' MORE OR LESS EAST OF S. COOLIDGE ST.

NAVD88 = 5603.65'

Approved For One Year From This Date
04/05/2021

City Engineer — 04/05/2021 Date

Water Department — 04/05/2021 Date

200 0 100 200
SCALE
1 inch = 200 ft.

Know what's below. Call before you dig.

Innovative Land Consultants, Inc.
12071 Tejon Street, Suite 470
Westminster, CO 80234
303.421.4224
www.innovativelandinc.com

No.	Rev. Date:	Revision Type:
1		
2		
3		
4		
5		
6		

Designed By: ACS
Prepared By: ACS
Approved By: TRH

Date: March 31, 2021
Horiz. Scale: 1" = 200'
Vert. Scale: N/A

Sheet: 1 of 2
Job No.: 1008-18

Proj. Name: Harvest Crossing/The Villages at Murphy Creek
Location: Aurora, CO
Plan Set: Master Drainage Report Update
Sheet Name: Master Historic Drainage Plan

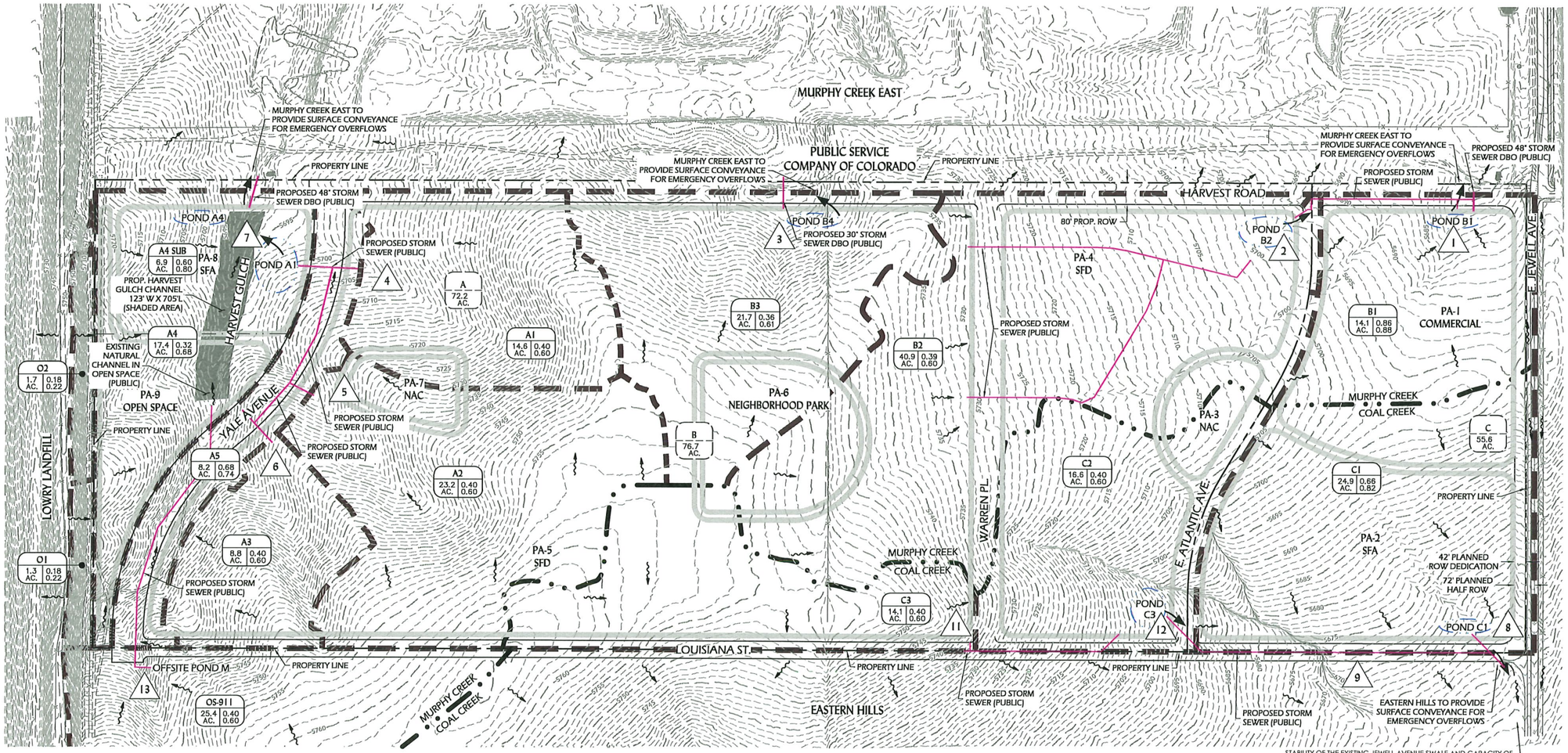
Sheet: 1

L:\JOB FOLDERS\1008 - SOUTH QUINCY RESIDENTIAL DEVELOPERS, INC\1008-18\PROD\DRAINAGE\MASTER\MASTER HIST DRNG PRINTED ON: 3/31/2021 12:30 PM

APPROVED ON 04/05/2021

2

221085



Basin Peak Runoff Calculations - Direct Runoff

Job No. 1008-18
11-Mar-21

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	Runoff Coefficients C_{100}	Weighted Imp. I (%)	Peak Flow (cfs) Q_2	Peak Flow (cfs) Q_{100}
A1	4	14.60	14.0	0.40	0.60	50%	13.56	54.84
A2	5	23.20	12.8	0.40	0.60	50%	22.41	90.66
A3	6	8.80	11.6	0.40	0.60	50%	8.87	35.89
A4	7	17.40	16.0	0.32	0.68	35%	12.19	69.50
A5	7	8.20	15.0	0.68	0.74	82%	12.51	36.95
B1	1	14.10	5.0	0.86	0.88	94%	40.90	112.84
B2	2	40.90	16.4	0.39	0.60	48%	34.07	143.01
B3	3	21.70	17.2	0.36	0.61	43%	16.30	74.86
C1	8	24.90	5.2	0.66	0.82	79%	54.33	183.00
C2	12	16.60	14.2	0.40	0.60	50%	15.32	61.97
C3	11	14.10	19.4	0.40	0.60	50%	11.15	45.12
O1	7	1.30	10.6	0.18	0.22	5%	0.61	2.02
O2	7	1.70	10.3	0.18	0.22	5%	0.81	2.68
OS-911	13	25.40	9.4	0.40	0.60	50%	27.85	112.67
OS-911,A,O1-O2	7	100.60	16.0	0.40	0.61	49%	88.28	363.16

Intensity = $\frac{28.5 * P_1}{(10 + T_d)^{0.786}}$ 2 Year P_1 = 0.99 Inches; 100 Year P_1 = 2.67 Inches

Pond Peak Runoff Calculations - Direct Runoff

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	Runoff Coefficients C_{100}	Weighted Imp. I (%)	Peak Flow (cfs) Q_5	Peak Flow (cfs) Q_{100}
Pond A1	7	54.80	15.0	0.44	0.62	55%	54.35	206.19
Pond A4	7	6.90	5.0	0.60	0.80	75%	13.90	49.99
Pond B1	1	14.10	5.0	0.86	0.88	94%	40.90	112.84
Pond B2	2	40.90	16.4	0.39	0.60	48%	34.07	143.01
Pond B4	3	21.70	17.2	0.36	0.61	43%	16.30	74.86
Pond C1	8	24.90	5.2	0.66	0.82	79%	54.33	183.00
Pond C3	12	30.70	19.4	0.40	0.60	50%	24.28	98.24

NOTES: Final drainage reports shall provide actual 100-yr routed runoff to ponds.

Description	Impervious (%)	Area (ac)	WQCV* (ac-ft)	EURV* (ac-ft)	100-year V = KA (ac-ft)	Required Volume** (ac-ft)	Historic 100-yr Rate (cfs)	Aurora Release Rate (cfs)	Allowable Release Rate (cfs)
Pond A1	55	54.8	1.21	2.87	5.38	6.81	80.5	72.2	72.2
Pond A4	75	6.9	0.20	0.51	0.91	1.16			
Pond B1	94	14.1	0.61	1.32	2.29	2.95	18.4	14.1	14.1
Pond B2	48	40.9	0.83	1.85	3.51	4.44	40.9	40.9	40.9
Pond B4	43	21.7	0.41	0.87	1.67	2.11	27.5	21.7	21.7
Pond C1	79	24.9	0.80	1.93	3.45	4.41	23.6	24.9	23.6
Pond C3	50	30.7	0.64	1.45	2.74	3.47	44.2	30.7	30.7

*Obtained from MHFD-Detention Version 4.03 and multiplied by 1.2 per City criteria.
**Required Volume is half EURV plus the 100-year V = KA volume.

Notes:
1. Ponds with A or B in the description are located in the Murphy Creek watershed.
2. Ponds with C in the description are located in the Coal Creek watershed.
3. The A Basin's release rates are based on the entire historic A Basin which includes Basins A1-A5. All A ponds release to Design Point 7.
4. A Basin ponds are conceptualized as follows: Pond A1 includes Basins A1, A2, A3 and A5, Pond A4 includes Basin A4 Sub Development.
5. B Basin ponds are conceptualized as follows: Pond B1 includes Basin B1, Pond B2 includes Basin B2, Pond B4 includes Basin B3.
6. C Basin ponds are conceptualized as follows: Pond C1 includes Basin C1, Pond C3 includes Basins C2 and C3.

LEGEND

- Property Line
- Right of Way Line
- Centerline
- Lot Line
- Easement Line
- Conceptual Pond Location
- Storm Sewer Line
- Watershed Boundary Line
- Basin Boundary Divide Line
- Sub-Basin Boundary Divide Line
- Sub-divided Sub-Basin Line
- 5280 Proposed Major Contour
- Proposed Minor Contour
- 5280 Existing Major Contour
- Existing Minor Contour
- Flow Direction Arrow
- Emergency Overflow Arrow
- A1 / Acre Ac. / C2 C100 — Drainage Basin ID
- A / Acre Ac. — Historic Drainage Basin ID
- 1 — Design Point
- DBO — Design By Others

MASTER DRAINAGE PLAN NOTES:
1. PONDS SHOWN HEREON ARE SCHEMATIC ONLY. ACTUAL SIZE, SHAPE AND LOCATION WILL VARY AS SITE DESIGN PROGRESSES. ALL PONDS WILL BE PRIVATE PONDS.
2. THE LOCAL STREET ALIGNMENT SHOWN HEREON IS NOT APPROVED BY THIS PLAN.
3. ANY CULVERTS INSTALLED WITHIN HARVEST ROAD FOR THE ASSOCIATED MURPHY CREEK EAST DEVELOPMENT WILL BE EXTENDED UNDER THE EAST HALF OF THE ROAD DURING THE ASSOCIATED HARVEST CROSSING DEVELOPMENT.
4. RUNOFF FROM HISTORIC BASINS O1 AND O2 FROM THE LOWRY LANDFILL ARE DIVERTED WEST (110± ACRES) TO LANDFILL PONDS NEAR MURPHY CREEK IN THE EXISTING AND FINAL CLOSURE DRAINAGE PLANS FOR THE LANDFILL. REFER TO THE DADS DRAINAGE MAPS INCLUDED IN THE MASTER DRAINAGE REPORT FOR ADDITIONAL INFORMATION. BASINS O1 AND O2 DRAIN 3 ACRES ONTO THE SITE.
5. THIS MASTER DRAINAGE PLAN HAS BEEN PREPARED BASED UPON THE BEST AVAILABLE INFORMATION AVAILABLE AT THE TIME. CONCEPTS, DRAINAGE PATTERNS, AND OFFSITE FACILITIES PRESENTED ON THIS PLAN SHALL BE CONFIRMED IN THE SUBSEQUENT PRELIMINARY AND FINAL DRAINAGE PLANS FOR THIS PROPERTY.

FACSIMILE
This electronic plan is a facsimile of the signed and sealed pdf set

Tess Hogan, PE Date: 03/31/2021

PROJECT BENCHMARK:

CITY OF AURORA BENCHMARK #4S6518SW001 (AZTEC #407). RECOVERED A 3" BRASS CAP STAMPED "M-095" LOCATED ON THE NORTH SIDE OF E. MISSISSIPPI AVE. 300' MORE OR LESS EAST OF S. COOLIDGE ST.

NAVD88 = 5603.65'

NOTES:
1. CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.
2. STORM SEWER SYSTEMS, IN COMBINATION WITH THE STREETS, WILL BE SIZED FOR THE 100 YEAR STORM EVENT.

200 0 100 200
SCALE
1 inch = 200 ft.

Innovative Land Consultants, Inc.
12071 Tejon Street, Suite 470
Westminster, CO 80234
303.421.4224
www.innovativelandinc.com

No.	Rev. Data:
1	
2	
3	
4	
5	
6	

Revision Type:

Designed By: ACS
Prepared By: ACS
Approved By: TRH

Date: March 31, 2021
Horiz. Scale: 1" = 200'
Vert. Scale: N/A

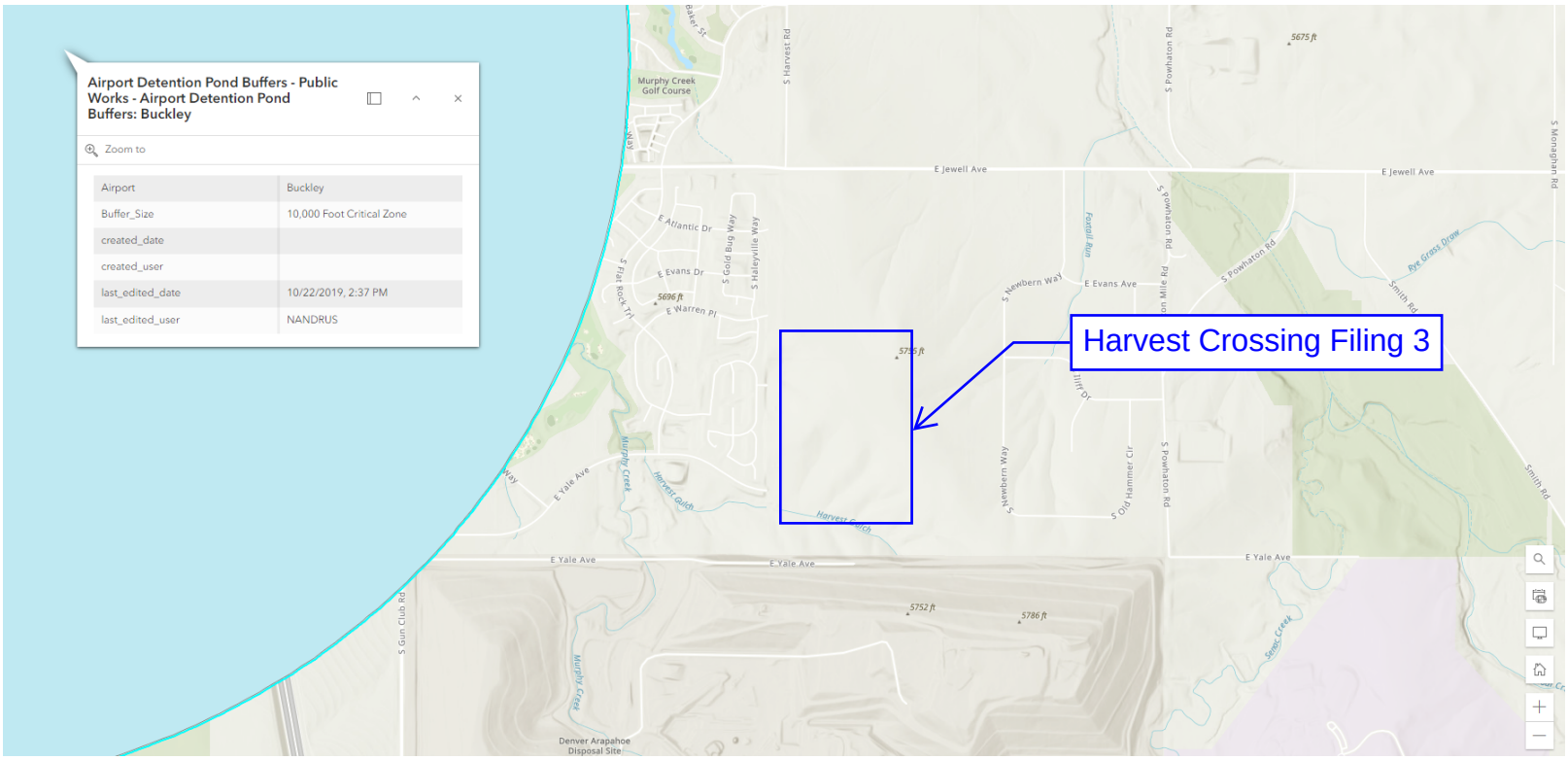
Sheet: 2 of 2
Job No.: 1008-18

Proj. Name: Harvest Crossing/The Villages at Murphy Creek
Location: Aurora, CO
Plan Set: Master Drainage Report Update
Sheet Name: Master Drainage Plan

Know what's below. Call before you dig.

Sheet: 2

BUCKLEY AIRPORT BASE BOUNDARY MAP



NOT TO SCALE
GIS MAP BASED ON AURORA OPEN DATA
AIRPORT DETENTION POND BUFFERS
BUCKLEY 10,000 FT CRITICAL ZONE

Appendix E – NRCS Soils Report and FEMA Maps

Custom Soil Resource Report
Map—Hydrologic Soil Group

Map Scale: 1:5,380 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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: Arapahoe County, Colorado
Survey Area Data: Version 19, 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: Mar 1, 2023—Sep 1, 2023

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FdB	Fondis silt loam, 1 to 3 percent slopes	C	22.8	18.7%
FdC	Fondis silt loam, 3 to 5 percent slopes	C	14.7	12.0%
RhD	Renohill-Buick loams, 3 to 9 percent slopes	D	84.7	69.3%
Totals for Area of Interest			**122.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided by the Arapahoe County and Cities of Aurora and Littleton GIS depts. The coordinate system used for production of the digital FIRM is Universal Transverse Mercator, Zone 13N, referenced to the North American Datum of 1983 and the GRS 80 spheroid, Western Hemisphere.

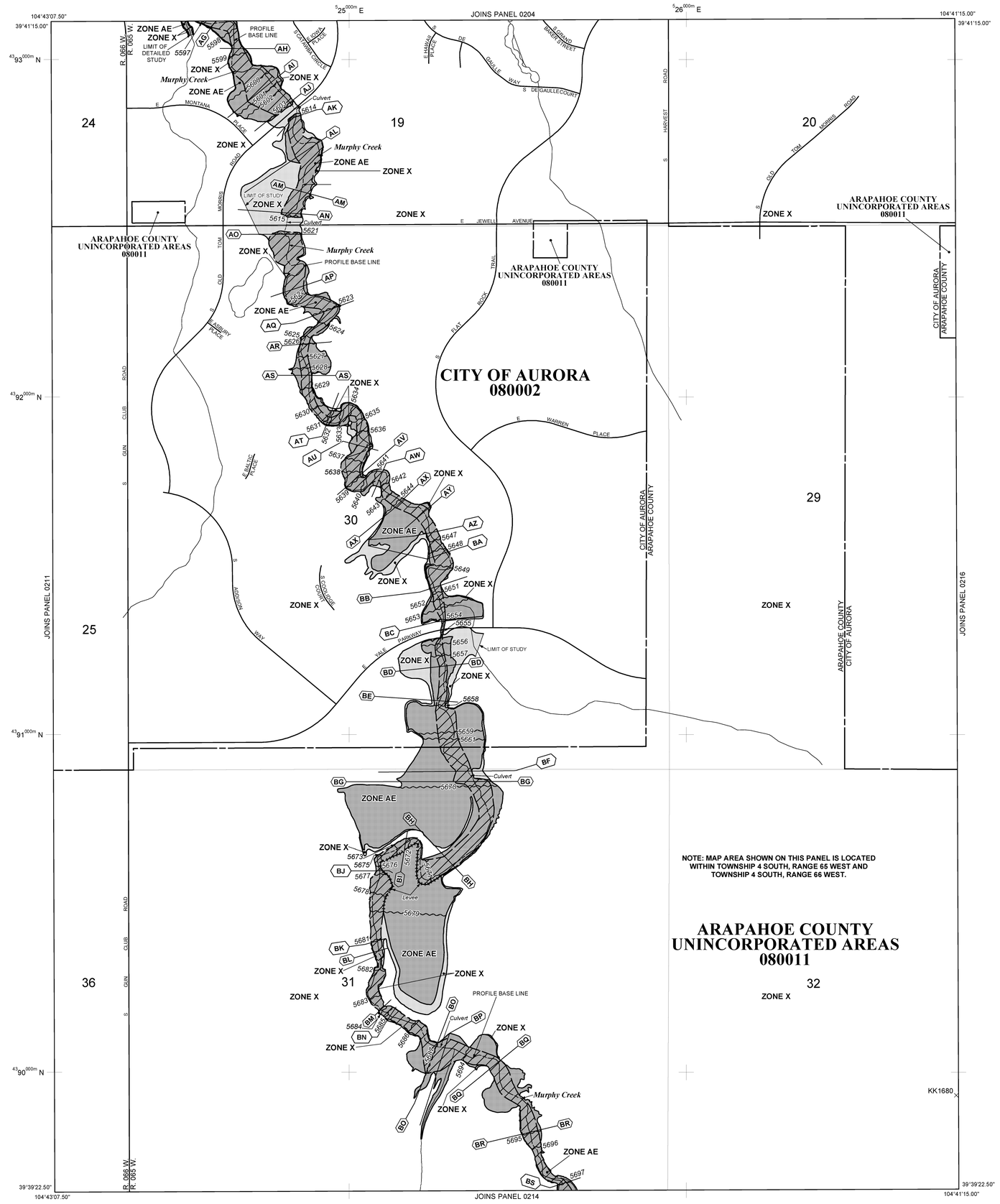
This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de- annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1- 800- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1- 877- 336- 2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 — 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 M	5000-foot grid ticks: New York State Plane coordinate system, east zone (FIPSZONE 3101), Transverse Mercator
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 •	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
April 17, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 4, 1991 December 3, 1993 August 16, 1995
December 17, 2010 - to update map format, to change Special Flood Hazard Areas, and to change Base Flood Elevations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0212K

FIRM
FLOOD INSURANCE RATE MAP

ARAPAHOE COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 212 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

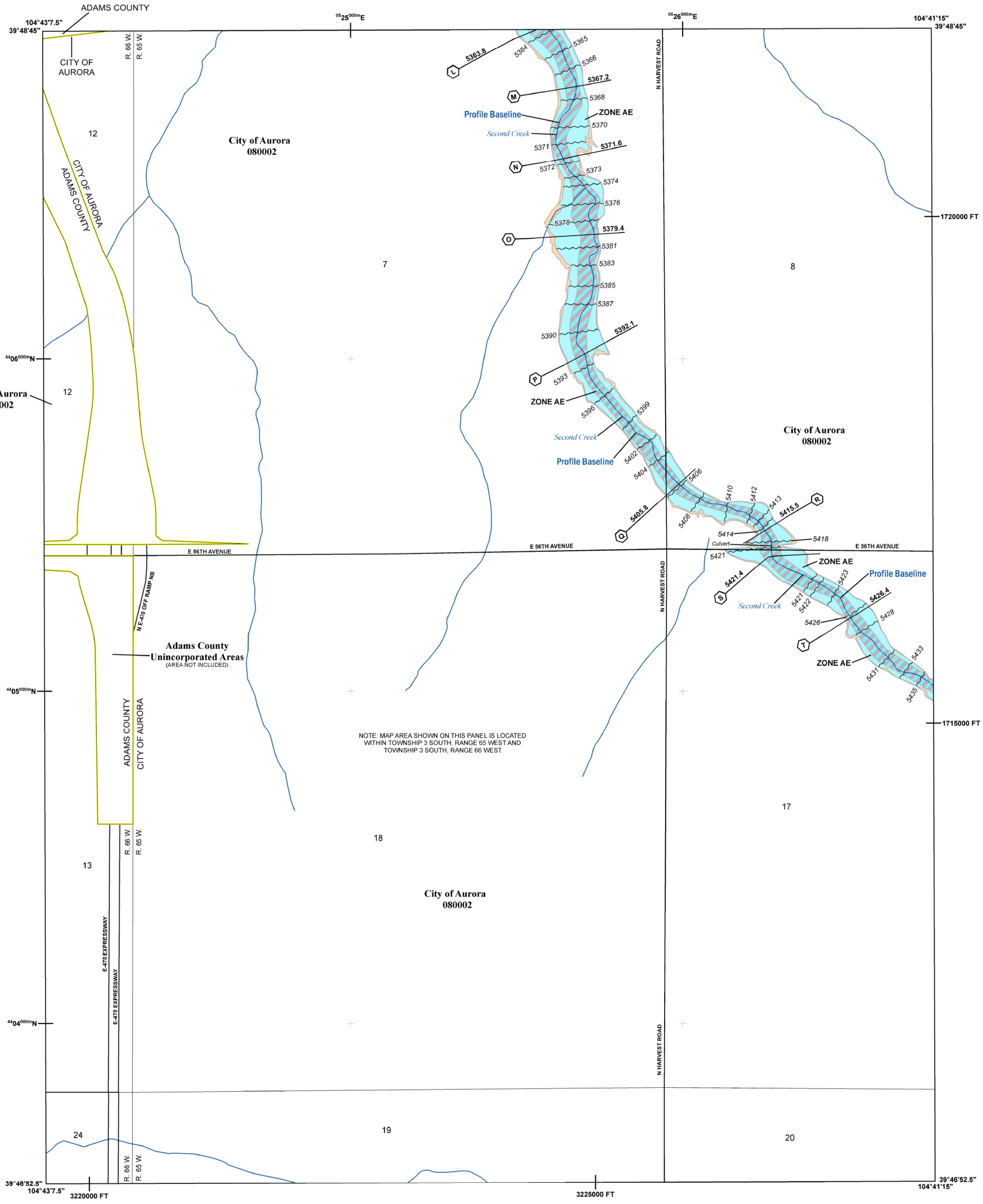
COMMUNITY	NUMBER	PANEL	SUFFIX
ARAPAHOE COUNTY	080011	0212	K
AURORA, CITY OF	080002	0212	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08005C0212K

MAP REVISED
DECEMBER 17, 2010

Federal Emergency Management Agency



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://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*
OTHER AREAS	NO SCREEN Areas of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Accredited or Provisionally Accredited Levee, Dike, or Floodwall
	Non-accredited Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://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. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

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 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 the community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided by the Arapahoe County and Cities of Aurora and Littleton GIS depts. The coordinate system used for production of the digital FIRM is Universal Transverse Mercator, Zone 13N, referenced to the North American Datum of 1983 and the GRS 1980 spheroid, Western Hemisphere.

SCALE

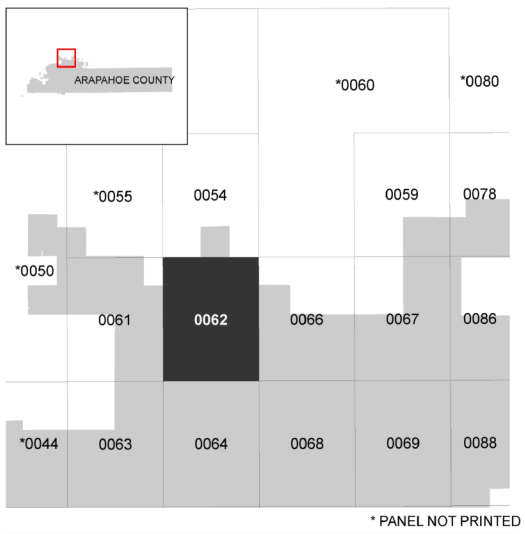
Map Projection:
NAD83 UTM Zone 13N
Western Hemisphere; Vertical Datum: NAVD88

1 inch = 500 feet 1:6,000

0 1,000 2,000 Feet

0 250 500 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

ARAPAHOE COUNTY, COLORADO
And Incorporated Areas

PANEL 62 OF 725

FEMA

Panel Contains:

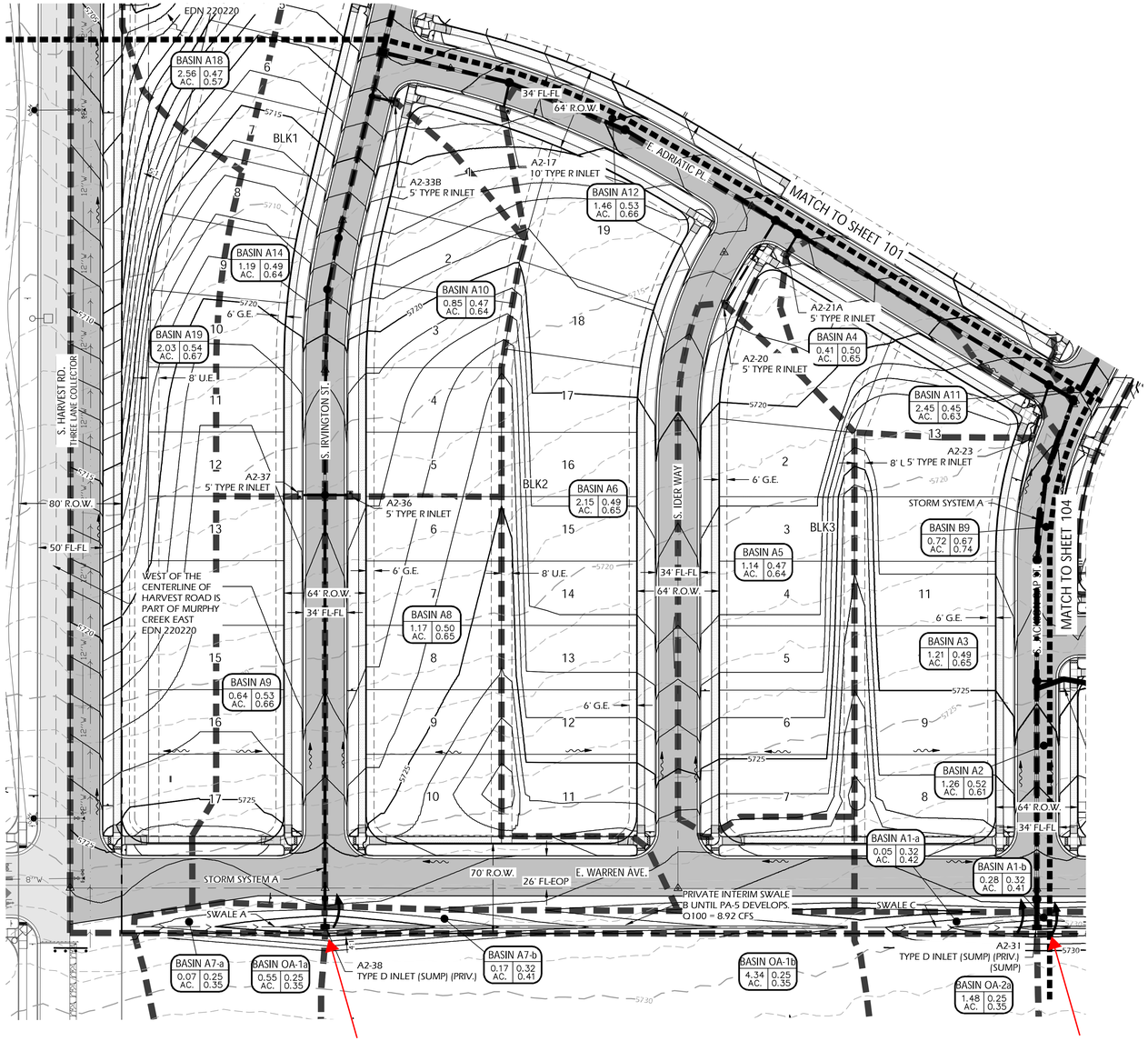
COMMUNITY	NUMBER	PANEL	SUFFIX
AURORA, CITY OF	080002	0062	L

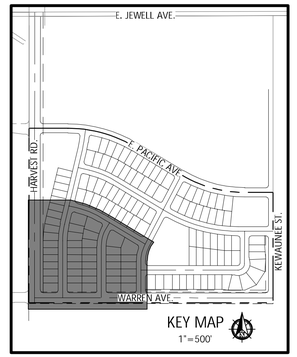
VERSION NUMBER
2.3.3.2

MAP NUMBER
08005C0062L

MAP REVISED
FEBRUARY 17, 2017

Appendix F – Excerpts from Referenced Documents





LEGEND

- Property Line
- Right of Way Line
- Centerline
- Lot Line
- Easement Line
- Wall
- Pond Outlet Structure
- Storm Manhole
- Flared End Section (FES)
- Type 'R' Inlet
- Type 'D' Inlet
- Inlet in Sump Condition
- Storm Sewer Line
- Watershed Boundary Line
- Basin Boundary Line
- Proposed Major Contour (5280)
- Proposed Minor Contour
- Existing Major Contour (5280)
- Existing Minor Contour
- Flow Direction Arrow
- Emergency Overflow Arrow
- Drainage Basin ID (A / Acre AC. | C2 C100)
- Design Point (1)
- Prop. Asphalt Pavement
- Prop. Concrete Pavement

PRIVATE SWALE NOTE:

1. PRIVATE INTERIM SWALES SHALL BE MAINTAINED BY THE HOA AND THE SLOPE OF LESS THAN 2% PERMITTED FOR UP TO 36 MONTHS, OTHERWISE REVISIONS SHALL BE SUBMITTED FOR CONCRETE LINING. IN ADDITION, THE CITY RESERVES THE RIGHT, PRIOR TO 36 MONTHS, TO REQUIRE THE SWALE TO BE CONCRETE LINED SHOULD THERE BE ISSUES WITH REDUCED CAPACITY, SEDIMENTATION, PONDING, OR OTHER ITEMS IDENTIFIED BY THE CITY ENGINEER

NOTES:

1. CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETELY AND/OR ACCURACY OF THIS DOCUMENT.
2. ALL STORM SEWER, INCLUDING ALL DETENTION POND FACILITIES, AND OTHER ASSOCIATED STORM STRUCTURES ARE PUBLIC UNLESS OTHERWISE NOTED.
3. DETENTION PONDS ARE PRIVATE UNLESS OTHERWISE NOTED AND MAINTAINED BY THE HOA.
4. THE STORM SEWER SYSTEM, IN COMBINATION WITH THE STREET, IS SIZED FOR THE 100 YEAR STORM EVENT.
5. ROADWAY PAVING WILL NOT BE PERMITTED AND CERTIFICATES OF OCCUPANCY WILL NOT BE ISSUED UNTIL DOWNSTREAM PIPE AND OUTFALL HAVE BEEN CONSTRUCTED IN HARVEST ROAD AND INITIALLY ACCEPTED.
6. FURTHER ADJACENT DOWNSTREAM DEVELOPMENT IS REQUIRED TO PROVIDE CONVEYANCE FOR EMERGENCY OVERFLOWS. CITY RECOMMENDS PRIVATE DRAINAGE EASEMENTS TO BE OBTAINED FOR ANY EMERGENCY FLOW PATHS NOT WITHIN ROW.

Calculated Proposed Runoff Rates

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	C_{100}	Peak Flow (cfs) Q_2	Q_{100}
A1	A2-31 (Int.)	0.34	14.0	0.32	0.41	0.25	0.87
A2	A2-29	1.26	9.1	0.52	0.61	1.83	5.79
A3	A2-23	1.21	11.1	0.49	0.65	1.51	5.40
A4	A2-21A	0.41	8.4	0.50	0.65	0.59	2.06
A5	A2-20	1.14	11.7	0.47	0.64	1.35	4.91
A6	A2-17	2.15	13.2	0.49	0.65	2.52	8.98
A7	A2-38 (Int.)	0.24	12.3	0.30	0.39	0.18	0.62
A8	A2-36	1.17	8.5	0.50	0.65	1.67	5.83
A9	A2-37	0.64	7.8	0.53	0.66	1.00	3.39
A10	A2-33B	0.85	10.8	0.47	0.64	1.04	3.80
A11	A2-12A	2.45	13.2	0.45	0.63	2.62	9.85
A12	A2-11	1.56	10.1	0.54	0.67	2.23	7.53
A14	A2-2	1.19	9.7	0.49	0.64	1.60	5.57
A15	A3-5	0.33	5.9	0.67	0.74	0.72	2.15
(Int.) indicates Interim Condition				(D.B.O.) indicates Designed by Others			

Calculated Proposed Runoff Rates

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	C_{100}	Peak Flow (cfs) Q_2	Q_{100}
A16	A3-4	3.26	11.7	0.50	0.65	4.08	14.36
A17	A3-2	0.21	5.0	0.67	0.74	0.48	1.43
A18	A1-6	2.56	8.4	0.47	0.57	3.41	11.16
A19	A4-2	2.03	11.6	0.54	0.67	2.78	9.19
B1	B3-11	0.57	12.3	0.62	0.70	0.87	2.63
B1-a	B3-14 (Int.)	0.10	8.1	0.25	0.35	0.07	0.28
B2	B3-7	3.67	14.2	0.42	0.58	3.58	13.24
B2-a	B3-8	0.20	5.3	0.60	0.70	0.39	1.24
B3	B3-5	1.02	8.1	0.56	0.68	1.66	5.43
B4	B3-6	3.76	13.9	0.35	0.64	3.08	15.25
B5	B3-2	1.08	11.6	0.54	0.67	1.46	4.92
B6	B4-2	0.17	9.0	0.67	0.74	0.32	0.96
B7	B2-13	0.25	6.3	0.55	0.68	0.44	1.45
B8	B2-12	1.12	12.3	0.45	0.62	1.23	4.65
B9	B2-9	0.89	6.4	0.64	0.72	1.78	5.44
(Int.) indicates Interim Condition				(D.B.O.) indicates Designed by Others			

Calculated Proposed Runoff Rates

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	C_{100}	Peak Flow (cfs) Q_2	Q_{100}
B10	B2-4	0.55	9.1	0.67	0.74	1.03	3.05
B11	B2-2	1.70	13.0	0.45	0.62	1.83	6.88
B12	B1-1	1.35	5.0	0.49	0.58	2.23	7.14
C1	B1-2B	0.41	5.0	0.67	0.74	0.93	2.75
D1	C1-4	0.11	5.0	0.71	0.79	0.27	0.80
D2	C1-2	0.23	5.0	0.67	0.74	0.52	1.54
OA-1a	A2-38 (Int.)	0.55	12.2	0.25	0.35	0.34	1.28
OA-2a	A2-31 (Int.)	1.48	14.4	0.25	0.35	0.85	3.20
OB	B3-14 (Int.)	0.61	6.7	0.25	0.35	0.38	1.43
OC	B4-4	0.54	5.3	0.67	0.74	1.21	3.59
OD	Pond T	1.39	13.4	0.25	0.35	0.82	3.11
OE	C2-2	0.89	6.5	0.67	0.75	1.86	5.62
OF	C2-5	1.00	9.4	0.57	0.66	1.56	4.90
OG	Pond T	10.96	15.2	0.26	0.36	6.42	23.85
(Int.) indicates Interim Condition				(D.B.O.) indicates Designed by Others			

COLORADO LICENSED KEVIN WARREN LAND 58938 7/27/2022 PROFESSIONAL ENGINEER

PROJECT BENCHMARK:
CITY OF AURORA BENCHMARK #4S6529NE002 BEING A 3" BRASS CAP STAMPED "CITY OF AURORA, BM, 23-70, 0-110" ATOP A 30" LONG STEEL PIPE IN CONC. ON THE SOUTH SIDE OF E. JEWELL AVE. APPROX. 300 FT. WEST OF THE CENTERLINE OF A BRIDGE CROSSING COAL CREEK, & AT THE SOUTHEAST CORNER OF INTERSECTION OF ROAD GOING SOUTHEAST FROM E. JEWELL AVE. EL. NAVD88 = 5623.18'

N

50 0 25 50
SCALE
1 inch = 50 ft.

ILC Innovative Land Consultants, Inc.
12071 Tejon Street, Suite 470
Westminster, CO 80234
303.421.4224
www.innovativelandinc.com

No.	Rev. Date:	Revision Type:
1		
2		
3		
4		
5		
6		

Designed By: XWL
Prepared By: AA
Approved By: XWL
Date: July 27, 2022
Horiz. Scale: 1" = 50'
Vert. Scale: N/A
Sheet: 102 of 113
Job No.: 1002.84

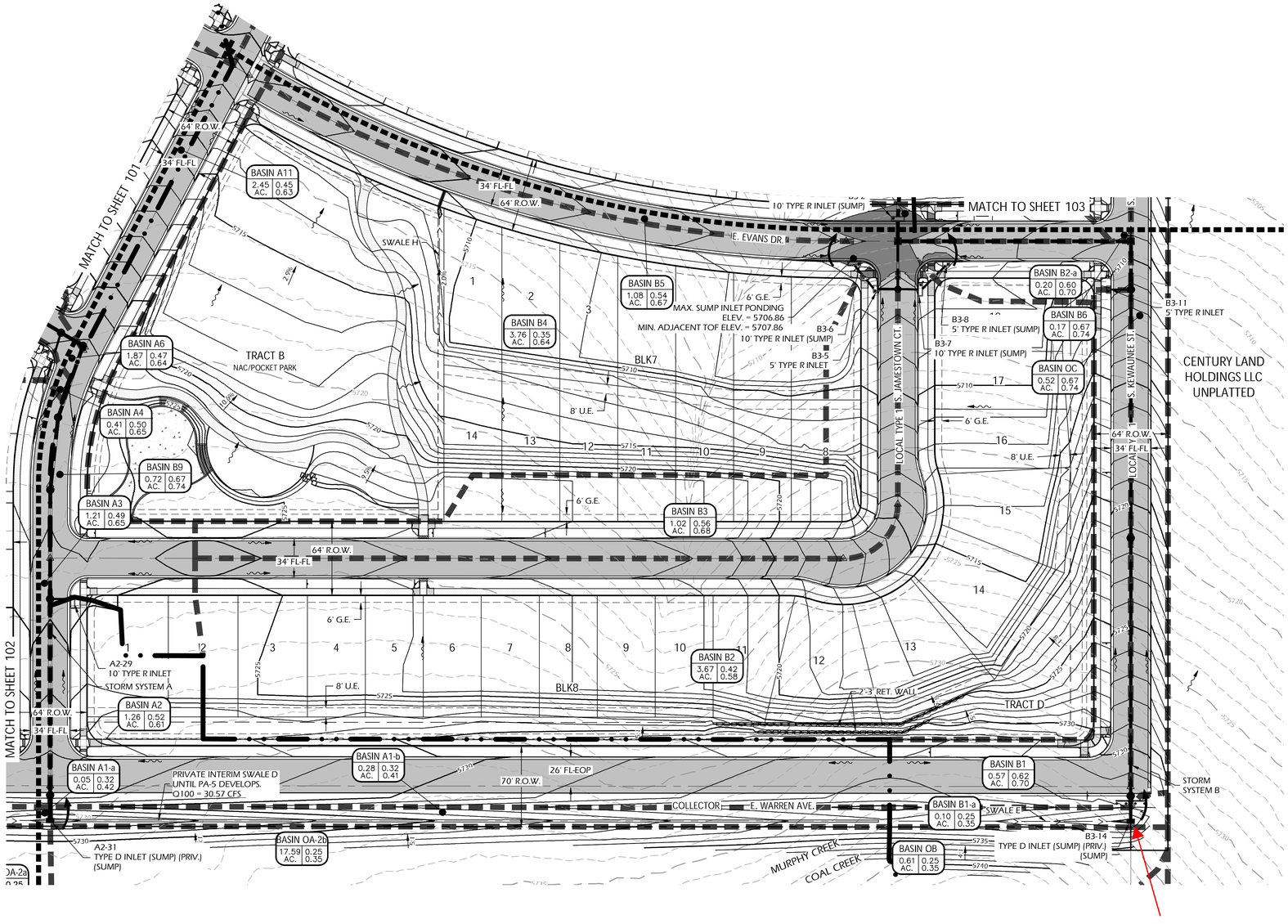
Prop. Name: Harvest Crossing Subdivision Filing No. 1
Location: Aurora, Colorado
Plan Set: Construction Documents
Sheet Name: Final Drainage Plan

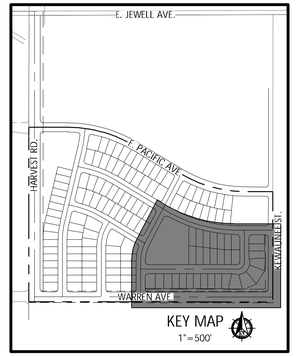
Client: Richmond American Homes
Address: Greenwood Village, CO 80111 (4350 South Monaco Street, Denver, Colorado 80237)
Contact: Eric Kuby
Phone: 720-977-3827

Know what's below. Call before you dig.

Sheet: 102

I:\JOB FOLDERS\1008 – SOUTH QUINCY RESIDENTIAL DEVELOPERS, INC\1008-18\PROD\DRAINAGE\FINAL\FINAL DRNG PRINTED ON: 7/27/2022 4:40 PM





LEGEND

- Property Line
- Right of Way Line
- Centerline
- Lot Line
- Easement Line
- Wall
- Pond Outlet Structure
- Storm Manhole
- Flared End Section (FES)
- Type 'R' Inlet
- Type 'D' Inlet
- Inlet in Sump Condition
- Storm Sewer Line
- Watershed Boundary Line
- Basin Boundary Line
- Proposed Major Contour (5280)
- Proposed Minor Contour
- Existing Major Contour (5280)
- Existing Minor Contour
- Flow Direction Arrow
- Emergency Overflow Arrow
- Drainage Basin ID (A / Acre AC. | C2 | C100)
- Design Point (1)
- Prop. Asphalt Pavement
- Prop. Concrete Pavement

NOTES:

1. CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETELY AND/OR ACCURACY OF THIS DOCUMENT.
2. ALL STORM SEWER, INCLUDING ALL DETENTION POND FACILITIES, AND OTHER ASSOCIATED STORM STRUCTURES ARE PUBLIC UNLESS OTHERWISE NOTED.
3. DETENTION PONDS ARE PRIVATE UNLESS OTHERWISE NOTED AND MAINTAINED BY THE HOA.
4. THE STORM SEWER SYSTEM, IN COMBINATION WITH THE STREET, IS SIZED FOR THE 100 YEAR STORM EVENT.
5. ROADWAY PAVING WILL NOT BE PERMITTED AND CERTIFICATES OF OCCUPANCY WILL NOT BE ISSUED UNTIL DOWNSTREAM PIPE AND OUTFALL HAVE BEEN CONSTRUCTED IN HARVEST ROAD AND INITIALLY ACCEPTED.
6. FURTHER ADJACENT DOWNSTREAM DEVELOPMENT IS REQUIRED TO PROVIDE CONVEYANCE FOR EMERGENCY OVERFLOWS. CITY RECOMMENDS PRIVATE DRAINAGE EASEMENTS TO BE OBTAINED FOR ANY EMERGENCY FLOW PATHS NOT WITHIN ROW.

Calculated Proposed Runoff Rates

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	Runoff Coefficients C_{100}	Peak Flow (cfs) Q_2	Peak Flow (cfs) Q_{100}
A1	A2-31 (Int.)	0.34	14.0	0.32	0.41	0.25	0.87
A2	A2-29	1.26	9.1	0.52	0.61	1.83	5.79
A3	A2-23	1.21	11.1	0.49	0.65	1.51	5.40
A4	A2-21A	0.41	8.4	0.50	0.65	0.59	2.06
A5	A2-20	1.14	11.7	0.47	0.64	1.35	4.91
A6	A2-17	2.15	13.2	0.49	0.65	2.52	8.98
A7	A2-38 (Int.)	0.24	12.3	0.30	0.39	0.18	0.62
A8	A2-36	1.17	8.5	0.50	0.65	1.67	5.83
A9	A2-37	0.64	7.8	0.53	0.66	1.00	3.39
A10	A2-33B	0.85	10.8	0.47	0.64	1.04	3.80
A11	A2-12A	2.45	13.2	0.45	0.63	2.62	9.85
A12	A2-11	1.56	10.1	0.54	0.67	2.23	7.53
A14	A2-2	1.19	9.7	0.49	0.64	1.60	5.57
A15	A3-5	0.33	5.9	0.67	0.74	0.72	2.15
(Int.) indicates Interim Condition				(D.B.O.) indicates Designed by Others			

Calculated Proposed Runoff Rates

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	Runoff Coefficients C_{100}	Peak Flow (cfs) Q_2	Peak Flow (cfs) Q_{100}
A16	A3-4	3.26	11.7	0.50	0.65	4.08	14.36
A17	A3-2	0.21	5.0	0.67	0.74	0.48	1.43
A18	A1-6	2.56	8.4	0.47	0.57	3.41	11.16
A19	A4-2	2.03	11.6	0.54	0.67	2.78	9.19
B1	B3-11	0.57	12.3	0.62	0.70	0.87	2.63
B1-a	B3-14 (Int.)	0.10	8.1	0.25	0.35	0.07	0.28
B2	B3-7	3.67	14.2	0.42	0.58	3.58	13.24
B2-a	B3-8	0.20	5.3	0.60	0.70	0.39	1.24
B3	B3-5	1.02	8.1	0.56	0.68	1.66	5.43
B4	B3-6	3.76	13.9	0.35	0.64	3.08	15.25
B5	B3-2	1.08	11.6	0.54	0.67	1.46	4.92
B6	B4-2	0.17	9.0	0.67	0.74	0.32	0.96
B7	B2-13	0.25	6.3	0.55	0.68	0.44	1.45
B8	B2-12	1.12	12.3	0.45	0.62	1.23	4.65
B9	B2-9	0.89	6.4	0.64	0.72	1.78	5.44
(Int.) indicates Interim Condition				(D.B.O.) indicates Designed by Others			

Calculated Proposed Runoff Rates

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients C_2	Runoff Coefficients C_{100}	Peak Flow (cfs) Q_2	Peak Flow (cfs) Q_{100}
B10	B2-4	0.55	9.1	0.67	0.74	1.03	3.05
B11	B2-2	1.70	13.0	0.45	0.62	1.83	6.88
B12	B1-1	1.35	5.0	0.49	0.58	2.23	7.14
C1	B1-2B	0.41	5.0	0.67	0.74	0.93	2.75
D1	C1-4	0.11	5.0	0.71	0.79	0.27	0.80
D2	C1-2	0.23	5.0	0.67	0.74	0.52	1.54
OA-1a	A2-38 (Int.)	0.55	12.2	0.25	0.35	0.34	1.28
OA-2a	A2-31 (Int.)	1.48	14.4	0.25	0.35	0.85	3.20
OB	B3-14 (Int.)	0.61	6.7	0.25	0.35	0.38	1.43
OC	B4-4	0.54	5.3	0.67	0.74	1.21	3.59
OD	Pond T	1.39	13.4	0.25	0.35	0.82	3.11
OE	C2-2	0.89	6.5	0.67	0.75	1.86	5.62
OF	C2-5	1.00	9.4	0.57	0.66	1.56	4.90
OG	Pond T	10.96	15.2	0.26	0.36	6.42	23.85
(Int.) indicates Interim Condition				(D.B.O.) indicates Designed by Others			

COLORADO LICENSED
LUNA WARREN HARD
58938
7/27/2022
PROFESSIONAL ENGINEER

PROJECT BENCHMARK:
CITY OF AURORA BENCHMARK #4S6529NE002 BEING A 3" BRASS CAP STAMPED "CITY OF AURORA, BM, 23-70, 0-110" ATOP A 30" LONG STEEL PIPE IN CONC. ON THE SOUTH SIDE OF E. JEWELL AVE. APPROX. 300 FT. WEST OF THE CENTERLINE OF A BRIDGE CROSSING COAL CREEK, & AT THE SOUTHEAST CORNER OF INTERSECTION OF ROAD GOING SOUTHEAST FROM E. JEWELL AVE. EL. NAVD88 = 5623.18'

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SCALE
1 inch = 50 ft.

Innovative Land Consultants, Inc.
12071 Tejon Street, Suite 470
Westminster, CO 80234
303.421.4224
www.innovativelandinc.com

No.	Rev. Date:	Revision Type:
1		
2		
3		
4		
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6		

Designed By: XWL
Prepared By: AA
Approved By: XWL
Date: July 27, 2022
Horiz. Scale: 1" = 50'
Vert. Scale: N/A
Sheet: 104 of 113
Job No.: 1002.84

Prjg. Name: Harvest Crossing Subdivision Filing No. 1
Location: Aurora, Colorado
Plan Set: Construction Documents
Sheet Name: Final Drainage Plan

Client: Richmond American Homes
Address: Greenwood Village, CO 80111 (4350 S. Monaco Street Denver, Colorado 80237)
Contact: Kelly Lee
Phone: 720-977-3827

Know what's below. Call before you dig.

Sheet: 104

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Time of Concentration

Project No.: 1008-18

6/8/22

Basin ID	C_5	Initial Flow Time T_i			Travel Time T_t						T_c	T_c Check		Final
		Length (ft)	Slope (%)	T_i (min)	Length (ft)	Slope (%)	Convey. Element	Convey. Coefficient	Vel. (fps)	T_t (min)	Final T_c (min)	Length (ft)	T_c=(L/180)+10 (min)	T_c (min)
Off-site Interim Condition														
OA-1a	0.27	400	3.36	20.1			Grass	7		0.0	20.1	400	12.2	12.2
OA-1a + A7-a	0.27	310	3.36	17.7	240	1.80	Swale	7	0.9	4.3	21.9	550	13.1	13.1
OA-1b	0.27	500	1.90	27.1	590	1.90	Grass	7	1.0	10.2	37.3	1,090	16.1	16.1
OA-1b + A7-b	0.27	500	1.90	27.0	190	1.90	Grass	7	1.0	3.3				
					400	1.50	Swale	7	0.9	7.8	38.1	1,090	16.1	16.1
OA-2a	0.27	500	2.25	25.6	300	2.25	Grass	7	1.1	4.8	30.4	800	14.4	14.4
OA-2a + A1-a	0.27	500	2.25	25.6	170	2.25	Grass	7	1.1	2.7				
					120	0.80	Swale	7	0.6	3.2	31.5	790	14.4	14.4
OA-2b	0.27	500	1.40	29.9	1,740	1.40	Grass	7	0.8	35.0	64.9	2,240	22.4	22.4
OA-2b + A1-b	0.27	500	1.40	29.9	1,030	1.40	Grass	7	0.8	20.7				
					710	1.80	Swale	7	0.9	12.6	63.2	2,240	22.4	22.4
OB	0.27	400	4.45	18.3	0	2.00	Grass	7	1.0	0.0	18.3	400	12.2	12.2
OB + B1-a	0.27	270	4.45	15.0	200	2.00	Swale	7	1.0	3.4	18.4	470	12.6	12.6
OC	0.68	38	5.45	2.7	702	4.78	Street	20	4.4	2.7	5.3	740	14.1	5.3
OD	0.27	300	2.50	19.2	315	1.00	Grass	7	0.7	7.5	26.7	615	13.4	13.4
OE	0.68	38	2.00	3.7	511	2.30	Street	20	3.0	2.8	6.5	549	13.1	6.5
OF	0.58	62	2.00	5.9	597	2.00	Street	20	2.8	3.5	9.4	659	13.7	9.4
OE + OF	0.63	62	2.00	5.3	820	2.00	Street	20	2.8	4.8	10.2	882	14.9	10.2
OG	0.28	300	2.08	20.1	642	2.08	Grass	7	1.0	10.6	30.7	942	15.2	15.2
Off-site Developed Condition														
OA1	0.45	100	2.00	9.3	840	1.20	Street	20	2.2	6.4	15.7	940	15.2	15.2
OA1 + A7	0.44	100	2.00	9.4	840	1.20	Street	20	2.2	6.4	15.8	940	15.2	15.2
OA2	0.39	100	2.00	10.2	450	4.80	Street	20	4.4	1.7	11.9	550	13.1	11.9
OA2 + A1	0.39	100	2.00	10.2	450	4.80	Street	20	4.4	1.7	11.9	550	13.1	11.9
OB	0.44	50	2.00	6.7	1750	4.80	Street	20	4.4	6.7	13.3	1,800	20.0	13.3
OB + B1-a	0.44	50	2.00	6.7	1750	4.80	Street	20	4.4	6.7	13.3	1,800	20.0	13.3
OC	0.68	15	2.00	2.3	730	4.80	Street	20	4.4	2.8	5.1	745	14.1	5.1
OD	0.00	300	2.50	25.4	315	1.00	Grass	7	0.7	7.5	32.9	615	13.4	13.4
OE	0.72	38	2.00	3.4	511	2.30	Street	20	3.0	2.8	6.2	549	13.1	6.2
OF	0.58	29	2.00	4.0	577	1.92	Street	20	2.8	3.5	7.5	606	13.4	7.5
OG	0.00	300	2.08	27.0	642	2.08	Grass	7	1.0	10.6	37.6	942	15.2	15.2
Historic														
OC	0.27	75	5.00	7.6	195	5.80	Street	20	4.8	0.7	8.3	270	11.5	8.3
OD	0.27	250	2.60	17.3	0	1.00	Grass	7	0.7	0.0	17.3	250	11.4	11.4
OE	0.27	54	3.90	7.0	0	1.00	Street	20	2.0	0.0	7.0	54	10.3	7.0
OF	0.37	72	2.00	8.9	0	1.00	Street	20	2.0	0.0	8.9	72	10.4	8.9
Ponds														
Pond A	0.53	125	2.00	9.2	1,090	2.50	Street	20	3.2	5.7				
					1,700	0.40	Pipe	25	1.6	17.9	32.9	2,915	26.2	26.2
Pond B	0.50	300	6.00	10.4	490	2.00	Grass	7	1.0	8.2				
					355	2.50	Street	20	3.2	1.9				
					670	0.40	Pipe	25	1.6	7.1	27.5	1,815	20.1	20.1
Ponds (Fully Developed)														
Pond A	0.47	125	2.00	10.0	1,085	2.50	Street	20	3.2	5.7				
					2,000	0.40	Pipe	25	1.6	21.1	36.8	3,210	27.8	27.8
Pond B	0.48	125	2.00	10.0	400	1.00	Street	20	2.0	3.3				
					760	1.80	Street	20	2.7	4.7				
					1,440	0.50	Pipe	25	1.8	13.6	31.6	2,725	25.1	25.1

Basin Runoff Calculations - Direct Runoff

Project No.: 1008-18

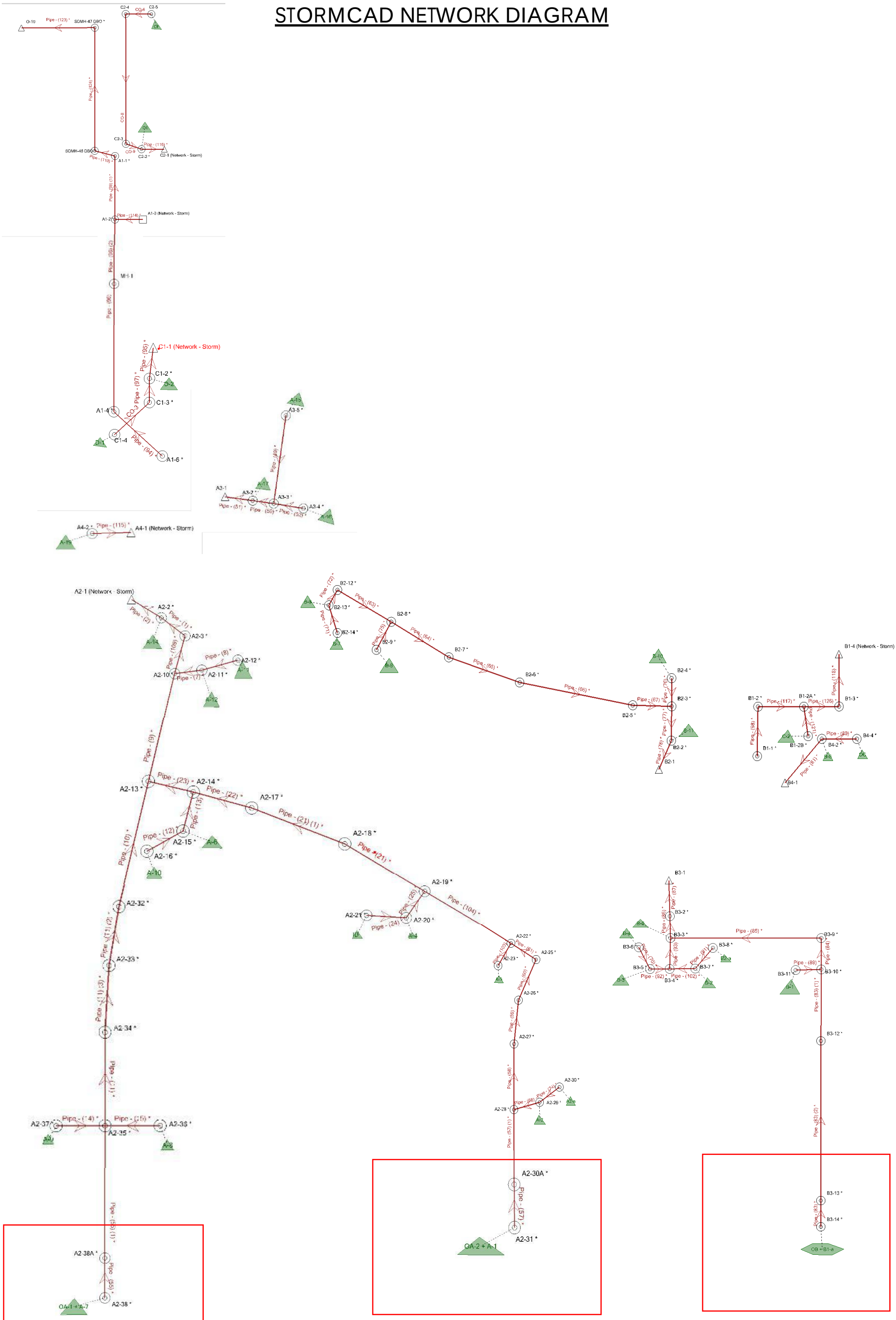
8-Jun-22

Basin ID	Design Point	Total Area (Ac.)	Imp (%)	Tc (min)	Runoff Coeff. C_2	C_5	C_{100}	I_2	I_5	I_{100}	Q_2	Q_{100}
Off-site Interim Condition												
OA-1a	A2-38 (Int.)	0.55	5%	12.2	0.25	0.27	0.35	2.47	3.44	6.65	0.34	1.28
OA-1a + A7-a	A2-38 (Int.)	0.62	5%	13.1	0.25	0.27	0.35	2.40	3.34	6.46	0.37	1.40
OA-1b	A2-38 (Int.)	4.34	5%	16.1	0.25	0.27	0.35	2.18	3.03	5.87	2.36	8.92
OA-1b + A7-b	A2-38 (Int.)	4.51	5%	16.1	0.25	0.27	0.35	2.18	3.03	5.87	2.48	9.33
OA-2a	A2-31 (Int.)	1.48	5%	14.4	0.25	0.27	0.35	2.29	3.19	6.17	0.85	3.20
OA-2a + A1-a	A2-31 (Int.)	1.53	5%	14.4	0.25	0.27	0.35	2.29	3.19	6.18	0.89	3.34
OA-2b	A2-31 (Int.)	17.59	5%	22.4	0.25	0.27	0.35	1.83	2.55	4.94	8.11	30.57
OA-2b + A1-b	A2-31 (Int.)	17.87	5%	22.4	0.25	0.27	0.35	1.83	2.55	4.94	8.28	31.14
OB	B3-14 (Int.)	0.61	5%	12.2	0.25	0.27	0.35	2.47	3.44	6.65	0.38	1.43
OB + B1-a	B3-14 (Int.)	0.71	5%	12.6	0.25	0.27	0.35	2.43	3.39	6.56	0.43	1.64
OC	B4-4	0.54	74%	5.3	0.67	0.68	0.74	3.30	4.60	8.90	1.21	3.59
OD	Pond T	1.39	5%	13.4	0.25	0.27	0.35	2.37	3.30	6.38	0.82	3.11
OE	C2-2	0.89	72%	6.5	0.67	0.68	0.75	3.11	4.34	8.40	1.86	5.62
OF	C2-5	1.00	55%	9.4	0.57	0.58	0.66	2.74	3.83	7.40	1.56	4.90
OG	Pond T	10.96	7%	15.2	0.26	0.28	0.36	2.23	3.11	6.02	6.42	23.85
Off-site Developed Condition												
OA1	PA	3.93	50%	15.2	0.40	0.45	0.60	2.23	3.11	6.02	3.51	14.18
OA1 + A7	PA	4.17	48%	15.2	0.39	0.44	0.59	2.23	3.11	6.02	3.67	14.75
OA2	PA	13.03	39%	11.9	0.33	0.39	0.61	2.50	3.48	6.73	10.68	53.90
OA2 + A1	PA	13.37	38%	11.9	0.33	0.39	0.61	2.49	3.48	6.73	10.94	54.79
OB	PA	16.04	49%	13.3	0.39	0.44	0.60	2.37	3.31	6.40	14.98	61.77
OB + B1-a	PA	16.14	49%	13.3	0.39	0.44	0.60	2.37	3.31	6.40	15.03	61.97
OC	B1-4	0.52	74%	5.1	0.67	0.68	0.74	3.34	4.66	9.01	1.18	3.50
OD	PT	Not Applicable - Same as Interim										
OE	C2-2	0.81	79%	6.2	0.71	0.72	0.79	3.17	4.41	8.54	1.83	5.48
OF	C2-5	1.00	55%	7.5	0.57	0.58	0.66	2.98	4.15	8.03	1.70	5.32
OG	PT	Not Applicable - Same as Interim										
Existing												
OC		0.60	5%	8.3	0.25	0.27	0.35	2.87	4.00	7.74	0.43	1.63
OD		1.39	5%	11.4	0.25	0.27	0.35	2.54	3.54	6.85	0.88	3.33
OE		0.81	5%	7.0	0.25	0.27	0.35	3.04	4.24	8.20	0.62	2.32
OF		0.97	21%	8.9	0.36	0.37	0.45	2.81	3.91	7.57	0.97	3.32
Emergency Overflow Contributing Flows (Developed Condition)												
Pond A inflow		39.96	48%	27.8	0.43	0.47	0.62	1.62	2.26	4.38	27.94	109.11
Pond B inflow		33.00	49%	25.1	0.43	0.48	0.62	1.72	2.40	4.64	24.59	94.99
Pond T inflow		14.71	16%	15.2	0.32	0.34	0.42	2.23	3.11	6.02	10.52	36.94
Pond T + Pond A		54.68	39%	27.8	0.40	0.44	0.57	1.62	2.26	4.38	35.60	135.97

Intensity : $\frac{28.5 * P_1}{(10 + T_c)^{0.786}}$

2 Year P_1 =	0.99	inches
5 Year P_1 =	1.38	inches
100 Year P_1 =	2.67	inches

STORMCAD NETWORK DIAGRAM



Historic Basin Peak Runoff Calculations - Direct Runoff

Job No. 1008-18

11-Mar-21

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients		Weighted Imp.	Peak Flow (cfs)	
				C_2	C_{100}	I (%)	Q_2	Q_{100}
A	7	72.2	21.39	0.18	0.22	5%	24.42	80.51
B1	1	14.0	17.78	0.20	0.24	7%	5.65	18.39
B2	2	41.0	26.22	0.18	0.22	5%	12.39	40.85
B3	3	21.7	16.67	0.18	0.22	5%	8.34	27.51
C1	8	18.1	18.89	0.20	0.24	8%	7.28	23.59
C2	9	30.2	20.75	0.18	0.22	5%	10.38	34.22
C3	10	7.3	14.33	0.18	0.22	5%	3.02	9.94
O1	7	1.3	10.56	0.18	0.22	5%	0.61	2.02
O2	7	1.7	10.25	0.18	0.22	5%	0.81	2.68
OS-911	13	25.4	15.61	0.18	0.22	5%	10.08	33.23
OS-911,A,O1-O2	7	100.6	21.39	0.18	0.22	5%	34.03	112.18

$$\text{Intensity} = \frac{28.5 * P_1}{(10 + T_c)^{0.786}}$$

2 Year P_1 = 0.99 Inches

100 Year P_1 = 2.67 Inches

Basin Peak Runoff Calculations - Direct Runoff

Job No. 1008-18

11-Mar-21

Basin ID	Design Point	Total Area (Ac.)	Tc (min)	Runoff Coefficients		Weighted Imp.	Peak Flow (cfs)	
				C_2	C_{100}	I (%)	Q_2	Q_{100}
A1	4	14.60	14.0	0.40	0.60	50%	13.56	54.84
A2	5	23.20	12.8	0.40	0.60	50%	22.41	90.66
A3	6	8.80	11.6	0.40	0.60	50%	8.87	35.89
A4	7	17.40	16.0	0.32	0.68	35%	12.19	69.50
A5	7	8.20	15.0	0.68	0.74	82%	12.51	36.95
B1	1	14.10	5.0	0.86	0.88	94%	40.90	112.84
B2	2	40.90	16.4	0.39	0.60	48%	34.07	143.01
B3	3	21.70	17.2	0.36	0.61	43%	16.30	74.86
C1	8	24.90	5.2	0.66	0.82	79%	54.33	183.00
C2	12	16.60	14.2	0.40	0.60	50%	15.32	61.97
C3	11	14.10	19.4	0.40	0.60	50%	11.15	45.12
O1	7	1.30	10.6	0.18	0.22	5%	0.61	2.02
O2	7	1.70	10.3	0.18	0.22	5%	0.81	2.68
OS-911	13	25.40	9.4	0.40	0.60	50%	27.85	112.67
OS-911,A,O1-O2	7	100.60	16.0	0.40	0.61	49%	88.28	363.16

$$\text{Intensity} = \frac{28.5 * P_1}{(10 + T_c)^{0.786}}$$

2 Year P_1 = 0.99 Inches

100 Year P_1 = 2.67 Inches

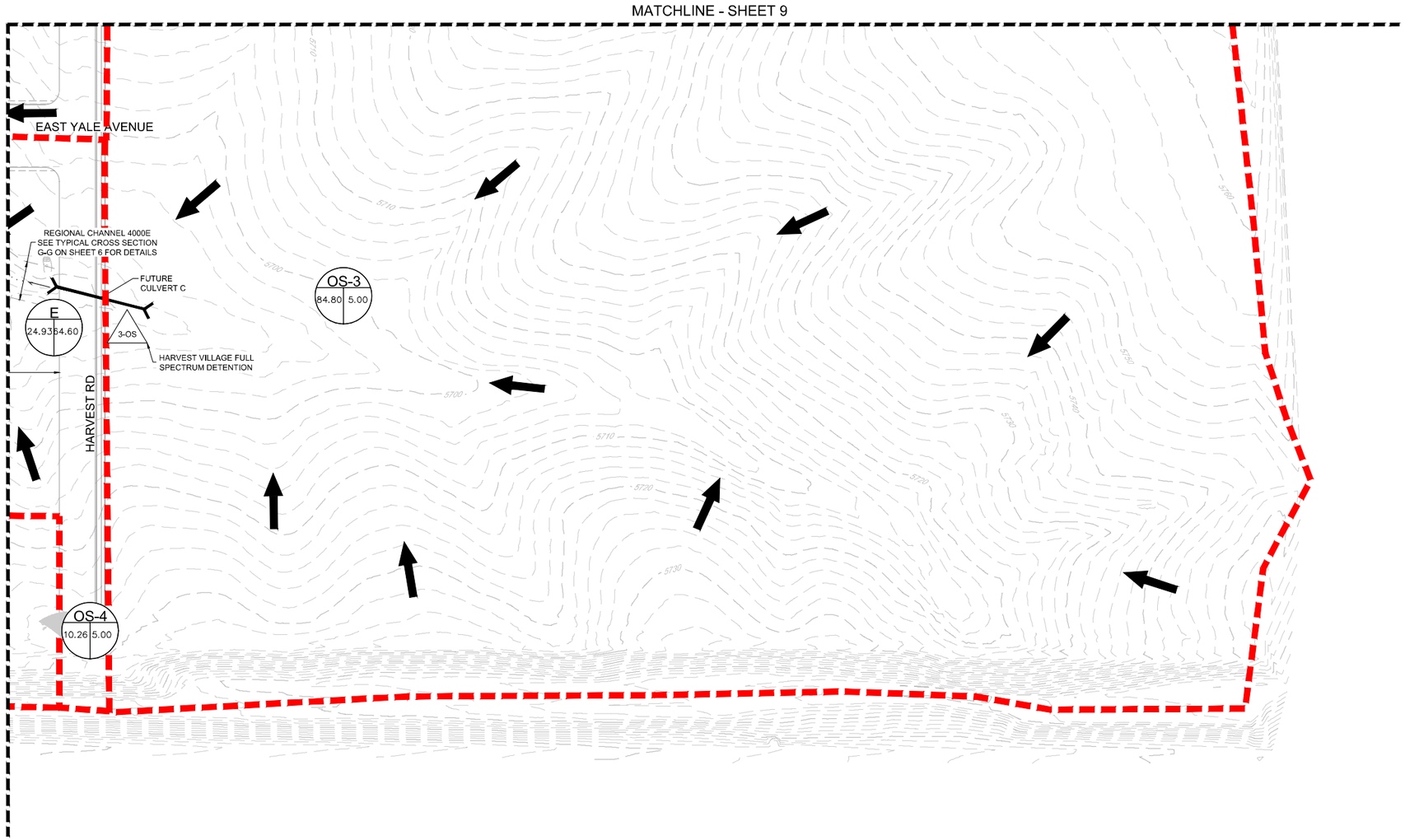
TABLE B-4 Continued
Existing Land-Use Conditions
Peak Flow Summary

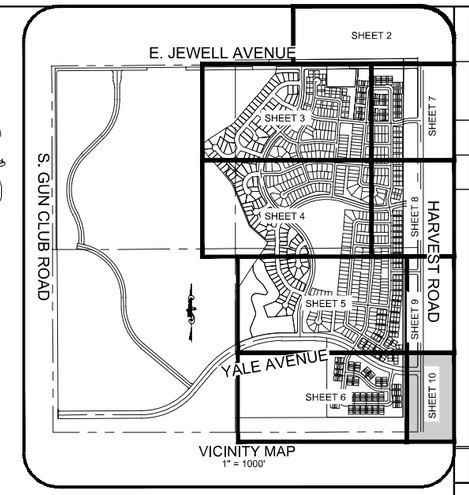
Conduit Element	Location	Peak Flows (cfs)					
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
1606re		277	531	709	1202	1489	1823
1625re		251	467	615	1013	1257	1555
1635re		255	436	554	850	1035	1257
1636re		240	407	514	766	954	1140
1637re		221	363	451	647	798	948
1655re		148	249	312	452	561	668
1665re		38	63	78	114	140	167
2045re		12	131	220	437	602	793
2046re		9	94	154	304	415	541
2075re		7	75	120	236	321	412
2085re		5	55	85	161	216	273
2095re		2	19	29	54	72	90
2205re		4	31	47	89	120	155
2305re		4	34	52	101	135	177
3105re		10	39	53	93	122	152
3205re		1	5	8	14	19	24
3315re		6	52	82	160	217	280
3325re		3	26	40	77	104	132
3505re		37	106	156	280	375	485
3515re		28	86	125	226	302	388
3516re		23	71	103	186	248	318
3545re		5	14	20	35	45	57
3555re		11	39	56	104	139	177
3565re		5	26	38	69	92	115
3805re		1	7	11	21	29	36
4005re		2	16	24	45	60	75
4305re		12	36	50	85	110	132
4315re		2	16	24	45	59	75
4405re		22	82	122	228	306	385
4415re		2	15	24	46	62	80

Conduit Element	Location	Peak Flows (cfs)					
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
4425re		4	35	56	110	151	189
4435re		2	15	24	47	65	82
4515re		7	40	59	110	147	184
4705re		3	26	44	87	120	159
4715re		2	17	27	52	71	91
5025re		2	19	33	66	92	122
5035re		2	14	22	44	60	78
5115re		2	23	36	70	95	122
5125re		9	79	122	232	311	396
5315re		5	42	63	117	156	196
5505re		14	139	226	437	592	761
5515re		1	12	18	33	44	56
5525re		9	88	142	278	377	484
5535re		3	37	64	114	155	199
5545re		2	17	27	52	71	90
5555re		7	66	105	205	279	356
5565re		1	16	26	49	65	82
6005re		5	58	92	183	249	321
6015re		4	39	61	116	156	197
6205re		3	28	44	85	114	145
6305re		2	21	33	60	80	97
6505re		3	23	35	65	86	109
7015re		5	64	105	211	288	373
7025re		6	58	91	177	238	303
7035re		3	30	47	90	121	153
7105re		0	13	22	50	68	88
7205re		0	32	54	116	158	201
7515re		23	30	34	57	84	116
7525re		139	210	255	340	413	480
7615re		26	50	66	108	138	168
7705re		105	170	214	305	379	446

10

220220





100 50 0 100 200

SCALE: 1" = 100

LEGEND

- X-X BASIN DESIGNATION (A = AREA IN ACRES, X = PERCENT IMPERVIOUSNESS)
- DESIGN POINT
- DETENTION POND
- PROPOSED MAJOR BASIN BOUNDARY
- PROPOSED MINOR BASIN BOUNDARY
- LIMITS OF CONSTRUCTION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 100-YR FLOODPLAIN
- FLOODWAY
- PROPOSED STORM
- EXISTING STORM
- PROPERTY BOUNDARY
- EASEMENT
- EMERGENCY OVERFLOW PATH
- GENERAL BASIN FLOW DIRECTION

BASIN SUMMARY TABLE

Basin ID	Design Point	Area (acres)	Imperviousness (%)	Q2-Year (cfs)	Q100-Year (cfs)
A	1-A	32.2	58.8	43.00	154.12
B	1-B	38.8	51.7	48.18	166.91
C	1-C	34.6	57.2	28.85	114.28
D	1-D	39.3	55.5	33.59	134.23
E	1-E	24.9	64.6	28.11	99.02
J	1-J	2.0	100.0	3.67	10.70
F7-A	1-F7-A	11.4	55.8	15.04	51.95
F7-B	1-F7-B	3.6	62.2	4.92	17.93
F7-C	1-F7-C	16.4	24.6	13.68	43.84
F7-A1	A1-F7	14.5	47.3	14.42	50.40
F7-B1	B1-F7	13.8	47.8	13.43	48.54
F7-C1	C1-F7	21.9	44.7	19.12	68.66
EMC	1-EMC	43.4	77.7	67.33	236.16
OS-1	1-OS	53.9	5.0	15.42	51.36
OS-2	2-OS	22.3	5.0	8.02	26.70
OS-3	3-OS	84.8	5.0	29.02	96.62
OS-4	4-OS	10.3	5.0	3.75	12.50
OS-J	J-OS	8.0	5.0	6.70	11.70

POND SUMMARY TABLE

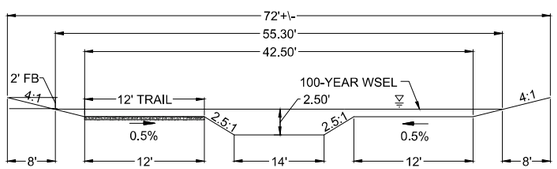
Pond ID	Contributing Basins	Tributary Area (ac)	Average Impervious (%)	L2 * WQCV (ac-ft)	EURV (ac-ft)	Peak Inflow Q (cfs)
Pond A	A	32.2	58.8	0.75	1.82	139.1
Pond B	B	38.8	51.7	0.82	1.90	129.3
Pond C	C	34.6	57.2	0.79	1.89	120.0
Pond D	D & OS-2	61.5	37.3	1.06	2.12	135.9
Pond E	E & OS-4	35.2	47.2	0.70	1.57	117.6
Pond F7-A	F7-A & F7-A1	25.9	51.1	0.54	1.25	71.4
Pond F7-B	F7-B & F7-B1	17.4	50.8	0.36	0.84	23.2
Pond F7-C	F7-C & F7-C1	38.3	36.1	0.65	1.27	39.7
Pond OS 100-20	OS-J & J	10.0	24.2	0.13	0.22	14.8

NOTE: These ponds are EURV only and do not provide 100-year detention. They are allowed to realease at rates up to the peak 100 year inflow rate.

FACSIMILE
THIS ELECTRONIC PLAN IS A FACSIMILE OF THE SIGNED AND SEALED PDF SET.

CO PROFESSIONAL ENGINEER
BRIAN SHAFFER, CO P.E. NO. 57673

11/19/2020
DATE



4000E CHANNEL SECTION
SECTION G-G

Q_{100} = 184 CFS *
SLOPE = 0.002 FT/FT

*NOTE: FLOWS FROM MOSER 2008 (FUTURE) ELEMENT 4515

NOTE:

1. 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, OF DIMENSIONS AND EVALUATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.
2. ALL STORM DRAIN WITHIN PUBLIC STREETS WILL BE PUBLICLY MAINTAINED UNLESS OTHERWISE NOTED.
3. EURV PONDS A, B, C, D, E, F7-A, F7-B, F7-C, AND OS100-20 POND OUTFALL PIPES, AND ALL SWALES WILL BE MAINTAINED BY THE MURPHY CREEK METROPOLITAN DISTRICT UNTIL ADJACENT LAND DEVELOPS.
4. TRIBUTARY 3000E CHANNEL AND 4000E CHANNEL WILL BE DESIGNED AND CONSTRUCTED TO BE MHFD MAINTENANCE ELIGIBLE DESIGNATED AS PUBLIC MAINTENANCE.
5. THIS SINGLE FAMILY DEVELOPMENT WILL HAVE A DENSITY OF FIVE DWELLING UNITS PER ACRE OR LESS.
6. STREAM CORRIDORS WILL BE EVALUATED IN GREATER DETAIL FOR STABILITY AS THEY ARE INCORPORATED INTO THE LAND USE CHANGES. IMPROVEMENTS WILL BE INFORMED BY GEOMORPHIC PRINCIPLES. STRUCTURAL STABILITY WILL BE PROVIDED THROUGH NATURAL MATERIALS LIKE VEGETATION AND IMPORTED ROCK THAT WORKS COHESIVELY WITH THE OTHER REGIONAL INFRASTRUCTURE.

BENCH MARK
A CITY OF AURORA BENCHMARK KNOWN AS 4S6518SW001 (FORMERLY KNOWN AS M-095) BEING A 3" DIAMETER BRASS CAP IN CONCRETE AT THE NORTH RIGHT OF WAY FENCE LINE OF EAST MISSISSIPPI AVENEUE, NEAR THE NORTH QUARTER CORNER OF SECTION 19, TOWNSHIP 4 SOUTH, RANGE 65 WEST, HAVING A PUBLISHED ELEVATION OF 5603.652, NAVD 1988 DATUM.

PREPARED UNDER THE SUPERVISION OF

BRIAN SCHAFFER
COLORADO P.E. 57673

No.	Revisions	Date	Init.	Appr.	Date

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MURPHY CREEK EAST (HARVEST RIDGE)
FILING NO. 1, 2, 3 & 4
MDR - DRAINAGE MAPS

SCALE: AS SHOWN
FILE NO: 8130323701
DRAWN BY: STP
CHECKED BY: SS
DATE: NOVEMBER 2020
SHEET NUMBER 10

N:\PROJECTS\MURPHY CREEK FARMS- LENNAR\DOCS\ENGINEERING\DRAINAGE\MASTER DRAINAGE REPORT\DRAINAGE MAPS\DRAINAGE MAP - PROPOSED 5TH SUBMITTAL.DWG, CSLOCKHART, 11/19/2020 2:00 PM

APPROVED ON 11/30/2020

Generally, on-site soils are classified in the Fondis group (FdB, FoC) and the Renohill group (RhD), which are within Hydrologic Soil Group C and D, respectively. The majority of the soils on-site are Renohill-Buick loams, 3 to 9 percent slopes (RhD). A quarter of the soils on-site are Fondis silt loam, 1 to 3 percent slopes (FdB) within a band from the central east side northwest to the west side of the site. Smaller pockets of Fondis silt loam, 3 to 5 percent slopes (FdC) may be found along the west side (southern third of the site). The NRCS Hydrologic Soil Group map may be found in Appendix C.

b. General Historic Drainage Patterns

Areas west of the ridgeline are tributary to Murphy Creek, and drain northwest and west toward the Murphy Creek East development. The Murphy Creek drainage basins are identified as Basins A and B on the Master Drainage Plan. Basin A flows to Harvest Gulch, a tributary of Murphy Creek, which then outfalls into Murphy Creek East. Basin B flows to Murphy Creek East at the Murphy Creek East Filing 1-4 Master Drainage Report planned low-points in the Harvest Road extension south of Jewell Avenue. Areas east of the ridgeline are tributary to Coal Creek, and drain northeast and east toward the future Eastern Hills development. The Coal Creek drainage basin is identified as Basin C on the Master Drainage Plan.

2. Overall Basin Description

a. Offsite Basins

The land south of the project site noted as Basins O1 and O2 on the Master Drainage Plan and Historic Offsite Drainage Map is area that historically drains to Harvest Gulch from the Lowry Landfill. Area south of Basins O1 and O2 within the Lowry Landfill has been diverted to the west by the existing landfill cells and ditches to a landfill pond prior to discharge to Murphy Creek. The Lowry Landfill diversion rerouted over 100 acres that would have otherwise drained to Harvest Gulch. Therefore, in the present, a minor amount of runoff from Lowry Landfill flows into Harvest Crossing. The existing and final closure drainage maps for the DADS project verify that these drainage patterns will continue to be diverted to the landfill ponds located near Murphy Creek and not be discharged onto Harvest Crossing.

Although the previous Master Drainage Report for the Villages at Murphy Creek accommodated the offsite drainage to be conservative, consideration was requested that subsequent drainage reports ignore this offsite drainage conveyance, as it is diverted by the landfill. This Master Drainage Report for Harvest Crossing includes the minor area from Basins O1 and O2 that will continue to discharge to the Villages at Murphy Creek.

Another offsite basin impacts the site near the southeast corner, Basin OS-911. This basin was referred to as Basin 911 of the Master Drainage Report for Eastern Hills. Eastern Hills was never developed, and the design has since expired, but the nomenclature from that study has been used for continuity. This offsite basin consists of 25.4 acres of land from the Eastern Hills project, which is

tributary to Harvest Gulch and Murphy Creek based on the existing topography. This basin is currently undeveloped, and upon development, will be required to construct a pond, referred to as Offsite Pond M in the southwest corner of the adjacent site (Design Point 961 in the Master Drainage Report for Eastern Hills). Offsite Pond M will provide detention and water quality treatment prior to discharge onto Harvest Crossing. Storm sewer will be provided in Yale Avenue for the future pond outlet from Basin OS-911, designed to convey the historic flow rate to Harvest Gulch in the planned open space south of Yale Avenue. Emergency flows for future offsite Pond M will be conveyed within Yale Avenue west to a sump location at Harvest Gulch, where they can safely enter the gulch.

b. Major Drainageways

Harvest Gulch, Murphy Creek Tributary 4000E, is located on the south side of the site. Approximately 110 acres of Lowry Landfill was rerouted away from the Harvest Gulch natural channel, leaving only 100.6 acres tributary in Harvest Crossing. All developments upstream of Harvest Gulch will have full-spectrum detention ponds prior to being discharged into the natural channel onsite. The existing major drainageway will be shortened to begin downstream of Yale Avenue; future Harvest Gulch will split the dedicated open space and future single family residential area located south of Yale Avenue. With the proposed design, the length of the Harvest Gulch flowline within the project site has been reduced to 705'.

At this time it is unknown what improvements to Harvest Gulch will be necessary to ensure the channel is well stabilized with the future development. Therefore, the MHFD stream management corridor width of 123' is depicted on the Master Drainage Plan as reserved space for drainageway improvements. Subsequent drainage reports may reduce this channel width utilizing geomorphically informed design which allows for MHFD maintenance eligibility. Per the direction of MHFD, the drainageway must be sized for the undetained, developed flow rates tributary to the channel.

c. Existing Irrigation Facilities

There are no known major irrigation facilities located on or adjacent to the project site.

d. Major Drainageway Planning Studies

The site is on the edge of the Murphy Creek watershed and was assumed to have a future imperviousness of 85% within the approved Murphy Creek Outfall Systems Plan (OSP). The north part of the site is part of Basin 356 within the Flood Hazard Area Delineation (FHAD) Murphy Creek which was updated after the OSP and also uses a future imperviousness of 85%. Both the OSP and FHAD use the same basins and imperviousness. A mid-westerly portion of the site is part of Basin 122 within the FHAD and also uses a future imperviousness of 85%. A middle portion of the site is part of Basin 450 within the FHAD and uses a future imperviousness of 85% for the north half and 2% for the south half. The southerly portion of the site is part of Basin 451 within the FHAD and uses a future imperviousness of 2%. See Appendix C for OSP and FHAD excerpts.

additional capture of Basin OC will require less additional water quality than it would have otherwise. The future development to the north will still have to divert all the flows out of the outfall through their detention pond and provide the water quality volumes for uncaptured C1 and C2 basins, unless future modifications to the storm system are made and the flows from Basins C1 and C2 are separated from the outfall system for Pond B.

Basin D consists of all onsite drainage area tributary to Interim Detention Pond T (Master Drainage Pond B1) within the Murphy Creek watershed. Land use within Basin D consists of Local and Collector Right-of-Way (R.O.W.) which is routed to the downstream storm sewer inlets. Should the storm sewer inlets become plugged, the stormwater will continue generally northwest down the street to the detention pond at the low point in the basin. The low point in the street adjacent to the detention pond will overflow into the detention pond, should the sump inlets become plugged.

Basin D1 consists of portions of S. Harvest Rd., just south of E. Pacific Ave. in PA-4. Total calculated developed peak runoff is expected to be 0.27 cfs in a 2-year storm event and 0.80 cfs in a 100-year storm event. Both the minor and major storm events will be captured at Inlet C1-4, an on-grade 5' Type R Inlet.

Basin D2 consists of a portion of proposed E. Pacific Ave. in PA-4. Total calculated developed peak runoff is expected to be 0.52 cfs in a 2-year storm event and 1.54 cfs in a 100-year storm event and will be captured by Inlet C1-2. Major storm runoff bypass is expected to continue to Basin OE within the offsite east half of Harvest Road in PA-1.

Basin D3 consists of the south portion of proposed E. Pacific Ave. in PA-4. Total calculated developed peak runoff is expected to be 0.30 cfs in a 2-year storm event and 0.89 cfs in a 100-year storm event and will be captured by Inlet C1-6. Major storm runoff bypass is expected to continue to Basin OE within the offsite east half of Harvest Road in PA-1. Due to the street warping of E. Pacific Ave., an on-grade 5' Type R Inlet (C1-6) is proposed in E. Pacific Ave. to collect nuisance flows in the gutter.

In the interim condition, *Basin OA2* sheet flows to the into Basin A1 and is collected in the proposed private swales along E. Warren Ave. A temporary private swale and private inlet are proposed within basin A1 to collect the undeveloped flows from Basin OA2 and OA1. In the developed condition, fully developed 100 year runoff from Basin OA2 is intended to be conveyed to Pond A via the storm sewer system running north in S. Jackson Gap Street. This storm system is designed to carry full future developed flows from basins A1 and OA1. The flows and basin delineation for the sizing of this storm sewer are based on the master drainage plan for Harvest Crossing/ The Village at Murphy Creek. (Refer to description of Basin A1). In emergency conditions the storm flows will overtop E. Warren Avenue and will flow north within Jackson Gap Street Right of Way. Jackson Gap right of way has the capacity to carry 80.8 cfs of flow.

The capacity of the street was calculated using the MHFD-Inlet and Street capacity spreadsheet and the results are included in Appendix B of this report.

In the interim condition, *Basin OA1* sheet flows into Basin A7 and is collected with runoff from that basin. A temporary private swale is proposed within Basin A7 to collect the undeveloped runoff that will be collected from Basins OA1 and A7. A temporary private inlet shall collect the flows from this ditch and connect to the storm system running north in S. Irvington street. This storm system is designed to carry fully developed 100 year flows from basin OA1 and A7 in the future. The flows and basin delineation for the sizing of this storm sewer are based on the master drainage plan for Harvest Crossing/ The Village at Murphy Creek. (Refer to description of Basin A7). In emergency conditions the storm flows will overtop E. Warren Avenue and will flow north within Irvington Street Right of Way. Irvington right of way has the capacity to carry 61.0 cfs of flow. The capacity of the street was calculated using the MHFD-Inlet and Street capacity spreadsheet and the results are included in Appendix B of this report.

In the interim condition, *Basin OB* sheet flows into Basin B1 and is collected with runoff from that basin. In the developed condition, runoff from Basin OB is intended to be conveyed to Pond B via the storm sewer system in S. Kewaunee St. (to be designed by others). (Refer to description of Basin B1-a.) In emergency conditions the storm flows will overtop E. Warren Avenue and will flow north within Kewaunee Street Right of Way. Kewaunee right of way has the capacity to carry 107.4 cfs of flow.

The pre-development watershed line delineating Murphy Creek and Coal Creek watersheds is slightly shifted through Basins A and B. Within Murphy Creek, Basin A pre-development area of 23.21 acres is approximately unchanged as Basin A post-development area of 23.14 acres. Within Coal Creek, Basin B pre-development area of 17.17 acres is approximately the same as the Basin B post-development area of 17.3 acres. During the off-site development, the overall watershed acreage will remain as it is now.

The ponds with a regional approach of treating the offsite area are being sized for the overall watershed pre-development area with the post-development 48% imperviousness in Master Drainage Pond B2, referred to as Pond A of this report, (with 2 acres of NAC park) and 50% imperviousness in Master Drainage Pond C3, referred to as Pond B of this report, throughout the watershed. Temporary pond T is being constructed to provide the necessary water quality and detention for the interim condition and shall be replaced by construction of the Master Drainage Pond B1 in the future. Pond T is designed for the interim conditions and is not sized for future proposed 94% impervious contribution reflected in the Master Drainage Report.

A table with the detailed private detention ponds for the project is provided below.

Pond Volumes Table			
Description	Pond A	Pond B	Pond T
1.2*WQCV	0.803 ac-ft	0.672 ac-ft	0.147 ac-ft
EURV	1.809 ac-ft	1.527 ac-ft	0.206 ac-ft
100-yr (+ 1/2 EURV Pond T)	3.724 ac-ft	3.119 ac-ft	0.965 ac-ft
Bottom Elevation	5689.2	5689.3	5677.5
100-yr (+ 1/2 EURV Pond T) WSE	5695.1	5696.5	5681.4
Overflow Weir Elevation	5696.2	5697.5	5683.5
Top of Berm	5698.0	5699.0	5685.1
Tributary Basin Properties			
Area	40 acres	33 acres	14.7 acres
Impervious	48%	49%	16%
Calculated Release Rates			
100-yr	40 cfs	33 cfs	14.5 cfs
Max Ponding (ft)	5.9	7.2	3.9
Max Available Depth (ft)	7.0	8.2	6.0
Allowable Release Rates (per Master Plan)			
100-yr	39.7 cfs	33.0 cfs	14.7 cfs

All proposed storm conveyance facilities, a combination of street and storm sewer, will be sized to capture and convey the 100-year storm event.

b. TOD and Urban Center Development Interception & Conveyance of Upstream Runoff

Not applicable.

c. Detention Pond Location and Outfall

Detention for this project is provided by two proposed private onsite full-spectrum detention ponds located in the northeast and northwest corners of the project site. Additional water quality and detention is provided in the private off-site interim full-spectrum detention pond along S. Harvest Rd. within PA-1. Detention Pond A (Master Drainage Pond B2), in the northwest corner of the site, and off-site Interim Detention Pond T (Master Drainage Pond B1) will outlet to proposed storm sewer within Harvest Road and discharge to the existing dual 5'x5' box culverts under E. Jewell Avenue, which ultimately outfalls into Murphy Creek. Detention Pond B (Master Drainage Pond C3), in the northeast corner, is proposed to outfall into an existing grassed channel. An interim swale is proposed to the existing channel, which continues to the northeast to E. Jewell Avenue and ultimately outfalls into Coal Creek. Based on recent topography of E. Jewell Ave., the roadside swale currently conveys the

existing minor storm runoff east; however, in the 100-year storm event, existing runoff overtops E. Jewell Ave. (approximately 0.5 mi. east of S. Harvest Rd.) and continues north/northeast to Coal Creek. The development of Harvest Crossing Filing 1 will reduce the minor storm runoff due to proposed Pond B, and the E. Jewell Ave existing swale will continue to convey runoff east; although the major storm runoff will also be reduced with the detention ponds, runoff will continue to cross E. Jewell Ave. as it has historically in an emergency condition.

d. Emergency Overflow Paths

The existing and proposed storm sewer systems, in combination with the streets, are designed to convey the major storm event. In an emergency condition, if an inlet were to become blocked, runoff from each of the proposed minor sump inlets would flow away from proposed structures or lots. However, if the proposed sump inlets adjacent to the detention ponds were to become clogged, excess runoff would overtop the curb and flow into the respective detention pond prior to impacting nearby lots.

Though the pond design and sizing was performed using the UD_Detention sizing spreadsheet, the emergency overflow was designed and sized using the rational method calculations performed for the entire basin draining to each individual pond. The rational Method calculations are presented in Appendix A and resulted in larger flow than the peak inflow into the pond calculated by the UD_Detention spreadsheet. For conservative sizing the greater flow was used in emergency overflow sizing. The overflow sizing is included in the pond detention section of Appendix C. Emergency overflow riprap sizing used the same flows as the ones used for the overflow sizing.

Emergency overflow for Pond A (Master Drainage Pond B2) is provided at the southeast corner of Harvest Road and E. Pacific Avenue. In case of complete clogging the pond, being a lowest point of it's basin, shall act as a retention pond. Once full it shall spill through the emergency spillway into Harvest road and continue north in the natural direction of the storm flow pattern. The flows will be carried to the north to the low point of Harvest road and then spill to the west into the channel of Murphy Creek East located directly west of the proposed temporary pond T. The routed calculated Rational Method peak 100 year flow expected at this lowest point of its basin will be 109.11 cfs. The capacity of Harvest Crossing downstream of this point has been evaluated and the capacity within the right of way was found to be 152 cfs, which will accommodate the full emergency flow from the basin of Pond A. The street capacity evaluation was performed using the UDFCD Street Capacity spreadsheet and is included with the pond sizing information in Appendix B.

Emergency overflow for Pond B (Master Drainage Pond C3) is provided at the southwest corner of E. Pacific Avenue and Kewaunee Street. In case of complete clogging the pond, being a lowest point of it's basin, shall act as a retention pond. Once full it shall spill through the emergency spillway into Pacific Avenue where it will pond and once the crown is overtopped the flows will continue north within the Kewaunee right of way. They will be caried to the