PHASE III DRAINAGE REPORT
FOR
RIDGEGATE SOUTHWEST VILLAGE FILING 1

Prepared For:

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Prepared By:

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February 12, 2021

Engineer's Certification

I affirm that this report and plan for the Phase III drainage design of Ridgegate Southwest Village Filing 1 was prepared by me (or under my direct supervision) in accordance with the provisions of Douglas County Drainage Design and Technical Criteria for the owners thereof. I understand that City of Lone Tree does not and will not assume liability for drainage facilities designed by others.

____

Aaron Clutter, P.E. Date

State of Colorado No. 36742

For and on Behalf of JR Engineering

Shea Homes herby certifies that the drainage facilities for Ridgegate Southwest Village Filing 1 shall be constructed according to the design presented in this report. I understand that Douglas County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that Douglas County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of Ridgegate, guarantee that the final drainage design review will absolve Shea Homes and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Shea Homes

Name of Developer

____

Authorized Signature

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I. GENERAL LOCATION AND DESCRIPTION

A. Site Location

The proposed development henceforth referred to as "Ridgegate Southwest Village Filing 1" site is located in Sections 23 and 24, Township 6 South, Range 69 West and Section 18, Township 6 South, Range 67 West of the 6th Principal Meridian. The site is located to the south of Ridgegate Parkway, east of Interstate Highway 25 (I-25), and north of the public service right-of-way. The site is bisected by a reach of Happy Canyon Creek that runs adjacent to the site on the west. A vicinity map showing the project site is shown below and is also presented in Appendix A.

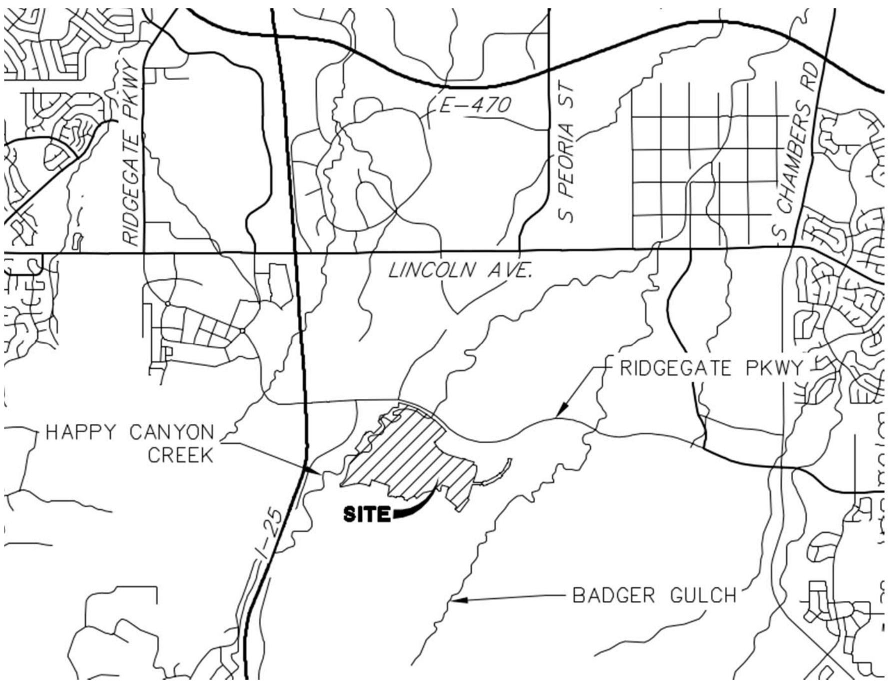


Figure 1: Vicinity Map

B. Description of Property

The proposed site of the Ridgegate Southwest Village Filing 1 development consists of approximately 186.03 acres of undeveloped land. The proposed development will consist of parks, commercial and multi-family lots, public roadways, and 365 residential lots. The site is currently unoccupied and undeveloped, and is vegetated with native grasses and shrubs. The majority of soil is classified by the Natural Resource Conservation Service (NRCS) as Hydrologic Group C and D. Hydrologic Group C soils are described as "soils that have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure." Hydrologic Group D soils are described as "soils that have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material."

The site slopes vary between 0-25%, with some areas up to 33%. The terrain is mountainous and relatively steep throughout. The historic drainage patterns for the entire Ridgegate Southwest Village Development are split in two directions. The western half of the development drains north and west to Happy Canyon Creek, while the eastern half of the development drains to the north and east to Badger Gulch. The Filing 1 improvements within this report will drain west to Happy Canyon Creek.

The site is shown on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) Community Panel No's. 08035C0063H and 08035C0064G, September 4, 2020 and March 16, 2016 respectively. The majority of the site lies within Zone X which is the flood insurance rate zone that corresponds to areas outside the one percent annual chance floodplain. See the FIRM Map located in Appendix A. Portions of the site, consisting of approximately 50 acres, are located within the 100 year floodplains of Happy Canyon Creek and Badger Gulch. These 100 year floodplains are further discussed in the "Happy Canyon Creek Flood Hazard Area Delineation", by Muller Engineering Company, dated July 2014. There will be no proposed development within these areas.

There is a major drainageway located adjacent to the site: Happy Canyon Creek. Happy Canyon Creek is located on the western edge of the site and shall be the ultimate outfall for the Filing 1 improvements. Happy Canyon Creek lies within a 100-year floodplain identified as Zone A in the FEMA FIRM Panel No's. 08035C0063H and 08035C0064G.

There is one irrigation canal located on site: Arapahoe Canal. This is an abandoned irrigation canal that crosses the proposed development.

There are no active ditch facilities located within the site. There are no significant geologic features within the area to be developed, and areas of higher topography within the site will remain undeveloped under a conservation easement.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Drainage Basins

The Ridgegate Southwest Village Filing 1 site lies within the Happy Canyon Creek basin, which is a left bank tributary of Cherry Creek. This report has been prepared in conformance with the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017.

In the existing condition, storm runoff from the undeveloped site on the western half of the site drains into Happy Canyon Creek via overland sheet flow and natural drainage channels. The historic drainage basin map can be referenced in the "Master Drainage Plan for Ridgegate –

Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017, and is included in Appendix E.

Development of the project site will result in increased runoff volume to Happy Canyon Creek. One onsite WQ/EURV pond will be provided for the proposed Filing 1 development. This WQ/EURV pond will also provide some detention of the developed runoff, as these developed flows are routed through the outlet structure. The design 100-year discharge for this pond will be approximately 90% of the un-detained 100-year peak flows of the developed site. This discharge percentage of the 100-year developed flow has been established in coordination with Merrick & Company in order to minimize the outlet structure as well as minimizing the adverse effects of the peak discharge from the site coinciding with the peak discharge in the receiving drainageway. Online detention is proposed in Happy Canyon Creek (by others). The inflows into Happy Canyon Creek will be analyzed in a separate drainage report by Merrick & Company. Per the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017, creek stabilization improvements are proposed (by others) within the channels to stabilize the drainageways and protect against the effects of urbanization in the watersheds.

B. Proposed Drainage Basins

There are three developed condition basins denoted within this report. Each basin is representative of a particular storm sewer system and outfall location. These basins are denoted as Basin A, Basin R, and Basin F. Basin A, and a majority of Basin F, will be routed to the proposed EURV Pond A, while Basin R and Sub-Basin F5 will have water quality provided by an existing water quality pond located just north of the site. The proposed basins will primarily follow existing drainage patterns. The drainage basins are presented in the drainage map located in Appendix F.

Basin A consists of Sub-Basins A1-A71 combining for a total of 151.78 acres. This basin represents a majority of the proposed Filing 1 development. These sub-basins are primarily residential lots, commercial lots, and open space. Stormwater runoff from these sub-basins are conveyed via curb and gutter and open space swales. Runoff is captured via a series of on-grade and sump inlets, as well as area inlets in the open space swales. Runoff is then piped north to the proposed EURV Pond A. The treated/detained pond releases are then discharged into Happy Canyon Creek.

Basin R consists of Sub-Basins R1-R19 combining for a total of 36.31 acres. This basin represents the eastern most portion of the proposed Filing 1 development. This basin also incorporates the existing Ridgegate Parkway that is adjacent to the site. Stormwater runoff from these sub-basins are conveyed via curb and gutter and open space swales. Runoff is captured via a series of on-grade and sump inlets, as well as area inlets in the open space swales. Runoff is then piped north where the developed runoff will split. A portion of the runoff will be piped north and outfall into an existing water quality pond located just north of Ridgegate Parkway. This existing water quality pond will provide water quality for the developed runoff prior to releasing into Happy Canyon Creek. The remaining flows from this basin will be piped south and outfall directly into Happy Canyon Creek undetained. Further discussions of this flow split can be found below.

Basin F consists of Sub-Basins F1-F5 combining for a total of 32.34 acres. This basin represents the future developments that are tributary to the EURV Pond A, and the existing infrastructure along Ridgegate Parkway. These sub-basins are primarily future residential lots, commercial lots, and open space. Stormwater runoff from these sub-basins will be captured by proposed public storm sewer subs or conveyed via future curb and gutter to proposed on-grade and sump inlets. Runoff will then be piped north to the proposed EURV Pond or existing water quality pond. The treated runoff from this basin will be discharged into Happy Canyon Creek.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

Storm drainage analysis and design criteria for this project were taken from the "Storm Drainage Design and Technical Criteria Manual" (SDDTCM) by Douglas County and the "Urban Storm Drainage Criteria Manual" (USDCM) by Mile High Flood Control District (MHFD).

B. Drainage Studies

The site has previously been studied by multiple reports. The "Master Drainage Plan for Ridgegate-Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017, has been utilized for the overall master planning of the site.

The "Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I", by Merrick & Company, dated October 2018, the "Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II", by Merrick & Company, dated October 2018, and the "Phase II Drainage Report for Ridgegate Southwest Village", by JR Engineering, dated October 28, 2020, have been utilized to confirm that this drainage report is in conformance with the allowable inflows into Happy Canyon Creek and also to the existing storm sewer system located in Ridgegate Parkway. The allowable versus the proposed inflows into the existing storm sewer systems is presented in Table 2.

The "Happy Canyon Creek Flood Hazard Area Delineation", by Muller Engineering Company, dated July 2014, has been utilized for 100 year floodplain mapping.

C. Water Quality and MS4 Permit Requirements

The Ridgegate Southwest Village development is subject to the requirements of the MS4 standards that went into effect July 1, 2019 (COR090000), or the standards in place at the time of submittal.

D. Hydrology

The Rational method was utilized to determine the hydrology of the site. The watershed areas for each inflow point into the ponds are less than 160 acres and do not require MHFD's Colorado Urban Hydrograph Procedure (CUHP). The overall EURV Pond A watershed has been split into two separate inflow points into the pond, each of which does not exceed 160 acres and does not require CUHP.

Rational method calculations were prepared for the sub-basins that directly impact the sizing of minor drainageways and pipe sizing. The 5-year storm was analyzed as the minor storm and the 100-year storm was analyzed as the major storm for aspects of design. The site is located in Douglas County Rainfall Zone 1. One-hour point rainfall values were taken from the SDDTCM and used in equation 5-1 from the USDCM to calculate intensities. 1-hour point rainfall values of 1.43 inches and 2.60 inches were used for a 5-year and 100-year storm events respectively.

Standard Forms SF-2 and SF-3 were used to determine the runoff from the minor and major storms on this site. Runoff coefficients were determined based on data presented in Table 6-5 from the USDCM. Basin percent impervious values were calculated based on proposed future land use and from data on Table 6-3 from the USDCM. Times of concentration were developed using equations from the USDCM. All runoff and hydrology calculations are included in Appendix B of this report.

E. Hydraulics

The UDFCD spreadsheet UD_Inlet v4.06, released August 2018, was utilized to determine street and inlet capacities of the development. The U.S. Environmental Protection Agency's Stormwater Management Model (EPA SWMM) v.5.0 was utilized to determine the existing flow rates in order to analyze the existing conditions for the site. EPA SWMM was also utilized to analyze the developed condition. Results for the existing and developed conditions can be found in the *Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins* by Merrick & Company, May, 2017. A copy of these results can also be found in Appendix E.

Pipe capacities were modeled in Bentley StormCAD V8i. NeoUDSewer is the approved computer program for storm sewer analysis in Douglas County and has been replaced with the latest version of UD-Sewer. A calibration model was prepared in StormCAD using UDFCD Example 6.13 in accordance with Douglas County criteria. A summary table of all inputs and modeling output has been included in Appendix C.

Using Storm StormCAD V8i, a modeling program for stormwater drainage, the hydraulic grade lines and energy grade lines were determined for the storm sewer network. Manhole and pipe losses for the model were obtained from the *Modeling Hydraulic and Energy Gradients in Storm Sewers: A Comparison of Computation Methods*, by AMEC Earth & Environmental, Inc. The manhole loss coefficients used in the model can be seen in Table 2. Iterative loss coefficients for manholes that contain 1 or more lateral lines were calculated using the Combined Junction Loss Equation. These iterative loss coefficients can be found in Appendix C.

Drainageway and swale calculations can be found in Appendix C. Swale locations have been provided on the drainage maps in Appendix F.

Table 1. StormCAD Standard Method Conversions

StormCAD Conversion Table			
Bend Loss	Bend Angle	K coefficient Conversion	
	0	0.05	
	22.5	0.1	
	45	0.4	
	60	0.64	
	90	1.32	
Lateral Loss	1 Lateral K coefficient Conversion		
	Bend Angle	Non Surcharged	Surcharged
	45	0.27	0.47
	60	0.52	0.9
	90	1.02	1.77
	2 Laterals K coefficient Conversion		
	45	0.96	
	60	1.16	
	90	1.52	

F. Pond Calculations and Water Quality Enhancement

The Ridgegate Southwest Village Filing 1 site will be serviced by one EURV pond and one existing WQ pond. All runoff from the proposed Filing 1 site will be captured and piped to one of these ponds, where the water will be treated prior to being released into Happy Canyon Creek. Detention will be provided in Happy Canyon Creek per the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017. As a result, detention is not required in the on-site ponds within the Ridgegate Southwest Village development, and will be required to only provide the WQCV and EURV volumes.

As stated previously, the minimum design discharge will be 90% of the 100-year developed inflow for all ponds. These discharge percentages of the 100-year developed flows have been established in coordination with Merrick & Company in their design of the in-line ponds within the channels. The pond outfalls to the receiving drainageways will include energy dissipation for the 100-year outfall and will include a low tail-water basin. The outfalls will be armored with soil riprap into Happy Canyon Creek or Badger Gulch to either the thalweg of the channel or the 100-year floodplain. All calculations pertaining to the proposed pond and the proposed location can be found in the appendix.

IV. STORMWATER MANAGEMENT FACILITY DESIGN

A. Stormwater Conveyance Facilities

The conveyance system within the Ridgegate Southwest Village site is that of a typical subdivision with curb and gutter capturing and conveying flows to on-grade and sump storm sewer inlets. Concentrated off-site flows are proposed to be channelized via swales and routed into the proposed storm sewer system.

All inlets within the proposed roadways will be Type R inlets. Area inlets for the improvements will consist of Type C inlets. Inlet calculations and sizing can be found in Appendix C.

Storm sewer will be sized to carry the minor storm in a free flowing condition, and the major storm will maintain an HGL a minimum of one foot below finished grade. Storm runoff from the proposed development will be conveyed via proposed storm sewer infrastructure to the proposed EURV Pond A, or to the existing infrastructure within Ridgegate Parkeway.

All storm sewer pipes, inlets, and streets will be public improvements. The EURV pond will reside on property owned by the City of Lone Tree but will be maintained by the Rampart Range Metro District. Easements and tracts will be established to allow for maintenance access to drainage facilities outside of public right-of-way.

B. Stormwater Storage Facilities

There is one proposed EURV pond within the Filing 1 development. This EURV pond will provide water quality for a majority of the Filing 1 site, and will outfall into Happy Canyon Creek. In-line detention is planned to be provided within Happy Canyon (by others) per the *Ridgegate Master Drainage Report* and will not be provided in the on-site ponds. The site will also utilize existing storm sewer infrastructure within Ridgegate Parkway, along with an existing water quality pond located just north of the site.

The proposed EURV pond will utilize forebays at each outfall point into the pond in order to dissipate the energy from the storm runoff and collect sediment. Trickle channels will then convey the runoff to the outlet structure. The outlet structure will include a micropool and contain an initial surcharge volume. The outlet structure will utilize orifice plates for both the water quality capture volume (WQCV) and EURV. The outlet structure's orifice plate will be sized to release the WQCV and EURV events over a period of 40 and 72 hours respectively. For the developed 100-year inflows, an overflow grate on the top of the outlet structure will be used in order to pass discharges above the EURV level and minimize incidental detention. The outlet structure will have a release rate of 464.5 cfs for a 100-year storm event and will require 10.266 ac-ft of storage. All flows up to the 100-year storm event shall enter the channel at the proposed outfall location. This outfall shall utilize a low tail-water basin to dissipate the kinetic energy of the storm discharge, and prevent scouring of Happy Canyon Creek. The pond will also have an emergency spillway to discharge emergency flows above the 100-year storm event. Trash racks will be used to prevent any trash from escaping the development, and for easy cleaning. A maintenance access trail will also be constructed for easy access to the outlet structure and forebays for maintenance and repairs. Watershed design parameters and design storm results for the proposed EURV pond can be found below in Table 2 & Table 3 respectively. All pond and forebay calculations can be found in Appendix D.

Table 2. Watershed Design Parameters

Watershed Area	176.58 AC
Percent Impervious	48.4%
Watershed Slope	0.031 ft/ft

Table 3. Design Storm Results

Design Storm Period	Volume (AC-FT)	Depth (FT)	Q_{out} (CFS)
WQCV	2.973	5.39	1.2
EURV	8.072	8.19	2.4
100-YR	10.266	9.27	464.5

The pond outfall will utilize riprap within Happy Canyon Creek. The flows from the pond are proposed to discharge into Happy Canyon Creek upstream of the 100-year floodplain and include a low-tailwater basin. In the situation that grading is done within the 100 year floodplain, a no-rise certification and a floodplain permit will be required.

A. Water Quality Enhancement Best Management Practices

Water quality is being provided for the site in the proposed EURV Pond A and an existing water quality pond prior to entering Happy Canyon Creek. Pond A will be designed as an EURV Pond and will utilize forebays and an outlet structure to treat storm water runoff from the proposed development. The forebays will be used to dissipate the energy of the runoff and allow any remaining sediment to settle out of the water before it departs the pond. The outlet structure will utilize an orifice plate to release the WQCV event over a period of 40 hours.

The existing water quality pond located north of Ridgegate Parkway, will provide water quality for Basin R and Sub-Basin F5. This existing pond and the associated tributary areas have been analyzed in the "Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I", by Merrick & Company, dated October 2018, and the "Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II", by Merrick & Company, dated October 2018.

B. Existing Ridgegate Parkway Storm Sewer

There is an existing storm sewer system located in Ridgegate Parkway that will be used to pipe flows to the existing water quality pond located just north of the site. The proposed design flows that enter the existing storm sewer system located in Ridgegate Parkway are all within the previously designed limit. These allowable inflows were specified in the following reports: "Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I", by Merrick & Company, dated October 2018, and the "Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II", by Merrick & Company, dated October 2018. Allowable and proposed inflows for the 5-year and 100-year storm events entering the existing Ridgegate Parkway storm sewer system are shown in the table below. The manhole located at Design point 9.4 will split the developed flows and send a portion of the developed runoff north to the existing water quality pond. The remaining flows will be diverted south, where they will combine with the flows released from EURV Pond A prior to entering Happy Canyon Creek. Based on the analysis conducted by Merrick & Company, 26.8 cfs will be routed to the EURV Pond A outfall, and 63.3 cfs will be routed to the existing water quality pond during a 5-year storm event. During a 100-year storm event, 92.5 cfs will be routed to the EURV Pond A outfall, and 111.0 cfs will be routed to the existing water quality pond. Calculations for this flow split can be found in Appendix E.

Table 4: Allowable vs. Proposed Inflows into Existing Ridgegate Storm Sewer System

RIDGEGATE PARKWAY STORM SEWER ALLOWABLE INFLOWS PER THE 2018 RIDGEGATE PARKWAY PHASE II AND III DRAINAGE REPORT						
Design Point	5-yr Minor Storm			100 yr- Major Storm		
	Allowable Inflow (cfs)	Proposed Inflow (cfs)	Δ Inflow (cfs)	Allowable Inflow (cfs)	Proposed Inflow (cfs)	Δ Inflow (cfs)
8.5	29.7	25.4	-4.3	86.3	61.6	-24.7
8.9	59.6	55.0	-4.6	160	132.9	-27.1
9.1	87.1	75.3	-11.8	219.2	182.0	-37.2
9.4	91.7	78.6	-13.1	234.3	190.7	-43.6

C. Floodplain Modification

There are no modifications proposed to any floodplain. The project site is outside the one percent annual chance floodplain, and there are no CLOMR, LOMR, or floodplain permitting requirements. In the situation that grading is done within the 100 year floodplain, a no-rise certification and a floodplain permit will be required.

D. Additional Permitting Requirements

An Approved Jurisdictional Determination, provided by the U.S. Army Corps of Engineers, Corps File No. MWO-2019-01406-DEN, has determined that there are no water resources of the U.S. on this site; therefore, a Department of the Army permit will not be required for this site. There are currently no endangered species located on the site. There are no other permitting requirements placed on the site.

V. CONCLUSIONS

A. Compliance with Standards

This report is in compliance with the standards set forth in the "Storm Drainage Design and Technical Criteria Manual" by Douglas County as well as the "Urban Storm Drainage Criteria Manual" by the Mile High Flood Control District (MHFD).

B. Variances

No variances are requested at this time.

C. Drainage Concept

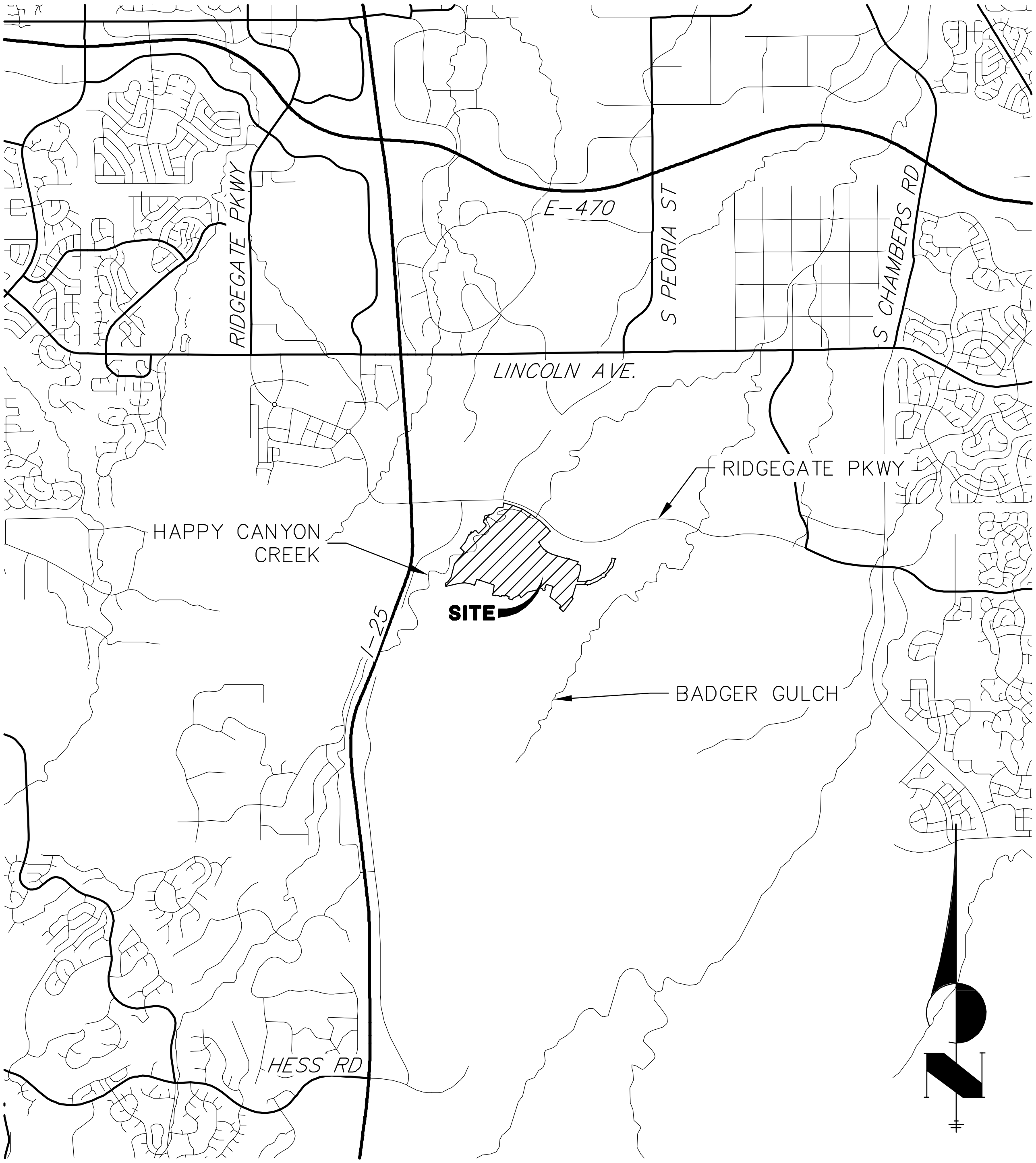
All proposed runoff will be safely conveyed through the site and release at allowable rates at the proposed Pond A outfall and at the existing water quality pond outfall north of Ridgegate Parkway. Water quality is currently or will be provided at both outfall locations. No adverse effects to Happy Canyon Creek or to the downstream infrastructure are expected as a result of the proposed Ridgegate Southwest Village Filing 1 improvements. No impacts are expected with respect to stormwater quality, quantity, or timing.

REFERENCES

1. Happy Canyon Creek Flood Hazard Area Delineation, by Muller Engineering Company, dated July 2014.
2. Master Drainage Plan for Ridgegate-Happy Canyon Creek and Badger Gulch Drainage Basins, Merrick & Company, Revised May 2017.
3. Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I, by Merrick & Company, dated October 2018.
4. Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II, by Merrick & Company, dated October 2018.
5. Storm Drainage Design and Technical Criteria Manual, Douglas County, July 2008.
6. Urban Storm Drainage Criteria Manual, Mile High Flood Control District, Latest Revision.
7. Phase II Drainage Report for Ridgegate Southwest Village, JR Engineering, dated October 28, 2020

APPENDIX A

FIGURES AND EXHIBITS



VICINITY MAP

SCALE 1'=5000'

15950.01
12/2/20
SHEET 1 OF 1

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A Westrian Company

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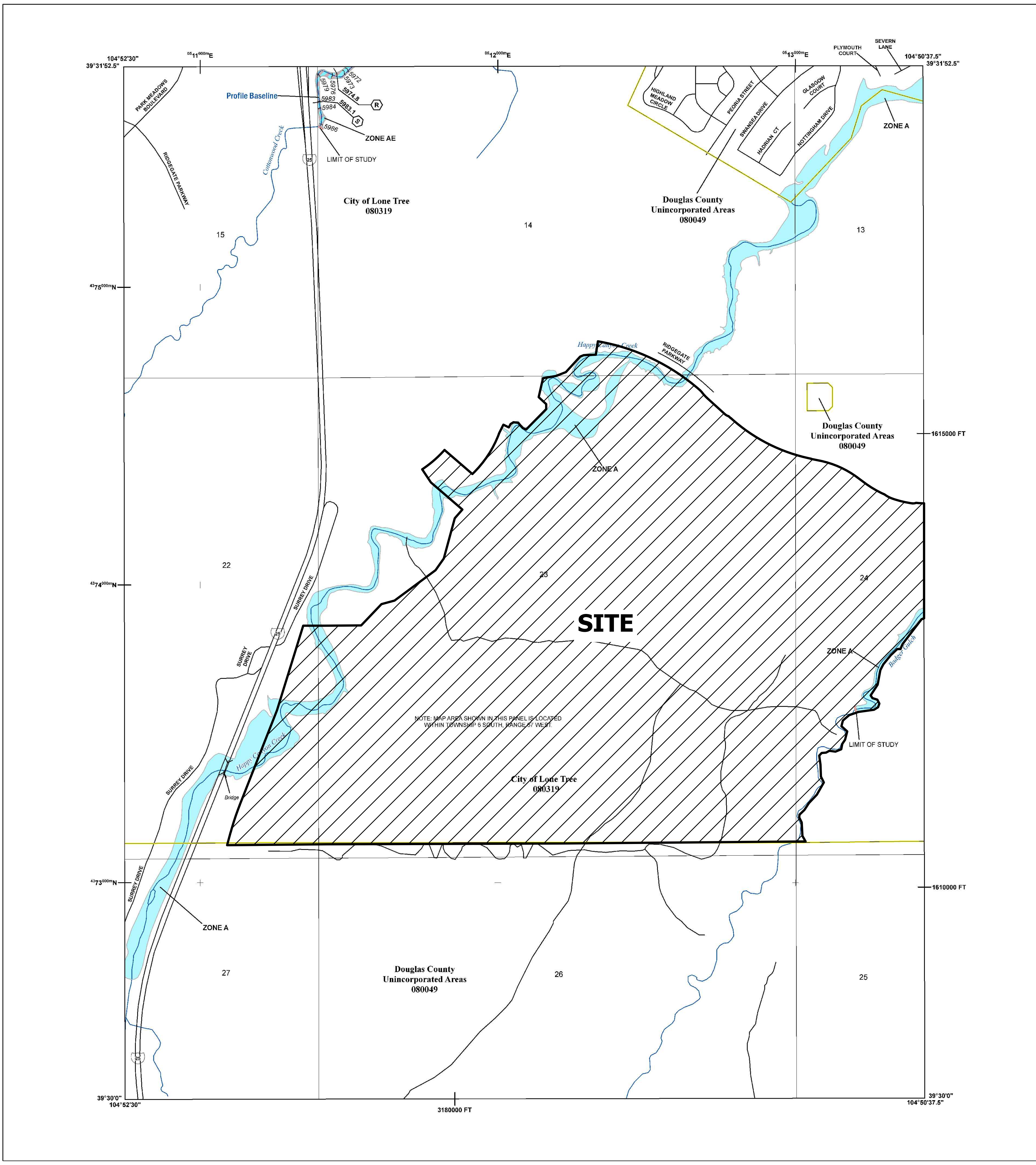
Fort Collins 970-491-9888 • www.jrengineering.com



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 Douglas County GIS Department and the Town of Castle Rock GIS Department. Additional input was provided by the City of Lone Tree and Town of Parker. These data are current as of 2003.

SCALE

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

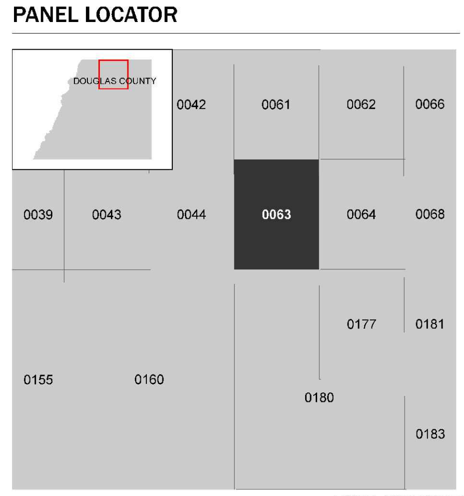
N

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

DOUGLAS COUNTY, COLORADO
And Incorporated Areas

PANEL 63 OF 495

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0063	G
LONE TREE, CITY OF	080319	0063	G

VERSION NUMBER
2.3.3.2

MAP NUMBER
08035C0063G

MAP REVISED
FEBRUARY 17, 2017

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 shown on 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 Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

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 Floodway Data table shown on this FIRM.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD 83, GRS 1980 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, Maryland 20910-3282
(301) 713-3242

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 Douglas County GIS Department and the Town of Castle Rock GIS Department. Additional input was provided by the City of Lone Tree and Town of Parker. These data are current as of 2010.

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 **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

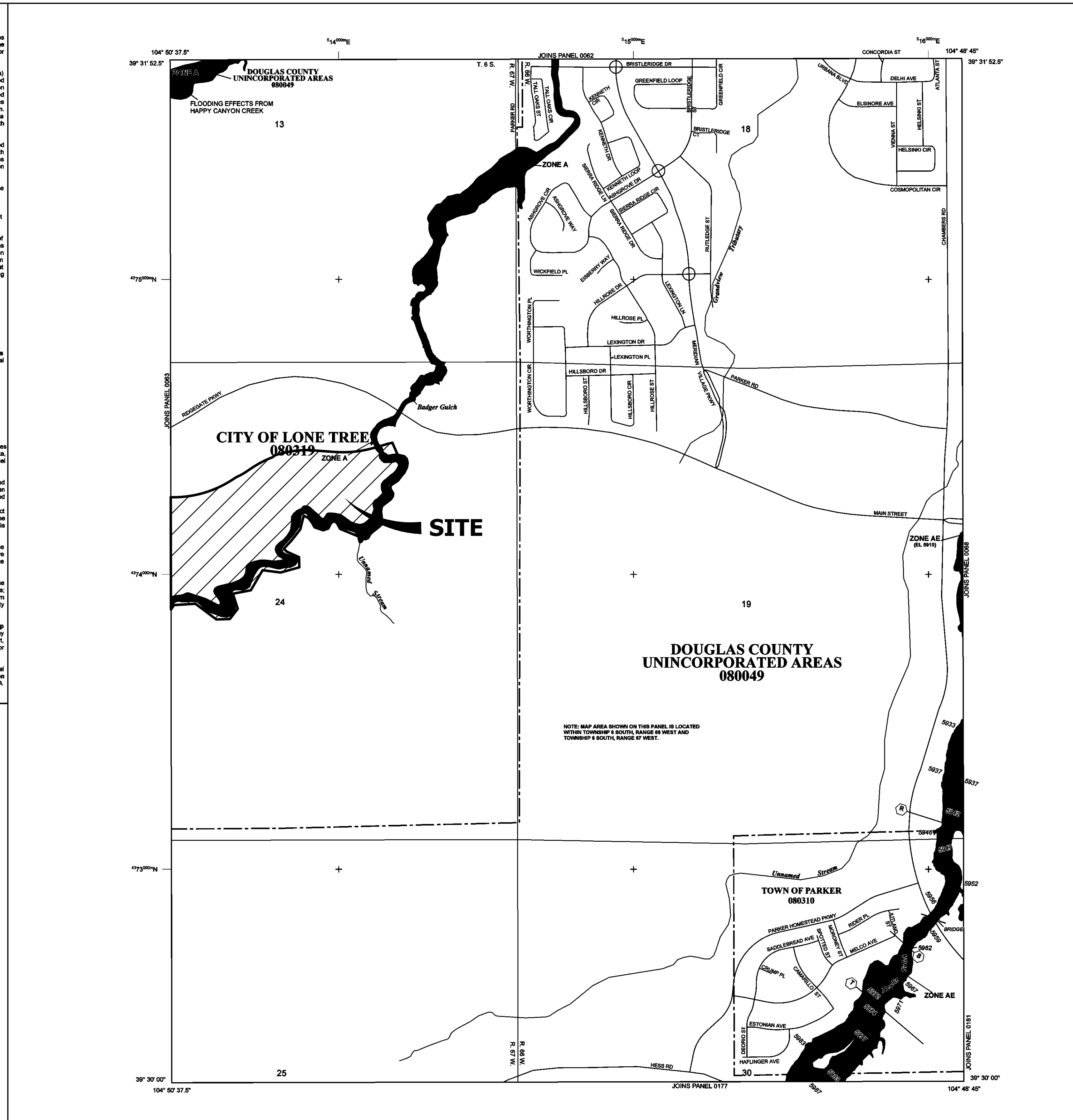
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

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.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** 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 MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



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 Areas 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.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

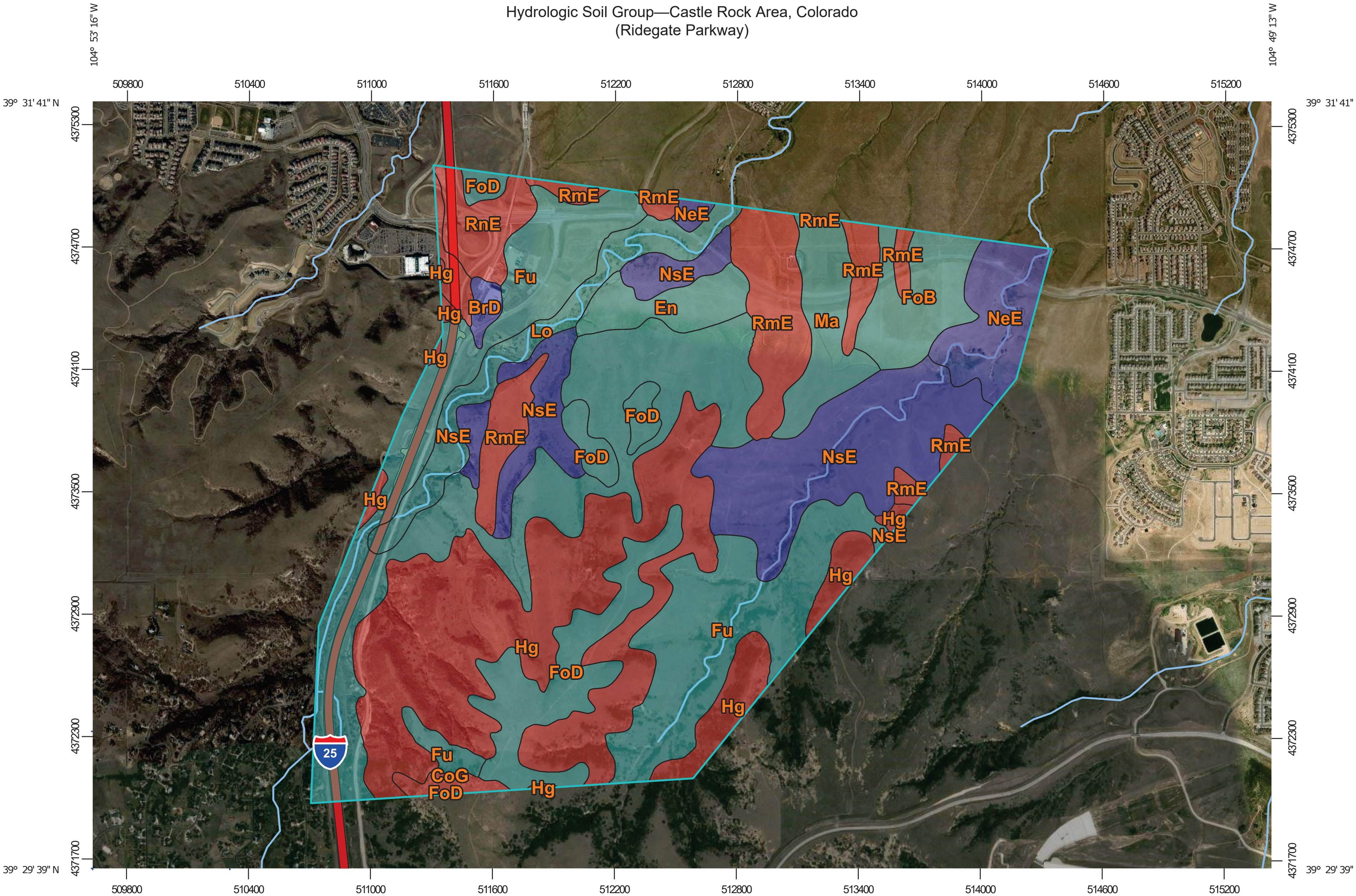
Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and 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

A——A Cross section line

23 - - - - 23 Transect line

45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

$^{49}89^{000m}$ N 1000-meter Universal Transverse Mercator grid values, zone 13

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

SEPTEMBER 30, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

MARCH 16, 2016: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to update map format, to add roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision.

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 0064G

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 64 OF 495
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0064	G
LONE TREE, CITY OF	080319	0064	G
PARKER, TOWN OF	080310	0064	G

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
08035C0064G

MAP REVISED
MARCH 16, 2016

Federal Emergency Management Agency
~~~



Map Scale: 1:26,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 350, 700, 1400, 2100

Feet: 0, 1000, 2000, 4000, 6000

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.

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: Castle Rock Area, Colorado
Survey Area Data: Version 11, Sep 10, 2018

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

Date(s) aerial images were photographed: Mar 16, 2012—Nov 19, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BrD	Bresser sandy loam, cool, 5 to 9 percent slopes	B	9.0	0.5%
CoG	Coni rocky loam, 3 to 100 percent slopes	D	11.1	0.6%
En	Englewood clay loam	C	42.5	2.3%
FoB	Fondis clay loam, 1 to 3 percent slopes	C	65.5	3.5%
FoD	Fondis clay loam, 3 to 9 percent slopes	C	122.1	6.6%
Fu	Fondis-Kutch association	C	541.8	29.2%
Hg	Hilly gravelly land	D	417.4	22.5%
Lo	Loamy alluvial land	C	78.0	4.2%
Ma	Manzanola clay loam	C	61.5	3.3%
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	B	71.9	3.9%
NsE	Newlin-Satanta complex, 5 to 20 percent slopes	B	242.0	13.0%
RmE	Renohill-Buick complex, 5 to 25 percent slopes	D	154.8	8.3%
RnE	Renohill-Manzanola clay loams, 3 to 20 percent slopes	D	40.1	2.2%
Totals for Area of Interest			**1,857.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B

HYDROLOGIC CALCULATIONS

COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: Ridgegate
Location: Douglas County - Zone 1

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

Basin ID	Total Area (ac)	Single Family Residential/Commercial			Roads/Pond			Open Space/Park			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A1	1.44	45%	0.27	8.4%	100%	0.00	0.0%	2%	1.17	1.6%	10.1%
A2	1.60	45%	0.00	0.0%	100%	0.00	0.0%	2%	1.60	2.0%	2.0%
A3	3.34	45%	0.00	0.0%	100%	0.00	0.0%	2%	3.34	2.0%	2.0%
A4	12.75	45%	0.00	0.0%	100%	0.00	0.0%	2%	12.75	2.0%	2.0%
A5	2.22	45%	1.36	27.6%	100%	0.35	15.8%	2%	0.51	0.5%	43.8%
A6	0.90	45%	0.51	25.5%	100%	0.35	38.9%	2%	0.04	0.1%	64.5%
A7	1.62	45%	0.68	18.9%	100%	0.53	32.7%	2%	0.41	0.5%	52.1%
A8	1.38	45%	0.75	24.5%	100%	0.63	45.7%	2%	0.00	0.0%	70.1%
A9	2.84	45%	2.16	34.2%	100%	0.38	13.4%	2%	0.30	0.2%	47.8%
A10	0.48	45%	0.00	0.0%	100%	0.33	68.8%	2%	0.15	0.6%	69.4%
A11	3.76	45%	1.18	14.1%	100%	0.13	3.5%	2%	2.45	1.3%	18.9%
A12	0.13	45%	0.01	3.3%	100%	0.07	55.5%	2%	0.05	0.7%	59.6%
A13	3.11	45%	1.47	21.2%	100%	1.20	38.7%	2%	0.44	0.3%	60.2%
A14	3.51	75%	3.48	74.4%	100%	0.00	0.0%	2%	0.03	0.0%	74.4%
A15	3.08	45%	0.00	0.0%	100%	0.17	5.5%	2%	2.91	1.9%	7.4%
A16	10.25	45%	0.77	3.4%	100%	0.00	0.0%	10%	9.48	9.2%	12.6%
A17	0.86	45%	0.00	0.0%	100%	0.65	75.6%	2%	0.21	0.5%	76.1%
A18	0.47	45%	0.00	0.0%	100%	0.35	74.5%	2%	0.12	0.5%	75.0%
A19	1.94	45%	0.75	17.4%	100%	0.76	39.2%	2%	0.43	0.4%	57.1%
A20	1.54	45%	0.54	15.8%	100%	0.69	44.8%	2%	0.31	0.4%	61.0%
A21	0.67	45%	0.00	0.0%	100%	0.53	79.1%	2%	0.14	0.4%	79.5%
A22	1.05	45%	0.04	1.7%	100%	0.83	79.0%	2%	0.18	0.3%	81.1%

Basin ID	Total Area (ac)	Single Family Residential/Commercial			Roads/Pond			Open Space/Park			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A23	1.81	45%	1.26	31.3%	100%	0.53	29.3%	2%	0.02	0.0%	60.6%
A23A	1.75	45%	0.98	25.2%	100%	0.35	20.0%	2%	0.42	0.5%	45.7%
A24	1.88	45%	1.17	28.0%	100%	0.57	30.3%	2%	0.14	0.1%	58.5%
A25	3.34	45%	0.23	3.1%	85%	3.11	79.1%	2%	0.00	0.0%	82.2%
A26	1.99	45%	0.33	7.5%	100%	1.17	58.8%	2%	0.49	0.5%	66.7%
A27	1.18	45%	0.00	0.0%	100%	0.91	77.1%	2%	0.27	0.5%	77.6%
A28A	0.96	45%	0.53	24.8%	100%	0.42	43.8%	2%	0.01	0.0%	68.6%
A28	0.68	45%	0.42	27.8%	100%	0.26	38.2%	2%	0.00	0.0%	66.0%
A29	1.60	45%	0.66	18.6%	100%	0.58	36.3%	2%	0.36	0.5%	55.3%
A30	0.59	45%	0.00	0.0%	100%	0.46	78.0%	2%	0.13	0.4%	78.4%
A31	2.11	45%	1.83	39.0%	100%	0.18	8.5%	2%	0.10	0.1%	47.7%
A32	0.93	45%	0.24	11.6%	100%	0.45	48.4%	2%	0.24	0.5%	60.5%
A33	1.16	45%	0.00	0.0%	100%	0.52	44.8%	2%	0.64	1.1%	45.9%
A34	0.74	45%	0.57	34.7%	100%	0.15	20.3%	2%	0.02	0.1%	55.0%
A35	0.18	45%	0.11	27.5%	100%	0.06	34.4%	2%	0.01	0.1%	62.0%
A36	2.22	45%	1.23	24.9%	100%	0.69	31.1%	2%	0.30	0.3%	56.3%
A37	3.43	45%	2.46	32.3%	100%	0.83	24.2%	2%	0.14	0.1%	56.6%
A38	2.42	45%	0.97	18.0%	100%	0.62	25.6%	2%	0.83	0.7%	44.3%
A39	1.42	45%	0.61	19.3%	100%	0.54	38.0%	2%	0.27	0.4%	57.7%
A40	2.15	45%	0.00	0.0%	75%	2.15	75.0%	2%	0.00	0.0%	75.0%
A41	2.25	45%	1.57	31.4%	100%	0.46	20.4%	2%	0.22	0.2%	52.0%
A42	1.48	45%	0.00	0.0%	100%	0.59	39.9%	2%	0.89	1.2%	41.1%
A43	2.48	75%	0.38	11.5%	100%	0.87	35.1%	2%	1.23	1.0%	47.6%
A44	1.90	45%	0.00	0.0%	100%	1.04	54.7%	2%	0.86	0.9%	55.6%
A45	6.05	45%	0.00	0.0%	100%	4.41	72.9%	2%	1.64	0.5%	73.4%
A46	8.92	45%	0.00	0.0%	90%	1.55	15.6%	25%	7.37	20.7%	36.3%
A51	1.38	45%	0.96	31.3%	100%	0.33	23.9%	2%	0.09	0.1%	55.3%
A52	2.36	45%	1.43	27.3%	100%	0.83	35.2%	2%	0.10	0.1%	62.5%
A53A	2.99	75%	2.99	75.0%	100%	0.00	0.0%	2%	0.00	0.0%	75.0%

Basin ID	Total Area (ac)	Single Family Residential/Commercial			Roads/Pond			Open Space/Park			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A53	1.75	45%	0.00	0.0%	100%	0.10	5.7%	2%	1.65	1.9%	7.6%
A54A	1.01	45%	0.89	39.7%	100%	0.12	11.9%	2%	0.00	0.0%	51.5%
A54	1.35	45%	0.02	0.7%	100%	0.90	66.7%	2%	0.43	0.6%	68.0%
A55	0.88	45%	0.00	0.0%	100%	0.66	75.0%	2%	0.22	0.5%	75.5%
A56	1.04	45%	0.89	38.5%	100%	0.15	14.4%	2%	0.00	0.0%	52.9%
A57	1.49	45%	1.33	40.2%	100%	0.16	10.7%	2%	0.00	0.0%	50.9%
A58	0.67	45%	0.00	0.0%	100%	0.50	74.6%	2%	0.17	0.5%	75.1%
A59	2.61	45%	1.99	34.3%	100%	0.38	14.6%	2%	0.24	0.2%	49.1%
A60	1.25	45%	0.87	31.3%	100%	0.37	29.6%	2%	0.01	0.0%	60.9%
A61	1.00	45%	0.63	28.4%	100%	0.15	15.0%	2%	0.22	0.4%	43.8%
A62	1.94	45%	1.00	23.2%	100%	0.73	37.6%	2%	0.21	0.2%	61.0%
A63	2.63	45%	1.63	27.9%	100%	0.91	34.6%	2%	0.09	0.1%	62.6%
A64	1.68	45%	1.10	29.5%	100%	0.37	22.0%	2%	0.21	0.3%	51.7%
A65	2.17	75%	1.08	37.3%	100%	0.67	30.9%	2%	0.42	0.4%	68.6%
A66	2.54	45%	0.89	15.8%	100%	1.23	48.4%	2%	0.42	0.3%	64.5%
A67	1.22	45%	0.00	0.0%	100%	0.93	76.2%	2%	0.29	0.5%	76.7%
A68	0.74	45%	0.00	0.0%	100%	0.54	73.0%	2%	0.20	0.5%	73.5%
A69	1.95	45%	0.00	0.0%	100%	0.82	42.1%	2%	1.13	1.2%	43.2%
A70	2.04	45%	0.00	0.0%	100%	1.24	60.8%	2%	0.80	0.8%	61.6%
A71	0.51	45%	0.00	0.0%	100%	0.42	82.4%	2%	0.09	0.4%	82.7%
R1	0.75	45%	0.00	0.0%	100%	0.67	89.8%	2%	0.08	0.2%	90.0%
R2	1.87	45%	0.61	14.7%	100%	1.05	56.0%	2%	0.21	0.2%	70.9%
R3	3.74	75%	2.29	45.9%	100%	1.30	34.8%	2%	0.15	0.1%	80.8%
R4	0.44	75%	0.44	75.0%	100%	0.00	0.0%	2%	0.00	0.0%	75.0%
R5	0.36	75%	0.36	75.0%	100%	0.00	0.0%	2%	0.00	0.0%	75.0%
R6	2.90	45%	1.00	15.5%	100%	1.00	34.5%	2%	0.90	0.6%	50.6%
R7	0.55	45%	0.00	0.0%	100%	0.40	72.7%	2%	0.15	0.5%	73.3%
R8	0.28	45%	0.00	0.0%	100%	0.17	60.1%	2%	0.11	0.8%	60.9%
R9	9.78	45%	0.00	0.0%	85%	9.78	85.0%	2%	0.00	0.0%	85.0%

Basin ID	Total Area (ac)	Single Family Residential/Commercial			Roads/Pond			Open Space/Park			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
R10	1.10	45%	0.00	0.0%	100%	0.57	52.2%	2%	0.53	1.0%	53.1%
R11	2.18	45%	0.00	0.0%	100%	0.18	8.1%	2%	2.00	1.8%	10.0%
R12	3.36	45%	0.00	0.0%	100%	0.97	28.9%	2%	2.39	1.4%	30.4%
R13	2.33	45%	0.00	0.0%	100%	0.67	28.9%	2%	1.66	1.4%	30.3%
R14	2.55	45%	0.00	0.0%	100%	0.85	33.2%	2%	1.70	1.3%	34.6%
R15	1.34	45%	0.00	0.0%	100%	0.70	52.2%	2%	0.64	1.0%	53.2%
R16	0.28	45%	0.00	0.0%	100%	0.16	58.3%	2%	0.12	0.8%	59.2%
R17	1.00	45%	0.00	0.0%	100%	0.50	50.1%	2%	0.50	1.0%	51.1%
R18	0.87	45%	0.00	0.0%	100%	0.58	66.8%	2%	0.29	0.7%	67.5%
R19	0.63	45%	0.00	0.0%	100%	0.51	80.4%	2%	0.12	0.4%	80.8%
F1	6.05	45%	3.10	23.1%	100%	1.08	17.9%	2%	1.87	0.6%	41.5%
F2	5.03	45%	3.99	35.7%	100%	0.86	17.1%	2%	0.18	0.1%	52.9%
F3	8.14	75%	8.14	75.0%	100%	0.00	0.0%	2%	0.00	0.0%	75.0%
F4	5.58	75%	4.89	65.7%	100%	0.00	0.0%	2%	0.69	0.2%	66.0%
F5	7.54	75%	7.54	75.0%	100%	0.00	0.0%	2%	0.00	0.0%	75.0%
TOTAL	220.43										51.2%

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Ridgegate
Location: Douglas County - Zone 1

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

Basin ID	Total Area (ac)	Basins Total Weighted % Imp.	Hydrologic Soil Group			Hydrologic Soil Group			Minor Coefficients			Major Coefficients			Basins Total Weighted C_5	Basins Total Weighted C_{100}
			Area A (ac)	Area B (ac)	Area C/D (ac)	% A (ac)	% B (ac)	% C/D (ac)	$C_{5,A}$	$C_{5,B}$	$C_{5,C/D}$	$C_{100,A}$	$C_{100,B}$	$C_{100,C/D}$		
A1	1.44	10.1%	0.00	0.00	1.44	0%	0%	100%	0.05	0.07	0.12	0.19	0.47	0.52	0.12	0.52
A2	1.60	2.0%	0.00	0.00	1.60	0%	0%	100%	0.01	0.01	0.05	0.13	0.44	0.49	0.05	0.49
A3	3.34	2.0%	0.00	0.00	3.34	0%	0%	100%	0.01	0.01	0.05	0.13	0.44	0.49	0.05	0.49
A4	12.75	2.0%	0.00	0.00	12.75	0%	0%	100%	0.01	0.01	0.05	0.13	0.44	0.49	0.05	0.49
A5	2.22	43.8%	0.00	0.00	2.22	0%	0%	100%	0.30	0.35	0.39	0.45	0.63	0.66	0.39	0.66
A6	0.90	64.5%	0.00	0.00	0.90	0%	0%	100%	0.49	0.53	0.56	0.61	0.73	0.75	0.56	0.75
A7	1.62	52.1%	0.00	0.00	1.62	0%	0%	100%	0.37	0.42	0.46	0.52	0.67	0.70	0.46	0.70
A8	1.38	70.1%	0.00	0.00	1.38	0%	0%	100%	0.55	0.58	0.61	0.66	0.76	0.77	0.61	0.77
A9	2.84	47.8%	0.00	0.00	2.84	0%	0%	100%	0.34	0.38	0.43	0.48	0.65	0.68	0.43	0.68
A10	0.48	69.4%	0.00	0.00	0.48	0%	0%	100%	0.54	0.58	0.60	0.65	0.75	0.77	0.60	0.77
A11	3.76	18.9%	0.00	0.00	3.76	0%	0%	100%	0.10	0.14	0.19	0.26	0.51	0.56	0.19	0.56
A12	0.13	59.6%	0.00	0.00	0.13	0%	0%	100%	0.44	0.49	0.52	0.57	0.71	0.73	0.52	0.73
A13	3.11	60.2%	0.00	0.00	3.11	0%	0%	100%	0.45	0.50	0.53	0.58	0.71	0.73	0.53	0.73
A14	3.51	74.4%	0.00	0.00	3.51	0%	0%	100%	0.59	0.62	0.64	0.69	0.78	0.79	0.64	0.79
A15	3.08	7.4%	0.00	0.00	3.08	0%	0%	100%	0.03	0.05	0.10	0.17	0.46	0.51	0.10	0.51
A16	10.25	12.6%	0.00	0.00	10.25	0%	0%	100%	0.06	0.09	0.14	0.21	0.49	0.54	0.14	0.54
A17	0.86	76.1%	0.00	0.00	0.86	0%	0%	100%	0.61	0.64	0.66	0.70	0.78	0.80	0.66	0.80
A18	0.47	75.0%	0.00	0.00	0.47	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
A19	1.94	57.1%	0.00	0.00	1.94	0%	0%	100%	0.42	0.47	0.50	0.56	0.69	0.72	0.50	0.72
A20	1.54	61.0%	0.00	0.00	1.54	0%	0%	100%	0.46	0.50	0.54	0.59	0.71	0.73	0.54	0.73
A21	0.67	79.5%	0.00	0.00	0.67	0%	0%	100%	0.64	0.67	0.69	0.73	0.80	0.81	0.69	0.81
A22	1.05	81.1%	0.00	0.00	1.05	0%	0%	100%	0.66	0.69	0.70	0.74	0.81	0.82	0.70	0.82
A23	1.81	60.6%	0.00	0.00	1.81	0%	0%	100%	0.45	0.50	0.53	0.58	0.71	0.73	0.53	0.73
A23A	1.75	45.7%	0.00	0.00	1.75	0%	0%	100%	0.32	0.37	0.41	0.47	0.64	0.67	0.41	0.67
A24	1.88	58.5%	0.00	0.00	1.88	0%	0%	100%	0.43	0.48	0.51	0.57	0.70	0.72	0.51	0.72
A25	3.34	82.2%	0.00	0.00	3.34	0%	0%	100%	0.67	0.69	0.71	0.75	0.81	0.82	0.71	0.82
A26	1.99	66.7%	0.00	0.00	1.99	0%	0%	100%	0.51	0.55	0.58	0.63	0.74	0.76	0.58	0.76

Basin ID	Total Area (ac)	Basins Total Weighted % Imp.	Hydrologic Soil Group			Hydrologic Soil Group			Minor Coefficients			Major Coefficients			Basins Total Weighted C_5	Basins Total Weighted C_{100}
			Area A (ac)	Area B (ac)	Area C/D (ac)	% A (ac)	% B (ac)	% C/D (ac)	$C_{5,A}$	$C_{5,B}$	$C_{5,C/D}$	$C_{100,A}$	$C_{100,B}$	$C_{100,C/D}$		
A27	1.18	77.6%	0.00	0.00	1.18	0%	0%	100%	0.62	0.65	0.67	0.71	0.79	0.80	0.67	0.80
A28A	0.96	68.6%	0.00	0.00	0.96	0%	0%	100%	0.53	0.57	0.60	0.64	0.75	0.76	0.60	0.76
A28	0.68	66.0%	0.00	0.00	0.68	0%	0%	100%	0.51	0.55	0.58	0.63	0.74	0.75	0.58	0.75
A29	1.60	55.3%	0.00	0.00	1.60	0%	0%	100%	0.40	0.45	0.49	0.54	0.69	0.71	0.49	0.71
A30	0.59	78.4%	0.00	0.00	0.59	0%	0%	100%	0.63	0.66	0.68	0.72	0.80	0.81	0.68	0.81
A31	2.11	47.7%	0.00	0.00	2.11	0%	0%	100%	0.33	0.38	0.43	0.48	0.65	0.68	0.43	0.68
A32	0.93	60.5%	0.00	0.00	0.93	0%	0%	100%	0.45	0.50	0.53	0.58	0.71	0.73	0.53	0.73
A33	1.16	45.9%	0.00	0.00	1.16	0%	0%	100%	0.32	0.37	0.41	0.47	0.64	0.67	0.41	0.67
A34	0.74	55.0%	0.00	0.00	0.74	0%	0%	100%	0.40	0.45	0.49	0.54	0.68	0.71	0.49	0.71
A35	0.18	62.0%	0.00	0.00	0.18	0%	0%	100%	0.47	0.51	0.54	0.59	0.72	0.74	0.54	0.74
A36	2.22	56.3%	0.00	0.00	2.22	0%	0%	100%	0.41	0.46	0.50	0.55	0.69	0.71	0.50	0.71
A37	3.43	56.6%	0.00	0.00	3.43	0%	0%	100%	0.42	0.46	0.50	0.55	0.69	0.72	0.50	0.72
A38	2.42	44.3%	0.00	0.00	2.42	0%	0%	100%	0.31	0.35	0.40	0.46	0.63	0.67	0.40	0.67
A39	1.42	57.7%	0.00	0.00	1.42	0%	0%	100%	0.43	0.47	0.51	0.56	0.70	0.72	0.51	0.72
A40	2.15	75.0%	0.00	0.00	2.15	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
A41	2.25	52.0%	0.00	0.00	2.25	0%	0%	100%	0.37	0.42	0.46	0.52	0.67	0.70	0.46	0.70
A42	1.48	41.1%	0.00	0.00	1.48	0%	0%	100%	0.28	0.33	0.37	0.43	0.62	0.65	0.37	0.65
A43	2.48	47.6%	0.00	0.00	2.48	0%	0%	100%	0.33	0.38	0.43	0.48	0.65	0.68	0.43	0.68
A44	1.90	55.6%	0.00	0.00	1.90	0%	0%	100%	0.41	0.45	0.49	0.54	0.69	0.71	0.49	0.71
A45	6.05	73.4%	0.00	0.00	6.05	0%	0%	100%	0.58	0.62	0.64	0.68	0.77	0.79	0.64	0.79
A46	8.92	36.3%	0.00	0.00	8.92	0%	0%	100%	0.24	0.29	0.33	0.39	0.60	0.63	0.33	0.63
A51	1.38	55.3%	0.00	0.00	1.38	0%	0%	100%	0.40	0.45	0.49	0.54	0.69	0.71	0.49	0.71
A52	2.36	62.5%	0.00	0.00	2.36	0%	0%	100%	0.47	0.52	0.55	0.60	0.72	0.74	0.55	0.74
A53A	2.99	75.0%	0.00	0.00	2.99	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
A53	1.75	7.6%	0.00	0.00	1.75	0%	0%	100%	0.03	0.05	0.10	0.17	0.46	0.51	0.10	0.51
A54A	1.01	51.5%	0.00	0.00	1.01	0%	0%	100%	0.37	0.42	0.46	0.51	0.67	0.69	0.46	0.69
A54	1.35	68.0%	0.00	0.00	1.35	0%	0%	100%	0.52	0.56	0.59	0.64	0.75	0.76	0.59	0.76
A55	0.88	75.5%	0.00	0.00	0.88	0%	0%	100%	0.60	0.63	0.65	0.70	0.78	0.79	0.65	0.79
A56	1.04	52.9%	0.00	0.00	1.04	0%	0%	100%	0.38	0.43	0.47	0.52	0.68	0.70	0.47	0.70
A57	1.49	50.9%	0.00	0.00	1.49	0%	0%	100%	0.36	0.41	0.45	0.51	0.67	0.69	0.45	0.69
A58	0.67	75.1%	0.00	0.00	0.67	0%	0%	100%	0.60	0.63	0.65	0.70	0.78	0.79	0.65	0.79
A59	2.61	49.1%	0.00	0.00	2.61	0%	0%	100%	0.35	0.40	0.44	0.49	0.66	0.69	0.44	0.69

Basin ID	Total Area (ac)	Basins Total Weighted % Imp.	Hydrologic Soil Group			Hydrologic Soil Group			Minor Coefficients			Major Coefficients			Basins Total Weighted C_5	Basins Total Weighted C_{100}
			Area A (ac)	Area B (ac)	Area C/D (ac)	% A (ac)	% B (ac)	% C/D (ac)	$C_{5,A}$	$C_{5,B}$	$C_{5,C/D}$	$C_{100,A}$	$C_{100,B}$	$C_{100,C/D}$		
A60	1.25	60.9%	0.00	0.00	1.25	0%	0%	100%	0.46	0.50	0.54	0.58	0.71	0.73	0.54	0.73
A61	1.00	43.8%	0.00	0.00	1.00	0%	0%	100%	0.30	0.35	0.39	0.45	0.63	0.66	0.39	0.66
A62	1.94	61.0%	0.00	0.00	1.94	0%	0%	100%	0.46	0.50	0.54	0.59	0.71	0.73	0.54	0.73
A63	2.63	62.6%	0.00	0.00	2.63	0%	0%	100%	0.47	0.52	0.55	0.60	0.72	0.74	0.55	0.74
A64	1.68	51.7%	0.00	0.00	1.68	0%	0%	100%	0.37	0.42	0.46	0.51	0.67	0.70	0.46	0.70
A65	2.17	68.6%	0.00	0.00	2.17	0%	0%	100%	0.53	0.57	0.60	0.64	0.75	0.76	0.60	0.76
A66	2.54	64.5%	0.00	0.00	2.54	0%	0%	100%	0.49	0.53	0.56	0.61	0.73	0.75	0.56	0.75
A67	1.22	76.7%	0.00	0.00	1.22	0%	0%	100%	0.61	0.64	0.66	0.71	0.79	0.80	0.66	0.80
A68	0.74	73.5%	0.00	0.00	0.74	0%	0%	100%	0.58	0.62	0.64	0.68	0.77	0.79	0.64	0.79
A69	1.95	43.2%	0.00	0.00	1.95	0%	0%	100%	0.29	0.34	0.39	0.45	0.63	0.66	0.39	0.66
A70	2.04	61.6%	0.00	0.00	2.04	0%	0%	100%	0.46	0.51	0.54	0.59	0.71	0.74	0.54	0.74
A71	0.51	82.7%	0.00	0.00	0.51	0%	0%	100%	0.68	0.70	0.71	0.75	0.81	0.82	0.71	0.82
R1	0.75	90.0%	0.00	0.00	0.75	0%	0%	100%	0.75	0.77	0.77	0.81	0.85	0.85	0.77	0.85
R2	1.87	70.9%	0.00	0.00	1.87	0%	0%	100%	0.55	0.59	0.62	0.66	0.76	0.77	0.62	0.77
R3	3.74	80.8%	0.00	0.00	3.74	0%	0%	100%	0.65	0.68	0.70	0.74	0.81	0.81	0.70	0.81
R4	0.44	75.0%	0.00	0.00	0.44	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
R5	0.36	75.0%	0.00	0.00	0.36	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
R6	2.90	50.6%	0.00	0.00	2.90	0%	0%	100%	0.36	0.41	0.45	0.50	0.66	0.69	0.45	0.69
R7	0.55	73.3%	0.00	0.00	0.55	0%	0%	100%	0.58	0.61	0.64	0.68	0.77	0.78	0.64	0.78
R8	0.28	60.9%	0.00	0.00	0.28	0%	0%	100%	0.46	0.50	0.53	0.58	0.71	0.73	0.53	0.73
R9	9.78	85.0%	0.00	0.00	9.78	0%	0%	100%	0.70	0.72	0.73	0.77	0.83	0.83	0.73	0.83
R10	1.10	53.1%	0.00	0.00	1.10	0%	0%	100%	0.38	0.43	0.47	0.52	0.68	0.70	0.47	0.70
R11	2.18	10.0%	0.00	0.00	2.18	0%	0%	100%	0.05	0.07	0.12	0.19	0.47	0.52	0.12	0.52
R12	3.36	30.4%	0.00	0.00	3.36	0%	0%	100%	0.19	0.23	0.28	0.35	0.57	0.61	0.28	0.61
R13	2.33	30.3%	0.00	0.00	2.33	0%	0%	100%	0.19	0.23	0.28	0.35	0.57	0.61	0.28	0.61
R14	2.55	34.6%	0.00	0.00	2.55	0%	0%	100%	0.22	0.27	0.32	0.38	0.59	0.63	0.32	0.63
R15	1.34	53.2%	0.00	0.00	1.34	0%	0%	100%	0.38	0.43	0.47	0.52	0.68	0.70	0.47	0.70
R16	0.28	59.2%	0.00	0.00	0.28	0%	0%	100%	0.44	0.49	0.52	0.57	0.70	0.73	0.52	0.73
R17	1.00	51.1%	0.00	0.00	1.00	0%	0%	100%	0.37	0.41	0.45	0.51	0.67	0.69	0.45	0.69
R18	0.87	67.5%	0.00	0.00	0.87	0%	0%	100%	0.52	0.56	0.59	0.64	0.74	0.76	0.59	0.76
R19	0.63	80.8%	0.00	0.00	0.63	0%	0%	100%	0.65	0.68	0.70	0.74	0.81	0.81	0.70	0.81
F1	6.05	41.5%	0.00	0.00	6.05	0%	0%	100%	0.28	0.33	0.38	0.43	0.62	0.65	0.38	0.65

Basin ID	Total Area (ac)	Basins Total Weighted % Imp.	Hydrologic Soil Group			Hydrologic Soil Group			Minor Coefficients			Major Coefficients			Basins Total Weighted C_5	Basins Total Weighted C_{100}
			Area A (ac)	Area B (ac)	Area C/D (ac)	% A (ac)	% B (ac)	% C/D (ac)	$C_{5,A}$	$C_{5,B}$	$C_{5,C/D}$	$C_{100,A}$	$C_{100,B}$	$C_{100,C/D}$		
F2	5.03	52.9%	0.00	0.00	5.03	0%	0%	100%	0.38	0.43	0.47	0.52	0.67	0.70	0.47	0.70
F3	8.14	75.0%	0.00	0.00	8.14	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
F4	5.58	66.0%	0.00	0.00	5.58	0%	0%	100%	0.51	0.55	0.58	0.63	0.74	0.75	0.58	0.75
F5	7.54	75.0%	0.00	0.00	7.54	0%	0%	100%	0.60	0.63	0.65	0.69	0.78	0.79	0.65	0.79
TOTAL	220.43	51.2%	0.00	0.00	220.43	0%	0%	100%	---	---	---	---	---	---	0.45	0.69

Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period

NRCS Soil Group	Storm Return Period						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.84i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
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 = Runoff coefficient for NRCS HSG B soils

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

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Ridgegate
Location: Douglas County - Zone 1

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C_5	C_{100}	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
A1	1.44	C	10%	0.12	0.52	90	13.4%	7.1	217	23.8%	7.0	3.4	1.1	8.2	307.0	25.0	8.2
A2	1.60	C	2%	0.05	0.49	156	16.4%	9.4	222	20.3%	7.0	3.2	1.2	10.6	378.0	26.5	10.6
A3	3.34	C	2%	0.05	0.49	300	16.0%	13.1	330	17.0%	7.0	2.9	1.9	15.0	630.0	27.1	15.0
A4	12.75	C	2%	0.05	0.49	300	25.8%	11.2	866	10.0%	15.0	4.7	3.0	14.3	1166.0	30.6	14.3
A5	2.22	C	44%	0.39	0.66	134	2.5%	10.9	611	5.7%	20.0	4.8	2.1	13.0	745.0	21.4	13.0
A6	0.90	C	64%	0.56	0.75	47	2.5%	4.9	599	5.7%	20.0	4.8	2.1	7.0	646.0	17.4	7.0
A7	1.62	C	52%	0.46	0.70	146	10.0%	6.5	628	5.4%	20.0	4.6	2.3	8.8	774.0	19.9	8.8
A8	1.38	C	70%	0.61	0.77	52	2.5%	4.7	805	5.4%	20.0	4.6	2.9	7.6	857.0	17.2	7.6
A9	2.84	C	48%	0.43	0.68	202	7.0%	9.1	566	4.8%	20.0	4.4	2.2	11.2	768.0	20.6	11.2
A10	0.48	C	69%	0.60	0.77	19	2.0%	3.1	563	4.8%	20.0	4.4	2.1	5.2	582.0	16.5	5.2
A11	3.76	C	19%	0.19	0.56	271	22.0%	9.8	757	3.5%	15.0	2.8	4.5	14.2	1028.0	28.6	14.2
A12	0.13	C	60%	0.52	0.73	28	2.0%	4.4	128	3.9%	20.0	3.9	0.5	4.9	156.0	16.5	5.0
A13	3.11	C	60%	0.53	0.73	89	11.0%	4.4	975	3.7%	20.0	3.8	4.2	8.6	1064.0	20.6	8.6
A14	3.51	C	74%	0.64	0.79	217	5.2%	7.0	310	5.5%	20.0	4.7	1.1	8.1	527.0	14.5	8.1
A15	3.08	C	7%	0.10	0.51	196	7.0%	13.4	715	5.1%	15.0	3.4	3.5	16.9	911.0	30.0	16.9
A16	10.25	C	13%	0.14	0.54	300	6.2%	16.5	568	4.5%	15.0	3.2	3.0	19.4	868.0	28.0	19.4
A17	0.86	C	76%	0.66	0.80	18	2.0%	2.7	411	4.0%	20.0	4.0	1.7	4.4	429.0	14.8	5.0
A18	0.47	C	75%	0.65	0.79	24.5	2.0%	3.2	392	4.0%	20.0	4.0	1.6	4.8	416.5	14.9	5.0
A19	1.94	C	57%	0.50	0.72	47	2.0%	5.9	854	3.5%	20.0	3.7	3.8	9.7	901.0	20.8	9.7
A20	1.54	C	61%	0.54	0.73	56	4.0%	4.8	893	3.5%	20.0	3.7	4.0	8.8	949.0	20.2	8.8
A21	0.67	C	80%	0.69	0.81	19	2.0%	2.6	528	3.6%	20.0	3.8	2.3	4.9	547.0	14.8	5.0
A22	1.05	C	81%	0.70	0.82	58	2.5%	4.1	517	3.6%	20.0	3.8	2.3	6.3	575.0	14.4	6.3
A23	1.81	C	61%	0.53	0.73	76	10.0%	4.2	570	2.9%	20.0	3.4	2.8	7.0	646.0	18.9	7.0
A23A	1.75	C	46%	0.41	0.67	105	4.7%	7.7	505	3.0%	20.0	3.5	2.4	10.1	610.0	21.4	10.1
A24	1.88	C	58%	0.51	0.72	76	10.0%	4.3	746	3.0%	20.0	3.5	3.6	7.9	822.0	20.2	7.9
A25	3.34	C	82%	0.71	0.82	80	2.0%	5.0	420	3.0%	20.0	3.5	2.0	7.0	500.0	14.0	7.0

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Ridgegate
Location: Douglas County - Zone 1

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C_5	C_{100}	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
A26	1.99	C	67%	0.58	0.76	18	2.0%	3.2	1398	3.5%	20.0	3.7	6.2	9.4	1416.0	21.4	9.4
A27	1.18	C	78%	0.67	0.80	19	2.0%	2.7	1132	3.5%	20.0	3.7	5.0	7.7	1151.0	17.9	7.7
A28A	0.96	C	69%	0.60	0.76	147	4.0%	7.0	472	4.2%	20.0	4.1	1.9	8.9	619.0	16.4	8.9
A28	0.68	C	66%	0.58	0.75	47	2.5%	4.8	458	4.3%	20.0	4.1	1.8	6.6	505.0	16.8	6.6
A29	1.60	C	55%	0.49	0.71	105	2.5%	8.4	664	3.5%	20.0	3.7	3.0	11.3	769.0	20.1	11.3
A30	0.59	C	78%	0.68	0.81	19	2.0%	2.6	541	3.5%	20.0	3.7	2.4	5.1	560.0	15.1	5.1
A31	2.11	C	48%	0.43	0.68	200	8.8%	8.4	341	3.4%	20.0	3.7	1.5	9.9	541.0	19.9	9.9
A32	0.93	C	61%	0.53	0.73	19	2.0%	3.6	805	2.0%	20.0	2.8	4.7	8.3	824.0	21.1	8.3
A33	1.16	C	46%	0.41	0.67	19	2.0%	4.3	869	2.0%	20.0	2.8	5.1	9.4	888.0	24.8	9.4
A34	0.74	C	55%	0.49	0.71	50	2.5%	5.8	372	3.0%	20.0	3.5	1.8	7.6	422.0	18.8	7.6
A35	0.18	C	62%	0.54	0.74	50	2.5%	5.2	126	3.0%	20.0	3.5	0.6	5.9	176.0	16.1	5.9
A36	2.22	C	56%	0.50	0.71	50	2.5%	5.7	860	2.5%	20.0	3.2	4.5	10.2	910.0	21.8	10.2
A37	3.43	C	57%	0.50	0.72	90	5.0%	6.1	602	2.5%	20.0	3.2	3.2	9.2	692.0	20.1	9.2
A38	2.42	C	44%	0.40	0.67	141	2.4%	11.3	707	3.0%	20.0	3.5	3.4	14.7	848.0	22.9	14.7
A39	1.42	C	58%	0.51	0.72	55	2.5%	5.9	654	3.0%	20.0	3.5	3.1	9.0	709.0	19.9	9.0
A40	2.15	C	75%	0.65	0.79	80	2.0%	5.8	490	3.9%	20.0	3.9	2.1	7.8	570.0	15.4	7.8
A41	2.25	C	52%	0.46	0.70	147	6.0%	7.7	665	4.1%	20.0	4.0	2.7	10.5	812.0	20.5	10.5
A42	1.48	C	41%	0.37	0.65	58	15.6%	4.0	1069	3.4%	20.0	3.7	4.8	8.9	1127.0	25.6	8.9
A43	2.48	C	48%	0.43	0.68	53	3.0%	6.2	697	2.5%	20.0	3.2	3.7	9.8	750.0	22.6	9.8
A44	1.90	C	56%	0.49	0.71	119	5.0%	7.1	693	2.5%	20.0	3.2	3.7	10.7	812.0	20.9	10.7
A45	6.05	C	73%	0.64	0.79	300	3.2%	9.9	641	4.3%	20.0	4.1	2.6	12.4	941.0	16.2	12.4
A46	8.92	C	36%	0.33	0.63	300	4.2%	14.9	701	4.1%	7.0	1.4	8.2	23.2	1001.0	23.9	23.2
A51	1.38	C	55%	0.49	0.71	107	2.5%	8.4	522	3.9%	20.0	3.9	2.2	10.6	629.0	19.2	10.6
A52	2.36	C	63%	0.55	0.74	57	2.5%	5.6	883	3.1%	20.0	3.5	4.2	9.7	940.0	20.1	9.7
A53A	2.99	C	75%	0.65	0.79	300	2.9%	9.9	400	6.2%	20.0	5.0	1.3	11.2	700.0	14.6	11.2
A53	1.75	C	8%	0.10	0.51	102	3.3%	12.3	450	4.5%	15.0	3.2	2.4	14.7	552.0	28.2	14.7
A54A	1.01	C	52%	0.46	0.69	141	7.2%	7.2	157	1.8%	16.0	2.2	1.2	8.4	298.0	18.4	8.4
A54	1.35	C	68%	0.59	0.76	19	2.0%	3.2	596	2.4%	20.0	3.1	3.2	6.4	615.0	17.9	6.4
A55	0.88	C	76%	0.65	0.79	19	2.0%	2.8	596	3.7%	20.0	3.8	2.6	5.4	615.0	15.8	5.4
A56	1.04	C	53%	0.47	0.70	93	2.5%	8.1	333	4.2%	20.0	4.1	1.4	9.5	426.0	18.7	9.5

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Ridgegate
Location: Douglas County - Zone 1

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C_5	C_{100}	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
A57	1.49	C	51%	0.45	0.69	150	4.0%	9.1	327	4.5%	20.0	4.2	1.3	10.4	477.0	18.9	10.4
A58	0.67	C	75%	0.65	0.79	19	2.0%	2.8	724	4.4%	20.0	4.2	2.9	5.7	743.0	16.2	5.7
A59	2.61	C	49%	0.44	0.69	143	16.0%	5.7	690	2.7%	20.0	3.3	3.5	9.2	833.0	22.1	9.2
A60	1.25	C	61%	0.54	0.73	101	2.5%	7.6	643	2.7%	20.0	3.3	3.3	10.8	744.0	19.4	10.8
A61	1.00	C	44%	0.39	0.66	143	16.0%	6.1	244	4.8%	20.0	4.4	0.9	7.0	387.0	19.8	7.0
A62	1.94	C	61%	0.54	0.73	46	2.5%	5.1	1329	3.2%	20.0	3.6	6.2	11.3	1375.0	22.7	11.3
A63	2.63	C	63%	0.55	0.74	84	2.5%	6.8	1350	3.2%	20.0	3.6	6.3	13.0	1434.0	22.4	13.0
A64	1.68	C	52%	0.46	0.70	143	8.0%	7.0	324	2.3%	20.0	3.0	1.8	8.7	467.0	19.4	8.7
A65	2.17	C	69%	0.60	0.76	175	3.0%	8.4	447	3.6%	20.0	3.8	2.0	10.3	622.0	16.5	10.3
A66	2.54	C	65%	0.56	0.75	46	2.0%	5.2	748	3.1%	20.0	3.5	3.5	8.8	794.0	19.0	8.8
A67	1.22	C	77%	0.66	0.80	19	2.0%	2.7	1029	3.6%	20.0	3.8	4.6	7.3	1048.0	17.6	7.3
A68	0.74	C	74%	0.64	0.79	19	2.0%	2.9	678	3.0%	20.0	3.5	3.3	6.2	697.0	16.9	6.2
A69	1.95	C	43%	0.39	0.66	119	5.0%	8.2	844	3.2%	20.0	3.6	3.9	12.2	963.0	23.9	12.2
A70	2.04	C	62%	0.54	0.74	59	5.0%	4.6	418	3.2%	20.0	3.6	1.9	6.5	477.0	17.7	6.5
A71	0.51	C	83%	0.71	0.82	27	2.0%	2.9	394	3.2%	20.0	3.6	1.8	4.7	421.0	13.7	5.0
R1	0.75	C	90%	0.77	0.85	27	2.0%	2.4	430	1.8%	20.0	2.7	2.7	5.1	457.0	13.2	5.1
R2	1.87	C	71%	0.62	0.77	54	2.0%	5.1	350	2.5%	20.0	3.2	1.8	7.0	404.0	15.9	7.0
R3	3.74	C	81%	0.70	0.81	50	2.0%	4.1	375	1.9%	20.0	2.8	2.3	6.4	425.0	14.5	6.4
R4	0.44	C	75%	0.65	0.79	80	2.0%	5.8	75	2.5%	20.0	3.2	0.4	6.2	155.0	13.7	6.2
R5	0.36	C	75%	0.65	0.79	80	2.0%	5.8	75	2.5%	20.0	3.2	0.4	6.2	155.0	13.7	6.2
R6	2.90	C	51%	0.45	0.69	69	2.5%	7.2	800	3.6%	20.0	3.8	3.5	10.7	869.0	21.8	10.7
R7	0.55	C	73%	0.64	0.78	23	2.0%	3.2	321	3.6%	20.0	3.8	1.4	4.6	344.0	15.0	5.0
R8	0.28	C	61%	0.53	0.73	74	2.0%	7.0	126	0.8%	20.0	1.8	1.2	8.2	200.0	17.0	8.2
R9	9.78	C	85%	0.73	0.83	10	2.0%	1.7	780	1.7%	20.0	2.6	5.0	6.7	790.0	16.3	6.7
R10	1.10	C	53%	0.47	0.70	110	1.8%	9.8	366	1.7%	20.0	2.6	2.3	12.2	476.0	19.8	12.2
R11	2.18	C	10%	0.12	0.52	148	7.3%	11.2	470	3.6%	15.0	2.8	2.8	13.9	618.0	28.3	13.9
R12	3.36	C	30%	0.28	0.61	130	11.9%	7.4	1155	2.1%	20.0	2.9	6.6	14.1	1285.0	30.9	14.1
R13	2.33	C	30%	0.28	0.61	33	3.4%	5.7	699	2.9%	20.0	3.4	3.4	9.1	732.0	26.0	9.1
R14	2.55	C	35%	0.32	0.63	90	18.1%	5.2	580	3.1%	20.0	3.5	2.7	7.9	670.0	24.1	7.9
R15	1.34	C	53%	0.47	0.70	133	17.8%	5.1	179	2.5%	20.0	3.2	0.9	6.0	312.0	18.1	6.0
R16	0.28	C	59%	0.52	0.73	48	2.0%	5.8	150	1.9%	20.0	2.8	0.9	6.7	198.0	17.0	6.7

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Ridgegate
Location: Douglas County - Zone 1

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C_5	C_{100}	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
R17	1.00	C	51%	0.45	0.69	92	14.9%	4.6	393	1.8%	20.0	2.7	2.4	7.0	485.0	20.3	7.0
R18	0.87	C	68%	0.59	0.76	67	3.4%	5.1	393	1.9%	20.0	2.7	2.4	7.5	460.4	17.1	7.5
R19	0.63	C	81%	0.70	0.81	67	3.4%	4.0	393	1.9%	20.0	2.8	2.4	6.4	460.0	14.6	6.4
F1	6.05	C	42%	0.38	0.65	192	13.8%	7.6	824	2.4%	20.0	3.1	4.5	12.1	1016.0	25.0	12.1
F2	5.03	C	53%	0.47	0.70	181	15.0%	6.3	767	1.4%	20.0	2.3	5.5	11.8	948.0	23.7	11.8
F3	8.14	C	75%	0.65	0.79	40	2.0%	4.1	800	3.6%	20.0	3.8	3.5	7.6	840.0	16.9	7.6
F4	5.58	C	66%	0.58	0.75	100	2.0%	7.5	1170	2.9%	20.0	3.4	5.7	13.3	1270.0	21.1	13.3
F5	7.54	C	75%	0.65	0.79	100	2.0%	6.5	735	5.8%	20.0	4.8	2.5	9.0	835.0	15.9	9.0

NOTES:

$$t_c = t_i + t_t$$ Equation 6-2

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.33}}$$ Equation 6-3

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$ Equation 6-4

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

$$t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$ Equation 6-5

Where:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Table 6-2. NRCS Conveyance factors, K

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

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

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A1	1.44	0.12	8.2	0.17	4.25	0.7								0.7	0.17	2.0	18	177	4.2	0.7	Type C Inlet Piped to DP 1.0
	2	A2	1.60	0.05	10.6	0.08	3.86	0.3								0.3	0.08	1.0	18	41	2.6	0.3	Type C Inlet Piped to DP 1.0
	1.0								10.8	0.25	3.82	1.0				1.0	0.25	3.5	18	185	5.6	0.6	Sum of DP 1 & DP 2, Piped to DP 1.1
	3	A3	3.34	0.05	15.0	0.17	3.31	0.6								0.6	0.17	2.0	18	255	4.0	1.1	Type C Inlet Piped to DP 1.1
	1.1								16.1	0.42	3.20	1.3				1.3	0.42	3.5	18	279	6.2	0.7	Sum of DP 3 & DP 1.0, Piped to DP 1.3
	4	A4	12.75	0.05	14.3	0.65	3.39	2.2								2.2	0.65	3.5	24	517	7.1	1.2	24" FES Piped to DP 1.2
	5	A5	2.22	0.39	13.0	0.87	3.53	3.1								3.1	0.87	2.0	18	9	6.5	0.0	On-grade inlet Piped to DP 1.2
	6	A6	0.90	0.56	7.0	0.51	4.49	2.3					0.2	0.04	3.9	2.1	0.47	2.0	18	243 9	3.9 5.8	1.0 0.0	On-grade inlet, Carryover flow to DP 7 Piped to DP 1.2
	1.2								15.5	1.99	3.27	6.5				6.5	1.99	3.0	24	44	9.0	0.1	Sum of DP 4, DP 5, & DP 6, Piped to DP 1.3
	1.3								16.9	2.41	3.13	7.5				7.5	2.41	1.0	36	244	6.1	0.7	Sum of DP 1.1 & DP 1.2, Piped to DP 1.4
	7	A7	1.62	0.46	8.8	0.75	4.15	3.1	8.8	0.79	4.15	3.3				3.3	0.79	2.0	18	9	6.7	0.0	On-grade inlet, Sum of carryover flow from DP 6 & Sub-Basin A7 Piped to DP 1.4
	8	A8	1.38	0.61	7.6	0.84	4.37	3.7								3.7	0.85	2.0	18	31	7.0	0.1	On-grade inlet Piped to DP 1.4
	1.4								17.5	4.05	3.07	12.4				12.4	4.05	1.0	36	100	7.2	0.2	Sum of DP 7, DP 8, & DP 1.3, Piped to DP 1.5
	9	A9	2.84	0.43	11.2	1.21	3.77	4.6					0.2	0.04	3.8	4.4	1.17	1.5	18	147 9	3.9 6.5	0.6 0.0	On-grade inlet, Carryover flow to DP 12 Piped to DP 1.5
	10	A10	0.48	0.60	5.2	0.29	4.89	1.4								1.4	0.29	2.1	18	31	5.4	0.1	On-grade inlet Piped to DP 1.5
	1.5								17.7	5.50	3.05	16.8				16.8	5.50	1.0	36	240	7.8	0.5	Sum of DP 9, DP 10, & DP 1.4, Piped to DP 1.9
	11	A11	3.76	0.19	14.2	0.72	3.39	2.4								2.4	0.72	2.5	24	57	6.4	0.1	Type C Inlet Piped to DP 1.6
	12	A12	0.13	0.52	5.0	0.07	4.95	0.3	11.9	0.11	3.68	0.4				0.4	0.11	3.5	18	0	4.1	0.0	On-grade inlet Piped to DP 1.6
	1.6								14.4	0.83	3.38	2.8				2.8	0.83	2.5	24	5	6.8	0.0	Sum of DP 11 & DP 12, Piped to DP 1.7
	1.7								18.3	6.34	3.01	19.1				19.1	6.34	2.8	48	173	11.3	0.3	Sum of DP 1.5 & DP 1.6, Piped to DP 2.0
	13	A13	3.11	0.53	8.6	1.65	4.18	6.9								6.9	1.65	3.0	18	9	9.6	0.0	On-grade inlet Piped to DP 2.0
	2.0								18.5	7.99	2.99	23.9				23.9	7.99	0.5	42	56	6.6	0.1	Sum of DP 13 & DP 1.7, Piped to DP 2.5
	14	A14	3.51	0.64	8.1	2.26	4.27	9.7								9.7	2.26	1.5	24	132	8.0	0.3	Storm Sewer Stub Piped to DP 2.1
	15	A15	3.08	0.10	16.9	0.30	3.13	0.9								0.9	0.30	2.0	18	41	4.6	0.1	Type C Inlet Piped to DP 2.1

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	2.1								17.0	2.56	3.12	8.0				8.0	2.56	1.0	24	79	6.6	0.2	Sum of DP 14 & DP 15, Piped to DP 2.3
	16	A16	10.25	0.14	19.4	1.42	2.92	4.1								4.1	1.42	2.0	30	22	6.7	0.1	Storm Sewer Stub Piped to DP 2.2
	17	A17	0.86	0.66	5.0	0.57	4.95	2.8								2.8	0.57	2.0	36	0	5.9	0.0	Sump inlet Piped to DP 2.2
	2.2								19.5	1.99	2.91	5.8				5.8	1.99	2.0	36	9	7.3	0.0	Sum of DP 16 & DP 17, Piped to DP 2.3
	18	A18	0.47	0.65	5.0	0.31	4.95	1.5								1.5	0.31	2.0	18	49	5.3	0.2	Sump inlet Piped to DP 2.3
	2.3								19.5	4.86	2.91	14.1				14.1	4.86	1.0	42	1324	7.3	3.0	Sum of DP 18, DP 2.1, & DP 2.2, Piped to DP 2.4
	19	A19	1.94	0.50	9.7	0.98	4.00	3.9								3.9	0.98	2.0	18	10	7.0	0.0	On-grade inlet Piped to DP 2.4
	20	A20	1.54	0.54	8.8	0.82	4.15	3.4								3.4	0.82	2.0	18	49	6.8	0.1	On-grade inlet Piped to DP 2.4
	2.4								22.5	6.66	2.70	18.0				18.0	6.66	1.0	42	70	7.9	0.1	Sum of DP 19, DP 20, & DP 2.3, Piped to DP 2.5
	2.5								22.7	14.64	2.69	39.4				39.4	14.64	2.0	54	370	12.3	0.5	Sum of DP 2.0 & DP 2.4, Piped to DP 2.6
	25	A25	3.34	0.71	7.0	2.37	4.48	10.6								10.6	2.37	2.0	24	44	9.1	0.1	Storm Sewer Stub Piped to DP 2.6
	2.6								23.2	17.01	2.65	45.1				45.1	17.01	1.8	54	260	12.2	0.4	Sum of DP 25, & DP 2.5, Piped to DP 2.9
	21	A21	0.67	0.69	5.0	0.46	4.95	2.3								2.3	0.46	2.5	24	50	6.2	0.1	Sump inlet Piped to DP 2.9
	22	A22	1.05	0.70	6.3	0.73	4.63	3.4	6.3	0.75	4.63	3.5				3.5	0.75	3.0	24	9	7.5	0.0	Sum of carryover flow from DP 26 & Sub-Basin A22, Sump inlet Piped to DP 2.9
	2.9								23.5	18.23	2.63	47.9				47.9	18.23	0.6	66	116	8.4	0.2	Sum of DP 21, DP 22, & DP 2.6, Piped to DP 3.1
	23	A23	1.81	0.53	7.0	0.96	4.49	4.3								4.3	0.96	2.0	18	110	7.2	0.3	On-grade inlet Piped to DP 2.7
	23A	A23A	1.75	0.41	10.1	0.72	3.94	2.8								2.8	0.72	2.0	18	0	6.4	0.0	Sump inlet Piped to DP 2.7
	2.7								7.2	1.68	4.44	7.5				7.5	1.68	2.0	18	39	8.3	0.1	Sum of DP 23 & DP 23A, Piped to DP 2.8
	24	A24	1.88	0.51	7.9	0.97	4.31	4.2								4.2	0.97	2.0	24	0	7.0	0.0	Sump inlet Piped to DP 2.8

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	2.8								7.9	2.65	4.31	11.4				11.4	2.65	3.8	24	254	11.7	0.4	Sum of DP 24 & DP 2.7, Piped to DP 2.8A
													1.5	0.41	3.8					535	3.9	2.3	Future on-grade inlets and infrastructure, Assumed carryover flow to DP 28A
	F1	F1	6.05	0.38	12.1	2.27	3.65	8.3								6.8	1.86	3.0	24	379	9.2	0.7	Piped to DP 4.0
													1.5	0.40	4					177	4.0	0.7	Future on-grade inlets and infrastructure, Assumed carryover flow to DP 28A
	F2	F2	5.03	0.47	11.8	2.35	3.69	8.7								7.2	1.95	2.0	24	36	8.1	0.1	Piped to DP 4.0
	4.0								12.8	3.81	3.57	13.6				13.6	3.81	3.0	24	113	11.2	0.2	Sum of DP F1 & DP F2, Piped to DP 4.1
																							Sum of carryover flow from DP F1, DP F2, and Sub-Basin A28A, On-grade inlet
	28A	A28A	0.96	0.60	8.9	0.57	4.13	2.4	14.4	1.38	3.38	4.7				4.7	1.38	2.0	18	10	7.4	0.0	Piped to DP 4.1
													0.1	0.02	3.5					292	3.7	1.3	On-grade inlet, carryover flow to DP 29
	28	A28	0.68	0.58	6.6	0.39	4.57	1.8								1.7	0.37	1.0	18	31	4.3	0.1	Piped to DP 4.1
	4.1								14.4	5.56	3.38	18.8				18.8	5.56	3.0	36	330	12.0	0.5	Sum of DP 2.8A, DP 2.8, & DP 4.0, Piped to DP 4.2
																							Sum of carryover flow from DP 28 and Sub-Basin A29, On-grade inlet
	29	A29	1.60	0.49	11.3	0.78	3.76	2.9	11.3	0.80	3.76	3.0				3.0	0.80	2.0	18	10	6.5	0.0	Piped to DP 4.2
																							On-grade inlet
	30	A30	0.59	0.68	5.1	0.40	4.94	2.0								2.0	0.40	2.0	18	48	5.8	0.1	Piped to DP 4.2
	4.2								14.9	6.76	3.33	22.5				22.5	6.76	3.0	36	54	12.6	0.1	Sum of DP 29, DP 30, & DP 4.1, Piped to DP 4.3
																							On-grade inlet
	31	A31	2.11	0.43	9.9	0.90	3.96	3.6								3.6	0.90	5.0	18	63	9.4	0.1	Piped to DP 4.3
	4.3								14.9	7.66	3.32	25.4				25.4	7.66	2.5	36	595	12.2	0.8	Sum of DP 31, & DP 4.2, Piped to DP 2.8A
	2.8A								15.8	10.31	3.24	33.4				33.4	10.31	3.0	36	164	14.1	0.2	Sum of DP 2.8 & DP 4.3, Piped to DP 3.0
													0.1	0.02	3.3					153	3.6	0.7	On-grade inlet, Carryover flow to DP 22
	26	A26	1.99	0.58	9.4	1.16	4.05	4.7								4.6	1.14	2.0	18	22	7.3	0.1	Piped to DP 3.0
																							On-grade inlet
	27	A27	1.18	0.67	7.7	0.79	4.34	3.4								3.4	0.79	2.0	18	47	6.8	0.1	Piped to DP 3.0
	3.0								15.9	12.24	3.22	39.4				39.4	12.24	1.0	36	67	9.8	0.1	Sum of DP 26, DP 27 & DP 2.8A, Piped to DP 3.1
	3.1								23.8	30.46	2.62	79.8				79.8	30.46	1.0	66	763	11.5	1.1	Sum of DP 2.9 & DP 3.0, Piped to DP 7.4A
																							On-grade inlet
	68	A68	0.74	0.64	6.2	0.47	4.67	2.2								2.2	0.47	2.0	18	41	6.0	0.1	Piped to DP 3.2
	3.2								23.8	30.93	2.62	81.0				81.0	30.93	1.0	66	192	11.6	0.3	Sum of DP 68 & DP 3.1, Piped to DP 5.7
																							Sump inlet
	34	A34	0.74	0.49	7.6	0.36	4.37	1.6								1.6	0.36	2.0	18	24	5.5	0.1	Piped to DP 4.5
																							Sump inlet
	35	A35	0.18	0.54	5.9	0.10	4.74	0.5								0.5	0.10	2.0	18	0	3.7	0.0	Piped to DP 4.5

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	4.5								7.7	0.46	4.36	2.0				2.0	0.46	2.0	18	71	5.7	0.2	Sum of DP 34 & DP 35, Piped to DP 4.6
	F3	F3	8.14	0.65	7.6	5.29	4.37	23.1								23.1	5.29	1.5	36	334	9.8	0.6	Storm sewer stub Piped to DP 4.6
	4.6								8.2	5.75	4.26	24.5				24.5	5.75	2.0	42	55	11.0	0.1	Sum of DP F3 & DP 4.5, Piped to DP 4.7
	32	A32	0.93	0.53	8.3	0.49	4.23	2.1					0.3	0.06	2.0	1.8	0.43	2.0	18	401 30	2.8 5.5	2.4 0.1	On-grade inlet, carryover flow to DP 36 Piped to DP 4.7
	33	A33	1.16	0.41	9.4	0.48	4.04	1.9					0.2	0.06	3.4	1.7	0.42	2.0	18	1069 9	3.7 5.4	4.8 0.0	On-grade inlet, carryover flow to DP 42 Piped to DP 4.7
	4.7								9.5	6.60	4.04	26.6				26.6	6.60	2.0	42	417	11.3	0.6	Sum of DP 32, DP 33, & DP 4.6, Piped to DP 4.8
	36	A36	2.22	0.50	10.2	1.10	3.92	4.3	10.7	1.16	3.85	4.5	0.2	0.05	4.2	4.3	1.12	2.0	18	665 30	4.1 7.2	2.7 0.1	On-grade inlet, Sum of carryover flow from DP 32 & Sub-Basin A36. Carryover flow to DP 41 Piped to DP 4.8
	4.8								10.7	7.71	3.84	29.6				29.6	7.71	2.0	42	503	11.6	0.7	Sum of DP 36 & DP 4.7, Piped to DP 5.2
	37	A37	3.43	0.50	9.2	1.71	4.07	7.0								7.0	1.71	2.0	18	138	8.2	0.3	On-grade inlet Piped to DP 5.0
	38	A38	2.42	0.40	14.7	0.97	3.35	3.2								3.2	0.97	1.0	24	0	5.0	0.0	Sump inlet Piped to DP 5.0
	5.0								14.7	2.68	3.35	9.0				9.0	2.68	1.0	24	41	6.7	0.1	Sum of DP 37 & DP 38, Piped to DP 5.1
	39	A39	1.42	0.51	9.0	0.72	4.11	3.0								3.0	0.72	3.0	24	0	7.1	0.0	Sump inlet Piped to DP 5.1
	5.1								14.8	3.40	3.34	11.4				11.4	3.40	3.0	24	242	10.8	0.4	Sum of DP 39 & DP 5.0, Piped to DP 5.2
	5.2								15.1	11.11	3.30	36.7				36.7	11.11	2.5	48	159	13.2	0.2	Sum of DP 4.8 & DP 5.1, Piped to DP 5.4
	40	A40	2.15	0.65	7.8	1.40	4.32	6.0								6.0	1.40	1.0	24	25	6.1	0.1	Storm sewer stub Piped to DP 5.3
	41	A41	2.25	0.46	10.5	1.04	3.88	4.0	10.7	1.09	3.85	4.2				4.2	1.09	2.0	24	0	7.0	0.0	On-grade inlet, sum of carryover flow from DP 36 & Sub-Basin 41 Piped to DP 5.3
	5.3								10.7	2.49	3.85	9.6				9.6	2.49	2.0	24	31	8.9	0.1	Sum of DP 40 & DP 41, Piped to DP 5.4
	42	A42	1.48	0.37	8.9	0.55	4.13	2.3	9.4	0.61	4.04	2.5				2.5	0.61	2.0	18	9	6.1	0.0	On-grade inlet, sum of carryover flow from DP 33 & Sub-Basin 42 Piped to DP 5.4
	5.4								15.3	14.21	3.28	46.6				46.6	14.21	2.0	54	52	12.9	0.1	Sum of DP 42, DP 5.2 & DP 5.3, Piped to DP 5.6
	43	A43	2.48	0.43	9.8	1.05	3.97	4.2								4.2	1.05	3.0	24	9	8.1	0.0	Sump inlet Piped to DP 5.5
	44	A44	1.90	0.49	10.7	0.93	3.84	3.6								3.6	0.93	3.0	24	38	7.7	0.1	Sump inlet Piped to DP 5.5

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF: Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	TOTAL RUNOFF: tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	STREET: Q_{street} (cfs)	C*A (ac)	Slope (%)	PIPE: Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	TRAVEL TIME: Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	5.5								10.8	1.98	3.83	7.6				7.6	1.98	1.0	18	193	6.4	0.5	Sum of DP 43 & DP 44, Piped to DP 5.6
	5.6								15.4	16.19	3.27	52.9				52.9	16.19	0.5	54	1193	8.1	2.4	Sum of DP 5.4 & DP 5.5, Piped to DP 5.7
	45	A45	6.05	0.64	12.4	3.85	3.61	13.9								13.9	3.85	0.5	54	0	5.6	0.0	Future storm infrastructure for parking area Piped to DP 5.7
	5.7								24.0	50.97	2.60	132.5				132.5	50.97	1.0	72	1193	13.2	1.5	Sum of DP 45, DP 3.2, & DP 5.6, Piped to DP 5.8
	5.8								24.0	50.97	2.60	132.5	132.5	50.97	0.5					292	1.1	4.6	Pond A Forebay Trickle channel conveyance to DP 9.6
	51	A51	1.38	0.49	10.6	0.67	3.85	2.6					0.4	0.10	3.2	2.2	0.57	3.0	18	420 55	3.6 6.8	2.0 0.1	On-grade inlet, Carryover flow to DP 54 Piped to DP 6.0
	52	A52	2.36	0.55	9.7	1.29	3.99	5.1								5.1	1.29	2.0	18	48	7.6	0.1	On-grade inlet Piped to DP 6.0
	6.0								10.8	1.86	3.83	7.1				7.1	1.86	2.5	18	220	9.0	0.4	Sum of DP 51 & DP 52, Piped to DP 6.2
	53A	A53A	2.99	0.65	11.2	1.94	3.77	7.3								7.3	1.94	2.0	18	20	8.3	0.0	Storm Sewer Stub Piped to DP 6.1A
	53	A53	1.75	0.10	14.7	0.17	3.35	0.6								0.6	0.17	2.0	24	0	3.8	0.0	Type C inlet Piped to DP 6.1A
	6.1A								14.7	2.11	3.35	7.1				7.1	2.11	1.0	24	240	6.3	0.6	Sum of DP 53A & DP 53, Piped to DP 6.1
	54A	A54A	1.01	0.46	8.4	0.46	4.22	1.9								1.9	0.46	1.0	18	29	4.5	0.1	Sump inlet Piped to DP 6.1B
	54	A54	1.35	0.59	6.4	0.80	4.62	3.7	10.6	0.90	3.85	3.5				3.5	0.90	1.0	18	0	5.2	0.0	Sump inlet, sum of carryover flow from DP 51 & Sub-basin A54 Piped to DP 6.1B
	6.1B								10.6	1.36	3.85	5.2				5.2	1.36	2.0	18	9	7.6	0.0	Sum of DP 54A & DP 54, Piped to DP 6.1
	55	A55	0.88	0.65	5.4	0.58	4.86	2.8								2.8	0.58	1.0	18	49	5.1	0.2	Sump inlet Piped to DP 6.1
	6.1								15.3	4.05	3.28	13.3				13.3	4.05	0.5	30	226	5.8	0.7	Sum of DP 6.1A, DP 6.1B, & DP 55, Piped to DP 6.2
	6.2								16.0	5.91	3.22	19.0				19.0	5.91	2.5	30	396	11.4	0.6	Sum of DP 6.0 & DP 6.1, Piped to DP 6.3
	56	A56	1.04	0.47	9.5	0.49	4.03	2.0								2.0	0.49	2.0	18	33	5.8	0.1	Sump inlet Piped to DP 6.3
	6.3								16.6	6.40	3.16	20.2				20.2	6.40	4.5	30	368	14.4	0.4	Sum of DP 56 & DP 6.2, Piped to DP 6.5
	57	A57	1.49	0.45	10.4	0.67	3.90	2.6								2.6	0.67	2.0	18	21	6.2	0.1	Sump inlet Piped to DP 6.4
	58	A58	0.67	0.65	5.7	0.44	4.78	2.1					0.3	0.06	2.7	1.8	0.38	2.0	18	345 0	3.3 5.5	1.7 0.0	On-grade inlet, Carryover flow to DP 66 Piped to DP 6.4
	6.4								10.4	1.05	3.89	4.1				4.1	1.05	2.0	18	9	7.1	0.0	Sum of DP 57 & DP 58, Piped to DP 6.5

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	6.5								17.0	7.45	3.12	23.2				23.2	7.45	4.8	30	64	15.3	0.1	Sum of DP 6.3 & DP 6.4, Piped to DP 6.8
	59	A59	2.61	0.44	9.2	1.14	4.07	4.6								4.6	1.14	2.0	18	6	7.4	0.0	On-grade inlet Piped to DP 6.6
	60	A60	1.25	0.54	10.8	0.67	3.82	2.6								2.6	0.67	2.0	18	36	6.1	0.1	On-grade inlet Piped to DP 6.6
	6.6								0.1	1.81	6.76	12.2				12.2	1.81	3.1	18	249	11.2	0.4	Sum of DP 59 & DP 60, Piped to DP 6.7
	61	A61	1.00	0.39	7.0	0.39	4.48	1.7								1.7	0.39	1.0	18	12	4.3	0.0	On-grade inlet Piped to DP 6.7
	6.7								0.5	2.20	6.57	14.5				14.5	2.20	3.0	18	258	11.4	0.4	Sum of DP 61 & DP 6.6, Piped to DP 6.8
	F4	F4	5.58	0.58	13.3	3.21	3.51	11.3								11.3	3.21	1.0	24	88	7.2	0.2	Storm sewer stub Piped to DP 6.8
	6.8								17.0	12.86	3.12	40.1				40.1	12.86	3.0	30	244	14.8	0.3	Sum of DP F4, DP 6.5, & DP 6.7, Piped to DP 7.2
	62	A62	1.94	0.54	11.3	1.04	3.76	3.9								3.9	1.04	2.0	18	34	7.0	0.1	On-grade inlet Piped to DP 6.9
	63	A63	2.63	0.55	13.0	1.44	3.53	5.1					0.1	0.02	3.5	5.0	1.42	2.0	18	447 6	3.7 7.6	2.0 0.0	On-grade inlet, Carryover flow to DP 65 Piped to DP 6.9
	6.9								13.1	2.46	3.53	8.7				8.7	2.46	3.2	18	349	10.3	0.6	Sum of DP 62 & DP 63, Piped to DP 7.0
	64	A64	1.68	0.46	8.7	0.77	4.16	3.2								3.2	0.77	1.0	24	0	5.1	0.0	Sump inlet Piped to DP 7.0
	7.0								13.6	3.23	3.47	11.2				11.2	3.23	1.0	24	38	7.1	0.1	Sum of DP 64 & DP 6.9, Piped to DP 7.1
	65	A65	2.17	0.60	10.3	1.30	3.90	5.1	10.3	1.32	3.90	5.2				5.2	1.32	2.5	24	0	8.0	0.0	Sump inlet, Sum of carryover flow from DP 63 & Sub-Basin R15 Piped to DP 7.1
	7.1								13.7	4.55	3.46	15.7				15.7	4.55	2.5	24	227	11.0	0.3	Sum of DP 65 & DP 7.0, Piped to DP 7.2
	7.2								17.3	17.41	3.09	53.8				53.8	17.41	1.0	42	34	10.6	0.1	Sum of DP 6.8 & DP 7.1, Piped to DP 7.3
	66	A66	2.54	0.56	8.8	1.43	4.15	5.9	8.8	1.49	4.15	6.2				6.2	1.49	2.0	18	9	8.0	0.0	Sump inlet, Sum of carryover flow from DP 58 & Sub-Basin R16 Piped to DP 7.3
	67	A67	1.22	0.66	7.3	0.81	4.43	3.6								3.6	0.81	2.0	18	49	6.8	0.1	Sump inlet Piped to DP 7.3
	7.3								17.4	19.71	3.09	60.9				60.9	19.71	0.8	48	197	9.8	0.3	Sum of DP 66, DP 67, & DP 7.2, Piped to DP 7.5
	69	A69	1.95	0.39	12.2	0.76	3.64	2.8								2.8	0.76	2.0	18	41	6.4	0.1	On-grade inlet, carryover flow to DP 71 Piped to DP 7.5
	7.5								17.7	20.47	3.06	62.6				62.6	20.47	1.0	48	392	11.0	0.6	Sum of DP 69 & DP 7.3, Piped to DP 7.7
	70	A70	2.04	0.54	6.5	1.10	4.59	5.0								5.0	1.10	0.7	24	25	5.1	0.1	Sump inlet Piped to DP 7.7

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	7.7								18.3	21.57	3.01	64.9				64.9	21.57	1.0	48	47	11.1	0.1	Sum of DP 7.5 & DP 70, Piped to DP 7.8
	71	A71	0.51	0.71	5.0	0.36	4.95	1.8								1.8	0.36	1.0	48	0	3.8	0.0	Sump inlet Piped to DP 7.8
	7.8								18.4	21.93	3.00	65.8				65.8	21.93	1.0	48	125	11.2	0.2	Sum of DP 7.7 & DP 71, Piped to DP 7.9
	7.9								18.4	21.93	3.00	65.8	65.8	21.93	0.5					265	1.1	4.2	Pond A Forebay Trickle channel conveyance to DP 9.6
	46	A46	8.92	0.33	23.2	2.97	2.65	7.9					7.9	2.97	2.0								Overland flow Pond conveyance to DP 7.9A
	7.9A								24.0	75.87	2.60	197.3											Pond A outlet structure Sum of DP 46, DP 5.8, & DP 7.9, outfall to Happy Canyon Creek
	7.9A								24.0	28.74	2.60	74.7				74.7	28.74	1.0	96	53	10.9	0.1	Outlet structure release Piped to DP 9.5
	72A	R1	0.75	0.77	5.1	0.58	4.92	2.9								2.9	0.58	1.0	18	85	5.0	0.3	Storm sewer stub Piped to DP 8.0
	72	R2	1.87	0.62	7.0	1.15	4.50	5.2								5.2	1.15	2.0	30	60	7.2	0.1	Storm sewer stub Piped to DP 8.0
	8.0								7.1	1.73	4.47	7.7				7.7	1.73	2.5	30	549	8.7	1.0	Sum of DP 72A & DP 72, Piped to DP 8.1
	73	R3	3.74	0.70	6.4	2.61	4.63	12.1								12.1	2.61	0.5	30	149	5.6	0.4	Storm sewer stub Piped to DP 8.1
	8.1								8.1	4.34	4.27	18.5				18.5	4.34	3.5	36	142	12.5	0.2	Sum of DP 73 & DP 8.0, Piped to DP 8.2
	74	R4	0.44	0.65	6.2	0.29	4.67	1.4								1.4	0.29	2.0	18	33	5.1	0.1	Storm sewer stub Piped to DP 8.2
	8.2								8.3	4.63	4.23	19.6				19.6	4.63	0.8	36	195	7.3	0.4	Sum of DP 74 & DP 8.1, Piped to DP 8.3
	75	R5	0.36	0.65	6.2	0.23	4.67	1.1								1.1	0.23	2.0	18	30	4.7	0.1	Storm sewer stub Piped to DP 8.3
	8.3								8.8	4.86	4.15	20.2				20.2	4.86	0.5	36	71	6.4	0.2	Sum of DP 75 & DP 8.2, Piped to DP 8.4
	76	R6	2.90	0.45	10.7	1.30	3.84	5.0								5.0	1.30	1.0	18	11	5.9	0.0	Sump inlet Piped to DP 8.4
	77	R7	0.55	0.64	5.0	0.35	4.95	1.7								1.7	0.35	1.0	18	38	4.3	0.1	Sump inlet Piped to DP 8.4
	8.4								10.7	6.51	3.84	25.0				25.0	6.51	0.5	36	71	6.7	0.2	Sum of DP 76, DP 77, & DP 8.3, Piped to DP 8.5
	78	R8	0.28	0.53	8.2	0.15	4.26	0.6								0.6	0.15	8.0	18	19	6.3	0.1	Existing inlet Piped to DP 8.5
	8.5								10.9	6.66	3.81	25.4				25.4	6.66	1.0	36	122	8.7	0.2	Sum of DP 78 & DP 8.4, Piped to DP 8.6
	79	R9	9.78	0.73	6.7	7.16	4.56	32.6								32.6	7.16	2.0	30	67	12.2	0.1	Storm sewer stub Piped to DP 8.6

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 5-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	8.6								11.2	13.82	3.78	52.2				52.2	13.82	1.1	42	454	10.9	0.7	Sum of DP 79 & DP 8.5, Piped to DP 8.7
	80	R10	1.10	0.47	12.2	0.52	3.65	1.9								1.9	0.52	8.0	18	19	9.3	0.0	Existing inlet Piped to DP 8.7
	8.7								12.2	14.34	3.64	52.2				52.2	14.34	3.0	42	780	15.7	0.8	Sum of DP 80 & DP 8.6, Piped to DP 8.9
	81	R11	2.18	0.12	13.9	0.26	3.43	0.9								0.9	0.26	2.0	36	35	4.1	0.1	Existing storm sewer stub Piped to DP 8.8
	82	R12	3.36	0.28	14.1	0.95	3.42	3.2								3.2	0.95	2.0	36	0	6.0	0.0	Existing inlet Piped to DP 8.8
	8.8								14.1	1.21	3.41	4.1				4.1	1.21	2.1	36	67	6.6	0.2	Sum of DP 81 & DP 82, Piped to DP 8.9
	83	R13	2.33	0.28	9.1	0.66	4.10	2.7								2.7	0.66	8.0	18	30	10.3	0.0	Existing inlet Piped to DP 8.9
	8.9								14.3	16.21	3.39	55.0				55.0	16.21	3.6	42	549	17.1	0.5	Sum of DP 83, DP 8.7, & DP 8.8, Piped to DP 9.1
	F5	F5	7.54	0.65	9.0	4.90	4.11	20.1								20.1	4.90	2.0	36	35	10.6	0.1	Existing storm sewer stub Piped to DP 9.0
	84	R14	2.55	0.32	7.9	0.81	4.31	3.5								3.5	0.81	3.4	36	0	7.6	0.0	Existing inlet Piped to DP 9.0
	9.0								9.1	5.71	4.10	23.4				23.4	5.71	3.4	36	67	13.3	0.1	Sum of DP F5 & DP 84, Piped to DP 9.1
	85	R15	1.34	0.47	6.0	0.63	4.71	3.0								3.0	0.63	3.4	36	0	7.0	0.0	Existing inlet Piped to DP 9.1
	9.1								14.8	22.55	3.34	75.3				75.3	22.55	1.6	54	397	13.6	0.5	Sum of DP 85, DP 8.9, & DP 9.0, Piped to DP 9.2
	86	R16	0.28	0.52	6.7	0.15	4.56	0.7								0.7	0.15	8.0	18	35	6.8	0.1	On-grade inlet Piped to DP 9.2
	87	R17	1.00	0.45	7.0	0.45	4.48	2.0								2.0	0.45	1.0	18	75	4.5	0.3	Existing inlet Piped to DP 9.2
	9.2								15.3	23.15	3.29	76.2				76.2	23.15	1.3	54	198	12.7	0.3	Sum of DP 86, DP 87, & DP 9.1, Piped to DP 9.4
	88	R18	0.87	0.59	7.5	0.51	4.39	2.2								2.2	0.51	2.0	36	67	5.5	0.2	Existing inlet Piped to DP 9.3
	89	R19	0.63	0.70	6.4	0.44	4.63	2.0								2.0	0.44	1.0	18	30	4.6	0.1	Existing inlet Piped to DP 9.3
	9.3								7.7	0.95	4.35	4.1				4.1	0.95	1.1	30	204	5.4	0.6	Sum of DP 88 & DP 89, Piped to DP 9.4
	9.4								15.5	24.10	3.26	78.6				78.6	24.10	1.0	60	180	11.6	0.3	Sum of DP 9.2 & DP 9.3, Piped to DP 9.5
	9.4								15.5	8.20	3.26	26.7				26.7	8.20	0.3	60	380	5.6	1.1	Split flows per Merrick manhole modifications, Piped to DP 9.5
	9.5								24.1	36.94	2.60	96.0				96.0	36.94	1.0	96	123	11.7	0.2	Sum of DP 7.9A & DP 9.4 Outfall into Happy Creek Canyon

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

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	A1	1.44	0.52	8.2	0.76	7.57	5.8								5.8	0.76	2.0	18	177	7.8	0.4	Type C Inlet Piped to DP 1.0
	2	A2	1.60	0.49	10.6	0.79	6.88	5.4								5.4	0.79	1.0	18	41	6.0	0.1	Type C Inlet Piped to DP 1.0
	1.0								10.7	1.55	6.85	10.6				10.6	1.55	3.5	18	185	11.3	0.3	Sum of DP 1 & DP 2, Piped to DP 1.1
	3	A3	3.34	0.49	15.0	1.64	5.89	9.7								9.7	1.64	2.0	18	255	9.0	0.5	Type C Inlet Piped to DP 1.1
	1.1								15.5	3.19	5.81	18.5				18.5	3.19	3.5	18	279	12.6	0.4	Sum of DP 3 & DP 1.0, Piped to DP 1.3
	4	A4	12.75	0.49	14.3	6.27	6.04	37.9								37.9	6.27	3.5	24	517	15.2	0.6	24" FES Piped to DP 1.2
	5	A5	2.22	0.66	13.0	1.47	6.29	9.2					1.6	0.26	3.9	7.6	1.21	2.0	18	289 9	3.9 8.5	1.2 0.0	On-grade inlet, Carryover flow to DP 7 Piped to DP 1.2
	6	A6	0.90	0.75	7.0	0.67	7.99	5.4					2.0	0.24	3.9	3.4	0.43	2.0	18	243 9	3.9 6.8	1.0 0.0	On-grade inlet, Carryover flow to DP 7 Piped to DP 1.2
	1.2								14.8	7.90	5.93	46.9				46.9	7.90	3.0	24	44	14.9	0.0	Sum of DP 4, DP 5, & DP 6, Piped to DP 1.3
	1.3								15.9	11.09	5.74	63.7				63.7	11.09	1.0	36	244	10.8	0.4	Sum of DP 1.1 & DP 1.2, Piped to DP 1.4
	7	A7	1.62	0.70	8.8	1.13	7.40	8.4	14.3	1.64	6.04	9.9	2.1	0.34	3.8	7.8	1.29	2.0	18	93 9	3.9 8.4	0.4 0.0	On-grade inlet, Sum of carryover flow from DP 5, DP 6, & Sub-Basin A7. Carryover flow to DP 9 Piped to DP 1.4
	8	A8	1.38	0.77	7.6	1.06	7.78	8.2					1.1	0.15	3.9	7.1	0.91	2.0	18	54 31	3.9 8.3	0.2 0.1	On-grade inlet, Carryover flow to DP 9 Piped to DP 1.4
	1.4								16.3	13.30	5.68	75.5				75.5	13.30	1.0	36	100	10.7	0.2	Sum of DP 7, DP 8, & DP 1.3, Piped to DP 1.5
	9	A9	2.84	0.68	11.2	1.93	6.71	13.0	14.7	2.42	5.97	14.5	5.9	0.98	3.8	8.6	1.44	1.5	18	147 9	3.9 7.8	0.6 0.0	On-grade inlet, Sum of carryover flow from DP 7, DP 8, & Sub-Basin A9. Carryover flow to DP 12 Piped to DP 1.5
	10	A10	0.48	0.77	5.2	0.37	8.71	3.2								3.2	0.37	2.1	18	31	6.8	0.1	On-grade inlet Piped to DP 1.5
	1.5								16.4	15.11	5.65	85.3				85.3	15.11	2.8	42	148	17.4	0.1	Sum of DP 9, DP 10, & DP 1.4, Piped to DP 1.7
	11	A11	3.76	0.56	14.2	2.11	6.05	12.8								12.8	2.11	2.5	24	57	10.4	0.1	Type C Inlet Piped to DP 1.6
	12	A12	0.13	0.73	5.0	0.10	8.82	0.9	11.9	1.08	6.20	6.7	1.0	0.16	3.7	5.7	0.92	3.5	18	173 0	3.8 9.5	0.7 0.0	On-grade inlet, Sum of carryover flow from DP 9 & Sub-Basin A12. Carryover flow to DP 13 Piped to DP 1.6
	1.6								14.3	3.03	6.03	18.3				18.3	3.03	2.5	24	5	11.3	0.0	Sum of DP 11 & DP 12, Piped to DP 1.7
	1.7								16.6	18.14	5.63	102.1				102.1	18.14	2.8	48	173	18.4	0.2	Sum of DP 1.5 & DP 1.6, Piped to DP 2.0
	13	A13	3.11	0.73	8.6	2.28	7.44	17.0	11.9	2.44	7.01	17.1	4.3	0.62	3.2	12.8	1.83	2.0	18	508 9	3.6 9.4	2.4 0.0	On-grade inlet, Sum of carryover flow from DP 12 & Sub-Basin A13. Carryover flow to DP 22 Piped to DP 2.0
	2.0								16.7	19.96	5.60	111.8				111.8	19.96	0.5	42	56	11.6	0.1	Sum of DP 13 & DP 1.7, Piped to DP 2.5
	14	A14	3.51	0.79	8.1	2.77	7.60	21.1								21.1	2.77	1.5	24	132	9.7	0.2	Storm Sewer Stub Piped to DP 2.1
	15	A15	3.08	0.51	16.9	1.58	5.58	8.8								8.8	1.58	2.0	18	41	8.7	0.1	Type C Inlet Piped to DP 2.1

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	2.1								16.9	4.35	5.56	24.2				24.2	4.35	1.0	24	79	8.1	0.2	Sum of DP 14 & DP 15, Piped to DP 2.3
	16	A16	10.25	0.54	19.4	5.49	5.19	28.5								28.5	5.49	2.0	30	22	11.7	0.0	Storm Sewer Stub Piped to DP 2.2
	17	A17	0.86	0.80	5.0	0.68	8.82	6.0								6.0	0.68	2.0	36	0	7.3	0.0	Sump inlet Piped to DP 2.2
	2.2								19.5	6.17	5.19	32.0				32.0	6.17	2.0	36	9	12.0	0.0	Sum of DP 16 & DP 17, Piped to DP 2.3
	18	A18	0.47	0.79	5.0	0.37	8.82	3.3								3.3	0.37	2.0	18	49	6.7	0.1	Sump inlet Piped to DP 2.3
	2.3								19.5	10.89	5.19	56.5				56.5	10.89	1.0	42	1324	10.7	2.1	Sum of DP 18, DP 2.1, & DP 2.2, Piped to DP 2.4
	19	A19	1.94	0.72	9.7	1.39	7.12	9.9					2.8	0.39	3.9	7.1	1.00	2.0	18	517 10	3.9 8.3	2.2 0.0	On-grade inlet, Carryover flow to DP 22 Piped to DP 2.4
	20	A20	1.54	0.73	8.8	1.13	7.38	8.3					1.8	0.25	3.9	6.5	0.88	2.0	18	530 49	3.9 8.0	2.2 0.1	On-grade inlet, Carryover flow to DP 21 Piped to DP 2.4
	2.4								21.5	12.77	4.92	62.8				62.8	12.77	1.0	42	70	11.0	0.1	Sum of DP 19, DP 20, & DP 2.3, Piped to DP 2.5
	2.5								21.6	32.73	4.90	160.4				160.4	32.73	2.0	54	370	18.1	0.3	Sum of DP 2.0 & DP 2.4, Piped to DP 2.6
	25	A25	3.34	0.82	7.0	2.74	7.98	21.9								21.9	2.74	2.0	24	44	10.9	0.1	Storm Sewer Stub Piped to DP 2.6
	2.6								22.0	35.47	4.86	172.4				172.4	35.47	1.8	54	260	17.5	0.2	Sum of DP 25, & DP 2.5, Piped to DP 2.9
	21	A21	0.67	0.81	5.0	0.54	8.82	4.8	11.0	0.79	6.76	5.3				5.3	0.79	2.5	24	50	8.0	0.1	Sum of carryover flow from DP 20 and Sub-Basin A21, Sump inlet Piped to DP 2.9
	22	A22	1.05	0.82	6.3	0.86	8.25	7.1	17.0	2.74	5.55	15.2				15.2	2.74	3.0	24	9	11.6	0.0	Sum of carryover flow from DP 13, DP 19, DP 26 , & Sub-Basin A22, Sump inlet Piped to DP 2.9
	2.9								22.2	39.00	4.83	188.4				188.4	39.00	0.6	66	116	11.9	0.2	Sum of DP 21, DP 22, & DP 2.6, Piped to DP 3.1
	23	A23	1.81	0.73	7.0	1.33	8.00	10.6					2.5	0.32	3.3	8.1	1.01	2.0	18	113 110	3.6 8.6	0.5 0.2	On-grade inlet, Carryover flow to DP 23A Piped to DP 2.7
	23A	A23A	1.75	0.67	10.1	1.17	7.01	8.2	10.1	1.49	7.01	10.4				10.4	1.49	2.0	18	0	9.1	0.0	Sum of carryover flow from DP 23 and Sub-Basin A23A, Sump inlet Piped to DP 2.7
	2.7								10.1	2.50	7.01	17.5				17.5	2.50	2.0	18	39	9.9	0.1	Sum of DP 23 & DP 23A, Piped to DP 2.8
	24	A24	1.88	0.72	7.9	1.36	7.67	10.4								10.4	1.36	2.0	24	0	9.0	0.0	Sump inlet Piped to DP 2.8

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	2.8								10.2	3.86	6.99	27.0				27.0	3.86	3.8	24	254	14.6	0.3	Sum of DP 24 & DP 2.7, Piped to DP 2.8A
													3.0	0.47	3.8					535	3.9	2.3	Future on-grade inlets and infrastructure, Assumed carryover flow to DP 28A
	F1	F1	6.05	0.65	12.1	3.96	6.50	25.7								22.7	3.49	3.0	24	379	12.8	0.5	Piped to DP 4.0
													3.0	0.46	4					177	4.0	0.7	Future on-grade inlets and infrastructure, Assumed carryover flow to DP 28A
	F2	F2	5.03	0.70	11.8	3.53	6.58	23.2								20.2	3.07	2.0	24	36	10.7	0.1	Piped to DP 4.0
	4.0								12.6	6.56	6.39	41.9				41.9	6.56	3.0	24	113	14.0	0.1	Sum of DP F1 & DP F2, Piped to DP 4.1
													2.1	0.35	3.5					327	3.7	1.5	Sum of carryover flow from DP F1, DP F2, and Sub-Basin A28A, On-grade inlet, carryover flow to DP 29
	28A	A28A	0.96	0.76	8.9	0.73	7.36	5.4	14.4	1.66	6.02	10.0				7.9	1.31	2.0	18	10	8.5	0.0	Piped to DP 4.1
													1.2	0.15	3.5					292	3.7	1.3	On-grade inlet, carryover flow to DP 29
	28	A28	0.68	0.75	6.6	0.51	8.13	4.1								2.9	0.36	1.0	18	31	5.1	0.1	Piped to DP 4.1
	4.1								14.4	8.23	6.02	49.6				49.6	8.23	3.0	36	330	15.6	0.4	Sum of DP 2.8A, DP 2.8, & DP 4.0, Piped to DP 4.2
													3.5	0.52	3.5					1123	3.7	5.0	Sum of carryover flow from DP 28A, DP 28 and Sub-Basin A29, On-grade inlet, carryover flow to DP 26
	29	A29	1.60	0.71	11.3	1.14	6.69	7.6	11.3	1.64	6.69	11.0				7.5	1.12	2.0	18	10	8.4	0.0	Piped to DP 4.2
																							On-grade inlet
	30	A30	0.59	0.81	5.1	0.47	8.79	4.1								4.1	0.47	2.0	18	48	7.0	0.1	Piped to DP 4.2
	4.2								14.8	9.82	5.95	58.4				58.4	9.82	3.0	36	54	16.4	0.1	Sum of DP 29, DP 30, & DP 4.1, Piped to DP 4.3
													2.2	0.31	3.5					1083	3.7	4.8	On-grade inlet, carryover flow to DP 26
	31	A31	2.11	0.68	9.9	1.43	7.05	10.1								7.9	1.12	5.0	18	63	12.0	0.1	Piped to DP 4.3
	4.3								14.8	10.94	5.94	65.0				65.0	10.94	2.5	36	909	15.6	1.0	Sum of DP 31, & DP 4.2, Piped to DP 2.8A
	2.8A								15.8	14.80	5.76	85.3				85.3	14.80	2.5	36	164	16.6	0.2	Sum of DP 2.8 & DP 4.3, Piped to DP 3.0
													5.0	0.87	3.3					153	3.6	0.7	On-grade inlet, Sum of carryover flow from DP 29, DP 31, & Sub-Basin 26, Carryover flow to DP 22
	26	A26	1.99	0.76	9.4	1.51	7.21	10.9	16.3	2.34	5.67	13.3				8.3	1.46	2.0	18	22	8.5	0.0	Piped to DP 3.0
													1.3	0.17	3.3					756	3.6	3.5	On-grade inlet, Carryover flow to DP 43
	27	A27	1.18	0.80	7.7	0.95	7.73	7.3								6.0	0.78	2.0	18	47	7.9	0.1	Piped to DP 3.0
	3.0								16.4	17.04	5.66	96.5				96.5	17.04	1.0	36	67	13.7	0.1	Sum of DP 26, DP 27 & DP 2.8A, Piped to DP 3.1
	3.1								22.4	56.04	4.82	270.1				270.1	56.04	1.0	66	763	15.8	0.8	Sum of DP 2.9 & DP 3.0, Piped to DP 3.2
													0.2	0.03	2.2					117	3.0	0.7	On-grade inlet, carryover flow to DP 66
	68	A68	0.74	0.79	6.2	0.58	8.32	4.8								4.6	0.55	2.0	18	7	7.3	0.0	Piped to DP 3.2
	3.2								22.4	56.60	4.82	272.8				272.8	56.60	1.0	66	192	15.8	0.2	Sum of DP 68 & DP 3.1, Piped to DP 5.7
																							Sump inlet
	34	A34	0.74	0.71	7.6	0.52	7.78	4.0								4.0	0.52	2.0	18	24	7.1	0.1	Piped to DP 4.5
																							Sump inlet
	35	A35	0.18	0.74	5.9	0.13	8.44	1.1								1.1	0.13	2.0	18	0	4.8	0.0	Piped to DP 4.5

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	4.5								7.6	0.65	7.76	5.0				5.0	0.65	2.0	18	71	7.5	0.2	Sum of DP 34 & DP 35, Piped to DP 4.6
	F3	F3	8.14	0.79	7.6	6.44	7.78	50.1								50.1	6.44	1.5	36	334	12.1	0.5	Storm sewer stub Piped to DP 4.6
	4.6								8.1	7.09	7.62	54.0				54.0	7.09	2.0	42	55	13.7	0.1	Sum of DP F3 & DP 4.5, Piped to DP 4.7
	32	A32	0.93	0.73	8.3	0.68	7.54	5.1					2.2	0.30	2.0	2.9	0.38	2.0	18	401 30	2.8 6.5	2.4 0.1	On-grade inlet, carryover flow to DP 36 Piped to DP 4.7
	33	A33	1.16	0.67	9.4	0.78	7.20	5.6					2.6	0.36	3.4	3.0	0.42	2.0	18	1069 9	3.7 6.5	4.8 0.0	On-grade inlet, carryover flow to DP 42 Piped to DP 4.7
	4.7								9.5	7.89	7.19	56.7				56.7	7.89	2.0	42	417	13.9	0.5	Sum of DP 32, DP 33, & DP 4.6, Piped to DP 4.8
	36	A36	2.22	0.71	10.2	1.59	6.97	11.1	10.7	1.89	6.85	12.9	4.8	0.70	4.2	8.1	1.18	2.0	18	665 30	4.1 8.6	2.7 0.1	On-grade inlet, Sum of carryover flow from DP 32 & Sub-Basin A36. Carryover flow to DP 41 Piped to DP 4.8
	4.8								10.7	9.07	6.84	62.1				62.1	9.07	2.0	42	503	14.3	0.6	Sum of DP 36 & DP 4.7, Piped to DP 5.2
	37	A37	3.43	0.72	9.2	2.46	7.26	17.9					4.8	0.66	1.5	13.1	1.80	2.0	18	134 138	2.4 9.4	0.9 0.2	On-grade inlet, carryover flow to DP 38 Piped to DP 5.0
	38	A38	2.42	0.67	14.7	1.61	5.97	9.6	14.7	2.27	5.97	13.5				13.5	2.27	1.0	24	0	7.5	0.0	Sump inlet, Sum of carryover flow from DP 37 & Sub-Basin A38 Piped to DP 5.0
	5.0								14.7	4.07	5.97	24.3				24.3	4.07	1.0	24	41	8.1	0.1	Sum of DP 37 & DP 38, Piped to DP 5.1
	39	A39	1.42	0.72	9.0	1.02	7.32	7.5								7.5	1.02	3.0	24	0	9.4	0.0	Sump inlet Piped to DP 5.1
	5.1								14.7	5.09	5.95	30.3				30.3	5.09	3.0	24	242	13.8	0.3	Sum of DP 39 & DP 5.0, Piped to DP 5.2
	5.2								15.0	14.16	5.90	83.6				83.6	14.16	2.5	48	159	16.7	0.2	Sum of DP 4.8 & DP 5.1, Piped to DP 5.4
	40	A40	2.15	0.79	7.8	1.70	7.69	13.1								13.1	1.70	1.0	24	25	7.5	0.1	Storm sewer stub Piped to DP 5.3
	41	A41	2.25	0.70	10.5	1.57	6.91	10.8	13.4	2.27	6.22	14.1	2.6	0.42	2.0	11.5	1.85	2.0	24	263 0	2.8 9.3	1.5 0.0	On-grade inlet, sum of carryover from from DP 36 & Sub-Basin 41, Carryover flow to DP 43 Piped to DP 5.3
	5.3								14.9	3.55	5.92	21.0				21.0	3.55	2.0	24	31	10.8	0.0	Sum of DP 40 & DP 41, Piped to DP 5.4
	42	A42	1.48	0.65	8.9	0.96	7.36	7.1	14.3	1.32	6.04	8.0	1.7	0.28	2.0	6.3	1.04	2.0	18	220 9	2.8 7.9	1.3 0.0	On-grade inlet, sum of carryover flow from DP 33 & Sub-Basin 42, Carryover flow to DP 43 Piped to DP 5.4
	5.4								15.2	18.76	5.87	110.1				110.1	18.76	2.0	54	52	16.4	0.1	Sum of DP 42, DP 5.2 & DP 5.3, Piped to DP 5.6
	43	A43	2.48	0.68	9.8	1.68	7.08	11.9	15.6	2.56	5.80	14.8				14.8	2.56	1.0	18	9	8.4	0.0	Sump inlet, sum of carryover flow from DP 27, DP41, DP 42, & Sub-Basin 43 Piped to DP 5.5
	44	A44	1.90	0.71	10.7	1.35	6.85	9.2								9.2	1.35	1.0	18	38	6.7	0.1	Sump inlet Piped to DP 5.5

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	5.5								15.6	3.91	5.80	22.7				22.7	3.91	1.0	18	193	12.8	0.3	Sum of DP 43 & DP 44, Piped to DP 5.6
	5.6								15.8	22.66	5.75	130.3				130.3	22.66	0.5	54	1193	10.0	2.0	Sum of DP 5.4 & DP 5.5, Piped to DP 5.7
	45	A45	6.05	0.79	12.4	4.75	6.43	30.5								30.5	4.75	0.5	54	0	7.0	0.0	Future storm infrastructure for parking area Piped to DP 5.7
	5.7								22.6	84.01	4.79	402.4				402.4	84.01	1.0	72	1193	17.1	1.2	Sum of DP 45, DP 3.2, & DP 5.6, Piped to DP 5.8
	5.8								22.6	84.01	4.79	402.4	402.4	84.01	0.5					292	1.1	4.6	Pond A Forebay Trickle channel conveyance to DP 9.6
	51	A51	1.38	0.71	10.6	0.98	6.86	6.7					3.0	0.44	2.4	3.7	0.54	3.0	18	420 55	3.1 8.1	2.3 0.1	On-grade inlet, Carryover flow to DP 54 Piped to DP 6.0
	52	A52	2.36	0.74	9.7	1.75	7.11	12.4					3.6	0.51	3.2	8.8	1.24	2.0	18	690 48	3.6 8.8	3.2 0.1	On-grade inlet, Carryover flow to DP 59 Piped to DP 6.0
	6.0								10.8	1.78	6.83	12.1				12.1	1.78	2.5	18	220	10.2	0.4	Sum of DP 51 & DP 52, Piped to DP 6.2
	53A	A53A	2.99	0.79	11.2	2.37	6.71	15.9								15.9	2.37	2.0	18	20	9.4	0.0	Storm Sewer Stub Piped to DP 6.1A
	53	A53	1.75	0.51	14.7	0.90	5.96	5.4								5.4	0.90	2.0	24	0	7.5	0.0	Type C inlet Piped to DP 6.1A
	6.1A								14.7	3.27	5.96	19.5				19.5	3.27	1.0	24	240	8.1	0.5	Sum of DP 53A & DP 53, Piped to DP 6.1
	54A	A54A	1.01	0.69	8.4	0.70	7.51	5.3								5.3	0.70	1.0	18	29	6.0	0.1	Sump inlet Piped to DP 6.1B
	54	A54	1.35	0.76	6.4	1.03	8.23	8.5	12.9	1.47	6.32	9.3				9.3	1.47	1.0	18	0	6.7	0.0	Sump inlet, sum of carryover flow from DP 51 & Sub-basin A54 Piped to DP 6.1B
	6.1B								12.9	2.17	6.32	13.7				13.7	2.17	2.0	18	9	9.5	0.0	Sum of DP 54A & DP 54, Piped to DP 6.1
	55	A55	0.88	0.79	5.4	0.70	8.65	6.1								6.1	0.70	1.0	18	49	6.1	0.1	Sump inlet Piped to DP 6.1
	6.1								15.2	6.14	5.87	36.0				36.0	6.14	0.5	30	226	7.4	0.5	Sum of DP 6.1A, DP 6.1B, & DP 55, Piped to DP 6.2
	6.2								15.7	7.92	5.78	45.8				45.8	7.92	2.5	30	396	14.3	0.5	Sum of DP 6.0 & DP 6.1, Piped to DP 6.3
	56	A56	1.04	0.70	9.5	0.73	7.18	5.2								5.2	0.73	2.0	18	33	7.6	0.1	Sump inlet Piped to DP 6.3
	6.3								16.2	8.65	5.70	49.3				49.3	8.65	4.5	30	368	18.2	0.3	Sum of DP 56 & DP 6.2, Piped to DP 6.5
	57	A57	1.49	0.69	10.4	1.03	6.94	7.1								7.1	1.03	2.0	18	21	8.2	0.0	Sump inlet Piped to DP 6.4
	58	A58	0.67	0.79	5.7	0.53	8.51	4.5					1.8	0.21	2.7	2.7	0.32	2.0	18	345 0	3.3 6.3	1.7 0.0	On-grade inlet, Carryover flow to DP 66 Piped to DP 6.4
	6.4								10.4	1.35	6.93	9.3				9.3	1.35	2.0	18	9	8.8	0.0	Sum of DP 57 & DP 58, Piped to DP 6.5

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

		DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	6.5								16.5	9.99	5.64	56.4				56.4	9.99	4.8	30	64	19.3	0.1	Sum of DP 6.3 & DP 6.4, Piped to DP 6.8
													5.3	0.84	3.1					244	3.5	1.2	On-grade inlet, Sum of carryover flow from DP 52 & Sub-Basin R9, carryover flow to DP 61
	59	A59	2.61	0.69	9.2	1.79	7.25	13.0	13.0	2.30	6.31	14.5				9.2	1.46	2.0	18	6	8.8	0.0	Piped to DP 6.6
													0.4	0.05	3.1					754	3.5	3.6	On-grade inlet, Sum of carryover flow from DP 51 & Sub-Basin R10, Carryover flow to DP 66
	60	A60	1.25	0.73	10.8	0.92	6.81	6.3								5.9	0.87	2.0	18	36	7.9	0.1	Piped to DP 6.6
	6.6								13.0	2.32	6.31	14.7				14.7	2.32	3.1	18	249	11.6	0.4	Sum of DP 59 & DP 60, Piped to DP 6.7
													3.0	0.44	2.3					324	3.0	1.8	On-grade inlet, Sum of carryover flow from DP 59 & Sub-Basin R11, Carryover flow to DP 64
	61	A61	1.00	0.66	7.0	0.66	7.98	5.3	10.4	1.50	6.93	10.4				7.4	1.07	1.0	18	12	6.4	0.0	Piped to DP 6.7
	6.7								13.3	3.39	6.23	21.1				21.1	3.39	3.0	18	258	12.0	0.4	Sum of DP 61 & DP 6.6, Piped to DP 6.8
																							Storm sewer stub
	F4	F4	5.58	0.75	13.3	4.21	6.25	26.3								26.3	4.21	1.0	24	88	8.4	0.2	Piped to DP 6.8
	6.8								16.5	17.60	5.63	99.1				99.1	17.60	3.0	30	244	20.2	0.2	Sum of DP F4, DP 6.5, & DP 6.7, Piped to DP 7.2
													1.8	0.27	3.2					319	3.6	1.5	On-grade inlet, carryover flow to DP 64
	62	A62	1.94	0.73	11.3	1.42	6.70	9.5								7.7	1.15	2.0	18	34	8.4	0.1	Piped to DP 6.9
													3.5	0.55	3.5					447	3.7	2.0	On-grade inlet, Carryover flow to DP 65
	63	A63	2.63	0.74	13.0	1.95	6.29	12.3								8.8	1.40	2.0	18	6	8.8	0.0	Piped to DP 6.9
	6.9								13.1	2.55	6.29	16.0				16.0	2.55	3.2	18	349	11.9	0.5	Sum of DP 62 & DP 63, Piped to DP 7.0
																							Sump inlet, Sum of carryover flow from DP 61, DP 62, & Sub-Basin R14
	64	A64	1.68	0.70	8.7	1.17	7.40	8.7	12.8	1.88	6.35	11.9				11.9	1.88	1.0	24	0	7.3	0.0	Piped to DP 7.0
	7.0								13.5	4.43	6.19	27.4				27.4	4.43	1.0	24	38	8.7	0.1	Sum of DP 64 & DP 6.9, Piped to DP 7.1
																							Sump inlet, Sum of carryover flow from DP 63 & Sub-Basin R15
	65	A65	2.17	0.76	10.3	1.66	6.94	11.5	15.0	2.21	5.90	13.0				13.0	2.21	2.5	24	0	10.4	0.0	Piped to DP 7.1
	7.1								15.0	6.64	5.90	39.2				39.2	6.64	2.5	24	227	12.5	0.3	Sum of DP 65 & DP 7.0, Piped to DP 7.2
	7.2								16.8	24.23	5.60	135.7				135.7	24.23	1.0	42	34	14.1	0.0	Sum of DP 6.8 & DP 7.1, Piped to DP 7.3
																							Sump inlet, Sum of carryover flow from DP 58, DP 60, DP 68, & Sub-Basin R16
	66	A66	2.54	0.75	8.8	1.90	7.40	14.1	10.8	2.19	6.81	14.9				14.9	2.19	2.0	18	9	9.6	0.0	Piped to DP 7.3
																							Sump inlet
	67	A67	1.22	0.80	7.3	0.97	7.89	7.7								7.7	0.97	2.0	18	49	8.4	0.1	Piped to DP 7.3
	7.3								16.8	27.40	5.59	153.1				153.1	27.40	0.8	48	197	12.2	0.3	Sum of DP 66, DP 67, & DP 7.2, Piped to DP 7.5
													1.9	0.29	3.2					394	3.6	1.8	On-grade inlet, carryover flow to DP 71
	69	A69	1.95	0.66	12.2	1.29	6.49	8.4								6.5	1.00	2.0	18	41	8.0	0.1	Piped to DP 7.5
	7.5								17.1	28.40	5.55	157.6				157.6	28.40	1.0	48	392	12.6	0.5	Sum of DP 69 & DP 7.3, Piped to DP 7.7
																							Sump inlet
	70	A70	2.04	0.74	6.5	1.50	8.18	12.3								12.3	1.50	0.7	24	25	6.4	0.1	Piped to DP 7.7

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	7.7								17.6	29.90	5.46	163.2				163.2	29.90	1.0	48	47	13.0	0.1	Sum of DP 7.5 & DP 70, Piped to DP 7.8
	71	A71	0.51	0.82	5.0	0.42	8.82	3.7	14.0	0.71	6.09	4.3				4.3	0.71	1.0	48	0	5.1	0.0	Sump inlet, sum of carryover flow from DP 69 and Sub-Basin R21 Piped to DP 7.8
	7.8								17.6	30.61	5.45	166.8				166.8	30.61	1.0	48	125	13.3	0.2	Sum of DP 7.7 & DP 71, Piped to DP 7.9
	7.9								17.6	30.61	5.45	166.8	166.8	30.61	0.5					265	1.1	4.2	Pond A Forebay Trickle channel conveyance to DP 9.6
	46	A46	8.92	0.63	23.2	5.65	4.73	26.7					26.7	5.65	2.0								Overland flow Pond conveyance to DP 7.9A
	7.9A								27.2	120.27	4.32	519.6											Pond A outlet structure Sum of DP 46, DP 5.8, & DP 7.9, outfall to Happy Canyon Creek
	7.9A								27.2	107.52	4.32	464.5				464.5	107.52	1.0	96	53	18.3	0.0	Outlet structure release Piped to DP 9.5
	72A	R1	0.75	0.85	5.1	0.64	8.77	5.6								5.6	0.64	1.0	18	85	6.0	0.2	Storm sewer stub Piped to DP 8.0
	72	R2	1.87	0.77	7.0	1.45	8.01	11.6								11.6	1.45	2.0	30	60	9.2	0.1	Storm sewer stub Piped to DP 8.0
	8.0								7.1	2.09	7.97	16.7				16.7	2.09	2.5	30	549	11.0	0.8	Sum of DP 72A & DP 72, Piped to DP 8.1
	73	R3	3.74	0.81	6.4	3.05	8.24	25.1								25.1	3.05	0.5	30	149	6.6	0.4	Storm sewer stub Piped to DP 8.1
	8.1								7.9	5.14	7.68	39.5				39.5	5.14	3.5	36	142	15.7	0.2	Sum of DP 73 & DP 8.0, Piped to DP 8.2
	74	R4	0.44	0.79	6.2	0.35	8.31	2.9								2.9	0.35	2.0	18	33	6.5	0.1	Storm sewer stub Piped to DP 8.2
	8.2								8.0	5.49	7.63	41.9				41.9	5.49	0.8	36	195	8.9	0.4	Sum of DP 74 & DP 8.1, Piped to DP 8.3
	75	R5	0.36	0.79	6.2	0.28	8.31	2.3								2.3	0.28	2.0	18	30	5.9	0.1	Storm sewer stub Piped to DP 8.3
	8.3								8.4	5.77	7.51	43.3				43.3	5.77	0.5	36	71	7.6	0.2	Sum of DP 75 & DP 8.2, Piped to DP 8.4
	76	R6	2.90	0.69	10.7	2.01	6.84	13.7								13.7	2.01	1.0	18	11	7.8	0.0	Sump inlet Piped to DP 8.4
	77	R7	0.55	0.78	5.0	0.43	8.82	3.8								3.8	0.43	1.0	18	38	5.4	0.1	Sump inlet Piped to DP 8.4
	8.4								10.7	8.21	6.84	56.2				56.2	8.21	1.0	36	398	10.6	0.6	Sum of DP 76, DP 77, & DP 8.3, Piped to DP 8.5
	78	R8	0.28	0.73	8.2	0.21	7.59	1.6								1.6	0.21	8.0	18	19	8.7	0.0	Existing inlet Piped to DP 8.5
	8.5								11.4	8.42	6.68	56.2				56.2	8.42	1.0	36	122	10.6	0.2	Sum of DP 78 & DP 8.4, Piped to DP 8.6
	79	R9	9.78	0.83	6.7	8.14	8.12	66.1								66.1	8.14	2.0	30	67	13.5	0.1	Storm sewer stub Piped to DP 8.6

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

Subdivision: Ridgegate
Location: Douglas County - Zone 1
Design Storm: 100-Year

Project Name:
Project No.: 15950.01
Calculated By: AAM
Checked By:
Date: 1/7/21

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	8.6								11.6	16.56	6.63	109.8				109.8	16.56	1.1	42	454	12.5	0.6	Sum of DP 79 & DP 8.5, Piped to DP 8.7
	80	R10	1.10	0.70	12.2	0.77	6.49	5.0								5.0	0.77	8.0	18	19	12.3	0.0	Existing inlet Piped to DP 8.7
	8.7								12.2	17.33	6.49	112.5				112.5	17.33	3.0	42	780	19.2	0.7	Sum of DP 80 & DP 8.6, Piped to DP 8.9
	81	R11	2.18	0.52	13.9	1.14	6.11	7.0								7.0	1.14	2.0	36	35	7.6	0.1	Existing storm sewer stub Piped to DP 8.8
	82	R12	3.36	0.61	14.1	2.04	6.08	12.4								12.4	2.04	2.0	36	0	9.2	0.0	Existing inlet Piped to DP 8.8
	8.8								14.1	3.18	6.08	19.3				19.3	3.18	2.1	36	67	10.7	0.1	Sum of DP 81 & DP 82, Piped to DP 8.9
	83	R13	2.33	0.61	9.1	1.42	7.30	10.4								10.4	1.42	8.0	18	30	15.0	0.0	Existing inlet Piped to DP 8.9
	8.9								14.2	21.93	6.06	132.9				132.9	21.93	3.6	42	549	21.4	0.4	Sum of DP 83, DP 8.7, & DP 8.8, Piped to DP 9.1
	F5	F5	7.54	0.79	9.0	5.96	7.32	43.6								43.6	5.96	2.0	36	35	13.0	0.0	Existing storm sewer stub Piped to DP 9.0
	84	R14	2.55	0.63	7.9	1.60	7.68	12.3								12.3	1.60	3.4	36	0	11.1	0.0	Existing inlet Piped to DP 9.0
	9.0								9.1	7.56	7.31	55.3				55.3	7.56	3.4	36	67	16.9	0.1	Sum of DP F5 & DP 84, Piped to DP 9.1
	85	R15	1.34	0.70	6.0	0.94	8.38	7.9								7.9	0.94	3.4	36	0	9.6	0.0	Existing inlet Piped to DP 9.1
	9.1								14.6	30.43	5.98	182.0				182.0	30.43	1.6	54	397	16.9	0.4	Sum of DP 85, DP 8.9, & DP 9.0, Piped to DP 9.2
	86	R16	0.28	0.73	6.7	0.20	8.11	1.6								1.6	0.20	8.0	18	35	8.9	0.1	On-grade inlet Piped to DP 9.2
	87	R17	1.00	0.69	7.0	0.69	7.98	5.5								5.5	0.69	1.0	18	75	5.9	0.2	Existing inlet Piped to DP 9.2
	9.2								15.0	31.32	5.91	185.1				185.1	31.32	1.3	54	198	15.7	0.2	Sum of DP 86, DP 87, & DP 9.1, Piped to DP 9.4
	88	R18	0.87	0.76	7.5	0.66	7.82	5.2								5.2	0.66	2.0	36	67	7.1	0.2	Existing inlet Piped to DP 9.3
	89	R19	0.63	0.81	6.4	0.51	8.24	4.2								4.2	0.51	1.0	18	30	5.6	0.1	Existing inlet Piped to DP 9.3
	9.3								7.6	1.17	7.77	9.1				9.1	1.17	1.1	30	204	6.8	0.5	Sum of DP 88 & DP 89, Piped to DP 9.4
	9.4								15.2	32.49	5.87	190.7				190.7	32.49	0.3	60				Sum of DP 9.2 & DP 9.3, split flows per Merrick manhole modifications
	9.4								15.2	15.76	5.87	92.5				92.5	15.76	0.3	60	380	7.7	0.8	Split flows per Merrick manhole modifications, Piped to DP 9.5
	9.5								27.2	123.28	4.32	532.6				532.6	123.28	1.0	96	123	18.9	0.1	Sum of DP 7.9A & DP 9.4 Outfall into Happy Creek Canyon

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

APPENDIX C

HYDRAULIC CALCULATIONS

Scenario: 5yr
Current Time Step: 0.000 h
FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Headloss Coefficient (Standard)
DPA1-10	6,004.77	5,994.78	60.90	5,999.02	5,997.75	5,999.23	5,998.42	1.915
DPA1-11	6,004.83	5,995.32	53.80	5,999.53	5,998.98	6,000.90	5,999.26	2.001
DPA1-12	6,008.49	5,999.86	40.10	6,002.21	6,002.16	6,004.53	6,002.89	0.074
DPA1-13	6,012.02	6,002.29	40.10	6,005.70	6,004.60	6,007.68	6,005.33	1.497
DPA1-14	6,015.11	6,005.74	23.20	6,008.37	6,007.62	6,010.89	6,008.24	1.224
DPA1-15	6,018.72	6,009.93	20.20	6,011.75	6,011.70	6,014.62	6,012.26	0.077
DPA1-16	6,027.86	6,018.62	20.20	6,020.43	6,020.40	6,023.14	6,020.96	0.052
DPA1-17	6,032.35	6,023.58	20.20	6,026.03	6,025.36	6,026.28	6,025.92	1.189
DPA1-18	6,042.40	6,032.36	19.00	6,034.11	6,034.09	6,034.74	6,034.63	0.050
DPA1-19	6,044.51	6,033.36	19.00	6,036.66	6,035.10	6,036.92	6,035.64	2.908
DPA1-1B	5,975.18	5,961.88	96.00	5,965.11	5,964.20	5,966.77	5,965.02	1.106
DPA1-1C	5,980.69	5,965.36	74.70	5,967.45	5,967.41	5,968.52	5,968.11	0.050
DPA1-1D	5,986.14	5,970.58	74.70	5,972.67	5,972.63	5,973.80	5,973.33	0.050
DPA1-1E	5,982.22	5,976.56	74.70	5,977.97	5,977.93	5,978.67	5,978.63	0.050
DPA1-2	5,992.04	5,981.57	65.80	5,986.53	5,986.52	5,986.75	5,986.72	0.074
DPA1-20	6,041.65	6,034.47	13.30	6,037.05	6,036.70	6,037.68	6,036.82	2.813
DPA1-21	6,046.02	6,037.69	7.10	6,039.21	6,038.85	6,039.46	6,039.21	1.000
DPA1-22	6,044.16	6,039.14	7.10	6,040.09	6,040.09	6,040.45	6,040.45	0.000
DPA1-3	5,990.83	5,981.96	65.80	5,986.55	5,986.54	5,986.80	5,986.77	0.050
DPA1-4	5,991.42	5,982.34	64.90	5,987.02	5,986.55	5,987.24	5,986.82	1.722
DPA1-5	5,995.02	5,984.55	62.60	5,987.25	5,987.20	5,989.55	5,988.05	0.058
DPA1-6	5,999.08	5,986.78	62.60	5,989.47	5,989.43	5,991.77	5,990.28	0.050
DPA1-7	6,002.98	5,991.06	62.60	5,994.75	5,993.70	5,997.18	5,994.55	1.240
DPA1-8	6,006.80	5,994.28	60.90	5,997.87	5,997.04	5,998.24	5,997.87	1.000
DPA1-9	6,005.01	5,995.12	60.90	5,997.84	5,997.84	5,998.32	5,998.32	0.000
DPA2-1	5,991.11	5,985.96	5.00	5,987.01	5,987.00	5,987.31	5,987.29	0.050
DPA3-1	6,003.38	5,997.07	2.80	5,997.91	5,997.91	5,998.15	5,998.15	0.000
DPA4-1	6,004.95	5,999.06	6.20	6,000.23	6,000.23	6,000.65	6,000.65	0.000
DPA4-2	6,004.95	5,999.67	3.60	6,000.59	6,000.59	6,000.88	6,000.88	0.000
DPA5-1	6,005.37	5,999.34	15.70	6,000.68	6,000.68	6,002.36	6,001.21	0.000
DPA5-2	6,010.64	6,003.24	15.70	6,004.90	6,004.87	6,005.86	6,005.40	0.057
DPA5-3	6,011.22	6,004.35	11.20	6,006.08	6,005.80	6,006.94	6,006.30	0.550
DPA5-4	6,011.96	6,005.31	8.70	6,006.94	6,006.66	6,007.49	6,007.23	0.496
DPA5-5	6,014.82	6,008.63	8.70	6,010.01	6,009.98	6,011.89	6,010.54	0.065
DPA5-6	6,017.88	6,011.97	8.70	6,013.48	6,013.32	6,015.18	6,013.88	0.280
DPA5-7	6,020.33	6,014.46	8.70	6,015.96	6,015.81	6,017.68	6,016.38	0.262
DPA5-8	6,023.03	6,017.02	8.70	6,019.00	6,018.37	6,019.14	6,018.93	1.112
DPA6-1	6,023.90	6,018.47	3.90	6,019.45	6,019.45	6,019.75	6,019.75	0.000
DPA6-2	6,024.41	6,018.21	5.00	6,019.30	6,019.30	6,019.65	6,019.65	0.000
DPA7-1	6,012.70	6,005.53	11.30	6,006.74	6,006.74	6,007.24	6,007.24	0.000
DPA7-2	6,013.09	6,006.73	14.50	6,008.10	6,008.10	6,010.42	6,008.72	0.001
DPA7-3	6,019.15	6,013.68	14.50	6,015.94	6,015.30	6,015.95	6,015.92	1.029
DPA7-4	6,019.15	6,014.46	1.70	6,015.94	6,015.94	6,015.96	6,015.96	0.000
DPA8-1	6,021.19	6,015.58	12.20	6,016.84	6,016.84	6,018.01	6,017.37	0.000
DPA8-2	6,022.31	6,016.13	12.20	6,017.67	6,017.64	6,019.99	6,018.17	0.065
DPA8-3	6,028.70	6,021.78	12.20	6,023.92	6,023.29	6,024.03	6,023.82	1.174
DPA9-1	6,028.82	6,022.44	4.60	6,023.91	6,023.91	6,024.04	6,024.04	0.000
DPA9-2	6,029.59	6,023.03	2.60	6,023.85	6,023.85	6,024.08	6,024.08	0.000
DPA10-1	6,015.29	6,008.74	4.10	6,009.95	6,009.93	6,010.48	6,010.24	0.070
DPA10-2	6,015.95	6,009.62	2.60	6,010.34	6,010.34	6,010.57	6,010.57	0.000
DPA11-1	6,032.95	6,026.06	2.00	6,027.23	6,027.23	6,027.43	6,027.43	0.000
DPA12-1	6,045.42	6,037.46	7.10	6,038.49	6,038.49	6,040.20	6,038.96	0.000
DPA12-2	6,049.79	6,043.55	7.10	6,045.40	6,044.79	6,045.42	6,045.26	1.301
DPA12-3	6,050.21	6,044.67	5.10	6,045.75	6,045.75	6,046.11	6,046.11	0.000
DPA13-1	6,051.92	6,045.67	2.20	6,046.45	6,046.45	6,046.66	6,046.66	0.000
DPA14-1	6,042.27	6,036.87	1.90	6,037.61	6,037.61	6,037.80	6,037.80	0.000
DPA14-2	6,041.84	6,036.29	5.20	6,037.41	6,037.38	6,037.49	6,037.75	0.078
DPA14-3	6,041.83	6,036.89	2.80	6,037.75	6,037.75	6,037.99	6,037.99	0.000
DPA15-10	6,017.56	6,006.82	46.00	6,010.38	6,009.30	6,010.87	6,010.04	1.451
DPA15-11	6,019.72	6,009.85	36.10	6,012.10	6,012.06	6,014.22	6,012.74	0.057
DPA15-12	6,021.79	6,011.82	36.10	6,014.03	6,013.99	6,016.20	6,014.67	0.062
DPA15-13	6,024.07	6,013.76	36.10	6,017.00	6,015.96	6,019.27	6,016.64	1.526
DPA15-14	6,026.15	6,016.53	29.60	6,018.67	6,018.62	6,021.30	6,019.35	0.066

DPA15-15	6,029.46	6,020.00	29.60	6,022.15	6,022.10	6,025.40	6,022.83	0.065
DPA15-16	6,041.49	6,030.99	29.60	6,033.13	6,033.08	6,036.14	6,033.81	0.063
DPA15-17	6,044.30	6,035.79	29.60	6,038.74	6,037.88	6,038.96	6,038.61	1.172
DPA15-18	6,046.19	6,037.91	26.60	6,039.95	6,039.91	6,041.85	6,040.58	0.063
DPA15-19	6,048.29	6,040.25	26.60	6,042.29	6,042.25	6,044.16	6,042.92	0.063
DPA15-2	5,999.16	5,982.07	133.40	5,986.50	5,986.44	5,988.49	5,987.25	0.066
DPA15-20	6,050.24	6,042.43	26.60	6,044.47	6,044.43	6,046.13	6,045.10	0.059
DPA15-21	6,051.37	6,043.76	26.60	6,045.81	6,045.77	6,046.44	6,046.44	0.057
DPA15-22	6,052.51	6,044.93	26.60	6,047.62	6,046.93	6,047.70	6,047.60	1.027
DPA15-23	6,053.62	6,046.24	24.50	6,048.90	6,048.17	6,049.19	6,048.80	1.150
DPA15-24	6,055.86	6,048.06	23.10	6,050.55	6,049.94	6,050.90	6,050.55	1.000
DPA15-25	6,058.82	6,050.10	23.10	6,052.59	6,051.98	6,052.94	6,052.59	1.000
DPA15-26	6,059.58	6,052.99	23.10	6,052.89	6,052.89	6,053.50	6,053.50	0.000
DPA15-3	6,005.87	5,986.26	133.40	5,990.09	5,990.03	5,992.08	5,991.27	0.050
DPA15-4	6,010.02	5,990.75	133.40	5,996.11	5,994.52	5,997.73	5,995.76	1.278
DPA15-5	6,014.90	5,996.86	52.30	5,999.46	5,999.37	6,000.48	6,000.18	0.102
DPA15-6	6,023.31	5,999.01	52.30	6,001.67	6,001.62	6,002.69	6,002.43	0.050
DPA15-7	6,017.78	6,001.27	52.30	6,004.13	6,003.88	6,004.81	6,004.69	0.304
DPA15-8	6,015.83	6,002.10	52.30	6,006.16	6,004.71	6,006.49	6,005.52	1.789
DPA15-9	6,017.03	6,007.03	46.00	6,008.98	6,008.98	6,010.33	6,009.72	0.000
DPA16-1	6,012.70	6,006.80	7.60	6,008.03	6,008.03	6,008.41	6,008.41	0.000
DPA17-1	6,017.82	6,010.81	2.50	6,011.63	6,011.63	6,011.86	6,011.86	0.000
DPA17-2	6,017.82	6,011.25	9.60	6,012.67	6,012.67	6,013.30	6,013.30	0.000
DPA18-1	6,024.75	6,018.56	10.90	6,019.74	6,019.74	6,021.92	6,020.24	0.000
DPA18-2	6,038.66	6,024.14	10.90	6,025.63	6,025.57	6,027.53	6,026.07	0.120
DPA18-3	6,039.26	6,028.78	10.90	6,030.26	6,030.21	6,031.27	6,030.71	0.093
DPA18-4	6,039.26	6,030.09	8.60	6,031.71	6,031.40	6,031.90	6,031.81	0.748
DPA18-5	6,039.86	6,031.85	2.60	6,032.84	6,032.67	6,033.47	6,032.90	0.748
DPA18-6	6,041.59	6,034.04	2.60	6,035.09	6,034.86	6,035.30	6,035.09	1.000
DPA18-7	6,042.17	6,035.15	2.60	6,035.76	6,035.76	6,036.38	6,035.99	0.000
DPA18-8	6,043.47	6,036.86	2.60	6,037.92	6,037.69	6,038.13	6,037.92	1.000
DPA18-9	6,043.47	6,037.55	2.60	6,038.38	6,038.38	6,038.61	6,038.61	0.000
DPA19-1	6,044.62	6,038.21	4.30	6,039.22	6,039.22	6,039.53	6,039.53	0.000
DPA20-1	6,052.81	6,047.35	1.80	6,048.06	6,048.06	6,048.25	6,048.25	0.000
DPA20-2	6,052.78	6,046.94	1.70	6,047.64	6,047.64	6,047.82	6,047.82	0.000
DPA21-1	6,054.36	6,048.65	2.00	6,049.18	6,049.18	6,049.49	6,049.38	0.000
DPA21-2	6,054.96	6,048.57	2.00	6,049.52	6,049.33	6,049.65	6,049.52	1.000
DPA21-3	6,054.96	6,049.01	1.60	6,049.71	6,049.71	6,049.88	6,049.88	0.000
DPA22-1	6,006.64	5,995.76	82.20	5,999.20	5,998.85	6,000.03	5,999.81	0.364
DPA22-10	6,035.04	6,023.90	46.40	6,027.26	6,026.39	6,027.57	6,027.14	1.159
DPA22-11	6,038.47	6,026.04	40.00	6,028.41	6,028.37	6,030.49	6,029.05	0.057
DPA22-12	6,042.81	6,031.06	40.00	6,034.23	6,033.40	6,036.35	6,034.08	1.207
DPA22-13	6,045.58	6,035.17	17.80	6,037.57	6,036.85	6,039.69	6,037.37	1.385
DPA22-14	6,054.27	6,044.47	14.10	6,046.02	6,046.00	6,048.15	6,046.44	0.065
DPA22-15	6,062.96	6,053.27	14.10	6,054.82	6,054.80	6,056.37	6,055.24	0.057
DPA22-16	6,073.48	6,059.52	14.10	6,061.07	6,061.05	6,061.60	6,061.49	0.050
DPA22-17	6,077.15	6,061.22	14.10	6,062.77	6,062.75	6,063.30	6,063.19	0.050
DPA22-18	6,070.79	6,062.92	14.10	6,065.16	6,064.48	6,065.61	6,064.92	1.519
DPA22-19	6,071.70	6,064.38	8.00	6,066.20	6,065.61	6,067.21	6,065.96	1.694
DPA22-2	6,008.86	5,996.80	82.20	6,001.06	5,999.88	6,003.11	6,000.84	1.226
DPA22-20	6,074.61	6,066.43	9.70	6,068.24	6,067.79	6,068.52	6,068.25	0.982
DPA22-21	6,078.66	6,067.52	9.70	6,068.64	6,068.64	6,069.10	6,069.10	0.000
DPA22-3	6,012.57	6,000.00	80.90	6,003.13	6,003.08	6,005.42	6,004.02	0.061
DPA22-4	6,018.56	6,004.71	80.90	6,007.86	6,007.79	6,010.15	6,008.74	0.071
DPA22-5	6,022.67	6,010.19	80.90	6,013.34	6,013.27	6,015.69	6,014.21	0.074
DPA22-6	6,027.55	6,014.77	80.90	6,017.91	6,017.85	6,019.30	6,018.79	0.069
DPA22-7	6,030.46	6,016.45	80.90	6,019.70	6,019.53	6,020.27	6,020.47	0.182
DPA22-8	6,029.05	6,017.87	49.40	6,021.42	6,020.40	6,021.83	6,021.13	1.383
DPA22-9	6,031.73	6,021.51	46.40	6,024.05	6,024.00	6,026.08	6,024.75	0.067
DPA23-1	6,008.92	6,003.51	2.20	6,004.28	6,004.28	6,004.48	6,004.48	0.000
DPA24-1	6,032.37	6,021.07	39.00	6,023.10	6,023.10	6,024.91	6,024.01	0.000
DPA24-10	6,072.60	6,064.58	22.50	6,067.10	6,066.44	6,067.64	6,067.05	1.095
DPA24-11	6,082.22	6,073.33	18.80	6,075.58	6,075.05	6,075.90	6,075.58	1.000
DPA24-12	6,083.06	6,075.22	18.80	6,077.53	6,076.94	6,078.01	6,077.48	1.103
DPA24-13	6,087.27	6,079.91	13.60	6,082.13	6,081.44	6,083.11	6,081.93	1.417
DPA24-14	6,093.55	6,086.27	6.80	6,087.43	6,087.40	6,089.10	6,087.76	0.063
DPA24-15	6,098.22	6,091.25	6.80	6,092.74	6,092.38	6,092.98	6,092.74	1.000
DPA24-16	6,099.28	6,093.49	6.80	6,094.41	6,094.41	6,094.77	6,094.77	0.000
DPA24-2	6,033.24	6,021.35	39.00	6,024.81	6,023.71	6,027.88	6,024.62	1.208
DPA24-3	6,039.07	6,028.53	33.00	6,030.72	6,030.72	6,033.24	6,031.52	0.000
DPA24-4	6,041.60	6,032.49	33.00	6,035.64	6,034.68	6,035.91	6,035.48	1.202
DPA24-5	6,047.69	6,038.91	25.40	6,040.90	6,040.87	6,043.88	6,041.53	0.050
DPA24-6	6,056.61	6,048.11	25.40	6,050.10	6,050.07	6,053.04	6,050.72	0.057
DPA24-7	6,061.61	6,053.21	25.40	6,055.21	6,055.17	6,058.15	6,055.82	0.066
DPA24-8								

	6,066.57	6,058.28	25.40	6,060.29	6,060.24	6,063.09	6,060.90	0.067
DPA24-9	6,070.54	6,062.48	25.40	6,065.22	6,064.44	6,066.22	6,065.09	1.195
DPA25-1	6,033.30	6,028.17	3.40	6,029.09	6,029.09	6,029.36	6,029.36	0.000
DPA25-2	6,033.45	6,027.73	4.60	6,028.77	6,028.77	6,029.11	6,029.11	0.000
DPA26-1	6,044.88	6,035.83	11.00	6,037.02	6,037.02	6,039.11	6,037.51	0.000
DPA26-2	6,049.28	6,040.01	11.00	6,041.68	6,041.45	6,042.64	6,041.95	0.460
DPA26-3	6,049.08	6,040.88	11.00	6,042.40	6,042.33	6,043.34	6,042.82	0.147
DPA26-4	6,049.10	6,041.96	7.50	6,043.57	6,043.19	6,043.84	6,043.57	1.000
DPA26-5	6,051.30	6,044.70	4.30	6,045.71	6,045.71	6,046.03	6,046.03	0.000
DPA27-1	6,071.67	6,065.94	3.60	6,067.15	6,066.87	6,067.37	6,067.16	1.000
DPA27-2	6,072.10	6,066.41	3.60	6,067.35	6,067.35	6,067.63	6,067.63	0.000
DPA28-1	6,072.82	6,066.60	3.00	6,067.48	6,067.48	6,067.73	6,067.73	0.000
DPA28-2	6,073.26	6,067.23	2.00	6,067.98	6,067.98	6,068.18	6,068.18	0.000
DPA29-1	6,083.15	6,077.46	1.70	6,078.17	6,078.17	6,078.35	6,078.35	0.000
DPA29-2	6,083.15	6,077.02	4.70	6,078.07	6,078.07	6,078.41	6,078.41	0.000
DPA30-1	6,087.88	6,082.01	7.20	6,083.05	6,083.05	6,083.52	6,083.52	0.000
DPA31-1	6,028.44	6,022.67	2.30	6,023.45	6,023.45	6,023.66	6,023.66	0.000
DPA31-2	6,029.75	6,022.20	3.50	6,023.12	6,023.12	6,023.40	6,023.40	0.000
DPA32-1	6,037.13	6,028.17	12.00	6,029.42	6,029.42	6,029.95	6,029.95	0.000
DPA33-1	6,042.87	6,033.17	24.90	6,034.64	6,034.64	6,035.58	6,035.19	0.000
DPA33-10	6,067.16	6,058.08	7.50	6,059.61	6,059.27	6,060.43	6,059.58	1.086
DPA33-11	6,070.02	6,063.60	1.30	6,063.24	6,063.23	6,064.03	6,063.38	0.058
DPA33-12	6,073.55	6,067.42	1.30	6,067.56	6,067.55	6,068.35	6,067.70	0.059
DPA33-13	6,076.62	6,070.72	1.30	6,071.37	6,071.36	6,072.13	6,071.51	0.057
DPA33-14	6,081.20	6,075.29	1.30	6,076.10	6,075.92	6,076.75	6,076.08	1.148
DPA33-15	6,090.15	6,084.05	1.00	6,084.81	6,084.63	6,084.88	6,084.76	1.403
DPA33-16	6,091.94	6,085.94	0.70	6,086.52	6,086.46	6,086.90	6,086.57	0.514
DPA33-17	6,098.75	6,089.93	0.70	6,090.46	6,090.46	6,090.57	6,090.57	0.000
DPA33-2	6,043.07	6,032.93	24.90	6,036.05	6,034.82	6,036.16	6,035.37	2.255
DPA33-3	6,043.86	6,034.03	21.60	6,035.85	6,035.82	6,037.39	6,036.32	0.059
DPA33-4	6,045.51	6,035.36	21.60	6,037.98	6,037.15	6,038.19	6,037.65	1.656
DPA33-5	6,054.21	6,042.85	16.90	6,045.04	6,044.47	6,046.60	6,044.94	1.235
DPA33-6	6,056.64	6,046.76	12.40	6,048.58	6,048.20	6,049.98	6,048.58	1.000
DPA33-7	6,057.52	6,048.66	12.40	6,050.53	6,050.11	6,050.75	6,050.49	1.094
DPA33-8	6,060.52	6,052.15	7.50	6,053.36	6,053.35	6,054.80	6,053.66	0.053
DPA33-9	6,063.48	6,054.95	7.50	6,056.16	6,056.14	6,057.62	6,056.45	0.059
DPA34-1	6,043.33	6,035.91	4.40	6,036.92	6,036.92	6,037.25	6,037.25	0.000
DPA35-1	6,045.52	6,038.00	5.70	6,039.07	6,039.05	6,039.93	6,039.37	0.067
DPA35-2	6,048.79	6,038.85	5.70	6,039.69	6,039.69	6,041.06	6,040.01	0.000
DPA35-3	6,052.11	6,041.88	5.70	6,043.19	6,043.17	6,044.54	6,043.49	0.051
DPA35-4	6,052.13	6,045.97	5.00	6,046.78	6,046.76	6,048.07	6,047.11	0.055
DPA35-5	6,055.64	6,049.27	4.30	6,050.30	6,050.29	6,050.49	6,050.60	0.054
DPA35-6	6,060.65	6,054.30	2.40	6,055.09	6,055.08	6,056.02	6,055.29	0.063
DPA35-7	6,065.87	6,059.70	2.40	6,060.51	6,060.51	6,060.73	6,060.73	0.000
DPA36-1	6,054.47	6,047.18	4.60	6,048.21	6,048.21	6,048.55	6,048.55	0.000
DPA36-2	6,054.47	6,047.62	1.40	6,048.27	6,048.27	6,048.43	6,048.43	0.000
DPA37-1	6,057.90	6,051.02	3.30	6,051.93	6,051.93	6,052.19	6,052.19	0.000
DPA37-2	6,056.44	6,051.45	3.70	6,052.41	6,052.41	6,052.70	6,052.70	0.000
DPA38-1	6,067.59	6,059.09	6.50	6,060.24	6,060.22	6,061.12	6,060.53	0.063
DPA38-2	6,068.21	6,060.44	6.50	6,061.98	6,061.57	6,062.04	6,061.88	1.298
DPA38-3	6,079.98	6,071.84	2.20	6,072.62	6,072.61	6,073.63	6,072.79	0.063
DPA38-4	6,089.37	6,081.09	2.20	6,081.86	6,081.85	6,082.87	6,082.03	0.065
DPA38-5	6,091.82	6,083.47	2.20	6,084.42	6,084.24	6,085.41	6,084.42	1.000
DPA38-6	6,088.00	6,088.00	2.20	6,088.00	6,088.00	6,088.18	6,088.18	0.000
DPA39-1	6,068.65	6,061.71	3.10	6,062.60	6,062.60	6,062.85	6,062.85	0.000
DPA39-2	6,066.59	6,061.83	2.10	6,062.60	6,062.60	6,062.80	6,062.80	0.000
DPA40-1	6,087.24	6,077.26	0.60	6,077.81	6,077.76	6,078.12	6,077.86	0.496
DPA40-2	6,085.97	6,078.57	0.60	6,079.07	6,079.06	6,079.38	6,079.16	0.073
DPA40-3	6,087.44	6,081.88	0.60	6,082.39	6,082.39	6,082.49	6,082.49	0.000
DPA41-1	6,094.95	6,085.48	0.30	6,085.90	6,085.90	6,085.97	6,085.97	0.000
DPA42-1	6,045.67	6,038.61	4.00	6,039.58	6,039.58	6,039.88	6,039.88	0.000
DPA42-2	6,045.72	6,038.97	3.40	6,039.87	6,039.87	6,040.14	6,040.14	0.000
DPA43-1	6,071.01	6,065.28	1.50	6,065.94	6,065.94	6,066.11	6,066.11	0.000
DPA43-2	6,071.01	6,063.60	5.80	6,065.15	6,065.15	6,065.37	6,065.23	0.050
DPA43-3	6,073.59	6,064.68	4.10	6,065.38	6,065.38	6,065.64	6,065.64	0.000
DPA44-1	6,072.25	6,066.53	0.90	6,067.09	6,067.09	6,067.22	6,067.22	0.000
DPR1-0	5,987.86	5,974.44	26.70	5,975.87	5,975.87	5,976.39	5,976.39	0.001
DPR1-1	5,988.89	5,967.64	26.70	5,969.73	5,969.63	5,971.38	5,970.15	0.200
DPR1-2	5,989.17	5,973.48	26.70	5,975.99	5,975.47	5,976.28	5,975.99	1.000
DPR2-0	6,047.56	6,037.95	25.00	6,039.57	6,039.57	6,040.63	6,040.21	0.001
DPR2-1	6,048.64	6,038.12	25.00	6,040.10	6,040.07	6,040.81	6,040.71	0.050
DPR2-10	6,070.48	6,061.47	7.70	6,062.70	6,062.68	6,063.34	6,063.02	0.058
DPR2-11	6,074.91	6,062.93	7.70	6,064.16	6,064.14	6,064.80	6,064.48	0.061
DPR2-12	6,077.41	6,063.83	7.70	6,065.99	6,065.04	6,066.02	6,065.38	2.790

	6,047.26	6,038.98	25.00	6,041.01	6,040.93	6,041.72	6,041.57	0.129
DPR2-3	6,046.63	6,039.60	25.00	6,042.68	6,041.55	6,042.90	6,042.20	1.742
DPR2-4	6,047.13	6,040.15	20.20	6,042.92	6,042.70	6,043.11	6,042.90	1.085
DPR2-5	6,048.61	6,040.72	19.60	6,042.94	6,042.93	6,043.30	6,043.20	0.057
DPR2-6	6,052.84	6,042.15	19.60	6,044.69	6,043.90	6,047.18	6,044.45	1.433
DPR2-7	6,057.98	6,048.11	18.50	6,050.44	6,049.83	6,050.54	6,050.36	1.161
DPR2-8	6,062.85	6,053.51	7.70	6,054.74	6,054.72	6,056.30	6,055.06	0.059
DPR2-9	6,066.60	6,057.42	7.70	6,058.66	6,058.64	6,060.21	6,058.98	0.058
DPR3-1	6,046.82	6,041.86	5.00	6,042.72	6,042.72	6,043.07	6,043.07	0.000
DPR3-2	6,046.83	6,042.33	1.70	6,042.82	6,042.82	6,043.00	6,043.00	0.000
DPR4-1	6,048.90	6,042.84	1.10	6,043.23	6,043.23	6,043.37	6,043.37	0.000
DPR5-1	6,054.57	6,045.96	1.40	6,046.40	6,046.40	6,046.56	6,046.56	0.000
DPR6-1	6,055.97	6,049.69	12.10	6,050.86	6,050.86	6,051.31	6,051.31	0.000
DPR7-1	6,077.07	6,065.50	5.20	6,066.25	6,066.25	6,066.52	6,066.52	0.000
DPR7-2	6,077.42	6,066.16	2.90	6,066.81	6,066.81	6,067.05	6,067.05	0.000
DPR8-1	6,018.73	6,006.36	0.90	6,007.05	6,006.99	6,007.77	6,007.08	0.640
DPR8-2	6,031.63	6,019.54	0.90	6,020.11	6,020.11	6,020.24	6,020.24	0.000

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Scenario: 5yr
Current Time Step: 0.000 h
Conduit FlexTable: Combined Pipe/Node Report

Label	Upstream Structure	Flow (cfs)	Capacity (Full Flow) (cfs)	Diameter (in)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Manning's n	Velocity (ft/s)	Upstream Structure Headloss Coefficient	Material
Pipe - (357) (1)	DPA1-1B	96.00	615.50	-	19.6	0.010	5,962.55	5,962.35	5,964.20	5,963.70	5,965.02	5,964.92	0.013	10.62	1.106	Concrete
Pipe - (578) (1) (1)	DPA1-1C	74.70	605.42	-	22.3	0.010	5,966.02	5,965.80	5,967.41	5,966.93	5,968.11	5,968.00	0.013	9.63	0.050	Concrete
Pipe - (578)	DPA1-1E	74.70	609.25	-	30.0	0.010	5,976.54	5,976.24	5,977.93	5,977.34	5,978.63	5,978.46	0.013	9.67	0.050	Concrete
Pipe - (578) (1)	DPA1-1D	74.70	609.25	-	22.0	0.010	5,971.24	5,971.02	5,972.63	5,972.14	5,973.33	5,973.22	0.013	9.67	0.050	Concrete
Pipe - (353)	DPR1-0	26.70	260.42	60.0	20.0	0.010	5,974.44	5,974.24	5,975.87	5,975.99	5,976.39	5,976.29	0.013	8.55	0.001	Concrete
Pipe - (576)	DPR1-1	26.70	344.32	60.0	137.3	0.017	5,968.20	5,965.80	5,969.63	5,966.75	5,970.15	5,968.41	0.013	10.41	0.200	Concrete
Pipe - (575)	DPR1-2	26.70	344.49	60.0	131.1	0.017	5,974.04	5,971.75	5,975.47	5,972.70	5,975.99	5,974.34	0.013	10.41	1.000	Concrete
Pipe - (264)	DPA1-3	65.80	182.32	60.0	38.8	0.005	5,982.48	5,982.29	5,986.54	5,986.53	5,986.77	5,986.75	0.013	8.53	0.050	Concrete
Pipe - (262)	DPA2-1	5.00	22.62	24.0	35.0	0.010	5,986.21	5,985.86	5,987.00	5,987.02	5,987.29	5,987.13	0.013	5.78	0.050	Concrete
Pipe - (262) (1)	DPA1-4	64.90	183.28	60.0	36.3	0.005	5,982.86	5,982.68	5,986.55	5,986.55	5,986.82	5,986.80	0.013	8.53	1.722	Concrete
Pipe - (264) (1)	DPA1-2	65.80	183.01	60.0	58.7	0.005	5,982.09	5,981.80	5,986.52	5,986.50	5,986.72	5,986.68	0.013	8.56	0.074	Concrete
Pipe - (218)	DPA1-5	62.60	260.53	60.0	190.8	0.010	5,984.97	5,983.06	5,987.20	5,987.02	5,988.05	5,987.24	0.013	10.91	0.058	Concrete
Pipe - (217) (1)	DPA1-6	62.60	344.91	60.0	101.5	0.018	5,987.20	5,985.42	5,989.43	5,986.96	5,990.28	5,989.26	0.013	13.34	0.050	Concrete
Pipe - (560) (1) (1)	DPA15-2	133.40	299.45	72.0	191.2	0.005	5,982.72	5,981.76	5,986.44	5,986.50	5,987.25	5,986.98	0.013	10.29	0.066	Concrete
Pipe - (215) (1)	DPA1-9	60.90	184.13	60.0	56.0	0.005	5,995.12	5,994.84	5,997.84	5,997.87	5,998.32	5,998.24	0.013	8.42	0.000	Concrete
Pipe - (225) (1)	DPA5-1	15.70	60.90	30.0	43.5	0.022	5,999.34	5,998.38	6,000.68	5,999.31	6,001.21	6,000.68	0.013	10.40	0.000	Concrete
Pipe - (217)	DPA1-7	62.60	343.94	60.0	101.5	0.017	5,991.47	5,989.70	5,993.70	5,991.24	5,994.55	5,993.54	0.013	13.32	1.240	Concrete
Pipe - (551)	DPA3-1	2.80	14.80	18.0	41.3	0.020	5,997.27	5,996.45	5,997.91	5,996.90	5,998.15	5,997.53	0.013	6.44	0.000	Concrete
Pipe - (215)	DPA1-10	60.90	184.35	60.0	45.9	0.005	5,995.35	5,995.12	5,997.75	5,997.84	5,998.42	5,998.32	0.013	8.42	1.915	Concrete
Pipe - (209)	DPA1-11	53.80	258.53	60.0	33.5	0.010	5,995.88	5,995.55	5,998.98	5,999.02	5,999.26	5,999.23	0.013	10.40	2.001	Concrete
Pipe - (226)	DPA4-1	6.20	14.74	18.0	11.2	0.020	5,999.27	5,999.05	6,000.23	5,999.82	6,000.65	6,000.53	0.013	7.98	0.000	Concrete
Pipe - (227)	DPA4-2	3.60	14.82	18.0	41.2	0.020	5,999.87	5,999.05	6,000.59	5,999.56	6,000.88	6,000.27	0.013	6.92	0.000	Concrete
Pipe - (560) (1)	DPA15-3	133.40	423.47	72.0	48.9	0.010	5,986.90	5,986.41	5,990.03	5,989.02	5,991.27	5,991.01	0.013	13.27	0.050	Concrete
Pipe - (574)	DPA22-1	82.20	290.91	66.0	130.6	0.008	5,996.36	5,995.38	5,998.85	5,997.43	5,999.81	5,999.04	0.013	10.53	0.364	Concrete
Pipe - (216)	DPA1-8	60.90	368.33	60.0	94.5	0.020	5,994.84	5,992.95	5,997.04	5,994.43	5,997.87	5,996.86	0.013	13.87	1.000	Concrete
Pipe - (538)	DPA7-1	11.30	22.66	24.0	81.7	0.010	6,005.53	6,004.71	6,006.74	6,005.71	6,007.24	6,006.52	0.013	7.21	0.000	Concrete
Pipe - (214)	DPA1-12	40.10	203.11	48.0	169.5	0.020	6,000.27	5,996.88	6,002.16	5,999.53	6,002.89	5,999.85	0.013	12.57	0.074	Concrete
Pipe - (566)	DPA22-2	82.20	389.12	66.0	61.1	0.013	5,997.39	5,996.57	5,999.88	5,999.20	6,000.84	6,000.03	0.013	12.99	1.226	Concrete
Pipe - (567)	DPA23-1	2.20	14.85	18.0	15.7	0.020	6,003.72	6,003.40	6,004.28	6,003.82	6,004.48	6,004.29	0.013	6.02	0.000	Concrete
Pipe - (422) (1)	DPA7-2	14.50	42.30	24.0	57.8	0.035	6,006.73	6,004.71	6,008.10	6,005.57	6,008.72	6,007.55	0.013	12.20	0.001	Concrete
Pipe - (560)	DPA15-4	133.40	423.47	72.0	48.9	0.010	5,991.39	5,990.90	5,994.52	5,993.51	5,995.76	5,995.50	0.013	13.27	1.278	Concrete
Pipe - (225)	DPA5-2	15.70	60.81	30.0	190.6	0.022	6,003.53	5,999.34	6,004.87	6,000.21	6,005.40	6,001.88	0.013	10.39	0.057	Concrete
Pipe - (530)	DPA5-3	11.20	27.90	24.0	37.5	0.015	6,004.60	6,004.03	6,005.80	6,004.96	6,006.30	6,005.92	0.013	8.39	0.550	Concrete
Pipe - (122) (1) (1)	DPA15-9	46.00	278.06	54.0	46.0	0.020	6,007.02	6,006.10	6,008.98	6,007.51	6,009.72	6,009.32	0.013	12.93	0.000	Concrete
Pipe - (418) (1)	DPA5-4	8.70	12.85	18.0	28.1	0.015	6,005.52	6,005.10	6,006.66	6,006.04	6,007.23	6,006.90	0.013	7.81	0.496	Concrete
Pipe - (205) (1)	DPA1-13	40.10	226.96	48.0	77.7	0.025	6,002.71	6,000.77	6,004.60	6,002.00	6,005.33	6,004.32	0.013	13.61	1.497	Concrete
Pipe - (565)	DPA22-3	80.90	375.41	66.0	96.0	0.012	6,000.60	5,999.40	6,003.08	6,001.26	6,004.02	6,003.31	0.013	12.60	0.061	Concrete
Pipe - (337)	DPA16-1	7.60	22.65	24.0	192.5	0.010	6,007.05	6,005.12	6,008.03	6,006.16	6,008.41	6,006.49	0.013	6.50	0.000	Concrete
Pipe - (417)	DPA5-5	8.70	20.33	18.0	81.4	0.037	6,008.83	6,005.78	6,009.98	6,006.94	6,010.54	6,007.49	0.013	11.05	0.065	Concrete
Pipe - (559)	DPA15-5	52.30	139.34	54.0	179.2	0.005	5,997.28	5,996.38	5,999.37	5,998.29	6,000.18	5,999.32	0.013	8.13	0.102	Concrete
Pipe - (205)	DPA1-14	23.20	129.09	36.0	63.0	0.037	6,006.07	6,003.71	6,007.62	6,005.70	6,008.24	6,006.03	0.013	13.83	1.224	Concrete
Pipe - (533)	DPA10-1	4.10	14.85	18.0	11.0	0.020	6,009.15	6,008.93	6,009.93	6,009.54	6,010.23	6,010.12	0.013	7.18	0.070	Concrete
Pipe - (556)	DPA15-8	52.30	138.78	54.0	146.6	0.005	6,002.62	6,001.89	6,004.71	6,004.13	6,005.52	6,004.81	0.013	8.11	1.789	Concrete
Pipe - (547)	DPA10-2	2.60	14.85	18.0	19.0	0.020	6,009.73	6,009.35	6,010.34	6,009.80	6,010.57	6,010.34	0.013	6.32	0.000	Concrete
Pipe - (425) (1)	DPA8-1	12.20	32.01	24.0	72.4	0.020	6,015.58	6,014.13	6,016.84	6,015.94	6,017.37	6,016.20	0.013	9.50	0.000	Concrete
Pipe - (122) (1)	DPA15-10	46.00	278.06	54.0	16.0	0.020	6,007.34	6,007.02	6,009.30	6,008.59	6,010.04	6,009.94	0.013	12.93	1.451	Concrete
Pipe - (557)	DPA15-7	52.30	138.88	54.0	431.0	0.005	6,001.79	5,999.64	6,003.88	6,001.55	6,004.69	6,002.58	0.013	8.11	0.304	Concrete
Pipe - (369)	DPA17-1	2.50	14.85	18.0	9.0	0.020	6,011.03	6,010.85	6,011.63	6,011.32	6,011.85	6,011.76	0.013	6.25	0.000	Concrete
Pipe - (370)	DPA17-2	9.60	14.85	18.0	31.0	0.020	6,011.47	6,010.85	6,012.67	6,011.78	6,013.30	6,012.86	0.013	8.94	0.000	Concrete
Pipe - (416)	DPA5-6	8.70	20.33	18.0	83.9	0.037	6,012.18	6,009.03	6,013.32	6,009.72	6,013.88	6,011.60	0.013	11.05	0.280	Concrete
Pipe - (564)	DPA22-4	80.90	375.41	66.0	173.2	0.012	6,005.32	6,003.15	6,007.79	6,004.94	6,008.74	6,007.22	0.013	12.60	0.071	Concrete
Pipe - (203)	DPA1-15	20.20	133.21	36.0	76.0	0.040	6,010.26	6,007.23	6,011.70	6,008.06	6,012.26	6,010.58	0.013	13.60	0.077	Concrete
Pipe - (580)	DPR8-1	0.90	66.69	36.0	10.0	0.010	6,006.69	6,006.59	6,006.99	6,006.84	6,007.08	6,007.00	0.013	3.32	0.640	Concrete
Pipe - (422)	DPA7-3	14.50	42.32	24.0	205.7	0.035	6,013.93	6,006.73	6,015.30	6,007.54	6,015.92	6,009.85	0.013	12.21	1.029	Concrete
Pipe - (421)	DPA7-4	1.70	14.74	18.0	12.2	0.020	6,014.67	6,014.43	6,015.94	6,015.94	6,015.96	6,015.95	0.013	5.56	0.000	Concrete
Pipe - (122)	DPA15-11	36.10	248.86	48.0	64.3	0.030	6,010.27	6,008.34	6,012.06	6,010.38	6,012.74	6,010.87	0.013	14.11	0.057	Concrete
Pipe - (415)	DPA5-7	8.70	19.64	18.0	65.7	0.035	6,014.67	6,012.37	6,015.81	6,013.09	6,016.38	6,014.79	0.013	10.78	0.262	Concrete
Pipe - (125) (1) (1)	DPA18-1	10.90	45.22	24.0	56.6	0.040	6,018.56	6,016.30	6,019.74	6,017.00	6,020.24	6,018.92	0.013	11.84	0.000	Concrete

Pipe - (121)	DPA15-12	36.10	249.37	48.0	45.5	0.030	6,012.20	6,010.83	6,013.99	6,012.01	6,014.67	6,014.13	0.013	14.13	0.062	Concrete
Pipe - (425)	DPA8-2	12.20	31.85	24.0	40.4	0.020	6,016.38	6,015.58	6,017.64	6,016.49	6,018.17	6,017.67	0.013	9.46	0.065	Concrete
Pipe - (563)	DPA22-5	80.90	375.41	66.0	174.5	0.012	6,010.79	6,008.61	6,013.27	6,010.39	6,014.21	6,012.68	0.013	12.60	0.074	Concrete
Pipe - (414)	DPA5-8	8.70	19.64	18.0	67.3	0.035	6,017.23	6,014.87	6,018.37	6,015.58	6,018.93	6,017.30	0.013	10.78	1.112	Concrete
Pipe - (558)	DPA15-6	52.30	138.88	54.0	431.0	0.005	5,999.53	5,997.38	6,001.62	5,999.29	6,002.43	6,000.32	0.013	8.11	0.050	Concrete
Pipe - (419)	DPA6-1	3.90	14.85	18.0	35.9	0.020	6,018.70	6,017.98	6,019.45	6,019.00	6,019.75	6,019.14	0.013	7.08	0.000	Concrete
Pipe - (120)	DPA15-13	36.10	248.52	48.0	49.1	0.030	6,014.17	6,012.70	6,015.96	6,013.87	6,016.64	6,016.03	0.013	14.09	1.526	Concrete
Pipe - (420)	DPA6-2	5.00	14.85	18.0	22.9	0.020	6,018.44	6,017.98	6,019.30	6,019.00	6,019.65	6,019.23	0.013	7.58	0.000	Concrete
Pipe - (119)	DPA15-14	29.60	124.64	36.0	44.7	0.035	6,016.86	6,015.30	6,018.62	6,016.44	6,019.35	6,018.70	0.013	14.45	0.066	Concrete
Pipe - (173) (2)	DPA24-1	39.00	110.72	36.0	55.5	0.028	6,021.07	6,019.54	6,023.10	6,020.92	6,024.01	6,023.27	0.013	14.30	0.000	Concrete
Pipe - (562)	DPA22-6	80.90	375.41	66.0	206.6	0.012	6,015.37	6,012.79	6,017.85	6,014.55	6,018.79	6,016.91	0.013	12.60	0.069	Concrete
Pipe - (201) (3)	DPA1-16	20.20	133.35	36.0	192.6	0.040	6,018.96	6,011.26	6,020.40	6,012.05	6,020.96	6,014.93	0.013	13.61	0.052	Concrete
Pipe - (176)	DPA31-1	2.30	14.85	18.0	46.7	0.020	6,022.88	6,021.95	6,023.45	6,022.34	6,023.67	6,022.92	0.013	6.10	0.000	Concrete
Pipe - (424)	DPA8-3	12.20	45.22	24.0	136.4	0.040	6,022.03	6,016.58	6,023.29	6,017.29	6,023.82	6,019.61	0.013	12.22	1.174	Concrete
Pipe - (423)	DPA9-1	4.60	14.65	18.0	6.2	0.019	6,022.65	6,022.53	6,023.91	6,023.92	6,024.04	6,024.03	0.013	7.34	0.000	Concrete
Pipe - (156)	DPA22-8	49.40	227.96	60.0	116.2	0.008	6,018.43	6,017.54	6,020.40	6,019.70	6,021.13	6,020.27	0.013	9.27	1.383	Concrete
Pipe - (117)	DPA15-15	29.60	124.77	36.0	70.9	0.035	6,020.34	6,017.86	6,022.10	6,018.94	6,022.83	6,021.56	0.013	14.46	0.065	Concrete
Pipe - (529)	DPA9-2	2.60	14.84	18.0	35.6	0.020	6,023.24	6,022.53	6,023.85	6,023.92	6,024.08	6,023.95	0.013	6.32	0.000	Concrete
Pipe - (175)	DPA31-2	3.50	14.85	18.0	23.0	0.020	6,022.40	6,021.95	6,023.12	6,022.47	6,023.40	6,023.10	0.013	6.88	0.000	Concrete
Pipe - (174)	DPA32-1	12.00	31.99	24.0	43.4	0.020	6,028.17	6,027.30	6,029.42	6,028.20	6,029.95	6,029.40	0.013	9.46	0.000	Concrete
Pipe - (561)	DPA22-7	80.90	260.10	66.0	-	0.006	6,017.05	6,016.37	6,019.53	6,018.51	6,020.47	6,019.90	0.013	9.66	0.182	Concrete
Pipe - (579)	DPR8-2	0.90	25.71	18.0	193.1	0.060	6,019.76	6,008.19	6,020.11	6,008.38	6,020.24	6,009.11	0.013	6.82	0.000	Concrete
Pipe - (154)	DPA22-9	46.40	263.94	54.0	172.1	0.018	6,022.03	6,018.93	6,024.00	6,021.42	6,024.75	6,021.83	0.013	12.49	0.067	Concrete
Pipe - (201)	DPA1-17	20.20	133.39	36.0	99.0	0.040	6,023.92	6,019.96	6,025.36	6,020.77	6,025.92	6,023.48	0.013	13.61	1.189	Concrete
Pipe - (552)	DPA11-1	2.00	14.85	18.0	32.3	0.020	6,026.70	6,026.05	6,027.23	6,026.43	6,027.43	6,026.95	0.013	5.86	0.000	Concrete
Pipe - (173)	DPA24-2	39.00	110.32	36.0	22.3	0.027	6,021.68	6,021.07	6,023.71	6,022.60	6,024.62	6,024.40	0.013	14.26	1.208	Concrete
Pipe - (374)	DPA25-1	3.40	14.85	18.0	40.7	0.020	6,028.39	6,027.58	6,029.09	6,028.07	6,029.36	6,028.77	0.013	6.82	0.000	Concrete
Pipe - (174) (1)	DPA25-2	4.60	14.85	18.0	18.8	0.020	6,027.95	6,027.58	6,028.77	6,028.20	6,029.11	6,028.89	0.013	7.41	0.000	Concrete
Pipe - (152) (1)	DPA22-10	46.40	264.08	54.0	88.2	0.018	6,024.42	6,022.83	6,026.39	6,024.19	6,027.14	6,026.22	0.013	12.50	1.159	Concrete
Pipe - (411) (1)	DPA18-7	2.60	14.85	18.0	34.5	0.020	6,035.15	6,034.46	6,035.76	6,035.09	6,035.99	6,035.30	0.013	6.32	0.000	Concrete
Pipe - (169) (1) (2)	DPA26-1	11.00	43.79	24.0	42.9	0.037	6,035.83	6,034.22	6,037.02	6,035.64	6,037.51	6,035.97	0.013	11.60	0.000	Concrete
Pipe - (152)	DPA22-11	40.00	277.84	54.0	88.2	0.020	6,026.55	6,024.79	6,028.37	6,027.26	6,029.05	6,027.57	0.013	12.42	0.057	Concrete
Pipe - (185) (1)	DPA33-1	24.90	203.63	48.0	54.2	0.020	6,033.17	6,032.08	6,034.64	6,034.23	6,035.19	6,034.43	0.013	10.99	0.000	Concrete
Pipe - (125) (1)	DPA18-2	10.90	45.20	24.0	146.0	0.040	6,024.39	6,018.56	6,025.57	6,019.23	6,026.07	6,021.41	0.013	11.84	0.120	Concrete
Pipe - (170)	DPA24-3	33.00	115.51	36.0	172.7	0.030	6,028.86	6,023.68	6,030.72	6,024.78	6,031.52	6,027.85	0.013	14.09	0.000	Concrete
Pipe - (125) (2)	DPA18-3	10.90	47.95	24.0	41.2	0.045	6,029.03	6,027.18	6,030.21	6,027.88	6,030.71	6,029.78	0.013	12.35	0.093	Concrete
Pipe - (123)	DPA18-4	8.60	31.99	24.0	40.3	0.020	6,030.35	6,029.55	6,031.40	6,030.29	6,031.81	6,031.30	0.013	8.64	0.748	Concrete
Pipe - (413)	DPA18-5	2.60	14.85	18.0	50.5	0.020	6,032.06	6,031.05	6,032.67	6,031.71	6,032.90	6,031.90	0.013	6.32	0.748	Concrete
Pipe - (426) (1) (1) (1)	DPA12-1	7.10	20.33	18.0	60.0	0.037	6,037.46	6,035.21	6,038.49	6,036.66	6,038.96	6,036.92	0.013	10.48	0.000	Concrete
Pipe - (539)	DPR2-0	25.00	66.69	36.0	53.5	0.010	6,037.95	6,037.42	6,039.57	6,038.74	6,040.21	6,039.82	0.013	8.76	0.001	Concrete
Pipe - (430) (2)	DPA35-2	5.70	42.30	24.0	12.6	0.035	6,038.85	6,038.41	6,039.69	6,039.00	6,040.01	6,039.85	0.013	9.39	0.000	Concrete
Pipe - (116)	DPA15-16	29.60	124.71	36.0	271.2	0.035	6,031.32	6,021.84	6,033.08	6,022.83	6,033.81	6,026.08	0.013	14.45	0.063	Concrete
Pipe - (412)	DPA18-6	2.60	14.85	18.0	99.6	0.020	6,034.25	6,032.26	6,034.86	6,032.68	6,035.09	6,033.31	0.013	6.32	1.000	Concrete
Pipe - (573) (1)	DPA24-4	33.00	115.37	36.0	75.2	0.030	6,032.82	6,030.57	6,034.68	6,031.75	6,035.48	6,034.27	0.013	14.08	1.202	Concrete
Pipe - (198)	DPA1-20	13.30	47.09	36.0	220.7	0.005	6,034.80	6,033.70	6,036.70	6,036.66	6,036.82	6,036.72	0.013	5.73	2.813	Concrete
Pipe - (196)	DPA14-3	2.80	14.85	18.0	40.1	0.020	6,037.11	6,036.31	6,037.75	6,037.05	6,037.99	6,037.21	0.013	6.45	0.000	Concrete
Pipe - (197)	DPA14-2	5.20	14.85	18.0	9.7	0.020	6,036.51	6,036.31	6,037.38	6,037.01	6,037.75	6,037.65	0.013	7.66	0.078	Concrete
Pipe - (568)	DPA14-1	1.90	14.85	18.0	19.5	0.020	6,037.09	6,036.70	6,037.61	6,037.41	6,037.80	6,037.49	0.013	5.77	0.000	Concrete
Pipe - (199) (1)	DPA1-18	19.00	127.36	36.0	235.0	0.036	6,032.69	6,024.12	6,034.09	6,026.03	6,034.63	6,026.28	0.013	12.94	0.050	Concrete
Pipe - (149)	DPA22-12	40.00	271.24	54.0	111.4	0.019	6,031.58	6,029.46	6,033.40	6,030.67	6,034.08	6,032.75	0.013	12.21	1.207	Concrete
Pipe - (185)	DPA33-2	24.90	201.72	48.0	9.1	0.020	6,033.35	6,033.17	6,034.82	6,034.38	6,035.37	6,035.31	0.013	10.91	2.255	Concrete
Pipe - (526)	DPA34-1	4.40	18.03	18.0	9.2	0.029	6,036.12	6,035.85	6,036.92	6,036.45	6,037.25	6,037.14	0.013	8.42	0.000	Concrete
Pipe - (411)	DPA18-8	2.60	14.85	18.0	96.7	0.020	6,037.08	6,035.15	6,037.69	6,035.57	6,037.92	6,036.19	0.013	6.32	1.000	Concrete
Pipe - (410)	DPA18-9	2.60	14.85	18.0	24.3	0.020	6,037.77	6,037.28	6,038.38	6,037.92	6,038.61	6,038.13	0.013	6.32	0.000	Concrete
Pipe - (184) (1)	DPA33-3	21.60	226.96	48.0	36.0	0.025	6,034.45	6,033.55	6,035.82	6,036.05	6,036.32	6,036.16	0.013	11.38	0.059	Concrete
Pipe - (549)	DPA1-22	7.10	31.99	24.0	52.0	0.020	6,039.14	6,038.10	6,040.09	6,039.21	6,040.45	6,039.46	0.013	8.19	0.000	Concrete
Pipe - (114)	DPA15-17	29.60	124.70	36.0	116.4	0.035	6,036.12	6,032.05	6,037.88	6,033.07	6,038.61	6,036.08	0.013	14.45	1.172	Concrete
Pipe - (198) (1)	DPA1-19	19.00	47.33	36.0	160.8	0.005	6,033.70	6,032.89	6,035.10	6,034.21	6,035.64	6,034.83	0.013	6.33	2.908	Concrete
Pipe - (448)	DPR4-1	1.10	14.85	18.0	32.5	0.020	6,042.84	6,042.19	6,043.23	6,042.92	6,043.37	6,042.95	0.013	4.92	0.000	Concrete
Pipe - (544)	DPA19-1	4.30	14.90	18.0	29.8	0.020	6,038.42	6,037.82	6,039.22	6,038.74	6,039.53	6,038.96	0.013	7.29	0.000	Concrete
Pipe - (184)	DPA33-4	21.60	226.96	48.0	45.3	0.025	6,035.78	6,034.65	6,037.15	6,035.57	6,037.65	6,037.11	0.013	11.38	1.656	Concrete
Pipe - (430) (1)	DPA35-1	5.70	42.38	24.0	12.3	0.035	6,038.21	6,037.78	6,039.05	6,038.37	6,039.37	6,039.22	0.013	9.40	0.067	Concrete
Pipe - (148)	DPA22-13	17.80	124.75	36.0	69.2	0.035	6,035.50	6,033.08	6,036.85	6,033.88	6,037.37	6,036.01	0.013	12.51	1.385	Concrete
Pipe - (527)	DPA42-1	4.00	14.77	18.0	15.7	0.020	6,038.81	6,038.50	6,039.58	6,039.08	6,039.88	6,039.70	0.013	7.10	0.000	Concrete
Pipe - (528)	DPA42-2	3.40	14.81	18.0	33.7	0.020	6,039.17	6,038.50	6,039.87	6,039.00	6,040.14	6,039.67	0.013	6.81	0.000	Concrete
Pipe - (553)	DPA1-21	7.10	22.60	24.0	210.3	0.010	6,037.90	6,035.80	6,038.85	6,037.05	6,039.21	6,037.23	0.013	6.37	1.000	Concrete
Pipe - (113)	DPA15-18	26.60	94.36	36.0	95.9	0.020	6,038.24	6,036.32	6,039.91	6,038.74	6,040.58	6,039.03	0.013	11.47	0.063	Concrete
Pipe - (243)	DPR2-3	25.00	47.18	36.0	84.8	0.005	6,039.94	6,039.51	6,041.55	6,041.06	6,042.20	6,041.78	0.013	6.77	1.742	Concrete
Pipe - (246)	DPR3-1	5.00	15.93	18.0	9.7	0.023	6,041.86	6,041.63	6,042.72	6,042.68	6,043.07	6,042.90	0.013	7.98	0.000	Concrete
Pipe - (247)																

	DPR3-2	1.70	14.85	18.0	35.1	0.020	6,042.33	6,041.63	6,042.82	6,042.68	6,043.00	6,042.70	0.013	5.59	0.000	Concrete
Pipe - (241)	DPR2-4	20.20	47.23	36.0	70.8	0.005	6,040.49	6,040.13	6,042.70	6,042.68	6,042.90	6,042.83	0.013	6.42	1.085	Concrete
Pipe - (244) (1)	DPR2-2	25.00	47.19	36.0	131.9	0.005	6,039.31	6,038.65	6,040.93	6,040.20	6,041.57	6,040.92	0.013	6.77	0.129	Concrete
Pipe - (449)	DPR5-1	1.40	18.19	18.0	32.5	0.030	6,045.96	6,044.98	6,046.40	6,045.26	6,046.56	6,045.84	0.013	6.10	0.000	Concrete
Pipe - (573)	DPA24-5	25.40	124.74	36.0	172.2	0.035	6,039.24	6,033.22	6,040.87	6,035.64	6,041.52	6,035.91	0.013	13.85	0.050	Concrete
Pipe - (112)	DPA15-19	26.60	94.40	36.0	106.8	0.020	6,040.58	6,038.44	6,042.25	6,039.56	6,042.92	6,041.46	0.013	11.47	0.063	Concrete
Pipe - (240)	DPR2-5	19.60	47.17	36.0	71.3	0.005	6,041.05	6,040.69	6,042.93	6,042.92	6,043.20	6,043.11	0.013	6.37	0.057	Concrete
Pipe - (245)	DPR2-1	25.00	66.69	36.0	50.0	0.010	6,038.45	6,037.95	6,040.07	6,039.28	6,040.71	6,040.35	0.013	8.76	0.050	Concrete
Pipe - (430)	DPA35-3	5.70	42.28	24.0	99.6	0.035	6,042.33	6,038.85	6,043.17	6,039.35	6,043.49	6,040.72	0.013	9.39	0.051	Concrete
Pipe - (169)	DPA26-3	11.00	31.99	24.0	19.4	0.020	6,041.14	6,040.75	6,042.33	6,041.66	6,042.82	6,042.63	0.013	9.24	0.147	Concrete
Pipe - (516)	DPA26-4	7.50	31.99	24.0	38.9	0.020	6,042.22	6,041.44	6,043.19	6,042.13	6,043.57	6,043.07	0.013	8.32	1.000	Concrete
Pipe - (169) (3) (1)	DPA26-2	11.00	43.79	24.0	118.3	0.037	6,040.26	6,035.83	6,041.45	6,036.51	6,041.95	6,038.60	0.013	11.60	0.460	Concrete
Pipe - (426) (1) (1)	DPA12-2	7.10	20.33	18.0	168.1	0.037	6,043.76	6,037.46	6,044.79	6,038.07	6,045.26	6,039.78	0.013	10.48	1.301	Concrete
Pipe - (426)	DPA12-3	5.10	14.85	18.0	46.2	0.020	6,044.89	6,043.96	6,045.75	6,045.40	6,046.11	6,045.53	0.013	7.62	0.000	Concrete
Pipe - (111)	DPA15-20	26.60	94.23	36.0	99.2	0.020	6,042.76	6,040.78	6,044.43	6,041.91	6,045.10	6,043.78	0.013	11.46	0.059	Concrete
Pipe - (344) (1)	DPA21-1	2.00	10.50	18.0	56.5	0.010	6,048.65	6,048.08	6,049.18	6,048.90	6,049.38	6,048.96	0.013	4.58	0.000	Concrete
Pipe - (545)	DPA26-5	4.30	14.85	18.0	110.0	0.020	6,044.92	6,042.72	6,045.71	6,043.57	6,046.03	6,043.84	0.013	7.27	0.000	Concrete
Pipe - (110) (2) (1)	DPA15-21	26.60	94.21	36.0	57.1	0.020	6,044.10	6,042.96	6,045.77	6,044.14	6,046.44	6,045.80	0.013	11.46	0.057	Concrete
Pipe - (532)	DPA13-1	2.20	19.64	18.0	55.2	0.035	6,045.89	6,043.96	6,046.45	6,045.40	6,046.66	6,045.42	0.013	7.35	0.000	Concrete
Pipe - (429)	DPA35-4	5.00	19.73	18.0	87.0	0.035	6,045.90	6,042.83	6,046.76	6,043.34	6,047.11	6,044.69	0.013	9.32	0.055	Concrete
Pipe - (110)	DPA15-22	26.60	94.15	36.0	58.2	0.020	6,045.26	6,044.10	6,046.93	6,045.81	6,047.60	6,046.44	0.013	11.45	1.027	Concrete
Pipe - (542)	DPA20-2	1.70	15.12	18.0	9.2	0.021	6,047.15	6,046.96	6,047.64	6,047.62	6,047.82	6,047.70	0.013	5.66	0.000	Concrete
Pipe - (543)	DPA20-1	1.80	14.92	18.0	29.7	0.020	6,047.56	6,046.96	6,048.06	6,047.62	6,048.25	6,047.71	0.013	5.70	0.000	Concrete
Pipe - (239)	DPR2-6	19.60	66.69	36.0	123.1	0.010	6,042.48	6,041.25	6,043.90	6,042.94	6,044.45	6,043.30	0.013	8.20	1.433	Concrete
Pipe - (109) (1)	DPA15-23	24.50	94.46	36.0	55.3	0.020	6,046.57	6,045.46	6,048.17	6,047.62	6,048.80	6,047.94	0.013	11.22	1.150	Concrete
Pipe - (183)	DPA33-5	16.90	171.26	42.0	239.5	0.029	6,043.22	6,036.28	6,044.47	6,037.98	6,044.94	6,038.19	0.013	11.34	1.235	Concrete
Pipe - (147)	DPA22-14	14.10	124.75	36.0	223.0	0.035	6,044.80	6,037.00	6,046.00	6,037.68	6,046.44	6,039.81	0.013	11.70	0.065	Concrete
Pipe - (375)	DPA36-2	1.40	14.85	18.0	31.0	0.020	6,047.83	6,047.21	6,048.27	6,047.52	6,048.43	6,047.95	0.013	5.28	0.000	Concrete
Pipe - (376)	DPA36-1	4.60	14.85	18.0	9.0	0.020	6,047.39	6,047.21	6,048.21	6,047.87	6,048.55	6,048.46	0.013	7.41	0.000	Concrete
Pipe - (344)	DPA21-2	2.00	10.50	18.0	14.7	0.010	6,048.79	6,048.65	6,049.33	6,049.10	6,049.52	6,049.41	0.013	4.58	1.000	Concrete
Pipe - (541)	DPA21-3	1.60	10.50	18.0	24.3	0.010	6,049.24	6,048.99	6,049.71	6,049.52	6,049.88	6,049.65	0.013	4.29	0.000	Concrete
Pipe - (105)	DPA15-26	23.10	74.76	36.0	56.5	0.013	6,051.34	6,050.63	6,052.89	6,052.59	6,053.50	6,052.94	0.013	9.32	0.000	Concrete
Pipe - (428)	DPA35-5	4.30	20.33	18.0	88.6	0.037	6,049.49	6,046.17	6,050.29	6,046.64	6,050.60	6,047.94	0.013	9.13	0.054	Concrete
Pipe - (109)	DPA15-24	23.10	74.49	36.0	129.9	0.012	6,048.39	6,046.77	6,049.94	6,048.90	6,050.55	6,049.19	0.013	9.30	1.000	Concrete
Pipe - (236)	DPR6-1	12.10	29.00	30.0	148.6	0.005	6,049.69	6,048.95	6,050.86	6,050.44	6,051.31	6,050.68	0.013	5.64	0.000	Concrete
Pipe - (521)	DPA37-2	3.70	14.85	18.0	31.2	0.020	6,051.68	6,051.05	6,052.41	6,051.58	6,052.70	6,052.27	0.013	6.98	0.000	Concrete
Pipe - (572)	DPA24-6	25.40	124.74	36.0	257.2	0.035	6,048.44	6,039.44	6,050.07	6,040.36	6,050.72	6,043.34	0.013	13.85	0.057	Concrete
Pipe - (182)	DPA33-6	12.40	174.22	42.0	64.0	0.030	6,047.13	6,045.21	6,048.20	6,045.86	6,048.58	6,047.42	0.013	10.48	1.000	Concrete
Pipe - (195) (1) (1) (1)	DPA33-7	12.40	174.13	42.0	42.7	0.030	6,049.04	6,047.76	6,050.11	6,048.44	6,050.49	6,049.83	0.013	10.48	1.094	Concrete
Pipe - (522)	DPA37-1	3.30	14.85	18.0	9.2	0.020	6,051.24	6,051.05	6,051.93	6,051.60	6,052.19	6,052.10	0.013	6.76	0.000	Concrete
Pipe - (237)	DPR2-7	18.50	124.74	36.0	142.0	0.035	6,048.45	6,043.48	6,049.83	6,044.26	6,050.36	6,046.75	0.013	12.65	1.161	Concrete
Pipe - (106)	DPA15-25	23.10	74.49	36.0	147.5	0.012	6,050.43	6,048.59	6,051.98	6,050.55	6,052.59	6,050.90	0.013	9.30	1.000	Concrete
Pipe - (195) (1)	DPA33-8	7.50	115.49	36.0	97.7	0.030	6,052.48	6,049.55	6,053.35	6,050.53	6,053.65	6,050.75	0.013	9.21	0.053	Concrete
Pipe - (536)	DPA35-6	2.40	20.33	18.0	128.4	-0.037	6,049.68	6,054.49	6,055.08	6,050.30	6,055.29	6,050.49	0.013	7.72	0.063	Concrete
Pipe - (571)	DPA24-7	25.40	124.74	36.0	140.1	0.035	6,053.54	6,048.64	6,055.17	6,049.56	6,055.83	6,052.50	0.013	13.85	0.066	Concrete
Pipe - (368) (1)	DPR2-8	7.70	76.71	30.0	138.8	0.035	6,053.80	6,048.95	6,054.72	6,050.44	6,055.06	6,050.54	0.013	10.01	0.059	Concrete
Pipe - (146) (1)	DPA22-15	14.10	124.75	36.0	223.0	0.035	6,053.60	6,045.80	6,054.80	6,046.48	6,055.24	6,048.61	0.013	11.70	0.057	Concrete
Pipe - (195)	DPA33-9	7.50	124.74	36.0	65.7	0.035	6,055.28	6,052.98	6,056.14	6,053.48	6,056.45	6,054.92	0.013	9.71	0.059	Concrete
Pipe - (535)	DPA35-7	2.40	20.33	18.0	139.4	0.037	6,059.92	6,054.70	6,060.51	6,055.05	6,060.73	6,055.98	0.013	7.72	0.000	Concrete
Pipe - (570)	DPA24-8	25.40	124.74	36.0	139.4	0.035	6,058.62	6,053.74	6,060.24	6,054.67	6,060.90	6,057.60	0.013	13.85	0.067	Concrete
Pipe - (431)	DPA39-2	2.10	10.50	18.0	31.2	0.010	6,062.05	6,061.74	6,062.60	6,062.20	6,062.80	6,062.53	0.013	4.64	0.000	Concrete
Pipe - (367) (1) (1)	DPR2-9	7.70	76.71	30.0	106.2	0.035	6,057.72	6,054.00	6,058.64	6,054.54	6,058.98	6,056.09	0.013	10.01	0.058	Concrete
Pipe - (194)	DPA33-10	7.50	124.74	36.0	75.2	0.035	6,058.41	6,055.78	6,059.27	6,056.28	6,059.58	6,057.75	0.013	9.71	1.086	Concrete
Pipe - (364)	DPA43-3	4.10	22.76	24.0	27.7	0.010	6,064.67	6,064.39	6,065.38	6,065.15	6,065.64	6,065.37	0.013	5.49	0.000	Concrete
Pipe - (433)	DPA38-1	6.50	64.92	30.0	19.2	0.025	6,059.38	6,058.90	6,060.22	6,059.50	6,060.53	6,060.31	0.013	8.46	0.063	Concrete
Pipe - (229)	DPR7-2	2.90	10.50	18.0	84.8	0.010	6,066.16	6,065.31	6,066.81	6,065.99	6,067.05	6,066.21	0.013	5.08	0.000	Concrete
Pipe - (434)	DPA38-2	6.50	64.96	30.0	24.3	0.025	6,060.73	6,060.12	6,061.57	6,060.70	6,061.88	6,061.57	0.013	8.47	1.298	Concrete
Pipe - (229) (1)	DPR7-1	5.20	58.00	30.0	59.4	0.020	6,065.50	6,064.31	6,066.25	6,065.99	6,066.52	6,066.02	0.013	7.32	0.000	Concrete
Pipe - (432)	DPA39-1	3.10	14.85	18.0	9.2	0.020	6,061.93	6,061.74	6,062.60	6,062.27	6,062.85	6,062.76	0.013	6.64	0.000	Concrete
Pipe - (362)	DPA22-21	9.70	27.65	24.0	43.5	0.015	6,067.53	6,066.88	6,068.64	6,068.24	6,069.10	6,068.52	0.013	8.03	0.000	Concrete
Pipe - (193) (1)	DPA33-11	1.30	23.45	18.0	58.2	0.050	6,062.80	6,059.90	6,063.23	6,060.14	6,063.38	6,060.93	0.013	7.13	0.058	Concrete
Pipe - (367) (1)	DPR2-10	7.70	76.71	30.0	109.9	0.035	6,061.76	6,057.91	6,062.68	6,058.45	6,063.02	6,060.00	0.013	10.01	0.058	Concrete
Pipe - (569)	DPA24-9	25.40	124.74	36.0	114.3	0.035	6,062.81	6,058.81	6,064.44	6,059.75	6,065.09	6,062.56	0.013	13.85	1.195	Concrete
Pipe - (142)	DPA22-18	14.10	47.22	36.0	305.3	0.005	6,063.28	6,061.75	6,064.48	6,062.87	6,064.92	6,063.40	0.013	5.83	1.519	Concrete
Pipe - (126)	DPA43-1	1.50	14.82	18.0	35.2	0.020	6,065.48	6,064.78	6,065.94	6,065.10	6,066.11	6,065.55	0.013	5.38	0.000	Concrete
Pipe - (127)	DPA43-2	5.80	40.70	30.0	11.2	0.010	6,063.89	6,063.78	6,065.15	6,065.16	6,065.23	6,065.22	0.013	5.88	0.050	Concrete
Pipe - (520)	DPA27-1	3.60	18.19	18.0	54.6	0.030	6,066.15	6,064.51	6,066.87	6,064.96	6,067.15	6,065.96	0.013	8.01	1.000	Concrete
Pipe - (363) (1)	DPA22-19	8.00	41.02	30.0	89.0	0.010	6,064.67	6,063.78	6,065.61	6,065.16	6,065.96	6,065.29	0.013	6.48	1.694	Concrete
Pipe - (519)	DPA27-2	3.60	18.19	18.0	9.2	0.030	6,066.63	6,066.35	6,067.35	6,067.15	6,067.63	6,067.37	0.013	8.01	0.000	Concrete
Pipe - (555)																

	DPA44-1	0.90	14.88	18.0	53.3	0.020	6,066.74	6,065.67	6,067.09	6,066.20	6,067.22	6,066.24	0.013	4.65	0.000	Concrete
Pipe - (371) (1)	DPA24-10	22.50	124.74	36.0	54.5	0.035	6,064.92	6,063.01	6,066.44	6,065.22	6,067.05	6,065.47	0.013	13.38	1.095	Concrete
Pipe - (518)	DPA28-1	3.00	14.85	18.0	9.8	0.020	6,066.82	6,066.62	6,067.48	6,067.13	6,067.73	6,067.63	0.013	6.58	0.000	Concrete
Pipe - (517)	DPA28-2	2.00	14.85	18.0	41.2	0.020	6,067.45	6,066.62	6,067.98	6,066.99	6,068.18	6,067.53	0.013	5.86	0.000	Concrete
Pipe - (144)	DPA22-16	14.10	99.90	36.0	269.6	0.022	6,059.85	6,053.80	6,061.05	6,054.56	6,061.49	6,056.11	0.013	9.99	0.050	Concrete
Pipe - (192) (1)	DPA33-12	1.30	23.48	18.0	72.4	0.050	6,067.12	6,063.50	6,067.55	6,063.74	6,067.70	6,064.53	0.013	7.14	0.059	Concrete
Pipe - (363)	DPA22-20	9.70	27.75	24.0	100.3	0.015	6,066.68	6,065.17	6,067.79	6,065.99	6,068.25	6,066.99	0.013	8.05	0.982	Concrete
Pipe - (366)	DPR2-11	7.70	40.99	30.0	125.9	0.010	6,063.22	6,061.96	6,064.14	6,062.70	6,064.48	6,063.33	0.013	6.40	0.061	Concrete
Pipe - (191) (1)	DPA33-13	1.30	23.47	18.0	62.1	0.050	6,070.93	6,067.83	6,071.36	6,068.07	6,071.51	6,068.86	0.013	7.13	0.057	Concrete
Pipe - (143)	DPA22-17	14.10	47.16	36.0	300.0	0.005	6,061.55	6,060.05	6,062.75	6,061.17	6,063.19	6,061.70	0.013	5.83	0.050	Concrete
Pipe - (365)	DPR2-12	7.70	41.02	30.0	69.5	0.010	6,064.12	6,063.42	6,065.04	6,064.16	6,065.38	6,064.79	0.013	6.41	2.790	Concrete
Pipe - (178) (1) (3) (1)	DPA38-3	2.20	45.22	24.0	271.5	0.040	6,072.09	6,061.24	6,072.61	6,061.98	6,072.79	6,062.04	0.013	7.44	0.063	Concrete
Pipe - (190) (1) (1)	DPA33-14	1.30	22.88	18.0	92.0	0.047	6,075.50	6,071.13	6,075.92	6,071.38	6,076.08	6,072.14	0.013	7.01	1.148	Concrete
Pipe - (371) (2) (1)	DPA24-11	18.80	117.53	36.0	275.0	0.031	6,073.66	6,065.12	6,075.05	6,067.10	6,075.58	6,067.33	0.013	12.18	1.000	Concrete
Pipe - (96) (2)	DPA24-12	18.80	111.08	36.0	61.0	0.028	6,075.55	6,073.86	6,076.94	6,075.58	6,077.48	6,075.90	0.013	11.70	1.103	Concrete
Pipe - (378)	DPA29-1	1.70	14.85	18.0	31.4	0.020	6,077.68	6,077.05	6,078.17	6,077.40	6,078.35	6,077.87	0.013	5.59	0.000	Concrete
Pipe - (377)	DPA29-2	4.70	14.85	18.0	9.4	0.020	6,077.24	6,077.05	6,078.07	6,077.72	6,078.41	6,078.32	0.013	7.45	0.000	Concrete
Pipe - (444)	DPA30-1	7.20	14.83	18.0	40.6	0.020	6,082.01	6,081.20	6,083.05	6,081.97	6,083.52	6,082.95	0.013	8.34	0.000	Concrete
Pipe - (187)	DPA40-2	0.60	16.61	18.0	32.2	0.025	6,078.78	6,077.97	6,079.06	6,078.17	6,079.16	6,078.47	0.013	4.45	0.073	Concrete
Pipe - (188)	DPA40-1	0.60	12.86	18.0	116.3	0.015	6,077.47	6,075.73	6,077.76	6,076.10	6,077.86	6,076.15	0.013	3.72	0.496	Concrete
Pipe - (435)	DPA24-13	13.60	78.59	30.0	113.3	0.037	6,080.20	6,076.04	6,081.44	6,077.53	6,081.93	6,077.84	0.013	11.99	1.417	Concrete
Pipe - (186)	DPA40-3	0.60	16.61	18.0	113.1	0.025	6,082.10	6,079.27	6,082.39	6,079.47	6,082.49	6,079.77	0.013	4.45	0.000	Concrete
Pipe - (178) (1) (4)	DPA38-4	2.20	50.55	24.0	165.1	0.050	6,081.34	6,073.09	6,081.85	6,073.38	6,082.03	6,074.38	0.013	8.04	0.065	Concrete
Pipe - (190) (2)	DPA33-15	1.00	22.88	18.0	179.8	0.047	6,084.26	6,075.73	6,084.63	6,075.94	6,084.76	6,076.59	0.013	6.48	1.403	Concrete
Pipe - (177)	DPA38-6	2.20	50.55	24.0	32.3	0.050	6,088.01	6,086.40	6,088.53	6,086.69	6,088.71	6,087.67	0.013	8.04	0.000	Concrete
Pipe - (178)	DPA38-5	2.20	50.55	24.0	43.9	0.050	6,083.72	6,081.53	6,084.24	6,081.82	6,084.42	6,082.82	0.013	8.04	1.000	Concrete
Pipe - (190)	DPA33-16	0.70	19.42	18.0	49.7	0.034	6,086.15	6,084.45	6,086.46	6,084.81	6,086.57	6,084.88	0.013	5.20	0.514	Concrete
Pipe - (436)	DPA24-14	6.80	45.22	24.0	144.7	0.040	6,086.48	6,080.70	6,087.40	6,082.13	6,087.76	6,082.25	0.013	10.36	0.063	Concrete
Pipe - (546)	DPA41-1	0.30	18.19	18.0	41.6	0.030	6,085.70	6,084.45	6,085.90	6,084.81	6,085.97	6,084.83	0.013	3.85	0.000	Concrete
Pipe - (439)	DPA24-16	6.80	45.25	24.0	45.7	0.040	6,093.49	6,091.66	6,094.41	6,092.74	6,094.77	6,092.98	0.013	10.37	0.000	Concrete
Pipe - (437)	DPA24-15	6.80	45.23	24.0	119.6	0.040	6,091.46	6,086.68	6,092.38	6,087.20	6,092.74	6,088.87	0.013	10.36	1.000	Concrete
Pipe - (524)	DPA33-17	0.70	18.19	18.0	126.6	0.030	6,090.15	6,086.35	6,090.46	6,086.55	6,090.57	6,086.94	0.013	4.96	0.000	Concrete

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Scenario: 100yr
Current Time Step: 0.000 h
FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Headloss Coefficient (Standard)
DPA1-10	6,004.77	5,994.78	153.10	6,002.19	6,000.38	6,002.49	6,001.33	1.915
DPA1-11	6,004.83	5,995.32	135.70	6,003.77	6,002.28	6,004.73	6,003.02	2.001
DPA1-12	6,008.49	5,999.86	99.10	6,004.65	6,004.57	6,005.63	6,005.54	0.074
DPA1-13	6,012.02	6,002.29	99.10	6,007.94	6,005.73	6,008.93	6,007.20	1.497
DPA1-14	6,015.11	6,005.74	56.40	6,010.11	6,008.50	6,011.00	6,009.81	1.224
DPA1-15	6,018.72	6,009.93	49.30	6,012.63	6,012.55	6,017.26	6,013.68	0.077
DPA1-16	6,027.86	6,018.62	49.30	6,021.30	6,021.25	6,025.20	6,022.38	0.052
DPA1-17	6,032.35	6,023.58	49.30	6,027.55	6,026.21	6,027.68	6,027.34	1.189
DPA1-18	6,042.40	6,032.36	45.80	6,034.95	6,034.90	6,036.00	6,035.95	0.050
DPA1-19	6,044.51	6,033.36	45.80	6,038.71	6,036.08	6,039.43	6,036.98	2.908
DPA1-1B	5,975.18	5,961.88	532.60	5,970.60	5,967.55	5,972.87	5,970.31	1.106
DPA1-1C	5,980.69	5,965.36	464.50	5,970.85	5,970.73	5,973.85	5,973.09	0.050
DPA1-1D	5,986.14	5,970.58	464.50	5,976.07	5,975.95	5,979.18	5,978.31	0.050
DPA1-1E	5,982.22	5,976.56	464.50	5,981.37	5,981.25	5,983.73	5,983.61	0.050
DPA1-2	5,992.04	5,981.57	166.80	5,987.59	5,987.51	5,988.72	5,988.63	0.074
DPA1-20	6,041.65	6,034.47	36.00	6,040.48	6,039.35	6,040.67	6,039.75	2.813
DPA1-21	6,046.02	6,037.69	19.50	6,042.64	6,042.05	6,043.24	6,042.64	1.000
DPA1-22	6,044.16	6,039.14	19.50	6,043.03	6,043.03	6,043.63	6,043.63	0.000
DPA1-3	5,990.83	5,981.96	166.80	5,987.81	5,987.75	5,988.88	5,988.87	0.050
DPA1-4	5,991.42	5,982.34	163.20	5,989.80	5,987.95	5,990.80	5,989.03	1.722
DPA1-5	5,995.02	5,984.55	157.60	5,990.56	5,990.50	5,991.56	5,991.50	0.058
DPA1-6	5,999.08	5,986.78	157.60	5,990.88	5,990.80	5,994.34	5,992.48	0.050
DPA1-7	6,002.98	5,991.06	157.60	5,997.16	5,995.07	5,998.33	5,996.76	1.240
DPA1-8	6,006.80	5,994.28	153.10	6,000.03	5,998.39	6,000.97	6,000.03	1.000
DPA1-9	6,005.01	5,995.12	153.10	6,000.22	6,000.22	6,001.17	6,001.17	0.000
DPA2-1	5,991.11	5,985.96	12.30	5,989.92	5,989.90	5,990.15	5,990.14	0.050
DPA3-1	6,003.38	5,997.07	6.50	5,998.26	5,998.26	5,998.69	5,998.69	0.000
DPA4-1	6,004.95	5,999.06	14.90	6,002.42	6,002.42	6,003.52	6,003.52	0.000
DPA4-2	6,004.95	5,999.67	7.70	6,002.41	6,002.41	6,002.71	6,002.71	0.000
DPA5-1	6,005.37	5,999.34	39.20	6,004.16	6,004.16	6,005.16	6,005.16	0.000
DPA5-2	6,010.64	6,003.24	39.20	6,005.86	6,005.80	6,007.15	6,006.89	0.057
DPA5-3	6,011.22	6,004.35	27.40	6,007.13	6,006.42	6,008.40	6,007.71	0.550
DPA5-4	6,011.96	6,005.31	16.00	6,008.41	6,007.78	6,009.69	6,009.06	0.496
DPA5-5	6,014.82	6,008.63	16.00	6,010.34	6,010.26	6,012.73	6,011.58	0.065
DPA5-6	6,017.88	6,011.97	16.00	6,013.97	6,013.60	6,015.25	6,014.92	0.280
DPA5-7	6,020.33	6,014.46	16.00	6,016.44	6,016.10	6,017.72	6,017.42	0.262
DPA5-8	6,023.03	6,017.02	16.00	6,020.12	6,018.65	6,020.42	6,019.97	1.112
DPA6-1	6,023.90	6,018.47	7.70	6,020.32	6,020.32	6,020.61	6,020.61	0.000
DPA6-2	6,024.41	6,018.21	8.80	6,020.28	6,020.28	6,020.67	6,020.67	0.000
DPA7-1	6,012.70	6,005.53	26.30	6,009.04	6,009.04	6,010.13	6,010.13	0.000
DPA7-2	6,013.09	6,006.73	21.10	6,008.38	6,008.38	6,011.19	6,009.28	0.001
DPA7-3	6,019.15	6,013.68	21.10	6,016.51	6,015.58	6,016.78	6,016.48	1.029
DPA7-4	6,019.15	6,014.46	7.40	6,016.57	6,016.57	6,016.84	6,016.84	0.000
DPA8-1	6,021.19	6,015.58	14.70	6,016.96	6,016.96	6,018.25	6,017.59	0.000
DPA8-2	6,022.31	6,016.13	14.70	6,017.80	6,017.76	6,020.37	6,018.39	0.065
DPA8-3	6,028.70	6,021.78	14.70	6,024.15	6,023.41	6,024.57	6,024.04	1.174
DPA9-1	6,028.82	6,022.44	9.20	6,024.19	6,024.19	6,024.62	6,024.62	0.000
DPA9-2	6,029.59	6,023.03	5.90	6,024.18	6,024.18	6,024.58	6,024.58	0.000
DPA10-1	6,015.29	6,008.74	9.30	6,010.37	6,010.33	6,011.23	6,010.94	0.070
DPA10-2	6,015.95	6,009.62	7.10	6,010.76	6,010.76	6,011.23	6,011.23	0.000
DPA11-1	6,032.95	6,026.06	5.20	6,027.58	6,027.58	6,027.94	6,027.94	0.000
DPA12-1	6,045.42	6,037.46	12.10	6,039.50	6,039.50	6,040.23	6,040.23	0.000
DPA12-2	6,049.79	6,043.55	12.10	6,046.17	6,045.08	6,046.24	6,045.92	1.301
DPA12-3	6,050.21	6,044.67	8.80	6,046.49	6,046.49	6,046.88	6,046.88	0.000
DPA13-1	6,051.92	6,045.67	3.70	6,046.63	6,046.63	6,046.92	6,046.92	0.000
DPA14-1	6,042.27	6,036.87	5.30	6,040.77	6,040.77	6,040.91	6,040.91	0.000
DPA14-2	6,041.84	6,036.29	13.70	6,040.72	6,040.65	6,040.86	6,041.58	0.078
DPA14-3	6,041.83	6,036.89	6.10	6,040.62	6,040.62	6,040.80	6,040.80	0.000
DPA15-10	6,017.56	6,006.82	109.00	6,012.41	6,010.41	6,014.61	6,011.79	1.451
DPA15-11	6,019.72	6,009.85	82.60	6,013.10	6,013.02	6,016.04	6,014.27	0.057
DPA15-12	6,021.79	6,011.82	82.60	6,015.03	6,014.95	6,018.04	6,016.20	0.062
DPA15-13	6,024.07	6,013.76	82.60	6,018.82	6,016.92	6,020.02	6,018.17	1.526
DPA15-14	6,026.15	6,016.53	62.10	6,019.50	6,019.40	6,023.07	6,020.87	0.066

DPA15-15	6,029.46	6,020.00	62.10	6,022.97	6,022.88	6,027.80	6,024.35	0.065
DPA15-16	6,041.49	6,030.99	62.10	6,033.95	6,033.86	6,038.03	6,035.33	0.063
DPA15-17	6,044.30	6,035.79	62.10	6,040.38	6,038.66	6,040.71	6,040.13	1.172
DPA15-18	6,046.19	6,037.91	56.70	6,041.05	6,040.98	6,042.22	6,042.07	0.063
DPA15-19	6,048.29	6,040.25	56.70	6,043.10	6,043.02	6,045.73	6,044.34	0.063
DPA15-2	5,999.16	5,982.07	403.20	5,989.40	5,989.20	5,993.39	5,992.36	0.066
DPA15-20	6,050.24	6,042.43	56.70	6,045.28	6,045.20	6,047.64	6,046.52	0.059
DPA15-21	6,051.37	6,043.76	56.70	6,046.62	6,046.54	6,047.86	6,047.86	0.057
DPA15-22	6,052.51	6,044.93	56.70	6,049.05	6,047.70	6,049.10	6,049.02	1.027
DPA15-23	6,053.62	6,046.24	54.00	6,050.46	6,049.34	6,051.24	6,050.32	1.150
DPA15-24	6,055.86	6,048.06	50.10	6,051.96	6,051.09	6,052.74	6,051.96	1.000
DPA15-25	6,058.82	6,050.10	50.10	6,053.88	6,052.73	6,054.66	6,053.88	1.000
DPA15-26	6,059.58	6,052.99	50.10	6,054.15	6,054.15	6,054.97	6,054.97	0.000
DPA15-3	6,005.87	5,986.26	403.20	5,992.43	5,992.25	5,996.42	5,995.82	0.050
DPA15-4	6,010.02	5,990.75	403.20	6,001.30	5,996.74	6,002.34	6,000.31	1.278
DPA15-5	6,014.90	5,996.86	130.00	6,002.19	6,002.08	6,003.23	6,003.12	0.102
DPA15-6	6,023.31	5,999.01	130.00	6,004.12	6,004.07	6,005.16	6,005.11	0.050
DPA15-7	6,017.78	6,001.27	130.00	6,005.96	6,005.57	6,007.11	6,006.86	0.304
DPA15-8	6,015.83	6,002.10	130.00	6,008.71	6,006.40	6,011.35	6,007.69	1.789
DPA15-9	6,017.03	6,007.03	109.00	6,010.09	6,010.09	6,012.19	6,011.47	0.000
DPA16-1	6,012.70	6,006.80	22.70	6,010.65	6,010.65	6,011.46	6,011.46	0.000
DPA17-1	6,017.82	6,010.81	6.30	6,012.43	6,012.43	6,012.64	6,012.64	0.000
DPA17-2	6,017.82	6,011.25	21.00	6,013.65	6,013.65	6,015.85	6,015.85	0.000
DPA18-1	6,024.75	6,018.56	29.80	6,020.42	6,020.42	6,023.99	6,021.91	0.000
DPA18-2	6,038.66	6,024.14	29.80	6,026.43	6,026.25	6,029.35	6,027.74	0.120
DPA18-3	6,039.26	6,028.78	29.80	6,031.03	6,030.89	6,032.67	6,032.38	0.093
DPA18-4	6,039.26	6,030.09	23.80	6,032.87	6,032.08	6,033.69	6,033.14	0.748
DPA18-5	6,039.86	6,031.85	12.80	6,034.23	6,033.62	6,035.05	6,034.44	0.748
DPA18-6	6,041.59	6,034.04	12.80	6,036.52	6,035.65	6,037.33	6,036.52	1.000
DPA18-7	6,042.17	6,035.15	12.80	6,037.03	6,037.03	6,037.84	6,037.84	0.000
DPA18-8	6,043.47	6,036.86	12.80	6,039.34	6,038.42	6,039.53	6,039.34	1.000
DPA18-9	6,043.47	6,037.55	6.20	6,039.42	6,039.42	6,039.61	6,039.61	0.000
DPA19-1	6,044.62	6,038.21	8.10	6,040.56	6,040.56	6,040.89	6,040.89	0.000
DPA20-1	6,052.81	6,047.35	2.90	6,049.08	6,049.08	6,049.12	6,049.12	0.000
DPA20-2	6,052.78	6,046.94	3.00	6,049.06	6,049.06	6,049.11	6,049.11	0.000
DPA21-1	6,054.36	6,048.65	5.10	6,050.60	6,050.60	6,050.73	6,050.73	0.000
DPA21-2	6,054.96	6,048.57	5.10	6,050.76	6,050.63	6,050.84	6,050.76	1.000
DPA21-3	6,054.96	6,049.01	4.00	6,050.79	6,050.79	6,050.87	6,050.87	0.000
DPA22-1	6,006.64	5,995.76	273.90	6,002.92	6,002.17	6,004.98	6,004.23	0.364
DPA22-10	6,035.04	6,023.90	175.20	6,030.90	6,028.26	6,032.52	6,030.54	1.159
DPA22-11	6,038.47	6,026.04	162.00	6,031.60	6,031.50	6,035.48	6,033.12	0.057
DPA22-12	6,042.81	6,031.06	162.00	6,037.79	6,035.30	6,039.00	6,037.36	1.207
DPA22-13	6,045.58	6,035.17	62.40	6,040.09	6,038.34	6,041.08	6,039.60	1.385
DPA22-14	6,054.27	6,044.47	56.50	6,047.32	6,047.24	6,051.87	6,048.55	0.065
DPA22-15	6,062.96	6,053.27	56.50	6,056.11	6,056.04	6,059.41	6,057.35	0.057
DPA22-16	6,073.48	6,059.52	56.50	6,062.35	6,062.29	6,063.66	6,063.60	0.050
DPA22-17	6,077.15	6,061.22	56.50	6,064.89	6,064.84	6,065.88	6,065.83	0.050
DPA22-18	6,070.79	6,062.92	56.50	6,068.59	6,067.08	6,068.64	6,068.07	1.519
DPA22-19	6,071.70	6,065.43	24.20	6,069.54	6,068.90	6,069.92	6,069.28	1.694
DPA22-2	6,008.86	5,996.80	273.90	6,005.86	6,003.33	6,007.88	6,005.39	1.226
DPA22-20	6,074.61	6,066.43	21.10	6,071.10	6,070.41	6,071.80	6,071.11	0.982
DPA22-21	6,078.66	6,067.52	21.10	6,071.48	6,071.48	6,072.18	6,072.18	0.000
DPA22-3	6,012.57	6,000.00	271.20	6,006.61	6,006.48	6,010.66	6,008.51	0.061
DPA22-4	6,018.56	6,004.71	271.20	6,010.07	6,009.89	6,014.13	6,012.45	0.071
DPA22-5	6,022.67	6,010.19	271.20	6,015.56	6,015.37	6,019.70	6,017.93	0.074
DPA22-6	6,027.55	6,014.77	271.20	6,020.12	6,019.95	6,022.69	6,022.51	0.069
DPA22-7	6,030.46	6,016.45	271.20	6,022.22	6,021.78	6,026.05	6,024.20	0.182
DPA22-8	6,029.05	6,017.87	190.30	6,025.19	6,022.38	6,025.33	6,024.41	1.383
DPA22-9	6,031.73	6,021.51	175.20	6,026.69	6,026.56	6,028.95	6,028.45	0.067
DPA23-1	6,008.92	6,003.51	4.60	6,005.89	6,005.89	6,005.99	6,005.99	0.000
DPA24-1	6,032.37	6,021.07	95.50	6,023.95	6,023.95	6,027.38	6,026.86	0.000
DPA24-10	6,072.60	6,064.58	58.40	6,068.88	6,067.39	6,069.65	6,068.75	1.095
DPA24-11	6,082.22	6,074.41	49.60	6,077.09	6,075.95	6,077.86	6,077.09	1.000
DPA24-12	6,083.06	6,075.22	49.60	6,079.10	6,077.85	6,080.23	6,078.98	1.103
DPA24-13	6,087.27	6,080.27	41.90	6,084.26	6,082.37	6,085.07	6,083.70	1.417
DPA24-14	6,093.55	6,086.59	22.70	6,088.24	6,088.18	6,091.34	6,089.17	0.063
DPA24-15	6,098.22	6,091.57	22.70	6,094.15	6,093.16	6,094.96	6,094.15	1.000
DPA24-16	6,099.28	6,093.49	22.70	6,095.19	6,095.19	6,096.18	6,096.18	0.000
DPA24-2	6,033.24	6,021.35	95.50	6,028.08	6,024.56	6,030.29	6,027.47	1.208
DPA24-3	6,039.07	6,028.53	84.30	6,031.67	6,031.67	6,035.54	6,034.00	0.000
DPA24-4	6,041.60	6,032.49	84.30	6,038.43	6,035.63	6,039.75	6,037.96	1.202
DPA24-5	6,047.69	6,038.91	65.00	6,041.91	6,041.83	6,046.84	6,043.39	0.050
DPA24-6	6,056.61	6,048.11	65.00	6,051.11	6,051.02	6,055.47	6,052.59	0.057
DPA24-7	6,061.61	6,053.21	65.00	6,056.23	6,056.13	6,060.58	6,057.69	0.066
DPA24-8								

	6,066.57	6,058.28	65.00	6,061.31	6,061.20	6,065.45	6,062.77	0.067
DPA24-9	6,070.54	6,062.48	65.00	6,067.27	6,065.40	6,067.58	6,066.96	1.195
DPA25-1	6,033.30	6,028.17	6.00	6,029.34	6,029.34	6,029.74	6,029.74	0.000
DPA25-2	6,033.45	6,027.73	8.30	6,029.07	6,029.07	6,029.61	6,029.61	0.000
DPA26-1	6,044.88	6,035.83	25.80	6,038.99	6,038.99	6,040.04	6,040.04	0.000
DPA26-2	6,049.28	6,040.01	25.80	6,042.59	6,042.04	6,043.72	6,043.23	0.460
DPA26-3	6,049.08	6,040.88	25.80	6,043.09	6,042.92	6,043.71	6,044.10	0.147
DPA26-4	6,049.10	6,041.96	17.50	6,044.46	6,043.73	6,044.79	6,044.46	1.000
DPA26-5	6,051.30	6,044.70	8.10	6,046.02	6,046.02	6,046.55	6,046.55	0.000
DPA27-1	6,071.67	6,065.94	7.90	6,067.88	6,067.56	6,068.19	6,067.88	1.000
DPA27-2	6,072.10	6,066.41	7.90	6,067.81	6,067.81	6,068.24	6,068.24	0.000
DPA28-1	6,072.82	6,066.60	7.50	6,068.93	6,068.93	6,069.21	6,069.21	0.000
DPA28-2	6,073.26	6,067.23	4.10	6,068.95	6,068.95	6,069.03	6,069.03	0.000
DPA29-1	6,083.15	6,077.46	2.90	6,079.12	6,079.12	6,079.17	6,079.17	0.000
DPA29-2	6,083.15	6,077.02	7.90	6,079.15	6,079.15	6,079.46	6,079.46	0.000
DPA30-1	6,087.88	6,082.01	20.20	6,085.76	6,085.76	6,087.79	6,087.79	0.000
DPA31-1	6,028.44	6,022.67	5.30	6,025.31	6,025.31	6,025.45	6,025.45	0.000
DPA31-2	6,029.75	6,022.20	13.70	6,025.58	6,025.58	6,026.52	6,026.52	0.000
DPA32-1	6,037.13	6,028.17	24.30	6,031.41	6,031.41	6,032.34	6,032.34	0.000
DPA33-1	6,042.87	6,033.17	113.60	6,038.13	6,038.13	6,039.40	6,039.40	0.000
DPA33-10	6,067.16	6,058.08	63.70	6,062.63	6,060.98	6,064.05	6,062.50	1.086
DPA33-11	6,070.02	6,063.60	18.50	6,064.53	6,064.43	6,067.60	6,066.14	0.058
DPA33-12	6,073.55	6,067.42	18.50	6,068.68	6,068.58	6,071.66	6,070.31	0.059
DPA33-13	6,076.62	6,070.72	18.50	6,072.49	6,072.39	6,075.54	6,074.12	0.057
DPA33-14	6,081.20	6,075.29	18.50	6,078.94	6,076.95	6,079.41	6,078.69	1.148
DPA33-15	6,090.15	6,084.05	10.60	6,086.49	6,085.51	6,086.66	6,086.21	1.403
DPA33-16	6,091.94	6,085.94	5.80	6,087.29	6,087.08	6,087.68	6,087.48	0.514
DPA33-17	6,098.75	6,089.93	5.80	6,091.08	6,091.08	6,091.47	6,091.47	0.000
DPA33-2	6,043.07	6,032.93	113.60	6,041.05	6,038.19	6,041.71	6,039.46	2.255
DPA33-3	6,043.86	6,034.03	102.80	6,041.30	6,041.23	6,042.34	6,042.27	0.059
DPA33-4	6,045.51	6,035.36	102.80	6,043.25	6,041.53	6,044.50	6,042.57	1.656
DPA33-5	6,054.21	6,042.85	86.20	6,048.09	6,046.11	6,049.32	6,047.71	1.235
DPA33-6	6,056.64	6,046.76	75.50	6,051.23	6,049.85	6,052.19	6,051.23	1.000
DPA33-7	6,057.52	6,048.66	75.50	6,053.27	6,051.76	6,053.57	6,053.14	1.094
DPA33-8	6,060.52	6,052.15	63.70	6,055.13	6,055.05	6,058.66	6,056.57	0.053
DPA33-9	6,063.48	6,054.95	63.70	6,057.93	6,057.84	6,061.61	6,059.37	0.059
DPA34-1	6,043.33	6,035.91	11.50	6,041.16	6,041.16	6,041.82	6,041.82	0.000
DPA35-1	6,045.52	6,038.00	19.20	6,043.38	6,043.34	6,043.96	6,043.92	0.067
DPA35-2	6,048.79	6,038.85	19.20	6,043.47	6,043.47	6,044.05	6,044.05	0.000
DPA35-3	6,052.11	6,041.88	19.20	6,044.13	6,044.10	6,046.24	6,044.76	0.051
DPA35-4	6,052.13	6,045.97	12.70	6,047.29	6,047.24	6,049.19	6,048.14	0.055
DPA35-5	6,055.64	6,049.27	8.70	6,050.66	6,050.63	6,050.85	6,051.20	0.054
DPA35-6	6,060.65	6,054.30	4.30	6,055.31	6,055.29	6,056.60	6,055.60	0.063
DPA35-7	6,065.87	6,059.70	4.30	6,060.72	6,060.72	6,061.04	6,061.04	0.000
DPA36-1	6,054.47	6,047.18	9.50	6,048.58	6,048.58	6,049.20	6,049.20	0.000
DPA36-2	6,054.47	6,047.62	3.20	6,048.51	6,048.51	6,048.77	6,048.77	0.000
DPA37-1	6,057.90	6,051.02	7.80	6,053.32	6,053.32	6,053.62	6,053.62	0.000
DPA37-2	6,056.44	6,051.45	7.10	6,053.41	6,053.41	6,053.66	6,053.66	0.000
DPA38-1	6,067.59	6,059.09	46.90	6,062.97	6,062.88	6,064.39	6,064.30	0.063
DPA38-2	6,068.21	6,060.44	46.90	6,065.13	6,063.29	6,067.39	6,064.71	1.298
DPA38-3	6,079.98	6,071.84	37.90	6,074.18	6,074.03	6,078.89	6,076.34	0.063
DPA38-4	6,089.37	6,081.09	37.90	6,083.43	6,083.28	6,087.07	6,085.58	0.065
DPA38-5	6,091.82	6,083.47	37.90	6,087.96	6,085.66	6,091.38	6,087.96	1.000
DPA38-6	6,088.00	6,088.00	37.90	6,088.00	6,088.00	6,090.30	6,090.30	0.000
DPA39-1	6,068.65	6,061.71	7.60	6,065.18	6,065.18	6,065.46	6,065.46	0.000
DPA39-2	6,066.59	6,061.83	3.40	6,065.16	6,065.16	6,065.22	6,065.22	0.000
DPA40-1	6,087.24	6,077.26	9.70	6,080.17	6,079.93	6,080.63	6,080.40	0.496
DPA40-2	6,085.97	6,078.57	9.70	6,080.47	6,080.44	6,081.95	6,080.91	0.073
DPA40-3	6,087.44	6,081.88	9.70	6,083.30	6,083.30	6,083.94	6,083.94	0.000
DPA41-1	6,094.95	6,085.48	5.40	6,086.60	6,086.60	6,086.97	6,086.97	0.000
DPA42-1	6,045.67	6,038.61	7.20	6,040.11	6,040.11	6,040.42	6,040.42	0.000
DPA42-2	6,045.72	6,038.97	6.50	6,040.16	6,040.16	6,040.59	6,040.59	0.000
DPA43-1	6,071.01	6,065.28	3.30	6,068.62	6,068.62	6,068.68	6,068.68	0.000
DPA43-2	6,071.01	6,063.60	32.00	6,068.69	6,068.66	6,069.97	6,069.32	0.050
DPA43-3	6,073.59	6,064.68	28.50	6,069.13	6,069.13	6,070.41	6,070.41	0.000
DPA44-1	6,072.25	6,066.53	8.80	6,069.91	6,069.91	6,070.30	6,070.30	0.000
DPR1-0	5,987.86	5,974.44	92.50	5,977.81	5,977.81	5,978.48	5,978.48	0.001
DPR1-1	5,988.89	5,967.64	92.50	5,971.15	5,970.93	5,974.05	5,972.04	0.200
DPR1-2	5,989.17	5,973.48	92.50	5,977.88	5,976.77	5,978.45	5,977.88	1.000
DPR2-0	6,047.56	6,037.95	56.20	6,040.38	6,040.38	6,042.01	6,041.69	0.001
DPR2-1	6,048.64	6,038.12	56.20	6,040.95	6,040.88	6,042.25	6,042.19	0.050
DPR2-10	6,070.48	6,061.47	16.70	6,063.17	6,063.14	6,064.15	6,063.70	0.058
DPR2-11	6,074.91	6,062.93	16.70	6,064.64	6,064.60	6,065.57	6,065.16	0.061
DPR2-12	6,077.41	6,063.83	16.70	6,067.06	6,065.50	6,067.15	6,066.06	2.790

	6,047.26	6,038.98	56.20	6,042.34	6,042.21	6,043.37	6,043.22	0.129
DPR2-3	6,046.63	6,039.60	56.20	6,044.63	6,042.92	6,045.57	6,043.91	1.742
DPR2-4	6,047.13	6,040.15	43.30	6,045.57	6,044.93	6,046.11	6,045.52	1.085
DPR2-5	6,048.61	6,040.72	41.90	6,045.88	6,045.85	6,046.42	6,046.39	0.057
DPR2-6	6,052.84	6,042.15	41.90	6,047.15	6,046.36	6,047.63	6,046.91	1.433
DPR2-7	6,057.98	6,048.11	39.50	6,051.56	6,050.49	6,051.74	6,051.41	1.161
DPR2-8	6,062.85	6,053.51	16.70	6,055.22	6,055.18	6,057.58	6,055.74	0.059
DPR2-9	6,066.60	6,057.42	16.70	6,059.13	6,059.10	6,061.51	6,059.66	0.058
DPR3-1	6,046.82	6,041.86	13.70	6,044.80	6,044.80	6,045.73	6,045.73	0.000
DPR3-2	6,046.83	6,042.33	3.80	6,044.68	6,044.68	6,044.75	6,044.75	0.000
DPR4-1	6,048.90	6,042.84	2.30	6,045.58	6,045.58	6,045.61	6,045.61	0.000
DPR5-1	6,054.57	6,045.96	2.90	6,047.16	6,047.16	6,047.21	6,047.21	0.000
DPR6-1	6,055.97	6,049.69	25.10	6,052.09	6,052.09	6,052.51	6,052.51	0.000
DPR7-1	6,077.07	6,065.50	11.60	6,066.97	6,066.97	6,067.20	6,067.20	0.000
DPR7-2	6,077.42	6,066.16	5.60	6,067.14	6,067.14	6,067.47	6,067.47	0.000
DPR8-1	6,018.73	6,006.36	7.00	6,007.71	6,007.52	6,010.10	6,007.82	0.640
DPR8-2	6,031.63	6,019.54	7.00	6,020.78	6,020.78	6,021.24	6,021.24	0.000

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Scenario: 100yr
Current Time Step: 0.000 h
Conduit FlexTable: Combined Pipe/Node Report

Label	Upstream Structure	Flow (cfs)	Capacity (Full Flow) (cfs)	Diameter (in)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Manning's n	Velocity (ft/s)	Upstream Structure Headloss Coefficient	Material
Pipe - (357) (1)	DPA1-1B	532.60	615.50	-	19.6	0.010	5,962.55	5,962.35	5,967.55	5,966.96	5,970.31	5,970.20	0.013	17.89	1.106	Concrete
Pipe - (578) (1) (1)	DPA1-1C	464.50	605.42	-	22.3	0.010	5,966.02	5,965.80	5,970.73	5,970.60	5,973.09	5,972.87	0.013	17.05	0.050	Concrete
Pipe - (578)	DPA1-1E	464.50	609.25	-	30.0	0.010	5,976.54	5,976.24	5,981.25	5,980.35	5,983.61	5,983.45	0.013	17.13	0.050	Concrete
Pipe - (578) (1)	DPA1-1D	464.50	609.25	-	22.0	0.010	5,971.24	5,971.02	5,975.95	5,975.20	5,978.31	5,978.20	0.013	17.13	0.050	Concrete
Pipe - (353)	DPR1-0	92.50	260.42	60.0	20.0	0.010	5,974.44	5,974.24	5,977.81	5,977.88	5,978.48	5,978.45	0.013	12.14	0.001	Concrete
Pipe - (576)	DPR1-1	92.50	344.32	60.0	137.3	0.017	5,968.20	5,965.80	5,970.93	5,970.60	5,972.04	5,970.95	0.013	14.87	0.200	Concrete
Pipe - (575)	DPR1-2	92.50	344.49	60.0	131.1	0.017	5,974.04	5,971.75	5,976.77	5,973.63	5,977.88	5,976.53	0.013	14.88	1.000	Concrete
Pipe - (264)	DPA1-3	166.80	182.32	60.0	38.8	0.005	5,982.48	5,982.29	5,987.75	5,987.59	5,988.87	5,988.72	0.013	8.50	0.050	Concrete
Pipe - (262)	DPA2-1	12.30	22.62	24.0	35.0	0.010	5,986.21	5,985.86	5,989.90	5,989.80	5,990.14	5,990.04	0.013	3.92	0.050	Concrete
Pipe - (262) (1)	DPA1-4	163.20	183.28	60.0	36.3	0.005	5,982.86	5,982.68	5,987.95	5,987.81	5,989.03	5,988.88	0.013	8.31	1.722	Concrete
Pipe - (264) (1)	DPA1-2	166.80	183.01	60.0	58.7	0.005	5,982.09	5,981.80	5,987.51	5,987.27	5,988.63	5,988.39	0.013	8.50	0.074	Concrete
Pipe - (218)	DPA1-5	157.60	260.53	60.0	190.8	0.010	5,984.97	5,983.06	5,990.50	5,989.80	5,991.50	5,990.80	0.013	8.03	0.058	Concrete
Pipe - (217) (1)	DPA1-6	157.60	344.91	60.0	101.5	0.018	5,987.20	5,985.42	5,990.80	5,990.56	5,992.49	5,991.56	0.013	17.17	0.050	Concrete
Pipe - (560) (1) (1)	DPA15-2	403.20	299.45	72.0	191.2	0.005	5,982.72	5,981.76	5,989.20	5,987.27	5,992.36	5,990.69	0.013	14.26	0.066	Concrete
Pipe - (215) (1)	DPA1-9	153.10	184.13	60.0	56.0	0.005	5,995.12	5,994.84	6,000.22	6,000.03	6,001.17	6,000.97	0.013	7.80	0.000	Concrete
Pipe - (225) (1)	DPA5-1	39.20	60.90	30.0	43.5	0.022	5,999.34	5,998.38	6,004.16	6,003.77	6,005.16	6,004.76	0.013	7.99	0.000	Concrete
Pipe - (217)	DPA1-7	157.60	343.94	60.0	101.5	0.017	5,991.47	5,989.70	5,995.07	5,992.35	5,996.76	5,995.80	0.013	17.13	1.240	Concrete
Pipe - (551)	DPA3-1	6.50	14.80	18.0	41.3	0.020	5,997.27	5,996.45	5,998.26	5,997.17	5,998.69	5,998.10	0.013	8.11	0.000	Concrete
Pipe - (215)	DPA1-10	153.10	184.35	60.0	45.9	0.005	5,995.35	5,995.12	6,000.38	6,000.22	6,001.33	6,001.17	0.013	7.80	1.915	Concrete
Pipe - (209)	DPA1-11	135.70	258.53	60.0	33.5	0.010	5,995.88	5,995.55	6,002.28	6,002.19	6,003.02	6,002.93	0.013	6.91	2.001	Concrete
Pipe - (226)	DPA4-1	14.90	14.74	18.0	11.2	0.020	5,999.27	5,999.05	6,002.42	6,002.19	6,003.52	6,003.30	0.013	8.43	0.000	Concrete
Pipe - (227)	DPA4-2	7.70	14.82	18.0	41.2	0.020	5,999.87	5,999.05	6,002.41	6,002.19	6,002.71	6,002.49	0.013	4.36	0.000	Concrete
Pipe - (560) (1)	DPA15-3	403.20	423.47	72.0	48.9	0.010	5,986.90	5,986.41	5,992.25	5,991.41	5,995.82	5,995.40	0.013	17.05	0.050	Concrete
Pipe - (574)	DPA22-1	273.90	290.91	66.0	130.6	0.008	5,996.36	5,995.38	6,002.17	6,001.30	6,004.23	6,003.36	0.013	11.53	0.364	Concrete
Pipe - (216)	DPA1-8	153.10	368.33	60.0	94.5	0.020	5,994.84	5,992.95	5,998.39	5,997.16	6,000.03	5,998.33	0.013	17.89	1.000	Concrete
Pipe - (538)	DPA7-1	26.30	22.66	24.0	81.7	0.010	6,005.53	6,004.71	6,009.04	6,007.94	6,010.13	6,009.03	0.013	8.37	0.000	Concrete
Pipe - (214)	DPA1-12	99.10	203.11	48.0	169.5	0.020	6,000.27	5,996.88	6,004.57	6,003.77	6,005.54	6,004.73	0.013	7.89	0.074	Concrete
Pipe - (566)	DPA22-2	273.90	389.12	66.0	61.1	0.013	5,997.39	5,996.57	6,003.33	6,002.92	6,005.39	6,004.98	0.013	11.53	1.226	Concrete
Pipe - (567)	DPA23-1	4.60	14.85	18.0	15.7	0.020	6,003.72	6,003.40	6,005.89	6,005.86	6,005.99	6,005.96	0.013	2.60	0.000	Concrete
Pipe - (422) (1)	DPA7-2	21.10	42.30	24.0	57.8	0.035	6,006.73	6,004.71	6,008.38	6,007.94	6,009.28	6,008.64	0.013	13.45	0.001	Concrete
Pipe - (560)	DPA15-4	403.20	423.47	72.0	48.9	0.010	5,991.39	5,990.90	5,996.74	5,995.90	6,000.31	5,999.89	0.013	17.05	1.278	Concrete
Pipe - (225)	DPA5-2	39.20	60.81	30.0	190.6	0.022	6,003.53	5,999.34	6,005.80	6,004.16	6,006.89	6,005.16	0.013	13.16	0.057	Concrete
Pipe - (530)	DPA5-3	27.40	27.90	24.0	37.5	0.015	6,004.60	6,004.03	6,006.42	6,005.86	6,007.71	6,007.15	0.013	10.12	0.550	Concrete
Pipe - (122) (1) (1)	DPA15-9	109.00	278.06	54.0	46.0	0.020	6,007.02	6,006.10	6,010.09	6,008.44	6,011.47	6,011.08	0.013	16.42	0.000	Concrete
Pipe - (418) (1)	DPA5-4	16.00	12.85	18.0	28.1	0.015	6,005.52	6,005.10	6,007.78	6,007.13	6,009.06	6,008.40	0.013	9.05	0.496	Concrete
Pipe - (205) (1)	DPA1-13	99.10	226.96	48.0	77.7	0.025	6,002.71	6,000.77	6,005.73	6,004.65	6,007.20	6,005.63	0.013	17.45	1.497	Concrete
Pipe - (565)	DPA22-3	271.20	375.41	66.0	96.0	0.012	6,000.60	5,999.40	6,006.48	6,005.86	6,008.51	6,007.88	0.013	11.41	0.061	Concrete
Pipe - (337)	DPA16-1	22.70	22.65	24.0	192.5	0.010	6,007.05	6,005.12	6,010.65	6,008.71	6,011.46	6,009.52	0.013	7.23	0.000	Concrete
Pipe - (417)	DPA5-5	16.00	20.33	18.0	81.4	0.037	6,008.83	6,005.78	6,010.26	6,008.41	6,011.58	6,009.69	0.013	12.75	0.065	Concrete
Pipe - (559)	DPA15-5	130.00	139.34	54.0	179.2	0.005	5,997.28	5,996.38	6,002.08	6,001.30	6,003.12	6,002.34	0.013	8.17	0.102	Concrete
Pipe - (205)	DPA1-14	56.40	129.09	36.0	63.0	0.037	6,006.07	6,003.71	6,008.50	6,007.94	6,009.81	6,008.93	0.013	17.64	1.224	Concrete
Pipe - (533)	DPA10-1	9.30	14.85	18.0	11.0	0.020	6,009.15	6,008.93	6,010.33	6,009.91	6,010.94	6,010.81	0.013	8.87	0.070	Concrete
Pipe - (556)	DPA15-8	130.00	138.78	54.0	146.6	0.005	6,002.62	6,001.89	6,006.40	6,005.96	6,007.69	6,007.11	0.013	9.92	1.789	Concrete
Pipe - (547)	DPA10-2	7.10	14.85	18.0	19.0	0.020	6,009.73	6,009.35	6,010.76	6,010.15	6,011.23	6,011.00	0.013	8.31	0.000	Concrete
Pipe - (425) (1)	DPA8-1	14.70	32.01	24.0	72.4	0.020	6,015.58	6,014.13	6,016.96	6,016.51	6,017.59	6,016.85	0.013	9.98	0.000	Concrete
Pipe - (122) (1)	DPA15-10	109.00	278.06	54.0	16.0	0.020	6,007.34	6,007.02	6,010.41	6,009.59	6,011.79	6,011.69	0.013	16.42	1.451	Concrete
Pipe - (557)	DPA15-7	130.00	138.88	54.0	431.0	0.005	6,001.79	5,999.64	6,005.57	6,004.12	6,006.86	6,005.16	0.013	9.92	0.304	Concrete
Pipe - (369)	DPA17-1	6.30	14.85	18.0	9.0	0.020	6,011.03	6,010.85	6,012.43	6,012.41	6,012.64	6,012.61	0.013	8.06	0.000	Concrete
Pipe - (370)	DPA17-2	21.00	14.85	18.0	31.0	0.020	6,011.47	6,010.85	6,013.65	6,012.41	6,015.85	6,014.61	0.013	11.88	0.000	Concrete
Pipe - (416)	DPA5-6	16.00	20.33	18.0	83.9	0.037	6,012.18	6,009.03	6,013.60	6,010.06	6,014.92	6,012.45	0.013	12.75	0.280	Concrete
Pipe - (564)	DPA22-4	271.20	375.41	66.0	173.2	0.012	6,005.32	6,003.15	6,009.89	6,006.81	6,012.45	6,010.86	0.013	17.21	0.071	Concrete
Pipe - (203)	DPA1-15	49.30	133.21	36.0	76.0	0.040	6,010.26	6,007.23	6,012.55	6,010.11	6,013.68	6,010.88	0.013	17.44	0.077	Concrete
Pipe - (580)	DPR8-1	7.00	66.69	36.0	10.0	0.010	6,006.69	6,006.59	6,007.52	6,007.31	6,007.82	6,007.76	0.013	6.12	0.640	Concrete
Pipe - (422)	DPA7-3	21.10	42.32	24.0	205.7	0.035	6,013.93	6,006.73	6,015.58	6,007.73	6,016.48	6,010.54	0.013	13.46	1.029	Concrete
Pipe - (421)	DPA7-4	7.40	14.74	18.0	12.2	0.020	6,014.67	6,014.43	6,016.57	6,016.51	6,016.84	6,016.78	0.013	4.19	0.000	Concrete
Pipe - (122)	DPA15-11	82.60	248.86	48.0	64.3	0.030	6,010.27	6,008.34	6,013.02	6,012.41	6,014.27	6,013.09	0.013	17.79	0.057	Concrete
Pipe - (415)	DPA5-7	16.00	19.64	18.0	65.7	0.035	6,014.67	6,012.37	6,016.10	6,013.97	6,017.42	6,015.25	0.013	12.39	0.262	Concrete
Pipe - (125) (1) (1)	DPA18-1	29.80	45.22	24.0	56.6	0.040	6,018.56	6,016.30	6,020.42	6,018.82	6,021.91	6,020.22	0.013	15.37	0.000	Concrete

Pipe - (121)	DPA15-12	82.60	249.37	48.0	45.5	0.030	6,012.20	6,010.83	6,014.95	6,012.76	6,016.20	6,015.70	0.013	17.82	0.062	Concrete
Pipe - (425)	DPA8-2	14.70	31.85	24.0	40.4	0.020	6,016.38	6,015.58	6,017.76	6,016.60	6,018.39	6,017.89	0.013	9.94	0.065	Concrete
Pipe - (563)	DPA22-5	271.20	375.41	66.0	174.5	0.012	6,010.79	6,008.61	6,015.37	6,012.27	6,017.93	6,016.32	0.013	17.21	0.074	Concrete
Pipe - (414)	DPA5-8	16.00	19.64	18.0	67.3	0.035	6,017.23	6,014.87	6,018.65	6,016.44	6,019.97	6,017.72	0.013	12.39	1.112	Concrete
Pipe - (558)	DPA15-6	130.00	138.88	54.0	431.0	0.005	5,999.53	5,997.38	6,004.07	6,002.19	6,005.11	6,003.23	0.013	8.17	0.050	Concrete
Pipe - (419)	DPA6-1	7.70	14.85	18.0	35.9	0.020	6,018.70	6,017.98	6,020.32	6,020.12	6,020.61	6,020.42	0.013	4.36	0.000	Concrete
Pipe - (120)	DPA15-13	82.60	248.52	48.0	49.1	0.030	6,014.17	6,012.70	6,016.92	6,014.61	6,018.17	6,017.62	0.013	17.78	1.526	Concrete
Pipe - (420)	DPA6-2	8.80	14.85	18.0	22.9	0.020	6,018.44	6,017.98	6,020.28	6,020.12	6,020.67	6,020.51	0.013	4.98	0.000	Concrete
Pipe - (119)	DPA15-14	62.10	124.64	36.0	44.7	0.035	6,016.86	6,015.30	6,019.40	6,018.82	6,020.87	6,020.02	0.013	17.62	0.066	Concrete
Pipe - (173) (2)	DPA24-1	95.50	110.72	36.0	55.5	0.028	6,021.07	6,019.54	6,023.95	6,021.95	6,026.86	6,025.78	0.013	17.62	0.000	Concrete
Pipe - (562)	DPA22-6	271.20	375.41	66.0	206.6	0.012	6,015.37	6,012.79	6,019.95	6,016.41	6,022.51	6,020.56	0.013	17.21	0.069	Concrete
Pipe - (201) (3)	DPA1-16	49.30	133.35	36.0	192.6	0.040	6,018.96	6,011.26	6,021.25	6,012.53	6,022.38	6,017.16	0.013	17.45	0.052	Concrete
Pipe - (176)	DPA31-1	5.30	14.85	18.0	46.7	0.020	6,022.88	6,021.95	6,025.31	6,025.19	6,025.45	6,025.33	0.013	3.00	0.000	Concrete
Pipe - (424)	DPA8-3	14.70	45.22	24.0	136.4	0.040	6,022.03	6,016.58	6,023.41	6,017.36	6,024.04	6,019.93	0.013	12.86	1.174	Concrete
Pipe - (423)	DPA9-1	9.20	14.65	18.0	6.2	0.019	6,022.65	6,022.53	6,024.19	6,024.15	6,024.62	6,024.57	0.013	5.21	0.000	Concrete
Pipe - (156)	DPA22-8	190.30	227.96	60.0	116.2	0.008	6,018.43	6,017.54	6,022.38	6,022.22	6,024.41	6,023.76	0.013	12.99	1.383	Concrete
Pipe - (117)	DPA15-15	62.10	124.77	36.0	70.9	0.035	6,020.34	6,017.86	6,022.88	6,019.55	6,024.35	6,023.12	0.013	17.63	0.065	Concrete
Pipe - (529)	DPA9-2	5.90	14.84	18.0	35.6	0.020	6,023.24	6,022.53	6,024.18	6,024.15	6,024.58	6,024.32	0.013	7.91	0.000	Concrete
Pipe - (175)	DPA31-2	13.70	14.85	18.0	23.0	0.020	6,022.40	6,021.95	6,025.58	6,025.19	6,026.52	6,026.13	0.013	7.75	0.000	Concrete
Pipe - (174)	DPA32-1	24.30	31.99	24.0	43.4	0.020	6,028.17	6,027.30	6,031.41	6,030.90	6,032.34	6,031.83	0.013	7.73	0.000	Concrete
Pipe - (561)	DPA22-7	271.20	260.10	66.0	-	0.006	6,017.05	6,016.37	6,021.78	6,020.94	6,024.20	6,023.50	0.013	12.42	0.182	Concrete
Pipe - (579)	DPR8-2	7.00	25.71	18.0	193.1	0.060	6,019.76	6,008.19	6,020.78	6,008.73	6,021.24	6,011.11	0.013	12.38	0.000	Concrete
Pipe - (154)	DPA22-9	175.20	263.94	54.0	172.1	0.018	6,022.03	6,018.93	6,026.56	6,025.19	6,028.45	6,027.08	0.013	11.02	0.067	Concrete
Pipe - (201)	DPA1-17	49.30	133.39	36.0	99.0	0.040	6,023.92	6,019.96	6,026.21	6,021.32	6,027.34	6,025.21	0.013	17.45	1.189	Concrete
Pipe - (552)	DPA11-1	5.20	14.85	18.0	32.3	0.020	6,026.70	6,026.05	6,027.58	6,027.55	6,027.94	6,027.69	0.013	7.66	0.000	Concrete
Pipe - (173)	DPA24-2	95.50	110.32	36.0	22.3	0.027	6,021.68	6,021.07	6,024.56	6,023.63	6,027.47	6,027.06	0.013	17.57	1.208	Concrete
Pipe - (374)	DPA25-1	6.00	14.85	18.0	40.7	0.020	6,028.39	6,027.58	6,029.34	6,028.26	6,029.74	6,029.16	0.013	7.96	0.000	Concrete
Pipe - (174) (1)	DPA25-2	8.30	14.85	18.0	18.8	0.020	6,027.95	6,027.58	6,029.07	6,028.46	6,029.61	6,029.38	0.013	8.64	0.000	Concrete
Pipe - (152) (1)	DPA22-10	175.20	264.08	54.0	88.2	0.018	6,024.42	6,022.83	6,028.26	6,026.69	6,030.54	6,028.95	0.013	17.76	1.159	Concrete
Pipe - (411) (1)	DPA18-7	12.80	14.85	18.0	34.5	0.020	6,035.15	6,034.46	6,037.03	6,036.52	6,037.84	6,037.33	0.013	7.24	0.000	Concrete
Pipe - (169) (1) (2)	DPA26-1	25.80	43.79	24.0	42.9	0.037	6,035.83	6,034.22	6,038.99	6,038.43	6,040.04	6,039.48	0.013	8.21	0.000	Concrete
Pipe - (152)	DPA22-11	162.00	277.84	54.0	88.2	0.020	6,026.55	6,024.79	6,031.50	6,030.90	6,033.12	6,032.52	0.013	10.19	0.057	Concrete
Pipe - (185) (1)	DPA33-1	113.60	203.63	48.0	54.2	0.020	6,033.17	6,032.08	6,038.13	6,037.79	6,039.40	6,039.06	0.013	9.04	0.000	Concrete
Pipe - (125) (1)	DPA18-2	29.80	45.20	24.0	146.0	0.040	6,024.39	6,018.56	6,026.25	6,019.76	6,027.74	6,023.33	0.013	15.36	0.120	Concrete
Pipe - (170)	DPA24-3	84.30	115.51	36.0	172.7	0.030	6,028.86	6,023.68	6,031.67	6,028.08	6,034.00	6,030.29	0.013	17.84	0.000	Concrete
Pipe - (125) (2)	DPA18-3	29.80	47.95	24.0	41.2	0.045	6,029.03	6,027.18	6,030.89	6,028.49	6,032.38	6,031.41	0.013	16.08	0.093	Concrete
Pipe - (123)	DPA18-4	23.80	31.99	24.0	40.3	0.020	6,030.35	6,029.55	6,032.08	6,030.93	6,033.14	6,032.57	0.013	11.16	0.748	Concrete
Pipe - (413)	DPA18-5	12.80	14.85	18.0	50.5	0.020	6,032.06	6,031.05	6,033.62	6,032.87	6,034.44	6,033.69	0.013	7.24	0.748	Concrete
Pipe - (426) (1) (1) (1)	DPA12-1	12.10	20.33	18.0	60.0	0.037	6,037.46	6,035.21	6,039.50	6,038.71	6,040.23	6,039.43	0.013	6.85	0.000	Concrete
Pipe - (539)	DPR2-0	56.20	66.69	36.0	53.5	0.010	6,037.95	6,037.42	6,040.38	6,039.59	6,041.69	6,041.22	0.013	10.58	0.001	Concrete
Pipe - (430) (2)	DPA35-2	19.20	42.30	24.0	12.6	0.035	6,038.85	6,038.41	6,043.47	6,043.38	6,044.05	6,043.96	0.013	6.11	0.000	Concrete
Pipe - (116)	DPA15-16	62.10	124.71	36.0	271.2	0.035	6,031.32	6,021.84	6,033.86	6,023.34	6,035.33	6,028.16	0.013	17.62	0.063	Concrete
Pipe - (412)	DPA18-6	12.80	14.85	18.0	99.6	0.020	6,034.25	6,032.26	6,035.65	6,034.23	6,036.52	6,035.05	0.013	9.45	1.000	Concrete
Pipe - (573) (1)	DPA24-4	84.30	115.37	36.0	75.2	0.030	6,032.82	6,030.57	6,035.63	6,032.69	6,037.96	6,036.56	0.013	17.82	1.202	Concrete
Pipe - (198)	DPA1-20	36.00	47.09	36.0	220.7	0.005	6,034.80	6,033.70	6,039.35	6,038.71	6,039.75	6,039.11	0.013	5.09	2.813	Concrete
Pipe - (196)	DPA14-3	6.10	14.85	18.0	40.1	0.020	6,037.11	6,036.31	6,040.62	6,040.48	6,040.80	6,040.67	0.013	3.45	0.000	Concrete
Pipe - (197)	DPA14-2	13.70	14.85	18.0	9.7	0.020	6,036.51	6,036.31	6,040.65	6,040.48	6,041.58	6,041.42	0.013	7.75	0.078	Concrete
Pipe - (568)	DPA14-1	5.30	14.85	18.0	19.5	0.020	6,037.09	6,036.70	6,040.77	6,040.72	6,040.91	6,040.86	0.013	3.00	0.000	Concrete
Pipe - (199) (1)	DPA1-18	45.80	127.36	36.0	235.0	0.036	6,032.69	6,024.12	6,034.90	6,027.55	6,035.95	6,028.20	0.013	16.54	0.050	Concrete
Pipe - (149)	DPA22-12	162.00	271.24	54.0	111.4	0.019	6,031.58	6,029.46	6,035.30	6,032.22	6,037.36	6,036.11	0.013	17.81	1.207	Concrete
Pipe - (185)	DPA33-2	113.60	201.72	48.0	9.1	0.020	6,033.35	6,033.17	6,038.19	6,038.13	6,039.46	6,039.40	0.013	9.04	2.255	Concrete
Pipe - (526)	DPA34-1	11.50	18.03	18.0	9.2	0.029	6,036.12	6,035.85	6,041.16	6,041.05	6,041.82	6,041.71	0.013	6.51	0.000	Concrete
Pipe - (411)	DPA18-8	12.80	14.85	18.0	96.7	0.020	6,037.08	6,035.15	6,038.42	6,037.03	6,039.34	6,037.84	0.013	9.45	1.000	Concrete
Pipe - (410)	DPA18-9	6.20	14.85	18.0	24.3	0.020	6,037.77	6,037.28	6,039.42	6,039.34	6,039.61	6,039.53	0.013	3.51	0.000	Concrete
Pipe - (184) (1)	DPA33-3	102.80	226.96	48.0	36.0	0.025	6,034.45	6,033.55	6,041.23	6,041.05	6,042.27	6,042.09	0.013	8.18	0.059	Concrete
Pipe - (549)	DPA1-22	19.50	31.99	24.0	52.0	0.020	6,039.14	6,038.10	6,043.03	6,042.64	6,043.63	6,043.24	0.013	6.21	0.000	Concrete
Pipe - (114)	DPA15-17	62.10	124.70	36.0	116.4	0.035	6,036.12	6,032.05	6,038.66	6,033.65	6,040.13	6,037.73	0.013	17.62	1.172	Concrete
Pipe - (198) (1)	DPA1-19	45.80	47.33	36.0	160.8	0.005	6,033.70	6,032.89	6,036.08	6,035.10	6,036.98	6,036.15	0.013	7.63	2.908	Concrete
Pipe - (448)	DPR4-1	2.30	14.85	18.0	32.5	0.020	6,042.84	6,042.19	6,045.58	6,045.57	6,045.61	6,045.59	0.013	1.30	0.000	Concrete
Pipe - (544)	DPA19-1	8.10	14.90	18.0	29.8	0.020	6,038.42	6,037.82	6,040.56	6,040.38	6,040.89	6,040.71	0.013	4.58	0.000	Concrete
Pipe - (184)	DPA33-4	102.80	226.96	48.0	45.3	0.025	6,035.78	6,034.65	6,041.53	6,041.30	6,042.57	6,042.34	0.013	8.18	1.656	Concrete
Pipe - (430) (1)	DPA35-1	19.20	42.38	24.0	12.3	0.035	6,038.21	6,037.78	6,043.34	6,043.25	6,043.92	6,043.83	0.013	6.11	0.067	Concrete
Pipe - (148)	DPA22-13	62.40	124.75	36.0	69.2	0.035	6,035.50	6,033.08	6,038.34	6,037.79	6,039.60	6,039.00	0.013	17.65	1.385	Concrete
Pipe - (527)	DPA42-1	7.20	14.77	18.0	15.7	0.020	6,038.81	6,038.50	6,040.11	6,040.09	6,040.42	6,040.35	0.013	8.31	0.000	Concrete
Pipe - (528)	DPA42-2	6.50	14.81	18.0	33.7	0.020	6,039.17	6,038.50	6,040.16	6,040.09	6,040.59	6,040.30	0.013	8.11	0.000	Concrete
Pipe - (553)	DPA1-21	19.50	22.60	24.0	210.3	0.010	6,037.90	6,035.80	6,042.05	6,040.48	6,042.64	6,041.08	0.013	6.21	1.000	Concrete
Pipe - (113)	DPA15-18	56.70	94.36	36.0	95.9	0.020	6,038.24	6,036.32	6,040.98	6,040.38	6,042.07	6,041.38	0.013	13.96	0.063	Concrete
Pipe - (243)	DPR2-3	56.20	47.18	36.0	84.8	0.005	6,039.94	6,039.51	6,042.92	6,042.34	6,043.91	6,043.37	0.013	7.95	1.742	Concrete
Pipe - (246)	DPR3-1	13.70	15.93	18.0	9.7	0.023	6,041.86	6,041.63	6,044.80	6,044.63	6,045.73	6,045.57	0.013	7.75	0.000	Concrete
Pipe - (247)																

	DPR3-2	3.80	14.85	18.0	35.1	0.020	6,042.33	6,041.63	6,044.68	6,044.63	6,044.75	6,044.71	0.013	2.15	0.000	Concrete
Pipe - (241)	DPR2-4	43.30	47.23	36.0	70.8	0.005	6,040.49	6,040.13	6,044.93	6,044.63	6,045.52	6,045.22	0.013	6.13	1.085	Concrete
Pipe - (244) (1)	DPR2-2	56.20	47.19	36.0	131.9	0.005	6,039.31	6,038.65	6,042.21	6,041.08	6,043.22	6,042.39	0.013	7.95	0.129	Concrete
Pipe - (449)	DPR5-1	2.90	18.19	18.0	32.5	0.030	6,045.96	6,044.98	6,047.16	6,047.15	6,047.21	6,047.19	0.013	7.53	0.000	Concrete
Pipe - (573)	DPA24-5	65.00	124.74	36.0	172.2	0.035	6,039.24	6,033.22	6,041.83	6,038.43	6,043.39	6,039.75	0.013	17.83	0.050	Concrete
Pipe - (112)	DPA15-19	56.70	94.40	36.0	106.8	0.020	6,040.58	6,038.44	6,043.02	6,041.05	6,044.34	6,042.22	0.013	13.96	0.063	Concrete
Pipe - (240)	DPR2-5	41.90	47.17	36.0	71.3	0.005	6,041.05	6,040.69	6,045.85	6,045.57	6,046.39	6,046.11	0.013	5.93	0.057	Concrete
Pipe - (245)	DPR2-1	56.20	66.69	36.0	50.0	0.010	6,038.45	6,037.95	6,040.88	6,040.13	6,042.19	6,041.76	0.013	10.58	0.050	Concrete
Pipe - (430)	DPA35-3	19.20	42.28	24.0	99.6	0.035	6,042.33	6,038.85	6,044.10	6,043.47	6,044.76	6,044.05	0.013	13.14	0.051	Concrete
Pipe - (169)	DPA26-3	25.80	31.99	24.0	19.4	0.020	6,041.14	6,040.75	6,042.92	6,042.59	6,044.10	6,043.72	0.013	11.33	0.147	Concrete
Pipe - (516)	DPA26-4	17.50	31.99	24.0	38.9	0.020	6,042.22	6,041.44	6,043.73	6,043.09	6,044.46	6,043.71	0.013	10.41	1.000	Concrete
Pipe - (169) (3) (1)	DPA26-2	25.80	43.79	24.0	118.3	0.037	6,040.26	6,035.83	6,042.04	6,038.99	6,043.23	6,040.04	0.013	14.51	0.460	Concrete
Pipe - (426) (1) (1)	DPA12-2	12.10	20.33	18.0	168.1	0.037	6,043.76	6,037.46	6,045.08	6,039.50	6,045.92	6,040.23	0.013	12.00	1.301	Concrete
Pipe - (426)	DPA12-3	8.80	14.85	18.0	46.2	0.020	6,044.89	6,043.96	6,046.49	6,046.17	6,046.88	6,046.56	0.013	4.98	0.000	Concrete
Pipe - (111)	DPA15-20	56.70	94.23	36.0	99.2	0.020	6,042.76	6,040.78	6,045.20	6,042.56	6,046.52	6,045.18	0.013	13.94	0.059	Concrete
Pipe - (344) (1)	DPA21-1	5.10	10.50	18.0	56.5	0.010	6,048.65	6,048.08	6,050.60	6,050.46	6,050.73	6,050.59	0.013	2.89	0.000	Concrete
Pipe - (545)	DPA26-5	8.10	14.85	18.0	110.0	0.020	6,044.92	6,042.72	6,046.02	6,044.46	6,046.55	6,044.79	0.013	8.59	0.000	Concrete
Pipe - (110) (2) (1)	DPA15-21	56.70	94.21	36.0	57.1	0.020	6,044.10	6,042.96	6,046.54	6,044.82	6,047.86	6,047.18	0.013	13.94	0.057	Concrete
Pipe - (532)	DPA13-1	3.70	19.64	18.0	55.2	0.035	6,045.89	6,043.96	6,046.63	6,046.17	6,046.92	6,046.24	0.013	8.53	0.000	Concrete
Pipe - (429)	DPA35-4	12.70	19.73	18.0	87.0	0.035	6,045.90	6,042.83	6,047.24	6,043.72	6,048.14	6,045.83	0.013	11.86	0.055	Concrete
Pipe - (110)	DPA15-22	56.70	94.15	36.0	58.2	0.020	6,045.26	6,044.10	6,047.70	6,046.62	6,049.02	6,047.86	0.013	13.93	1.027	Concrete
Pipe - (542)	DPA20-2	3.00	15.12	18.0	9.2	0.021	6,047.15	6,046.96	6,049.06	6,049.05	6,049.11	6,049.10	0.013	1.70	0.000	Concrete
Pipe - (543)	DPA20-1	2.90	14.92	18.0	29.7	0.020	6,047.56	6,046.96	6,049.08	6,049.05	6,049.12	6,049.10	0.013	1.64	0.000	Concrete
Pipe - (239)	DPR2-6	41.90	66.69	36.0	123.1	0.010	6,042.48	6,041.25	6,046.36	6,045.88	6,046.91	6,046.42	0.013	5.93	1.433	Concrete
Pipe - (109) (1)	DPA15-23	54.00	94.46	36.0	55.3	0.020	6,046.57	6,045.46	6,049.34	6,049.05	6,050.32	6,049.96	0.013	13.81	1.150	Concrete
Pipe - (183)	DPA33-5	86.20	171.26	42.0	239.5	0.029	6,043.22	6,036.28	6,046.11	6,043.25	6,047.71	6,044.50	0.013	17.83	1.235	Concrete
Pipe - (147)	DPA22-14	56.50	124.75	36.0	223.0	0.035	6,044.80	6,037.00	6,047.24	6,040.09	6,048.55	6,041.08	0.013	17.21	0.065	Concrete
Pipe - (375)	DPA36-2	3.20	14.85	18.0	31.0	0.020	6,047.83	6,047.21	6,048.51	6,048.09	6,048.77	6,048.22	0.013	6.70	0.000	Concrete
Pipe - (376)	DPA36-1	9.50	14.85	18.0	9.0	0.020	6,047.39	6,047.21	6,048.58	6,048.22	6,049.20	6,049.10	0.013	8.91	0.000	Concrete
Pipe - (344)	DPA21-2	5.10	10.50	18.0	14.7	0.010	6,048.79	6,048.65	6,050.63	6,050.60	6,050.76	6,050.73	0.013	2.89	1.000	Concrete
Pipe - (541)	DPA21-3	4.00	10.50	18.0	24.3	0.010	6,049.24	6,048.99	6,050.79	6,050.76	6,050.87	6,050.84	0.013	2.26	0.000	Concrete
Pipe - (105)	DPA15-26	50.10	74.76	36.0	56.5	0.013	6,051.34	6,050.63	6,054.15	6,053.88	6,054.97	6,054.66	0.013	11.33	0.000	Concrete
Pipe - (428)	DPA35-5	8.70	20.33	18.0	88.6	0.037	6,049.49	6,046.17	6,050.63	6,046.86	6,051.20	6,048.76	0.013	11.05	0.054	Concrete
Pipe - (109)	DPA15-24	50.10	74.49	36.0	129.9	0.012	6,048.39	6,046.77	6,051.09	6,050.46	6,051.96	6,051.24	0.013	11.30	1.000	Concrete
Pipe - (236)	DPR6-1	25.10	29.00	30.0	148.6	0.005	6,049.69	6,048.95	6,052.09	6,051.56	6,052.51	6,051.97	0.013	6.65	0.000	Concrete
Pipe - (521)	DPA37-2	7.10	14.85	18.0	31.2	0.020	6,051.68	6,051.05	6,053.41	6,053.27	6,053.66	6,053.52	0.013	4.02	0.000	Concrete
Pipe - (572)	DPA24-6	65.00	124.74	36.0	257.2	0.035	6,048.44	6,039.44	6,051.02	6,040.98	6,052.59	6,045.92	0.013	17.83	0.057	Concrete
Pipe - (182)	DPA33-6	75.50	174.22	42.0	64.0	0.030	6,047.13	6,045.21	6,049.85	6,048.09	6,051.23	6,049.32	0.013	17.46	1.000	Concrete
Pipe - (195) (1) (1) (1)	DPA33-7	75.50	174.13	42.0	42.7	0.030	6,049.04	6,047.76	6,051.76	6,051.23	6,053.14	6,052.19	0.013	17.45	1.094	Concrete
Pipe - (522)	DPA37-1	7.80	14.85	18.0	9.2	0.020	6,051.24	6,051.05	6,053.32	6,053.27	6,053.62	6,053.57	0.013	4.41	0.000	Concrete
Pipe - (237)	DPR2-7	39.50	124.74	36.0	142.0	0.035	6,048.45	6,043.48	6,050.49	6,047.15	6,051.41	6,047.63	0.013	15.65	1.161	Concrete
Pipe - (106)	DPA15-25	50.10	74.49	36.0	147.5	0.012	6,050.43	6,048.59	6,052.73	6,051.96	6,053.88	6,052.74	0.013	11.30	1.000	Concrete
Pipe - (195) (1)	DPA33-8	63.70	115.49	36.0	97.7	0.030	6,052.48	6,049.55	6,055.05	6,053.27	6,056.57	6,054.53	0.013	16.74	0.053	Concrete
Pipe - (536)	DPA35-6	4.30	20.33	18.0	128.4	-0.037	6,049.68	6,054.49	6,055.29	6,050.66	6,055.60	6,050.85	0.013	9.13	0.063	Concrete
Pipe - (571)	DPA24-7	65.00	124.74	36.0	140.1	0.035	6,053.54	6,048.64	6,056.13	6,050.26	6,057.69	6,054.61	0.013	17.83	0.066	Concrete
Pipe - (368) (1)	DPR2-8	16.70	76.71	30.0	138.8	0.035	6,053.80	6,048.95	6,055.18	6,051.56	6,055.74	6,051.74	0.013	12.50	0.059	Concrete
Pipe - (146) (1)	DPA22-15	56.50	124.75	36.0	223.0	0.035	6,053.60	6,045.80	6,056.04	6,047.22	6,057.35	6,051.77	0.013	17.21	0.057	Concrete
Pipe - (195)	DPA33-9	63.70	124.74	36.0	65.7	0.035	6,055.28	6,052.98	6,057.84	6,054.71	6,059.37	6,058.25	0.013	17.74	0.059	Concrete
Pipe - (535)	DPA35-7	4.30	20.33	18.0	139.4	0.037	6,059.92	6,054.70	6,060.72	6,055.17	6,061.04	6,056.46	0.013	9.13	0.000	Concrete
Pipe - (570)	DPA24-8	65.00	124.74	36.0	139.4	0.035	6,058.62	6,053.74	6,061.20	6,055.36	6,062.77	6,059.71	0.013	17.83	0.067	Concrete
Pipe - (431)	DPA39-2	3.40	10.50	18.0	31.2	0.010	6,062.05	6,061.74	6,065.16	6,065.13	6,065.22	6,065.19	0.013	1.92	0.000	Concrete
Pipe - (367) (1) (1)	DPR2-9	16.70	76.71	30.0	106.2	0.035	6,057.72	6,054.00	6,059.10	6,054.80	6,059.66	6,057.16	0.013	12.50	0.058	Concrete
Pipe - (194)	DPA33-10	63.70	124.74	36.0	75.2	0.035	6,058.41	6,055.78	6,060.98	6,057.49	6,062.50	6,061.16	0.013	17.74	1.086	Concrete
Pipe - (364)	DPA43-3	28.50	22.76	24.0	27.7	0.010	6,064.67	6,064.39	6,069.13	6,068.69	6,070.41	6,069.97	0.013	9.07	0.000	Concrete
Pipe - (433)	DPA38-1	46.90	64.92	30.0	19.2	0.025	6,059.38	6,058.90	6,062.88	6,062.63	6,064.30	6,064.05	0.013	9.55	0.063	Concrete
Pipe - (229)	DPR7-2	5.60	10.50	18.0	84.8	0.010	6,066.16	6,065.31	6,067.14	6,067.06	6,067.47	6,067.22	0.013	6.04	0.000	Concrete
Pipe - (434)	DPA38-2	46.90	64.96	30.0	24.3	0.025	6,060.73	6,060.12	6,063.29	6,062.97	6,064.71	6,064.39	0.013	9.55	1.298	Concrete
Pipe - (229) (1)	DPR7-1	11.60	58.00	30.0	59.4	0.020	6,065.50	6,064.31	6,066.97	6,067.06	6,067.20	6,067.15	0.013	9.23	0.000	Concrete
Pipe - (432)	DPA39-1	7.60	14.85	18.0	9.2	0.020	6,061.93	6,061.74	6,065.18	6,065.13	6,065.46	6,065.42	0.013	4.30	0.000	Concrete
Pipe - (362)	DPA22-21	21.10	27.65	24.0	43.5	0.015	6,067.53	6,066.88	6,071.48	6,071.10	6,072.18	6,071.80	0.013	6.72	0.000	Concrete
Pipe - (193) (1)	DPA33-11	18.50	23.45	18.0	58.2	0.050	6,062.80	6,059.90	6,064.43	6,062.63	6,066.14	6,064.33	0.013	10.47	0.058	Concrete
Pipe - (367) (1)	DPR2-10	16.70	76.71	30.0	109.9	0.035	6,061.76	6,057.91	6,063.14	6,058.71	6,063.70	6,061.09	0.013	12.50	0.058	Concrete
Pipe - (569)	DPA24-9	65.00	124.74	36.0	114.3	0.035	6,062.81	6,058.81	6,065.40	6,060.46	6,066.96	6,064.60	0.013	17.83	1.195	Concrete
Pipe - (142)	DPA22-18	56.50	47.22	36.0	305.3	0.005	6,063.28	6,061.75	6,067.08	6,064.89	6,068.07	6,065.88	0.013	7.99	1.519	Concrete
Pipe - (126)	DPA43-1	3.30	14.82	18.0	35.2	0.020	6,065.48	6,064.78	6,068.62	6,068.59	6,068.68	6,068.64	0.013	1.87	0.000	Concrete
Pipe - (127)	DPA43-2	32.00	40.70	30.0	11.2	0.010	6,063.89	6,063.78	6,068.66	6,068.59	6,069.32	6,069.25	0.013	6.52	0.050	Concrete
Pipe - (520)	DPA27-1	7.90	18.19	18.0	54.6	0.030	6,066.15	6,064.51	6,067.56	6,067.27	6,067.88	6,067.58	0.013	9.93	1.000	Concrete
Pipe - (363) (1)	DPA22-19	24.20	41.02	30.0	89.0	0.010	6,064.67	6,063.78	6,068.90	6,068.59	6,069.28	6,068.97	0.013	4.93	1.694	Concrete
Pipe - (519)	DPA27-2	7.90	18.19	18.0	9.2	0.030	6,066.63	6,066.35	6,067.81	6,067.88	6,068.24	6,068.19	0.013	9.93	0.000	Concrete
Pipe - (555)																

	DPA44-1	8.80	14.88	18.0	53.3	0.020	6,066.74	6,065.67	6,069.91	6,069.54	6,070.30	6,069.92	0.013	4.98	0.000	Concrete
Pipe - (371) (1)	DPA24-10	58.40	124.74	36.0	54.5	0.035	6,064.92	6,063.01	6,067.39	6,067.27	6,068.75	6,068.33	0.013	17.35	1.095	Concrete
Pipe - (518)	DPA28-1	7.50	14.85	18.0	9.8	0.020	6,066.82	6,066.62	6,068.93	6,068.88	6,069.21	6,069.16	0.013	4.24	0.000	Concrete
Pipe - (517)	DPA28-2	4.10	14.85	18.0	41.2	0.020	6,067.45	6,066.62	6,068.95	6,068.88	6,069.03	6,068.97	0.013	2.32	0.000	Concrete
Pipe - (144)	DPA22-16	56.50	99.90	36.0	269.6	0.022	6,059.85	6,053.80	6,062.29	6,055.41	6,063.60	6,058.71	0.013	14.57	0.050	Concrete
Pipe - (192) (1)	DPA33-12	18.50	23.48	18.0	72.4	0.050	6,067.12	6,063.50	6,068.58	6,064.55	6,070.31	6,067.61	0.013	14.72	0.059	Concrete
Pipe - (363)	DPA22-20	21.10	27.75	24.0	100.3	0.015	6,066.68	6,065.17	6,070.41	6,069.54	6,071.11	6,070.24	0.013	6.72	0.982	Concrete
Pipe - (366)	DPR2-11	16.70	40.99	30.0	125.9	0.010	6,063.22	6,061.96	6,064.60	6,063.07	6,065.16	6,064.05	0.013	7.92	0.061	Concrete
Pipe - (191) (1)	DPA33-13	18.50	23.47	18.0	62.1	0.050	6,070.93	6,067.83	6,072.39	6,068.89	6,074.12	6,071.88	0.013	14.72	0.057	Concrete
Pipe - (143)	DPA22-17	56.50	47.16	36.0	300.0	0.005	6,061.55	6,060.05	6,064.84	6,062.49	6,065.83	6,063.80	0.013	7.99	0.050	Concrete
Pipe - (365)	DPR2-12	16.70	41.02	30.0	69.5	0.010	6,064.12	6,063.42	6,065.50	6,064.55	6,066.06	6,065.49	0.013	7.93	2.790	Concrete
Pipe - (178) (1) (3) (1)	DPA38-3	37.90	45.22	24.0	271.5	0.040	6,072.09	6,061.24	6,074.03	6,065.13	6,076.34	6,067.39	0.013	16.12	0.063	Concrete
Pipe - (190) (1) (1)	DPA33-14	18.50	22.88	18.0	92.0	0.047	6,075.50	6,071.13	6,076.95	6,072.18	6,078.69	6,075.24	0.013	14.41	1.148	Concrete
Pipe - (371) (2) (1)	DPA24-11	49.60	117.53	36.0	275.0	0.031	6,073.66	6,065.12	6,075.95	6,068.88	6,077.09	6,069.65	0.013	15.92	1.000	Concrete
Pipe - (96) (2)	DPA24-12	49.60	111.08	36.0	61.0	0.028	6,075.55	6,073.86	6,077.85	6,077.09	6,078.98	6,077.86	0.013	15.27	1.103	Concrete
Pipe - (378)	DPA29-1	2.90	14.85	18.0	31.4	0.020	6,077.68	6,077.05	6,079.12	6,079.10	6,079.17	6,079.14	0.013	6.52	0.000	Concrete
Pipe - (377)	DPA29-2	7.90	14.85	18.0	9.4	0.020	6,077.24	6,077.05	6,079.15	6,079.10	6,079.46	6,079.41	0.013	4.47	0.000	Concrete
Pipe - (444)	DPA30-1	20.20	14.83	18.0	40.6	0.020	6,082.01	6,081.20	6,085.76	6,084.26	6,087.79	6,086.29	0.013	11.43	0.000	Concrete
Pipe - (187)	DPA40-2	9.70	16.61	18.0	32.2	0.025	6,078.78	6,077.97	6,080.44	6,080.17	6,080.91	6,080.63	0.013	5.49	0.073	Concrete
Pipe - (188)	DPA40-1	9.70	12.86	18.0	116.3	0.015	6,077.47	6,075.73	6,079.93	6,078.94	6,080.40	6,079.41	0.013	5.49	0.496	Concrete
Pipe - (435)	DPA24-13	41.90	78.59	30.0	113.3	0.037	6,080.20	6,076.04	6,082.37	6,079.10	6,083.70	6,080.23	0.013	16.27	1.417	Concrete
Pipe - (186)	DPA40-3	9.70	16.61	18.0	113.1	0.025	6,082.10	6,079.27	6,083.30	6,080.10	6,083.94	6,081.58	0.013	9.76	0.000	Concrete
Pipe - (178) (1) (4)	DPA38-4	37.90	50.55	24.0	165.1	0.050	6,081.34	6,073.09	6,083.28	6,074.40	6,085.58	6,079.12	0.013	17.66	0.065	Concrete
Pipe - (190) (2)	DPA33-15	10.60	22.88	18.0	179.8	0.047	6,084.26	6,075.73	6,085.51	6,078.94	6,086.21	6,079.50	0.013	12.70	1.403	Concrete
Pipe - (177)	DPA38-6	37.90	50.55	24.0	32.3	0.050	6,088.01	6,086.40	6,089.95	6,087.92	6,092.25	6,091.33	0.013	17.66	0.000	Concrete
Pipe - (178)	DPA38-5	37.90	50.55	24.0	43.9	0.050	6,083.72	6,081.53	6,085.66	6,083.00	6,087.96	6,086.65	0.013	17.66	1.000	Concrete
Pipe - (190)	DPA33-16	5.80	19.42	18.0	49.7	0.034	6,086.15	6,084.45	6,087.08	6,086.49	6,087.48	6,086.66	0.013	9.60	0.514	Concrete
Pipe - (436)	DPA24-14	22.70	45.22	24.0	144.7	0.040	6,086.48	6,080.70	6,088.18	6,084.26	6,089.17	6,085.07	0.013	14.40	0.063	Concrete
Pipe - (546)	DPA41-1	5.40	18.19	18.0	41.6	0.030	6,085.70	6,084.45	6,086.60	6,086.49	6,086.97	6,086.64	0.013	8.97	0.000	Concrete
Pipe - (439)	DPA24-16	22.70	45.25	24.0	45.7	0.040	6,093.49	6,091.66	6,095.19	6,094.15	6,096.18	6,094.96	0.013	14.41	0.000	Concrete
Pipe - (437)	DPA24-15	22.70	45.23	24.0	119.6	0.040	6,091.46	6,086.68	6,093.16	6,087.70	6,094.15	6,090.80	0.013	14.41	1.000	Concrete
Pipe - (524)	DPA33-17	5.80	18.19	18.0	126.6	0.030	6,090.15	6,086.35	6,091.08	6,087.29	6,091.47	6,087.68	0.013	9.15	0.000	Concrete

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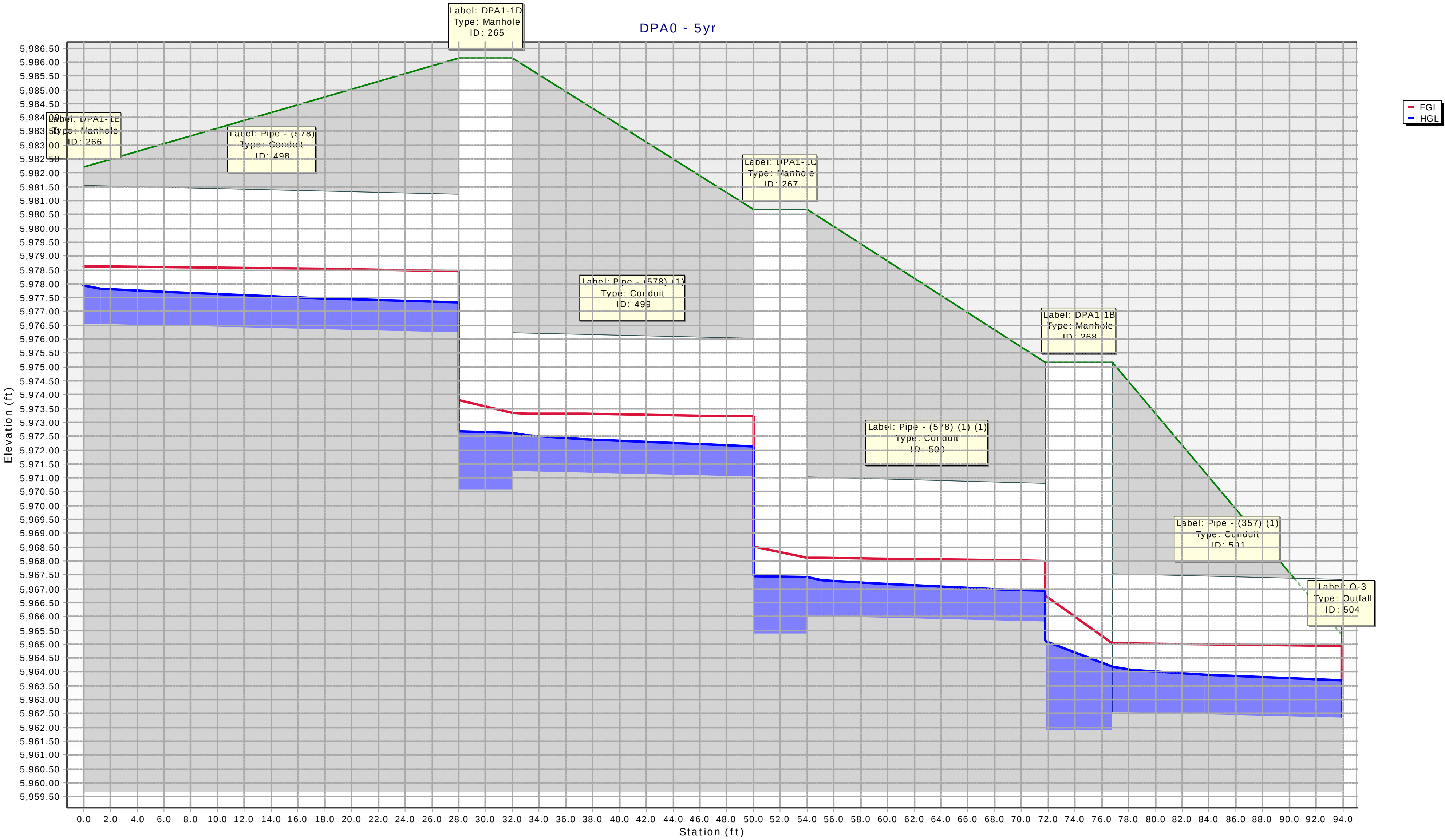
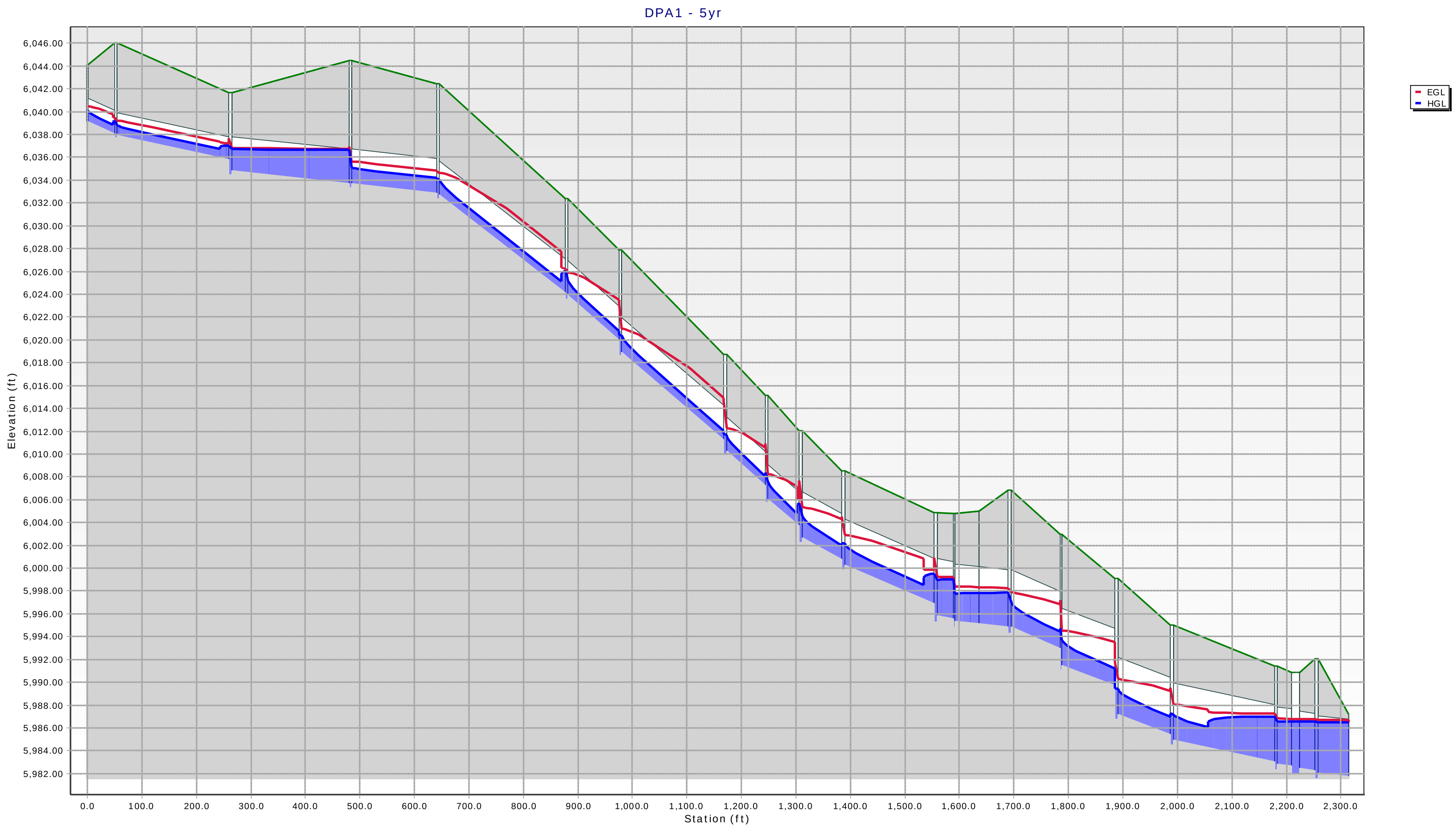


DPA0 - 5yr
Label: DPA1-1D
Type: Manhole
ID: 265
Label: DPA1-1E
Type: Manhole
ID: 266
Label: Pipe - (578)
Type: Conduit
ID: 498
Label: DPA1-1C
Type: Manhole
ID: 267
Label: Pipe - (578) (1)
Type: Conduit
ID: 499
Label: DPA1-1B
Type: Manhole
ID: 268
Label: Pipe - (578) (1) (1)
Type: Conduit
ID: 500
Label: Pipe - (357) (1)
Type: Conduit
ID: 501
Label: O-3
Type: Outfall
ID: 504
EGL
HGL
Elevation (ft)
Station (ft)
5,986.50
5,959.50
0.0
94.0



DPA1 - 5yr
EGL
HGL
Elevation (ft)
Station (ft)
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6,042.00
6,040.00
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5,994.00
5,992.00
5,990.00
5,988.00
5,986.00
5,984.00
5,982.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
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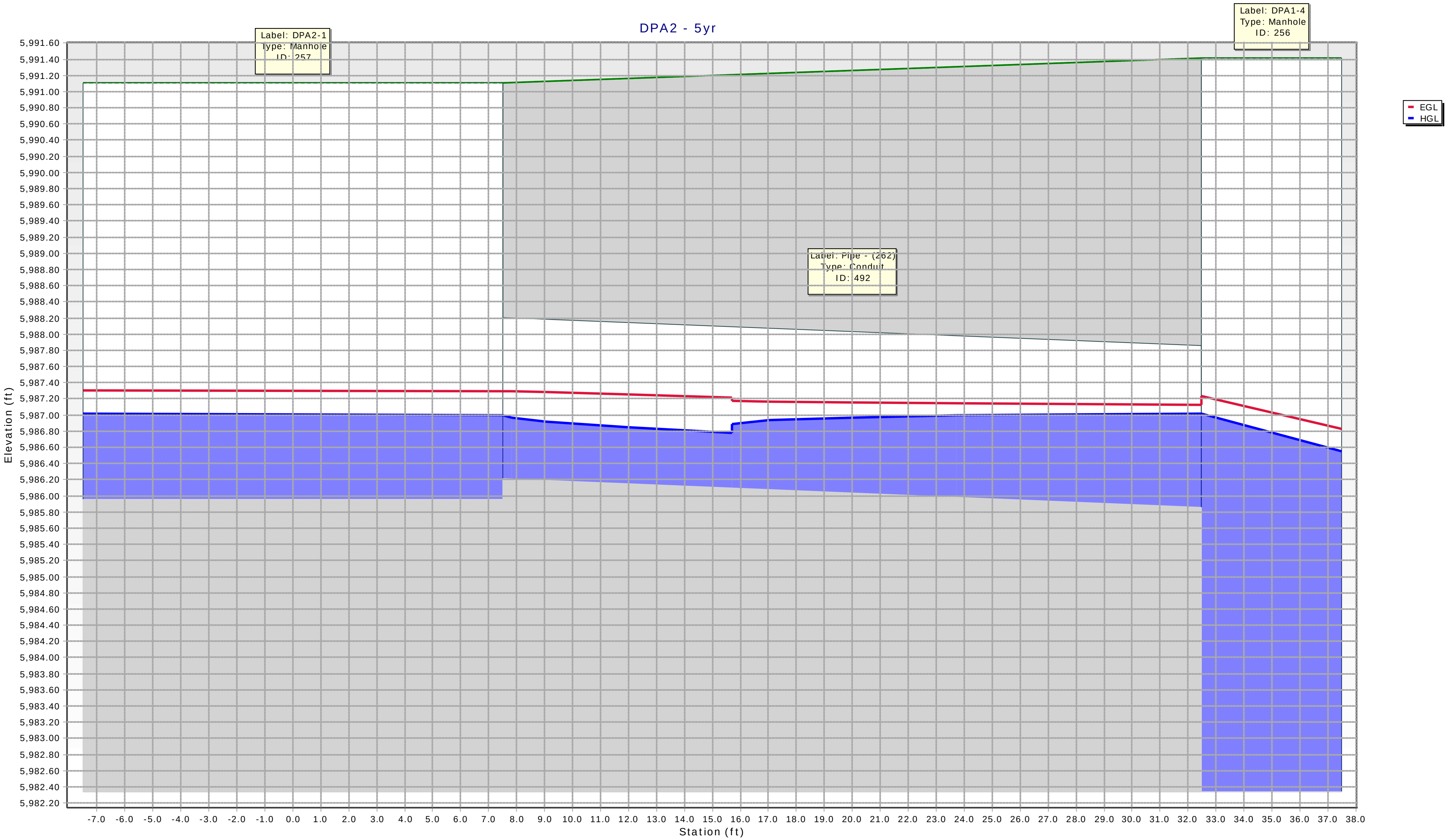

DPA2 - 5yr
Label: DPA2-1
Type: Manhole
ID: 257
Label: DPA1-4
Type: Manhole
ID: 256
Label: Pipe - (262)
Type: Conduit
ID: 492
EGL
HGL
Elevation (ft)
Station (ft)
5,991.60
5,991.40
5,991.20
5,991.00
5,990.80
5,990.60
5,990.40
5,990.20
5,990.00
5,989.80
5,989.60
5,989.40
5,989.20
5,989.00
5,988.80
5,988.60
5,988.40
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5,987.60
5,987.40
5,987.20
5,987.00
5,986.80
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5,986.40
5,986.20
5,986.00
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5,985.40
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5,985.00
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5,982.80
5,982.60
5,982.40
5,982.20
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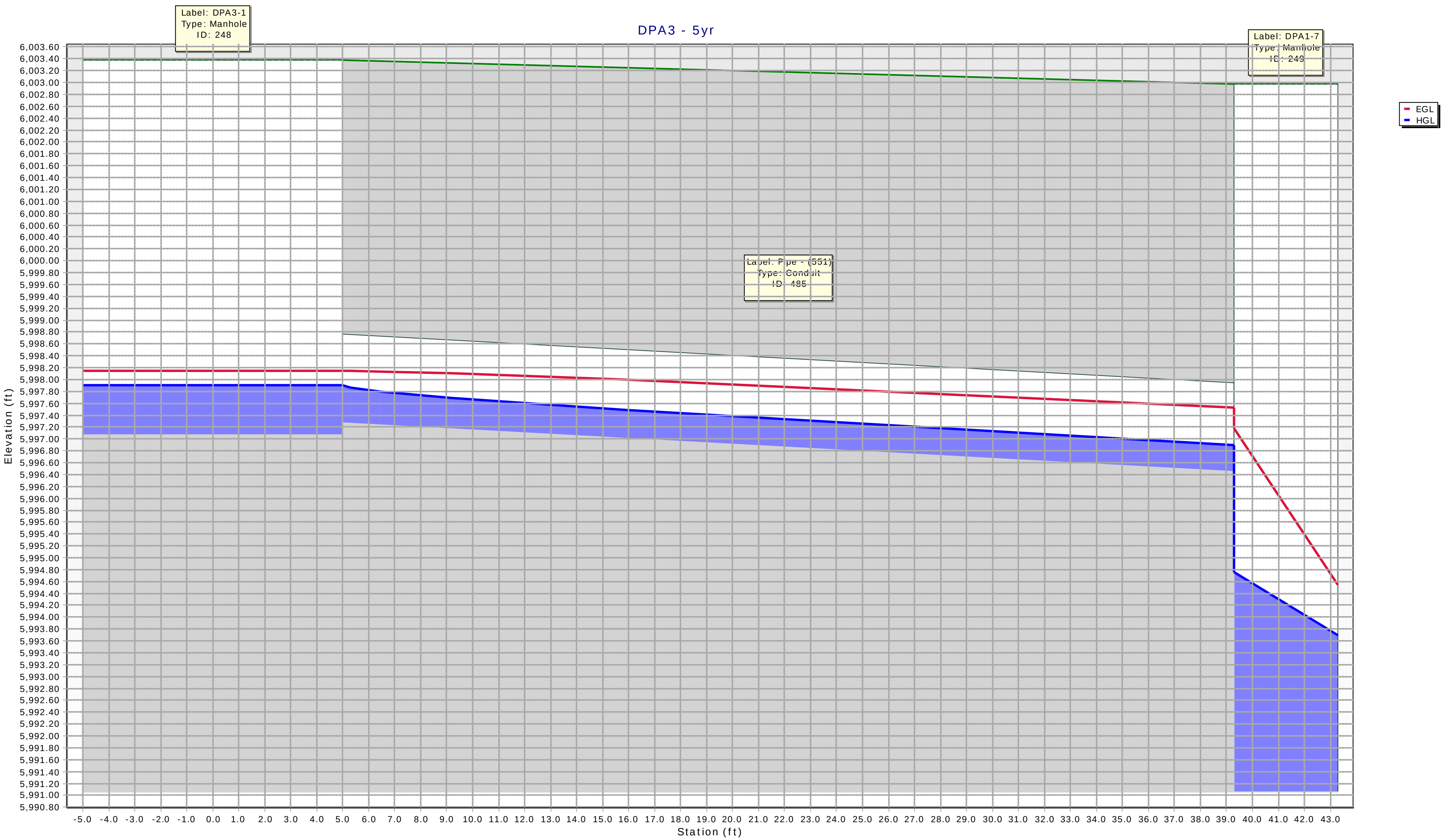
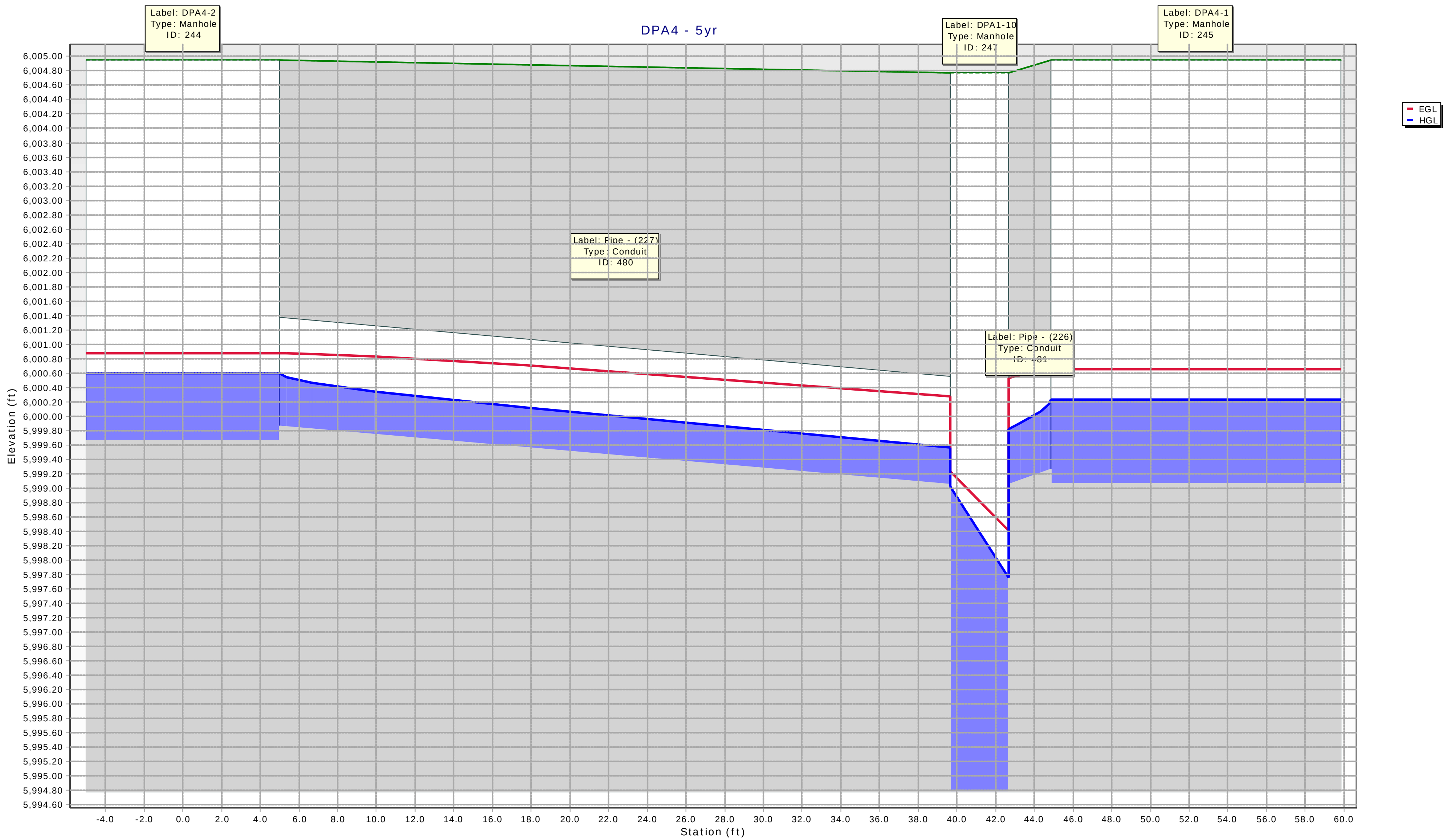
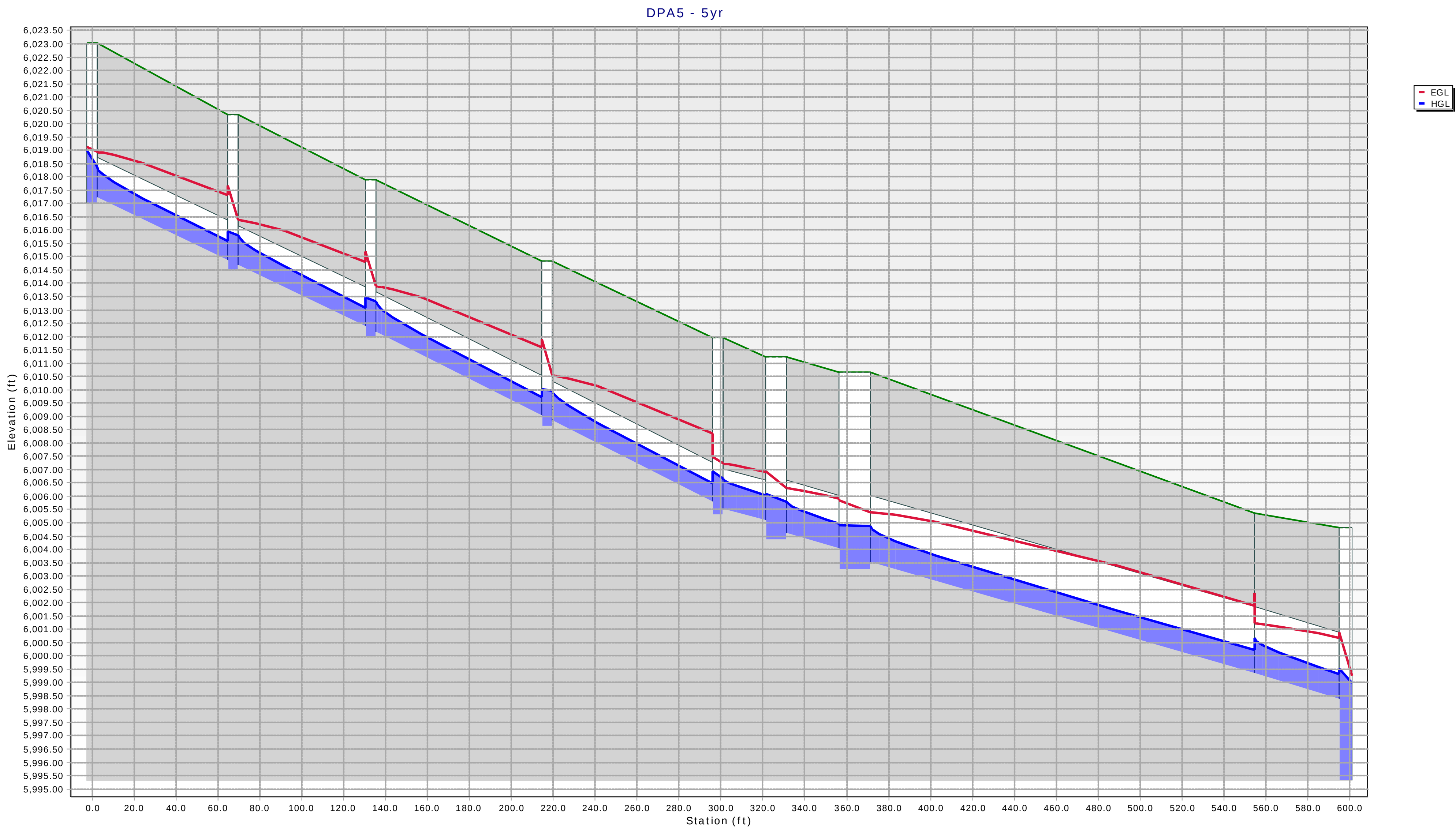


DPA3 - 5yr
Label: DPA3-1
Type: Manhole
ID: 248
Label: DPA1-7
Type: Manhole
ID: 249
Label: Pipe - (551)
Type: Conduit
ID: 485
EGL
HGL
Elevation (ft)
Station (ft)



DPA4 - 5yr
Label: DPA4-2
Type: Manhole
ID: 244
Label: DPA1-10
Type: Manhole
ID: 247
Label: DPA4-1
Type: Manhole
ID: 245
Label: Pipe - (227)
Type: Conduit
ID: 480
Label: Pipe - (226)
Type: Conduit
EGL
HGL
Elevation (ft)
Station (ft)



DPA5 - 5yr
EGL
HGL
Elevation (ft)
Station (ft)
6,023.50
6,023.00
6,022.50
6,022.00
6,021.50
6,021.00
6,020.50
6,020.00
6,019.50
6,019.00
6,018.50
6,018.00
6,017.50
6,017.00
6,016.50
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
6,013.00
6,012.50
6,012.00
6,011.50
6,011.00
6,010.50
6,010.00
6,009.50
6,009.00
6,008.50
6,008.00
6,007.50
6,007.00
6,006.50
6,006.00
6,005.50
6,005.00
6,004.50
6,004.00
6,003.50
6,003.00
6,002.50
6,002.00
6,001.50
6,001.00
6,000.50
6,000.00
5,999.50
5,999.00
5,998.50
5,998.00
5,997.50
5,997.00
5,996.50
5,996.00
5,995.50
5,995.00
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
380.0
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440.0
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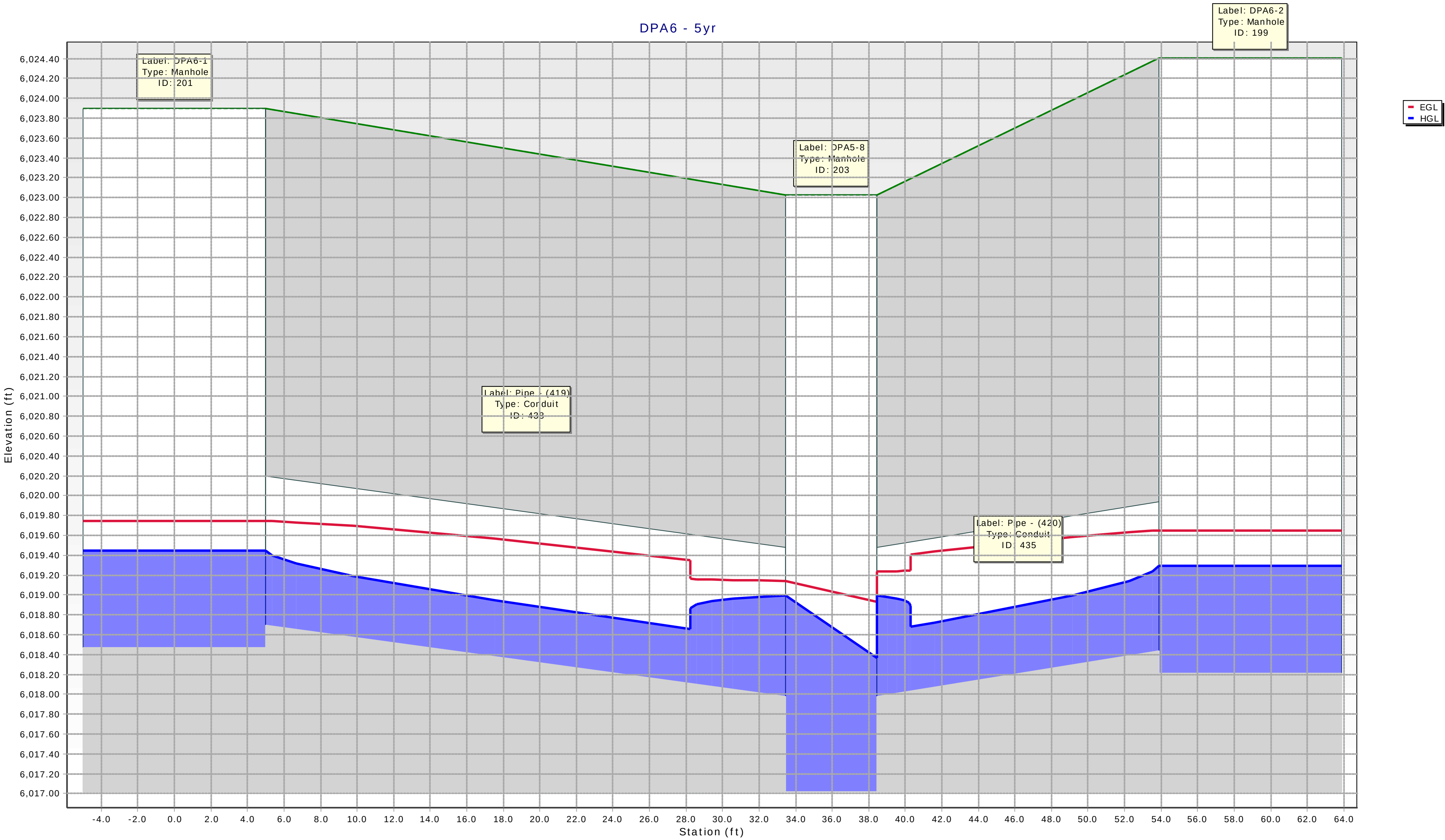
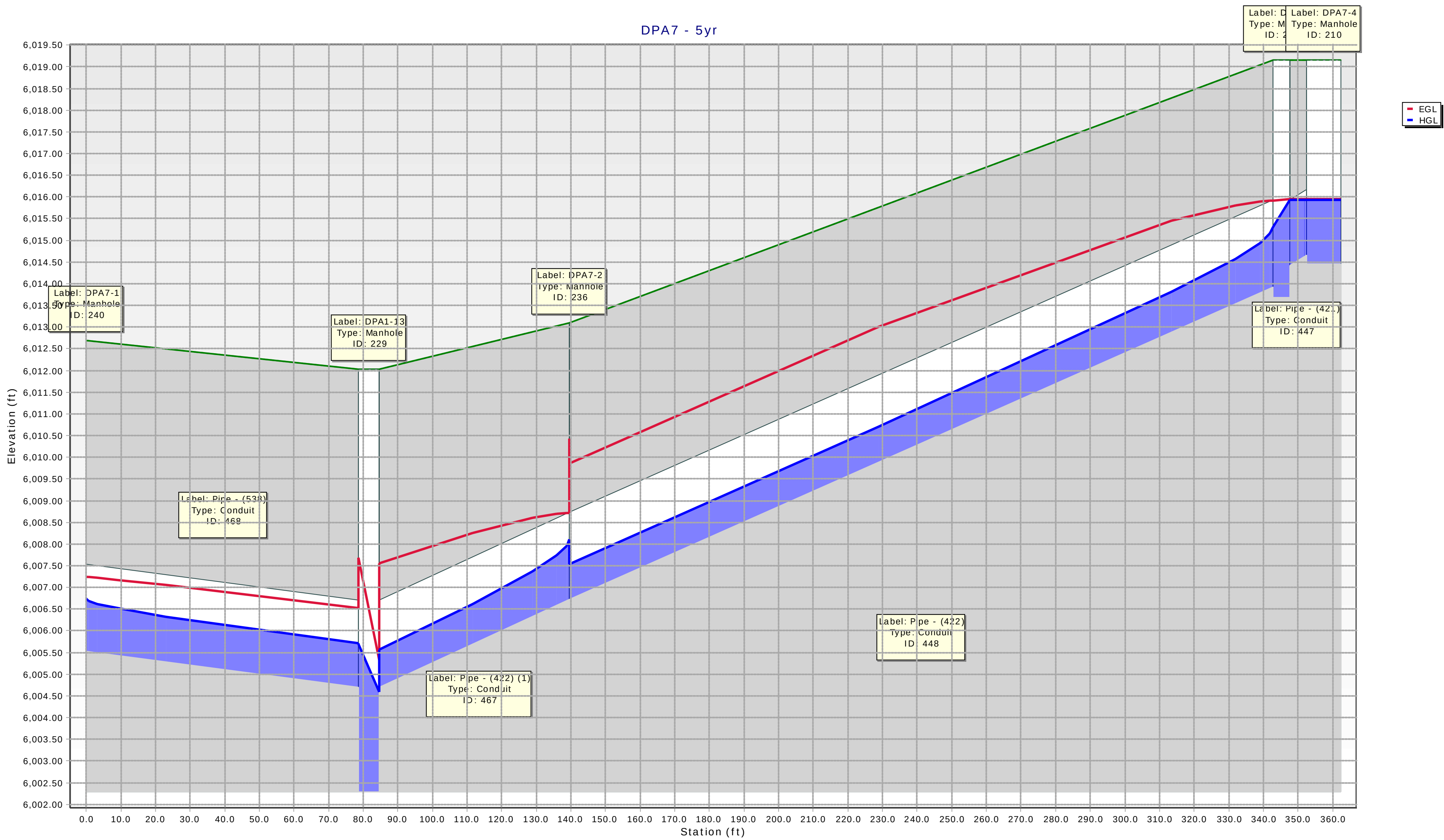
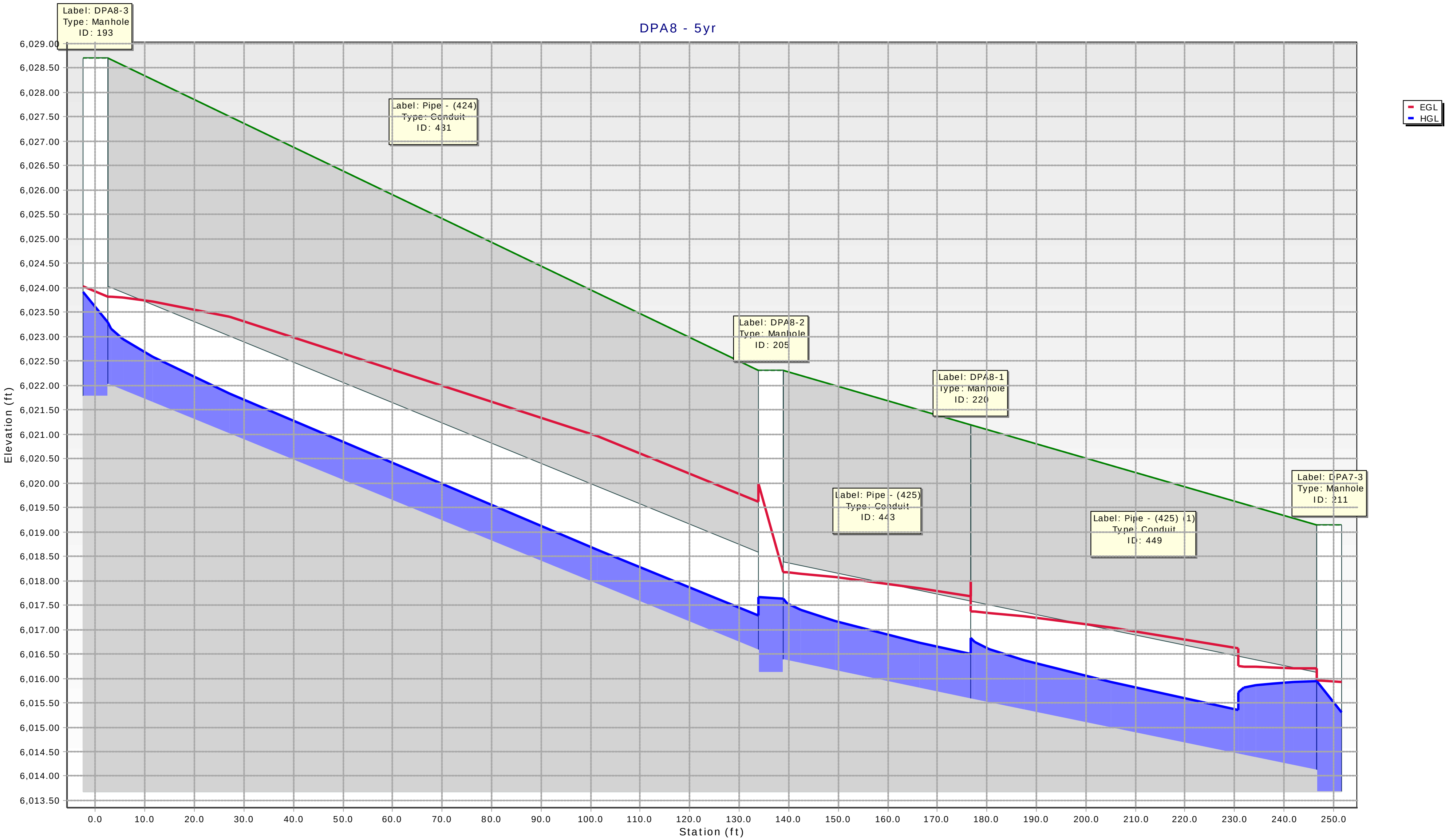
500.0
520.0
540.0
560.0
580.0
600.0

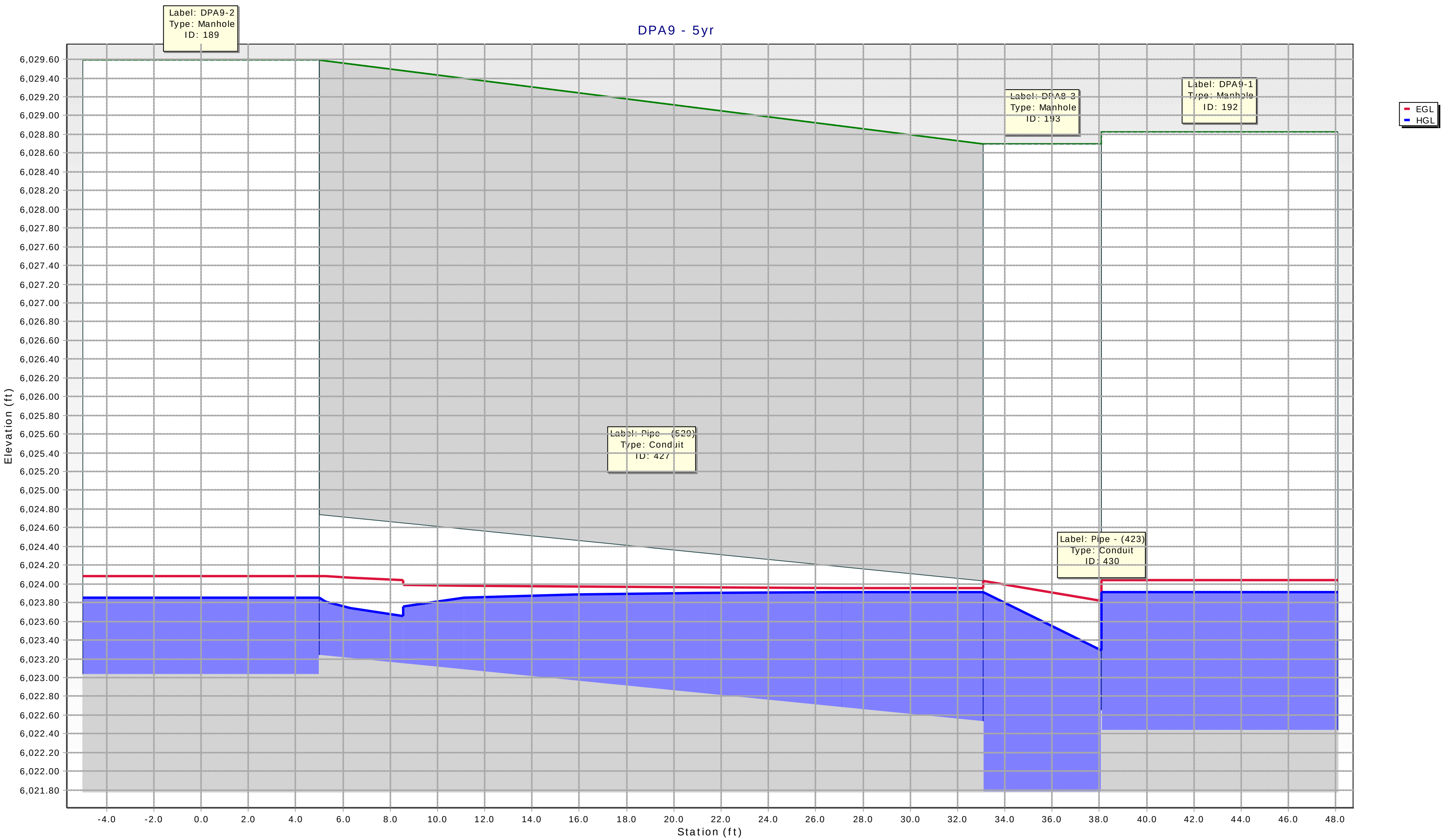


DPA6 - 5yr
Label: DPA6-1
Type: Manhole
ID: 201
Label: DPA5-8
Type: Manhole
ID: 203
Label: DPA6-2
Type: Manhole
ID: 199
Label: Pipe - (419)
Type: Conduit
ID: 433
Label: Pipe - (420)
Type: Conduit
ID: 435
EGL
HGL
Elevation (ft)
Station (ft)


DPA7 - 5yr
Label: DPA7-1
Type: Manhole
ID: 240
Label: DPA1-13
Type: Manhole
ID: 229
Label: DPA7-2
Type: Manhole
ID: 236
Label: DPA7-4
Type: Manhole
ID: 210
Label: Pipe - (538)
Type: Conduit
ID: 468
Label: Pipe - (422) (1)
Type: Conduit
ID: 467
Label: Pipe - (422)
Type: Conduit
ID: 448
Label: Pipe - (421)
Type: Conduit
ID: 447
EGL
HGL
Elevation (ft)
Station (ft)
6,019.50
6,019.00
6,018.50
6,018.00
6,017.50
6,017.00
6,016.50
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
6,013.00
6,012.50
6,012.00
6,011.50
6,011.00
6,010.50
6,010.00
6,009.50
6,009.00
6,008.50
6,008.00
6,007.50
6,007.00
6,006.50
6,006.00
6,005.50
6,005.00
6,004.50
6,004.00
6,003.50
6,003.00
6,002.50
6,002.00
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0 120.0 130.0 140.0 150.0 160.0 170.0 180.0 190.0 200.0 210.0 220.0 230.0 240.0 250.0 260.0 270.0 280.0 290.0 300.0 310.0 320.0 330.0 340.0 350.0 360.0



DPA8 - 5yr
Label: DPA8-3
Type: Manhole
ID: 193
Label: Pipe - (424)
Type: Conduit
ID: 431
Label: DPA8-2
Type: Manhole
ID: 205
Label: DPA8-1
Type: Manhole
ID: 220
Label: Pipe - (425)
Type: Conduit
ID: 443
Label: Pipe - (425) (1)
Type: Conduit
ID: 449
Label: DPA7-3
Type: Manhole
ID: 211
EGL
HGL
Elevation (ft)
Station (ft)
6,029.00
6,028.50
6,028.00
6,027.50
6,027.00
6,026.50
6,026.00
6,025.50
6,025.00
6,024.50
6,024.00
6,023.50
6,023.00
6,022.50
6,022.00
6,021.50
6,021.00
6,020.50
6,020.00
6,019.50
6,019.00
6,018.50
6,018.00
6,017.50
6,017.00
6,016.50
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0
220.0
230.0
240.0
250.0



DPA9 - 5yr
Label: DPA9-2
Type: Manhole
ID: 189
Label: DPA8-3
Type: Manhole
ID: 193
Label: DPA9-1
Type: Manhole
ID: 192
Label: Pipe - (529)
Type: Conduit
ID: 427
Label: Pipe - (423)
Type: Conduit
ID: 430
EGL
HGL
Elevation (ft)
Station (ft)
6,029.60
6,029.40
6,029.20
6,029.00
6,028.80
6,028.60
6,028.40
6,028.20
6,028.00
6,027.80
6,027.60
6,027.40
6,027.20
6,027.00
6,026.80
6,026.60
6,026.40
6,026.20
6,026.00
6,025.80
6,025.60
6,025.40
6,025.20
6,025.00
6,024.80
6,024.60
6,024.40
6,024.20
6,024.00
6,023.80
6,023.60
6,023.40
6,023.20
6,023.00
6,022.80
6,022.60
6,022.40
6,022.20
6,022.00
6,021.80
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
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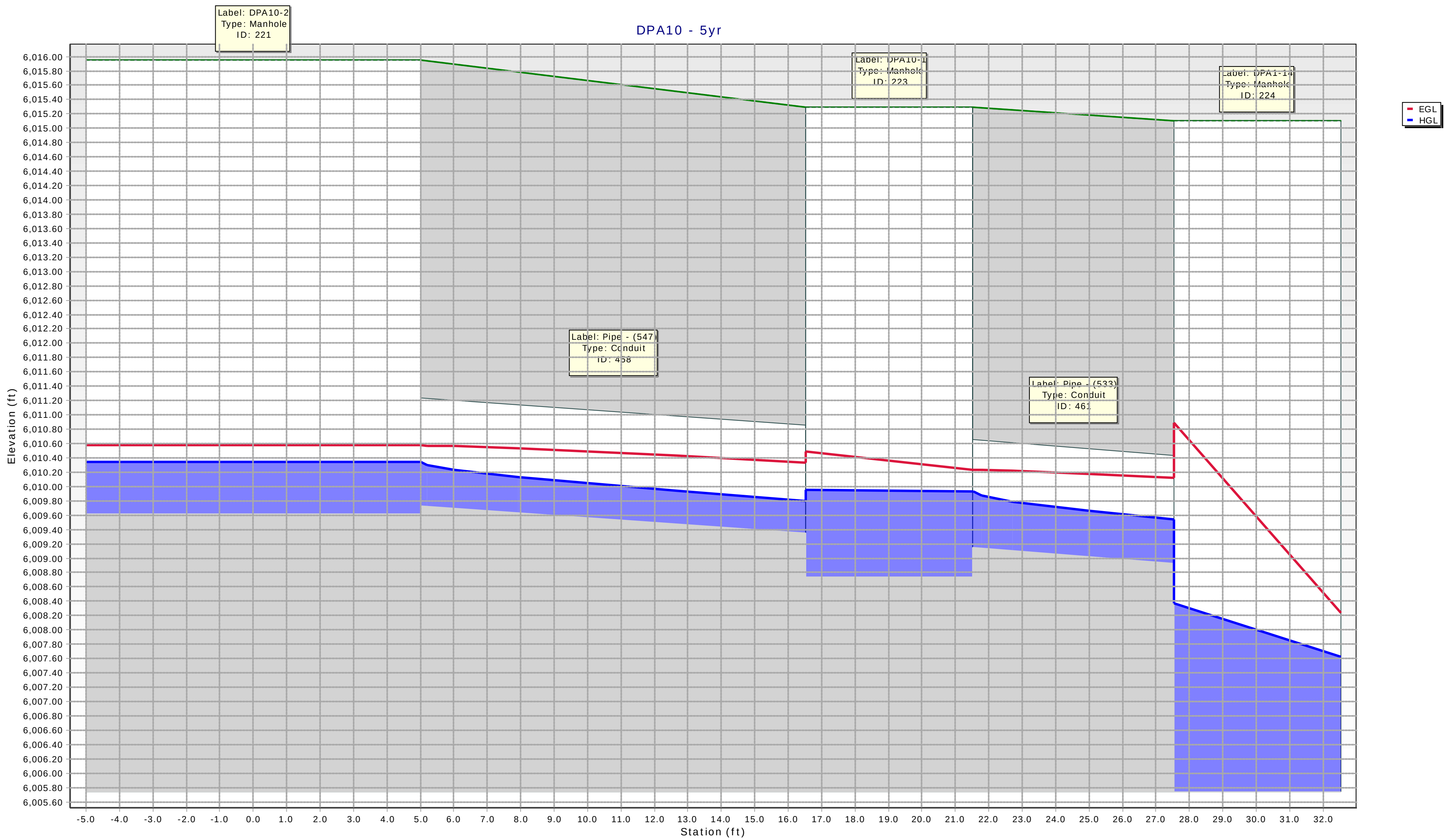
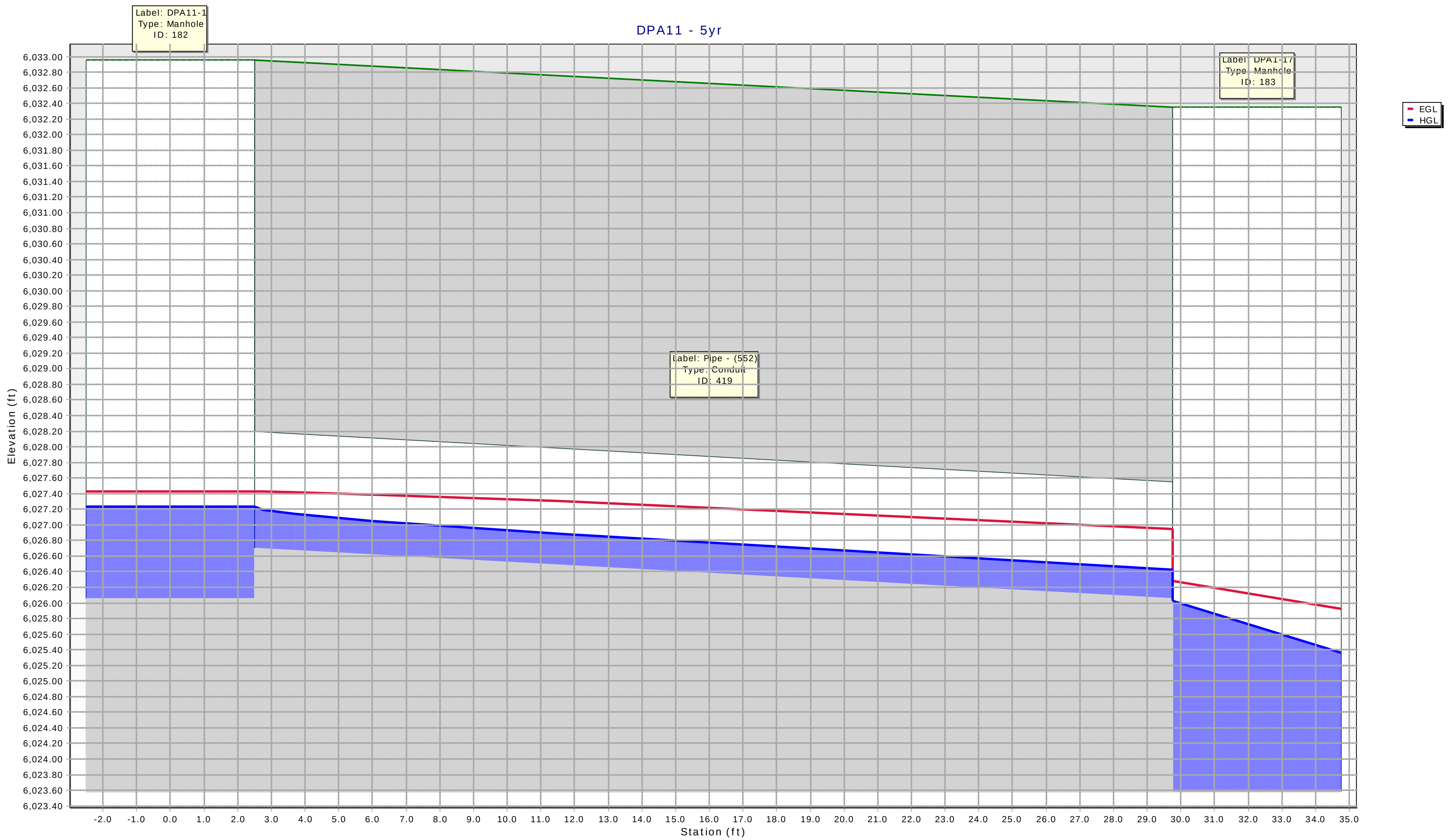
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0


DPA10 - 5yr
Label: DPA10-2
Type: Manhole
ID: 221
Label: DPA10-1
Type: Manhole
ID: 223
Label: DPA1-14
Type: Manhole
ID: 224
Label: Pipe - (547)
Type: Conduit
ID: 458
Label: Pipe - (533)
Type: Conduit
ID: 461
EGL
HGL
Elevation (ft)
Station (ft)
6,016.00
6,015.80
6,015.60
6,015.40
6,015.20
6,015.00
6,014.80
6,014.60
6,014.40
6,014.20
6,014.00
6,013.80
6,013.60
6,013.40
6,013.20
6,013.00
6,012.80
6,012.60
6,012.40
6,012.20
6,012.00
6,011.80
6,011.60
6,011.40
6,011.20
6,011.00
6,010.80
6,010.60
6,010.40
6,010.20
6,010.00
6,009.80
6,009.60
6,009.40
6,009.20
6,009.00
6,008.80
6,008.60
6,008.40
6,008.20
6,008.00
6,007.80
6,007.60
6,007.40
6,007.20
6,007.00
6,006.80
6,006.60
6,006.40
6,006.20
6,006.00
6,005.80
6,005.60
-5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0


DPA11 - 5yr
Label: DPA11-1
Type: Manhole
ID: 182
Label: DPA1-17
Type: Manhole
ID: 183
Label: Pipe - (552)
Type: Conduit
ID: 419
EGL
HGL
Elevation (ft)
Station (ft)
6,033.00
6,032.80
6,032.60
6,032.40
6,032.20
6,032.00
6,031.80
6,031.60
6,031.40
6,031.20
6,031.00
6,030.80
6,030.60
6,030.40
6,030.20
6,030.00
6,029.80
6,029.60
6,029.40
6,029.20
6,029.00
6,028.80
6,028.60
6,028.40
6,028.20
6,028.00
6,027.80
6,027.60
6,027.40
6,027.20
6,027.00
6,026.80
6,026.60
6,026.40
6,026.20
6,026.00
6,025.80
6,025.60
6,025.40
6,025.20
6,025.00
6,024.80
6,024.60
6,024.40
6,024.20
6,024.00
6,023.80
6,023.60
6,023.40
-2.0
-1.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
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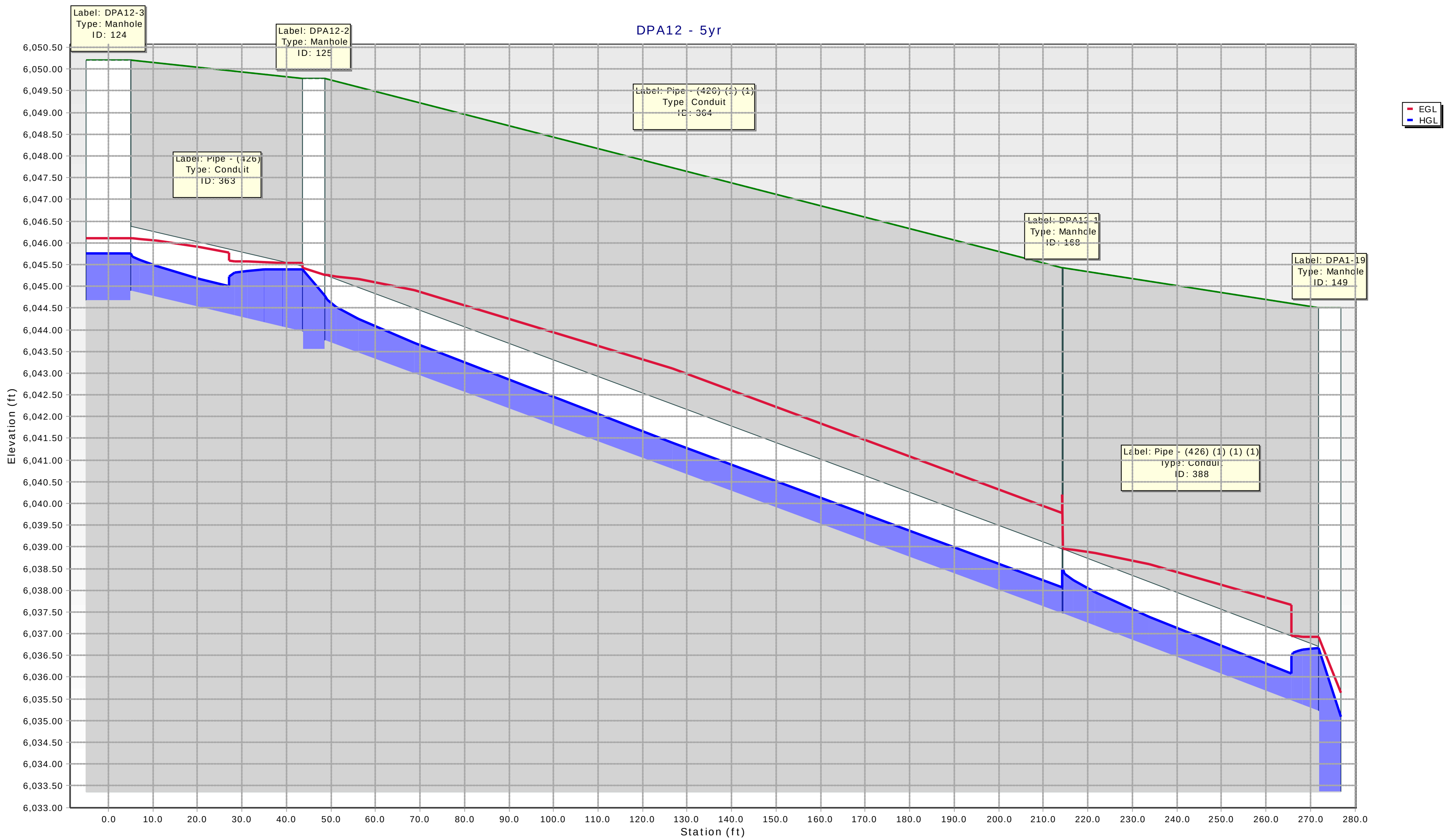
33.0
34.0
35.0



DPA12 - 5yr
Label: DPA12-3
Type: Manhole
ID: 124
Label: DPA12-2
Type: Manhole
ID: 125
Label: Pipe - (426) (1) (1)
Type: Conduit
ID: 364
Label: Pipe - (426)
Type: Conduit
ID: 363
Label: DPA12-1
Type: Manhole
ID: 168
Label: DPA1-19
Type: Manhole
ID: 149
Label: Pipe - (426) (1) (1) (1)
Type: Conduit
ID: 388
EGL
HGL
Elevation (ft)
Station (ft)
6,050.50
6,050.00
6,049.50
6,049.00
6,048.50
6,048.00
6,047.50
6,047.00
6,046.50
6,046.00
6,045.50
6,045.00
6,044.50
6,044.00
6,043.50
6,043.00
6,042.50
6,042.00
6,041.50
6,041.00
6,040.50
6,040.00
6,039.50
6,039.00
6,038.50
6,038.00
6,037.50
6,037.00
6,036.50
6,036.00
6,035.50
6,035.00
6,034.50
6,034.00
6,033.50
6,033.00
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0
220.0
230.0
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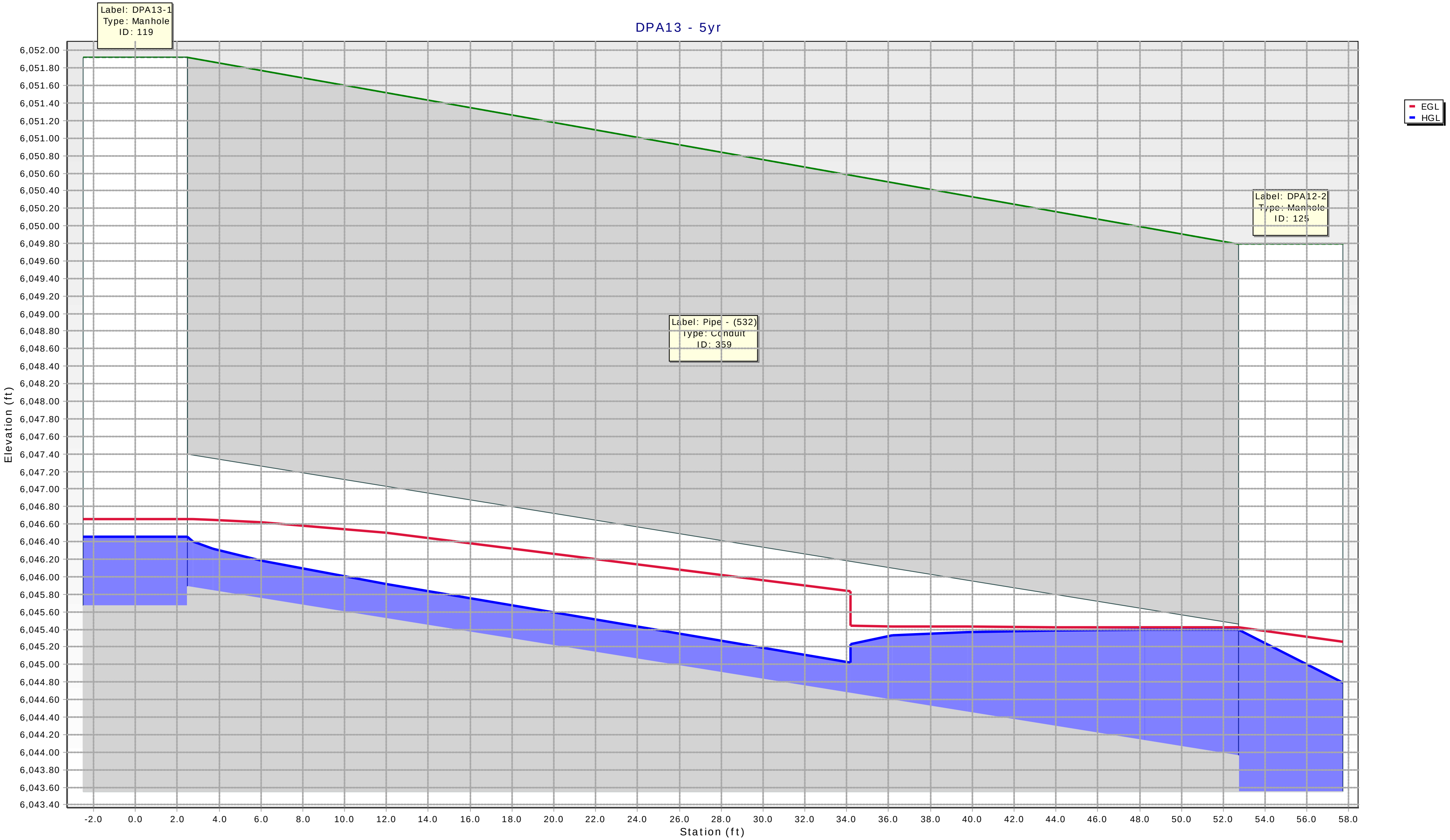
250.0
260.0
270.0
280.0


DPA13 - 5yr
Label: DPA13-1
Type: Manhole
ID: 119
Label: Pipe - (532)
Type: Conduit
ID: 359
Label: DPA12-2
Type: Manhole
ID: 125
EGL
HGL
Elevation (ft)
Station (ft)
6,052.00
6,051.80
6,051.60
6,051.40
6,051.20
6,051.00
6,050.80
6,050.60
6,050.40
6,050.20
6,050.00
6,049.80
6,049.60
6,049.40
6,049.20
6,049.00
6,048.80
6,048.60
6,048.40
6,048.20
6,048.00
6,047.80
6,047.60
6,047.40
6,047.20
6,047.00
6,046.80
6,046.60
6,046.40
6,046.20
6,046.00
6,045.80
6,045.60
6,045.40
6,045.20
6,045.00
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
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42.0
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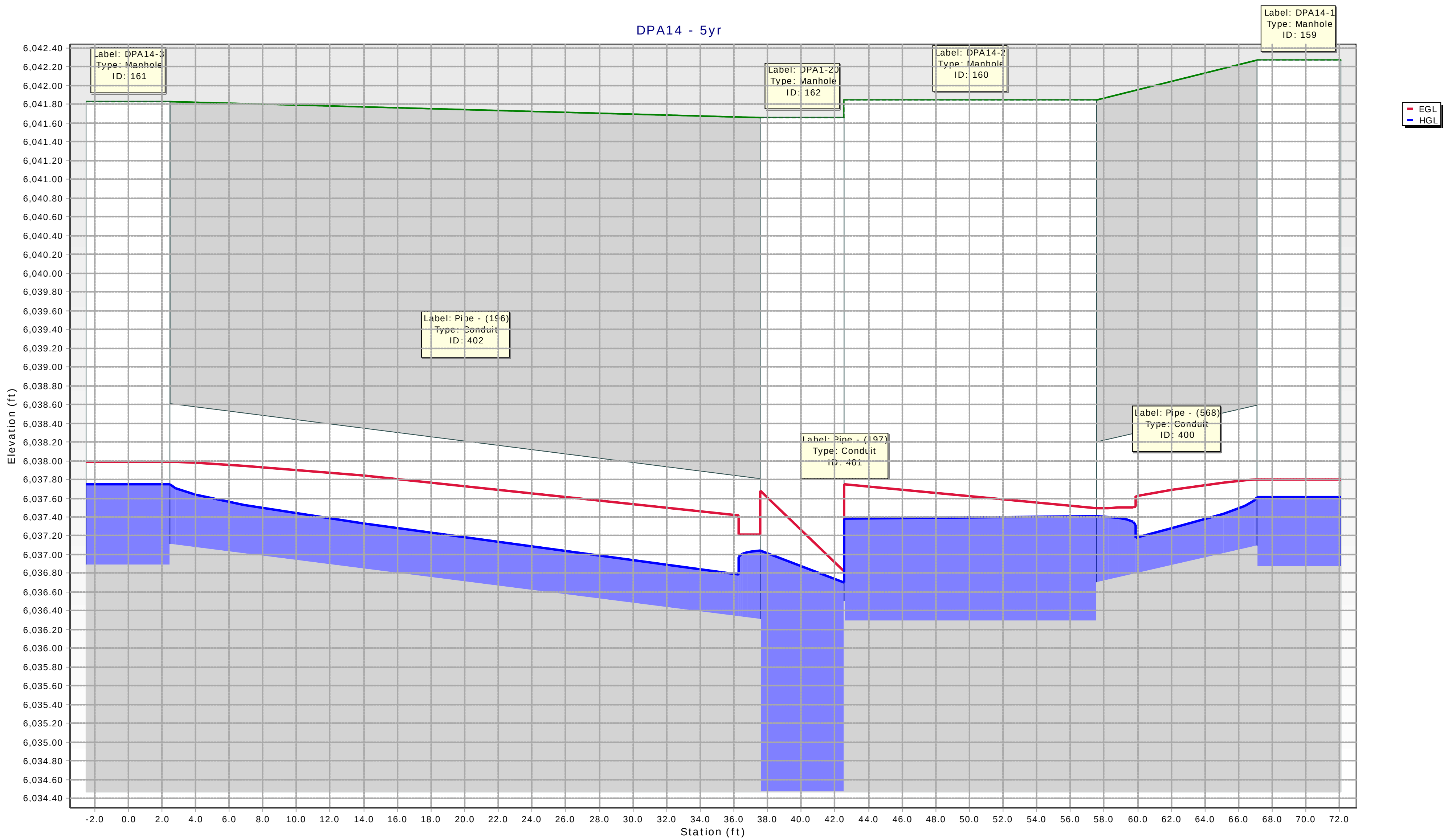
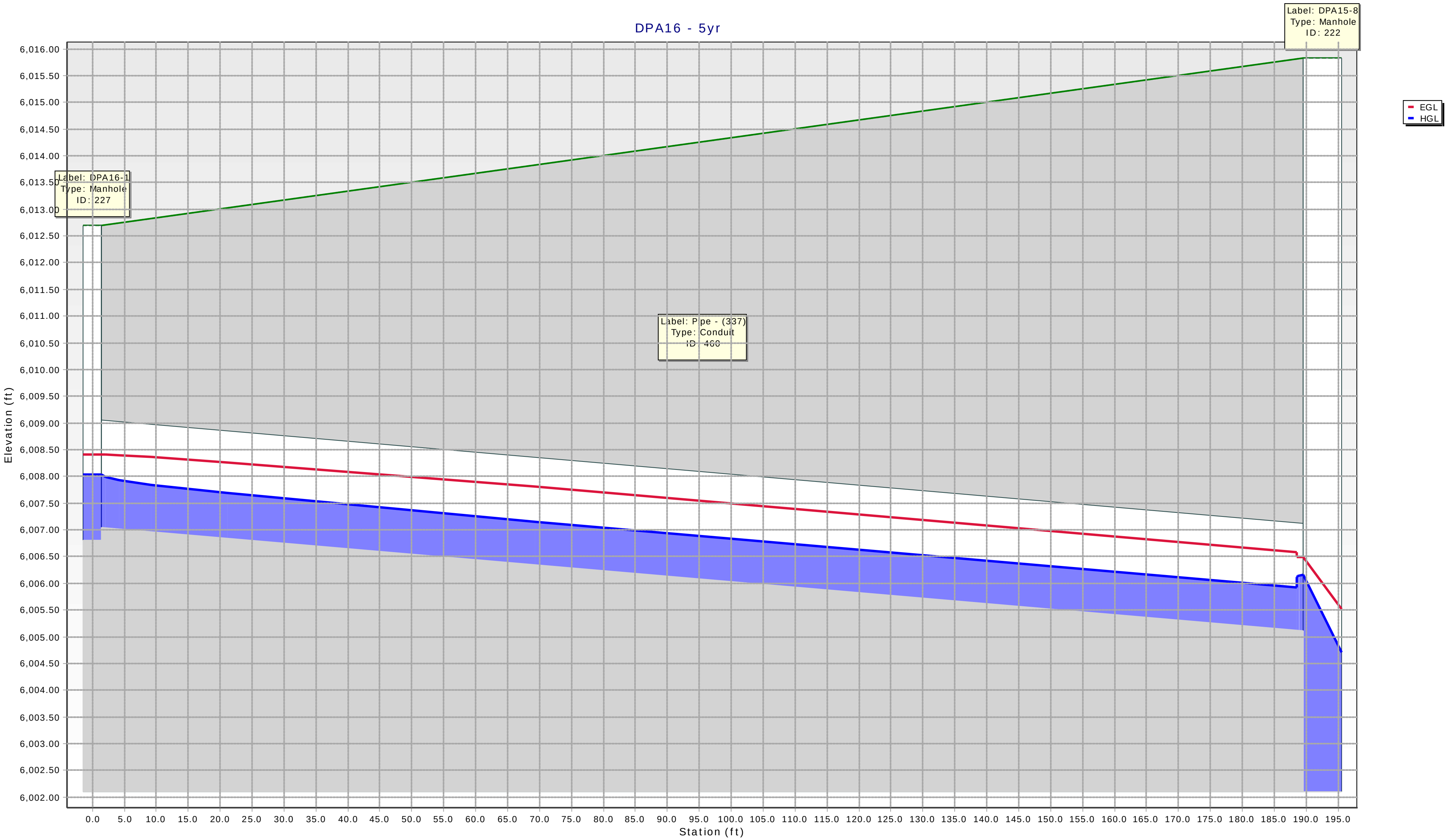
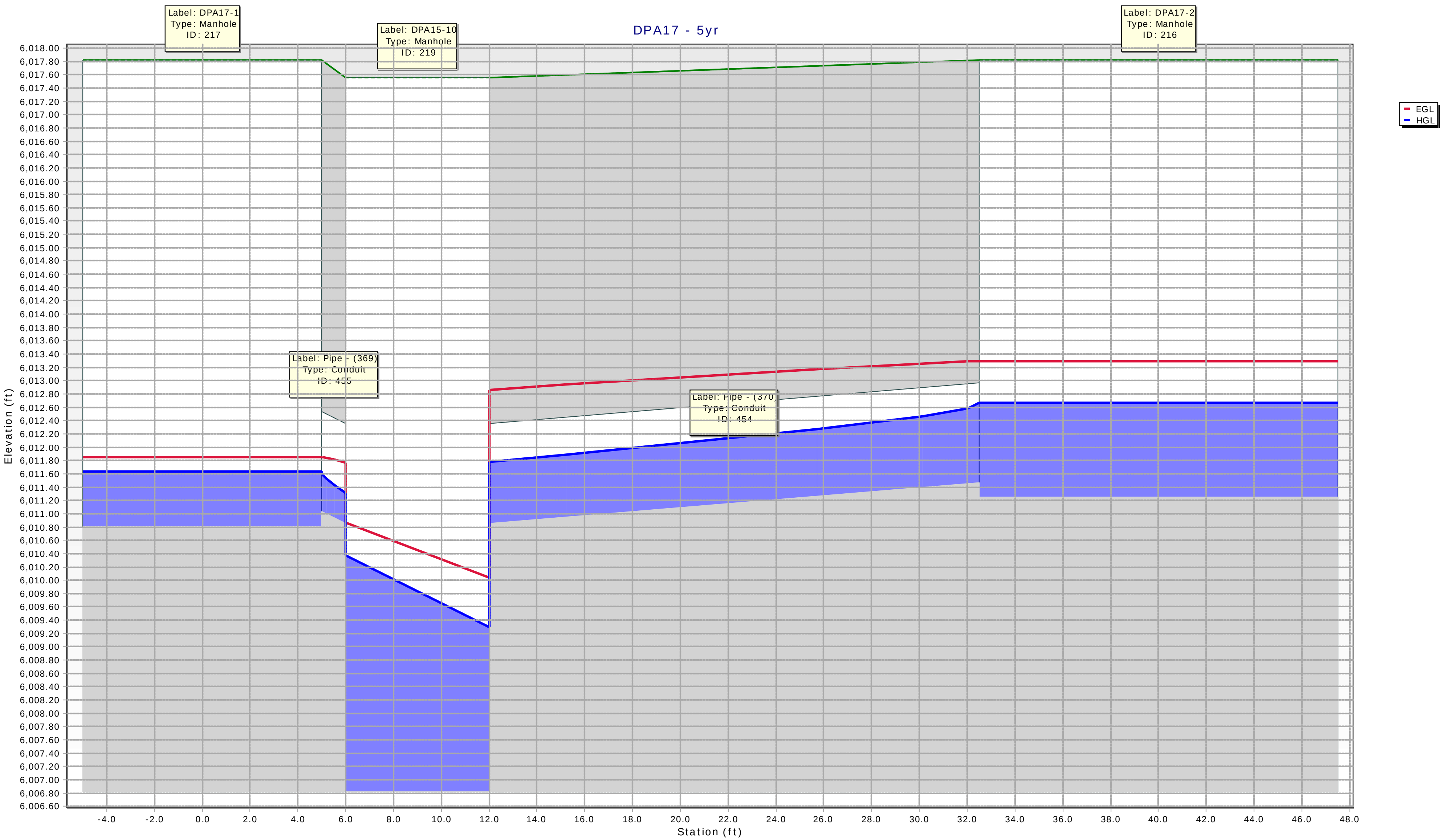
54.0
56.0
58.0


DPA14 - 5yr
Label: DPA14-3
Type: Manhole
ID: 161
Label: DPA1-20
Type: Manhole
ID: 162
Label: DPA14-2
Type: Manhole
ID: 160
Label: DPA14-1
Type: Manhole
ID: 159
Label: Pipe - (196)
Type: Conduit
ID: 402
Label: Pipe - (197)
Type: Conduit
ID: 401
Label: Pipe - (568)
Type: Conduit
ID: 400
EGL
HGL
Elevation (ft)
Station (ft)

DPA15 - 5yr
EGL
HGL
Elevation (ft)
Station (ft)
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
6,014.00
6,012.00
6,010.00
6,008.00
6,006.00
6,004.00
6,002.00
6,000.00
5,998.00
5,996.00
5,994.00
5,992.00
5,990.00
5,988.00
5,986.00
5,984.00
5,982.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0
2,000.0
2,100.0
2,200.0
2,300.0
2,400.0
2,500.0
2,600.0
2,700.0
2,800.0
2,900.0
3,000.0



DPA16 - 5yr
Label: DPA16-1
Type: Manhole
ID: 227
Label: Pipe - (337)
Type: Conduit
ID: 460
Label: DPA15-8
Type: Manhole
ID: 222
EGL
HGL
Elevation (ft)
Station (ft)
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
6,013.00
6,012.50
6,012.00
6,011.50
6,011.00
6,010.50
6,010.00
6,009.50
6,009.00
6,008.50
6,008.00
6,007.50
6,007.00
6,006.50
6,006.00
6,005.50
6,005.00
6,004.50
6,004.00
6,003.50
6,003.00
6,002.50
6,002.00
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0 60.0 65.0 70.0 75.0 80.0 85.0 90.0 95.0 100.0 105.0 110.0 115.0 120.0 125.0 130.0 135.0 140.0 145.0 150.0 155.0 160.0 165.0 170.0 175.0 180.0 185.0 190.0 195.0


DPA17 - 5yr
Label: DPA17-1
Type: Manhole
ID: 217
Label: DPA15-10
Type: Manhole
ID: 219
Label: DPA17-2
Type: Manhole
ID: 216
Label: Pipe - (369)
Type: Conduit
ID: 455
Label: Pipe - (370)
Type: Conduit
ID: 454
EGL
HGL
Elevation (ft)
Station (ft)
6,018.00
6,017.80
6,017.60
6,017.40
6,017.20
6,017.00
6,016.80
6,016.60
6,016.40
6,016.20
6,016.00
6,015.80
6,015.60
6,015.40
6,015.20
6,015.00
6,014.80
6,014.60
6,014.40
6,014.20
6,014.00
6,013.80
6,013.60
6,013.40
6,013.20
6,013.00
6,012.80
6,012.60
6,012.40
6,012.20
6,012.00
6,011.80
6,011.60
6,011.40
6,011.20
6,011.00
6,010.80
6,010.60
6,010.40
6,010.20
6,010.00
6,009.80
6,009.60
6,009.40
6,009.20
6,009.00
6,008.80
6,008.60
6,008.40
6,008.20
6,008.00
6,007.80
6,007.60
6,007.40
6,007.20
6,007.00
6,006.80
6,006.60
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
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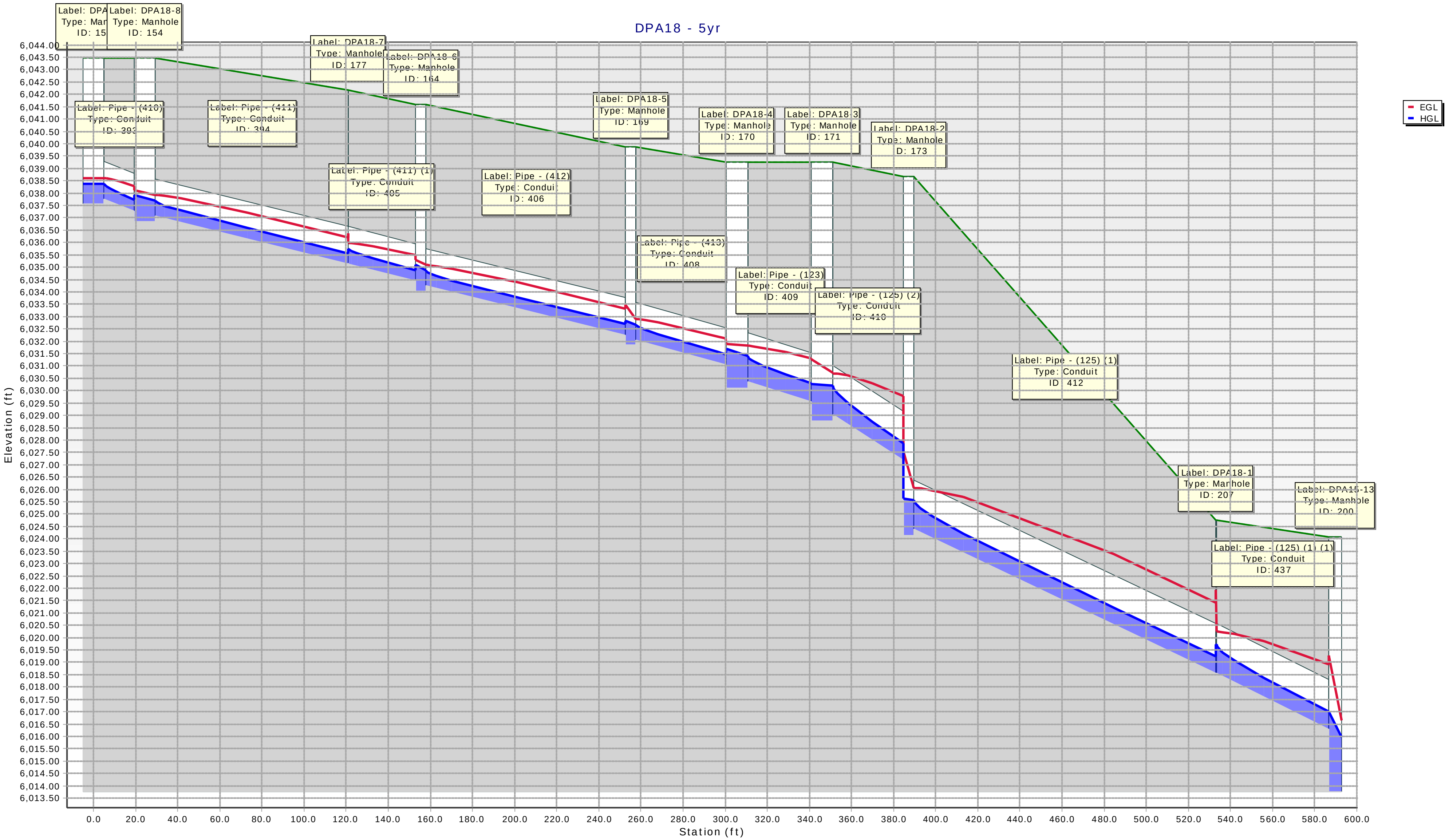
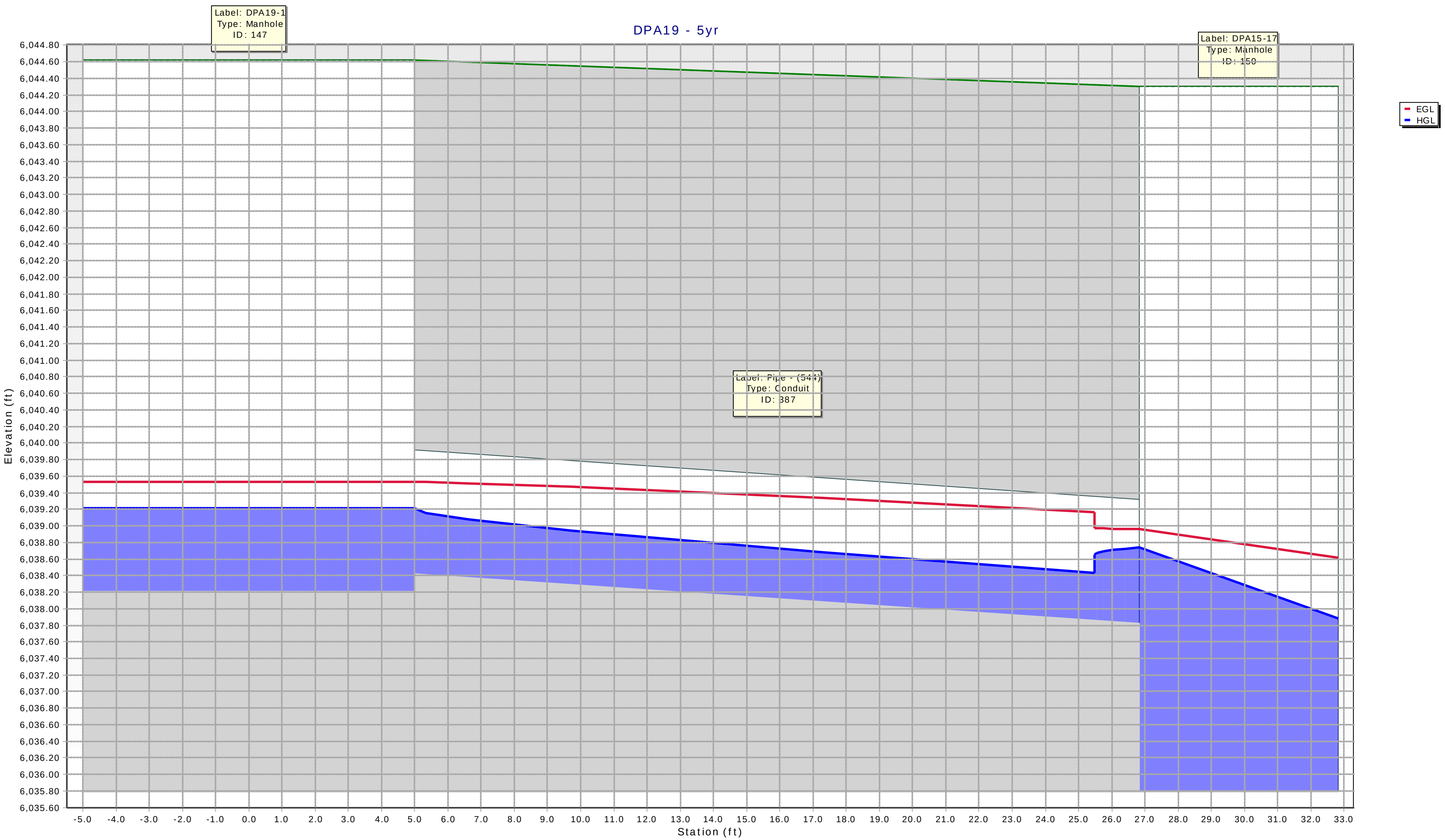
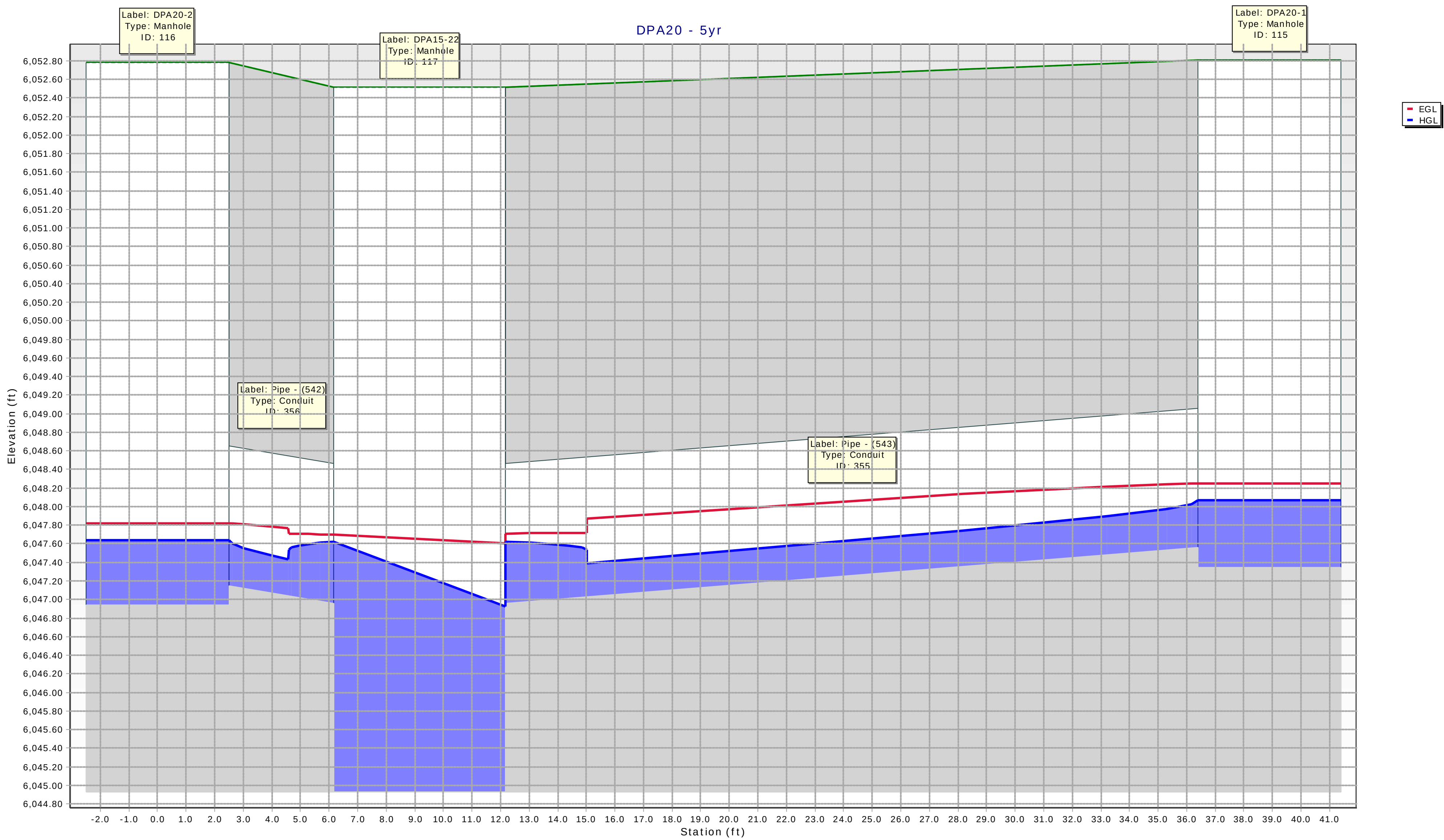
42.0
44.0
46.0
48.0

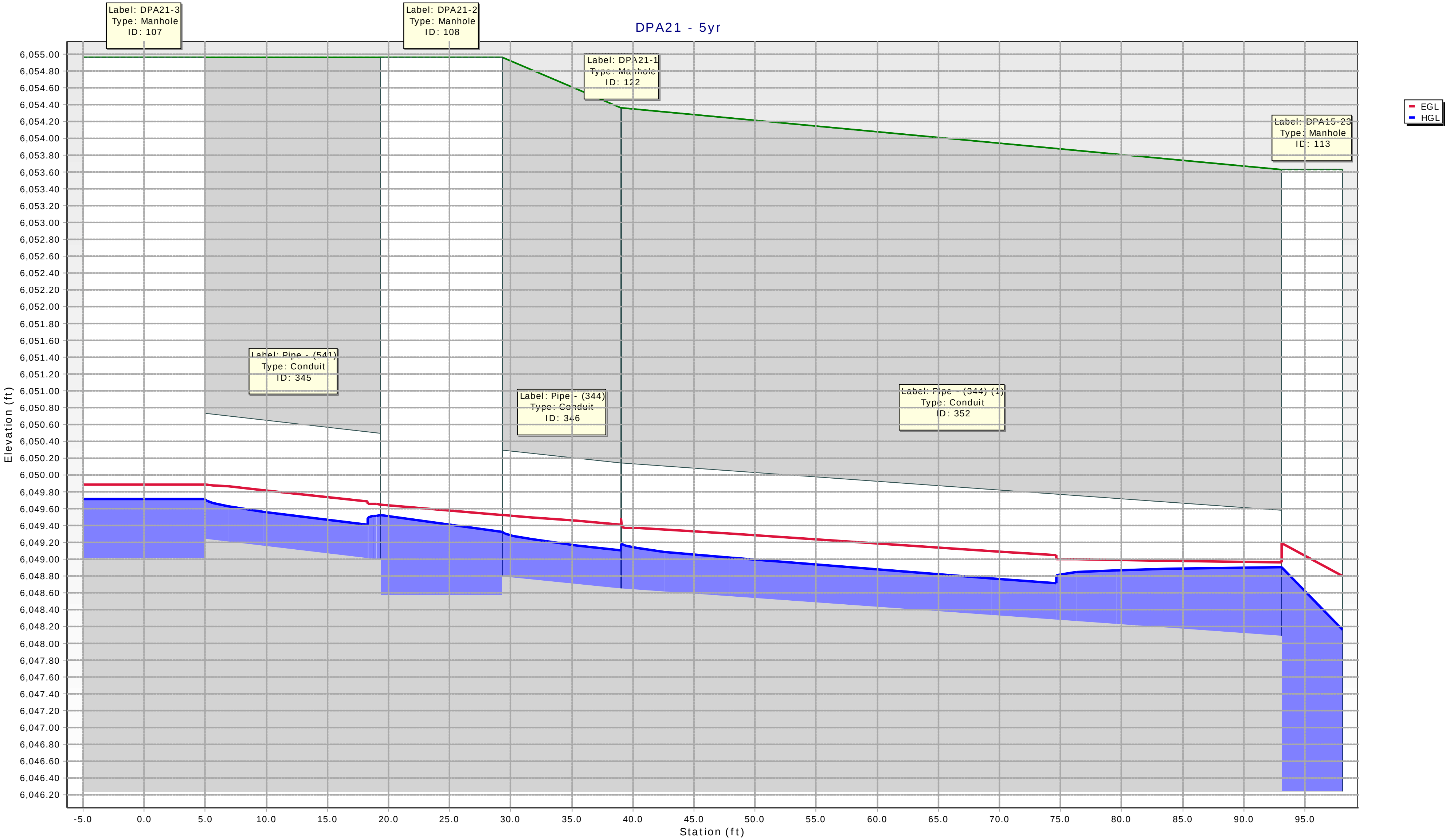


DPA18 - 5yr
Elevation (ft)
Station (ft)
EGL
HGL
Label: DPA18-8
Type: Manhole
ID: 154
Label: DPA18-7
Type: Manhole
ID: 177
Label: DPA18-6
Type: Manhole
ID: 164
Label: DPA18-5
Type: Manhole
ID: 169
Label: DPA18-4
Type: Manhole
ID: 170
Label: DPA18-3
Type: Manhole
ID: 171
Label: DPA18-2
Type: Manhole
ID: 173
Label: DPA18-1
Type: Manhole
ID: 207
Label: DPA15-13
Type: Manhole
ID: 200
Label: Pipe - (410)
Type: Conduit
ID: 393
Label: Pipe - (411)
Type: Conduit
ID: 394
Label: Pipe - (411) (1)
Type: Conduit
ID: 405
Label: Pipe - (412)
Type: Conduit
ID: 406
Label: Pipe - (413)
Type: Conduit
ID: 408
Label: Pipe - (123)
Type: Conduit
ID: 409
Label: Pipe - (125) (2)
Type: Conduit
ID: 410
Label: Pipe - (125) (1)
Type: Conduit
ID: 412
Label: Pipe - (125) (1) (1)
Type: Conduit
ID: 437

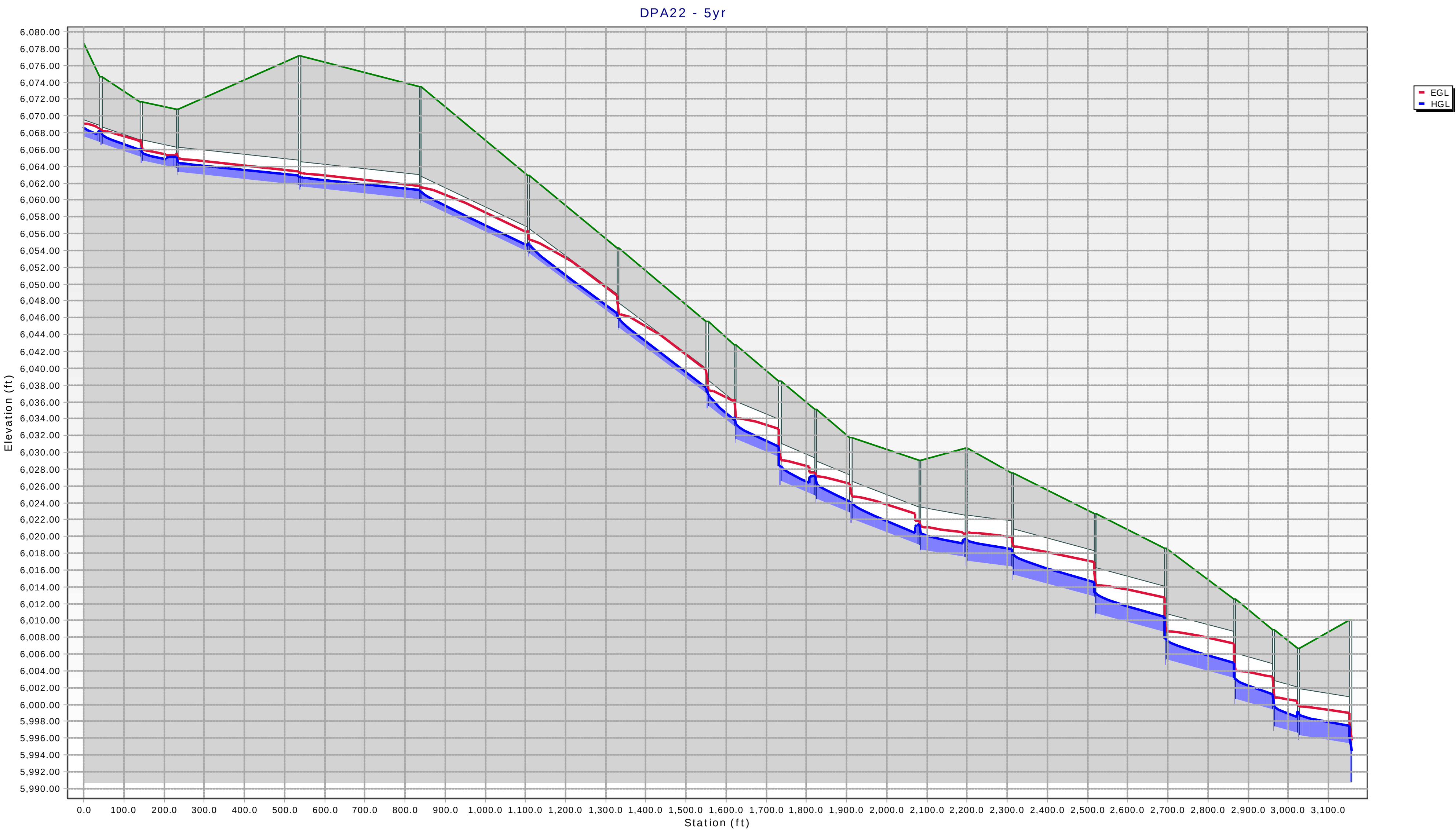

DPA19 - 5yr
Label: DPA19-1
Type: Manhole
ID: 147
Label: DPA15-17
Type: Manhole
ID: 150
Label: Pipe - (544)
Type: Conduit
ID: 387
EGL
HGL
Elevation (ft)
Station (ft)
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
6,043.20
6,043.00
6,042.80
6,042.60
6,042.40
6,042.20
6,042.00
6,041.80
6,041.60
6,041.40
6,041.20
6,041.00
6,040.80
6,040.60
6,040.40
6,040.20
6,040.00
6,039.80
6,039.60
6,039.40
6,039.20
6,039.00
6,038.80
6,038.60
6,038.40
6,038.20
6,038.00
6,037.80
6,037.60
6,037.40
6,037.20
6,037.00
6,036.80
6,036.60
6,036.40
6,036.20
6,036.00
6,035.80
6,035.60
-5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0



DPA20 - 5yr
Label: DPA20-2
Type: Manhole
ID: 116
Label: DPA15-22
Type: Manhole
ID: 117
Label: DPA20-1
Type: Manhole
ID: 115
Label: Pipe - (542)
Type: Conduit
ID: 356
Label: Pipe - (543)
Type: Conduit
ID: 355
EGL
HGL
Elevation (ft)
Station (ft)

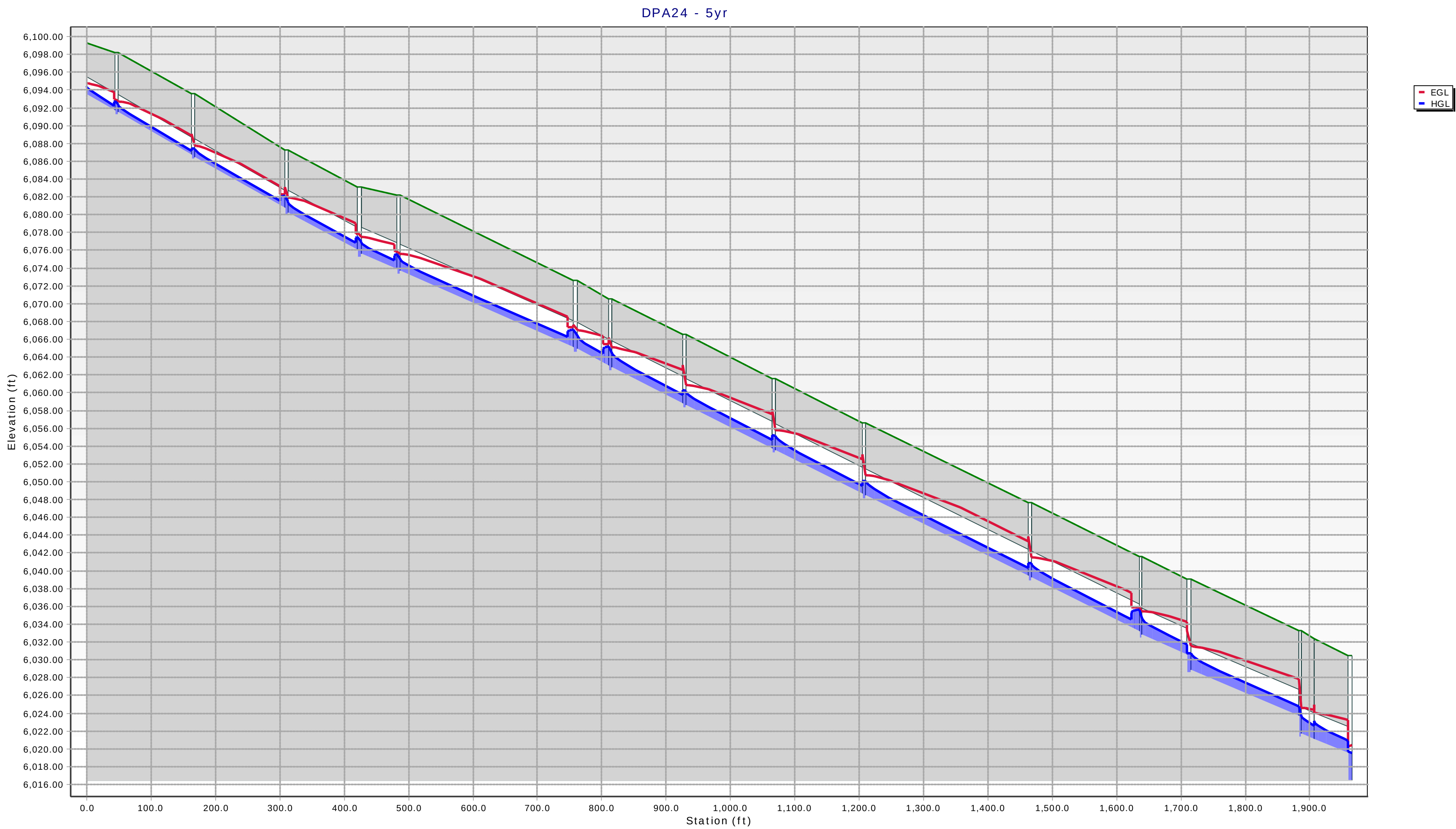


DPA21 - 5yr
Label: DPA21-3
Type: Manhole
ID: 107
Label: DPA21-2
Type: Manhole
ID: 108
Label: DPA21-1
Type: Manhole
ID: 122
Label: DPA15-23
Type: Manhole
ID: 113
Label: Pipe - (541)
Type: Conduit
ID: 345
Label: Pipe - (344)
Type: Conduit
ID: 346
Label: Pipe - (344) (1)
Type: Conduit
ID: 352
EGL
HGL
Elevation (ft)
Station (ft)
6,055.00
6,054.80
6,054.60
6,054.40
6,054.20
6,054.00
6,053.80
6,053.60
6,053.40
6,053.20
6,053.00
6,052.80
6,052.60
6,052.40
6,052.20
6,052.00
6,051.80
6,051.60
6,051.40
6,051.20
6,051.00
6,050.80
6,050.60
6,050.40
6,050.20
6,050.00
6,049.80
6,049.60
6,049.40
6,049.20
6,049.00
6,048.80
6,048.60
6,048.40
6,048.20
6,048.00
6,047.80
6,047.60
6,047.40
6,047.20
6,047.00
6,046.80
6,046.60
6,046.40
6,046.20
-5.0
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0

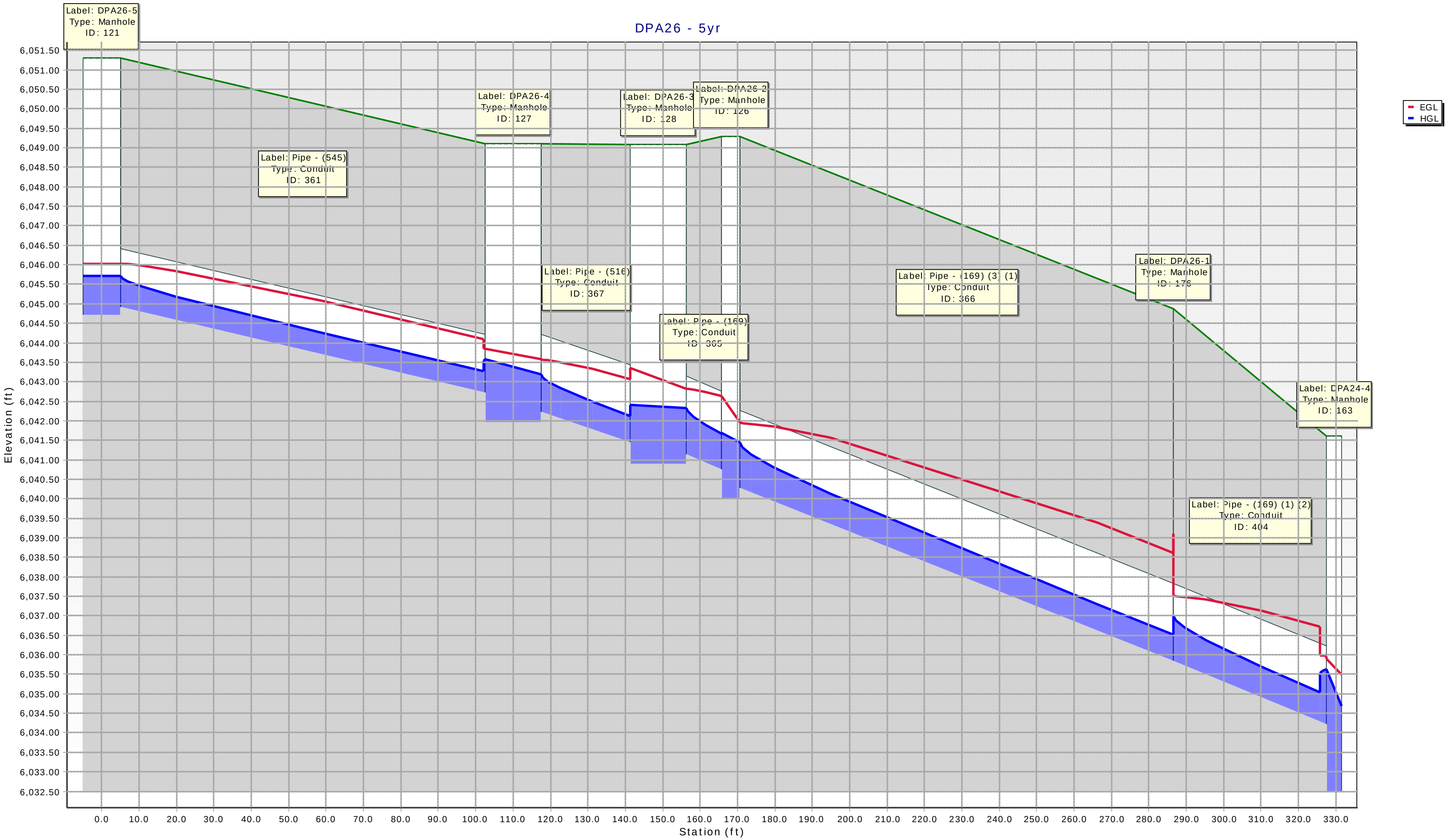


DPA22 - 5yr
Elevation (ft)
Station (ft)
EGL
HGL
6,080.00
6,078.00
6,076.00
6,074.00
6,072.00
6,070.00
6,068.00
6,066.00
6,064.00
6,062.00
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
6,014.00
6,012.00
6,010.00
6,008.00
6,006.00
6,004.00
6,002.00
6,000.00
5,998.00
5,996.00
5,994.00
5,992.00
5,990.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0
2,000.0
2,100.0
2,200.0
2,300.0
2,400.0
2,500.0
2,600.0
2,700.0
2,800.0
2,900.0
3,000.0
3,100.0

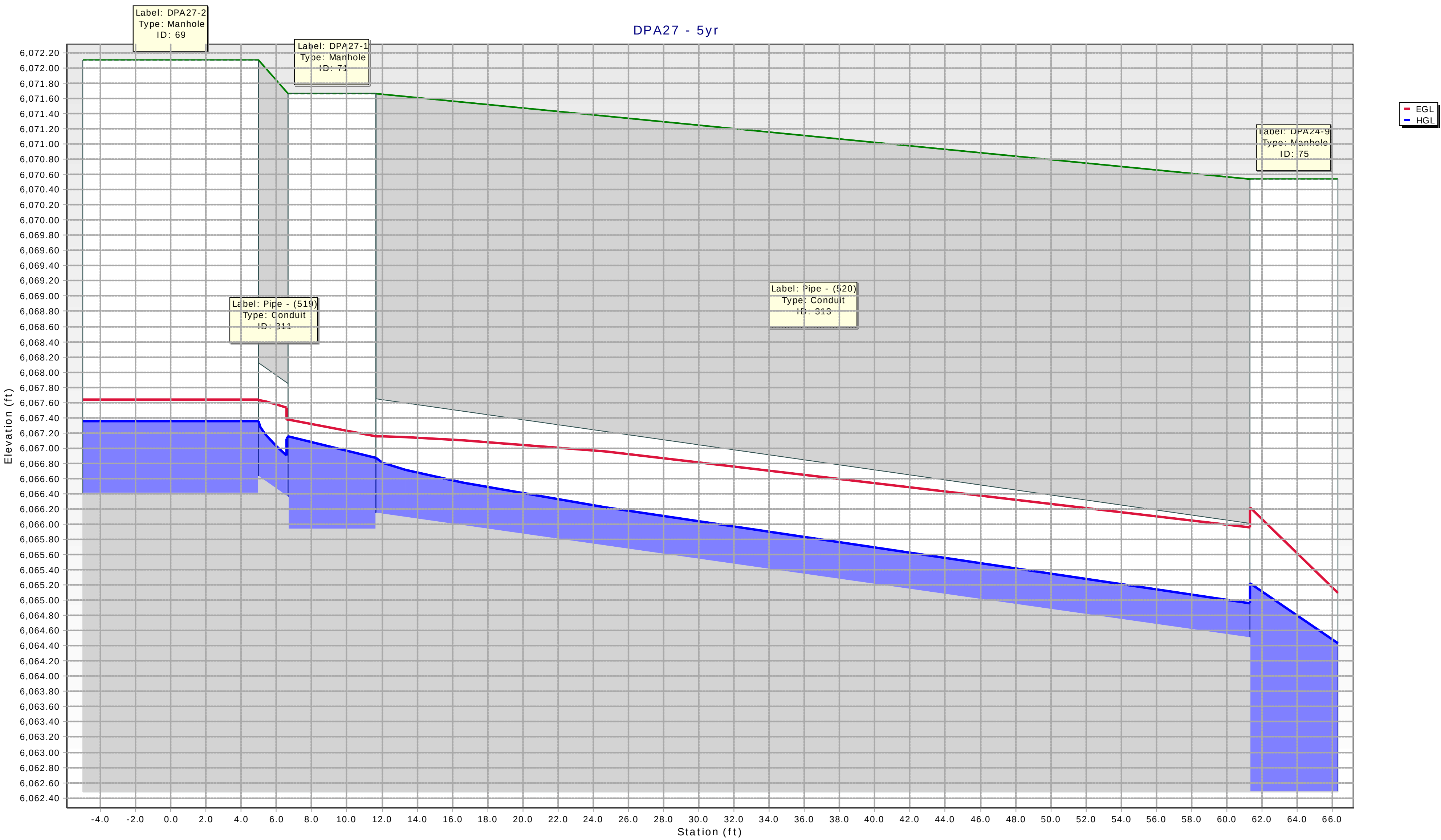
DPA23 - 5yr
Label: DPA23-1
Type: Manhole
ID: 237
Label: DPA22-2
Type: Manhole
ID: 238
Label: Pipe - (567)
Type: Conduit
ID: 474
EGL
HGL
Elevation (ft)
Station (ft)
6,009.00
6,008.80
6,008.60
6,008.40
6,008.20
6,008.00
6,007.80
6,007.60
6,007.40
6,007.20
6,007.00
6,006.80
6,006.60
6,006.40
6,006.20
6,006.00
6,005.80
6,005.60
6,005.40
6,005.20
6,005.00
6,004.80
6,004.60
6,004.40
6,004.20
6,004.00
6,003.80
6,003.60
6,003.40
6,003.20
6,003.00
6,002.80
6,002.60
6,002.40
6,002.20
6,002.00
6,001.80
6,001.60
6,001.40
6,001.20
6,001.00
6,000.80
6,000.60
6,000.40
6,000.20
6,000.00
5,999.80
5,999.60
5,999.40
5,999.20
5,999.00
5,998.80
5,998.60
5,998.40
5,998.20
5,998.00
5,997.80
5,997.60
5,997.40
5,997.20
5,997.00
5,996.80
5,996.60
-4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0


DPA24 - 5yr
Elevation (ft)
Station (ft)
EGL
HGL
6,100.00
6,098.00
6,096.00
6,094.00
6,092.00
6,090.00
6,088.00
6,086.00
6,084.00
6,082.00
6,080.00
6,078.00
6,076.00
6,074.00
6,072.00
6,070.00
6,068.00
6,066.00
6,064.00
6,062.00
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0

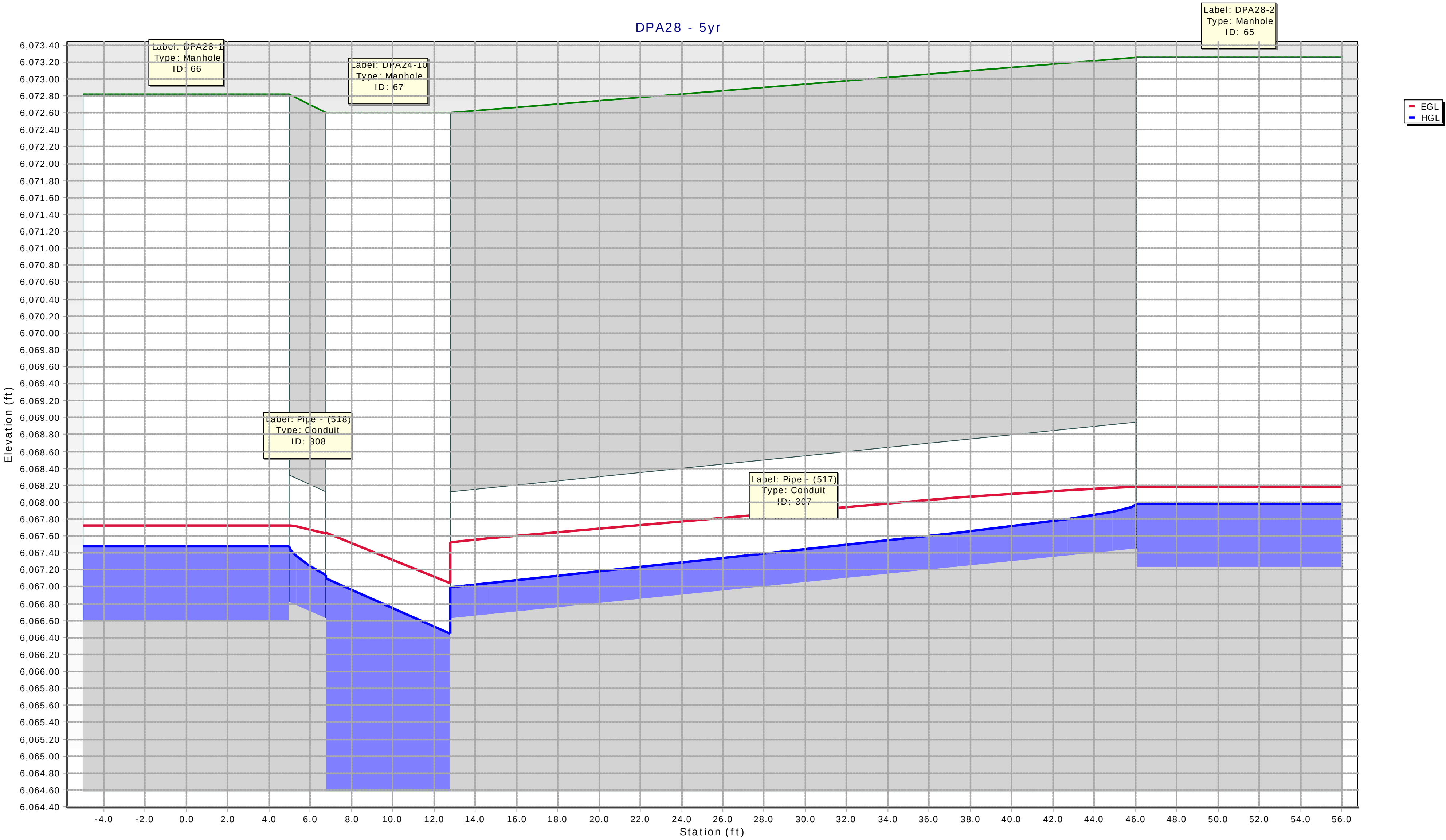

DPA25 - 5yr
Label: DPA25-1
Type: Manhole
ID: 180
Label: DPA24-2
Type: Manhole
ID: 181
Label: DPA25-2
Type: Manhole
ID: 179
Label: Pipe - (374)
Type: Conduit
ID: 417
Label: Pipe - (174) (1)
Type: Conduit
ID: 416
EGL
HGL
Elevation (ft)
Station (ft)



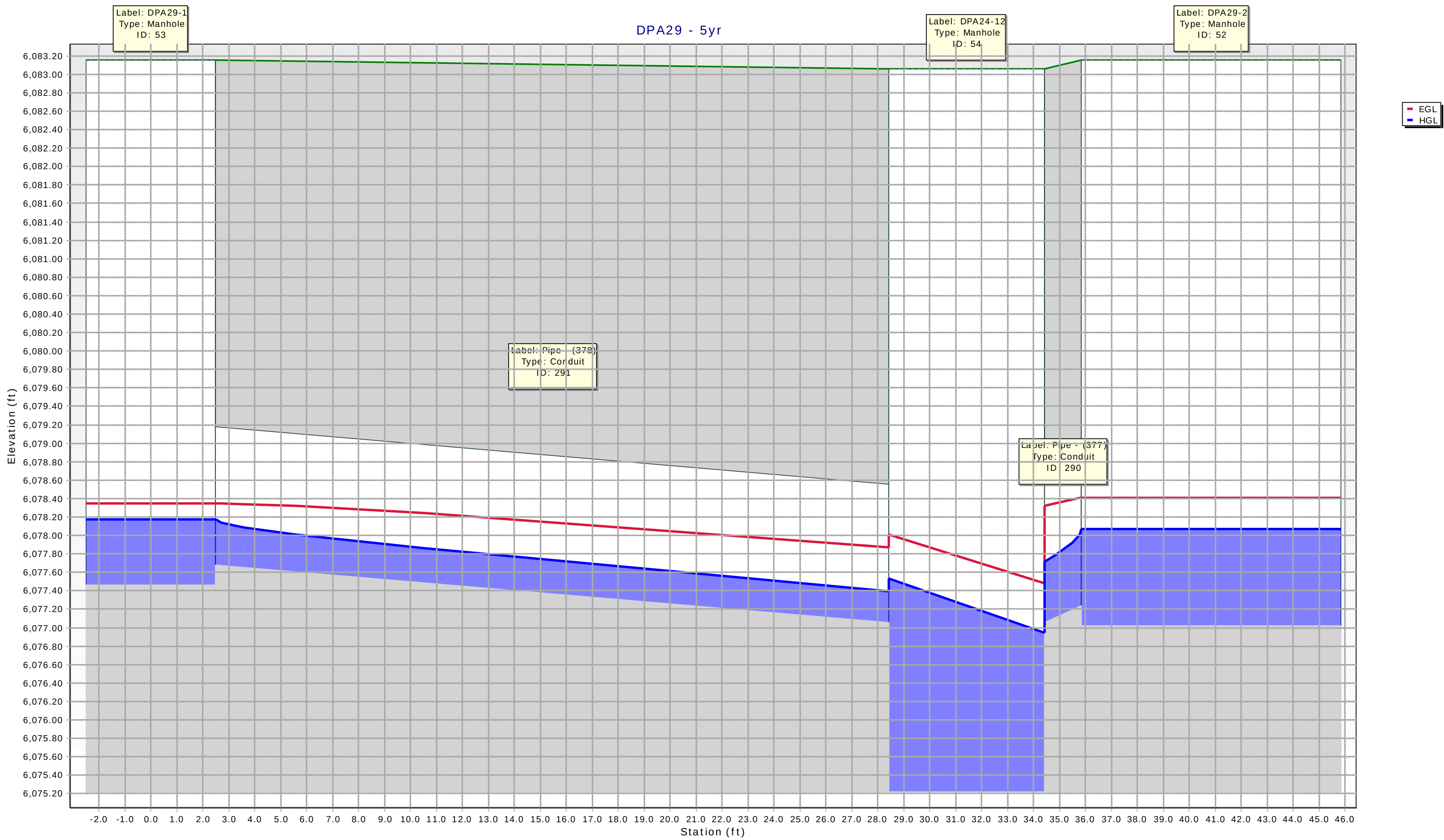
DPA26 - 5yr
Label: DPA26-5
Type: Manhole
ID: 121
Label: Pipe - (545)
Type: Conduit
ID: 361
Label: DPA26-4
Type: Manhole
ID: 127
Label: Pipe - (516)
Type: Conduit
ID: 367
Label: DPA26-3
Type: Manhole
ID: 128
Label: DPA26-2
Type: Manhole
ID: 126
Label: Pipe - (169)
Type: Conduit
ID: 365
Label: Pipe - (169) (3) (1)
Type: Conduit
ID: 366
Label: DPA26-1
Type: Manhole
ID: 176
Label: Pipe - (169) (1) (2)
Type: Conduit
ID: 404
Label: DPA24-4
Type: Manhole
ID: 163
EGL
HGL
Elevation (ft)
Station (ft)
6,051.50
6,051.00
6,050.50
6,050.00
6,049.50
6,049.00
6,048.50
6,048.00
6,047.50
6,047.00
6,046.50
6,046.00
6,045.50
6,045.00
6,044.50
6,044.00
6,043.50
6,043.00
6,042.50
6,042.00
6,041.50
6,041.00
6,040.50
6,040.00
6,039.50
6,039.00
6,038.50
6,038.00
6,037.50
6,037.00
6,036.50
6,036.00
6,035.50
6,035.00
6,034.50
6,034.00
6,033.50
6,033.00
6,032.50
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0 120.0 130.0 140.0 150.0 160.0 170.0 180.0 190.0 200.0 210.0 220.0 230.0 240.0 250.0 260.0 270.0 280.0 290.0 300.0 310.0 320.0 330.0

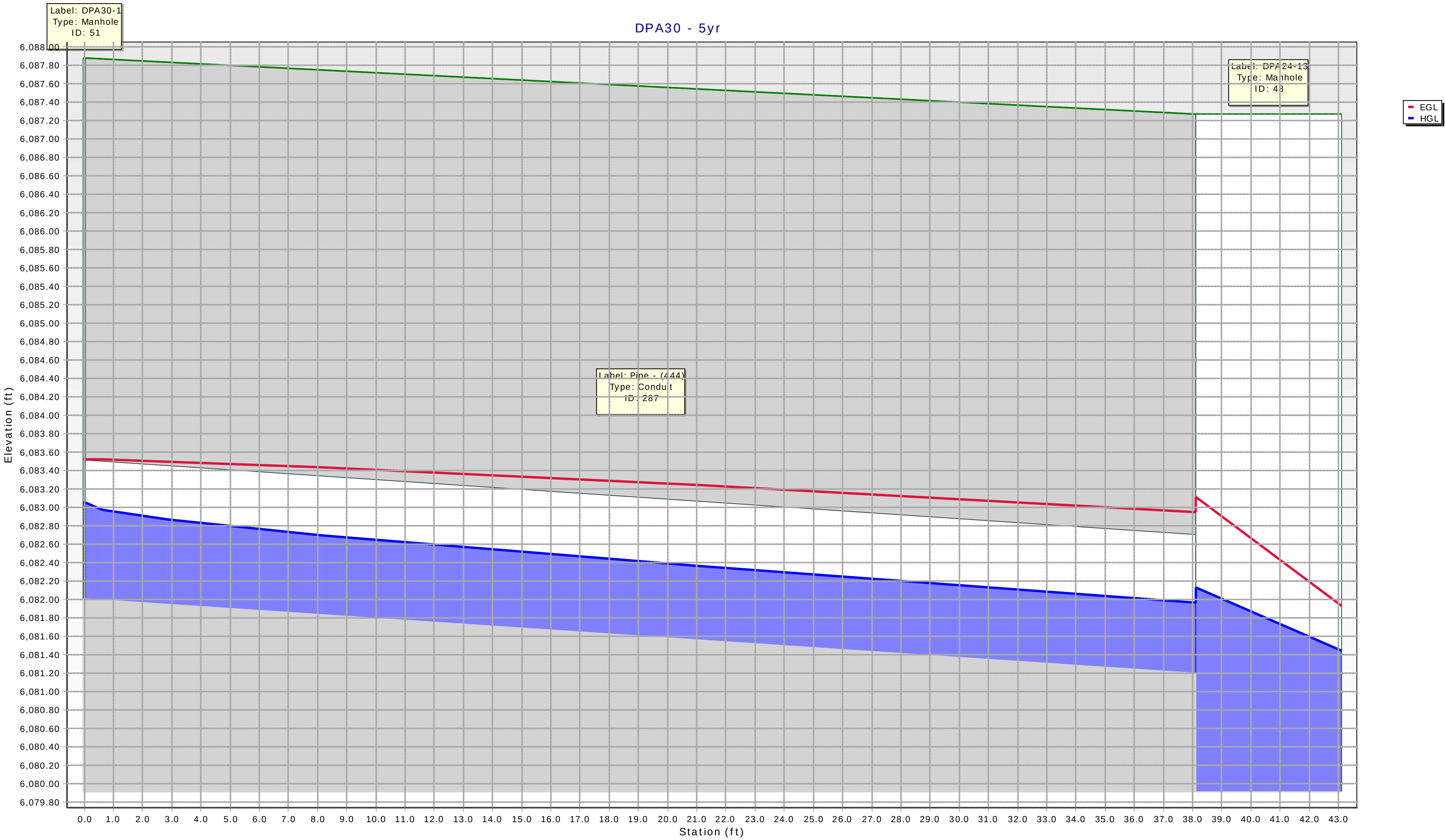


DPA27 - 5yr
Label: DPA27-2
Type: Manhole
ID: 69
Label: DPA27-1
Type: Manhole
ID: 71
Label: DPA24-9
Type: Manhole
ID: 75
Label: Pipe - (519)
Type: Conduit
ID: 311
Label: Pipe - (520)
Type: Conduit
ID: 313
EGL
HGL
Elevation (ft)
Station (ft)
6,072.20
6,072.00
6,071.80
6,071.60
6,071.40
6,071.20
6,071.00
6,070.80
6,070.60
6,070.40
6,070.20
6,070.00
6,069.80
6,069.60
6,069.40
6,069.20
6,069.00
6,068.80
6,068.60
6,068.40
6,068.20
6,068.00
6,067.80
6,067.60
6,067.40
6,067.20
6,067.00
6,066.80
6,066.60
6,066.40
6,066.20
6,066.00
6,065.80
6,065.60
6,065.40
6,065.20
6,065.00
6,064.80
6,064.60
6,064.40
6,064.20
6,064.00
6,063.80
6,063.60
6,063.40
6,063.20
6,063.00
6,062.80
6,062.60
6,062.40
-4.0 -2.0 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0 36.0 38.0 40.0 42.0 44.0 46.0 48.0 50.0 52.0 54.0 56.0 58.0 60.0 62.0 64.0 66.0

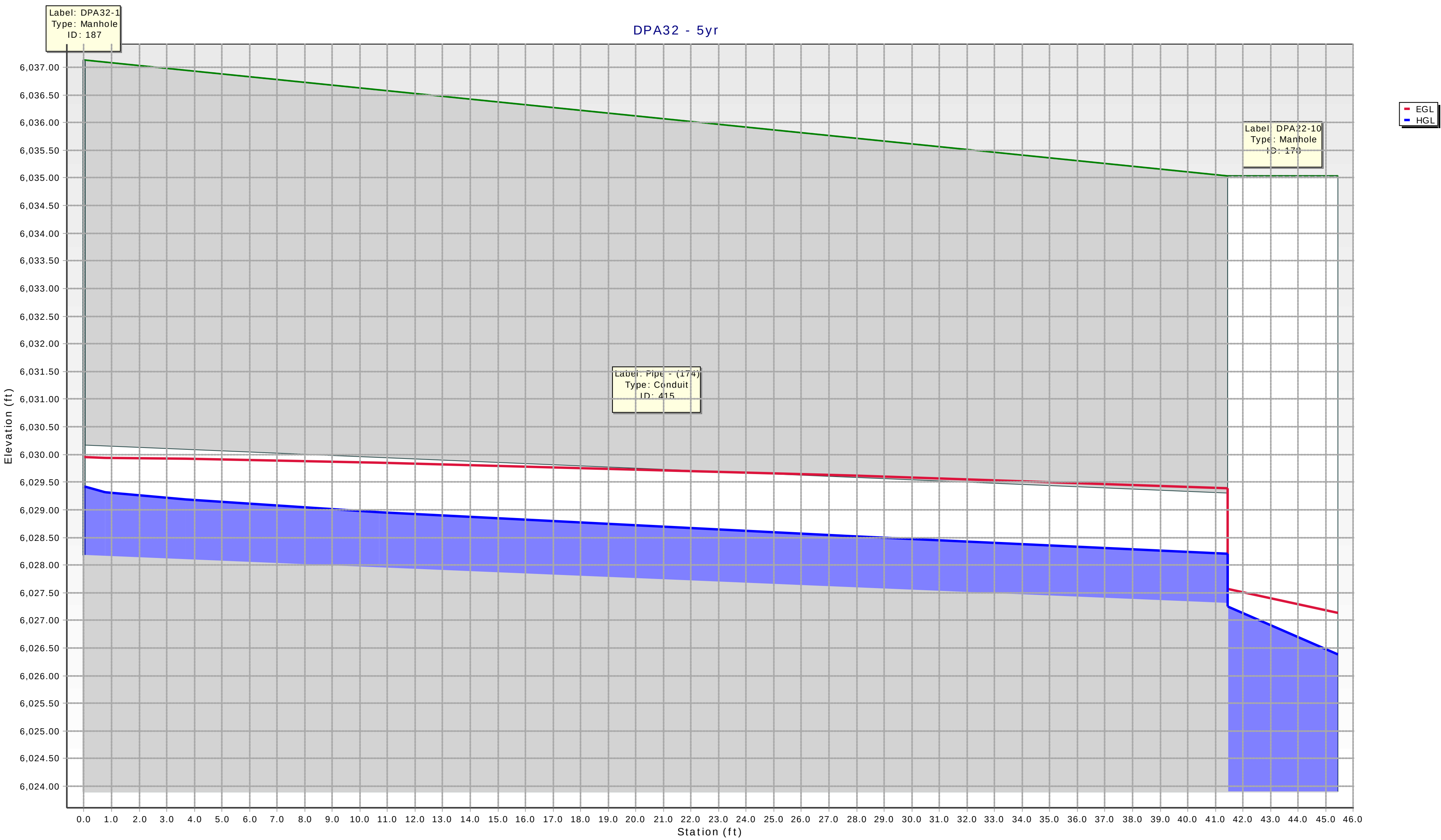


DPA28 - 5yr
Label: DPA28-1
Type: Manhole
ID: 66
Label: DPA24-10
Type: Manhole
ID: 67
Label: DPA28-2
Type: Manhole
ID: 65
Label: Pipe - (518)
Type: Conduit
ID: 308
Label: Pipe - (517)
Type: Conduit
ID: 307
EGL
HGL
Elevation (ft)
Station (ft)

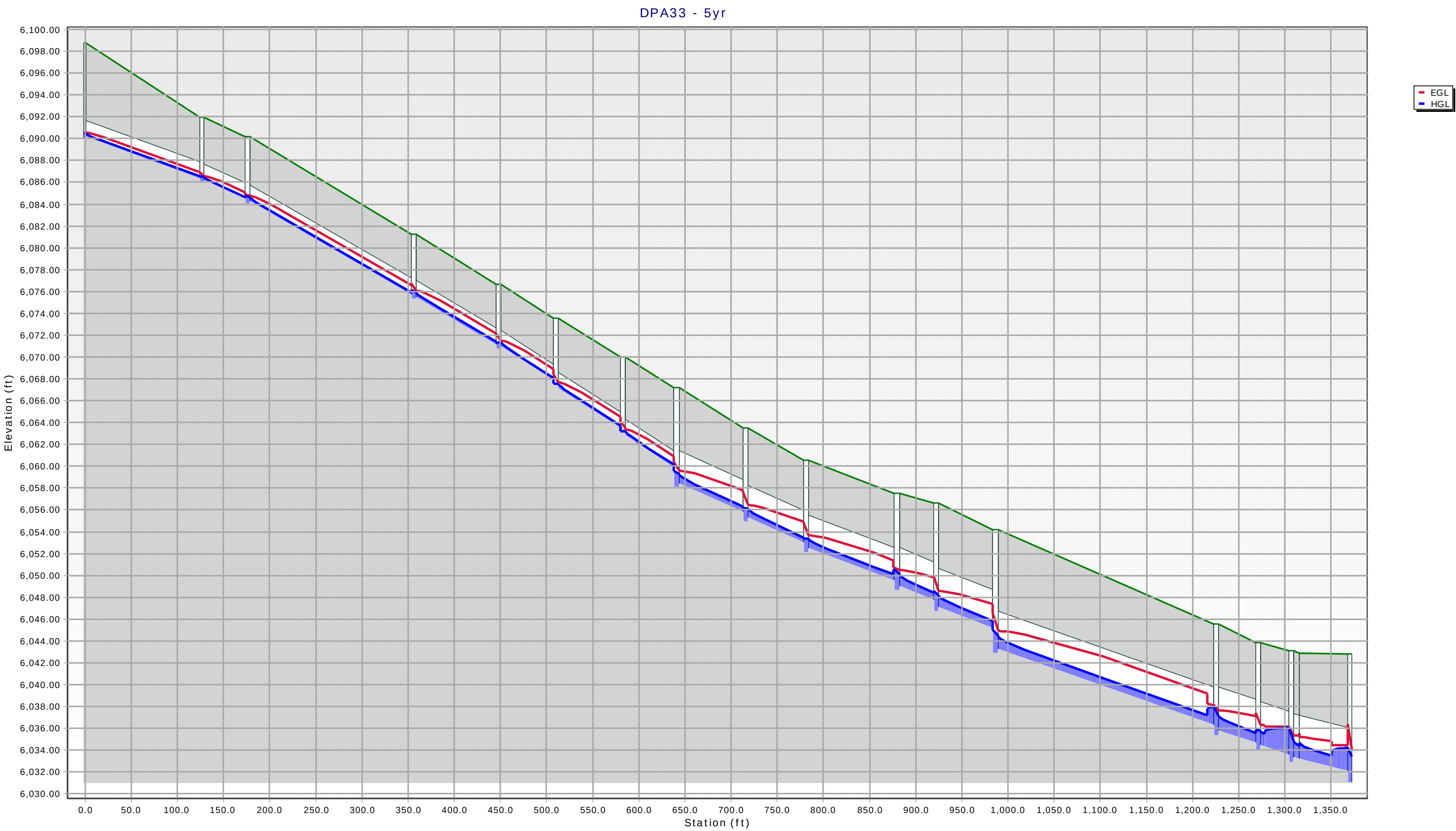

DPA29 - 5yr
Label: DPA29-1
Type: Manhole
ID: 53
Label: DPA24-12
Type: Manhole
ID: 54
Label: DPA29-2
Type: Manhole
ID: 52
Label: Pipe - (378)
Type: Conduit
ID: 291
Label: Pipe - (377)
Type: Conduit
ID: 290
EGL
HGL
Elevation (ft)
Station (ft)
6,083.20
6,083.00
6,082.80
6,082.60
6,082.40
6,082.20
6,082.00
6,081.80
6,081.60
6,081.40
6,081.20
6,081.00
6,080.80
6,080.60
6,080.40
6,080.20
6,080.00
6,079.80
6,079.60
6,079.40
6,079.20
6,079.00
6,078.80
6,078.60
6,078.40
6,078.20
6,078.00
6,077.80
6,077.60
6,077.40
6,077.20
6,077.00
6,076.80
6,076.60
6,076.40
6,076.20
6,076.00
6,075.80
6,075.60
6,075.40
6,075.20
-2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0 44.0 45.0 46.0

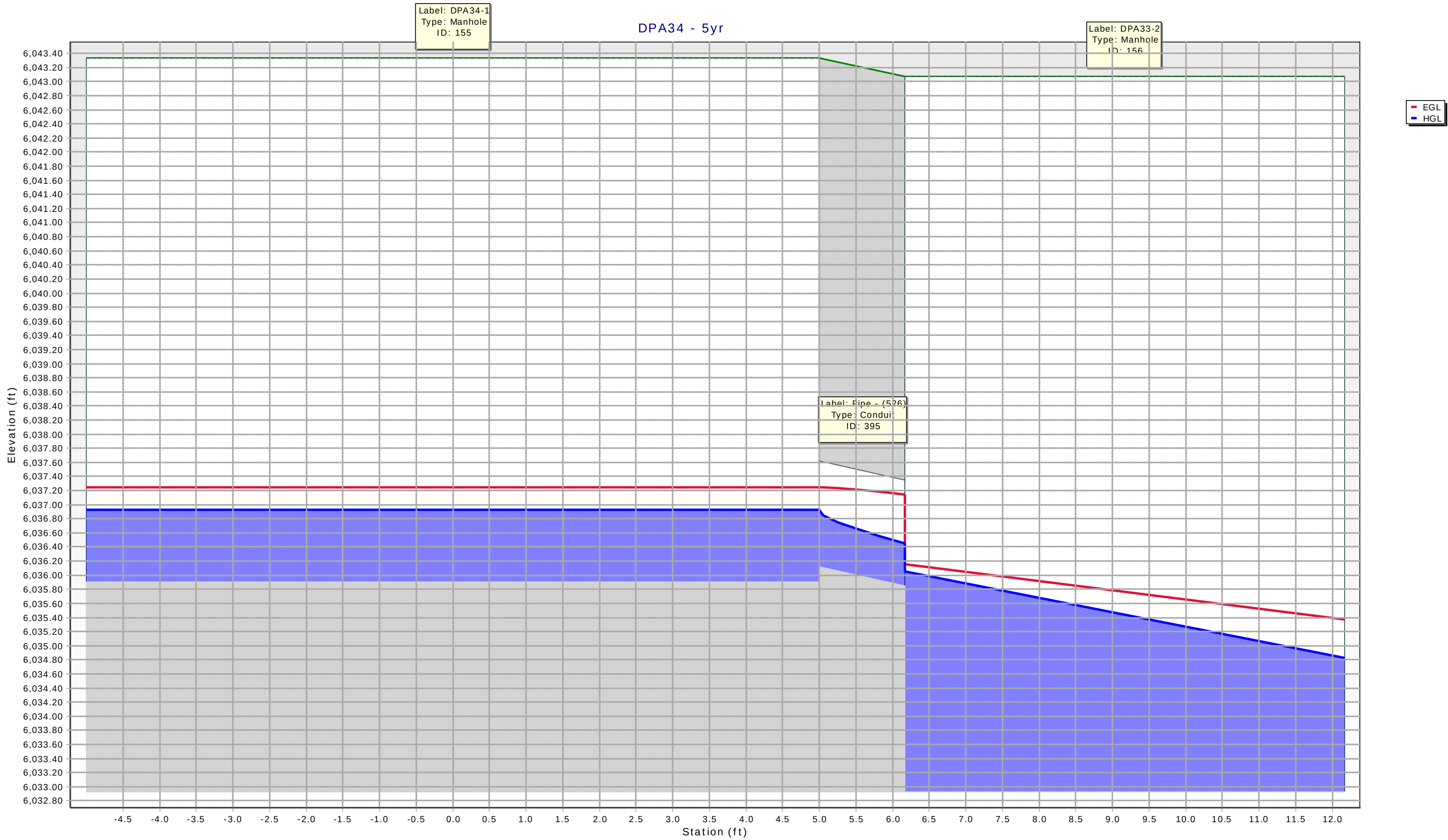

DPA30 - 5yr
Label: DPA30-1
Type: Manhole
ID: 51
Label: DPA24-13
Type: Manhole
ID: 43
Label: Pipe - (444)
Type: Conduit
ID: 287
EGL
HGL
Elevation (ft)
Station (ft)


DPA31 - 5yr
Label: DPA31-1
Type: Manhole
ID: 194
Label: DPA22-8
Type: Manhole
ID: 191
Label: DPA31-2
Type: Manhole
ID: 188
Label: Pipe - (176)
Type: Conduit
ID: 429
Label: Pipe - (175)
Type: Conduit
ID: 426
EGL
HGL
Elevation (ft)
Station (ft)

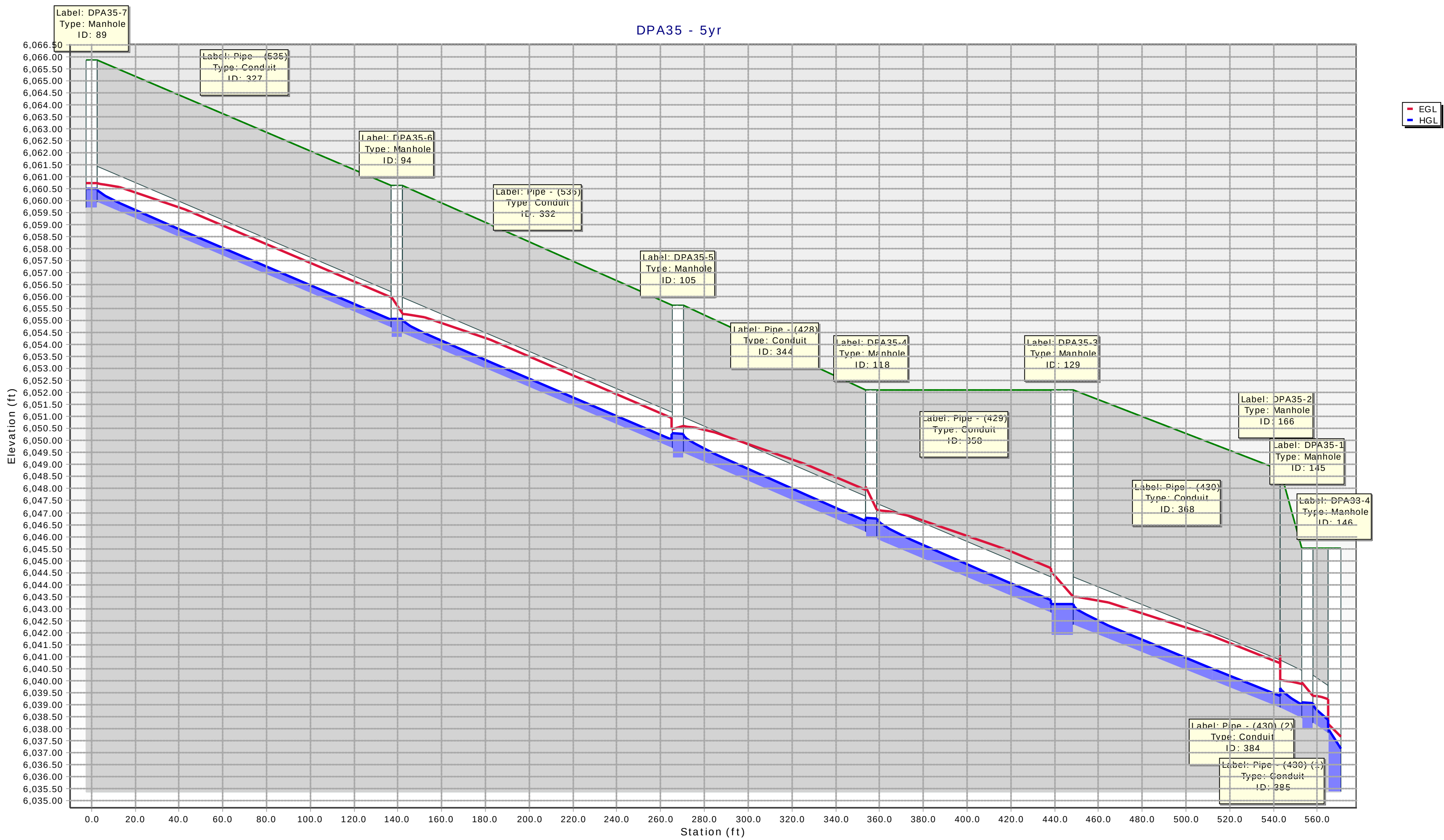


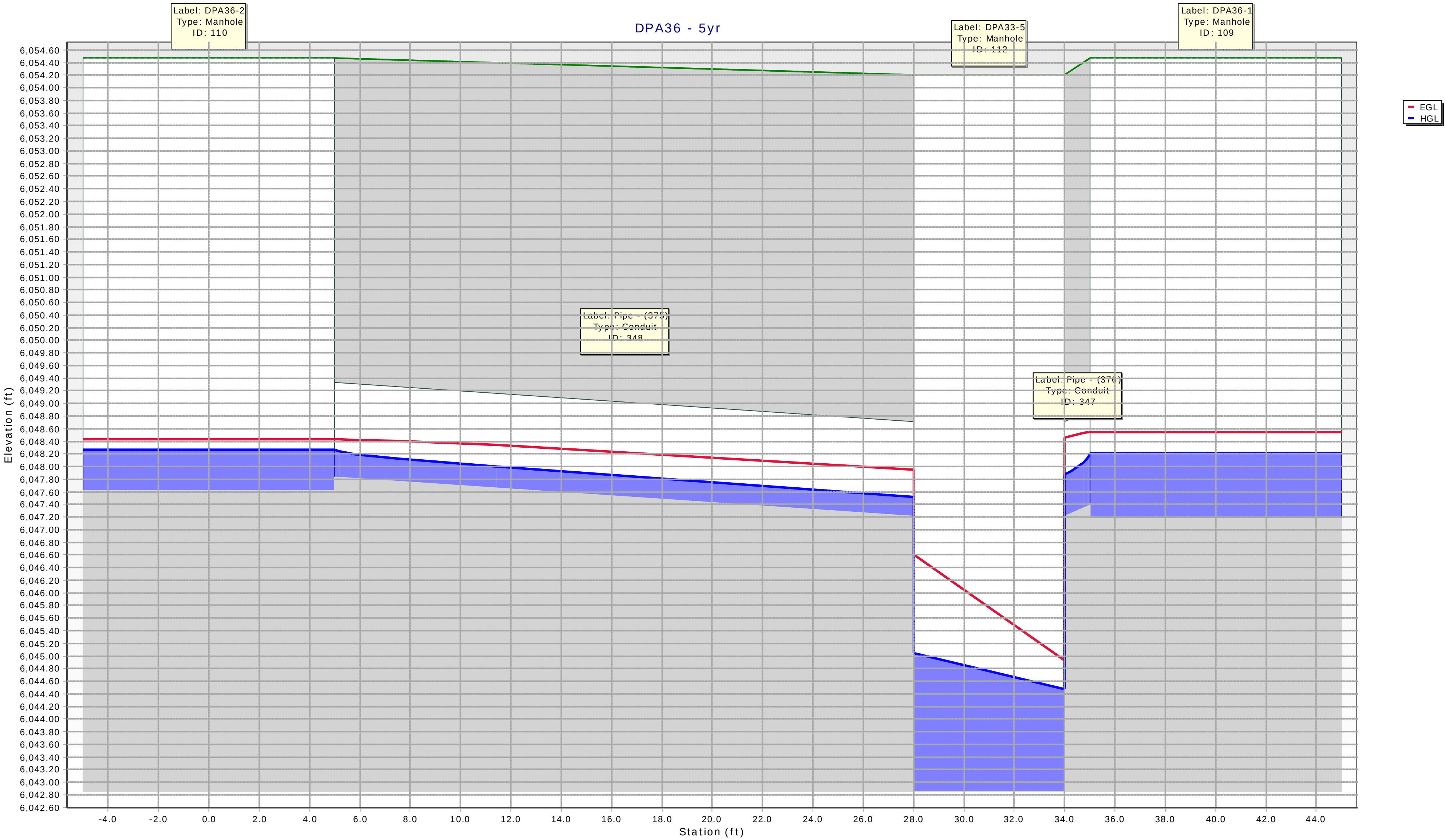
DPA32 - 5yr
Label: DPA32-1
Type: Manhole
ID: 187
Label: DPA22-10
Type: Manhole
ID: 178
Label: Pipe - (174)
Type: Conduit
ID: 415
EGL
HGL
Elevation (ft)
Station (ft)
6,037.00
6,036.50
6,036.00
6,035.50
6,035.00
6,034.50
6,034.00
6,033.50
6,033.00
6,032.50
6,032.00
6,031.50
6,031.00
6,030.50
6,030.00
6,029.50
6,029.00
6,028.50
6,028.00
6,027.50
6,027.00
6,026.50
6,026.00
6,025.50
6,025.00
6,024.50
6,024.00
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0 44.0 45.0 46.0

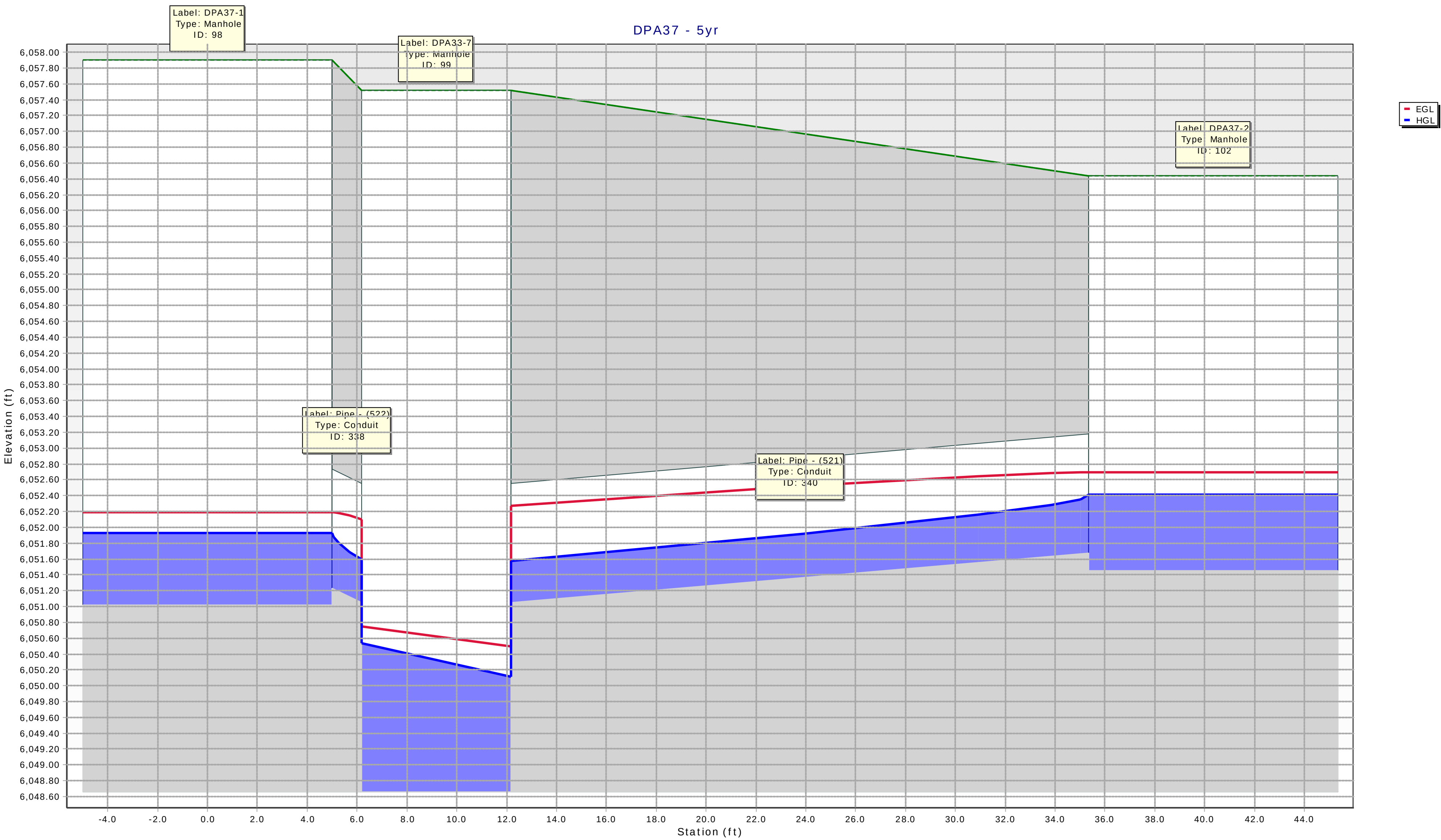

DPA33 - 5yr
Elevation (ft)
Station (ft)
EGL
HGL
6,100.00
6,098.00
6,096.00
6,094.00
6,092.00
6,090.00
6,088.00
6,086.00
6,084.00
6,082.00
6,080.00
6,078.00
6,076.00
6,074.00
6,072.00
6,070.00
6,068.00
6,066.00
6,064.00
6,062.00
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1,000.0
1,050.0
1,100.0
1,150.0
1,200.0
1,250.0
1,300.0
1,350.0



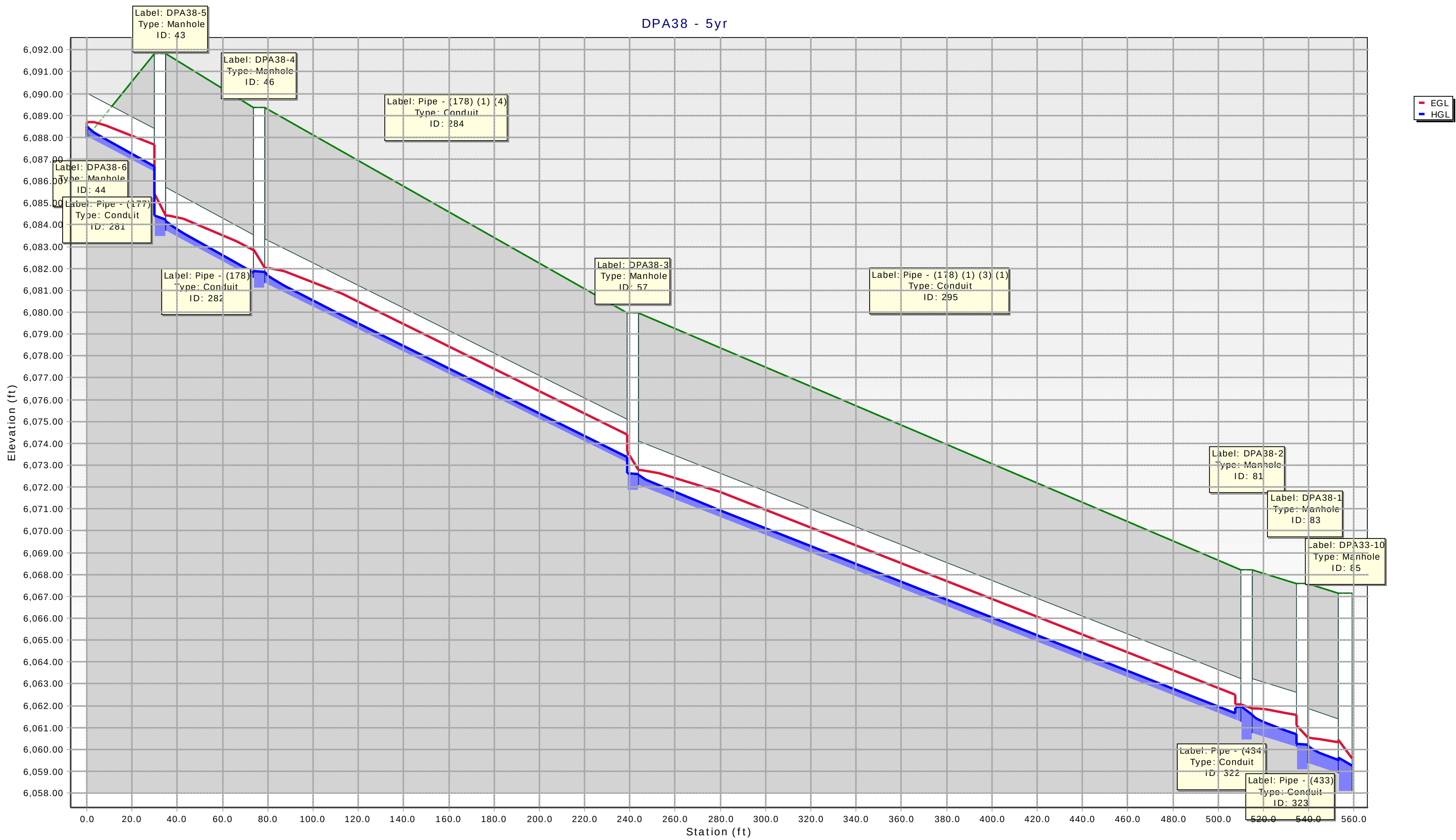
DPA34 - 5yr
Label: DPA34-1
Type: Manhole
ID: 155
Label: DPA33-2
Type: Manhole
Label: Pipe - (526)
Type: Conduit
ID: 395
EGL
HGL
Elevation (ft)
Station (ft)


DPA35 - 5yr
Label: DPA35-7
Type: Manhole
ID: 89
Label: Pipe - (535)
Type: Conduit
ID: 327
Label: DPA35-6
Type: Manhole
ID: 94
Label: Pipe - (536)
Type: Conduit
ID: 332
Label: DPA35-5
Type: Manhole
ID: 105
Label: Pipe - (428)
Type: Conduit
ID: 344
Label: DPA35-4
Type: Manhole
ID: 118
Label: DPA35-3
Type: Manhole
ID: 129
Label: Pipe - (429)
Type: Conduit
ID: 358
Label: DPA35-2
Type: Manhole
ID: 166
Label: DPA35-1
Type: Manhole
ID: 145
Label: Pipe - (430)
Type: Conduit
ID: 368
Label: DPA33-4
Type: Manhole
ID: 146
Label: Pipe - (430) (2)
Type: Conduit
ID: 384
Label: Pipe - (430) (1)
Type: Conduit
ID: 385
EGL
HGL
Elevation (ft)
Station (ft)

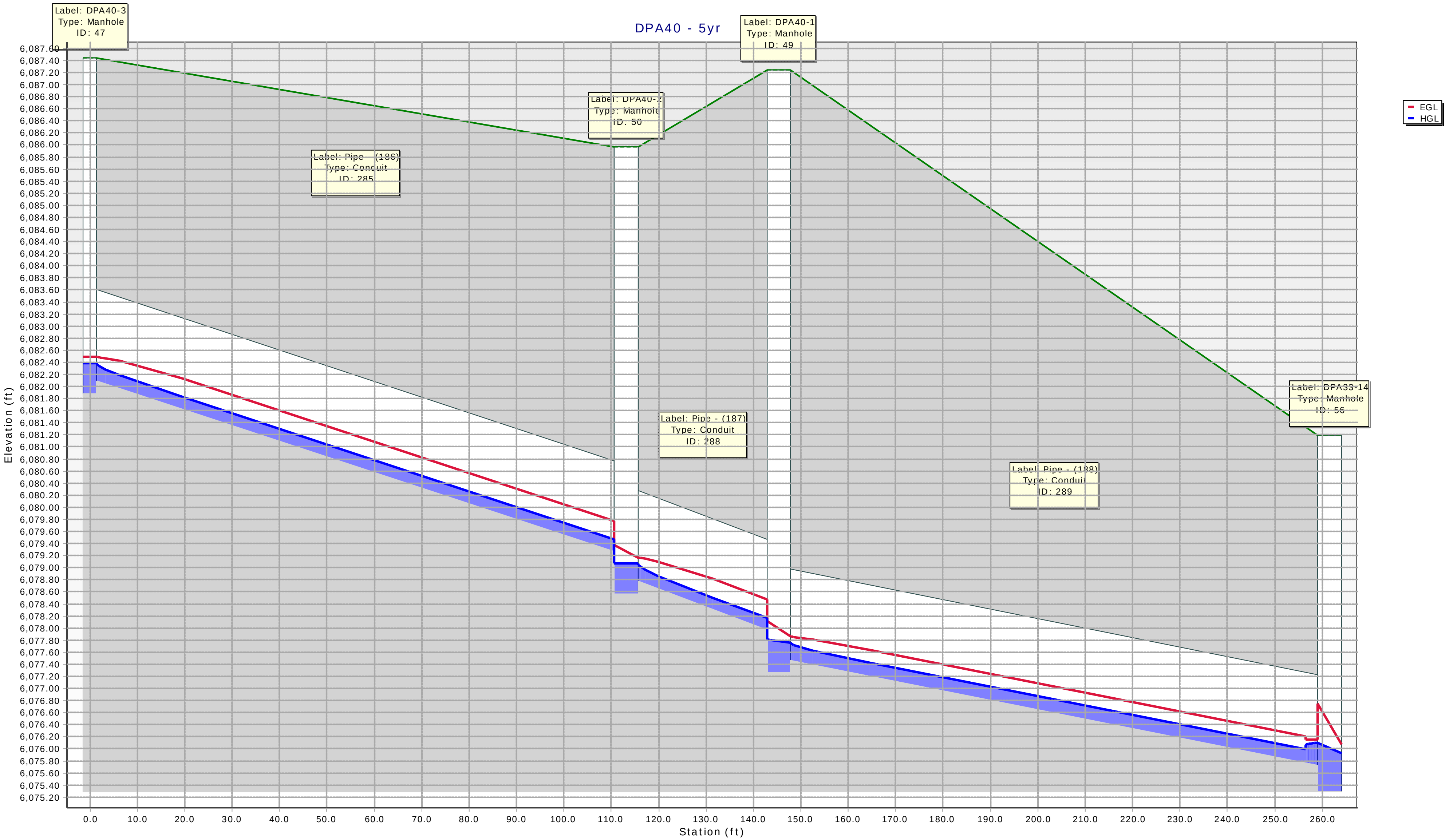

DPA36 - 5yr
Label: DPA36-2
Type: Manhole
ID: 110
Label: DPA33-5
Type: Manhole
ID: 112
Label: DPA36-1
Type: Manhole
ID: 109
Label: Pipe - (375)
Type: Conduit
ID: 348
Label: Pipe - (376)
Type: Conduit
ID: 347
EGL
HGL
Elevation (ft)
Station (ft)

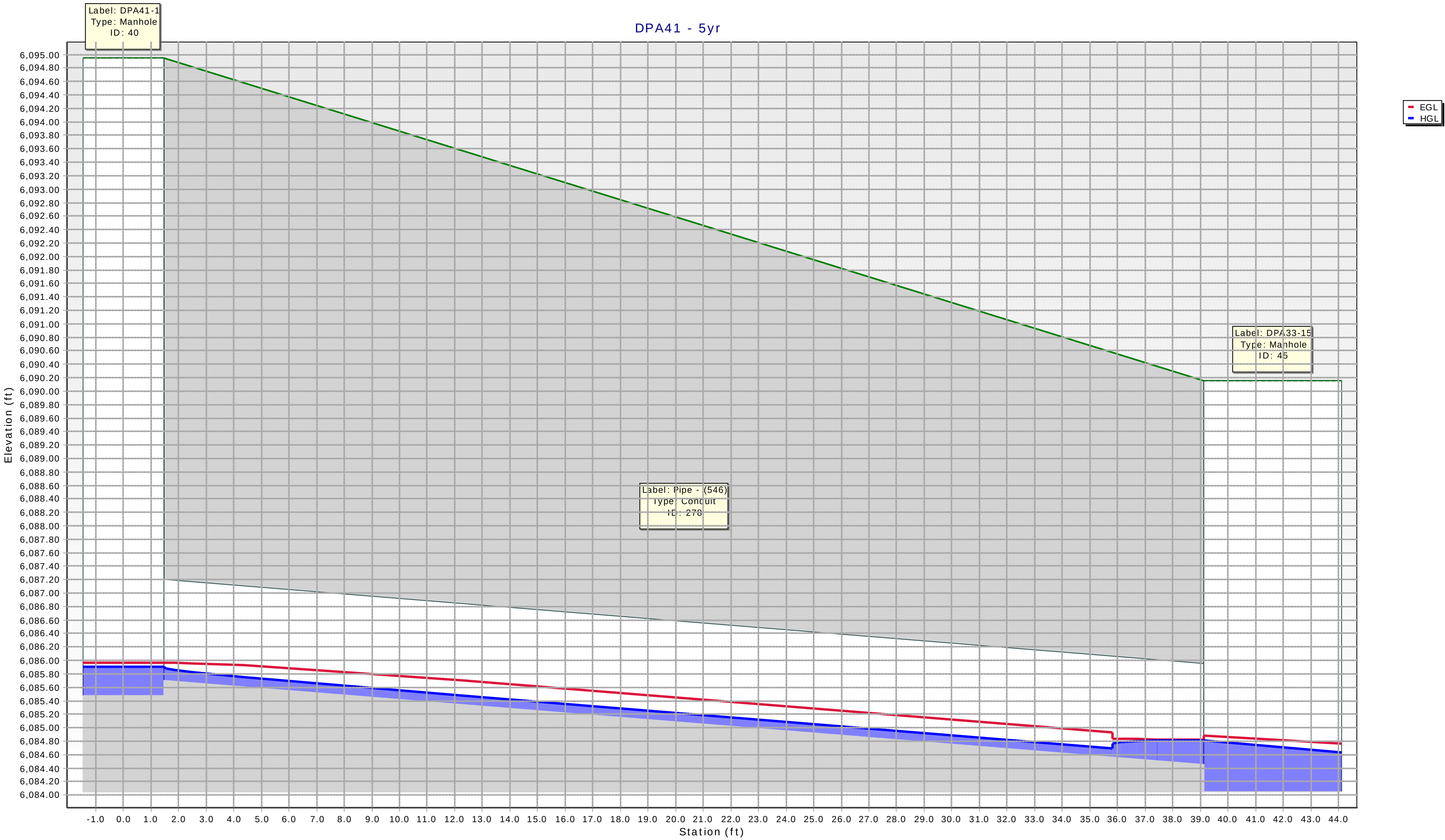


DPA37 - 5yr
Label: DPA37-1
Type: Manhole
ID: 98
Label: DPA33-7
Type: Manhole
ID: 99
Label: DPA37-2
Type: Manhole
ID: 102
Label: Pipe - (522)
Type: Conduit
ID: 338
Label: Pipe - (521)
Type: Conduit
ID: 340
EGL
HGL
Elevation (ft)
Station (ft)

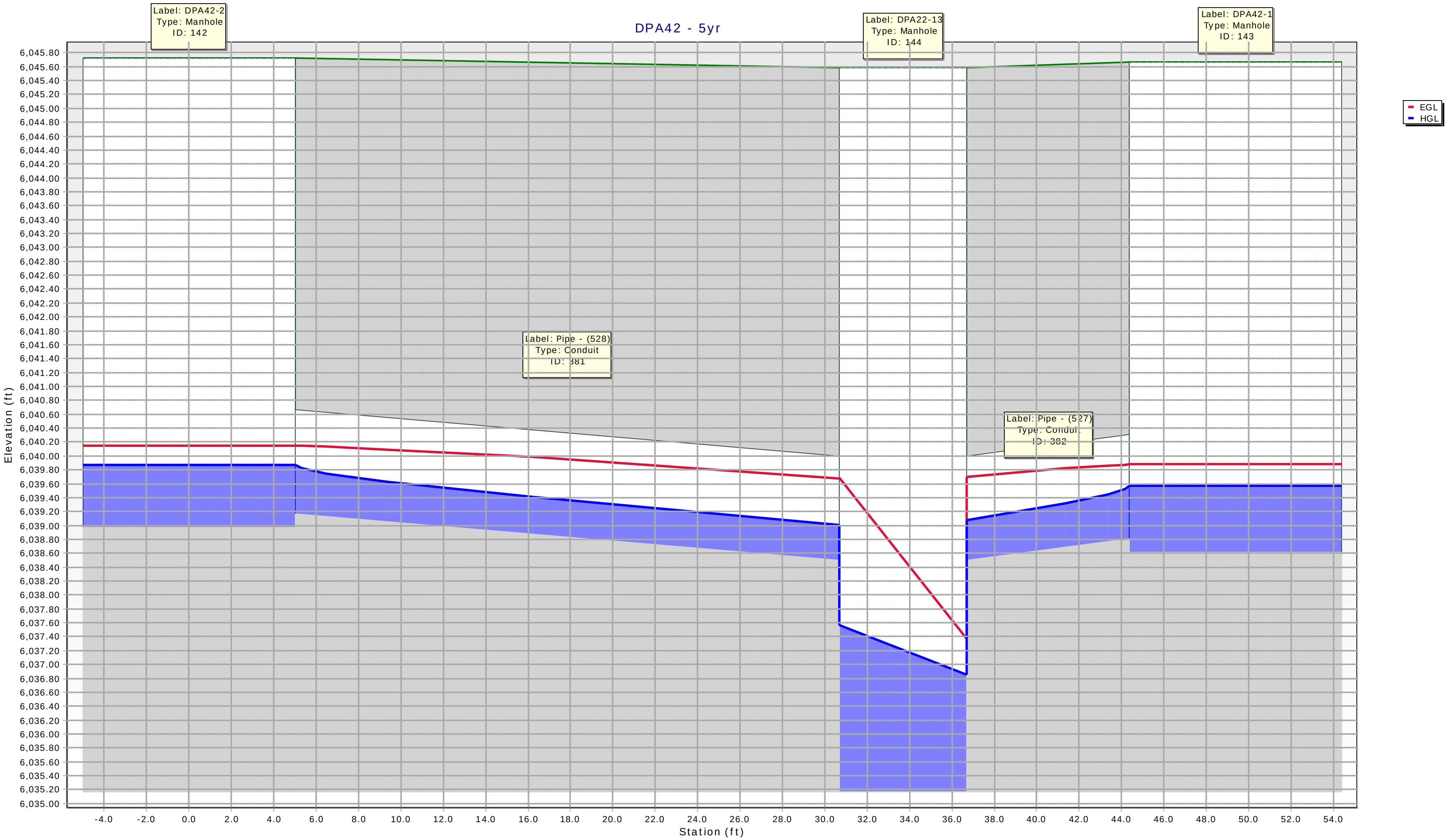

DPA38 - 5yr
Elevation (ft)
Station (ft)
EGL
HGL
Label: DPA38-5
Type: Manhole
ID: 43
Label: DPA38-4
Type: Manhole
ID: 46
Label: Pipe - (178) (1) (4)
Type: Conduit
ID: 284
Label: DPA38-6
Type: Manhole
ID: 44
Label: Pipe - (177)
Type: Conduit
ID: 281
Label: Pipe - (178)
Type: Conduit
ID: 282
Label: DPA38-3
Type: Manhole
ID: 57
Label: Pipe - (178) (1) (3) (1)
Type: Conduit
ID: 295
Label: DPA38-2
Type: Manhole
ID: 81
Label: DPA38-1
Type: Manhole
ID: 83
Label: DPA33-10
Type: Manhole
ID: 85
Label: Pipe - (434)
Type: Conduit
ID: 322
Label: Pipe - (433)
Type: Conduit
ID: 323
6,092.00
6,091.00
6,090.00
6,089.00
6,088.00
6,087.00
6,086.00
6,085.00
6,084.00
6,083.00
6,082.00
6,081.00
6,080.00
6,079.00
6,078.00
6,077.00
6,076.00
6,075.00
6,074.00
6,073.00
6,072.00
6,071.00
6,070.00
6,069.00
6,068.00
6,067.00
6,066.00
6,065.00
6,064.00
6,063.00
6,062.00
6,061.00
6,060.00
6,059.00
6,058.00
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0
500.0
520.0
540.0
560.0

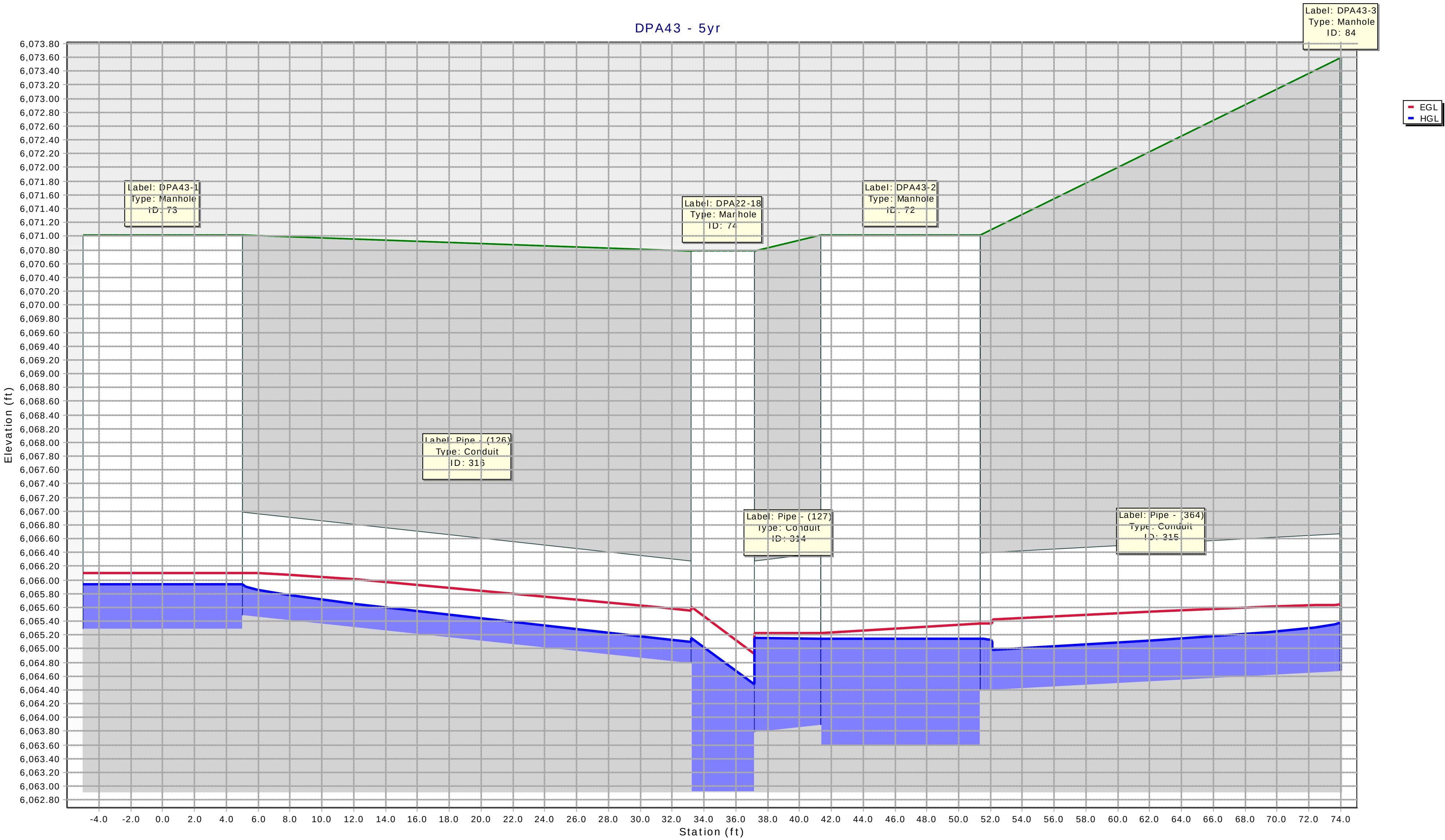

DPA39 - 5yr
Label: DPA39-1
Type: Manhole
ID: 79
Label: DPA38-2
Type: Manhole
ID: 81
Label: DPA39-2
Type: Manhole
ID: 87
Label: Pipe - (432)
Type: Conduit
ID: 320
Label: Pipe - (431)
Type: Conduit
ID: 321
EGL
HGL
Elevation (ft)
Station (ft)

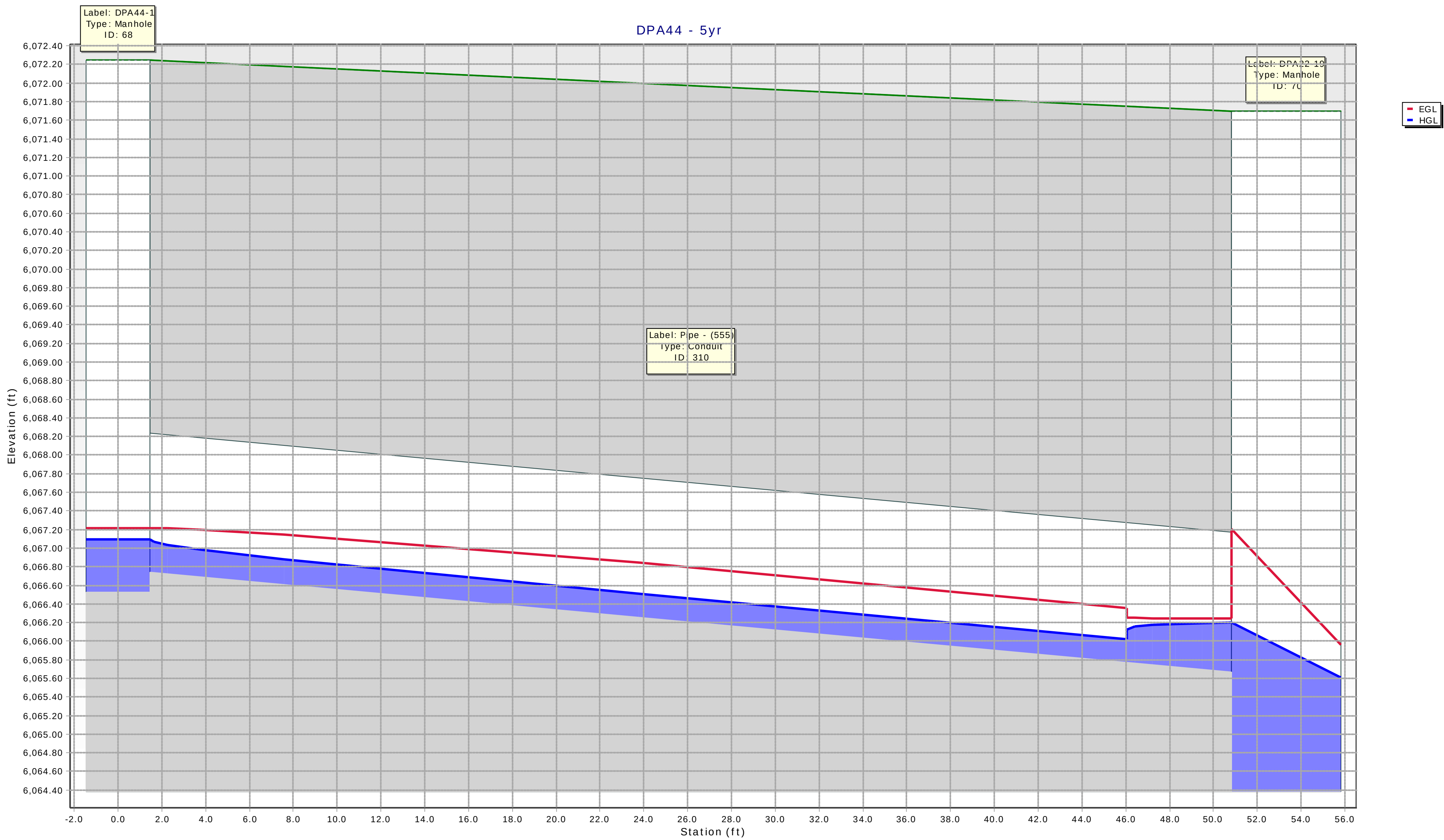

DPA40 - 5yr
Label: DPA40-3
Type: Manhole
ID: 47
Label: DPA40-2
Type: Manhole
ID: 50
Label: DPA40-1
Type: Manhole
ID: 49
Label: DPA33-14
Type: Manhole
ID: 56
Label: Pipe - (186)
Type: Conduit
ID: 285
Label: Pipe - (187)
Type: Conduit
ID: 288
Label: Pipe - (188)
Type: Conduit
ID: 289
EGL
HGL
Elevation (ft)
Station (ft)



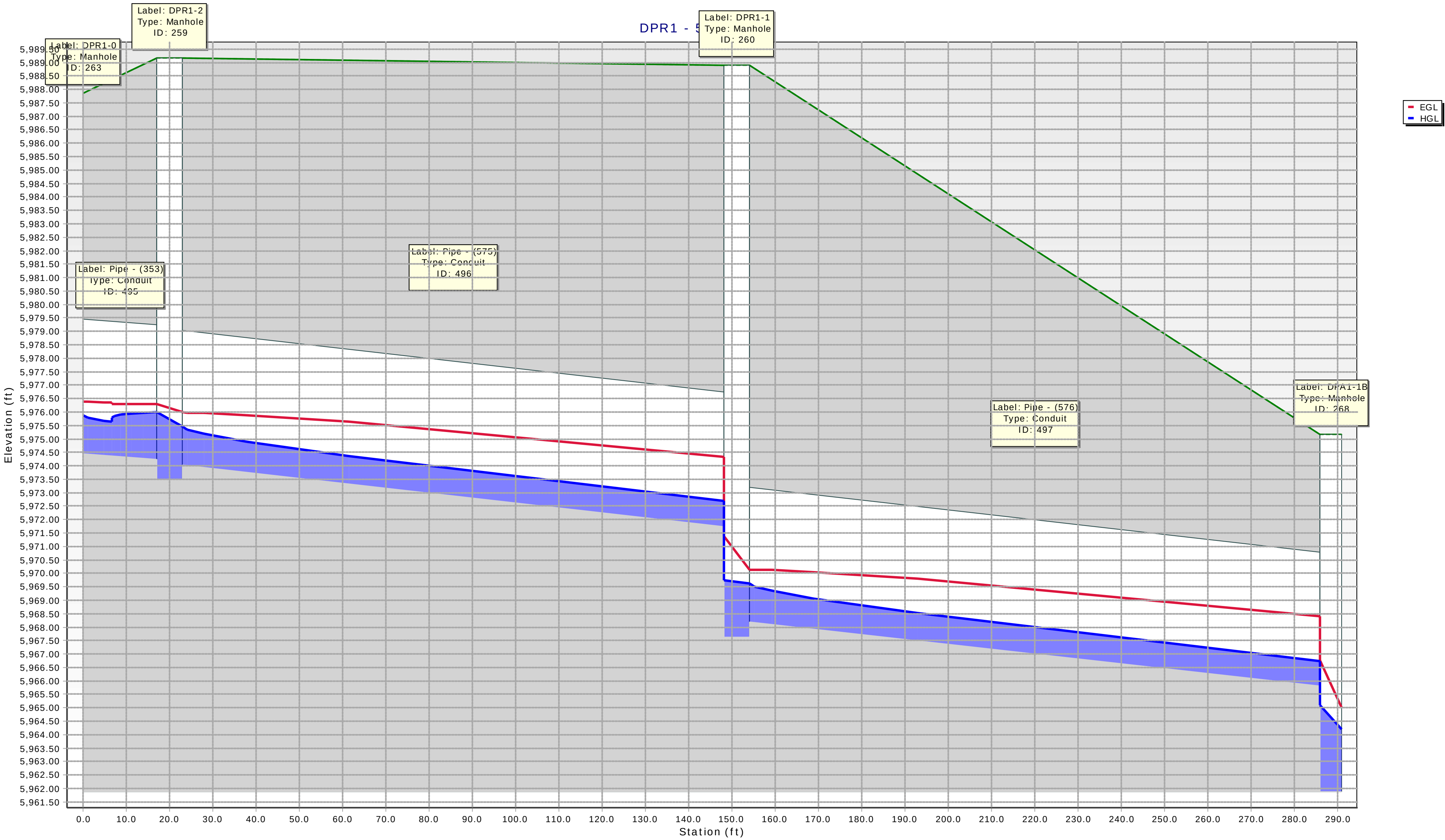
DPA41 - 5yr
Label: DPA41-1
Type: Manhole
ID: 40
Label: DPA33-15
Type: Manhole
ID: 45
Label: Pipe - (546)
Type: Conduit
ID: 278
EGL
HGL
Elevation (ft)
Station (ft)

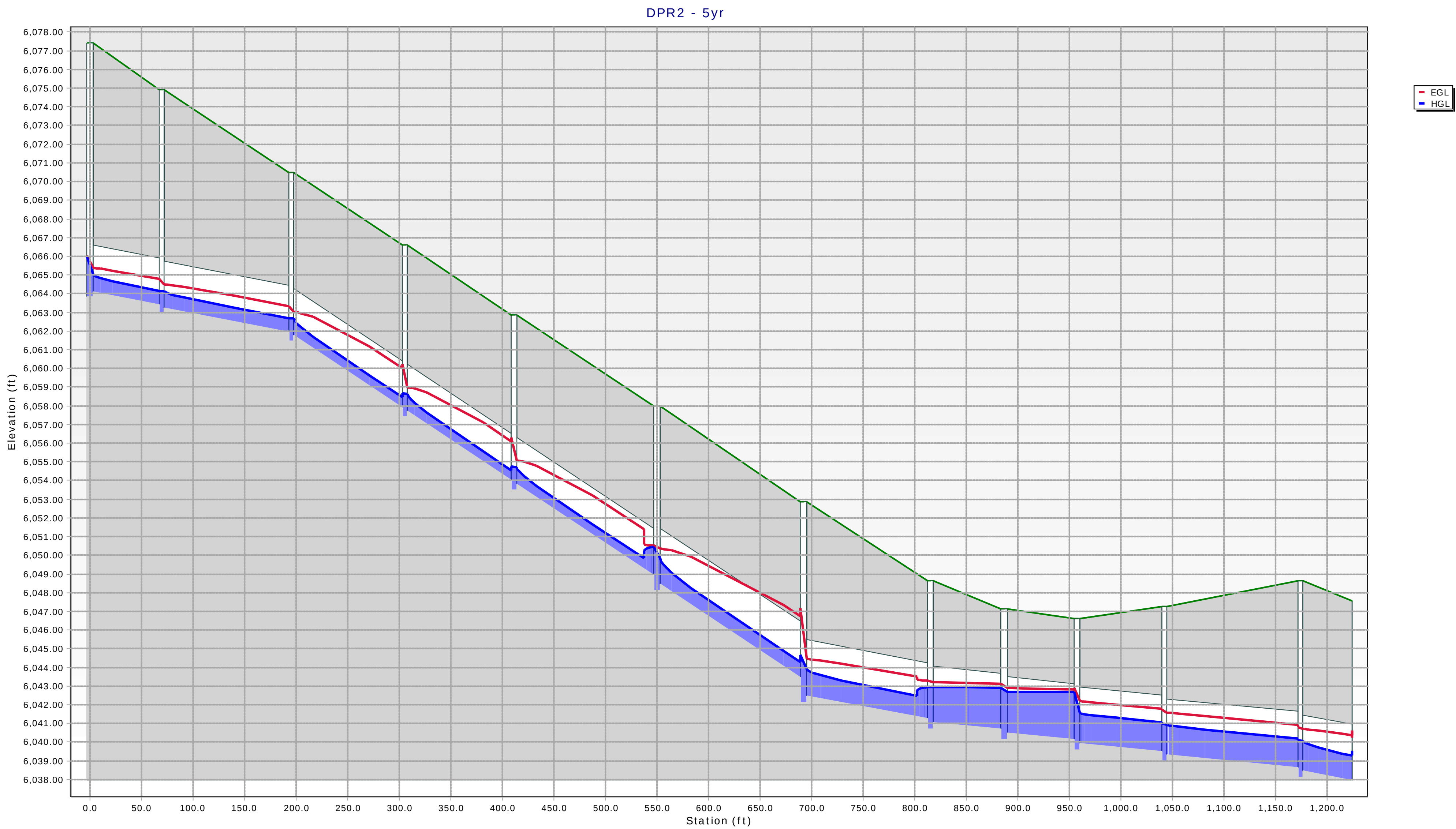

DPA42 - 5yr
Label: DPA42-2
Type: Manhole
ID: 142
Label: DPA22-13
Type: Manhole
ID: 144
Label: DPA42-1
Type: Manhole
ID: 143
Label: Pipe - (528)
Type: Conduit
ID: 381
Label: Pipe - (527)
Type: Conduit
ID: 382
EGL
HGL
Elevation (ft)
Station (ft)

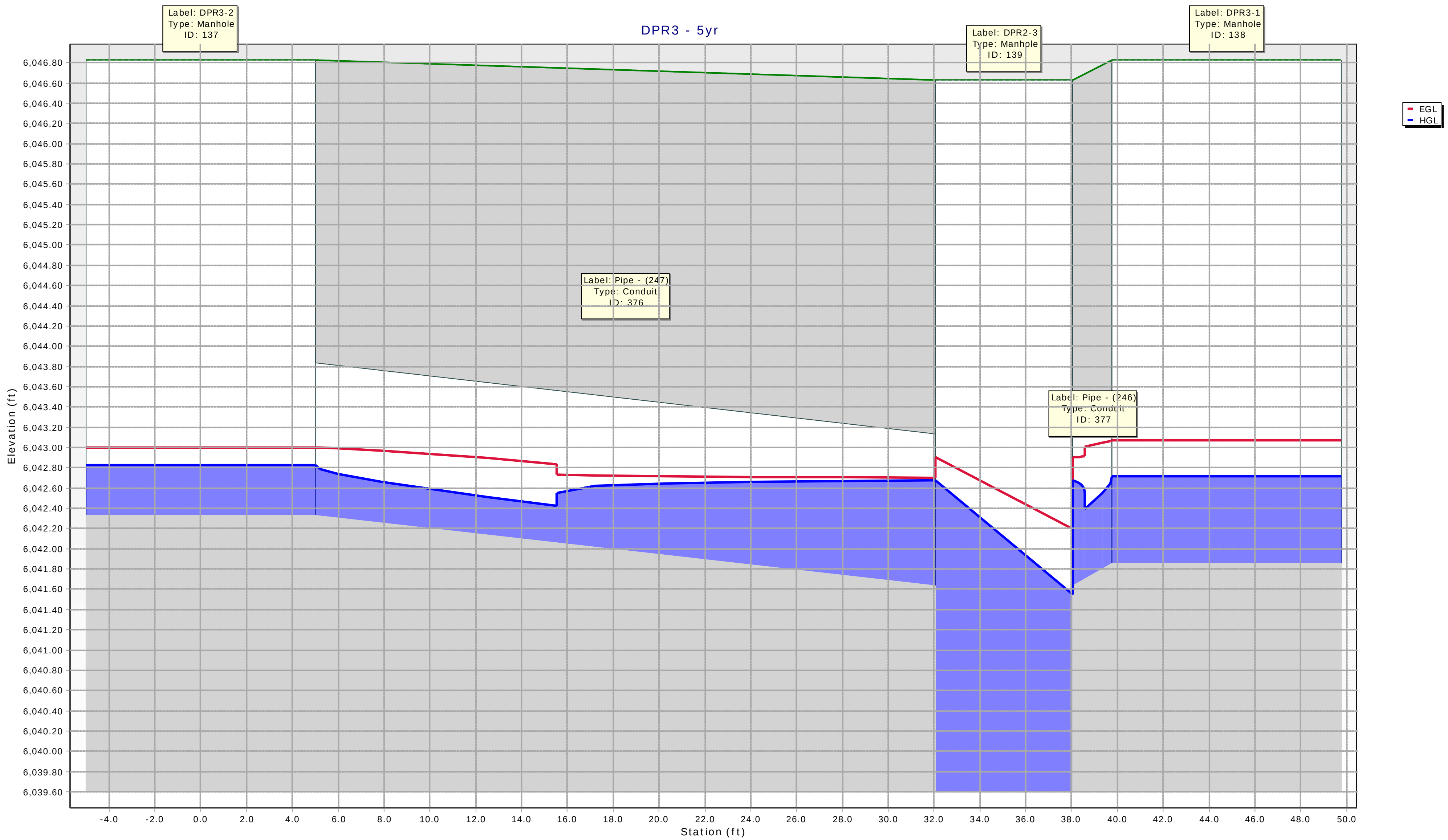

DPA43 - 5yr
Label: DPA43-3
Type: Manhole
ID: 84
EGL
HGL
Label: DPA43-1
Type: Manhole
ID: 73
Label: DPA22-18
Type: Manhole
ID: 74
Label: DPA43-2
Type: Manhole
ID: 72
Label: Pipe - (126)
Type: Conduit
ID: 316
Label: Pipe - (127)
Type: Conduit
ID: 314
Label: Pipe - (364)
Type: Conduit
ID: 315
Elevation (ft)
Station (ft)



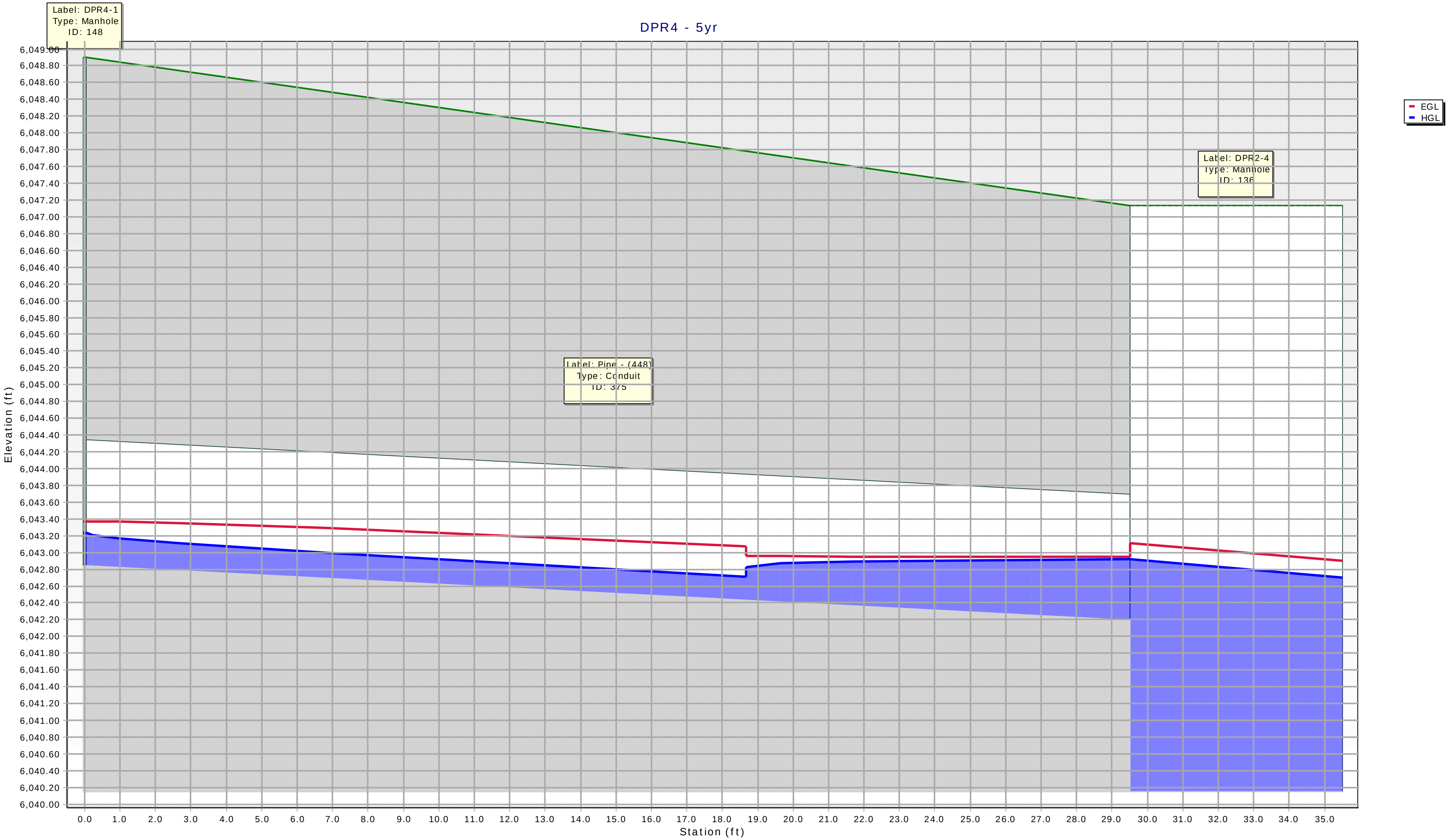
DPA44 - 5yr
Label: DPA44-1
Type: Manhole
ID: 68
Label: Pipe - (555)
Type: Conduit
ID: 310
Type: Manhole
EGL
HGL
Elevation (ft)
Station (ft)

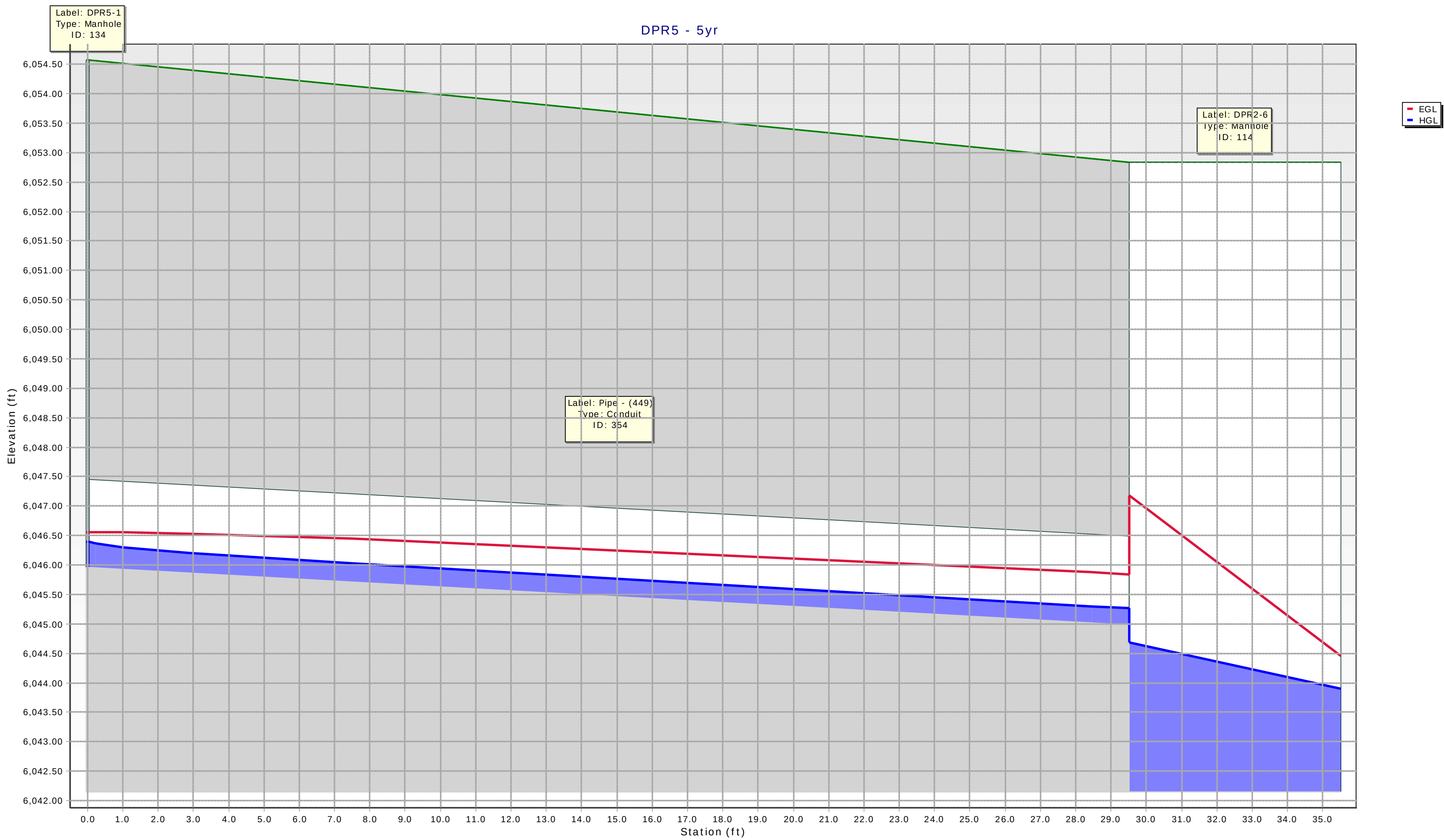

DPR1 - 5
Label: DPR1-0
Type: Manhole
ID: 263
Label: DPR1-2
Type: Manhole
ID: 259
Label: DPR1-1
Type: Manhole
ID: 260
Label: DPA1-1B
Type: Manhole
ID: 268
Label: Pipe - (353)
Type: Conduit
ID: 495
Label: Pipe - (575)
Type: Conduit
ID: 496
Label: Pipe - (576)
Type: Conduit
ID: 497
EGL
HGL
Elevation (ft)
Station (ft)


DPR2 - 5yr
Elevation (ft)
Station (ft)
EGL
HGL
6,078.00
6,077.00
6,076.00
6,075.00
6,074.00
6,073.00
6,072.00
6,071.00
6,070.00
6,069.00
6,068.00
6,067.00
6,066.00
6,065.00
6,064.00
6,063.00
6,062.00
6,061.00
6,060.00
6,059.00
6,058.00
6,057.00
6,056.00
6,055.00
6,054.00
6,053.00
6,052.00
6,051.00
6,050.00
6,049.00
6,048.00
6,047.00
6,046.00
6,045.00
6,044.00
6,043.00
6,042.00
6,041.00
6,040.00
6,039.00
6,038.00
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1,000.0
1,050.0
1,100.0
1,150.0
1,200.0

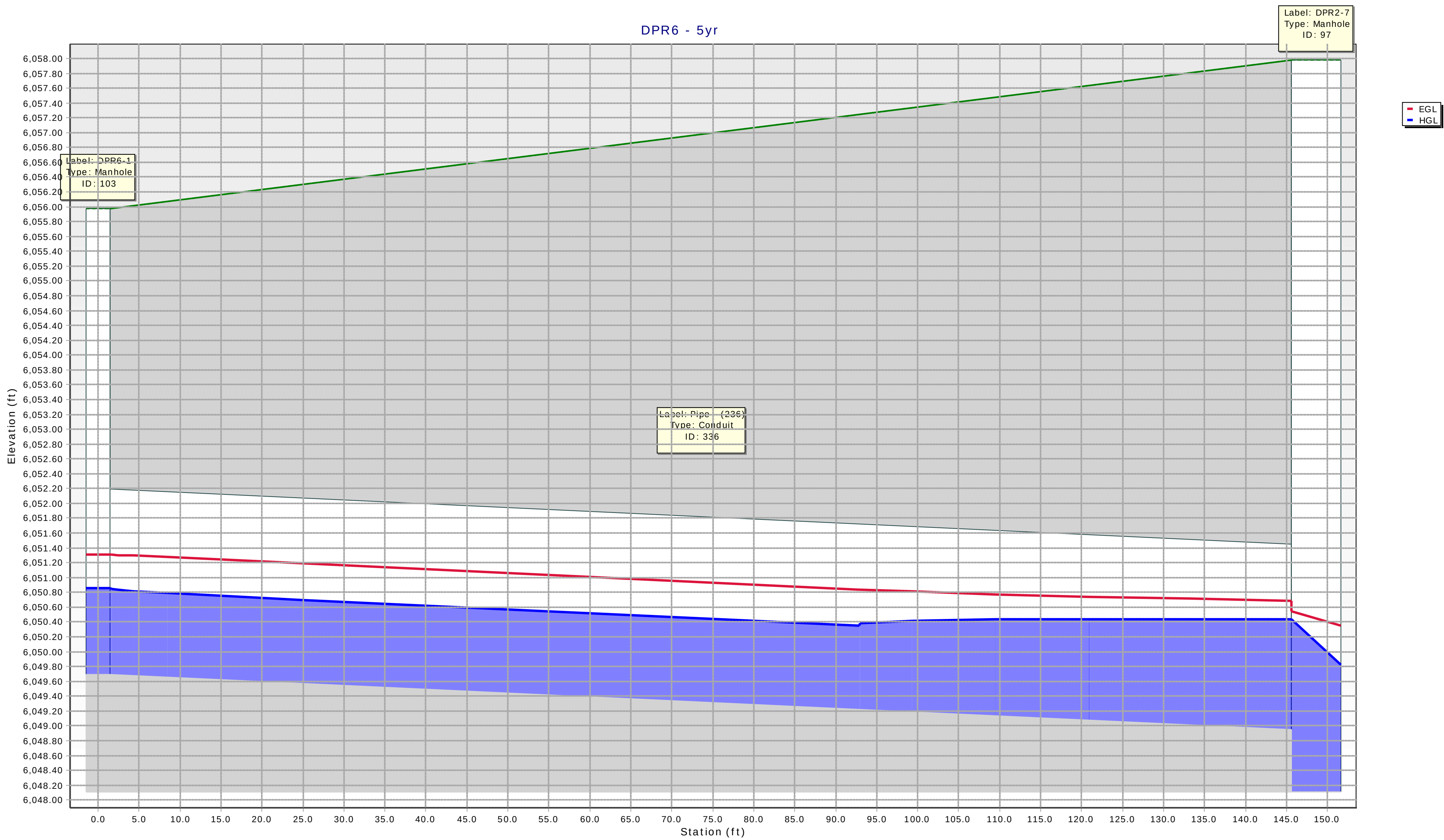


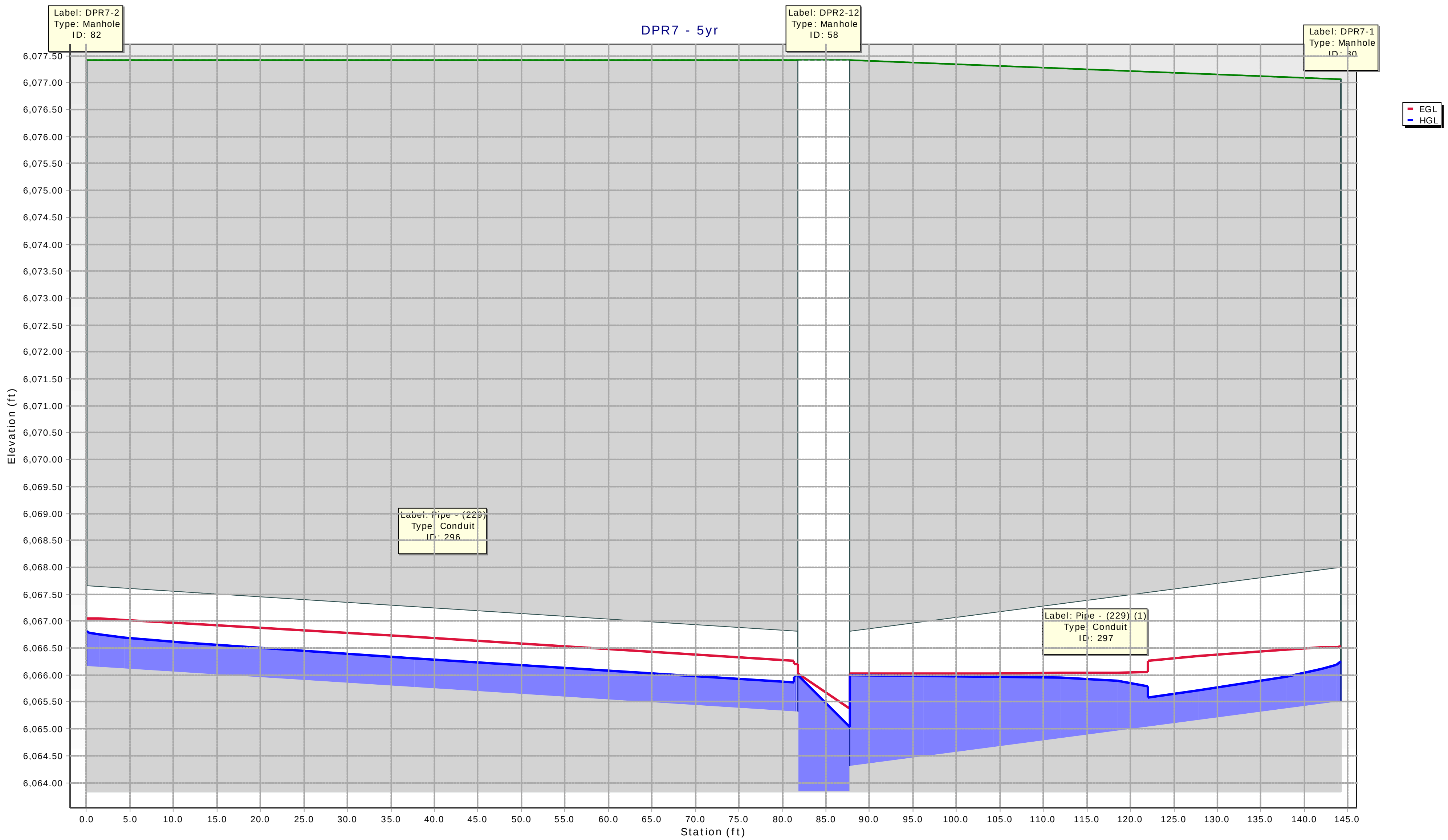
DPR3 - 5yr
Label: DPR3-2
Type: Manhole
ID: 137
Label: DPR2-3
Type: Manhole
ID: 139
Label: DPR3-1
Type: Manhole
ID: 138
Label: Pipe - (247)
Type: Conduit
ID: 376
Label: Pipe - (246)
Type: Conduit
ID: 377
EGL
HGL
Elevation (ft)
Station (ft)
6,046.80
6,046.60
6,046.40
6,046.20
6,046.00
6,045.80
6,045.60
6,045.40
6,045.20
6,045.00
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
6,043.20
6,043.00
6,042.80
6,042.60
6,042.40
6,042.20
6,042.00
6,041.80
6,041.60
6,041.40
6,041.20
6,041.00
6,040.80
6,040.60
6,040.40
6,040.20
6,040.00
6,039.80
6,039.60
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0


DPR4 - 5yr
Label: DPR4-1
Type: Manhole
ID: 148
Label: DPR2-4
Type: Manhole
ID: 136
Label: Pipe - (448)
Type: Conduit
ID: 375
EGL
HGL
Elevation (ft)
Station (ft)
6,049.00
6,048.80
6,048.60
6,048.40
6,048.20
6,048.00
6,047.80
6,047.60
6,047.40
6,047.20
6,047.00
6,046.80
6,046.60
6,046.40
6,046.20
6,046.00
6,045.80
6,045.60
6,045.40
6,045.20
6,045.00
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
6,043.20
6,043.00
6,042.80
6,042.60
6,042.40
6,042.20
6,042.00
6,041.80
6,041.60
6,041.40
6,041.20
6,041.00
6,040.80
6,040.60
6,040.40
6,040.20
6,040.00
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0

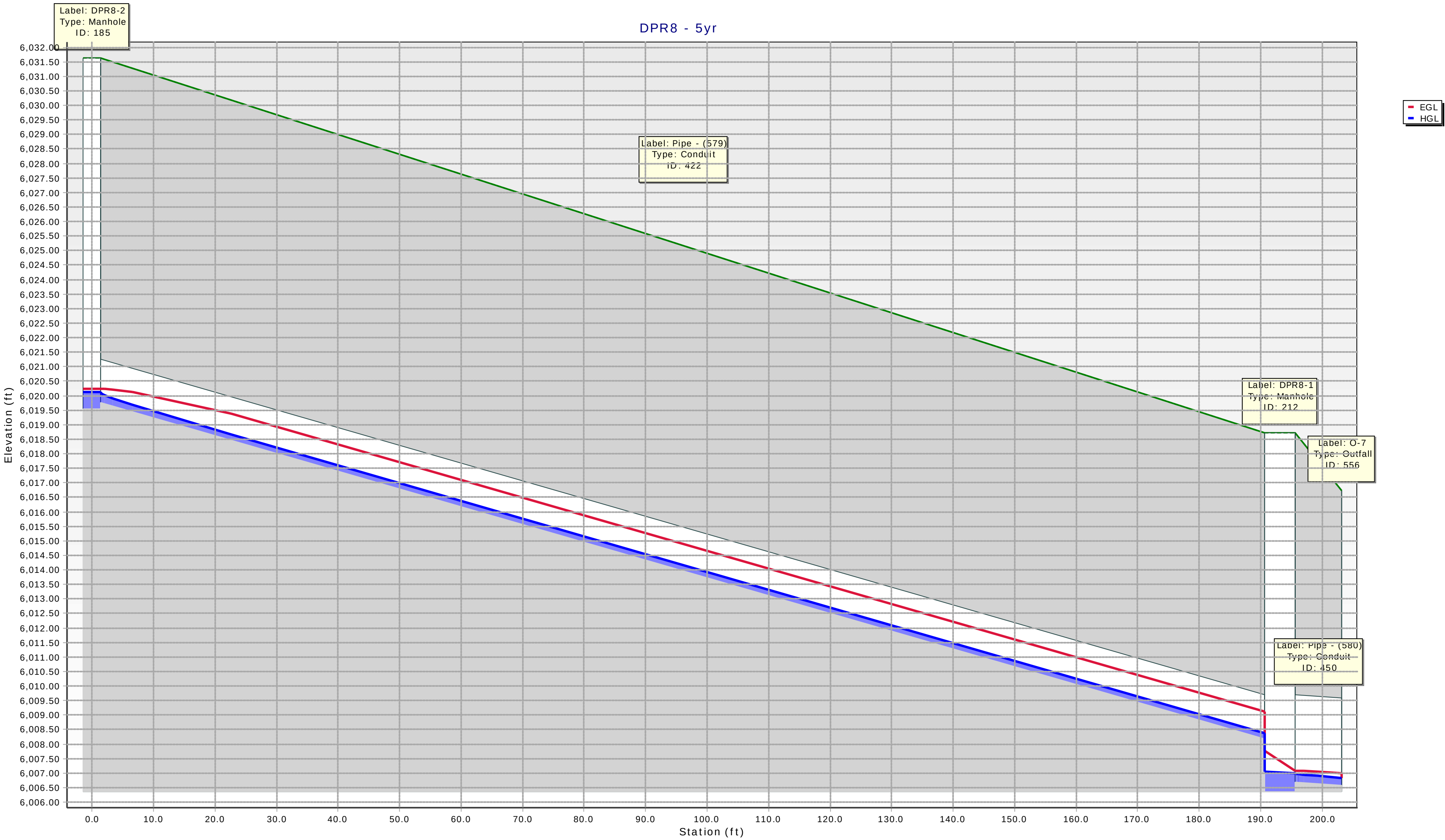


DPR5 - 5yr
Label: DPR5-1
Type: Manhole
ID: 134
Label: DPR2-6
Type: Manhole
ID: 114
Label: Pipe - (449)
Type: Conduit
ID: 354
EGL
HGL
Elevation (ft)
Station (ft)
6,054.50
6,054.00
6,053.50
6,053.00
6,052.50
6,052.00
6,051.50
6,051.00
6,050.50
6,050.00
6,049.50
6,049.00
6,048.50
6,048.00
6,047.50
6,047.00
6,046.50
6,046.00
6,045.50
6,045.00
6,044.50
6,044.00
6,043.50
6,043.00
6,042.50
6,042.00
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0

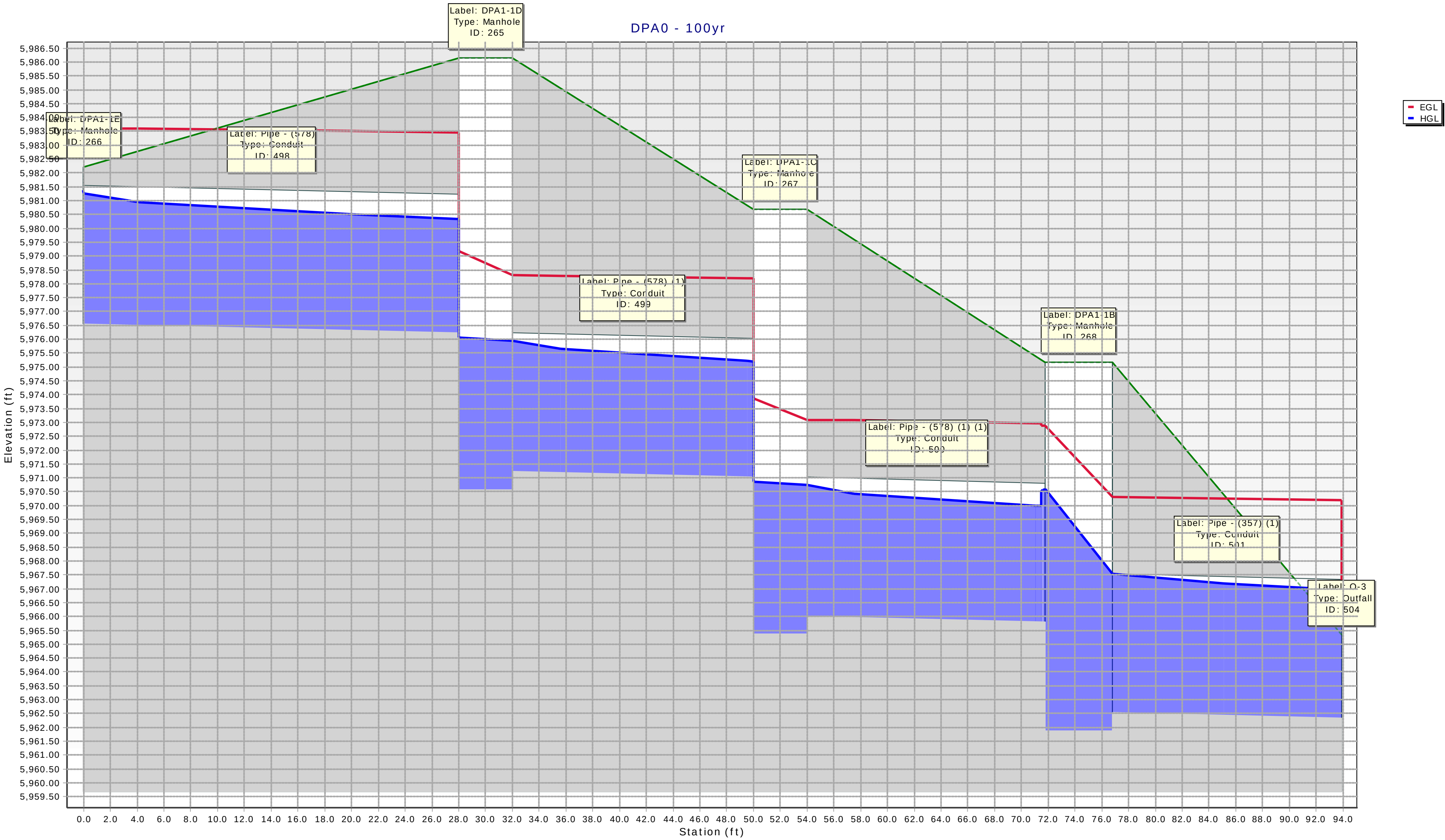

DPR6 - 5yr
Label: DPR2-7
Type: Manhole
ID: 97
Label: DPR6-1
Type: Manhole
ID: 103
Label: Pipe - (236)
Type: Conduit
ID: 336
EGL
HGL
Elevation (ft)
Station (ft)
6,058.00
6,057.80
6,057.60
6,057.40
6,057.20
6,057.00
6,056.80
6,056.60
6,056.40
6,056.20
6,056.00
6,055.80
6,055.60
6,055.40
6,055.20
6,055.00
6,054.80
6,054.60
6,054.40
6,054.20
6,054.00
6,053.80
6,053.60
6,053.40
6,053.20
6,053.00
6,052.80
6,052.60
6,052.40
6,052.20
6,052.00
6,051.80
6,051.60
6,051.40
6,051.20
6,051.00
6,050.80
6,050.60
6,050.40
6,050.20
6,050.00
6,049.80
6,049.60
6,049.40
6,049.20
6,049.00
6,048.80
6,048.60
6,048.40
6,048.20
6,048.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0
150.0

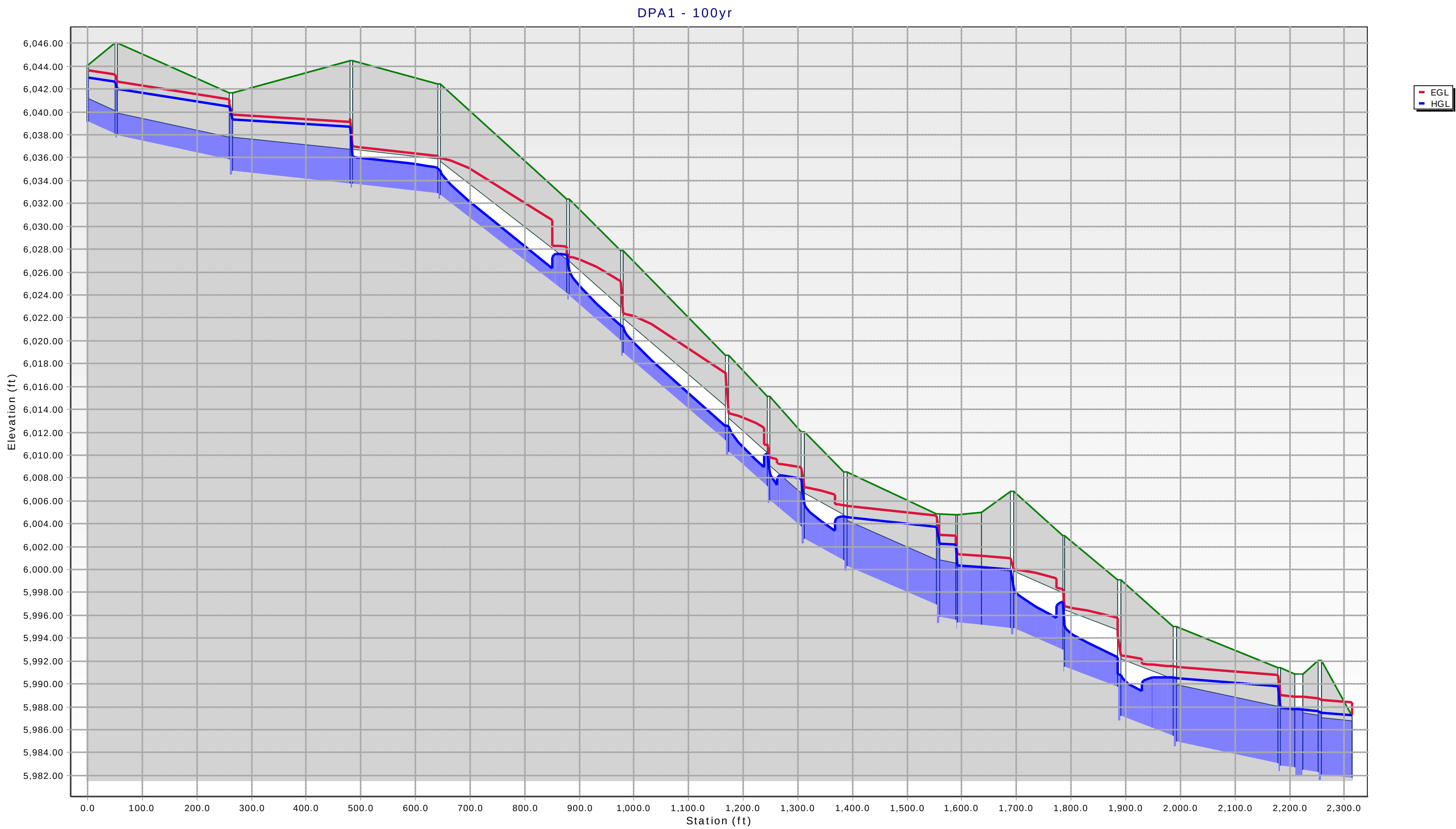


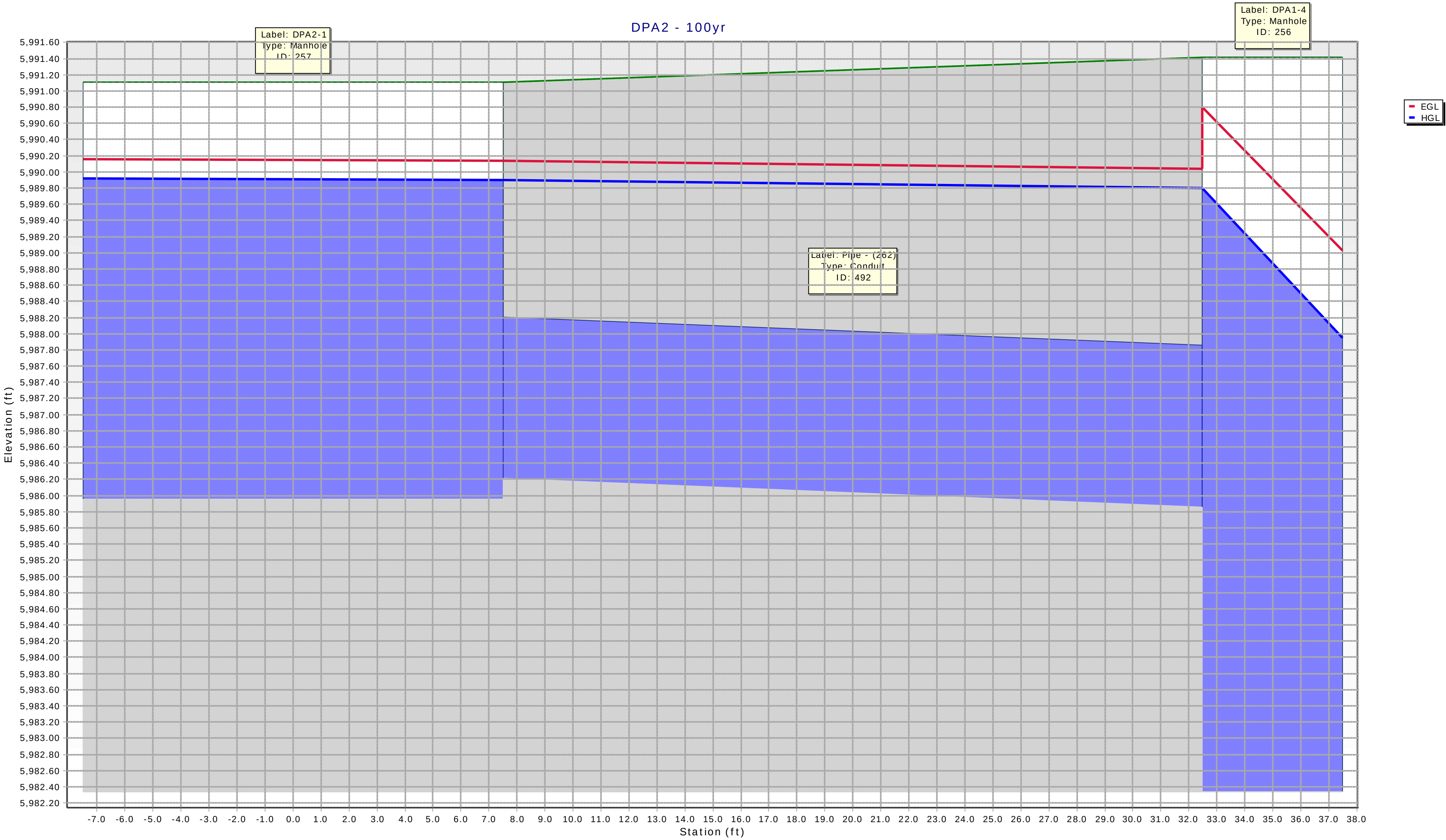
DPR7 - 5yr
Label: DPR7-2
Type: Manhole
ID: 82
Label: DPR2-12
Type: Manhole
ID: 58
Label: DPR7-1
Type: Manhole
ID: 30
Label: Pipe - (229)
Type: Conduit
ID: 296
Label: Pipe - (229) (1)
Type: Conduit
ID: 297
EGL
HGL
Elevation (ft)
Station (ft)
6,077.50
6,077.00
6,076.50
6,076.00
6,075.50
6,075.00
6,074.50
6,074.00
6,073.50
6,073.00
6,072.50
6,072.00
6,071.50
6,071.00
6,070.50
6,070.00
6,069.50
6,069.00
6,068.50
6,068.00
6,067.50
6,067.00
6,066.50
6,066.00
6,065.50
6,065.00
6,064.50
6,064.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0



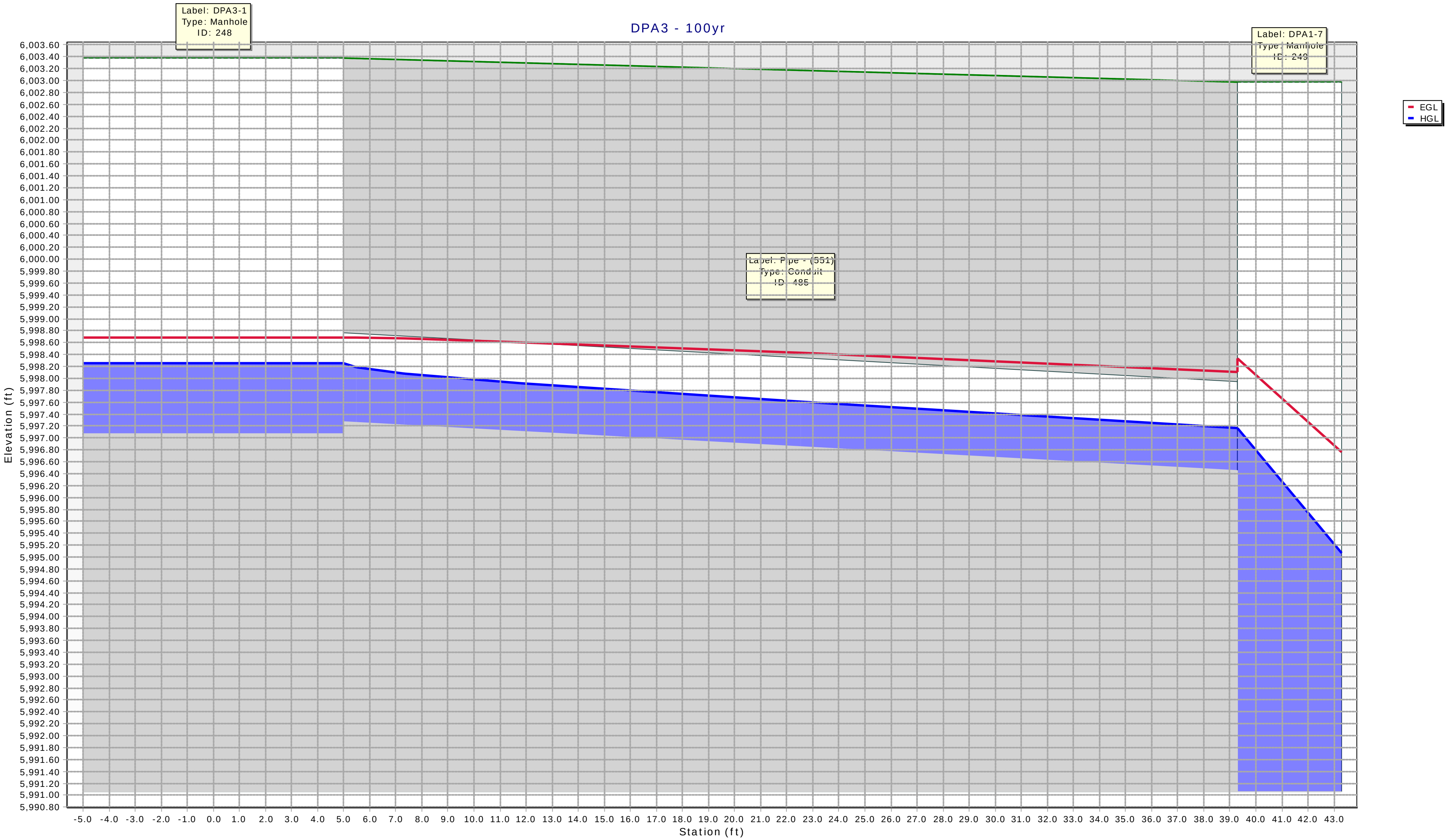
DPR8 - 5yr
Label: DPR8-2
Type: Manhole
ID: 185
Label: Pipe - (579)
Type: Conduit
ID: 422
Label: DPR8-1
Type: Manhole
ID: 212
Label: O-7
Type: Outfall
ID: 556
Label: Pipe - (580)
Type: Conduit
ID: 450
EGL
HGL
Elevation (ft)
Station (ft)


DPA0 - 100yr
Label: DPA1-1D
Type: Manhole
ID: 265
Label: DPA1-1E
Type: Manhole
ID: 266
Label: Pipe - (578)
Type: Conduit
ID: 498
Label: DPA1-1C
Type: Manhole
ID: 267
Label: Pipe - (578) (1)
Type: Conduit
ID: 499
Label: DPA1-1B
Type: Manhole
ID: 268
Label: Pipe - (578) (1) (1)
Type: Conduit
ID: 500
Label: Pipe - (357) (1)
Type: Conduit
ID: 501
Label: O-3
Type: Outfall
ID: 504
EGL
HGL
Elevation (ft)
Station (ft)

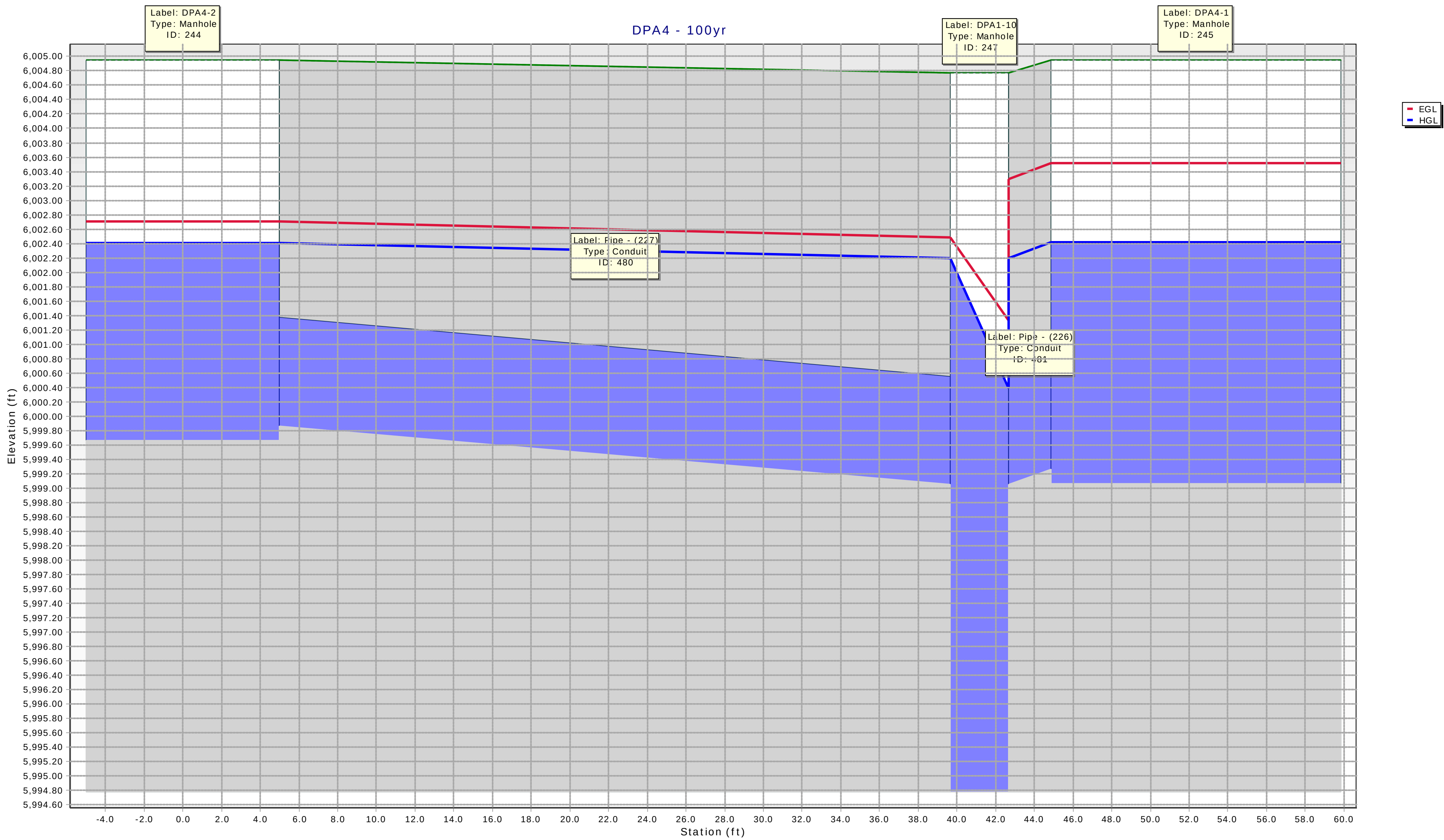

DPA1 - 100yr
EGL
HGL
Elevation (ft)
Station (ft)
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
6,014.00
6,012.00
6,010.00
6,008.00
6,006.00
6,004.00
6,002.00
6,000.00
5,998.00
5,996.00
5,994.00
5,992.00
5,990.00
5,988.00
5,986.00
5,984.00
5,982.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0
2,000.0
2,100.0
2,200.0
2,300.0



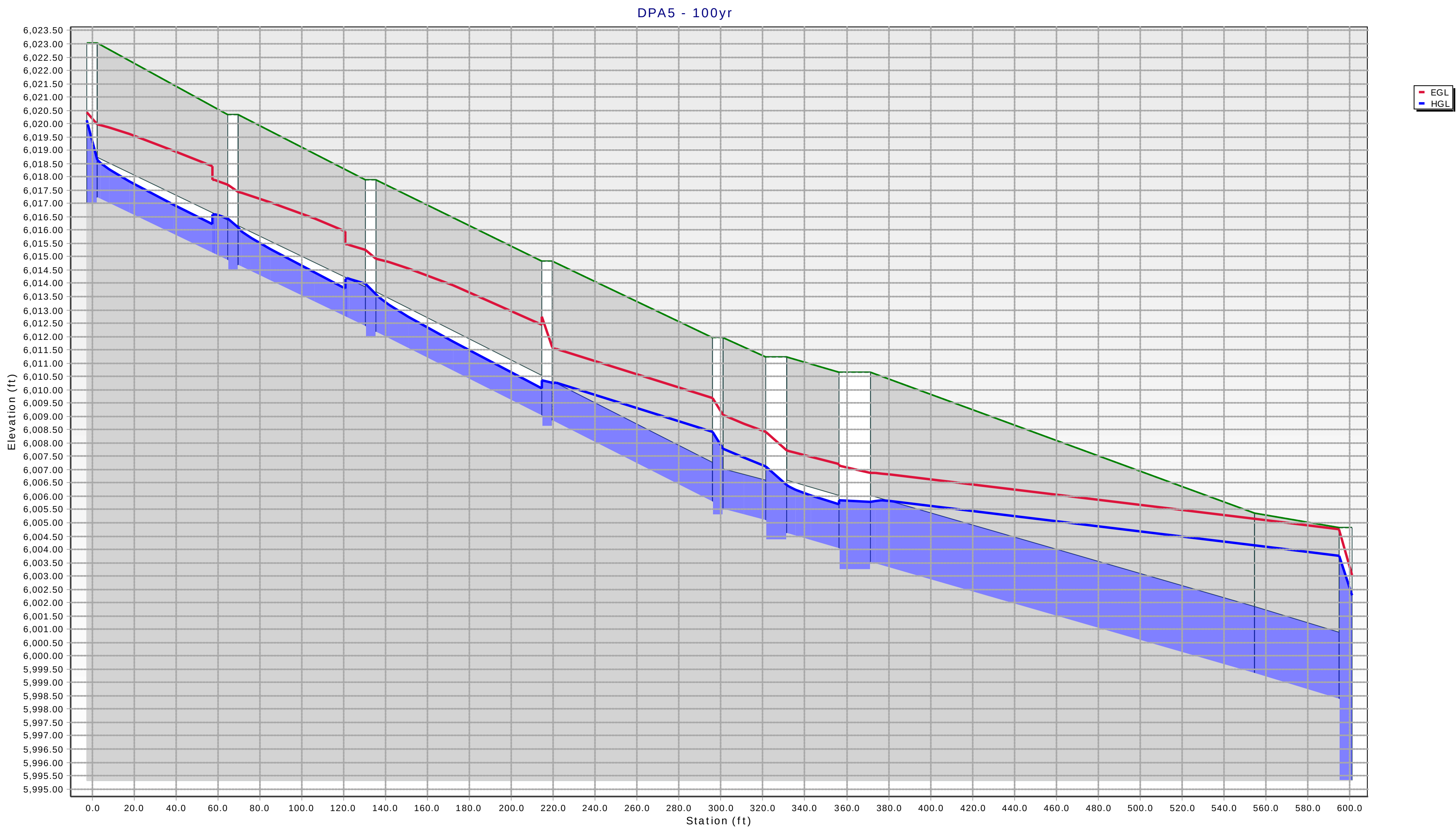
DPA2 - 100yr
Label: DPA2-1
Type: Manhole
ID: 257
Label: DPA1-4
Type: Manhole
ID: 256
Label: Pipe - (262)
Type: Conduit
ID: 492
EGL
HGL
Elevation (ft)
Station (ft)



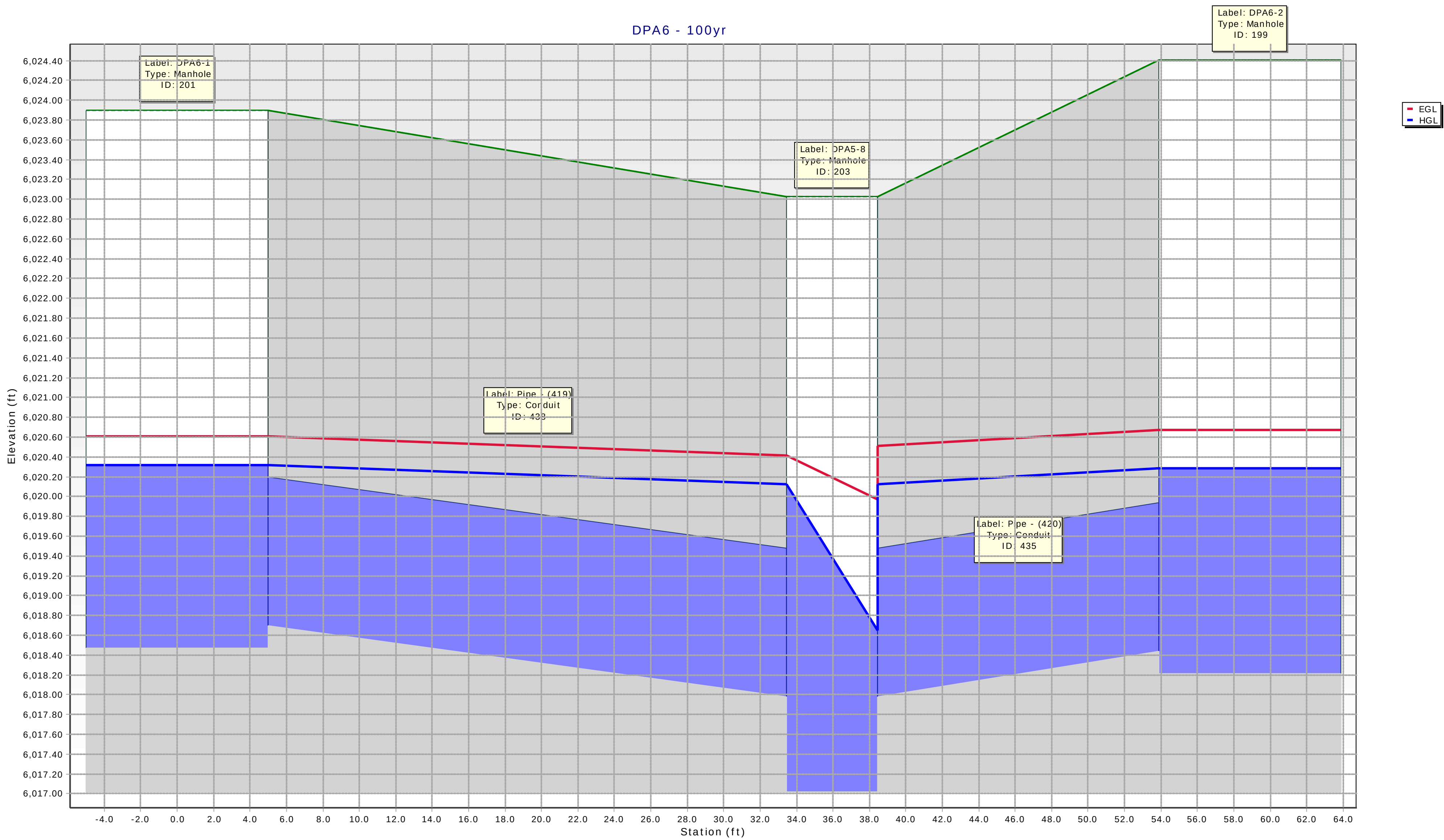
DPA3 - 100yr
Label: DPA3-1
Type: Manhole
ID: 248
Label: DPA1-7
Type: Manhole
ID: 249
Label: Pipe - (551)
Type: Conduit
ID: 485
EGL
HGL
Elevation (ft)
Station (ft)



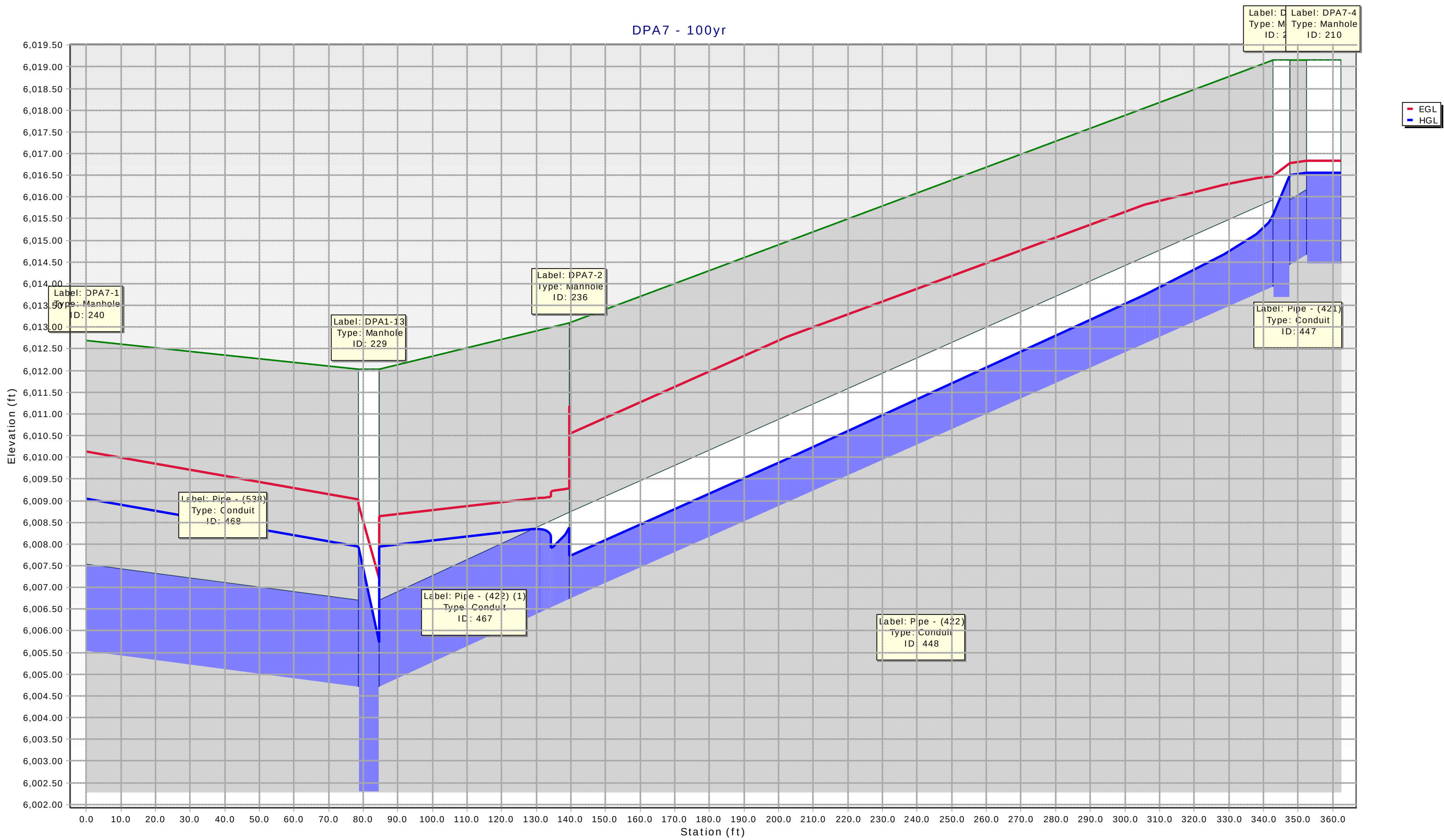
DPA4 - 100yr
Label: DPA4-2
Type: Manhole
ID: 244
Label: DPA1-10
Type: Manhole
ID: 247
Label: DPA4-1
Type: Manhole
ID: 245
Label: Pipe - (227)
Type: Conduit
ID: 480
Label: Pipe - (226)
Type: Conduit
ID: 481
EGL
HGL
Elevation (ft)
Station (ft)
6,005.00
6,004.80
6,004.60
6,004.40
6,004.20
6,004.00
6,003.80
6,003.60
6,003.40
6,003.20
6,003.00
6,002.80
6,002.60
6,002.40
6,002.20
6,002.00
6,001.80
6,001.60
6,001.40
6,001.20
6,001.00
6,000.80
6,000.60
6,000.40
6,000.20
6,000.00
5,999.80
5,999.60
5,999.40
5,999.20
5,999.00
5,998.80
5,998.60
5,998.40
5,998.20
5,998.00
5,997.80
5,997.60
5,997.40
5,997.20
5,997.00
5,996.80
5,996.60
5,996.40
5,996.20
5,996.00
5,995.80
5,995.60
5,995.40
5,995.20
5,995.00
5,994.80
5,994.60
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
54.0
56.0
58.0
60.0

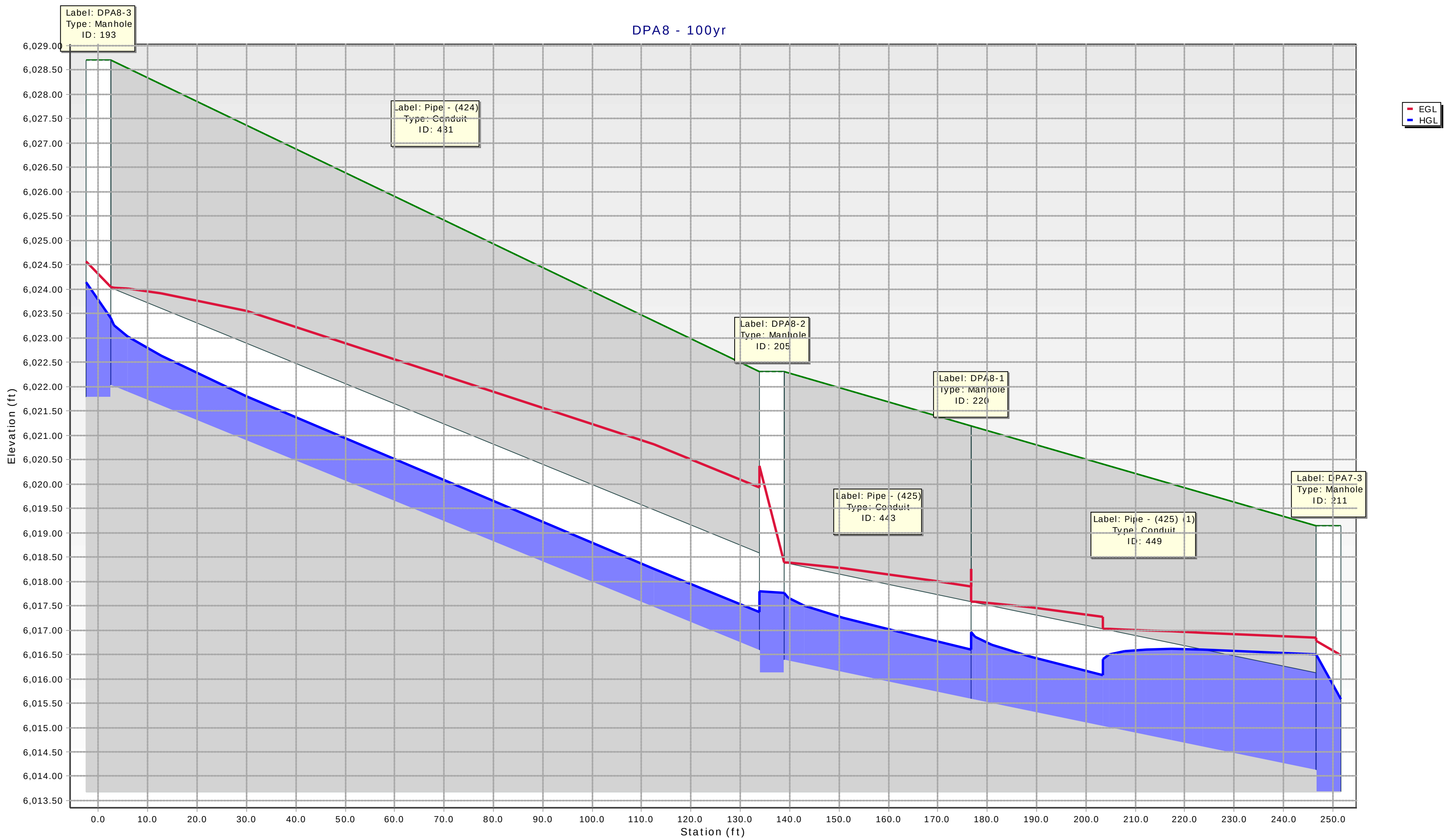

DPA5 - 100yr
EGL
HGL
Elevation (ft)
Station (ft)
6,023.50
6,023.00
6,022.50
6,022.00
6,021.50
6,021.00
6,020.50
6,020.00
6,019.50
6,019.00
6,018.50
6,018.00
6,017.50
6,017.00
6,016.50
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
6,013.00
6,012.50
6,012.00
6,011.50
6,011.00
6,010.50
6,010.00
6,009.50
6,009.00
6,008.50
6,008.00
6,007.50
6,007.00
6,006.50
6,006.00
6,005.50
6,005.00
6,004.50
6,004.00
6,003.50
6,003.00
6,002.50
6,002.00
6,001.50
6,001.00
6,000.50
6,000.00
5,999.50
5,999.00
5,998.50
5,998.00
5,997.50
5,997.00
5,996.50
5,996.00
5,995.50
5,995.00
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0
500.0
520.0
540.0
560.0
580.0
600.0

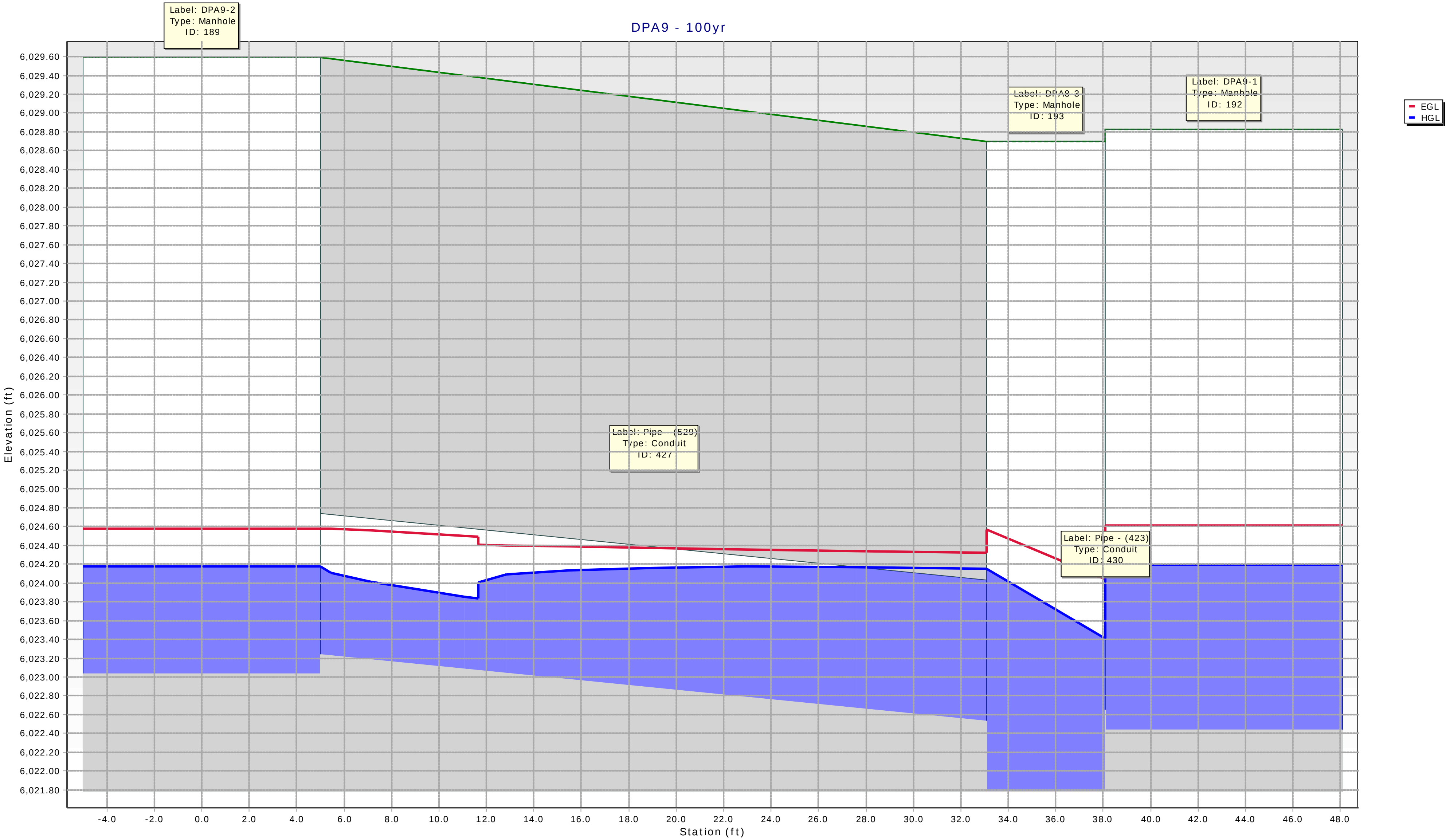
DPA6 - 100yr

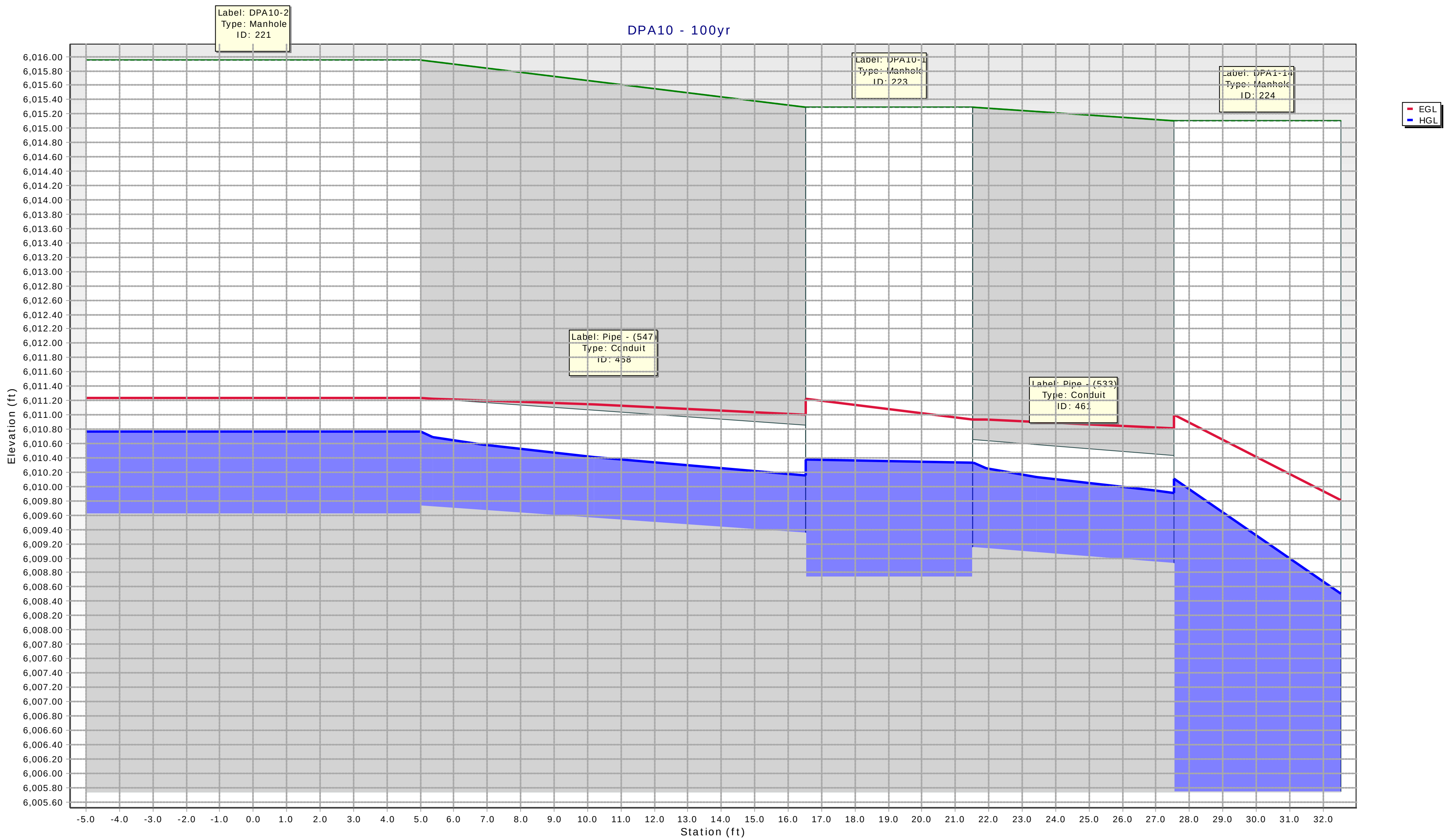


Label: DPA6-1
Type: Manhole
ID: 201
Label: DPA5-8
Type: Manhole
ID: 203
Label: DPA6-2
Type: Manhole
ID: 199
Label: Pipe - (419)
Type: Conduit
ID: 433
Label: Pipe - (420)
Type: Conduit
ID: 435
EGL
HGL
Elevation (ft)
Station (ft)
6,024.40
6,024.20
6,024.00
6,023.80
6,023.60
6,023.40
6,023.20
6,023.00
6,022.80
6,022.60
6,022.40
6,022.20
6,022.00
6,021.80
6,021.60
6,021.40
6,021.20
6,021.00
6,020.80
6,020.60
6,020.40
6,020.20
6,020.00
6,019.80
6,019.60
6,019.40
6,019.20
6,019.00
6,018.80
6,018.60
6,018.40
6,018.20
6,018.00
6,017.80
6,017.60
6,017.40
6,017.20
6,017.00
-4.0 -2.0 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0 36.0 38.0 40.0 42.0 44.0 46.0 48.0 50.0 52.0 54.0 56.0 58.0 60.0 62.0 64.0

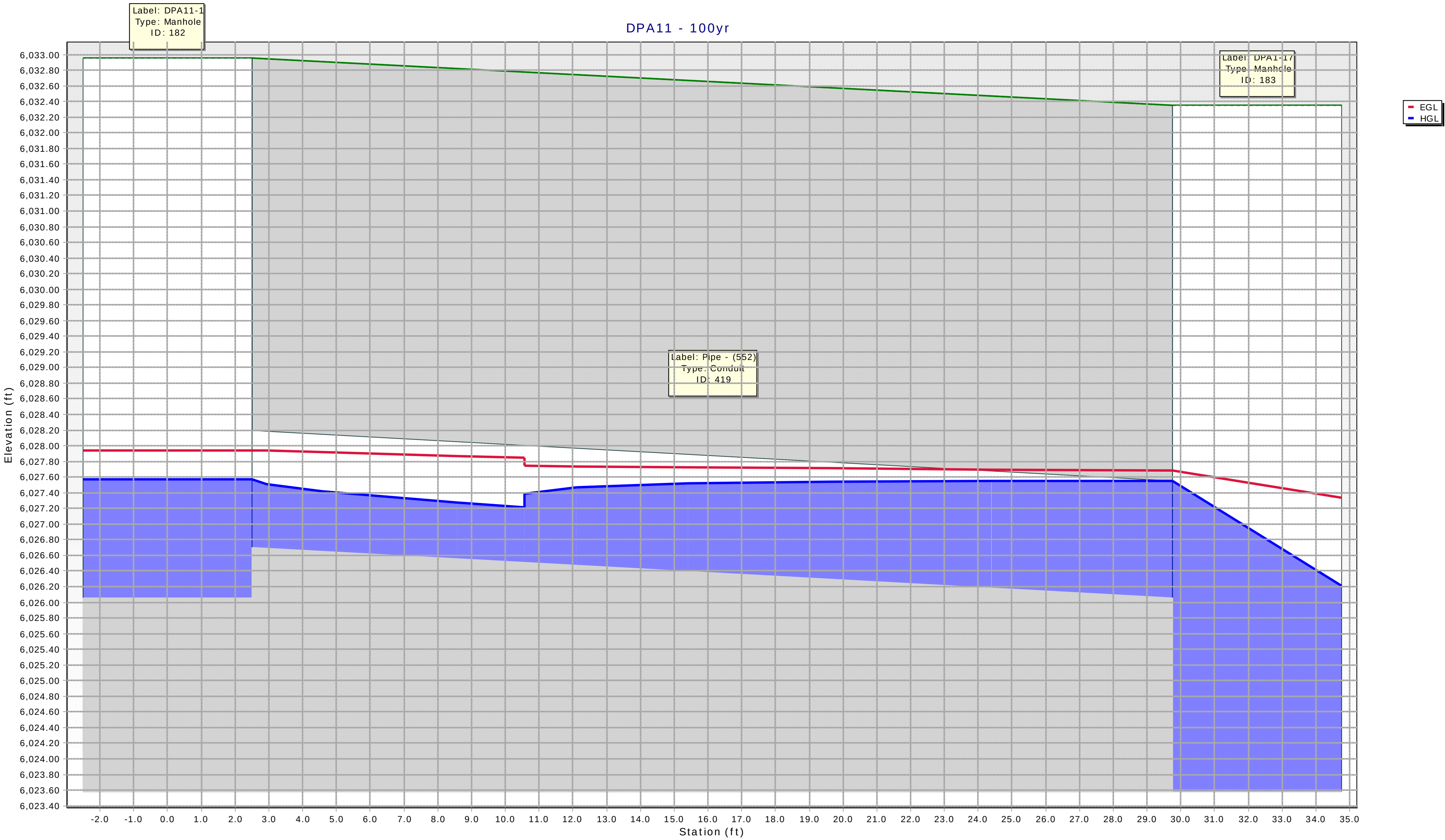

DPA7 - 100yr
Elevation (ft)
Station (ft)
EGL
HGL
Label: DPA7-1
Type: Manhole
ID: 240
Label: DPA1-13
Type: Manhole
ID: 229
Label: DPA7-2
Type: Manhole
ID: 236
Label: DPA7-4
Type: Manhole
ID: 210
Label: Pipe - (538)
Type: Conduit
ID: 468
Label: Pipe - (422) (1)
Type: Conduit
ID: 467
Label: Pipe - (422)
Type: Conduit
ID: 448
Label: Pipe - (421)
Type: Conduit
ID: 447


DPA8 - 100yr
Label: DPA8-3
Type: Manhole
ID: 193
Label: Pipe - (424)
Type: Conduit
ID: 431
Label: DPA8-2
Type: Manhole
ID: 205
Label: DPA8-1
Type: Manhole
ID: 220
Label: Pipe - (425)
Type: Conduit
ID: 443
Label: Pipe - (425) (1)
Type: Conduit
ID: 449
Label: DPA7-3
Type: Manhole
ID: 211
EGL
HGL
Elevation (ft)
Station (ft)
6,029.00
6,028.50
6,028.00
6,027.50
6,027.00
6,026.50
6,026.00
6,025.50
6,025.00
6,024.50
6,024.00
6,023.50
6,023.00
6,022.50
6,022.00
6,021.50
6,021.00
6,020.50
6,020.00
6,019.50
6,019.00
6,018.50
6,018.00
6,017.50
6,017.00
6,016.50
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0
220.0
230.0
240.0
250.0

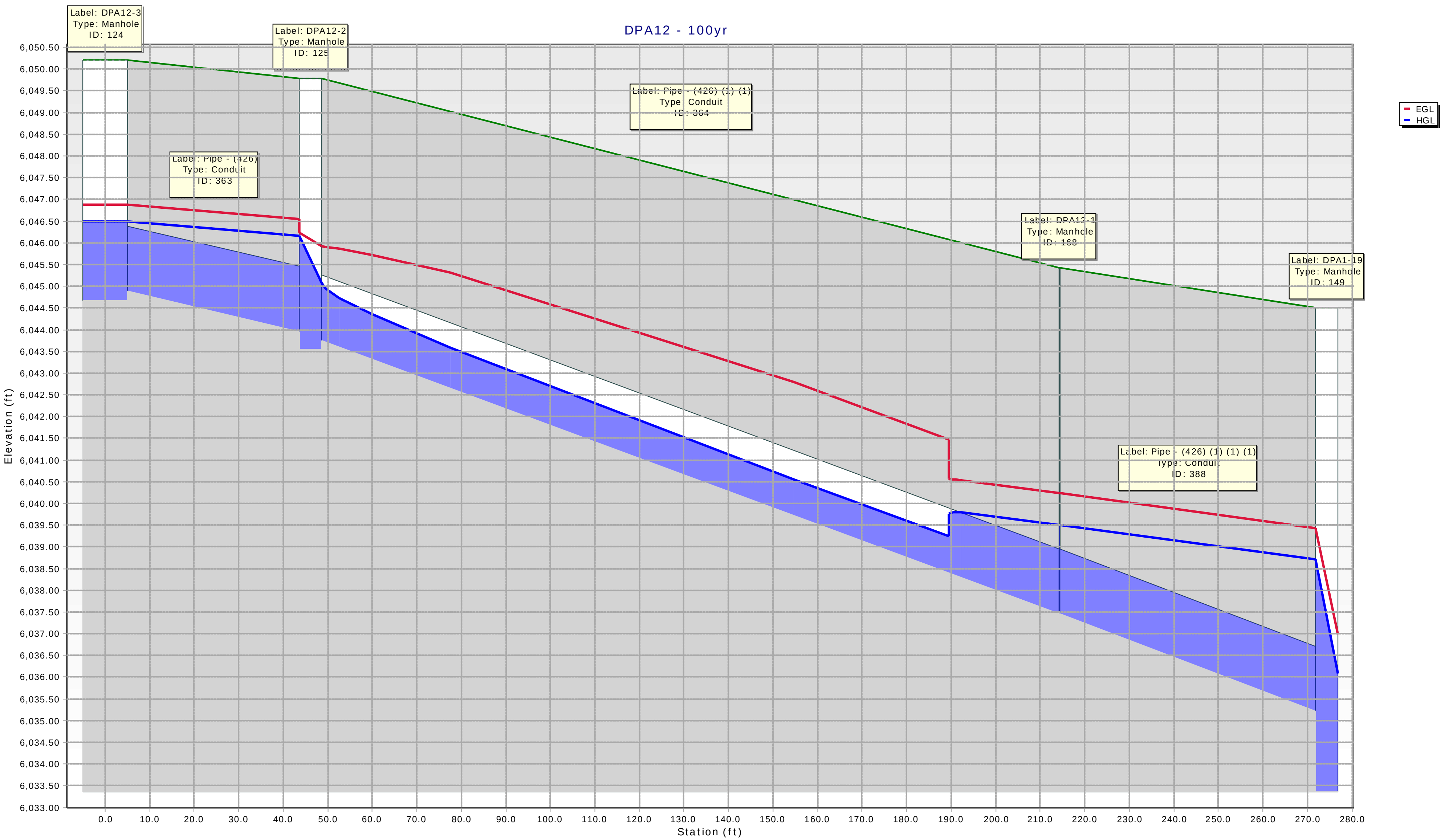

DPA9 - 100yr
Label: DPA9-2
Type: Manhole
ID: 189
Label: DPA8-3
Type: Manhole
ID: 193
Label: DPA9-1
Type: Manhole
ID: 192
Label: Pipe - (529)
Type: Conduit
ID: 427
Label: Pipe - (423)
Type: Conduit
ID: 430
EGL
HGL
Elevation (ft)
Station (ft)
6,029.60
6,029.40
6,029.20
6,029.00
6,028.80
6,028.60
6,028.40
6,028.20
6,028.00
6,027.80
6,027.60
6,027.40
6,027.20
6,027.00
6,026.80
6,026.60
6,026.40
6,026.20
6,026.00
6,025.80
6,025.60
6,025.40
6,025.20
6,025.00
6,024.80
6,024.60
6,024.40
6,024.20
6,024.00
6,023.80
6,023.60
6,023.40
6,023.20
6,023.00
6,022.80
6,022.60
6,022.40
6,022.20
6,022.00
6,021.80
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0

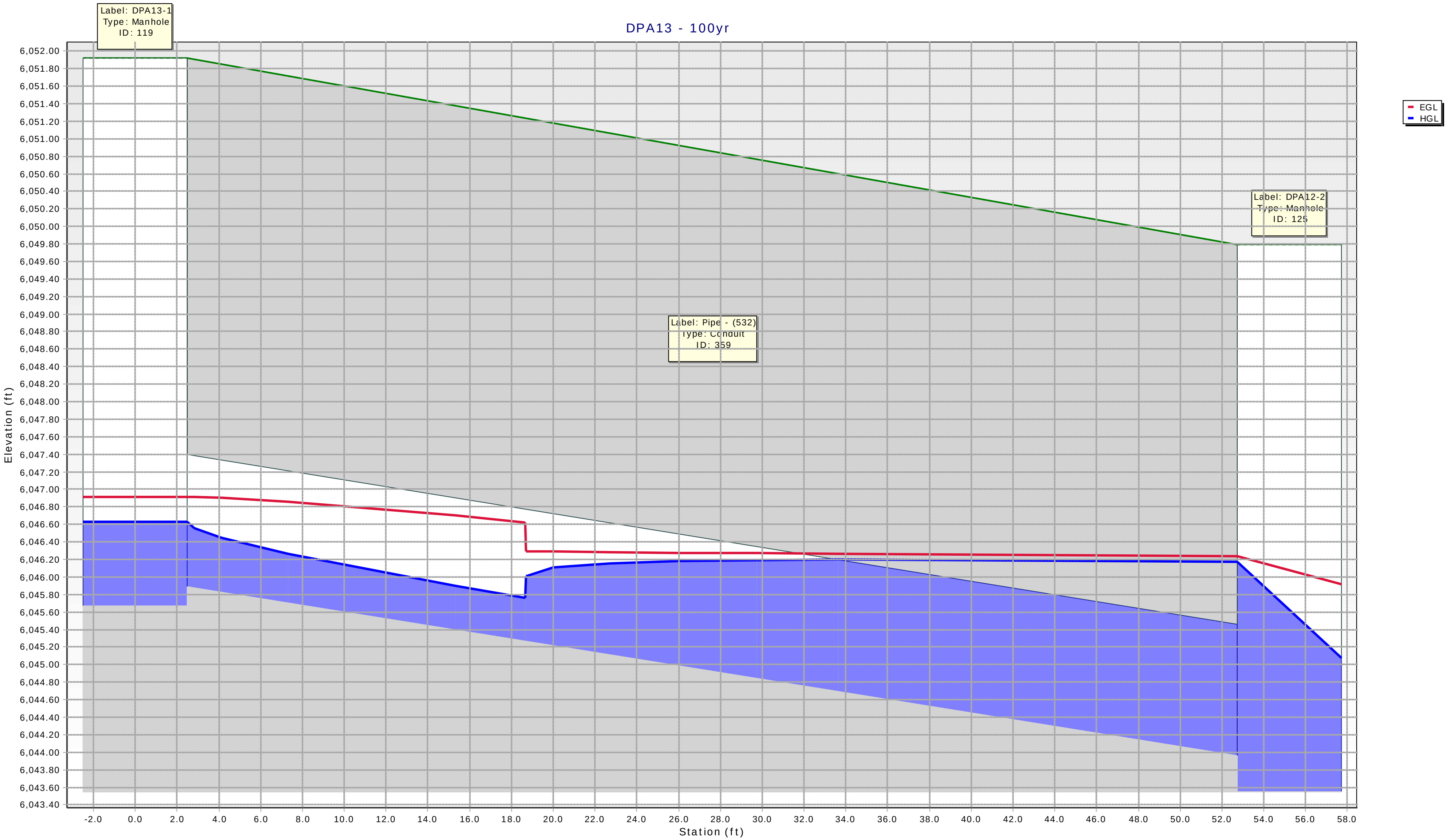


DPA10 - 100yr
Label: DPA10-2
Type: Manhole
ID: 221
Label: DPA10-1
Type: Manhole
ID: 223
Label: DPA1-14
Type: Manhole
ID: 224
Label: Pipe - (547)
Type: Conduit
ID: 458
Label: Pipe - (533)
Type: Conduit
ID: 461
EGL
HGL
Elevation (ft)
Station (ft)

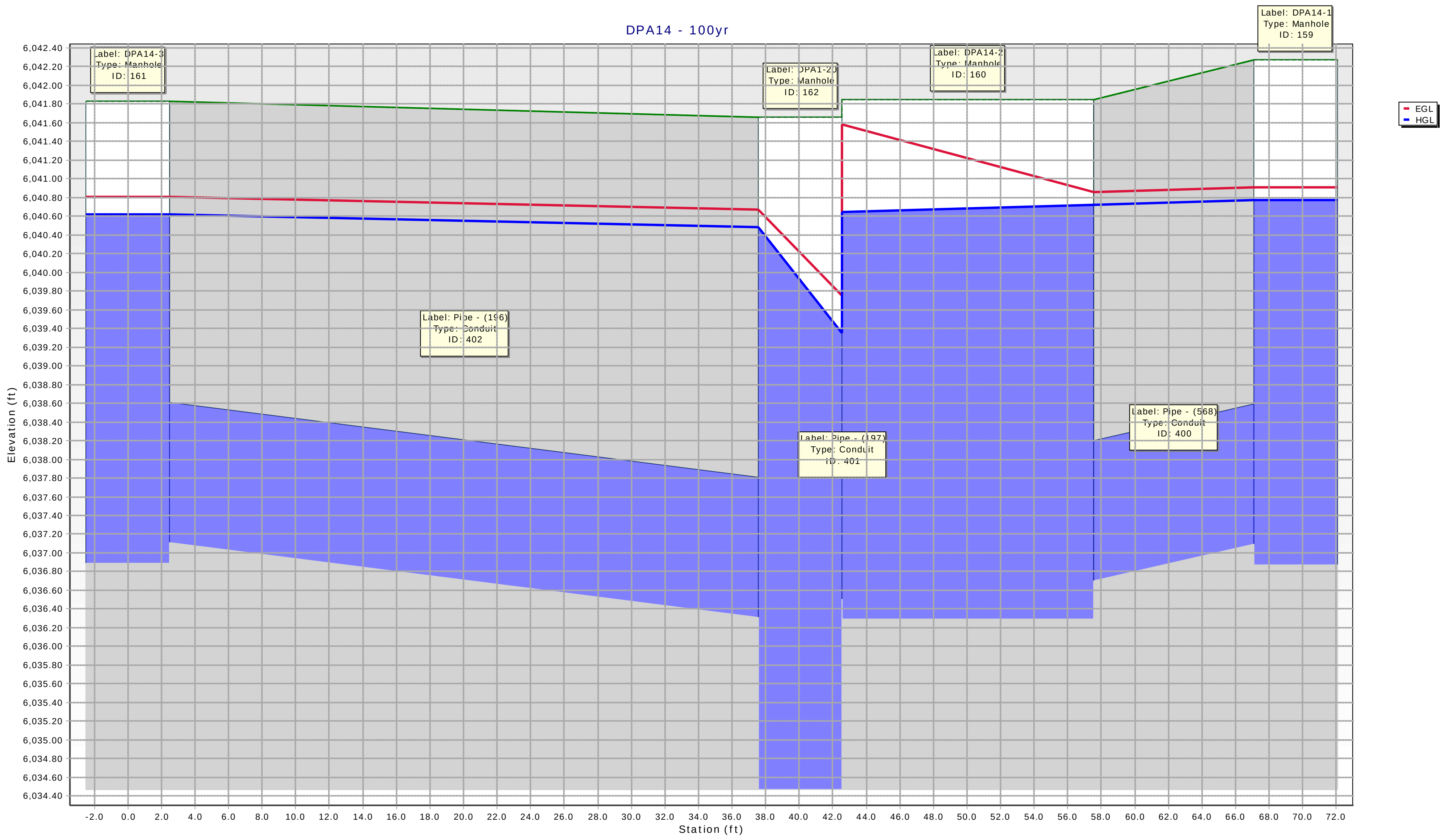


DPA11 - 100yr
Label: DPA11-1
Type: Manhole
ID: 182
Label: DPA1-17
Type: Manhole
ID: 183
Label: Pipe - (552)
Type: Conduit
ID: 419
EGL
HGL
Elevation (ft)
6,033.00
6,032.80
6,032.60
6,032.40
6,032.20
6,032.00
6,031.80
6,031.60
6,031.40
6,031.20
6,031.00
6,030.80
6,030.60
6,030.40
6,030.20
6,030.00
6,029.80
6,029.60
6,029.40
6,029.20
6,029.00
6,028.80
6,028.60
6,028.40
6,028.20
6,028.00
6,027.80
6,027.60
6,027.40
6,027.20
6,027.00
6,026.80
6,026.60
6,026.40
6,026.20
6,026.00
6,025.80
6,025.60
6,025.40
6,025.20
6,025.00
6,024.80
6,024.60
6,024.40
6,024.20
6,024.00
6,023.80
6,023.60
6,023.40
-2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0
Station (ft)


DPA12 - 100yr
Label: DPA12-3
Type: Manhole
ID: 124
Label: DPA12-2
Type: Manhole
ID: 125
Label: Pipe - (426)
Type: Conduit
ID: 363
Label: Pipe - (426) (1) (1)
Type: Conduit
ID: 364
Label: DPA12-1
Type: Manhole
ID: 168
Label: DPA1-19
Type: Manhole
ID: 149
Label: Pipe - (426) (1) (1) (1)
Type: Conduit
ID: 388
EGL
HGL
Elevation (ft)
Station (ft)
6,050.50
6,050.00
6,049.50
6,049.00
6,048.50
6,048.00
6,047.50
6,047.00
6,046.50
6,046.00
6,045.50
6,045.00
6,044.50
6,044.00
6,043.50
6,043.00
6,042.50
6,042.00
6,041.50
6,041.00
6,040.50
6,040.00
6,039.50
6,039.00
6,038.50
6,038.00
6,037.50
6,037.00
6,036.50
6,036.00
6,035.50
6,035.00
6,034.50
6,034.00
6,033.50
6,033.00
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0
220.0
230.0
240.0
250.0
260.0
270.0
280.0

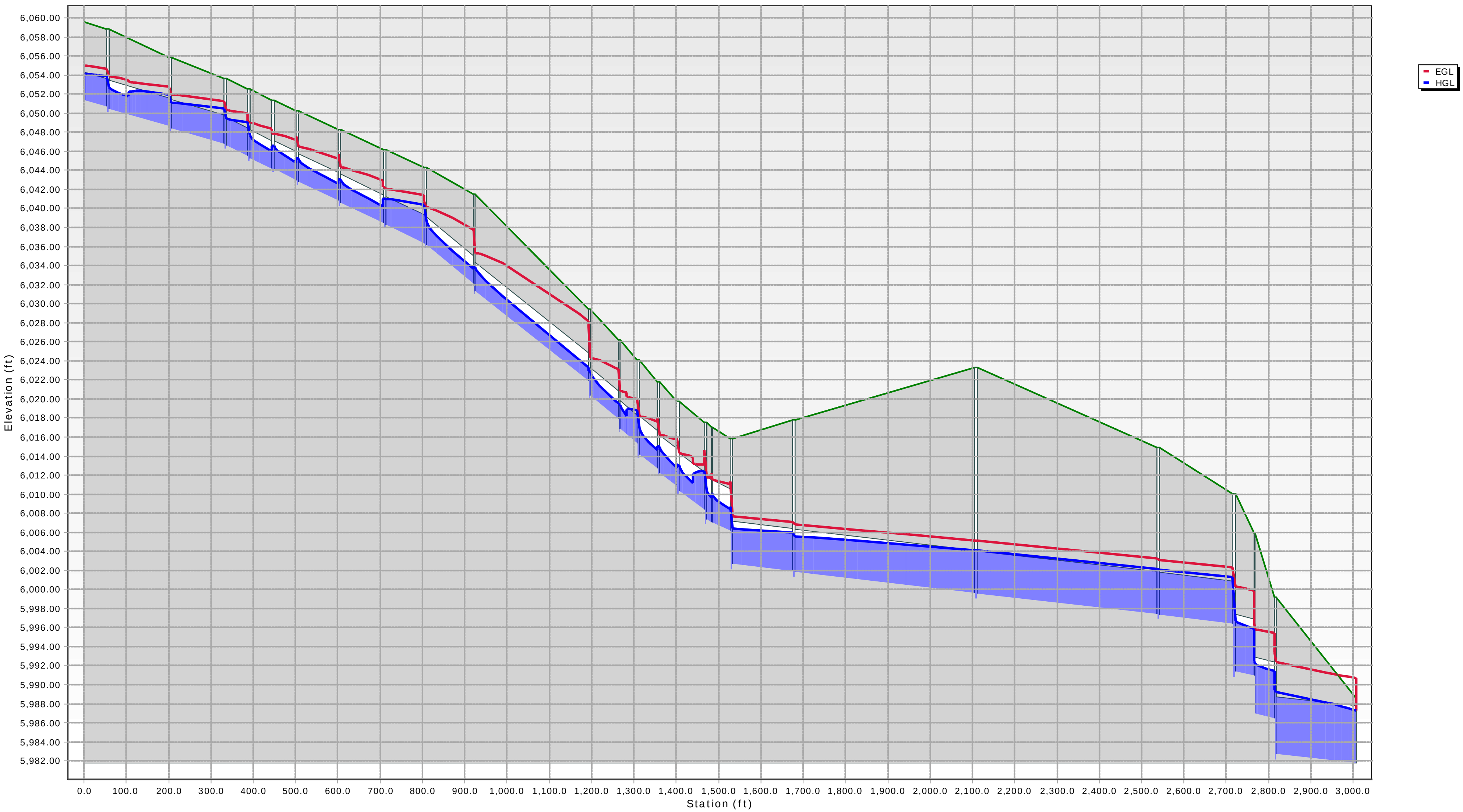


DPA13 - 100yr
Label: DPA13-1
Type: Manhole
ID: 119
Label: Pipe - (532)
Type: Conduit
ID: 359
Label: DPA12-2
Type: Manhole
ID: 125
EGL
HGL
Elevation (ft)
Station (ft)
6,052.00
6,051.80
6,051.60
6,051.40
6,051.20
6,051.00
6,050.80
6,050.60
6,050.40
6,050.20
6,050.00
6,049.80
6,049.60
6,049.40
6,049.20
6,049.00
6,048.80
6,048.60
6,048.40
6,048.20
6,048.00
6,047.80
6,047.60
6,047.40
6,047.20
6,047.00
6,046.80
6,046.60
6,046.40
6,046.20
6,046.00
6,045.80
6,045.60
6,045.40
6,045.20
6,045.00
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
-2.0 0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0 36.0 38.0 40.0 42.0 44.0 46.0 48.0 50.0 52.0 54.0 56.0 58.0

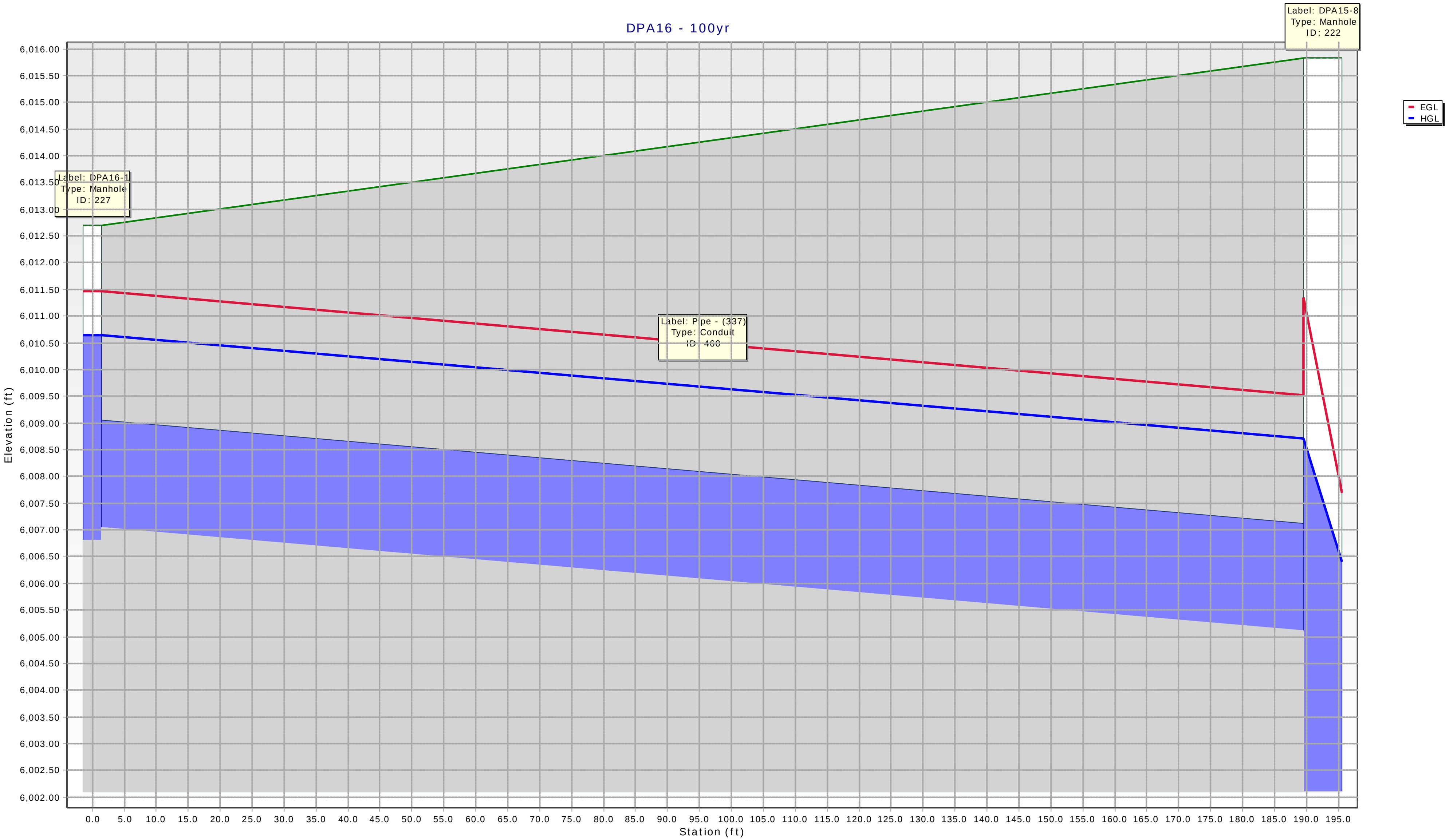


DPA14 - 100yr
Label: DPA14-3
Type: Manhole
ID: 161
Label: DPA1-20
Type: Manhole
ID: 162
Label: DPA14-2
Type: Manhole
ID: 160
Label: DPA14-1
Type: Manhole
ID: 159
Label: Pipe - (196)
Type: Conduit
ID: 402
Label: Pipe - (197)
Type: Conduit
ID: 401
Label: Pipe - (568)
Type: Conduit
ID: 400
EGL
HGL
Elevation (ft)
Station (ft)

DPA15 - 100yr



EGL
HGL
Elevation (ft)
Station (ft)
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
6,014.00
6,012.00
6,010.00
6,008.00
6,006.00
6,004.00
6,002.00
6,000.00
5,998.00
5,996.00
5,994.00
5,992.00
5,990.00
5,988.00
5,986.00
5,984.00
5,982.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0
2,000.0
2,100.0
2,200.0
2,300.0
2,400.0
2,500.0
2,600.0
2,700.0
2,800.0
2,900.0
3,000.0



DPA16 - 100yr
Label: DPA16-1
Type: Manhole
ID: 227
Label: Pipe - (337)
Type: Conduit
ID: 460
Label: DPA15-8
Type: Manhole
ID: 222
EGL
HGL
Elevation (ft)
Station (ft)
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
6,013.00
6,012.50
6,012.00
6,011.50
6,011.00
6,010.50
6,010.00
6,009.50
6,009.00
6,008.50
6,008.00
6,007.50
6,007.00
6,006.50
6,006.00
6,005.50
6,005.00
6,004.50
6,004.00
6,003.50
6,003.00
6,002.50
6,002.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0
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175.0
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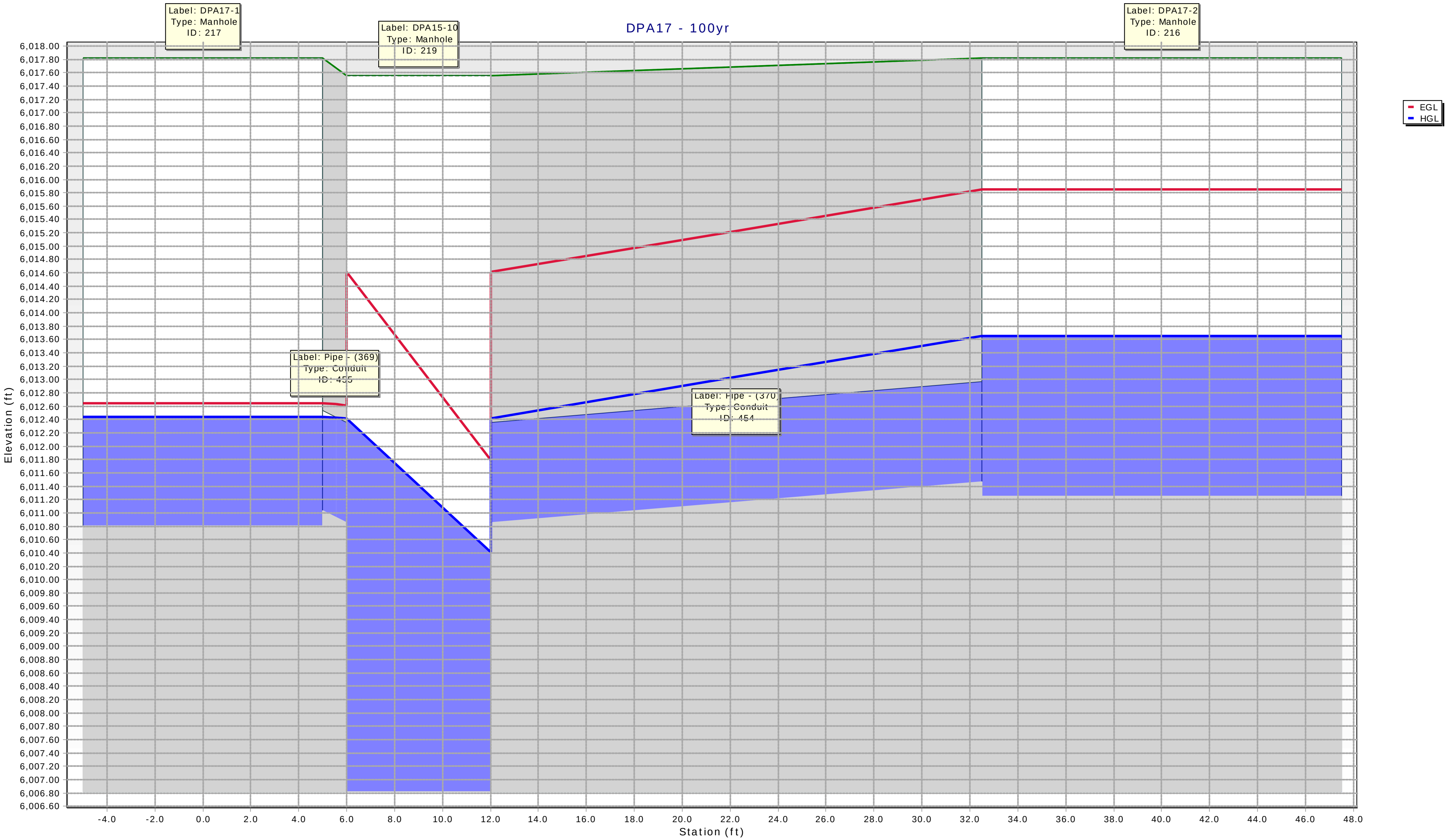
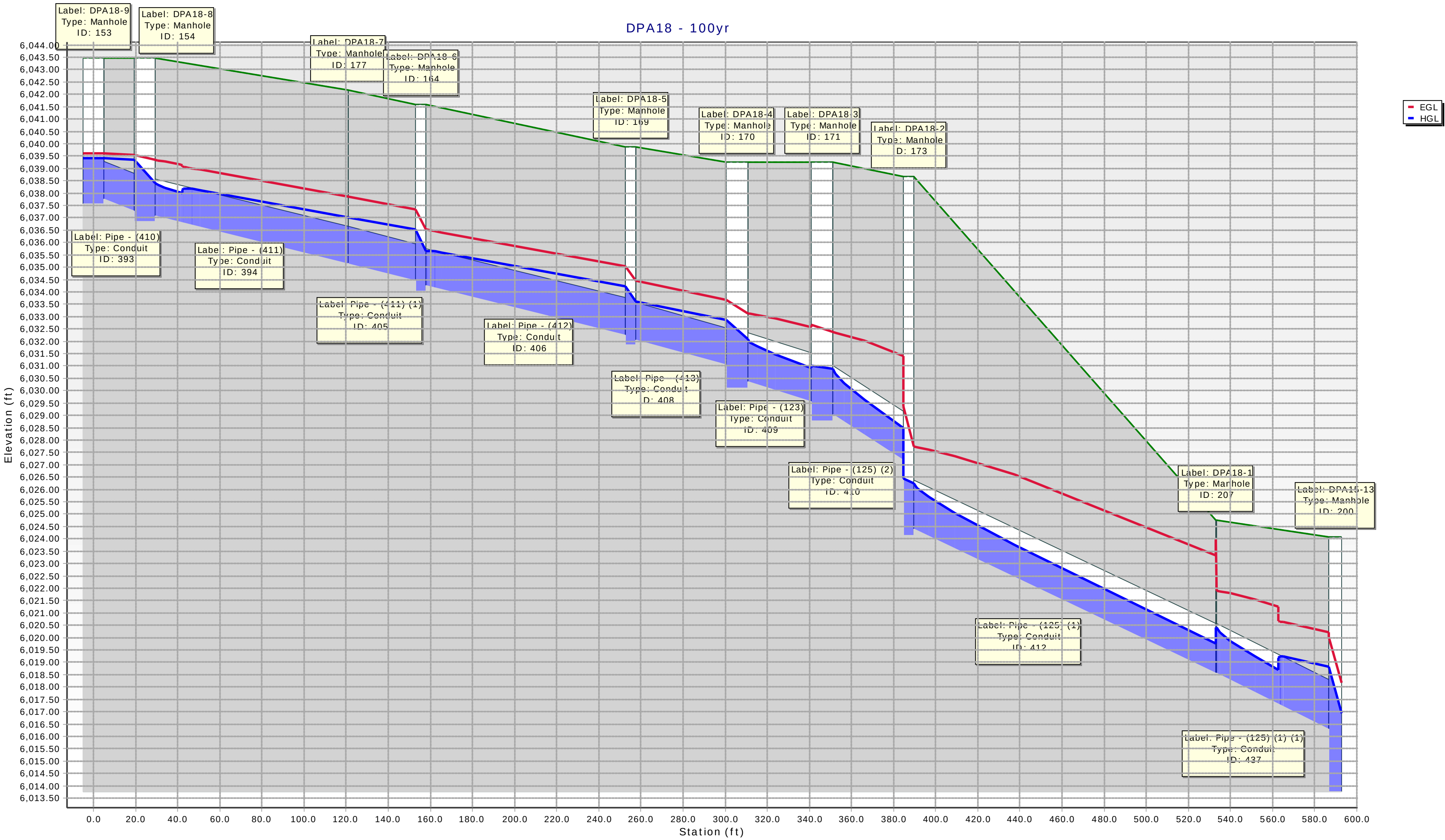
185.0
190.0
195.0



DPA17 - 100yr
Label: DPA17-1
Type: Manhole
ID: 217
Label: DPA15-10
Type: Manhole
ID: 219
Label: DPA17-2
Type: Manhole
ID: 216
Label: Pipe - (369)
Type: Conduit
ID: 455
Label: Pipe - (370)
Type: Conduit
ID: 454
EGL
HGL
Elevation (ft)
Station (ft)



DPA18 - 100yr
Label: DPA18-9
Type: Manhole
ID: 153
Label: DPA18-8
Type: Manhole
ID: 154
Label: DPA18-7
Type: Manhole
ID: 177
Label: DPA18-6
Type: Manhole
ID: 164
Label: DPA18-5
Type: Manhole
ID: 169
Label: DPA18-4
Type: Manhole
ID: 170
Label: DPA18-3
Type: Manhole
ID: 171
Label: DPA18-2
Type: Manhole
ID: 173
Label: DPA18-1
Type: Manhole
ID: 207
Label: DPA15-13
Type: Manhole
ID: 200
Label: Pipe - (410)
Type: Conduit
ID: 393
Label: Pipe - (411)
Type: Conduit
ID: 394
Label: Pipe - (411) (1)
Type: Conduit
ID: 405
Label: Pipe - (412)
Type: Conduit
ID: 406
Label: Pipe - (413)
Type: Conduit
ID: 408
Label: Pipe - (123)
Type: Conduit
ID: 409
Label: Pipe - (125) (2)
Type: Conduit
ID: 410
Label: Pipe - (125) (1)
Type: Conduit
ID: 412
Label: Pipe - (125) (1) (1)
Type: Conduit
ID: 437
EGL
HGL
Elevation (ft)
Station (ft)
6,044.00
6,043.50
6,043.00
6,042.50
6,042.00
6,041.50
6,041.00
6,040.50
6,040.00
6,039.50
6,039.00
6,038.50
6,038.00
6,037.50
6,037.00
6,036.50
6,036.00
6,035.50
6,035.00
6,034.50
6,034.00
6,033.50
6,033.00
6,032.50
6,032.00
6,031.50
6,031.00
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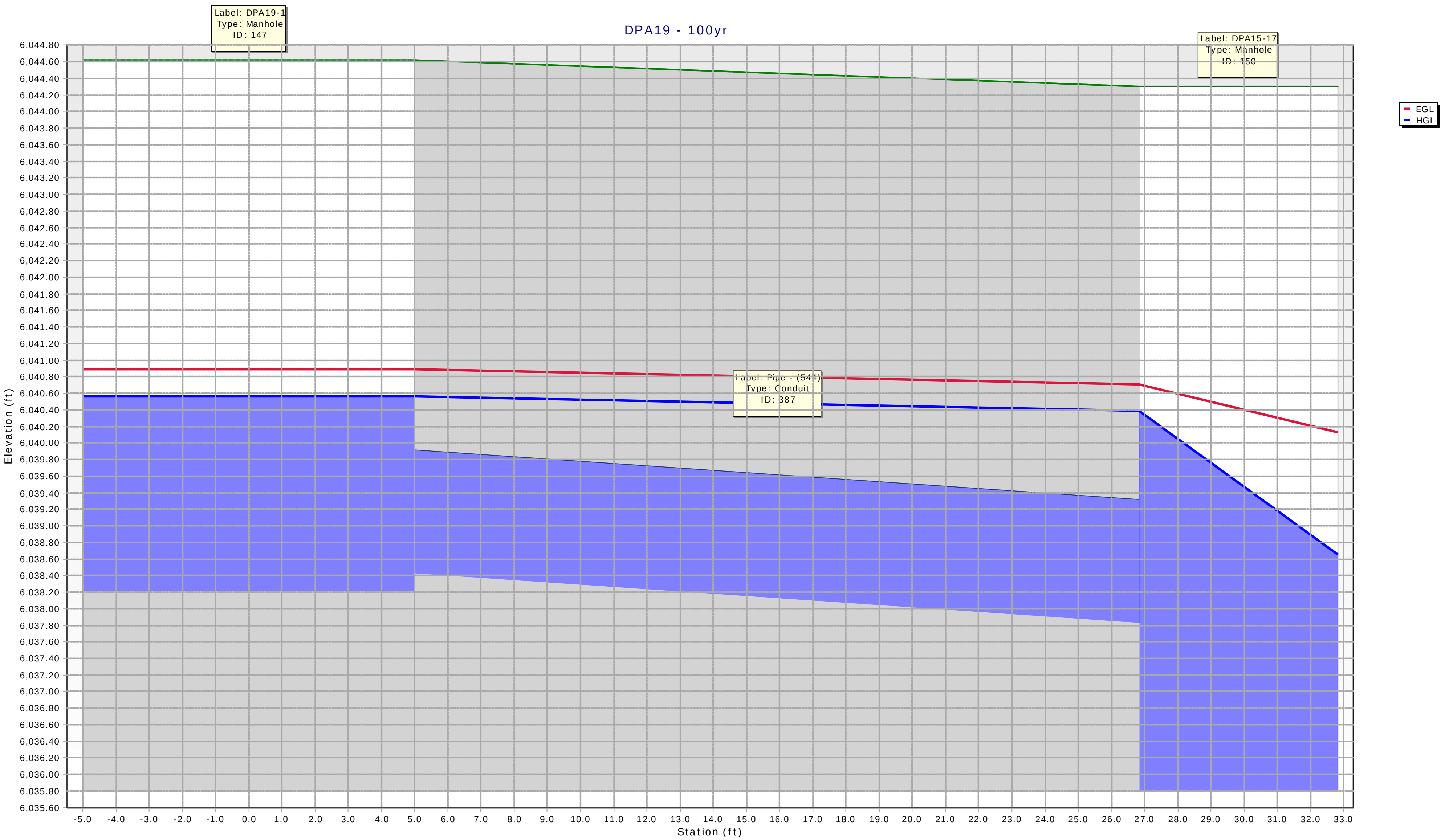
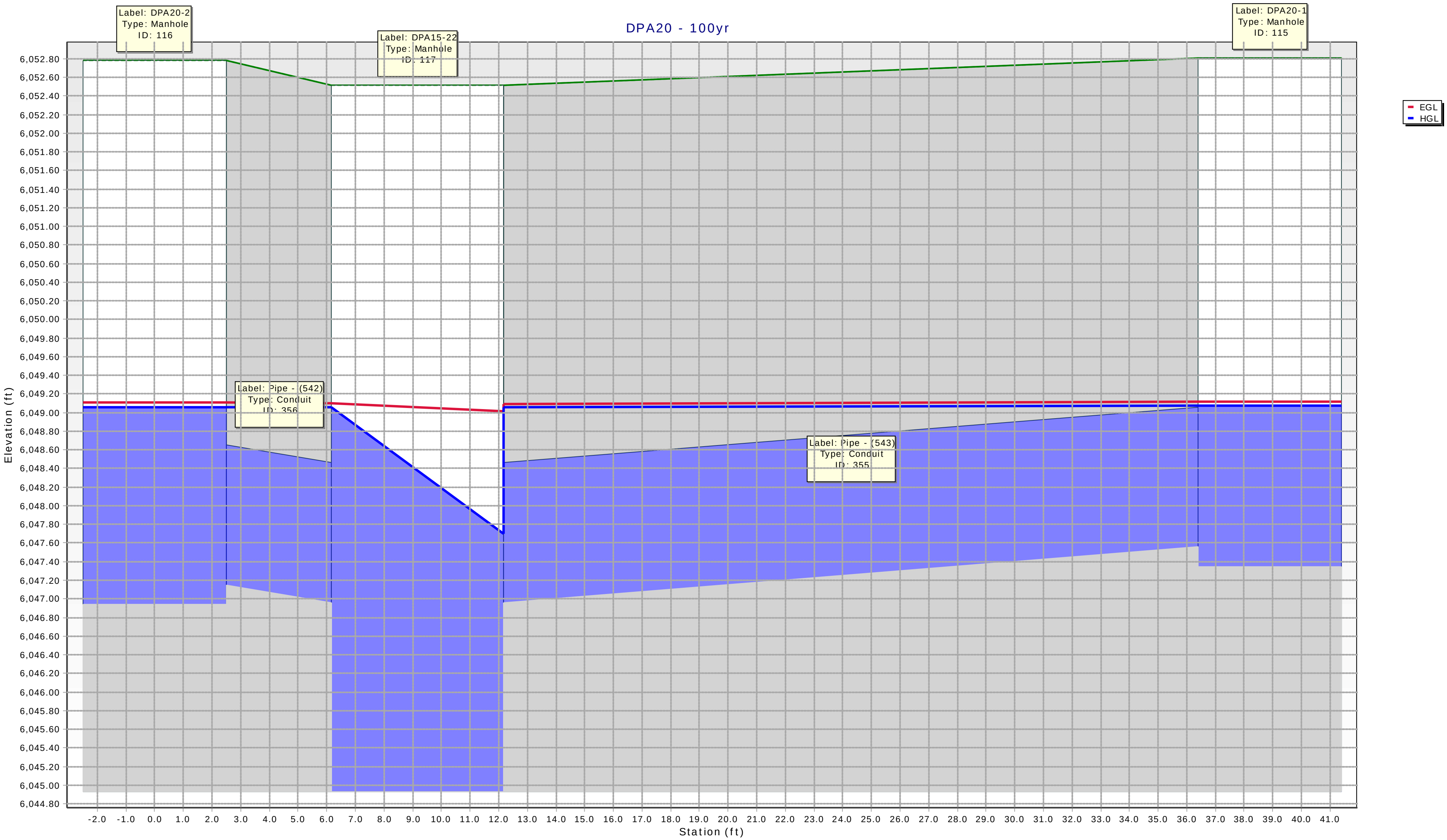
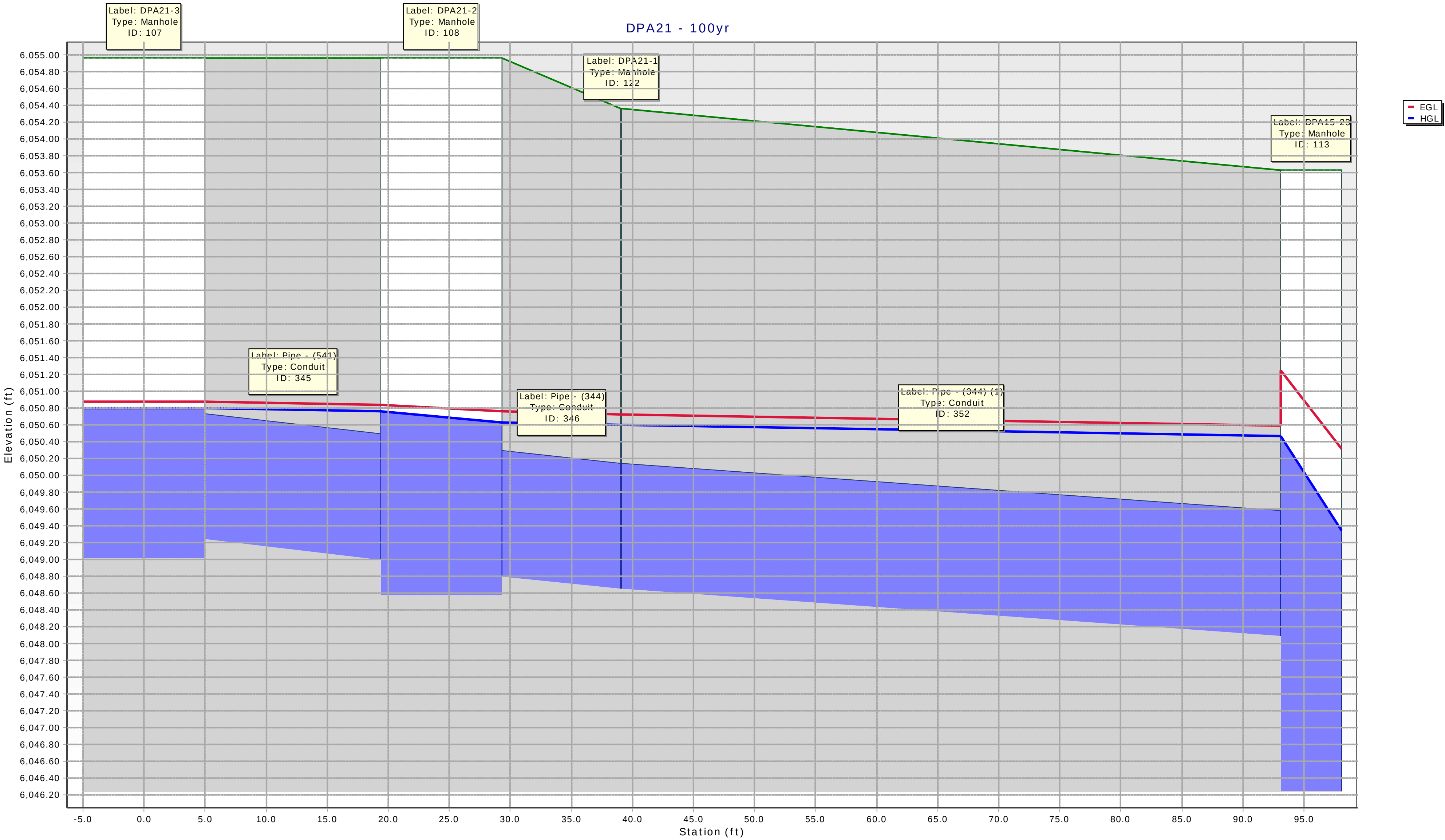
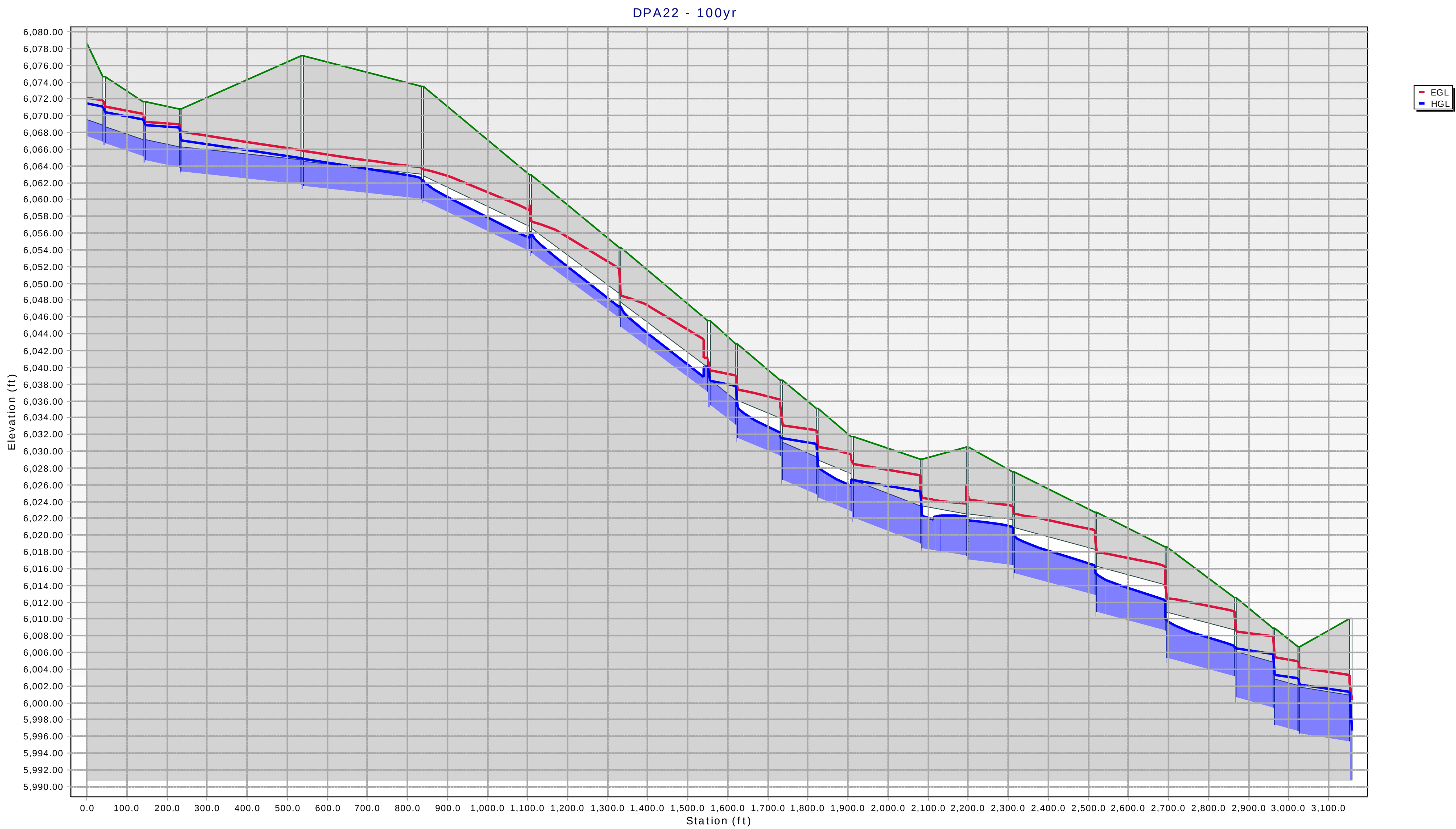
6,028.50
6,028.00
6,027.50
6,027.00
6,026.50
6,026.00
6,025.50
6,025.00
6,024.50
6,024.00
6,023.50
6,023.00
6,022.50
6,022.00
6,021.50
6,021.00
6,020.50
6,020.00
6,019.50
6,019.00
6,018.50
6,018.00
6,017.50
6,017.00
6,016.50
6,016.00
6,015.50
6,015.00
6,014.50
6,014.00
6,013.50
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
480.0
500.0
520.0
540.0
560.0
580.0
600.0


DPA19 - 100yr
Label: DPA19-1
Type: Manhole
ID: 147
Label: DPA15-17
Type: Manhole
ID: 150
Label: Pipe - (544)
Type: Conduit
ID: 387
EGL
HGL
Elevation (ft)
Station (ft)

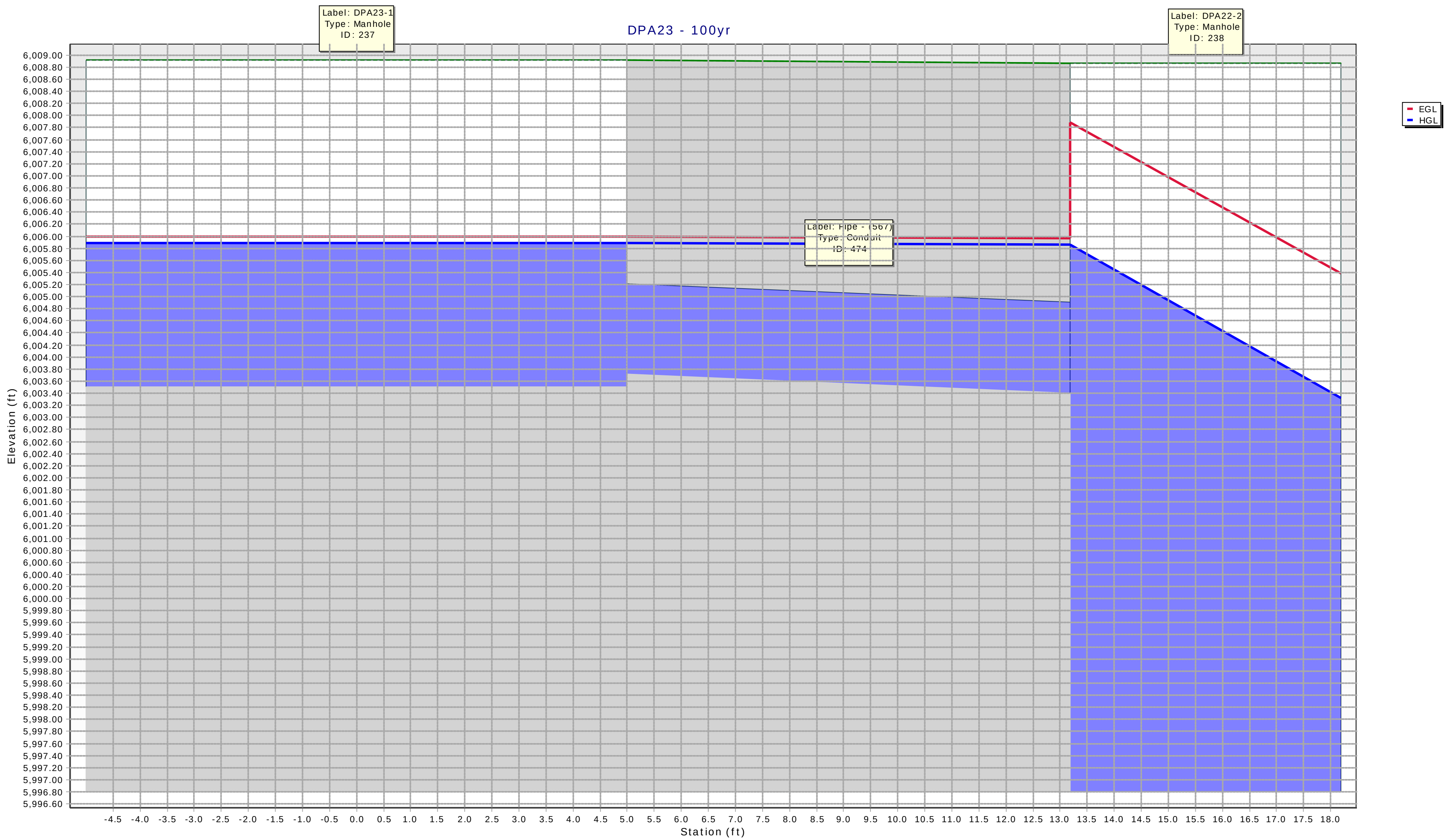

DPA20 - 100yr
Label: DPA20-2
Type: Manhole
ID: 116
Label: DPA15-22
Type: Manhole
ID: 117
Label: DPA20-1
Type: Manhole
ID: 115
Label: Pipe - (542)
Type: Conduit
ID: 356
Label: Pipe - (543)
Type: Conduit
ID: 355
EGL
HGL
Elevation (ft)
Station (ft)



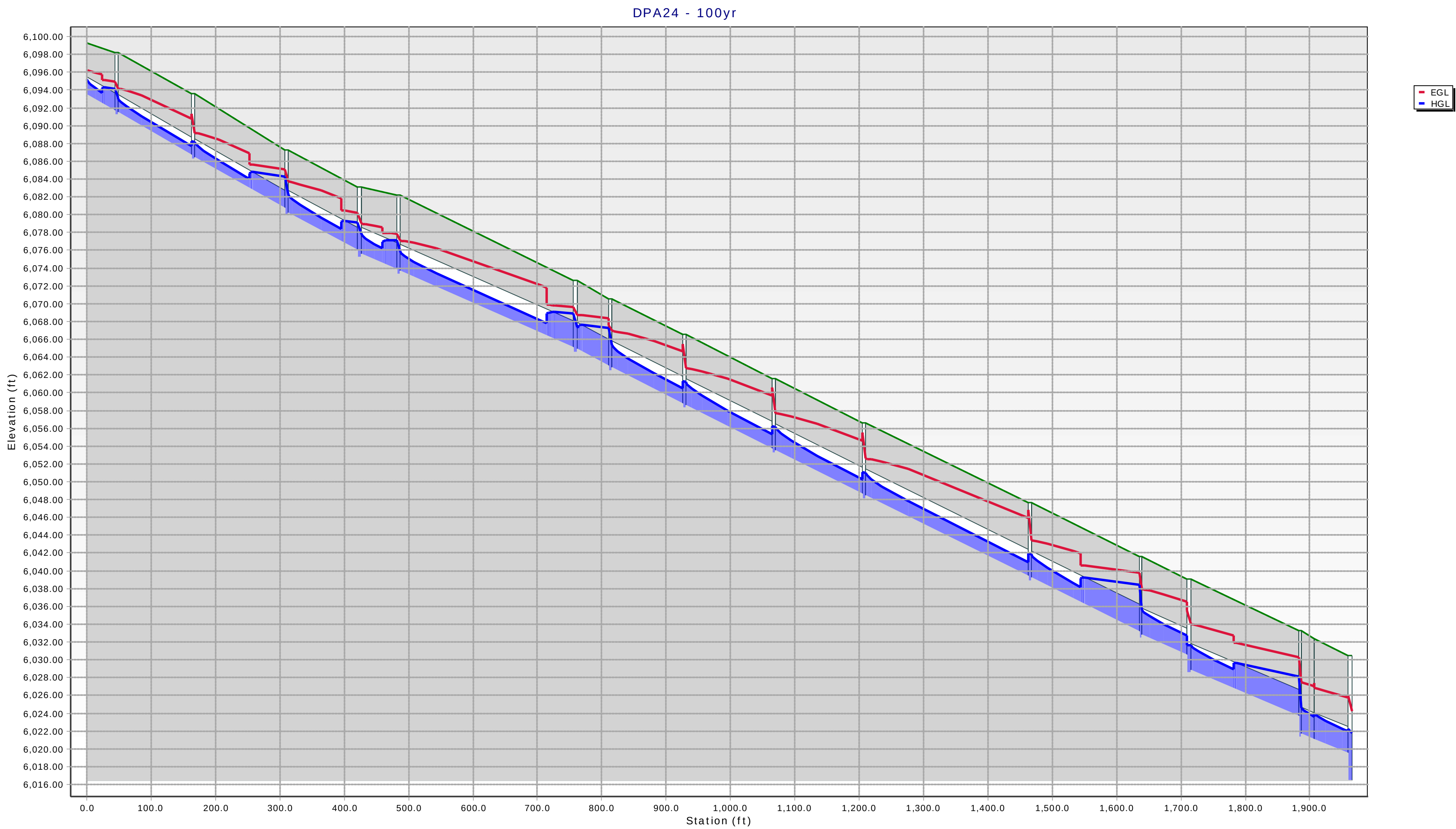
DPA21 - 100yr
Label: DPA21-3
Type: Manhole
ID: 107
Label: DPA21-2
Type: Manhole
ID: 108
Label: DPA21-1
Type: Manhole
ID: 122
Label: DPA15-23
Type: Manhole
ID: 113
Label: Pipe - (541)
Type: Conduit
ID: 345
Label: Pipe - (344)
Type: Conduit
ID: 346
Label: Pipe - (344) (1)
Type: Conduit
ID: 352
EGL
HGL
Elevation (ft)
Station (ft)

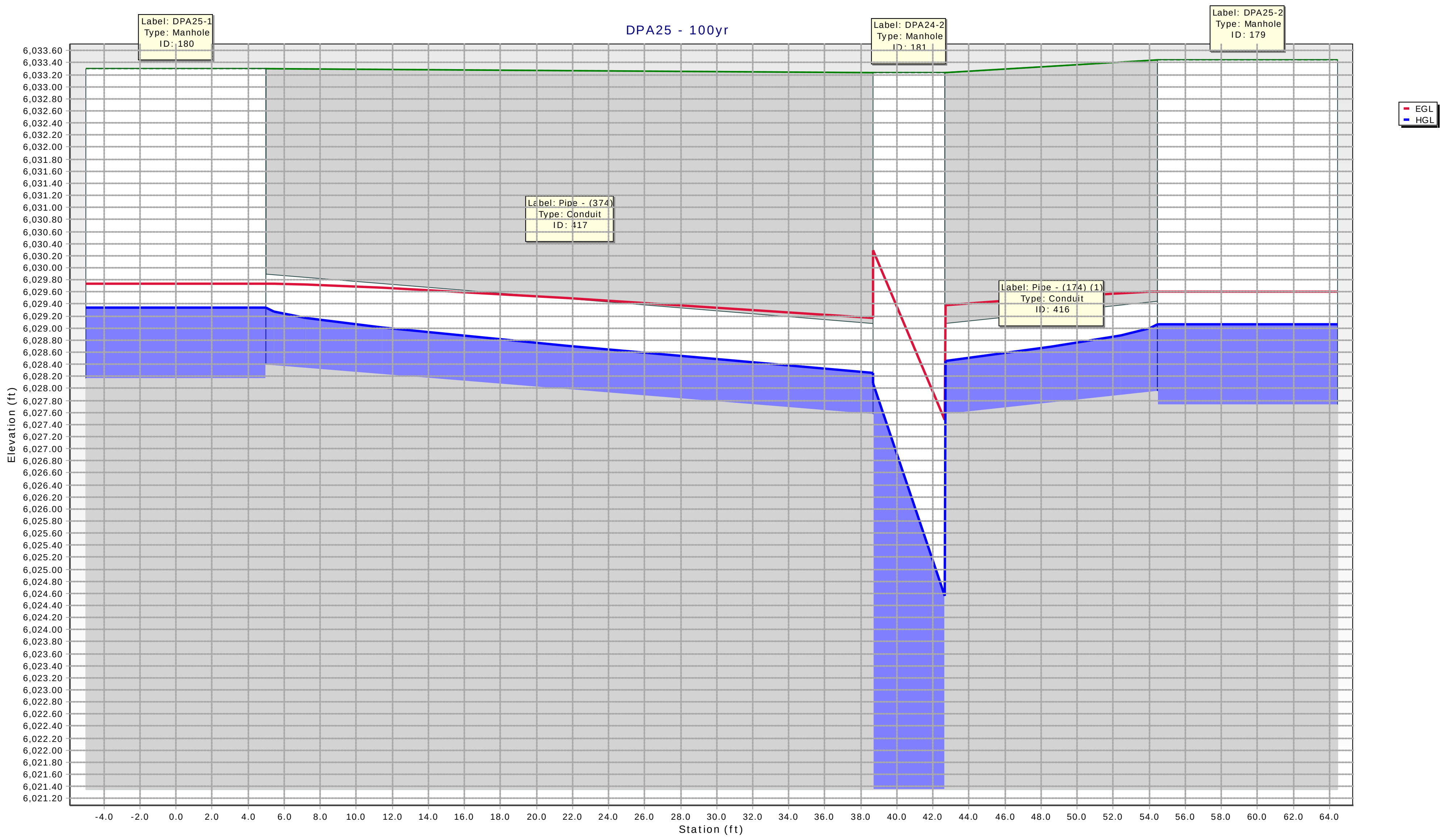


DPA22 - 100yr
Elevation (ft)
Station (ft)
EGL
HGL
6,080.00
6,078.00
6,076.00
6,074.00
6,072.00
6,070.00
6,068.00
6,066.00
6,064.00
6,062.00
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
6,014.00
6,012.00
6,010.00
6,008.00
6,006.00
6,004.00
6,002.00
6,000.00
5,998.00
5,996.00
5,994.00
5,992.00
5,990.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0
2,000.0
2,100.0
2,200.0
2,300.0
2,400.0
2,500.0
2,600.0
2,700.0
2,800.0
2,900.0
3,000.0
3,100.0

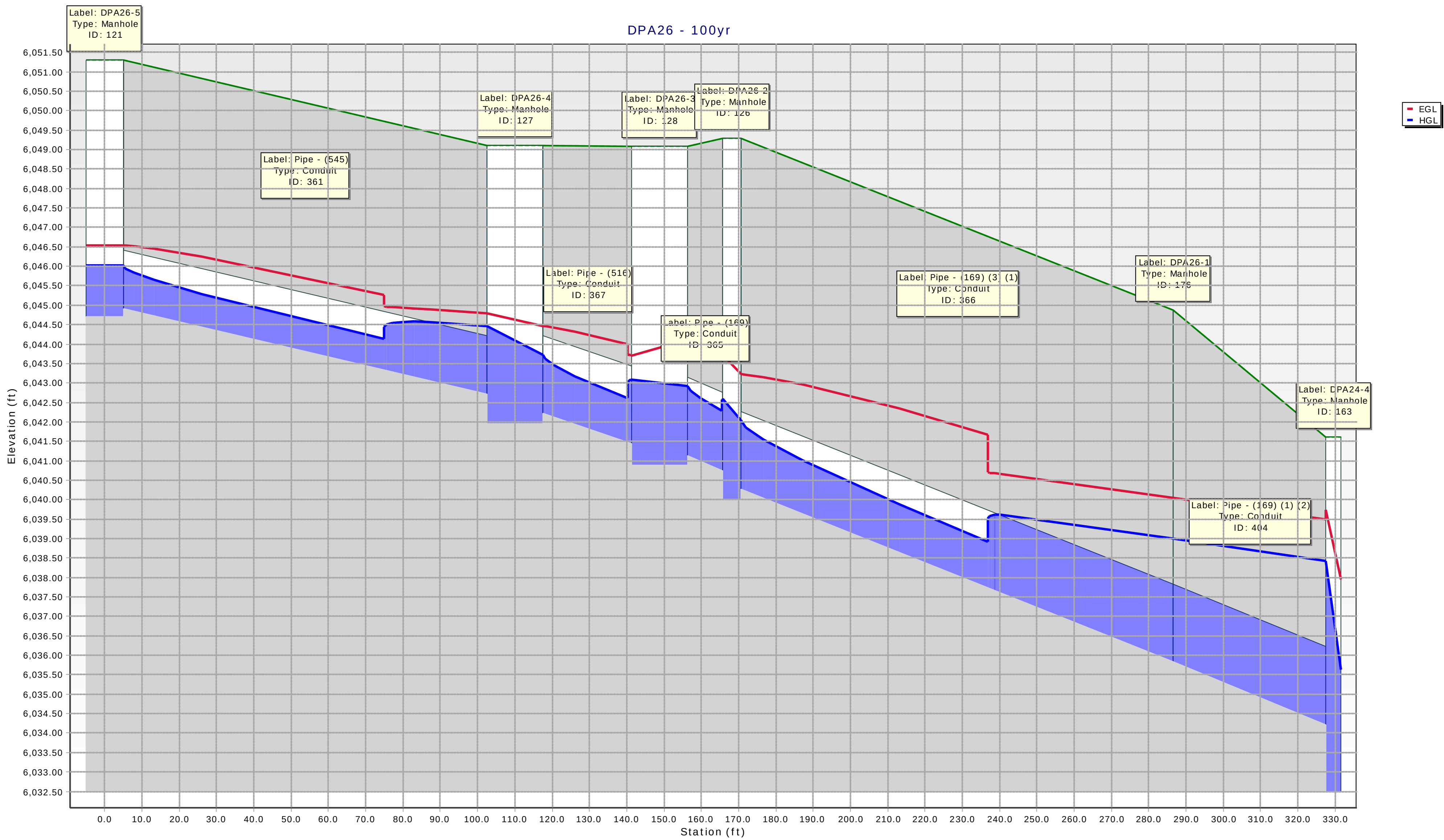


DPA23 - 100yr
Label: DPA23-1
Type: Manhole
ID: 237
Label: DPA22-2
Type: Manhole
ID: 238
Label: Pipe - (567)
Type: Conduit
ID: 474
EGL
HGL
Elevation (ft)
Station (ft)
6,009.00
6,008.00
6,007.00
6,006.00
6,005.00
6,004.00
6,003.00
6,002.00
6,001.00
6,000.00
5,999.00
5,998.00
5,997.00
5,996.60
-4.5
0.0
5.0
10.0
15.0
18.0

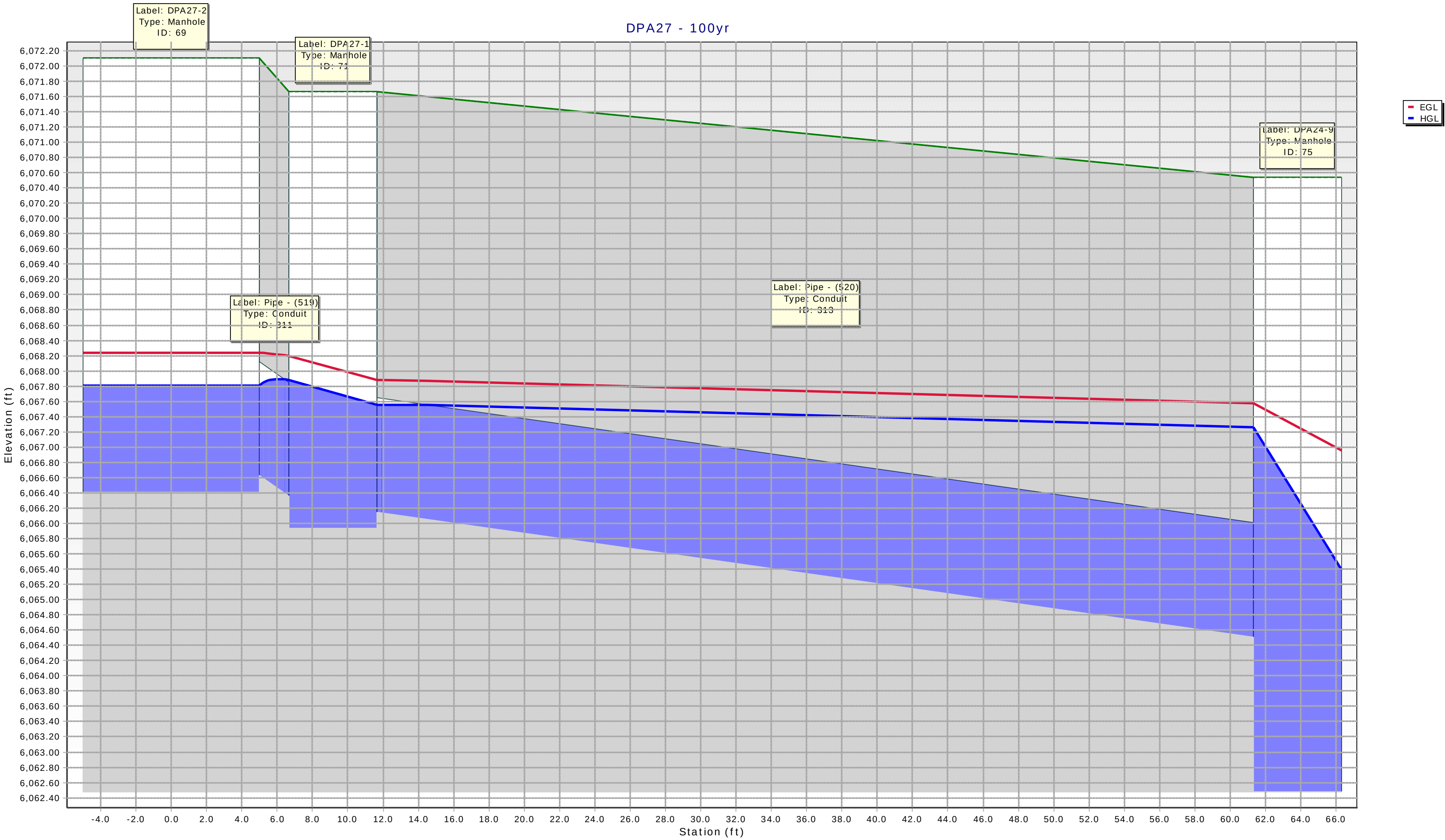

DPA24 - 100yr
Elevation (ft)
Station (ft)
EGL
HGL
6,100.00
6,098.00
6,096.00
6,094.00
6,092.00
6,090.00
6,088.00
6,086.00
6,084.00
6,082.00
6,080.00
6,078.00
6,076.00
6,074.00
6,072.00
6,070.00
6,068.00
6,066.00
6,064.00
6,062.00
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
6,028.00
6,026.00
6,024.00
6,022.00
6,020.00
6,018.00
6,016.00
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1,000.0
1,100.0
1,200.0
1,300.0
1,400.0
1,500.0
1,600.0
1,700.0
1,800.0
1,900.0

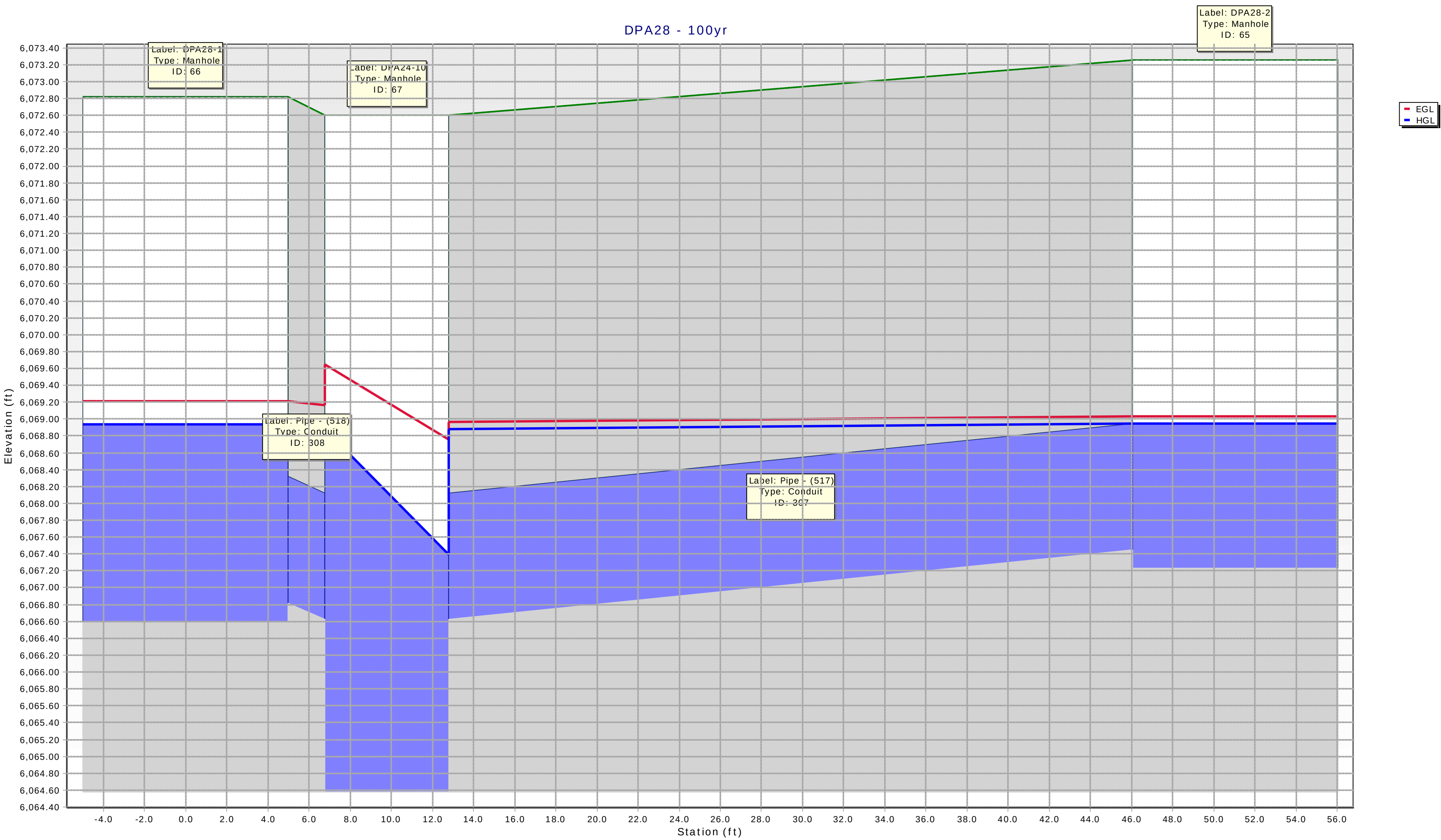


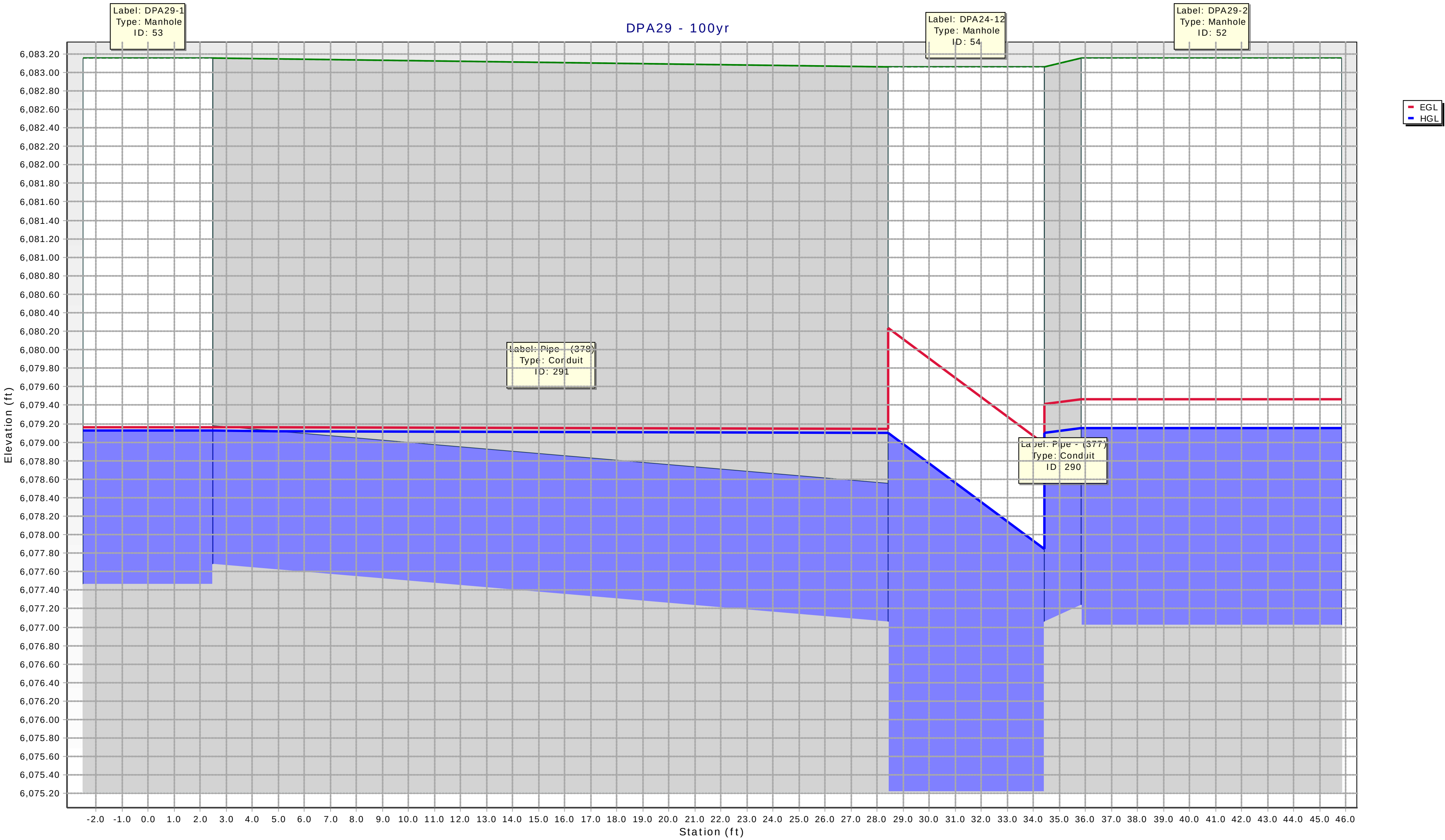
DPA25 - 100yr
Label: DPA25-1
Type: Manhole
ID: 180
Label: DPA24-2
Type: Manhole
ID: 181
Label: DPA25-2
Type: Manhole
ID: 179
Label: Pipe - (374)
Type: Conduit
ID: 417
Label: Pipe - (174) (1)
Type: Conduit
ID: 416
EGL
HGL
Elevation (ft)
Station (ft)
6,033.60
6,021.20
-4.0
64.0



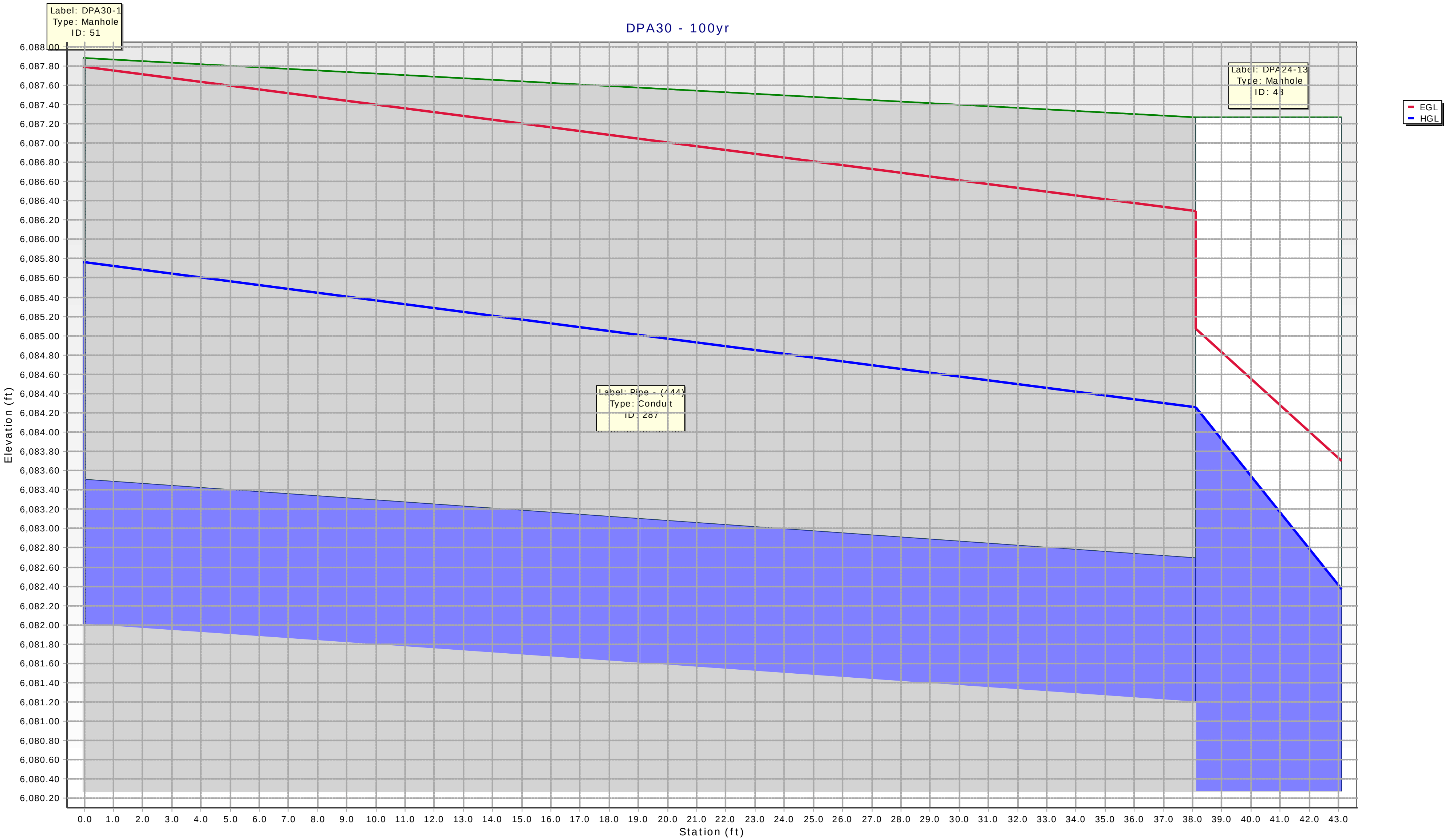
DPA26 - 100yr
Label: DPA26-5
Type: Manhole
ID: 121
Label: DPA26-4
Type: Manhole
ID: 127
Label: DPA26-3
Type: Manhole
ID: 128
Label: DPA26-2
Type: Manhole
ID: 126
Label: Pipe - (545)
Type: Conduit
ID: 361
Label: Pipe - (516)
Type: Conduit
ID: 367
Label: Pipe - (169) (3) (1)
Type: Conduit
ID: 366
Label: DPA26-1
Type: Manhole
ID: 176
Label: Pipe - (169)
Type: Conduit
ID: 365
Label: DPA24-4
Type: Manhole
ID: 163
Label: Pipe - (169) (1) (2)
Type: Conduit
ID: 404
EGL
HGL
Elevation (ft)
Station (ft)

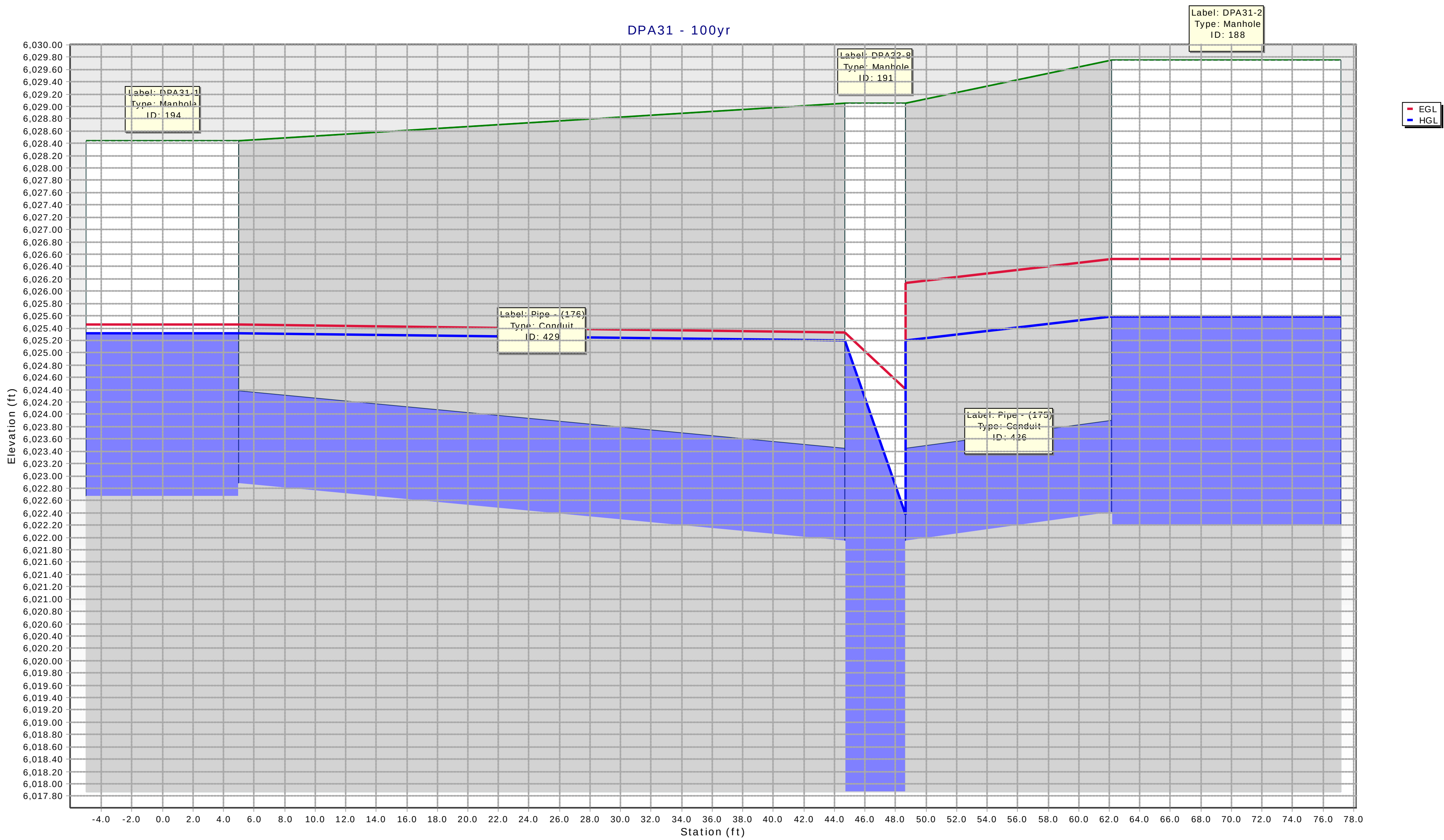

DPA27 - 100yr
Label: DPA27-2
Type: Manhole
ID: 69
Label: DPA27-1
Type: Manhole
ID: 71
Label: DPA24-9
Type: Manhole
ID: 75
Label: Pipe - (519)
Type: Conduit
ID: 311
Label: Pipe - (520)
Type: Conduit
ID: 313
EGL
HGL
Elevation (ft)
Station (ft)
6,072.20
6,072.00
6,071.80
6,071.60
6,071.40
6,071.20
6,071.00
6,070.80
6,070.60
6,070.40
6,070.20
6,070.00
6,069.80
6,069.60
6,069.40
6,069.20
6,069.00
6,068.80
6,068.60
6,068.40
6,068.20
6,068.00
6,067.80
6,067.60
6,067.40
6,067.20
6,067.00
6,066.80
6,066.60
6,066.40
6,066.20
6,066.00
6,065.80
6,065.60
6,065.40
6,065.20
6,065.00
6,064.80
6,064.60
6,064.40
6,064.20
6,064.00
6,063.80
6,063.60
6,063.40
6,063.20
6,063.00
6,062.80
6,062.60
6,062.40
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
54.0
56.0
58.0
60.0
62.0
64.0
66.0

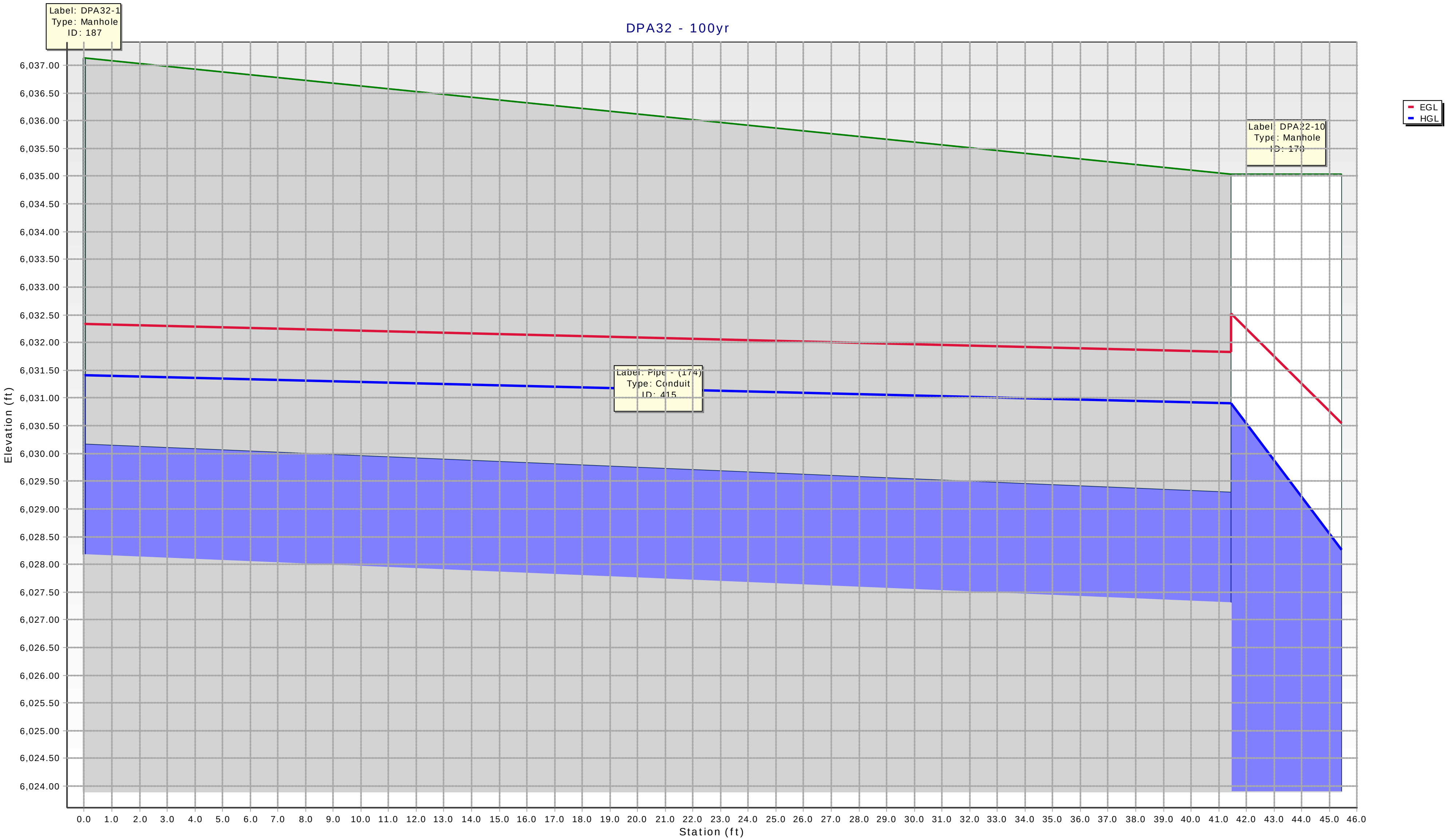

DPA28 - 100yr
Label: DPA28-1
Type: Manhole
ID: 66
Label: DPA24-10
Type: Manhole
ID: 67
Label: DPA28-2
Type: Manhole
ID: 65
Label: Pipe - (518)
Type: Conduit
ID: 308
Label: Pipe - (517)
Type: Conduit
ID: 307
EGL
HGL
Elevation (ft)
Station (ft)
6,073.40
6,073.20
6,073.00
6,072.80
6,072.60
6,072.40
6,072.20
6,072.00
6,071.80
6,071.60
6,071.40
6,071.20
6,071.00
6,070.80
6,070.60
6,070.40
6,070.20
6,070.00
6,069.80
6,069.60
6,069.40
6,069.20
6,069.00
6,068.80
6,068.60
6,068.40
6,068.20
6,068.00
6,067.80
6,067.60
6,067.40
6,067.20
6,067.00
6,066.80
6,066.60
6,066.40
6,066.20
6,066.00
6,065.80
6,065.60
6,065.40
6,065.20
6,065.00
6,064.80
6,064.60
6,064.40
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
54.0
56.0

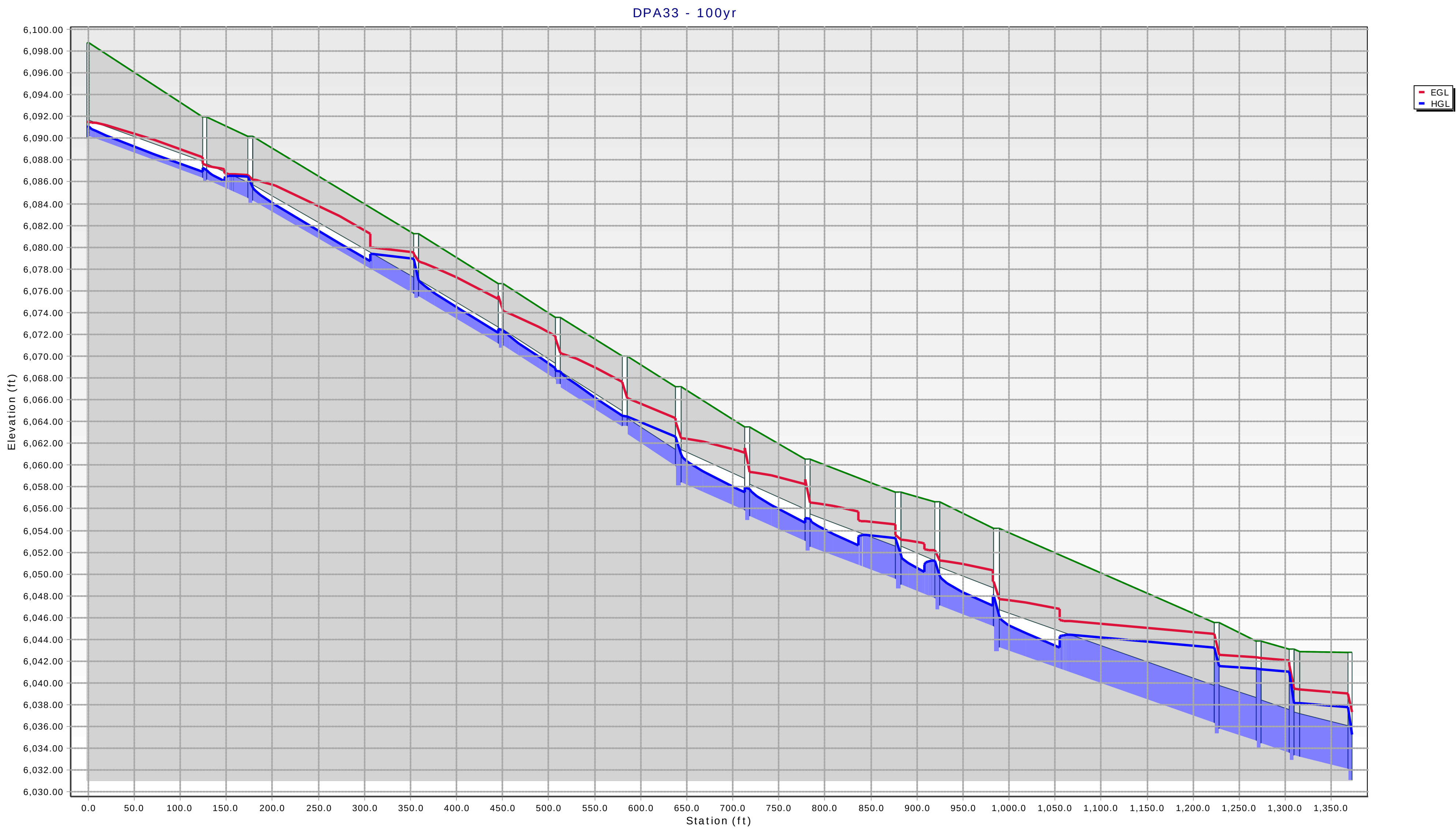


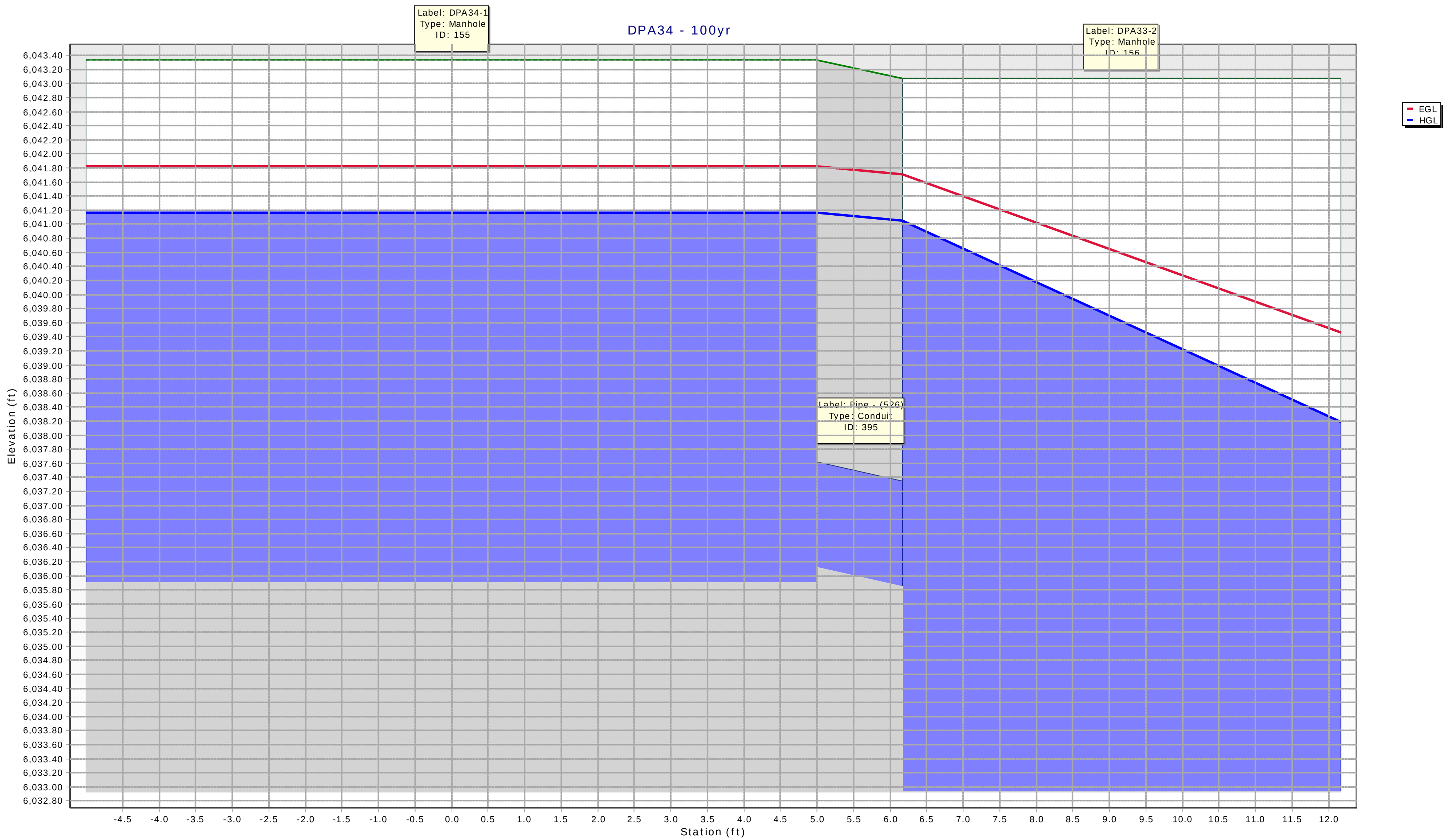
DPA29 - 100yr
Label: DPA29-1
Type: Manhole
ID: 53
Label: DPA24-12
Type: Manhole
ID: 54
Label: DPA29-2
Type: Manhole
ID: 52
Label: Pipe - (378)
Type: Conduit
ID: 291
Label: Pipe - (377)
Type: Conduit
ID: 290
EGL
HGL
Elevation (ft)
Station (ft)
6,083.20
6,083.00
6,082.80
6,082.60
6,082.40
6,082.20
6,082.00
6,081.80
6,081.60
6,081.40
6,081.20
6,081.00
6,080.80
6,080.60
6,080.40
6,080.20
6,080.00
6,079.80
6,079.60
6,079.40
6,079.20
6,079.00
6,078.80
6,078.60
6,078.40
6,078.20
6,078.00
6,077.80
6,077.60
6,077.40
6,077.20
6,077.00
6,076.80
6,076.60
6,076.40
6,076.20
6,076.00
6,075.80
6,075.60
6,075.40
6,075.20
-2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0 44.0 45.0 46.0


DPA30 - 100yr
Label: DPA30-1
Type: Manhole
ID: 51
Label: DPA24-13
Type: Manhole
ID: 43
Label: Pipe - (444)
Type: Conduit
ID: 287
EGL
HGL
Elevation (ft)
Station (ft)
6,088.00
6,087.80
6,087.60
6,087.40
6,087.20
6,087.00
6,086.80
6,086.60
6,086.40
6,086.20
6,086.00
6,085.80
6,085.60
6,085.40
6,085.20
6,085.00
6,084.80
6,084.60
6,084.40
6,084.20
6,084.00
6,083.80
6,083.60
6,083.40
6,083.20
6,083.00
6,082.80
6,082.60
6,082.40
6,082.20
6,082.00
6,081.80
6,081.60
6,081.40
6,081.20
6,081.00
6,080.80
6,080.60
6,080.40
6,080.20
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0

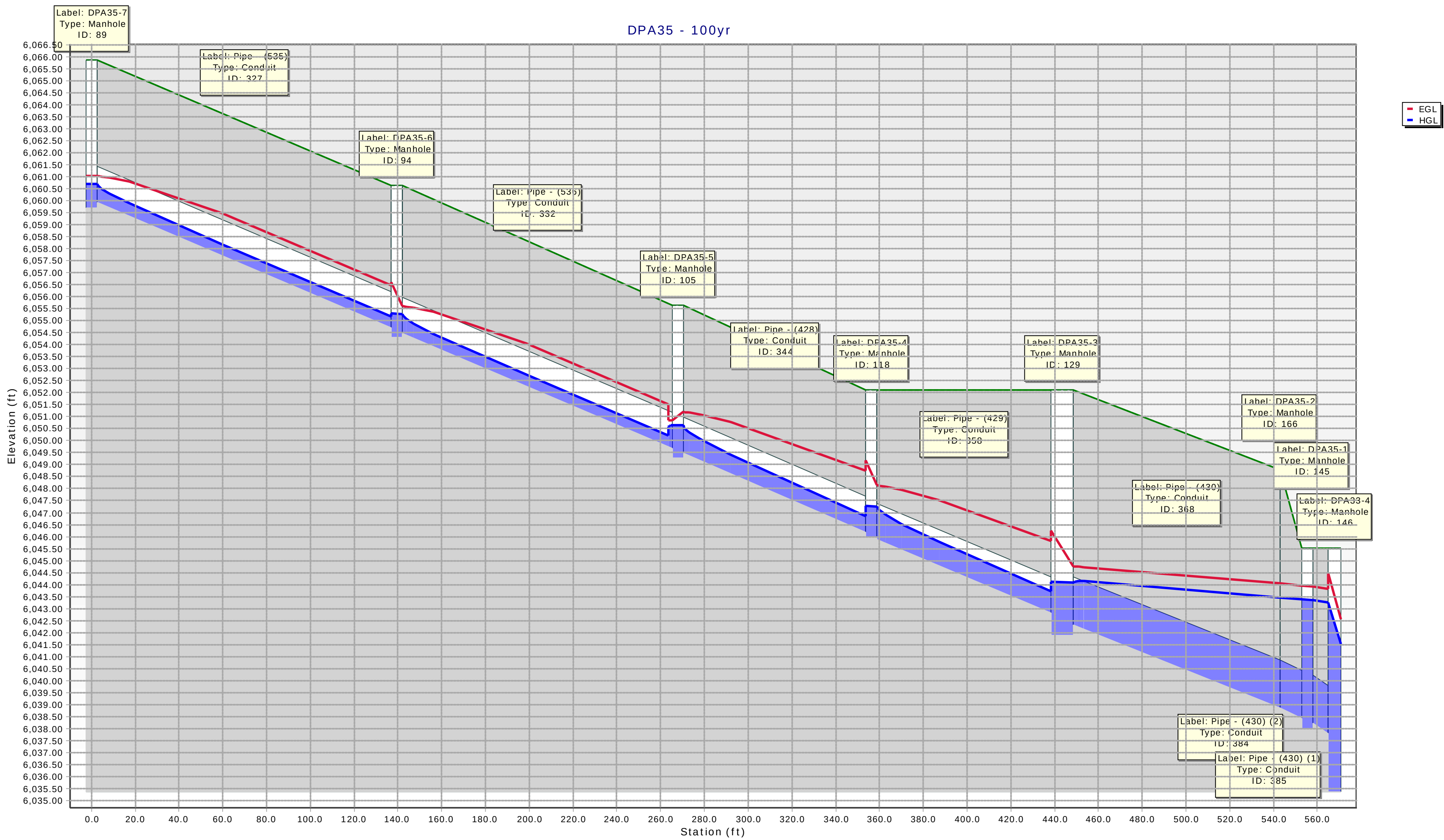

DPA31 - 100yr
Label: DPA31-1
Type: Manhole
ID: 194
Label: DPA22-8
Type: Manhole
ID: 191
Label: DPA31-2
Type: Manhole
ID: 188
Label: Pipe - (176)
Type: Conduit
ID: 429
Label: Pipe - (175)
Type: Conduit
ID: 426
EGL
HGL
Elevation (ft)
Station (ft)

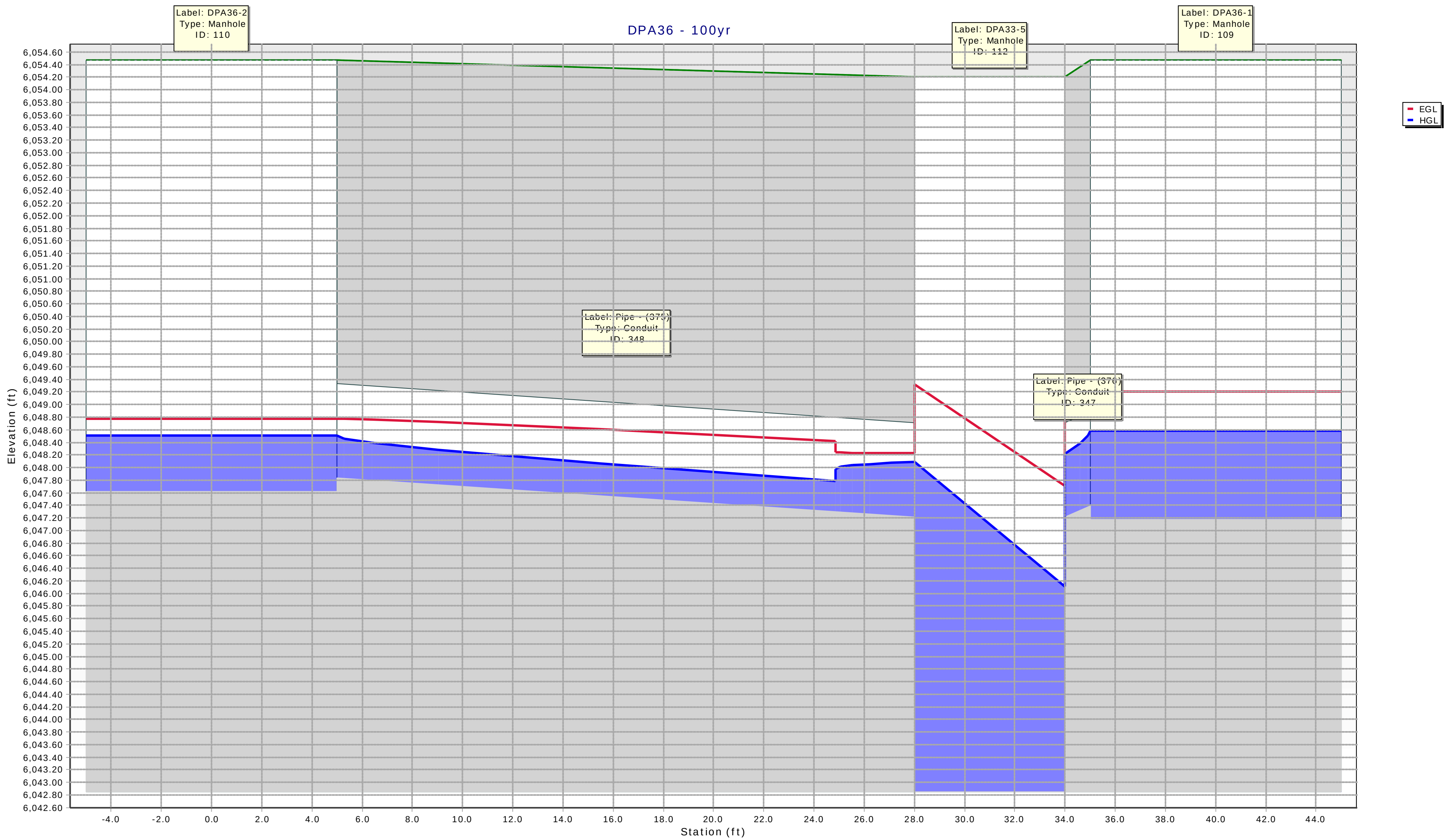

DPA32 - 100yr
Label: DPA32-1
Type: Manhole
ID: 187
Label: DPA22-10
Type: Manhole
ID: 178
Label: Pipe - (174)
Type: Conduit
ID: 415
EGL
HGL
Elevation (ft)
Station (ft)
6,037.00
6,036.50
6,036.00
6,035.50
6,035.00
6,034.50
6,034.00
6,033.50
6,033.00
6,032.50
6,032.00
6,031.50
6,031.00
6,030.50
6,030.00
6,029.50
6,029.00
6,028.50
6,028.00
6,027.50
6,027.00
6,026.50
6,026.00
6,025.50
6,025.00
6,024.50
6,024.00
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0 44.0 45.0 46.0


DPA33 - 100yr
Elevation (ft)
Station (ft)
EGL
HGL
6,100.00
6,098.00
6,096.00
6,094.00
6,092.00
6,090.00
6,088.00
6,086.00
6,084.00
6,082.00
6,080.00
6,078.00
6,076.00
6,074.00
6,072.00
6,070.00
6,068.00
6,066.00
6,064.00
6,062.00
6,060.00
6,058.00
6,056.00
6,054.00
6,052.00
6,050.00
6,048.00
6,046.00
6,044.00
6,042.00
6,040.00
6,038.00
6,036.00
6,034.00
6,032.00
6,030.00
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1,000.0
1,050.0
1,100.0
1,150.0
1,200.0
1,250.0
1,300.0
1,350.0

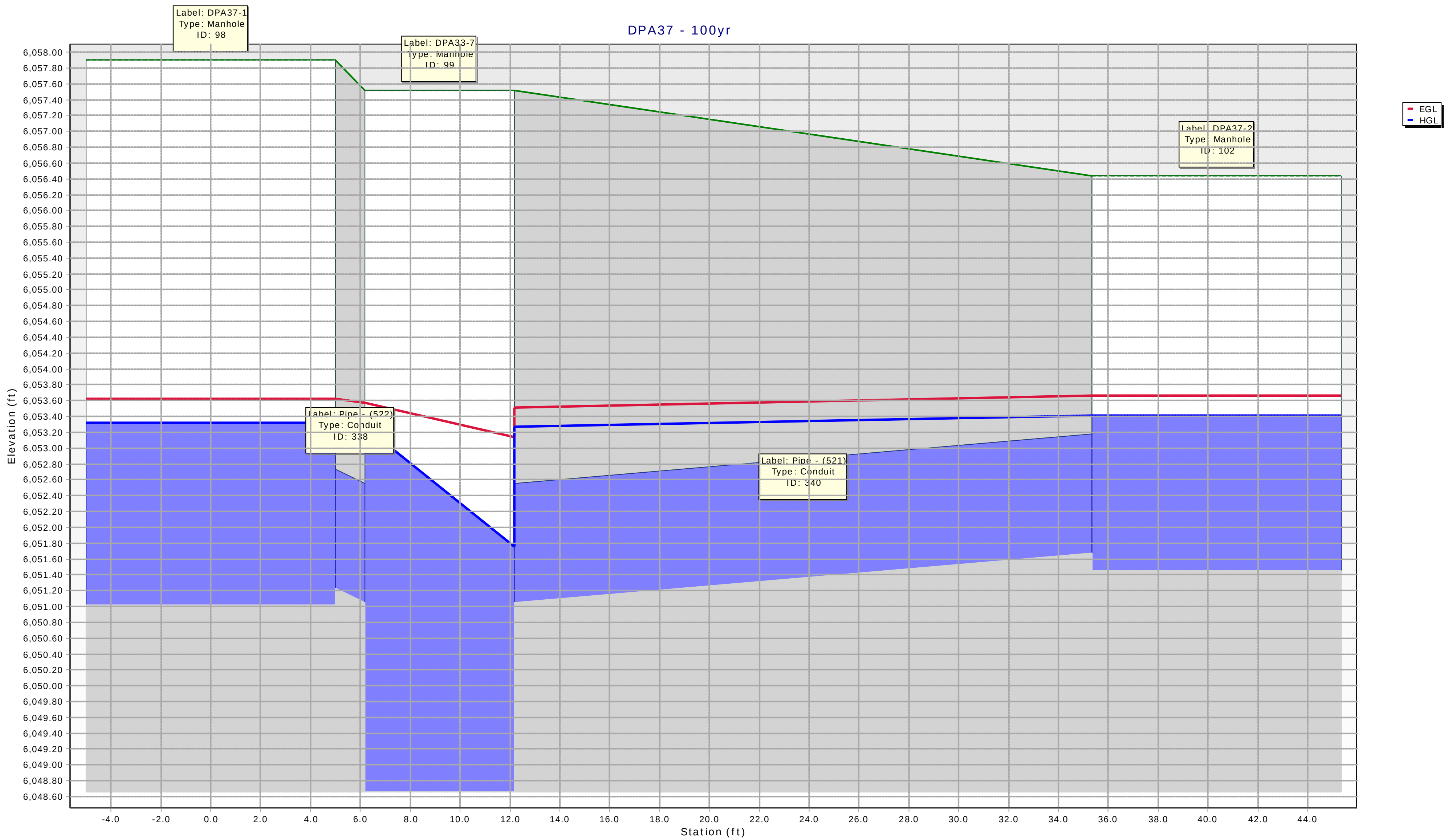


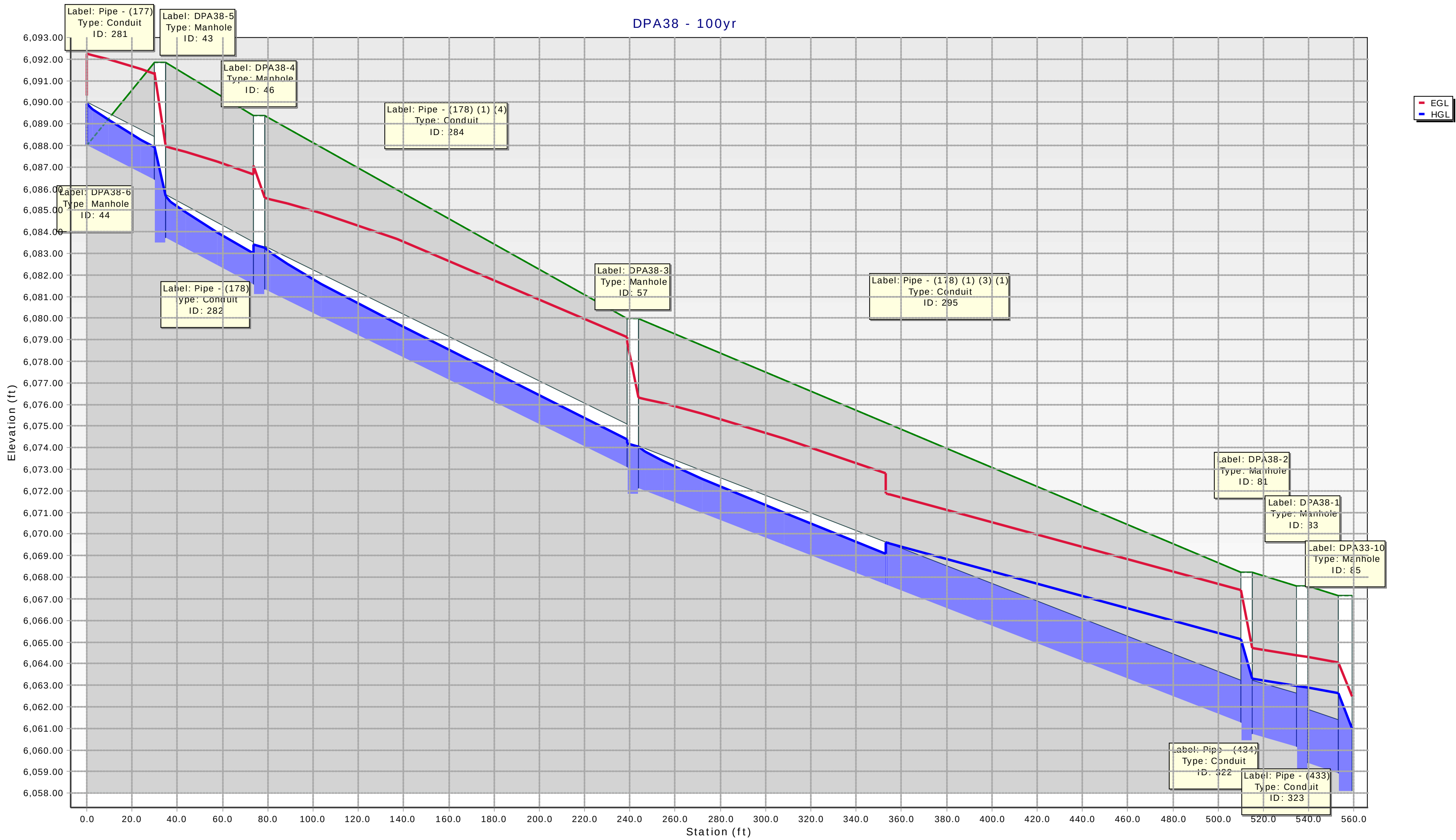
DPA34 - 100yr
Label: DPA34-1
Type: Manhole
ID: 155
Label: DPA33-2
Type: Manhole
ID: 156
Label: Pipe - (526)
Type: Conduit
ID: 395
EGL
HGL
Elevation (ft)
Station (ft)
6,043.40
6,043.20
6,043.00
6,042.80
6,042.60
6,042.40
6,042.20
6,042.00
6,041.80
6,041.60
6,041.40
6,041.20
6,041.00
6,040.80
6,040.60
6,040.40
6,040.20
6,040.00
6,039.80
6,039.60
6,039.40
6,039.20
6,039.00
6,038.80
6,038.60
6,038.40
6,038.20
6,038.00
6,037.80
6,037.60
6,037.40
6,037.20
6,037.00
6,036.80
6,036.60
6,036.40
6,036.20
6,036.00
6,035.80
6,035.60
6,035.40
6,035.20
6,035.00
6,034.80
6,034.60
6,034.40
6,034.20
6,034.00
6,033.80
6,033.60
6,033.40
6,033.20
6,033.00
6,032.80
-4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0


DPA35 - 100yr
Label: DPA35-7
Type: Manhole
ID: 89
Label: Pipe - (535)
Type: Conduit
ID: 327
Label: DPA35-6
Type: Manhole
ID: 94
Label: Pipe - (536)
Type: Conduit
ID: 332
Label: DPA35-5
Type: Manhole
ID: 105
Label: Pipe - (428)
Type: Conduit
ID: 344
Label: DPA35-4
Type: Manhole
ID: 118
Label: Pipe - (429)
Type: Conduit
ID: 358
Label: DPA35-3
Type: Manhole
ID: 129
Label: Pipe - (430)
Type: Conduit
ID: 368
Label: DPA35-2
Type: Manhole
ID: 166
Label: DPA35-1
Type: Manhole
ID: 145
Label: DPA33-4
Type: Manhole
ID: 146
Label: Pipe - (430) (2)
Type: Conduit
ID: 384
Label: Pipe - (430) (1)
Type: Conduit
ID: 385
EGL
HGL
Elevation (ft)
Station (ft)

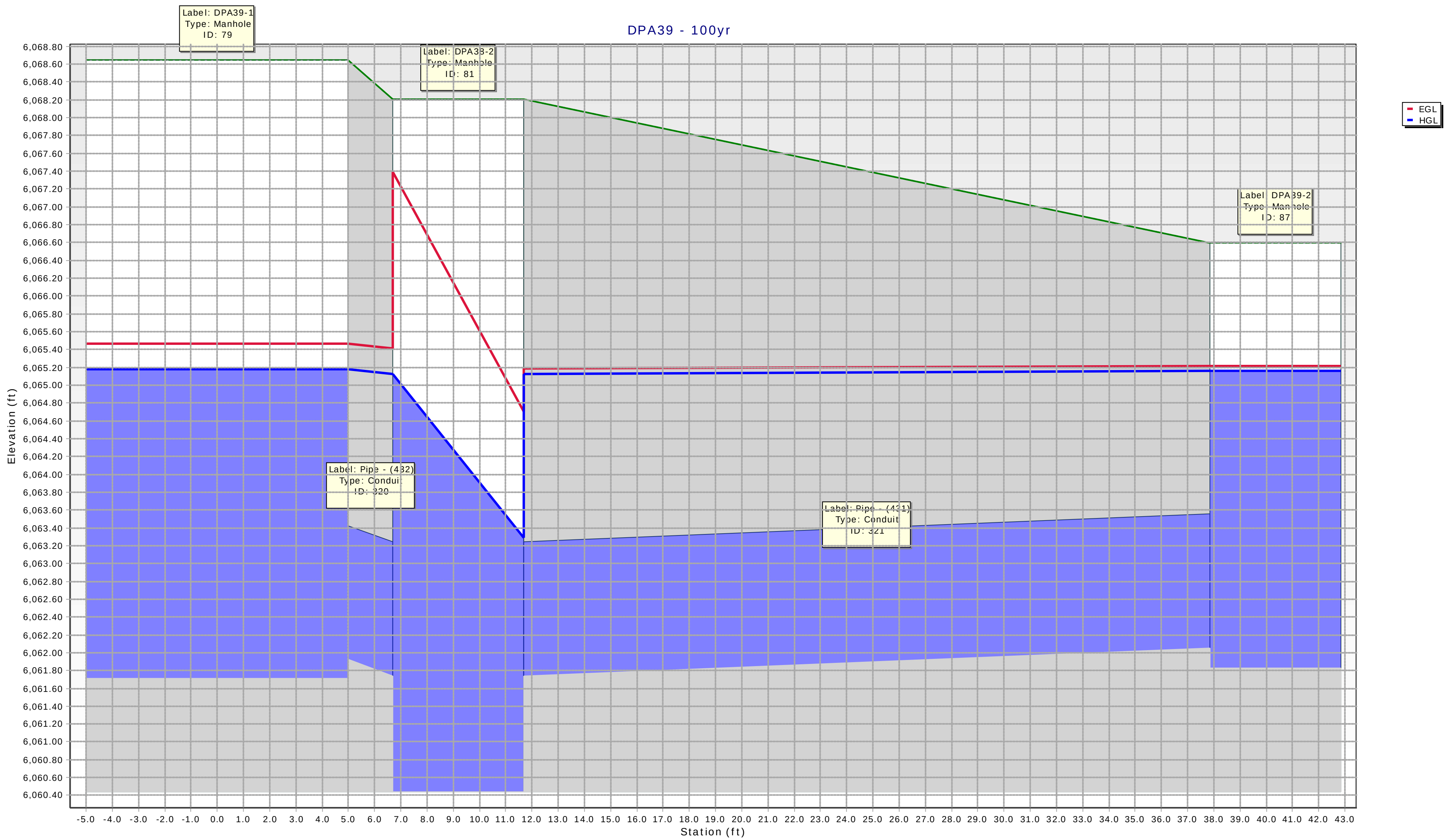


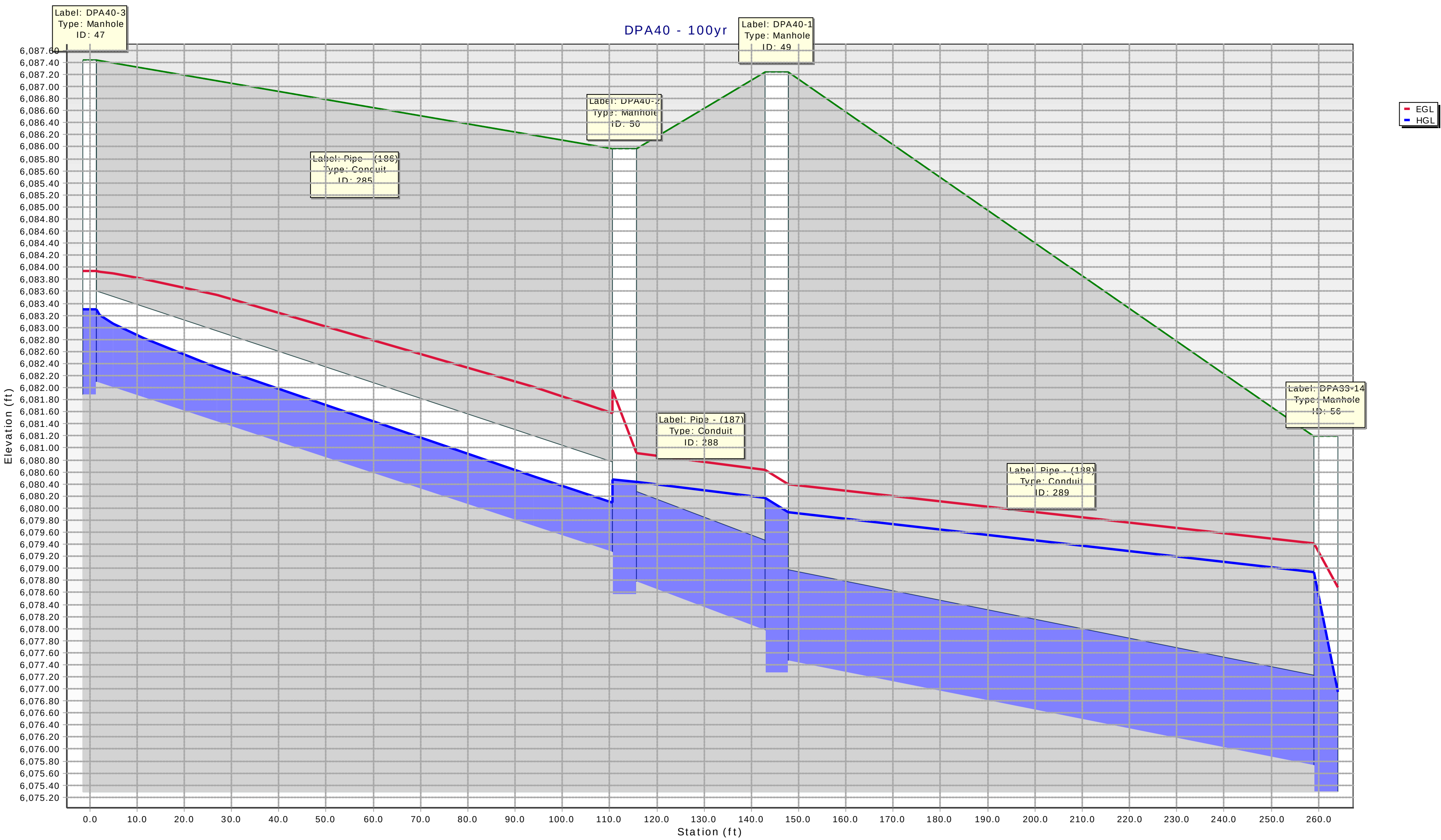
DPA36 - 100yr
Label: DPA36-2
Type: Manhole
ID: 110
Label: DPA33-5
Type: Manhole
ID: 112
Label: DPA36-1
Type: Manhole
ID: 109
Label: Pipe - (375)
Type: Conduit
ID: 348
Label: Pipe - (376)
Type: Conduit
ID: 347
EGL
HGL
Elevation (ft)
Station (ft)

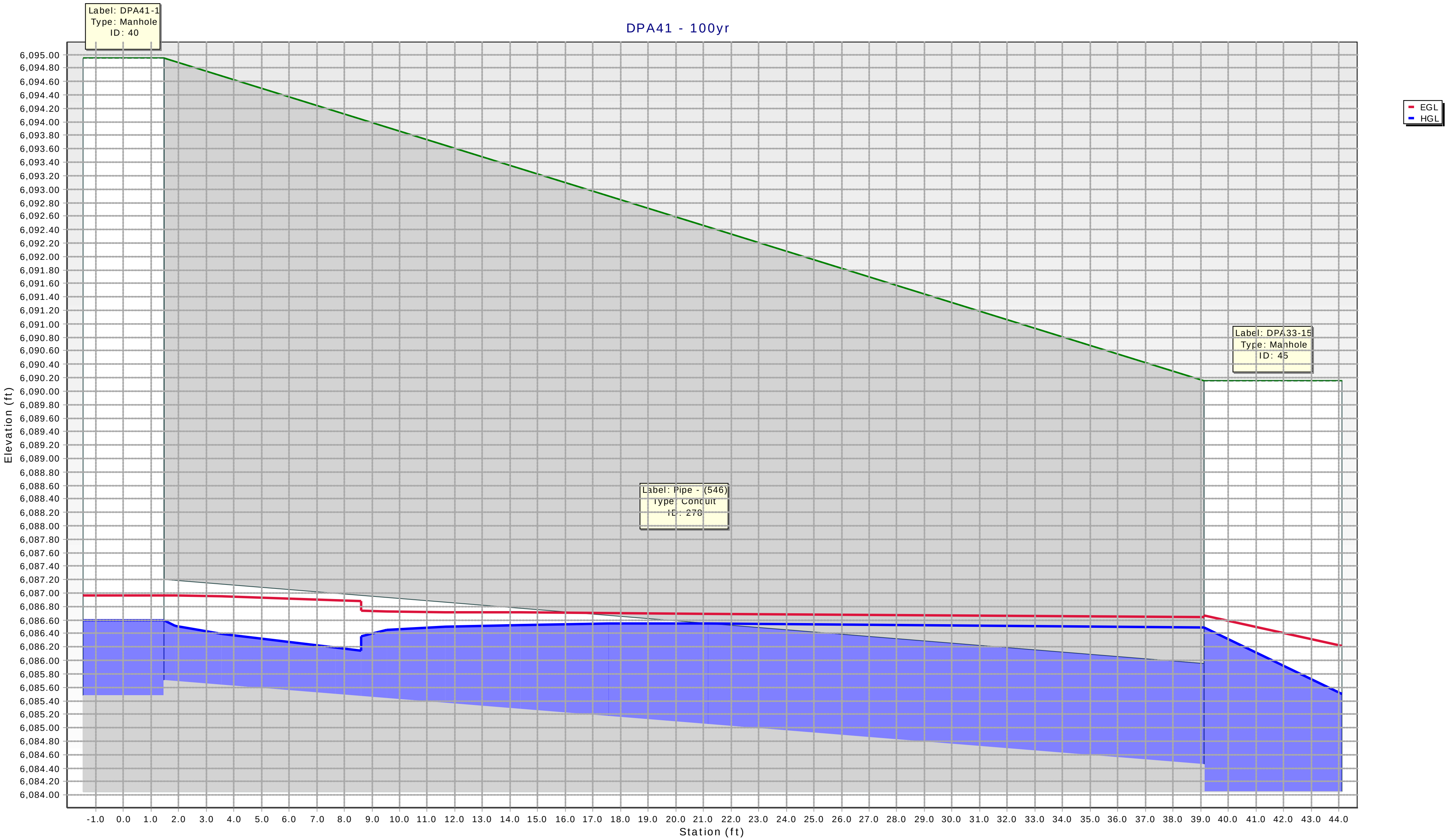

DPA37 - 100yr
Label: DPA37-1
Type: Manhole
ID: 98
Label: DPA33-7
Type: Manhole
ID: 99
Label: DPA37-2
Type: Manhole
ID: 102
Label: Pipe - (522)
Type: Conduit
ID: 338
Label: Pipe - (521)
Type: Conduit
ID: 340
EGL
HGL
Elevation (ft)
Station (ft)
6,058.00
6,057.80
6,057.60
6,057.40
6,057.20
6,057.00
6,056.80
6,056.60
6,056.40
6,056.20
6,056.00
6,055.80
6,055.60
6,055.40
6,055.20
6,055.00
6,054.80
6,054.60
6,054.40
6,054.20
6,054.00
6,053.80
6,053.60
6,053.40
6,053.20
6,053.00
6,052.80
6,052.60
6,052.40
6,052.20
6,052.00
6,051.80
6,051.60
6,051.40
6,051.20
6,051.00
6,050.80
6,050.60
6,050.40
6,050.20
6,050.00
6,049.80
6,049.60
6,049.40
6,049.20
6,049.00
6,048.80
6,048.60
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0



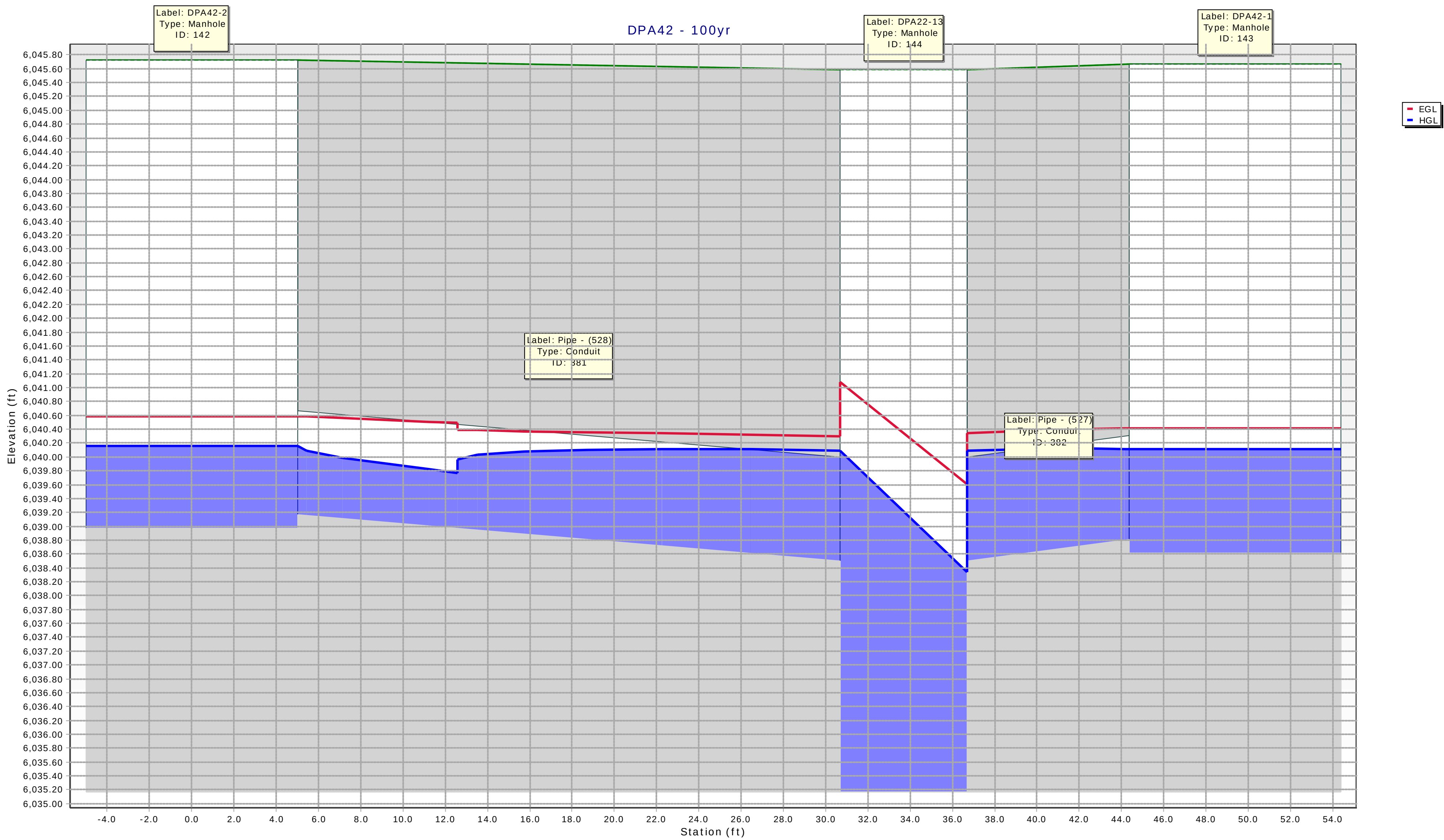
DPA38 - 100yr
Label: Pipe - (177)
Type: Conduit
ID: 281
Label: DPA38-5
Type: Manhole
ID: 43
Label: DPA38-4
Type: Manhole
ID: 46
Label: Pipe - (178) (1) (4)
Type: Conduit
ID: 284
Label: DPA38-6
Type: Manhole
ID: 44
Label: Pipe - (178)
Type: Conduit
ID: 282
Label: DPA38-3
Type: Manhole
ID: 57
Label: Pipe - (178) (1) (3) (1)
Type: Conduit
ID: 295
Label: DPA38-2
Type: Manhole
ID: 81
Label: DPA38-1
Type: Manhole
ID: 83
Label: DPA33-10
Type: Manhole
ID: 85
Label: Pipe - (434)
Type: Conduit
ID: 322
Label: Pipe - (433)
Type: Conduit
ID: 323
EGL
HGL
Elevation (ft)
Station (ft)

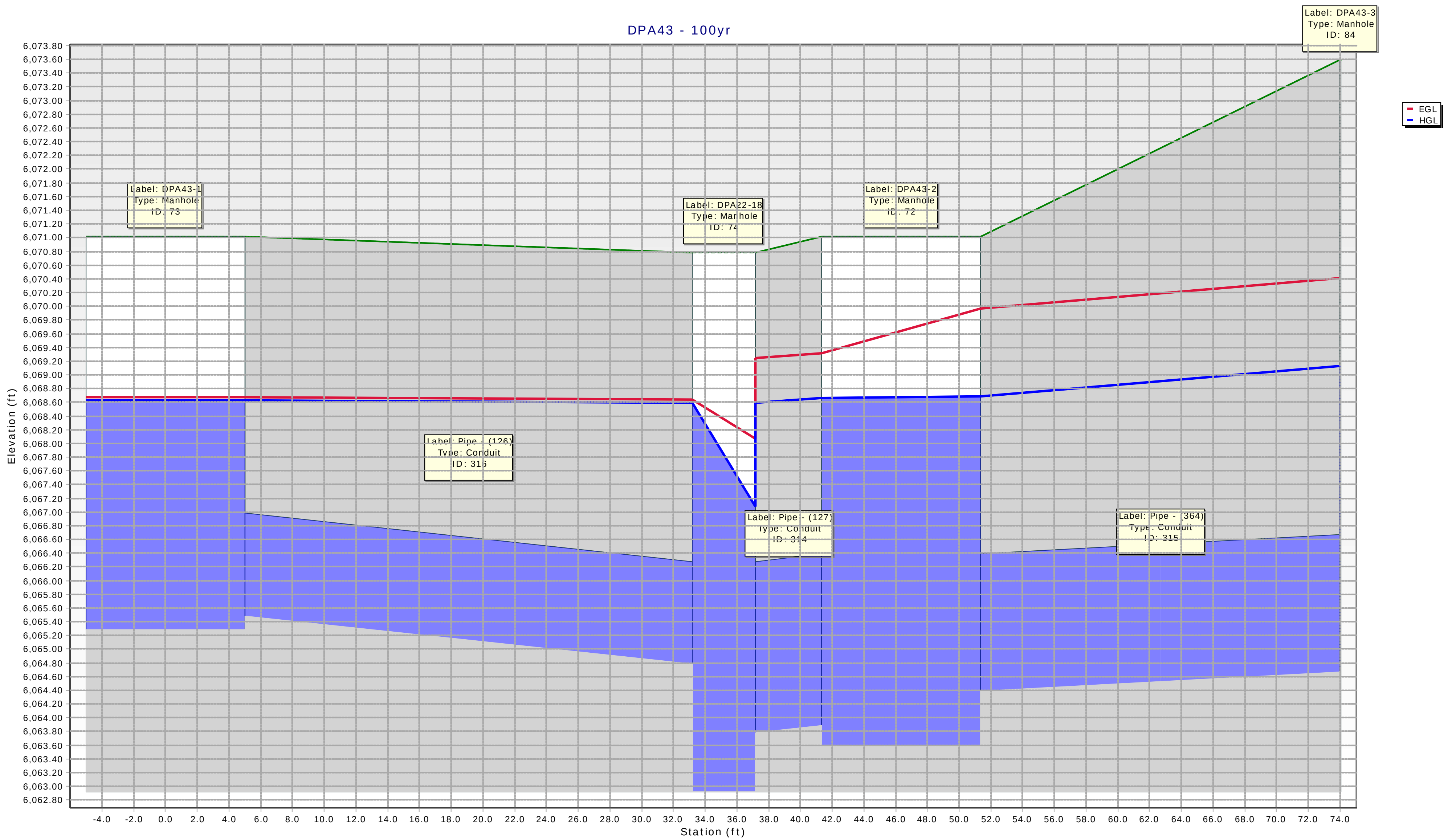

DPA39 - 100yr
Label: DPA39-1
Type: Manhole
ID: 79
Label: DPA38-2
Type: Manhole
ID: 81
Label: DPA39-2
Type: Manhole
ID: 87
Label: Pipe - (432)
Type: Conduit
ID: 320
Label: Pipe - (431)
Type: Conduit
ID: 321
EGL
HGL
Elevation (ft)
Station (ft)
6,068.80
6,068.60
6,068.40
6,068.20
6,068.00
6,067.80
6,067.60
6,067.40
6,067.20
6,067.00
6,066.80
6,066.60
6,066.40
6,066.20
6,066.00
6,065.80
6,065.60
6,065.40
6,065.20
6,065.00
6,064.80
6,064.60
6,064.40
6,064.20
6,064.00
6,063.80
6,063.60
6,063.40
6,063.20
6,063.00
6,062.80
6,062.60
6,062.40
6,062.20
6,062.00
6,061.80
6,061.60
6,061.40
6,061.20
6,061.00
6,060.80
6,060.60
6,060.40
-5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0

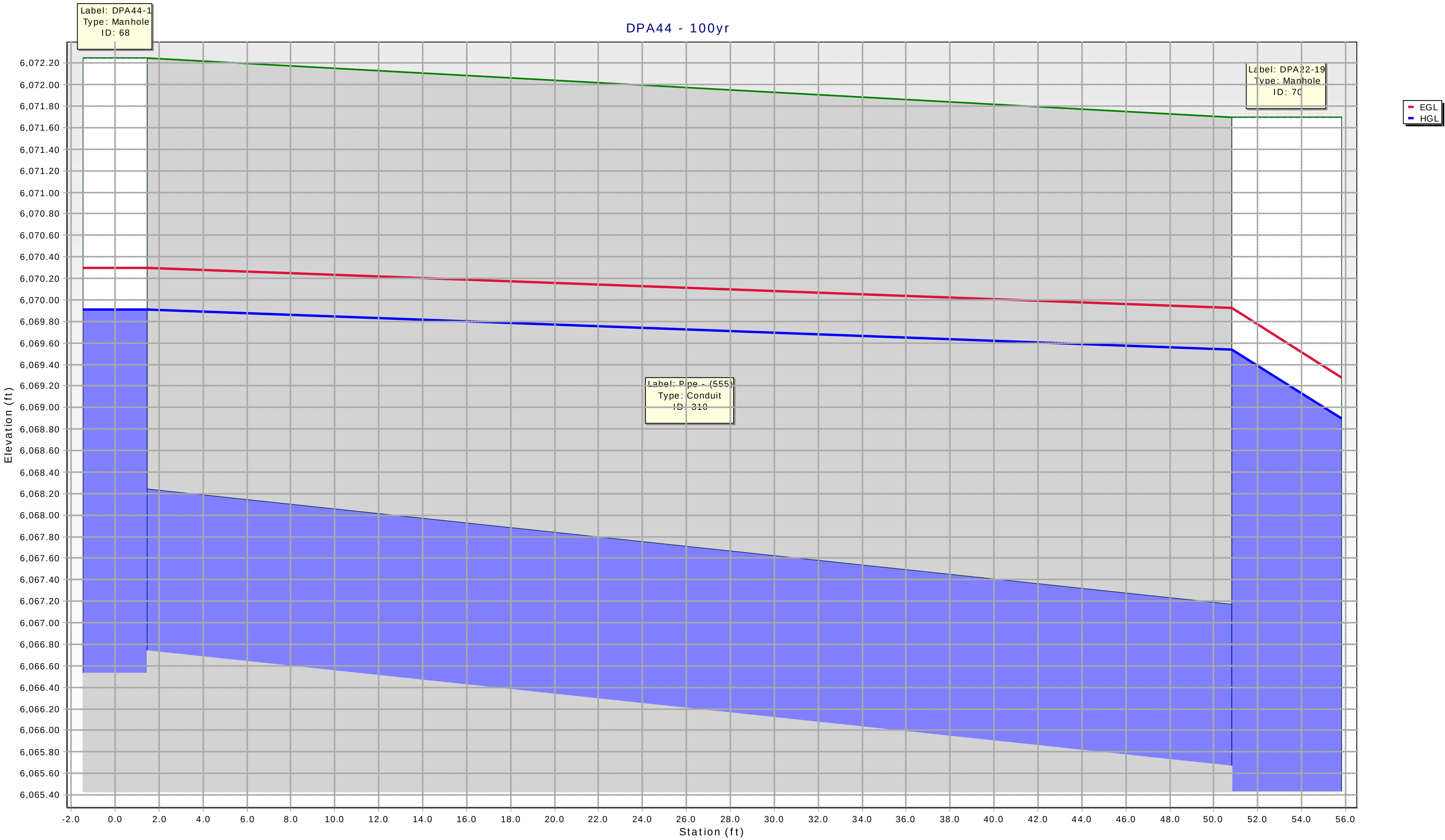

DPA40 - 100yr
Label: DPA40-3
Type: Manhole
ID: 47
Label: DPA40-2
Type: Manhole
ID: 50
Label: DPA40-1
Type: Manhole
ID: 49
Label: DPA33-14
Type: Manhole
ID: 56
Label: Pipe - (186)
Type: Conduit
ID: 285
Label: Pipe - (187)
Type: Conduit
ID: 288
Label: Pipe - (188)
Type: Conduit
ID: 289
EGL
HGL
Elevation (ft)
Station (ft)
6,087.60
6,075.20
0.0
260.0



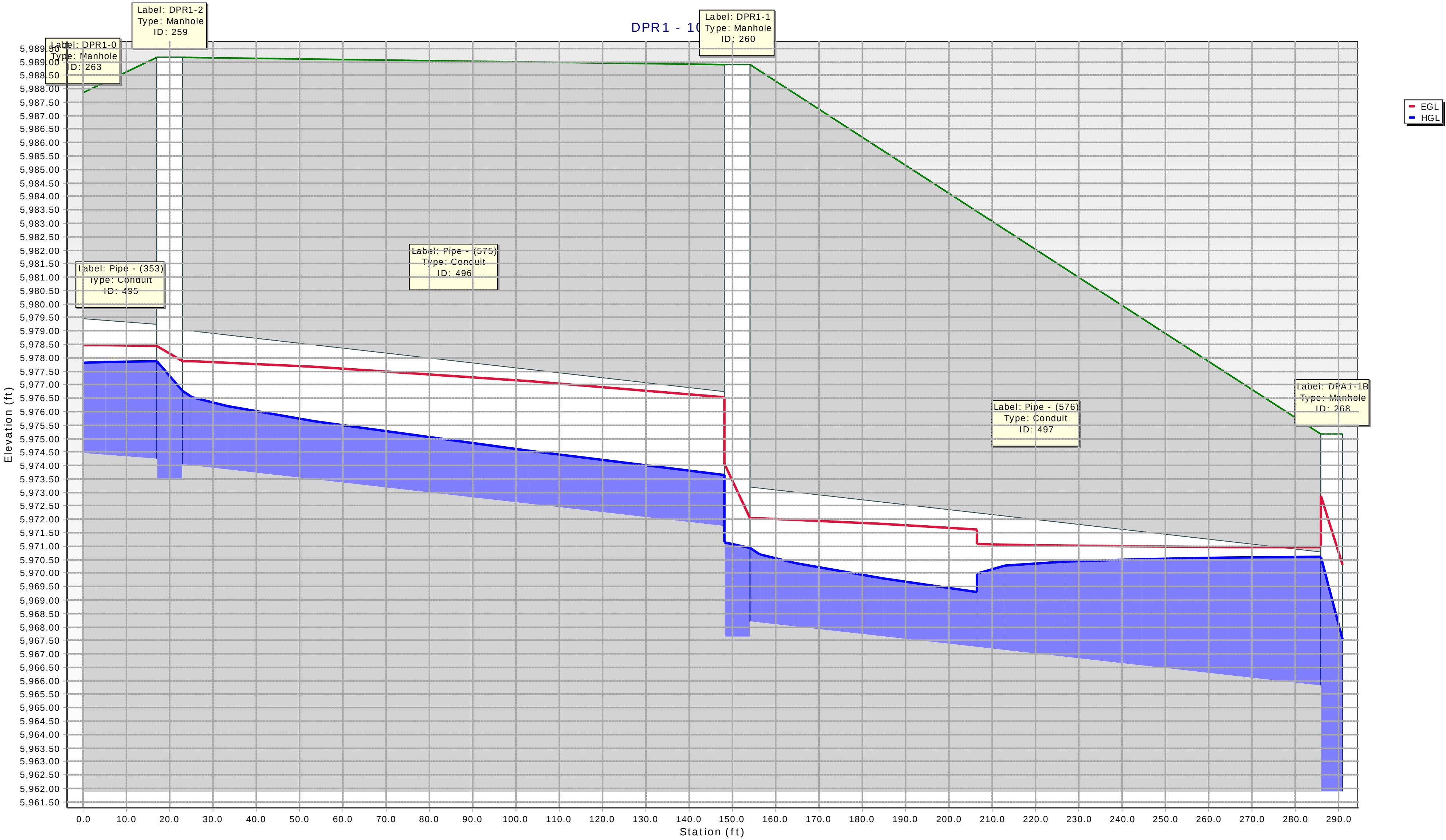
DPA41 - 100yr
Label: DPA41-1
Type: Manhole
ID: 40
Label: DPA33-15
Type: Manhole
ID: 45
Label: Pipe - (546)
Type: Conduit
ID: 278
EGL
HGL
Elevation (ft)
Station (ft)
6,095.00
6,094.80
6,094.60
6,094.40
6,094.20
6,094.00
6,093.80
6,093.60
6,093.40
6,093.20
6,093.00
6,092.80
6,092.60
6,092.40
6,092.20
6,092.00
6,091.80
6,091.60
6,091.40
6,091.20
6,091.00
6,090.80
6,090.60
6,090.40
6,090.20
6,090.00
6,089.80
6,089.60
6,089.40
6,089.20
6,089.00
6,088.80
6,088.60
6,088.40
6,088.20
6,088.00
6,087.80
6,087.60
6,087.40
6,087.20
6,087.00
6,086.80
6,086.60
6,086.40
6,086.20
6,086.00
6,085.80
6,085.60
6,085.40
6,085.20
6,085.00
6,084.80
6,084.60
6,084.40
6,084.20
6,084.00
-1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0 40.0 41.0 42.0 43.0 44.0

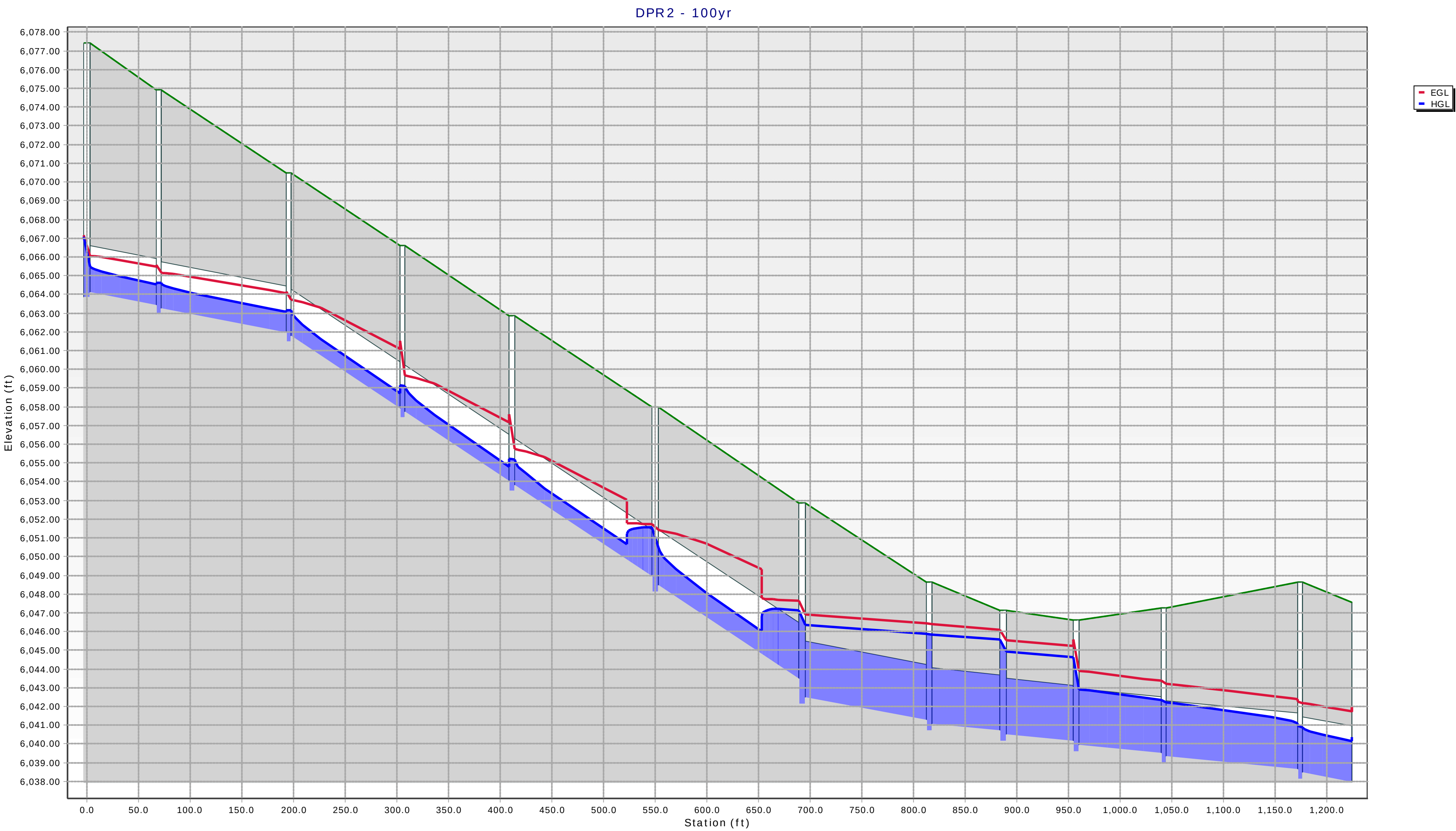

DPA42 - 100yr
Label: DPA42-2
Type: Manhole
ID: 142
Label: DPA22-13
Type: Manhole
ID: 144
Label: DPA42-1
Type: Manhole
ID: 143
Label: Pipe - (528)
Type: Conduit
ID: 381
Label: Pipe - (527)
Type: Conduit
ID: 382
EGL
HGL
Elevation (ft)
Station (ft)
6,045.80
6,045.60
6,045.40
6,045.20
6,045.00
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
6,043.20
6,043.00
6,042.80
6,042.60
6,042.40
6,042.20
6,042.00
6,041.80
6,041.60
6,041.40
6,041.20
6,041.00
6,040.80
6,040.60
6,040.40
6,040.20
6,040.00
6,039.80
6,039.60
6,039.40
6,039.20
6,039.00
6,038.80
6,038.60
6,038.40
6,038.20
6,038.00
6,037.80
6,037.60
6,037.40
6,037.20
6,037.00
6,036.80
6,036.60
6,036.40
6,036.20
6,036.00
6,035.80
6,035.60
6,035.40
6,035.20
6,035.00
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
54.0


DPA43 - 100yr
Label: DPA43-1
Type: Manhole
ID: 73
Label: DPA22-18
Type: Manhole
ID: 74
Label: DPA43-2
Type: Manhole
ID: 72
Label: DPA43-3
Type: Manhole
ID: 84
Label: Pipe - (126)
Type: Conduit
ID: 316
Label: Pipe - (127)
Type: Conduit
ID: 314
Label: Pipe - (364)
Type: Conduit
ID: 315
EGL
HGL
Elevation (ft)
Station (ft)

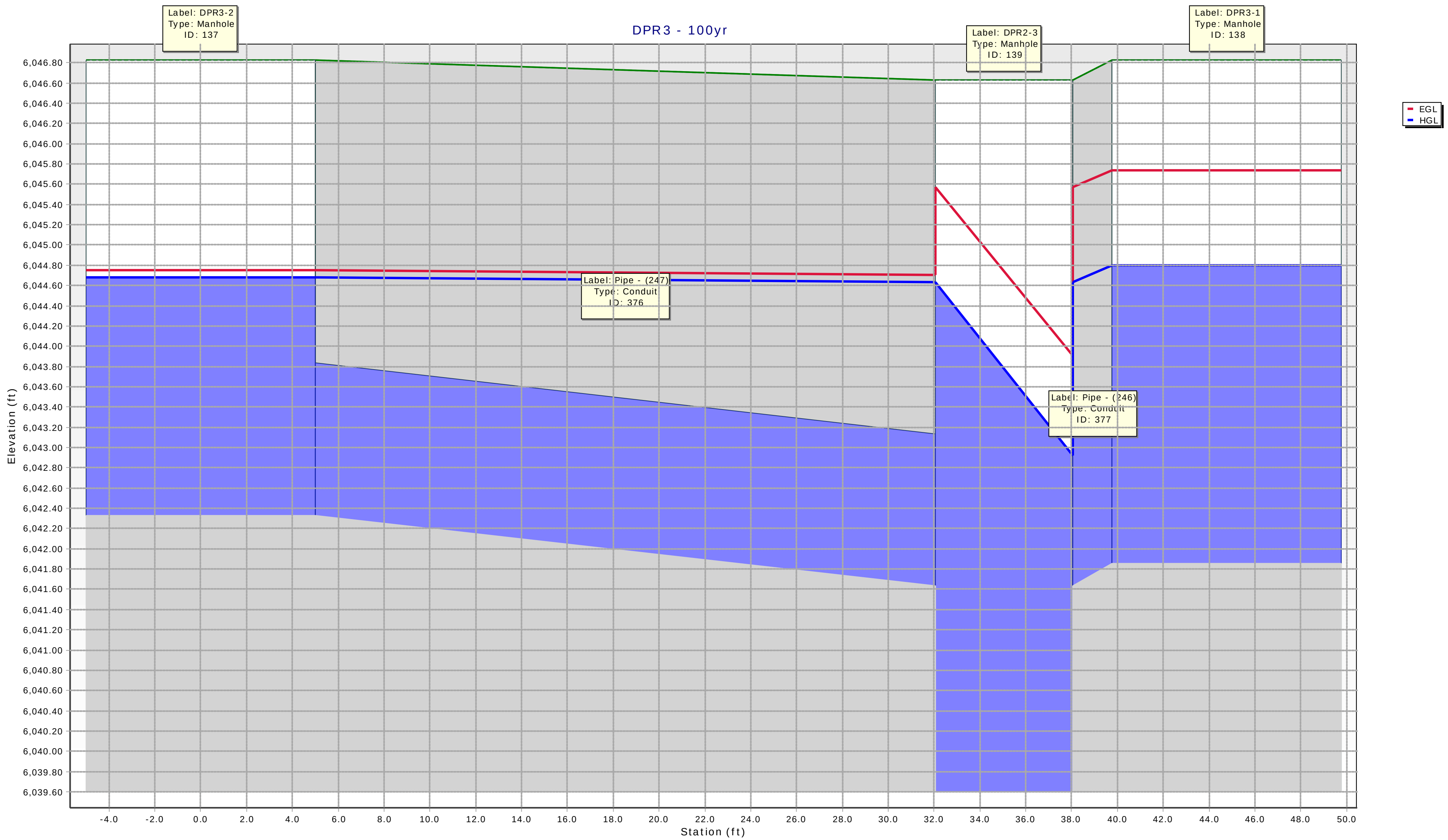


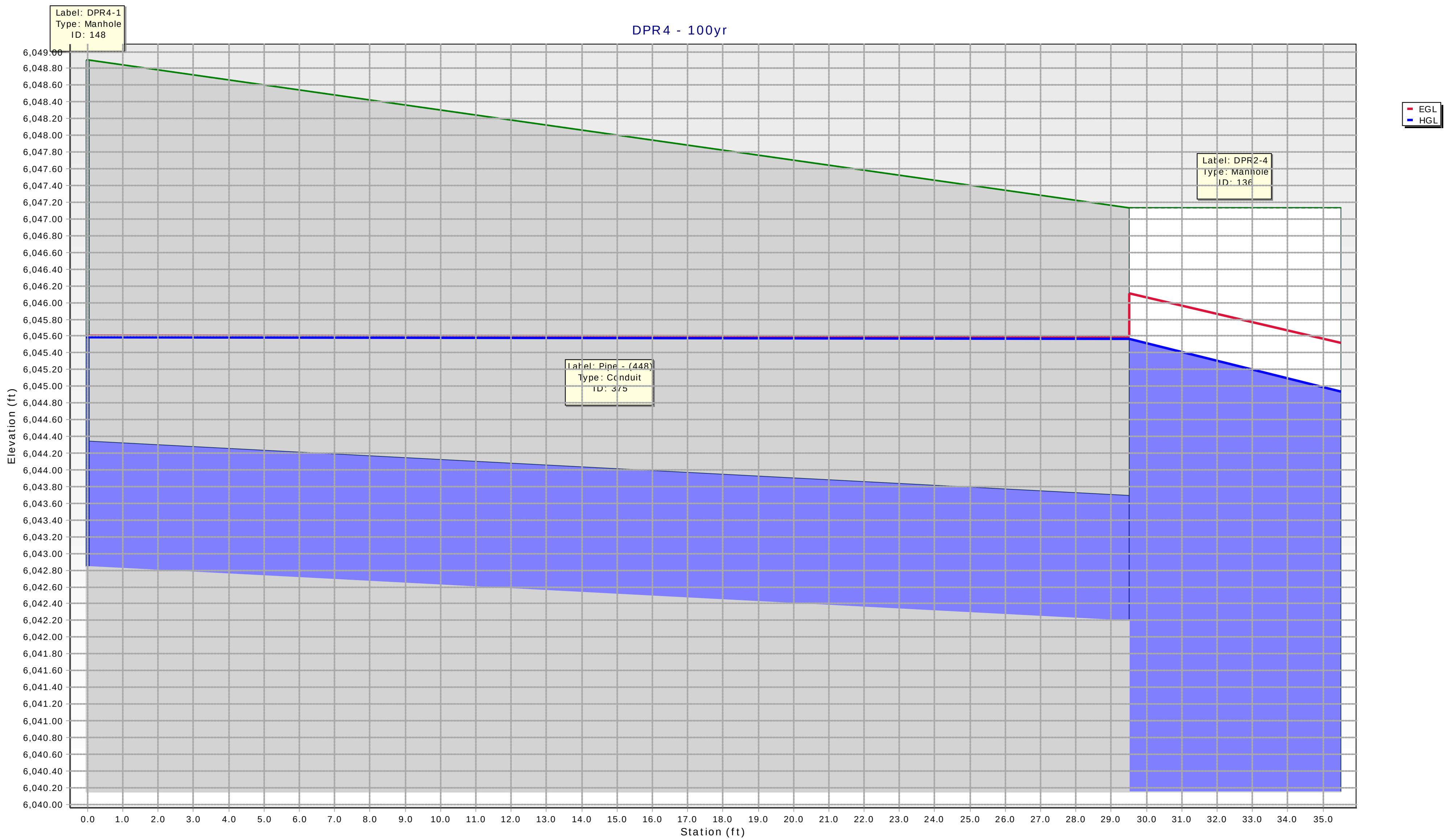
DPA44 - 100yr
Label: DPA44-1
Type: Manhole
ID: 68
Label: DPA22-19
Type: Manhole
ID: 70
Label: Pipe - (555)
Type: Conduit
ID: 310
EGL
HGL
Elevation (ft)
6,072.20
6,072.00
6,071.80
6,071.60
6,071.40
6,071.20
6,071.00
6,070.80
6,070.60
6,070.40
6,070.20
6,070.00
6,069.80
6,069.60
6,069.40
6,069.20
6,069.00
6,068.80
6,068.60
6,068.40
6,068.20
6,068.00
6,067.80
6,067.60
6,067.40
6,067.20
6,067.00
6,066.80
6,066.60
6,066.40
6,066.20
6,066.00
6,065.80
6,065.60
6,065.40
Station (ft)
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
54.0
56.0


DPR1 - 10
Label: DPR1-0
Type: Manhole
ID: 263
Label: DPR1-2
Type: Manhole
ID: 259
Label: DPR1-1
Type: Manhole
ID: 260
Label: DPA1-1B
Type: Manhole
ID: 268
Label: Pipe - (353)
Type: Conduit
ID: 495
Label: Pipe - (575)
Type: Conduit
ID: 496
Label: Pipe - (576)
Type: Conduit
ID: 497
EGL
HGL
Elevation (ft)
Station (ft)

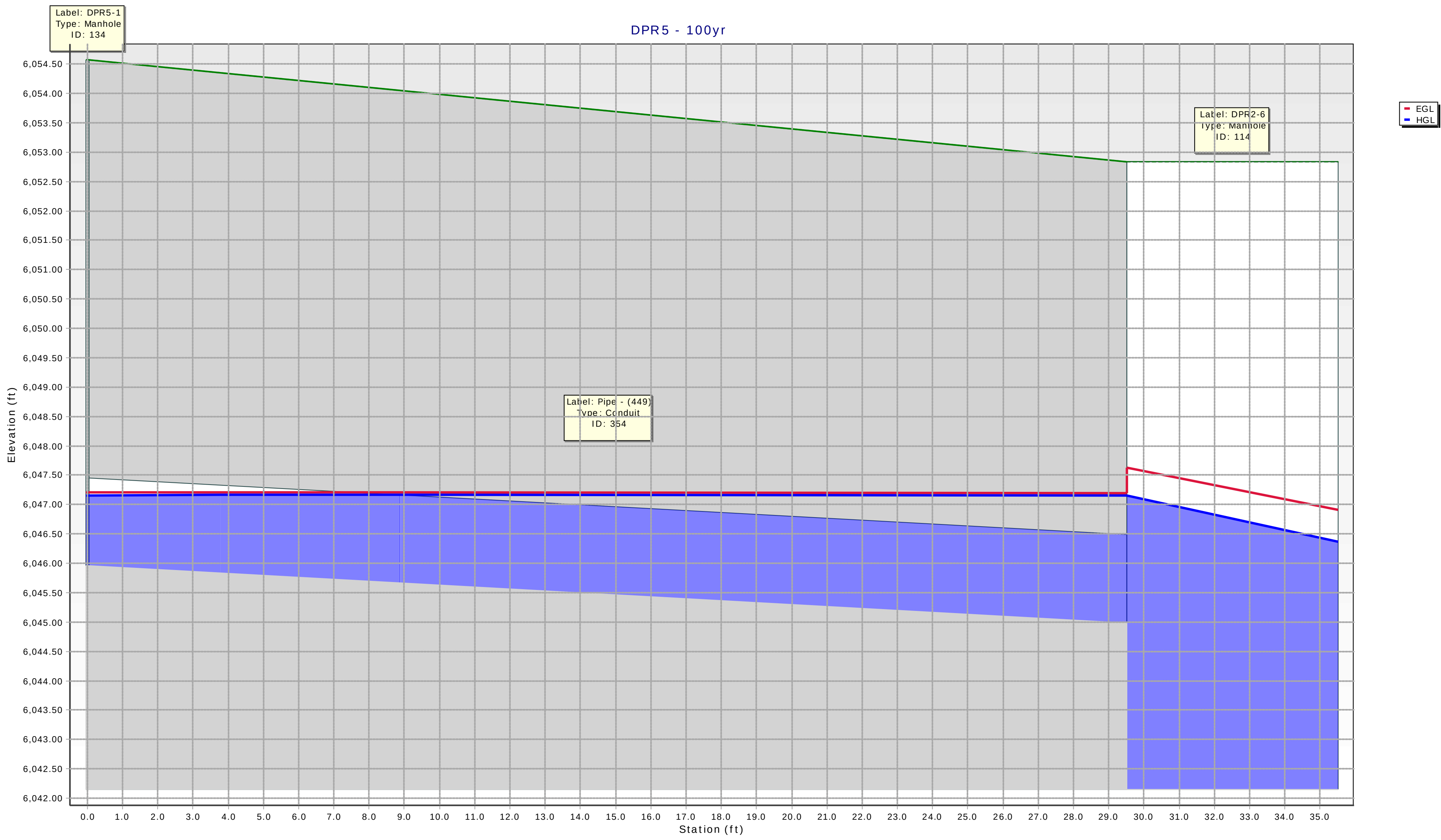


DPR2 - 100yr
EGL
HGL
Elevation (ft)
Station (ft)
6,078.00
6,077.00
6,076.00
6,075.00
6,074.00
6,073.00
6,072.00
6,071.00
6,070.00
6,069.00
6,068.00
6,067.00
6,066.00
6,065.00
6,064.00
6,063.00
6,062.00
6,061.00
6,060.00
6,059.00
6,058.00
6,057.00
6,056.00
6,055.00
6,054.00
6,053.00
6,052.00
6,051.00
6,050.00
6,049.00
6,048.00
6,047.00
6,046.00
6,045.00
6,044.00
6,043.00
6,042.00
6,041.00
6,040.00
6,039.00
6,038.00
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1,000.0
1,050.0
1,100.0
1,150.0
1,200.0

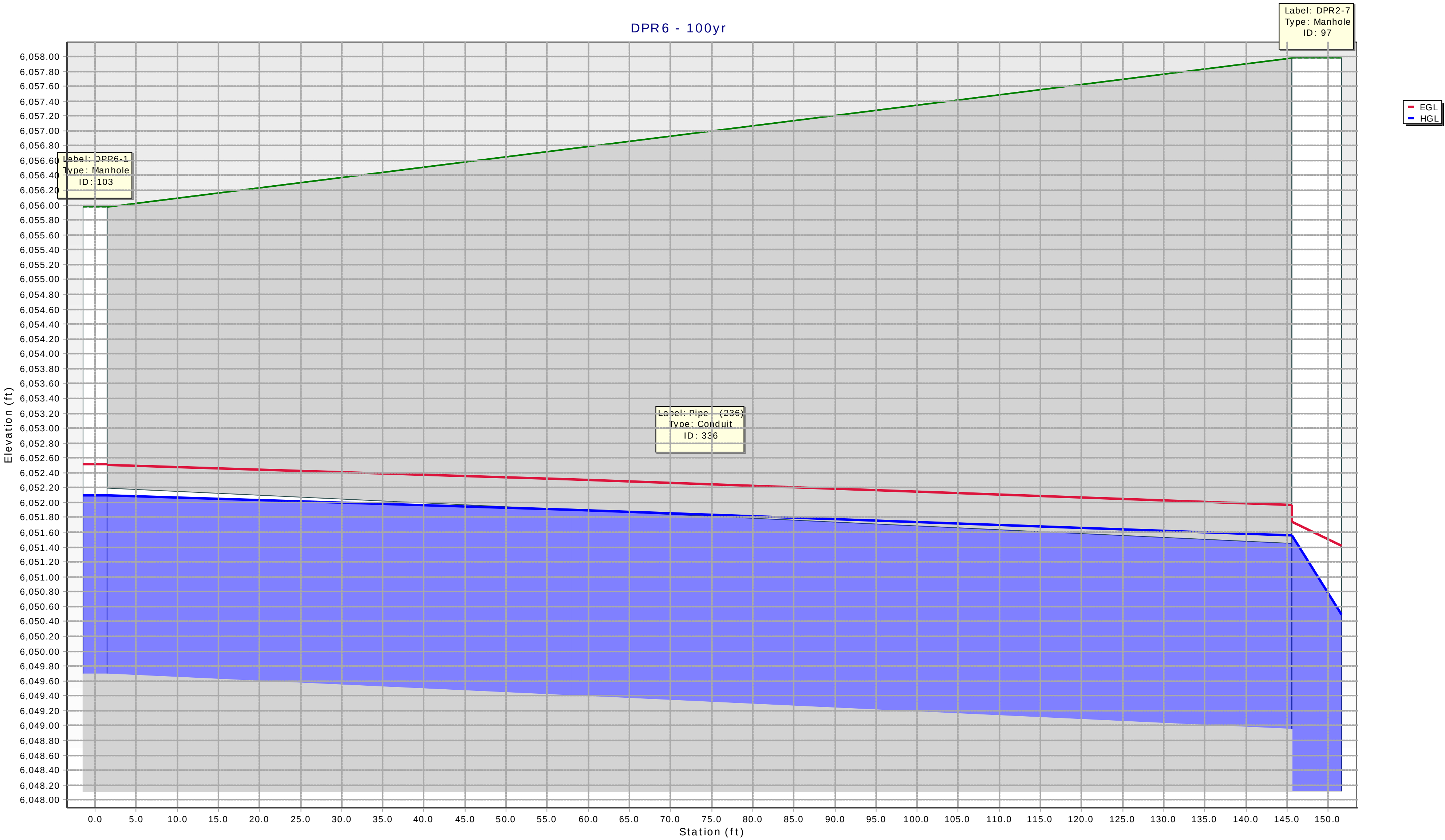

DPR3 - 100yr
Label: DPR3-2
Type: Manhole
ID: 137
Label: DPR2-3
Type: Manhole
ID: 139
Label: DPR3-1
Type: Manhole
ID: 138
Label: Pipe - (247)
Type: Conduit
ID: 376
Label: Pipe - (246)
Type: Conduit
ID: 377
EGL
HGL
Elevation (ft)
Station (ft)
6,046.80
6,046.60
6,046.40
6,046.20
6,046.00
6,045.80
6,045.60
6,045.40
6,045.20
6,045.00
6,044.80
6,044.60
6,044.40
6,044.20
6,044.00
6,043.80
6,043.60
6,043.40
6,043.20
6,043.00
6,042.80
6,042.60
6,042.40
6,042.20
6,042.00
6,041.80
6,041.60
6,041.40
6,041.20
6,041.00
6,040.80
6,040.60
6,040.40
6,040.20
6,040.00
6,039.80
6,039.60
-4.0
-2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0

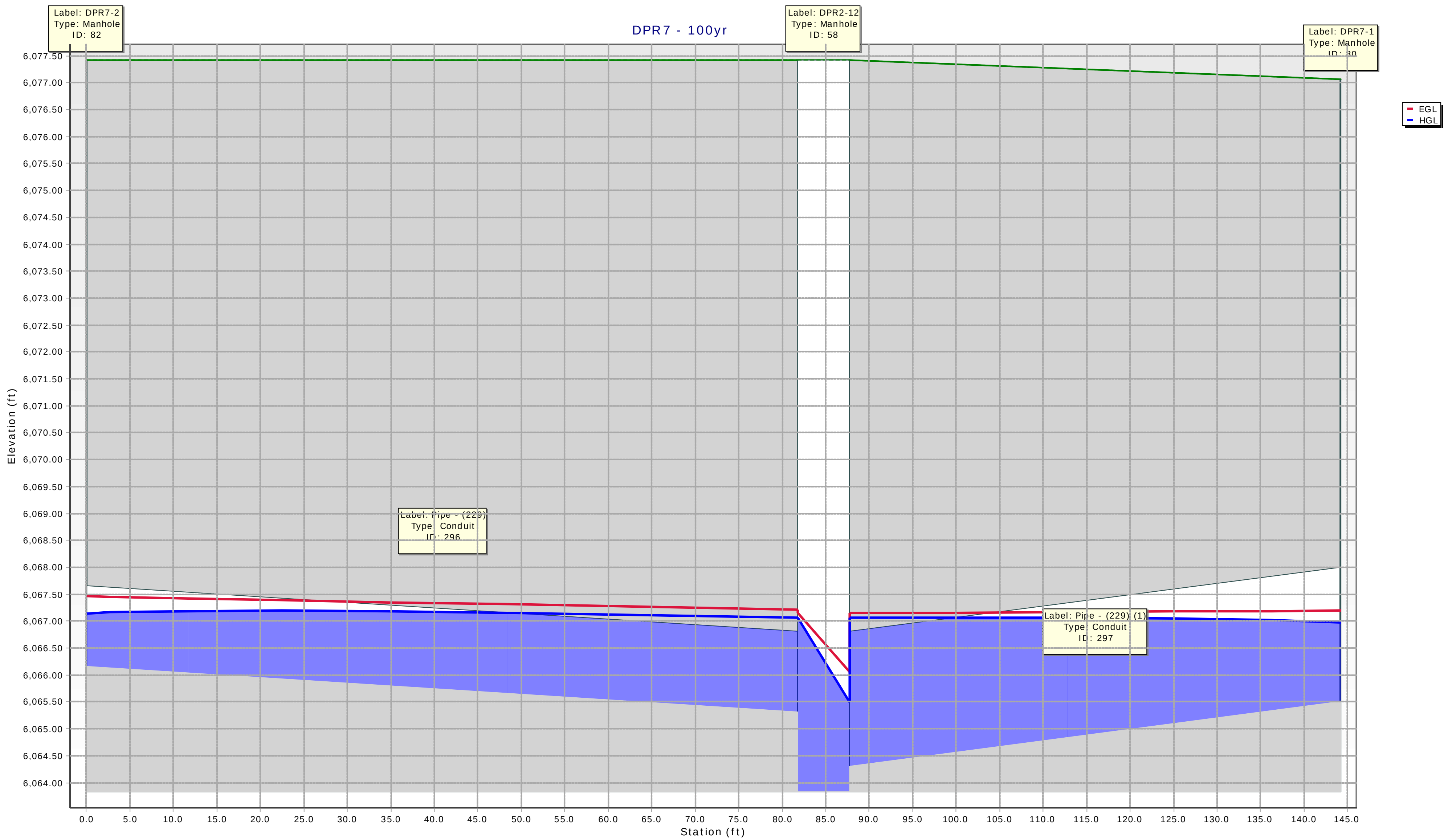


DPR4 - 100yr
Label: DPR4-1
Type: Manhole
ID: 148
Label: DPR2-4
Type: Manhole
ID: 136
Label: Pipe - (448)
Type: Conduit
ID: 375
EGL
HGL
Elevation (ft)
Station (ft)



DPR5 - 100yr
Label: DPR5-1
Type: Manhole
ID: 134
Label: DPR2-6
Type: Manhole
ID: 114
Label: Pipe - (449)
Type: Conduit
ID: 354
EGL
HGL
Elevation (ft)
Station (ft)
6,054.50
6,054.00
6,053.50
6,053.00
6,052.50
6,052.00
6,051.50
6,051.00
6,050.50
6,050.00
6,049.50
6,049.00
6,048.50
6,048.00
6,047.50
6,047.00
6,046.50
6,046.00
6,045.50
6,045.00
6,044.50
6,044.00
6,043.50
6,043.00
6,042.50
6,042.00
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0


DPR6 - 100yr
Label: DPR2-7
Type: Manhole
ID: 97
Label: DPR6-1
Type: Manhole
ID: 103
Label: Pipe - (236)
Type: Conduit
ID: 336
EGL
HGL
Elevation (ft)
Station (ft)
6,058.00
6,057.80
6,057.60
6,057.40
6,057.20
6,057.00
6,056.80
6,056.60
6,056.40
6,056.20
6,056.00
6,055.80
6,055.60
6,055.40
6,055.20
6,055.00
6,054.80
6,054.60
6,054.40
6,054.20
6,054.00
6,053.80
6,053.60
6,053.40
6,053.20
6,053.00
6,052.80
6,052.60
6,052.40
6,052.20
6,052.00
6,051.80
6,051.60
6,051.40
6,051.20
6,051.00
6,050.80
6,050.60
6,050.40
6,050.20
6,050.00
6,049.80
6,049.60
6,049.40
6,049.20
6,049.00
6,048.80
6,048.60
6,048.40
6,048.20
6,048.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0
150.0


DPR7 - 100yr
Label: DPR7-2
Type: Manhole
ID: 82
Label: DPR2-12
Type: Manhole
ID: 58
Label: DPR7-1
Type: Manhole
ID: 30
Label: Pipe - (229)
Type: Conduit
ID: 296
Label: Pipe - (229) (1)
Type: Conduit
ID: 297
EGL
HGL
Elevation (ft)
Station (ft)
6,077.50
6,077.00
6,076.50
6,076.00
6,075.50
6,075.00
6,074.50
6,074.00
6,073.50
6,073.00
6,072.50
6,072.00
6,071.50
6,071.00
6,070.50
6,070.00
6,069.50
6,069.00
6,068.50
6,068.00
6,067.50
6,067.00
6,066.50
6,066.00
6,065.50
6,065.00
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5.0
10.0
15.0
20.0
25.0
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35.0
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45.0
50.0
55.0
60.0
65.0
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75.0
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85.0
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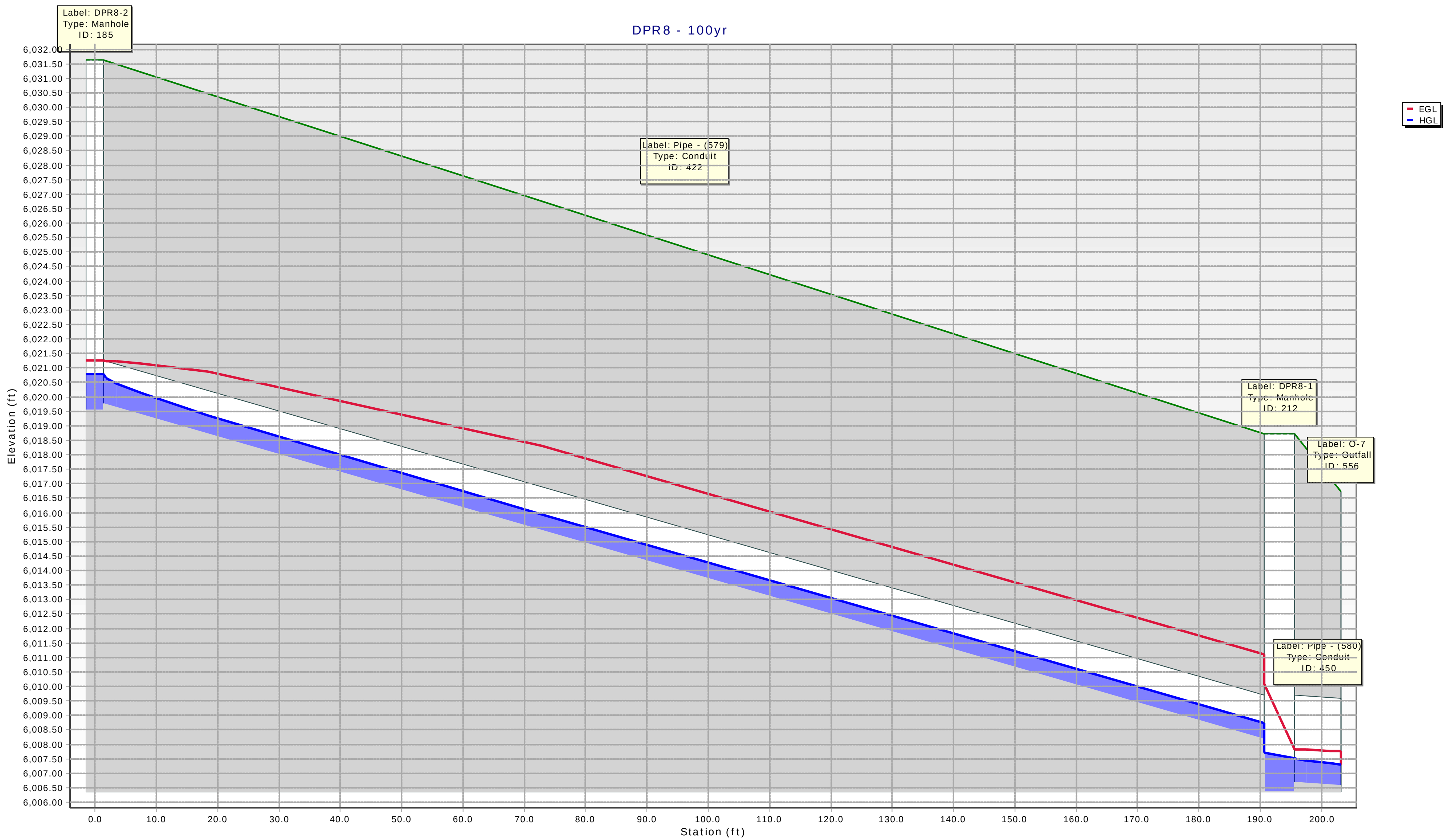
145.0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Type: Manhole
ID: 185
Label: Pipe - (579)
Type: Conduit
ID: 422
Label: DPR8-1
Type: Manhole
ID: 212
Label: O-7
Type: Outfall
ID: 556
Label: Pipe - (580)
Type: Conduit
ID: 450
EGL
HGL
Elevation (ft)
Station (ft)
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120.0
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150.0
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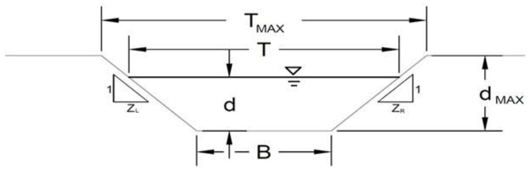
190.0
200.0

Version 4.06 Released August 2018

AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A1



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E	C	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0200	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**18.00**	**18.00**	**feet**
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**2.00**	**2.00**	**feet**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**122.0**	**122.0**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**2.00**	**2.00**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**0.7**	**5.8**	**cfs**
Water Depth	d =	**0.61**	**0.89**	**feet**

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

Version 4.06 Released August 2018

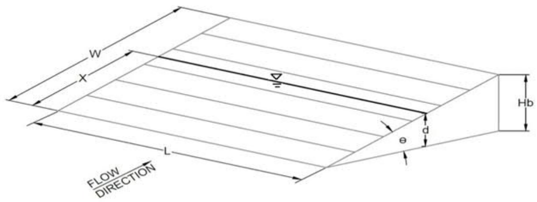
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A1

Inlet Design Information (Input)

Type of Inlet: CDOT Type C — Inlet Type = CDOT Type C



Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grate	W =	3.00	feet
Length of Grate	L =	3.00	feet
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grate	H_B =	0.00	feet
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	0.96	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	

		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.61	0.89	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.8**	**15.3**	**cfs**
	Bypassed Flow, Q_b =	**0.0**	**0.0**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

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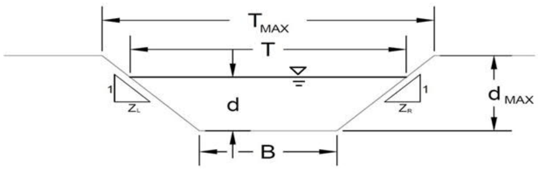
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A2



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E	C	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0200	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**18.00**	**18.00**	**feet**
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**2.00**	**2.00**	**feet**

Allowable Channel Capacity Based On Channel Geometry		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**122.0**	**122.0**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**2.00**	**2.00**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**0.3**	**5.4**	**cfs**
Water Depth	d =	**0.40**	**0.88**	**feet**

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

Version 4.06 Released August 2018

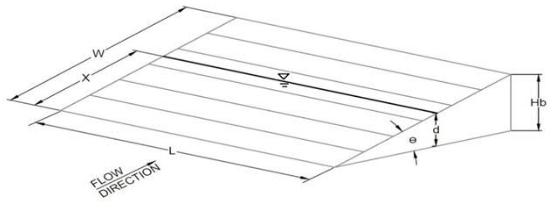
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A2

Inlet Design Information (Input)

Type of Inlet: CDOT Type C — Inlet Type = CDOT Type C



Angle of Inclined Grate (must be <= 30 degrees)	θ =		0.00	degrees
Width of Grate	W =		3.00	feet
Length of Grate	L =		3.00	feet
Open Area Ratio	A_{RATIO} =		0.70	
Height of Inclined Grate	H_B =		0.00	feet
Clogging Factor	C_f =		0.50	
Grate Discharge Coefficient	C_d =		0.96	
Orifice Coefficient	C_o =		0.64	
Weir Coefficient	C_w =		2.05	
		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.40	0.88	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.7**	**15.2**	**cfs**
	Bypassed Flow, Q_b =	**0.0**	**0.0**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

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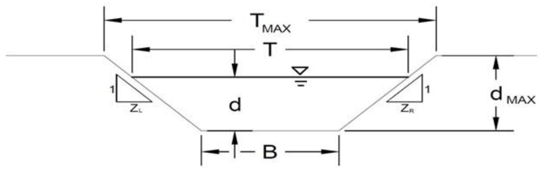
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A3



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E	C	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0200	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	18.00	18.00	feet
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	2.00	2.00	feet

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	122.0	122.0	cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	2.00	2.00	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	0.6	9.7	cfs
Water Depth	d =	0.57	0.96	feet

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

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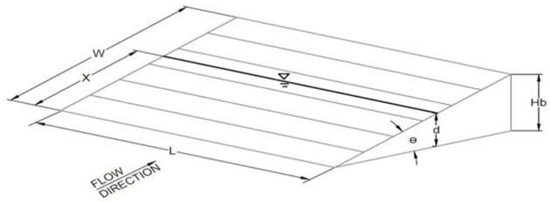
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A3

Inlet Design Information (Input)

Type of Inlet: CDOT Type C — Inlet Type = CDOT Type C



Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grate	W =	3.00	feet
Length of Grate	L =	3.00	feet
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grate	H_B =	0.00	feet
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	0.96	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	

		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.57	0.96	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**7.9**	**15.9**	**cfs**
	Bypassed Flow, Q_b =	**0.0**	**0.0**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

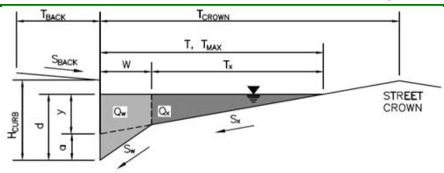
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A5



Gutter Geometry (Enter data in the blue cells)

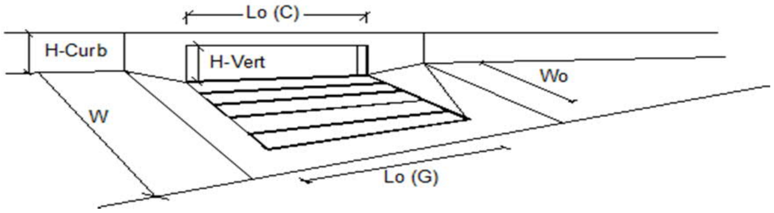
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.057		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)				check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**16.1**	**32.5**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



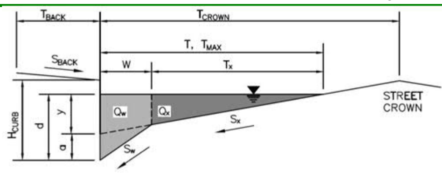
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.1**	**7.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**82**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A6



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.057	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

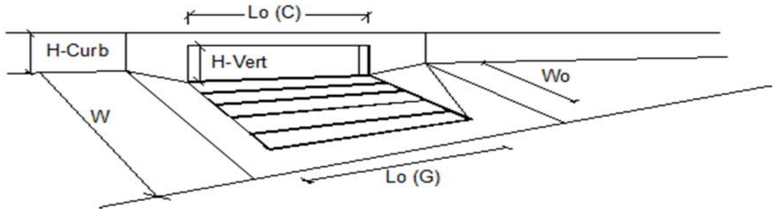
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**16.1**	**32.5**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



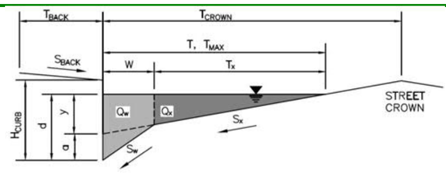
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.1**	**3.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.2**	**2.0**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**90**	**62**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A7



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.039	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

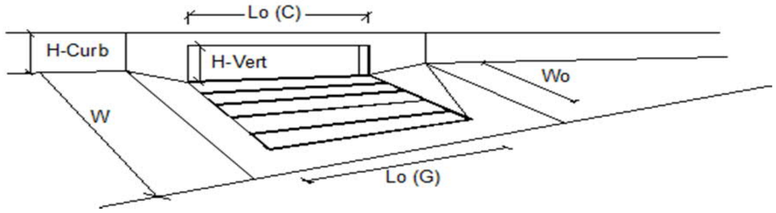
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**15.1**	**26.9**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**3.3**	**7.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**2.1**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**79**	**%**

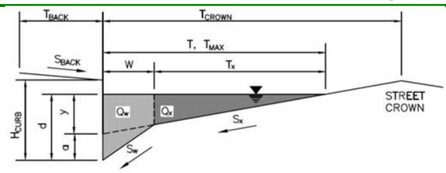
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A8



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.039	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

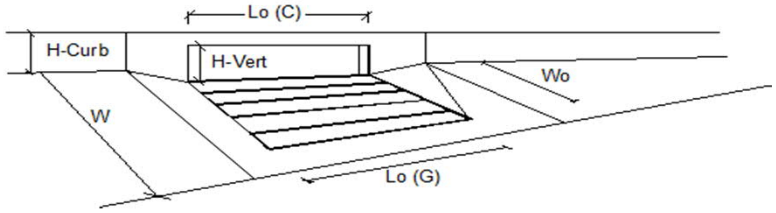
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**15.1**	**26.9**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



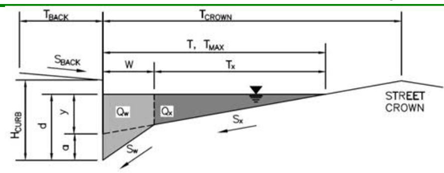
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.7**	**7.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**85**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A9



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.039	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

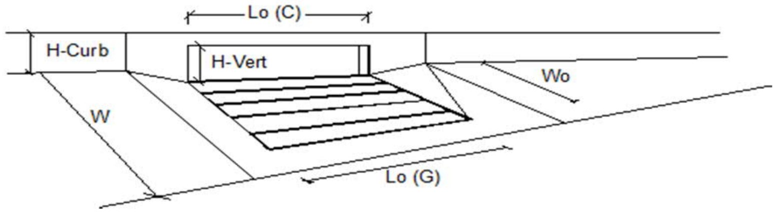
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**15.1**	**26.9**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.6**	**9.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**5.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**65**	**%**

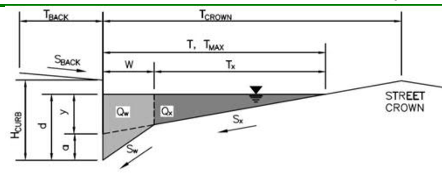
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A10



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.039	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

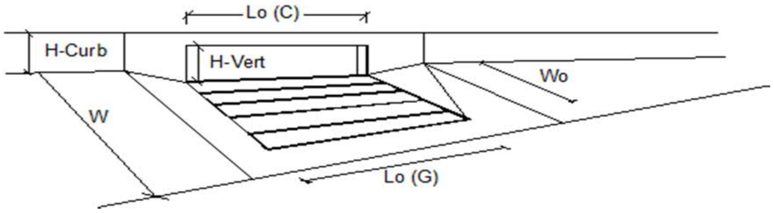
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**15.1**	**26.9**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.4**	**3.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

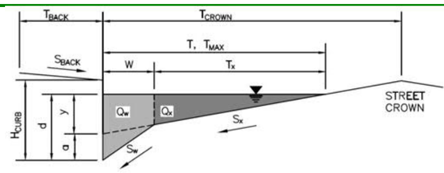
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A11



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.038	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

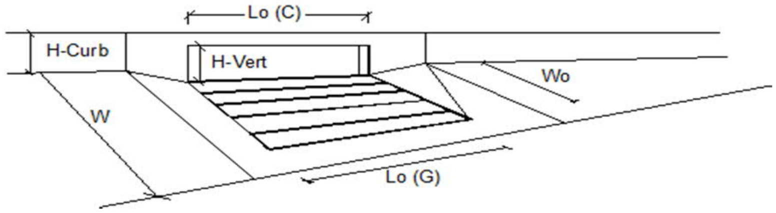
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**6.1**	**94.1**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.4**	**4.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.4**	**5.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**84**	**46**	**%**

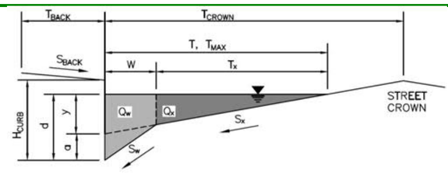
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A12



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.037	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

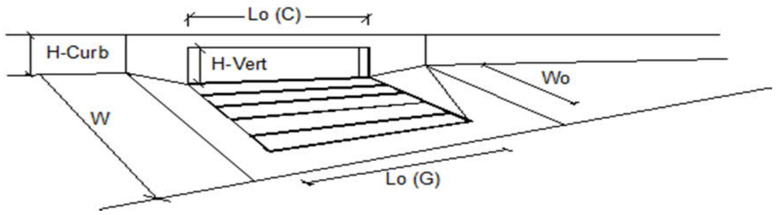
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**6.0**	**94.8**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.0**	**4.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.1**	**6.4**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**93**	**41**	**%**

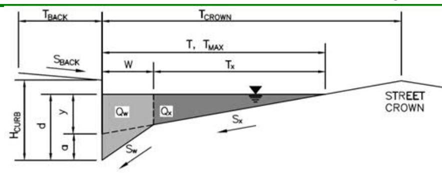
Version 4.06 Released August 2018

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

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

Project: **Ridgegate Southwest Village Filing 1**

Inlet ID: **A13**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.037	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

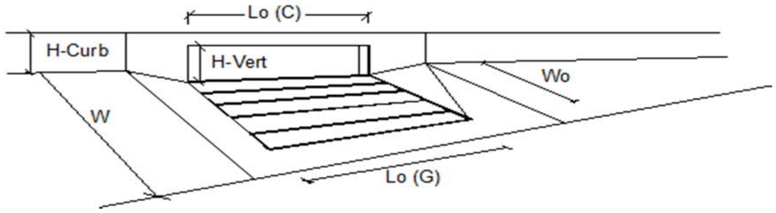
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**6.0**	**94.8**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



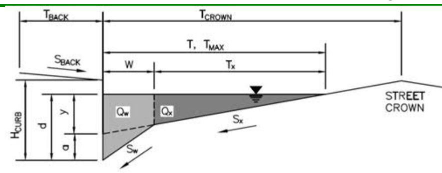
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**0.7**	**4.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**4.6**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**48**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A13A



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.037	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

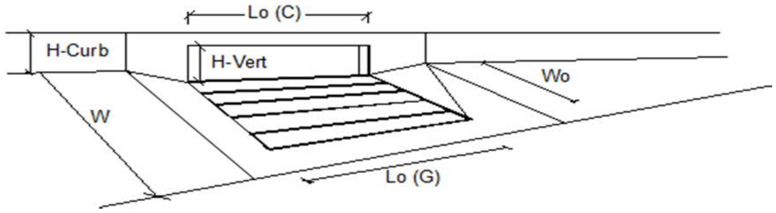
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**6.0**	**94.8**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.8**	**6.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**89**	**%**

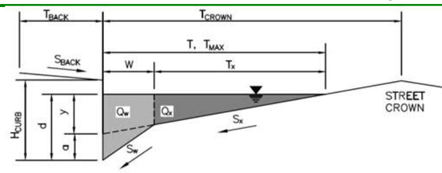
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A13B



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.025	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

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

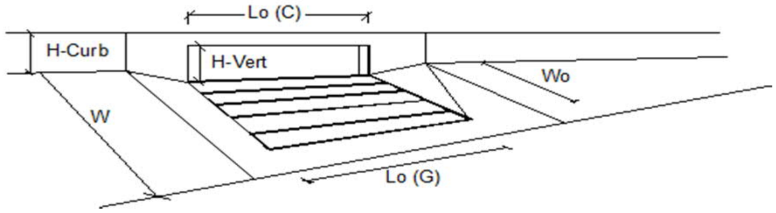
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**18.8**	**19.8**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



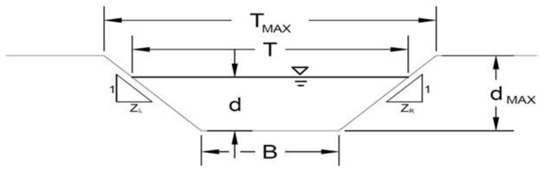
Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.4**	**11.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**81**	**%**

Version 4.06 Released August 2018

AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A15



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E	C	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0550	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	18.00	18.00	feet
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	1.00	1.00	feet

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	31.8	31.8	cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	1.00	1.00	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	0.9	8.8	cfs
Water Depth	d =	0.48	0.71	feet

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

Version 4.06 Released August 2018

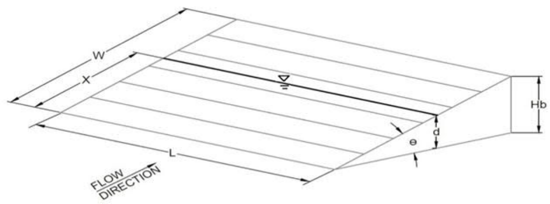
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A15

Inlet Design Information (Input)

Type of Inlet	CDOT Type C	Inlet Type =	CDOT Type C	
Angle of Inclined Grate (must be <= 30 degrees)		θ =	0.00	degrees
Width of Grate		W =	3.00	feet
Length of Grate		L =	3.00	feet
Open Area Ratio		A_{RATIO} =	0.70	
Height of Inclined Grate		H_B =	0.00	feet
Clogging Factor		C_f =	0.50	
Grate Discharge Coefficient		C_d =	0.96	
Orifice Coefficient		C_o =	0.64	
Weir Coefficient		C_w =	2.05	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.48	0.71	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**6.1**	**11.1**	**cfs**
	Bypassed Flow, Q_b =	**0.0**	**0.0**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

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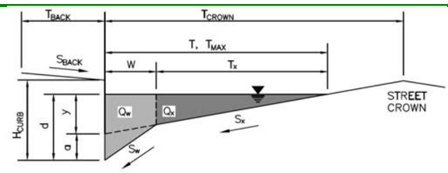
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A17



Gutter Geometry (Enter data in the blue cells)

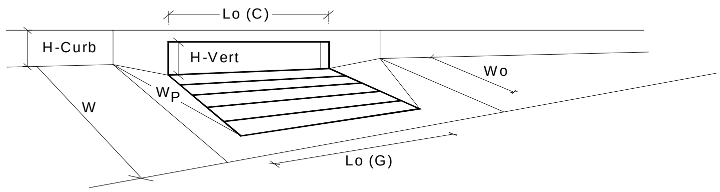
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.2	5.4	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.19	0.29	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.40	0.51	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.81	0.90	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.0**	**6.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.8	6.0	cfs

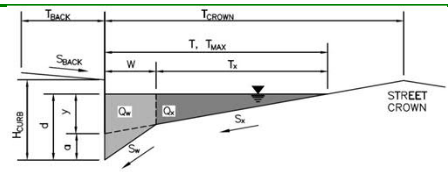
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A18



Gutter Geometry (Enter data in the blue cells)

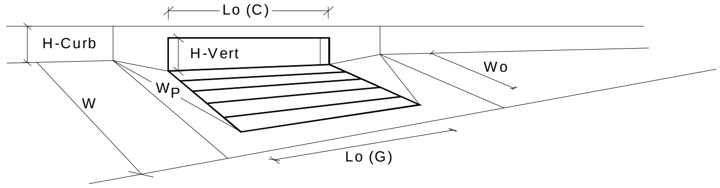
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLEET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.2	5.5	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.19	0.29	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.40	0.52	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.81	0.91	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

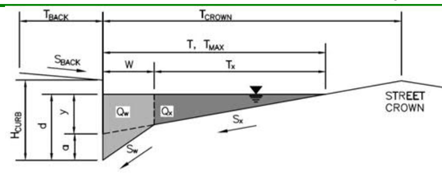
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.0**	**6.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.0	6.4	cfs

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A19



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	27.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	22.0	22.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

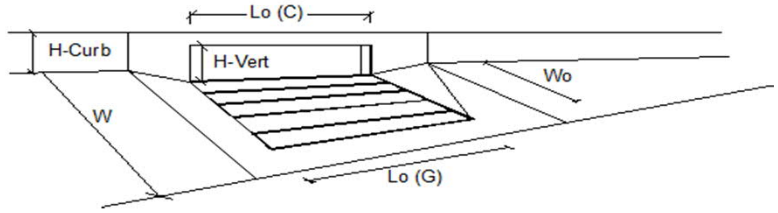
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.3**	**41.8**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)			MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**4.0**	**7.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.1**	**2.8**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**99**	**72**	**%**

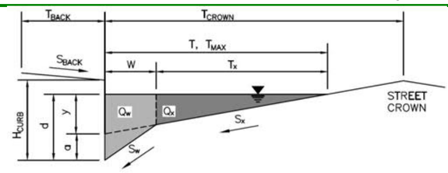
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A20



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

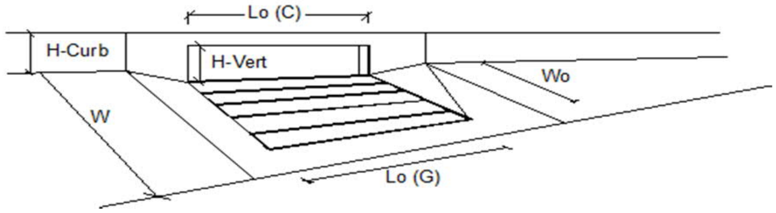
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.3**	**18.7**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)			MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**3.4**	**6.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**1.8**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**78**	**%**

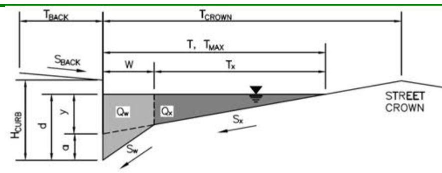
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A21



Gutter Geometry (Enter data in the blue cells)

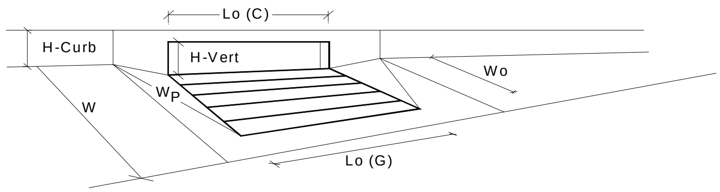
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	27.5	27.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



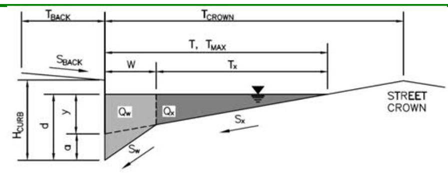
		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	5.1	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.17	0.26	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.38	0.49	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	0.88	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**2.5**	**5.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.3	5.3	cfs

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A22



Gutter Geometry (Enter data in the blue cells)

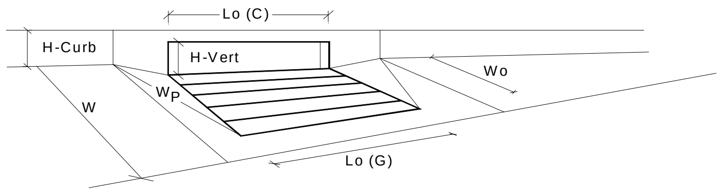
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	27.5	27.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.3	6.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

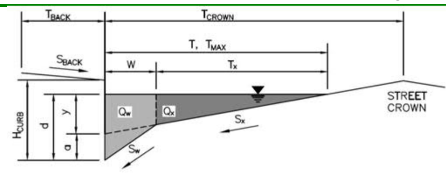
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.20	0.40	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.41	0.65	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.67	0.84	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.7**	**13.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.6	13.7	cfs

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

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

Project: Ridgegate Southwest Village Filing 1
Inlet ID: A23



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.033	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

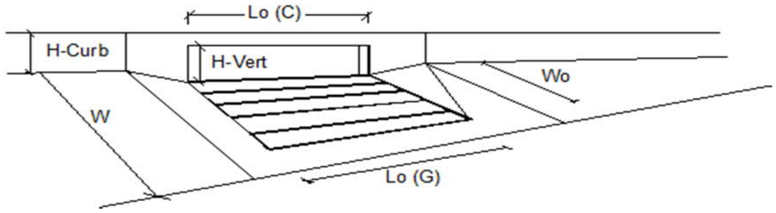
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**6.7**	**12.6**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.3**	**8.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**76**	**%**

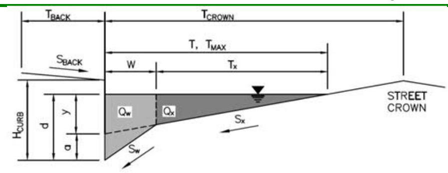
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A23A



Gutter Geometry (Enter data in the blue cells)

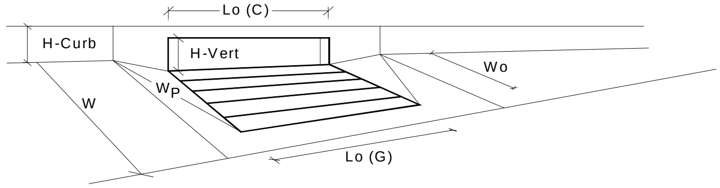
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



			MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.0	6.1	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

		MINOR	MAJOR	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.17	0.35	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.38	0.58	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.64	0.80	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**2.9**	**10.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.8	10.4	cfs

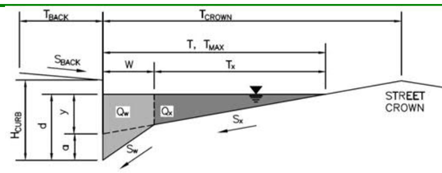
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A24



Gutter Geometry (Enter data in the blue cells)

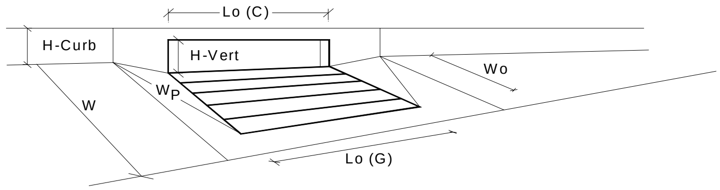
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	14.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	14.0	14.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.3	5.9	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.20	0.33	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.41	0.56	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.67	0.78	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.7**	**9.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.7	9.2	cfs

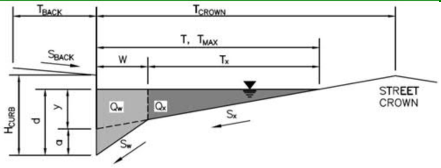
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A26



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	27.5	27.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

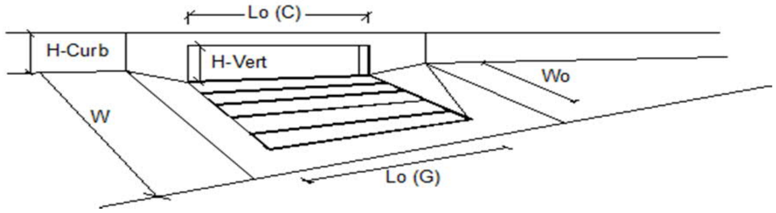
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**72.2**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.5**	**8.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**5.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**96**	**62**	**%**

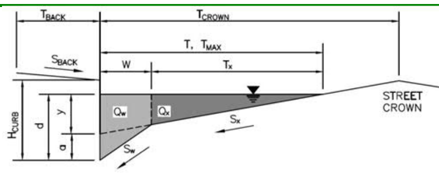
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A27



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.5	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	27.5	27.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

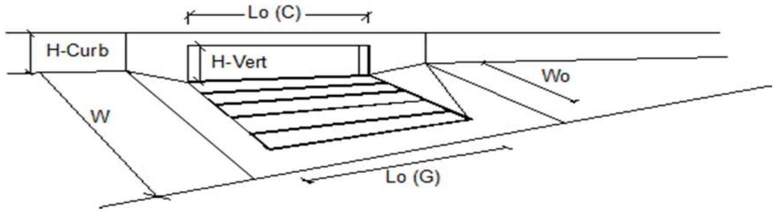
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**72.2**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



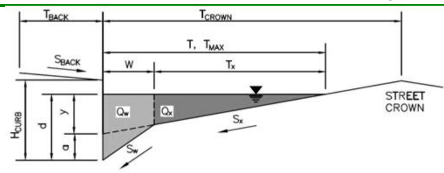
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**3.4**	**6.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**1.3**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**82**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A28A



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

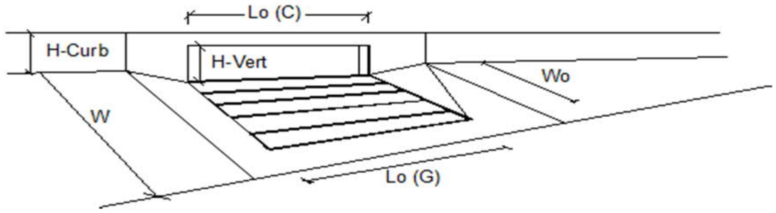
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**7.4**	**27.3**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



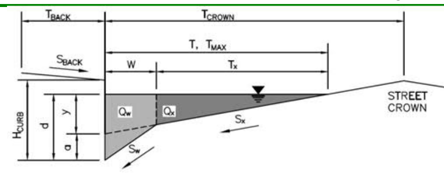
Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.7**	**7.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**79**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A28



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

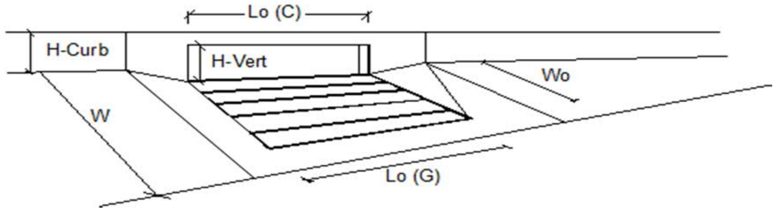
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**7.4**	**27.3**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.7**	**2.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**97**	**71**	**%**

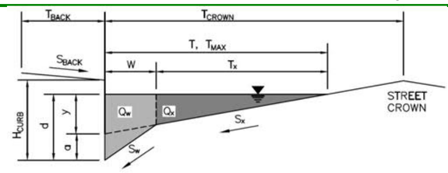
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A29



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

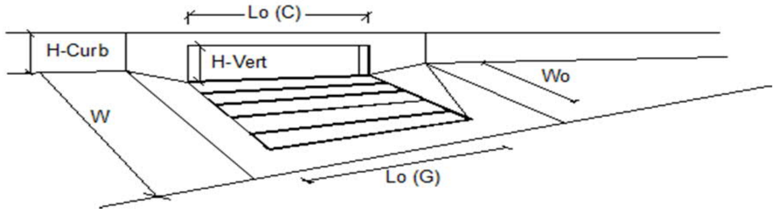
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**17.5**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



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

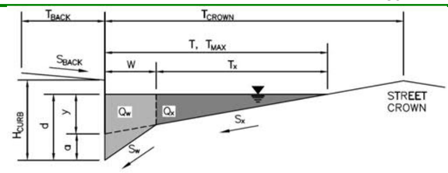
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.0**	**7.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**3.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**68**	**%**

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A30



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	27.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	22.0	22.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

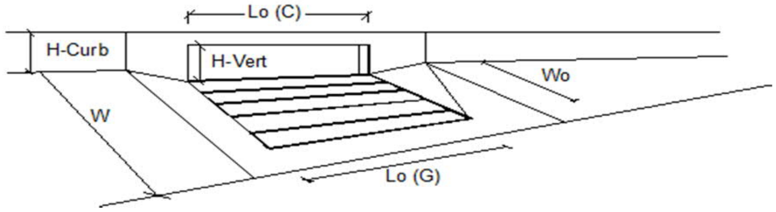
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**17.0**	**39.1**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.0**	**4.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**99**	**%**

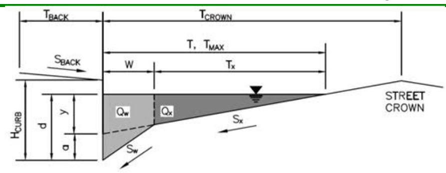
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A31



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.034	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

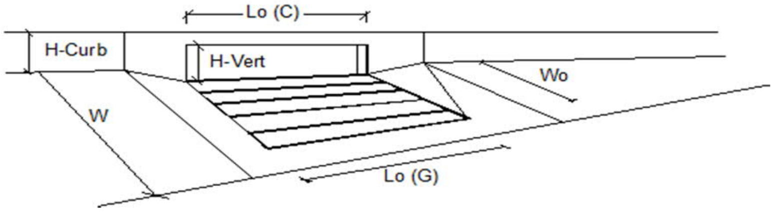
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**14.1**	**25.2**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**3.6**	**7.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**2.2**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**78**	**%**

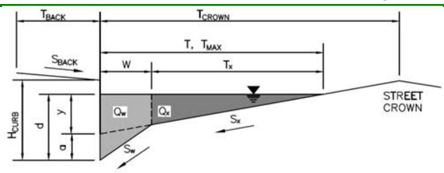
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A34



Gutter Geometry (Enter data in the blue cells)

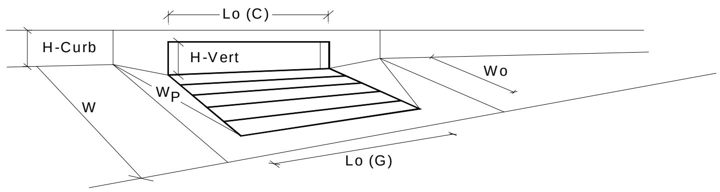
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.6	4.6	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.13	0.22	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.34	0.44	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.75	0.84	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**1.7**	**4.0**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.6	4.0	cfs

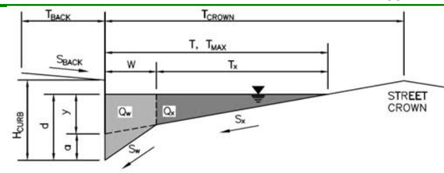
Version 4.06 Released August 2018

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

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

Project: **Ridgegate Southwest Village Filing 1**

Inlet ID: **A35**



Gutter Geometry (Enter data in the blue cells)

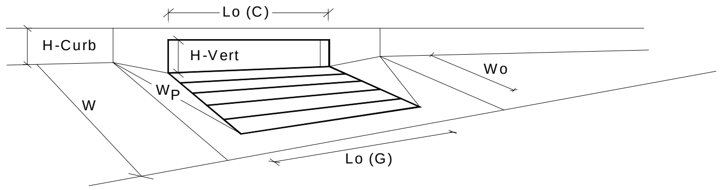
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



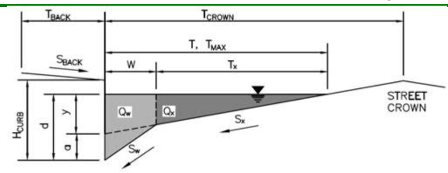
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	2.8	3.4	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.07	0.12	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.26	0.32	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.65	0.73	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**0.5**	**1.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	0.5	1.2	cfs

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A32



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

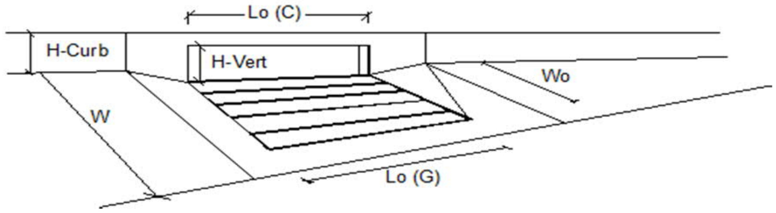
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.7**	**17.7**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.8**	**2.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.3**	**2.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**86**	**56**	**%**

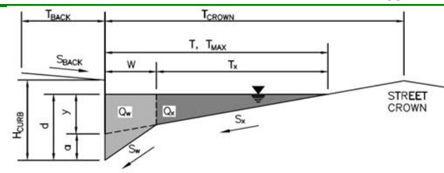
Version 4.06 Released August 2018

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

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

Project: **Ridgegate Southwest Village Filing 1**

Inlet ID: **A33**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

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

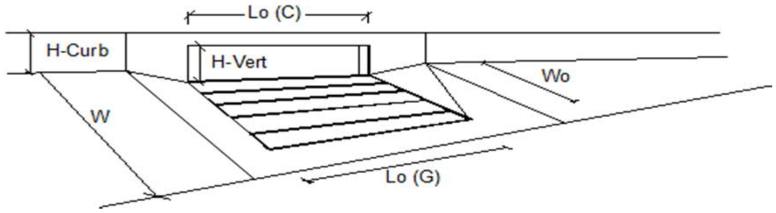
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.7**	**17.7**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.7**	**3.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**2.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**89**	**53**	**%**

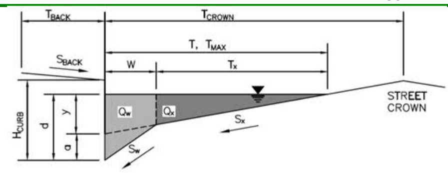
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A36



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

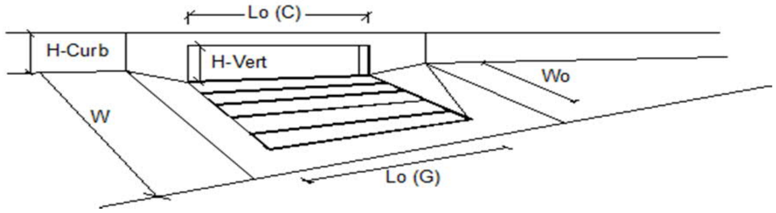
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**17.7**	**17.7**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.3**	**8.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**4.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**96**	**63**	**%**

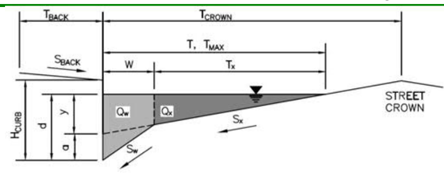
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A37



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

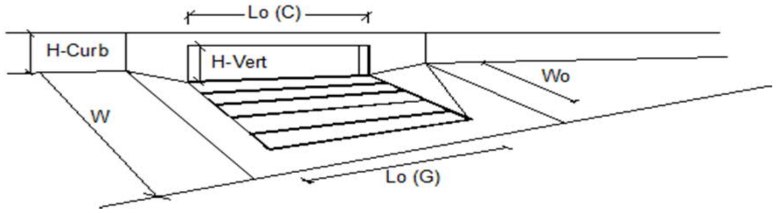
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**3.8**	**118.4**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.2**	**6.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**85**	**%**

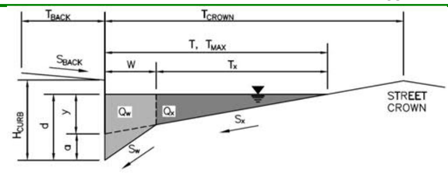
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A38



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	9.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	10.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	10.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

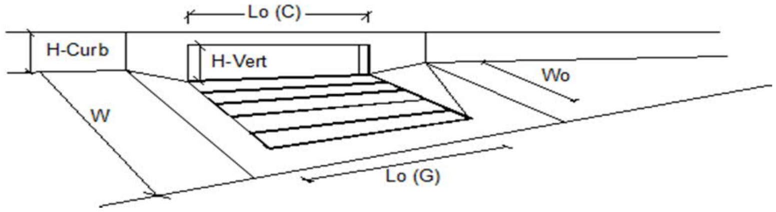
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**3.8**	**118.4**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.6**	**6.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**90**	**%**

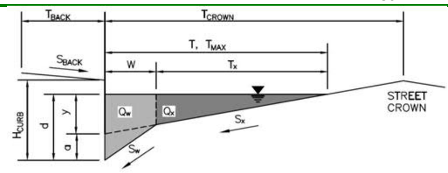
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A39A



Gutter Geometry (Enter data in the blue cells)

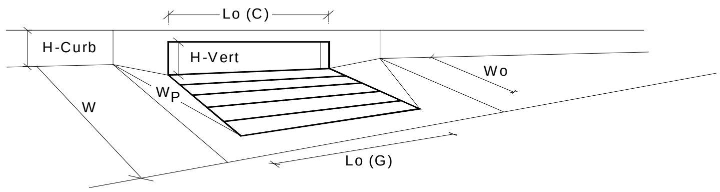
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

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

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening			
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	7.2	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

		MINOR	MAJOR	
Low Head Performance Reduction (Calculated)				
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	0.44	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.44	0.68	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.84	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**4.0**	**13.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.8	13.1	cfs

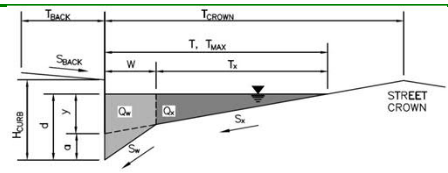
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A39



Gutter Geometry (Enter data in the blue cells)

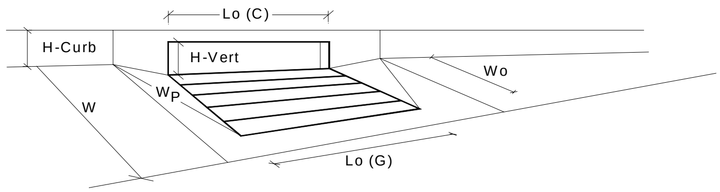
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

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

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.2	5.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.18	0.32	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.40	0.55	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.81	0.92	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**2.9**	**7.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.9	7.5	cfs

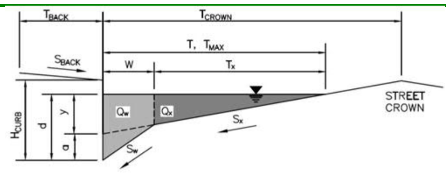
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A41



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.038	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

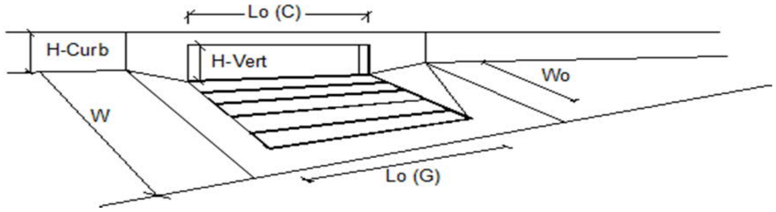
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.5**	**24.4**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.2**	**11.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**82**	**%**

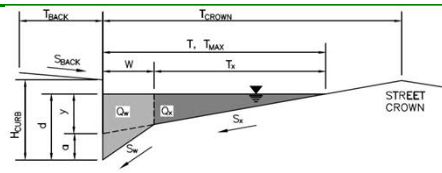
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A42



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.038	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

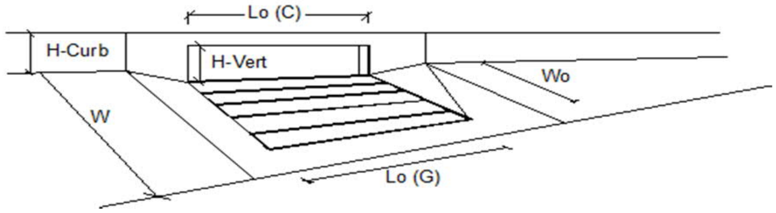
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.5**	**24.4**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.5**	**6.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**79**	**%**

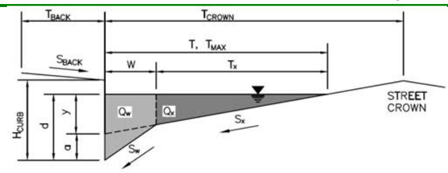
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A43



Gutter Geometry (Enter data in the blue cells)

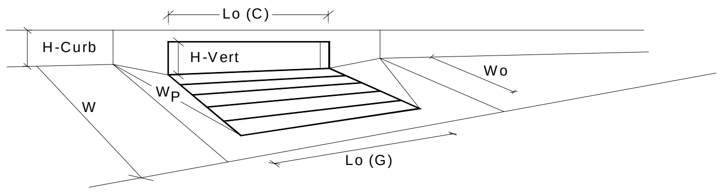
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.5	7.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.21	0.42	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.43	0.67	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.68	0.85	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**4.3**	**14.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.2	14.8	cfs

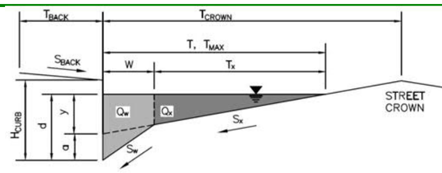
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A44



Gutter Geometry (Enter data in the blue cells)

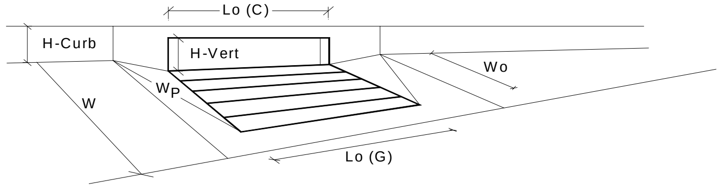
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.3	5.9	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.20	0.33	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.41	0.56	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.67	0.78	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.7**	**9.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.6	9.2	cfs

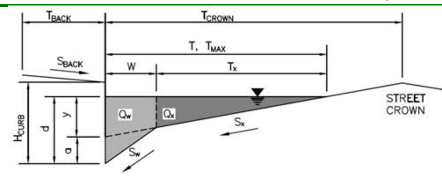
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A51



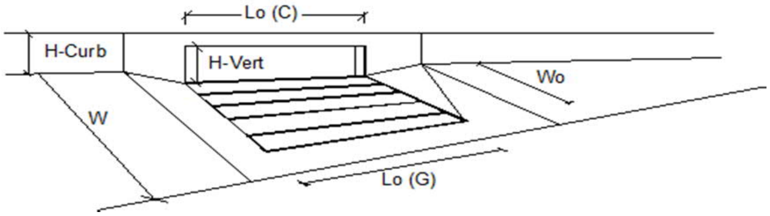
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**14.3**	**25.5**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)			MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.2**	**3.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.4**	**3.0**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**86**	**55**	**%**

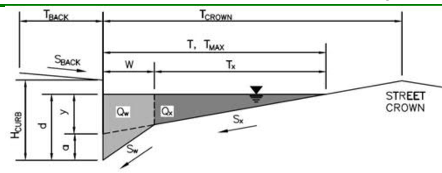
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A52



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

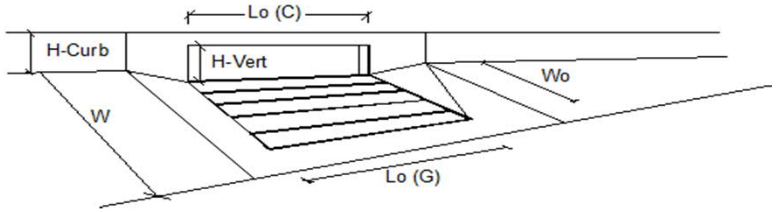
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**14.3**	**25.5**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.0**	**8.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**3.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**71**	**%**

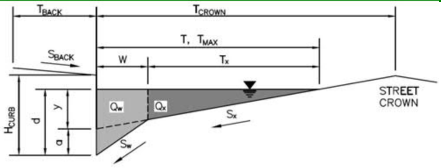
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A54

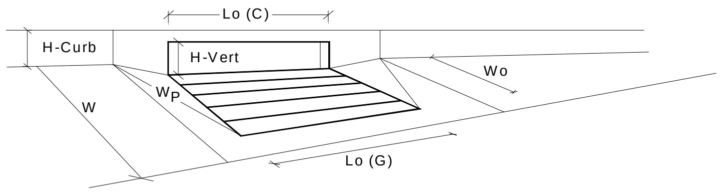


Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	**Major Storm**	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.3	5.9	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.20	0.33	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.41	0.56	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.67	0.78	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.7**	**9.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.5	9.3	cfs

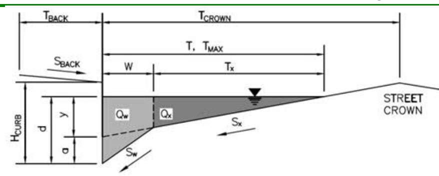
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A54A



Gutter Geometry (Enter data in the blue cells)

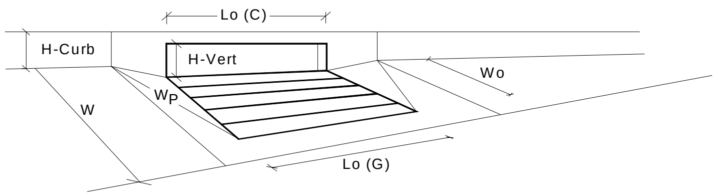
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	4.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	20.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.0	6.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.17	0.34	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.52	0.78	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**2.0**	**5.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	1.9	5.3	cfs

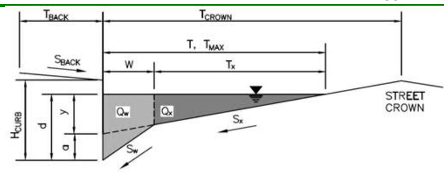
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A55



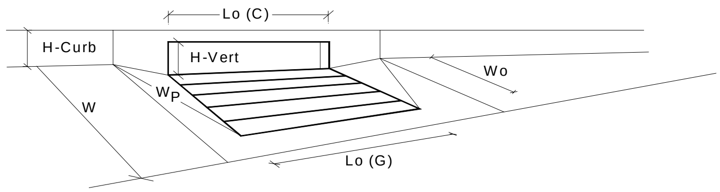
Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	27.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	22.0	22.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.6	6.4	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.22	0.37	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.60	0.83	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**2.9**	**6.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	2.8	6.1	cfs

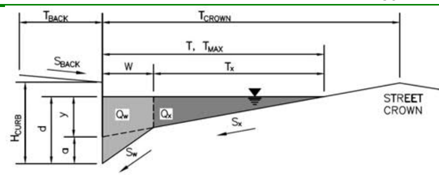
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A56



Gutter Geometry (Enter data in the blue cells)

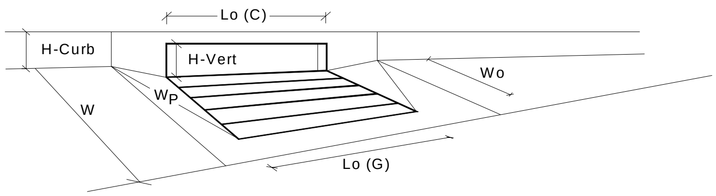
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	4.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	20.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



			MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening				
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.0	5.9	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

		MINOR	MAJOR	
Low Head Performance Reduction (Calculated)				
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.17	0.33	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.52	0.76	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**2.0**	**5.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.0	5.2	cfs

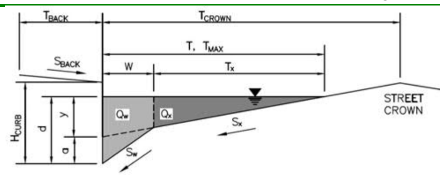
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A57



Gutter Geometry (Enter data in the blue cells)

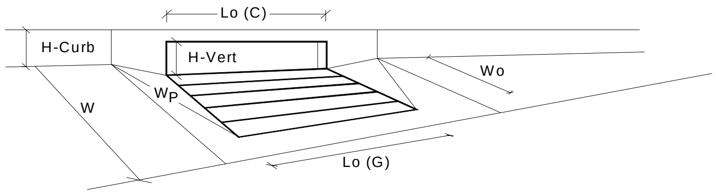
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	4.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	20.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	20.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)			MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.0	5.6	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.17	0.30	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.38	0.53	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	0.91	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**2.6**	**7.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.6	7.1	cfs

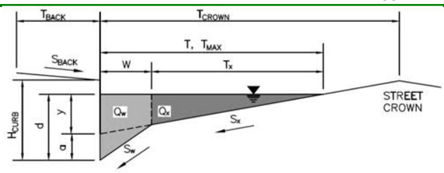
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A58



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.041	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

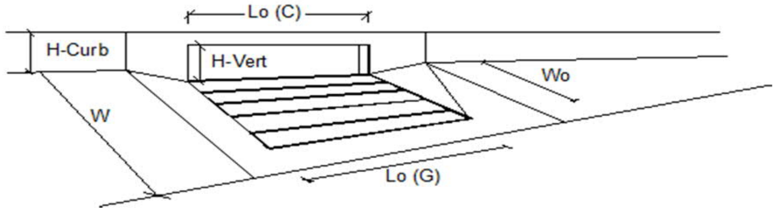
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**16.2**	**18.9**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.8**	**2.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.3**	**1.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**86**	**61**	**%**

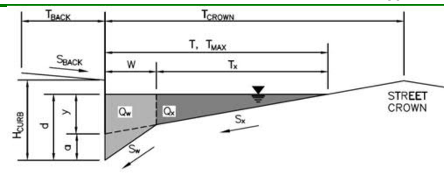
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A59



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.052	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

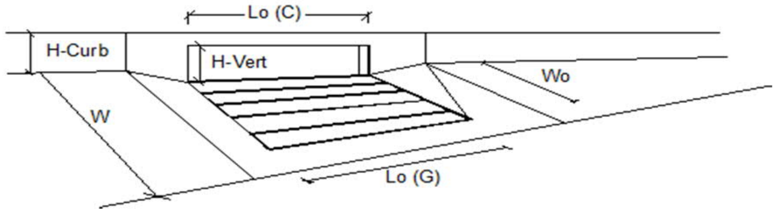
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.5**	**31.1**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.6**	**9.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**69**	**%**

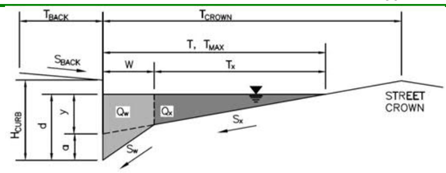
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A60



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.052	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

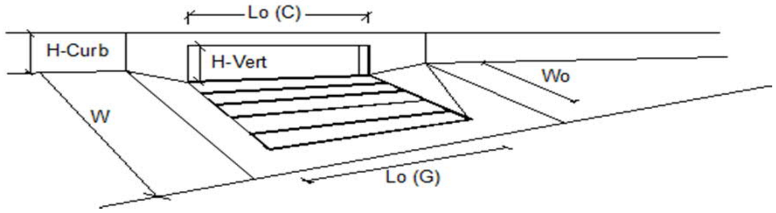
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**16.5**	**31.1**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.6**	**5.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.4**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**94**	**%**

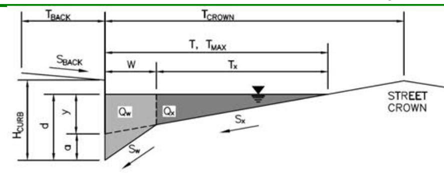
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A61



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.030	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

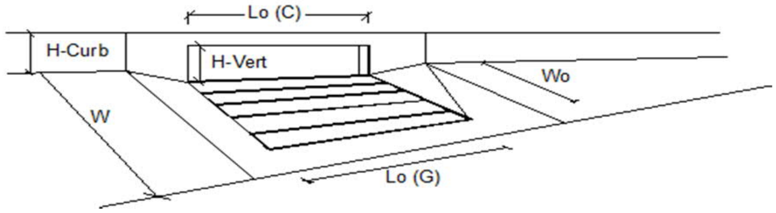
				Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**13.2**	**23.6**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.7**	**7.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**82**	**%**

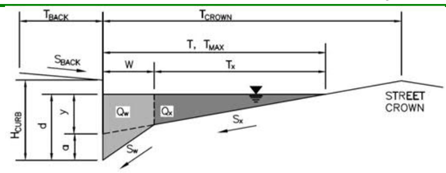
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A62



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.046	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

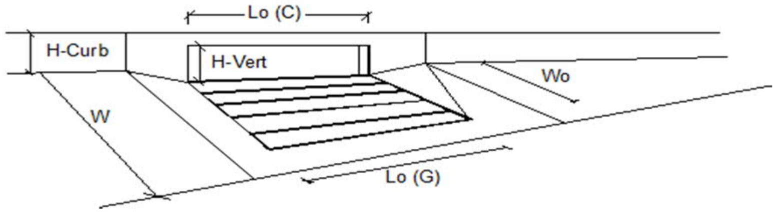
			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.4**	**29.2**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.9**	**7.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.8**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**81**	**%**

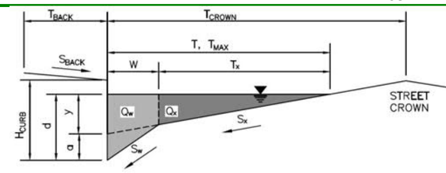
Version 4.06 Released August 2018

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

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

Project: **Ridgegate Southwest Village Filing 1**

Inlet ID: **A63**



Gutter Geometry (Enter data in the blue cells)

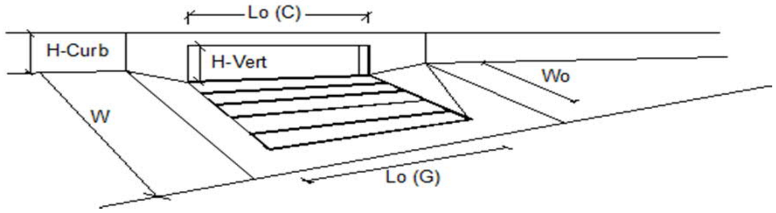
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.046		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)				check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.4**	**29.2**	**cfs**

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

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.0**	**8.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**3.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**72**	**%**

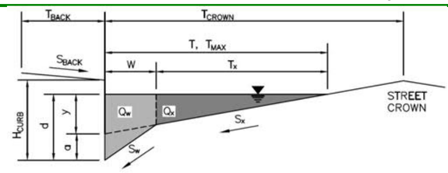
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A64



Gutter Geometry (Enter data in the blue cells)

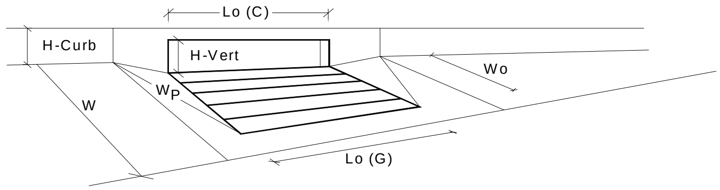
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input)				
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.0	6.6	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

		MINOR	MAJOR	
Low Head Performance Reduction (Calculated)				
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.25	0.39	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.47	0.63	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.87	0.97	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.0**	**10.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.2	10.7	cfs

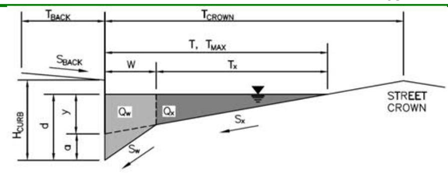
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A65



Gutter Geometry (Enter data in the blue cells)

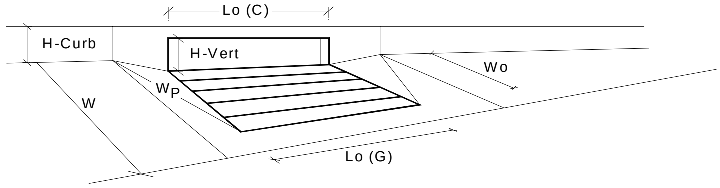
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

			Minor Storm	Major Storm	
	Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Warning 02	Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.0	12.0	inches
	Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.8	6.7	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.24	0.40	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.46	0.64	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.71	0.83	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.3**	**13.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.2	13.0	cfs

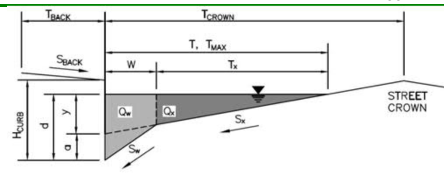
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A66



Gutter Geometry (Enter data in the blue cells)

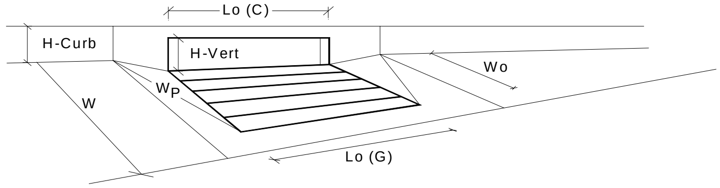
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.1	7.1	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.26	0.43	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.49	0.67	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.73	0.85	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

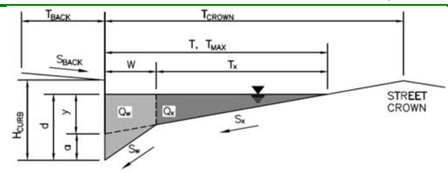
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**6.3**	**15.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	6.2	14.9	cfs

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A67



Gutter Geometry (Enter data in the blue cells)

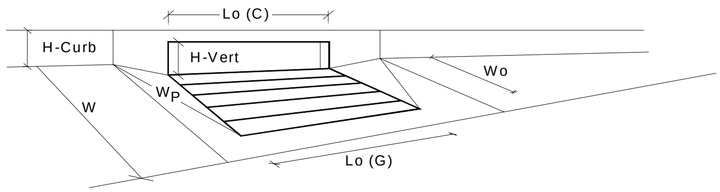
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	27.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	22.0	22.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.5	5.8	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

		MINOR	MAJOR	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.21	0.32	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.43	0.55	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.84	0.93	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**3.8**	**7.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.6	7.7	cfs

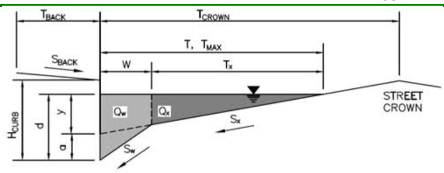
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A68



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

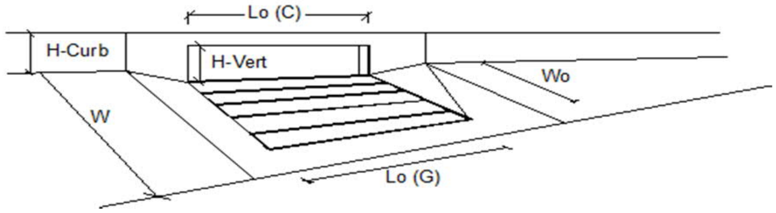
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**16.3**	**18.7**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.2**	**4.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**95**	**%**

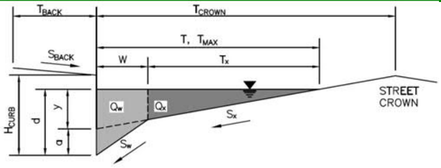
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A69



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	23.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	28.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

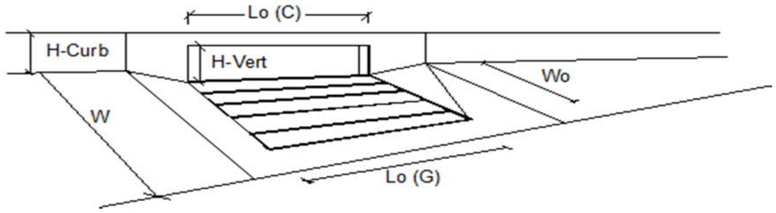
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	18.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.3**	**25.0**	**cfs**

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

INLET ON A CONTINUOUS GRADE

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.8**	**6.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**1.9**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**78**	**%**

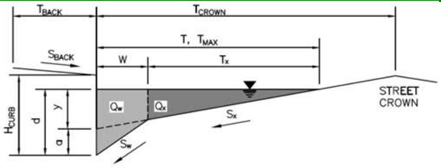
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A70

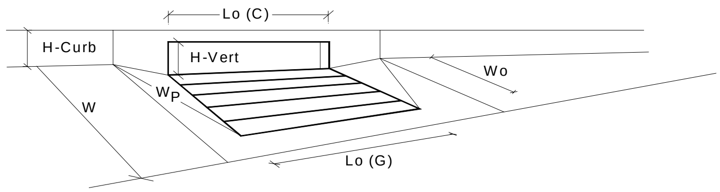


Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	47.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	37.0	37.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)		MINOR	MAJOR	
Type of Inlet: CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.8	6.6	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.24	0.39	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.46	0.63	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.71	0.83	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.3**	**12.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.0	12.3	cfs

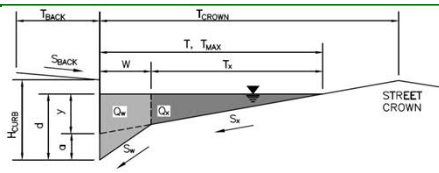
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A71



Gutter Geometry (Enter data in the blue cells)

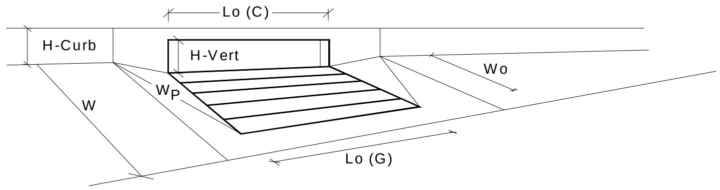
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	23.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	16.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

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

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	3.6	4.5	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.14	0.21	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.34	0.43	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.60	0.68	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**2.0**	**4.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	1.8	4.3	cfs

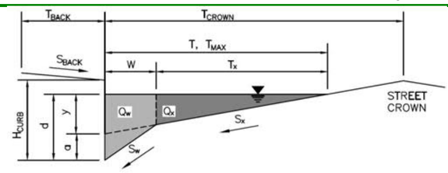
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A76



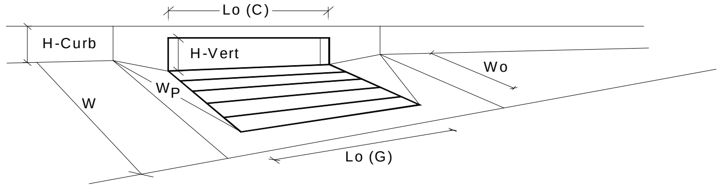
Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



			MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.8	6.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.24	0.40	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.46	0.65	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.71	0.84	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**5.3**	**13.8**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	5.0	13.7	cfs

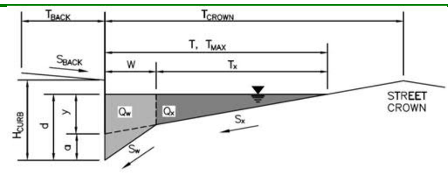
Version 4.06 Released August 2018

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

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

Project: Ridgegate Southwest Village Filing 1

Inlet ID: A77



Gutter Geometry (Enter data in the blue cells)

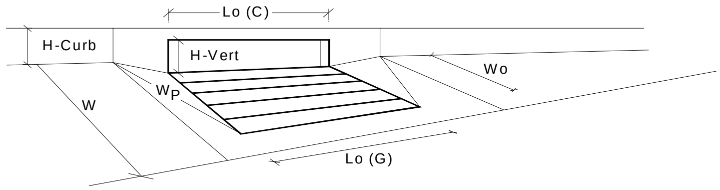
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

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

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018



Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.9	5.2	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.16	0.27	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.51	0.67	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

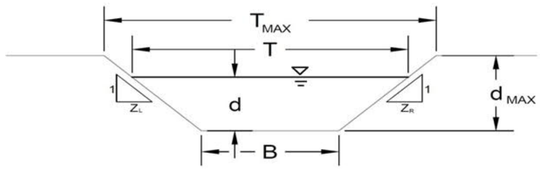
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**1.8**	**3.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.7	3.8	cfs

Version 4.06 Released August 2018

AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A53



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E	C	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0500	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	18.00	18.00	feet
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	1.00	1.00	feet

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	29.2	29.2	cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	1.00	1.00	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	0.6	5.4	cfs
Water Depth	d =	0.45	0.66	feet

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

Version 4.06 Released August 2018

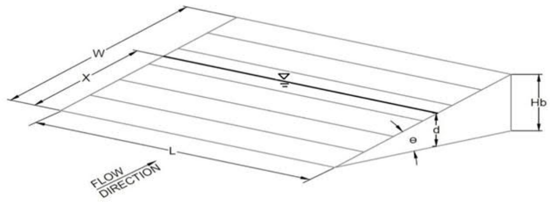
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

A53

Inlet Design Information (Input)

Type of Inlet	CDOT Type C	Inlet Type =	CDOT Type C	
Angle of Inclined Grate (must be <= 30 degrees)		θ =	0.00	degrees
Width of Grate		W =	3.00	feet
Length of Grate		L =	3.00	feet
Open Area Ratio		A_{RATIO} =	0.70	
Height of Inclined Grate		H_B =	0.00	feet
Clogging Factor		C_f =	0.50	
Grate Discharge Coefficient		C_d =	0.96	
Orifice Coefficient		C_o =	0.64	
Weir Coefficient		C_w =	2.05	

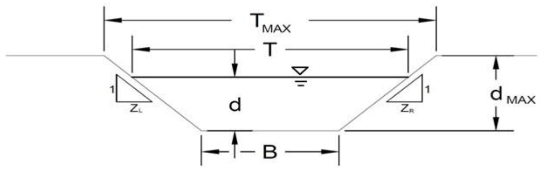


		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.45	0.66	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.5**	**9.8**	**cfs**
	Bypassed Flow, Q_b =	**0.0**	**0.0**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

R11



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E	C	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0200	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	18.00	18.00	feet
Max. Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	1.00	1.00	feet

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	11.0	11.0	cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	1.00	1.00	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	0.9	7.0	cfs
Water Depth	d =	0.66	0.91	feet

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

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

Version 4.06 Released August 2018

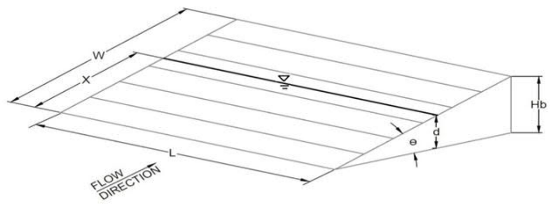
AREA INLET IN A SWALE

Ridgegate Southwest Village Filing 1

R11

Inlet Design Information (Input)

Type of Inlet	CDOT Type C	Inlet Type =	CDOT Type C
Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grate	W =	3.00	feet
Length of Grate	L =	3.00	feet
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grate	H_B =	0.00	feet
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	0.96	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	



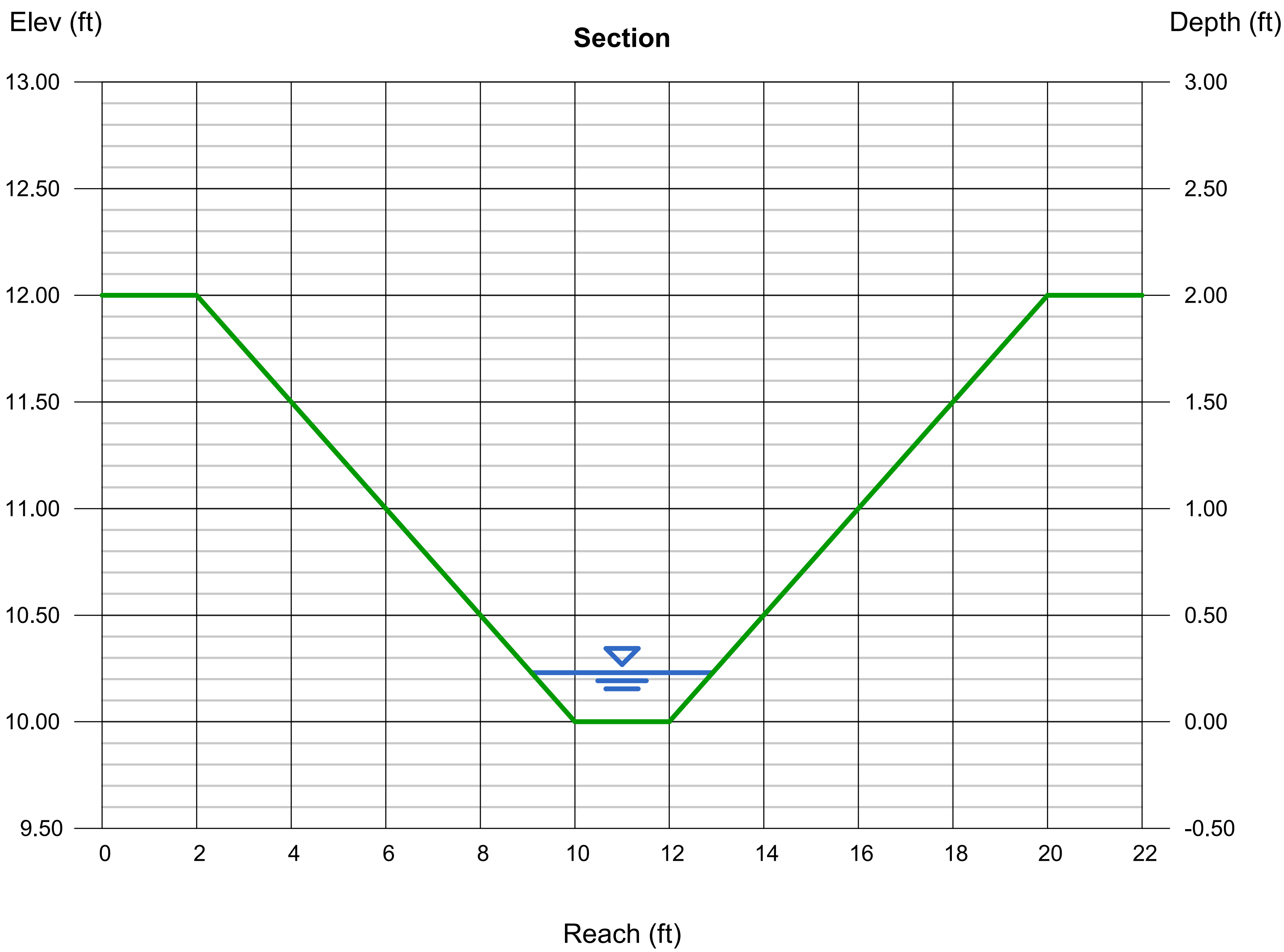
		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.66	0.91	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**9.8**	**15.4**	**cfs**
	Bypassed Flow, Q_b =	**0.0**	**0.0**	**cfs**
	Capture Percentage = Q_a/Q_o = C%	**100**	**100**	**%**

Channel Report

Swale A4 (5-Year)

Trapezoidal	
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 5.00
N-Value	= 0.030
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 2.20

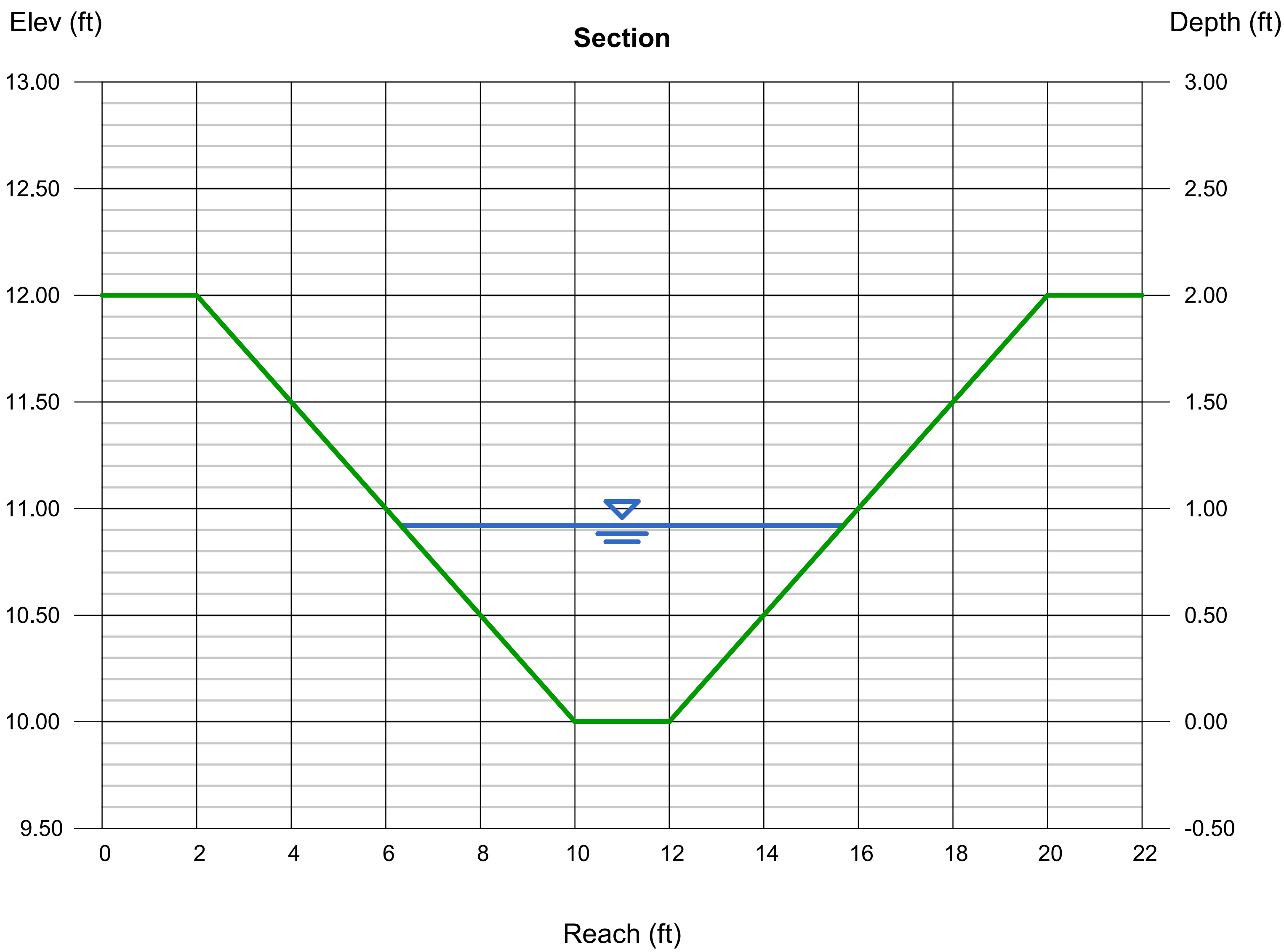
Highlighted	
Depth (ft)	= 0.23
Q (cfs)	= 2.200
Area (sqft)	= 0.67
Velocity (ft/s)	= 3.28
Wetted Perim (ft)	= 3.90
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 3.84
EGL (ft)	= 0.40



Channel Report

Swale A4 (100-Year)

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 2.00	Depth (ft)	= 0.92
Side Slopes (z:1)	= 4.00, 4.00	Q (cfs)	= 37.90
Total Depth (ft)	= 2.00	Area (sqft)	= 5.23
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 7.25
Slope (%)	= 5.00	Wetted Perim (ft)	= 9.59
N-Value	= 0.030	Crit Depth, Yc (ft)	= 1.19
		Top Width (ft)	= 9.36
Calculations		EGL (ft)	= 1.74
Compute by:	Known Q		
Known Q (cfs)	= 37.90		



USACE Steep slope Method (2%-20% Channel Slope)

Slope of Bed	0.10	ft/ft
Bottom width of Channel	2	ft
Channel Flow	37.9	ft^3/S
Gravity constant (g)	32.2	ft/s
Unit Discharge (q)	23.6875	
d30	1.408517	
D30 INCHES	16.90221	

In cases where unit discharge is low, riprap can be used on steep slopes ranging from 2 to 20 percent. A typical application is a rock-lined chute. The stone size equation is

$$D_{30} = \frac{1.95\ S^{0.555}\ q^{2/3}}{g^{1/3}} \qquad (3\text{-}5)$$

where

S = slope of bed

q = unit discharge

Equation 3-5 is applicable to thickness = 1.5 D_{100}, angular rock, unit weight of 167 pcf, D_{85}/D_{15} from 1.7 to 2.7, slopes from 2 to 20 percent, and uniform flow on a down-slope with no tailwater. The following steps should be used in application of Equation 3-5:

(1) Estimate q = Q/b where b = bottom width of chute.

(2) Multiply q by flow concentration factor of 1.25. Use greater factor if approach flow is skewed.

(3) Compute D_{30} using Equation 3-5.

(4) Use uniform gradation having $D_{85}/D_{15} \leq 2$ such as Table 3-1.

(5) Restrict application to straight channels with side slope of 1V:2.5H or flatter.

(6) Use filter fabric beneath rock.

The guidance for steep slope riprap generally results in large riprap sizes. Grouted riprap is often used instead of loose riprap in steep slope applications. *

TABLE 3. VOID–FILLED RIPRAP PLACEMENT AND GRADATION

RIPRAP DESIGNATION	% SMALLER THAN GIVEN SIZE BY WEIGHT	INTERMEDIATE ROCK DIMENSION (INCHES)	D_{50}* (INCHES)
TYPE VL	70 – 100 50 – 70 35 – 50 2 – 10	12 9 6 2	6
TYPE L	70 – 100 50 – 70 35 – 50 2 – 10	15 12 9 3	9
TYPE M	70 – 100 50 – 70 35 – 50 2 – 10	21 18 12 4	12
TYPE H	70 – 100 50 – 70 35 – 50 2 – 10	30 24 18 6	18

*D_{50} = MEAN ROCK SIZE

NOTE: MIX ON SITE AND PRIOR TO PLACEMENT

Use Type H Riprap

USACE Steep slope Method (2%-20% Channel Slope)

Slope of Bed	0.05	ft/ft
Bottom width of Channel	2	ft
Channel Flow	37.9	ft^3/S
Gravity constant (g)	32.2	ft/s
Unit Discharge (q)	23.6875	
d30	0.979815	
D30 INCHES	11.75778	

In cases where unit discharge is low, riprap can be used on steep slopes ranging from 2 to 20 percent. A typical application is a rock-lined chute. The stone size equation is

$$D_{30} = \frac{1.95\ S^{0.555}\ q^{2/3}}{g^{1/3}} \qquad (3\text{-}5)$$

where

S = slope of bed

q = unit discharge

Equation 3-5 is applicable to thickness = 1.5 D_{100}, angular rock, unit weight of 167 pcf, D_{85}/D_{15} from 1.7 to 2.7, slopes from 2 to 20 percent, and uniform flow on a downslope with no tailwater. The following steps should be used in application of Equation 3-5:

(1) Estimate q = Q/b where b = bottom width of chute.

(2) Multiply q by flow concentration factor of 1.25. Use greater factor if approach flow is skewed.

(3) Compute D_{30} using Equation 3-5.

(4) Use uniform gradation having $D_{85}/D_{15} \leq 2$ such as Table 3-1.

(5) Restrict application to straight channels with side slope of 1V:2.5H or flatter.

(6) Use filter fabric beneath rock.

The guidance for steep slope riprap generally results in large riprap sizes. Grouted riprap is often used instead of loose riprap in steep slope applications. *

TABLE 3. VOID–FILLED RIPRAP PLACEMENT AND GRADATION

RIPRAP DESIGNATION	% SMALLER THAN GIVEN SIZE BY WEIGHT	INTERMEDIATE ROCK DIMENSION (INCHES)	D_{50}* (INCHES)
TYPE VL	70 – 100 50 – 70 35 – 50 2 – 10	12 9 6 2	6
TYPE L	70 – 100 50 – 70 35 – 50 2 – 10	15 12 9 3	9
TYPE M	70 – 100 50 – 70 35 – 50 2 – 10	21 18 12 4	12
TYPE H	70 – 100 50 – 70 35 – 50 2 – 10	30 24 18 6	18

*D_{50} = MEAN ROCK SIZE

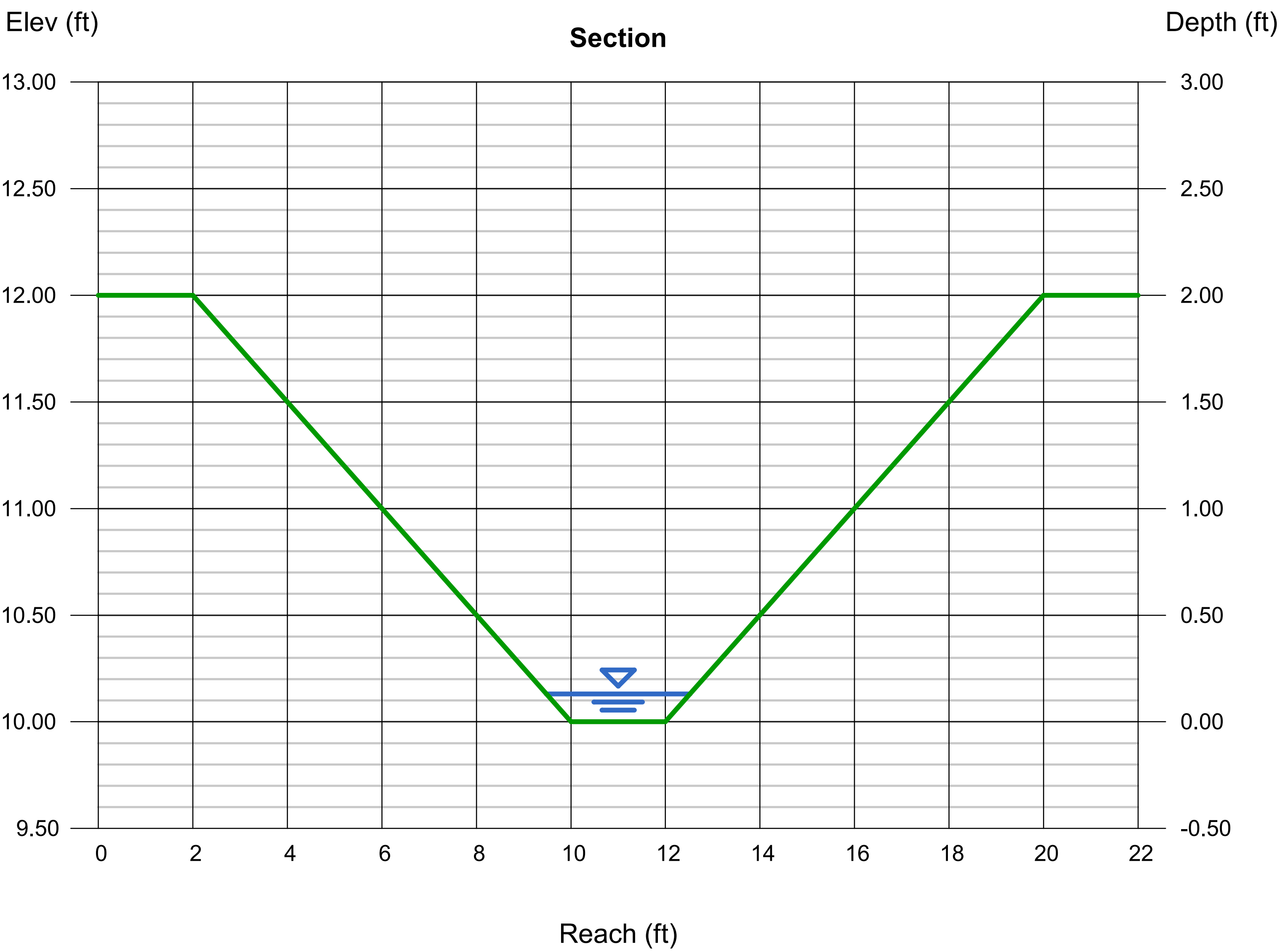
NOTE: MIX ON SITE AND PRIOR TO PLACEMENT

Use Type M Riprap

Channel Report

Swale A15 (5-Year)

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 2.00	Depth (ft)	= 0.13
Side Slopes (z:1)	= 4.00, 4.00	Q (cfs)	= 0.900
Total Depth (ft)	= 2.00	Area (sqft)	= 0.33
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 2.75
Slope (%)	= 6.50	Wetted Perim (ft)	= 3.07
N-Value	= 0.030	Crit Depth, Yc (ft)	= 0.17
		Top Width (ft)	= 3.04
Calculations		EGL (ft)	= 0.25
Compute by:	Known Q		
Known Q (cfs)	= 0.90		



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 18 2020

Swale A15 (100-Year)

Trapezoidal

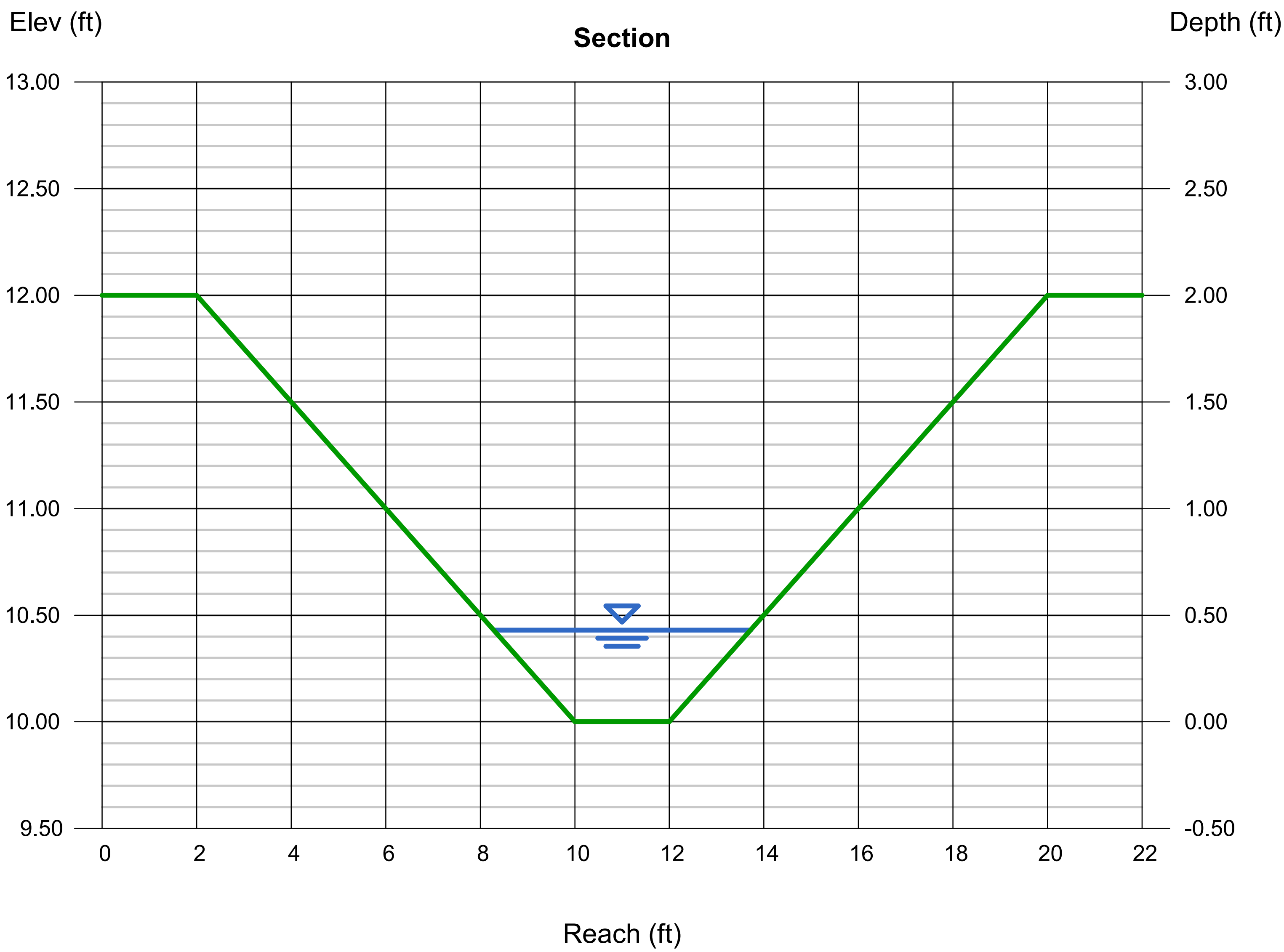
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 6.50
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.80

Highlighted

Depth (ft)	= 0.43
Q (cfs)	= 8.800
Area (sqft)	= 1.60
Velocity (ft/s)	= 5.50
Wetted Perim (ft)	= 5.55
Crit Depth, Yc (ft)	= 0.59
Top Width (ft)	= 5.44
EGL (ft)	= 0.90



Channel Report

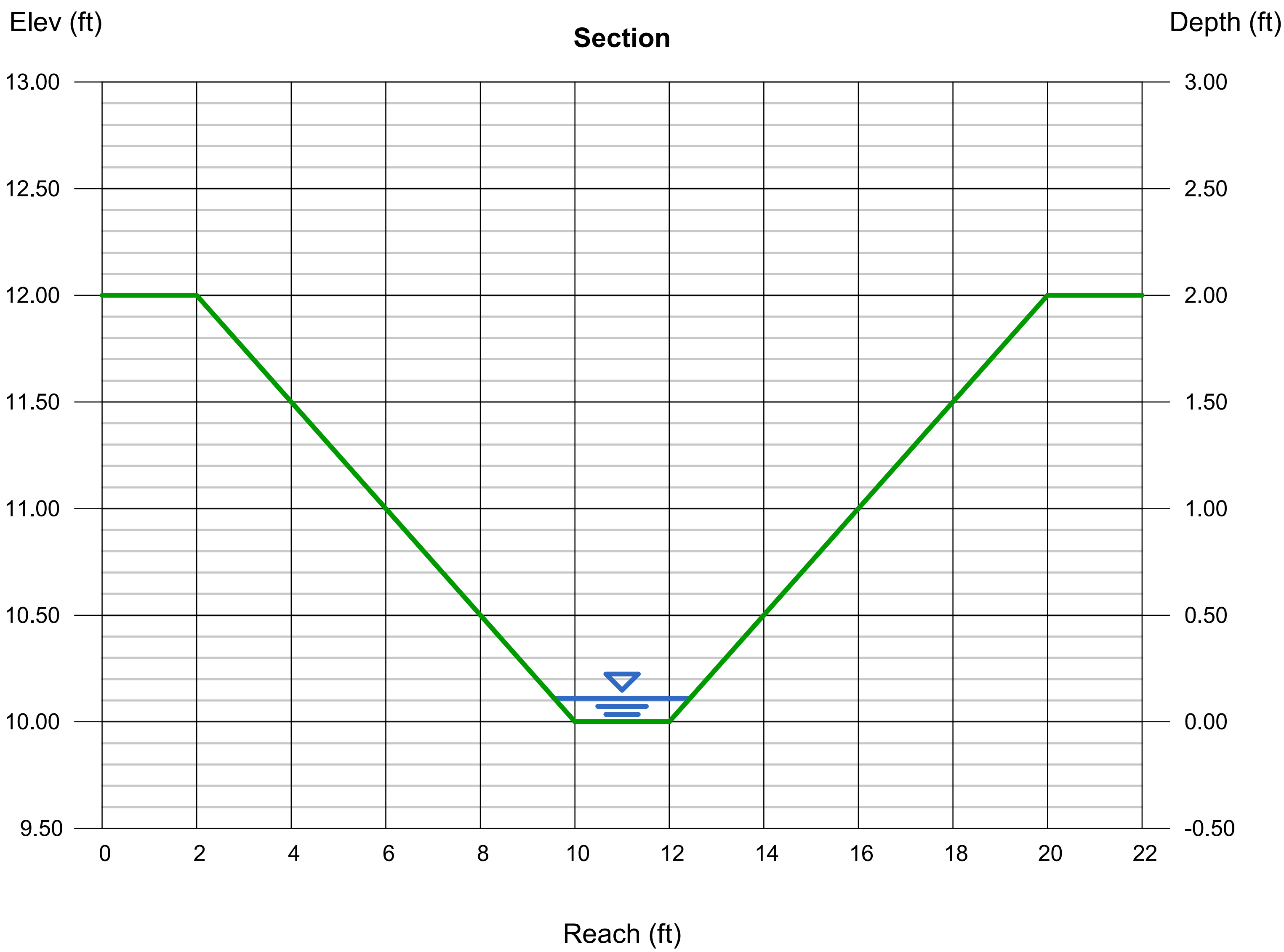
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 18 2020

Swale A53 (5-Year)

Trapezoidal	
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 5.00
N-Value	= 0.030

Calculations	
Compute by:	Known Q
Known Q (cfs)	= 0.60

Highlighted	
Depth (ft)	= 0.11
Q (cfs)	= 0.600
Area (sqft)	= 0.27
Velocity (ft/s)	= 2.24
Wetted Perim (ft)	= 2.91
Crit Depth, Yc (ft)	= 0.13
Top Width (ft)	= 2.88
EGL (ft)	= 0.19

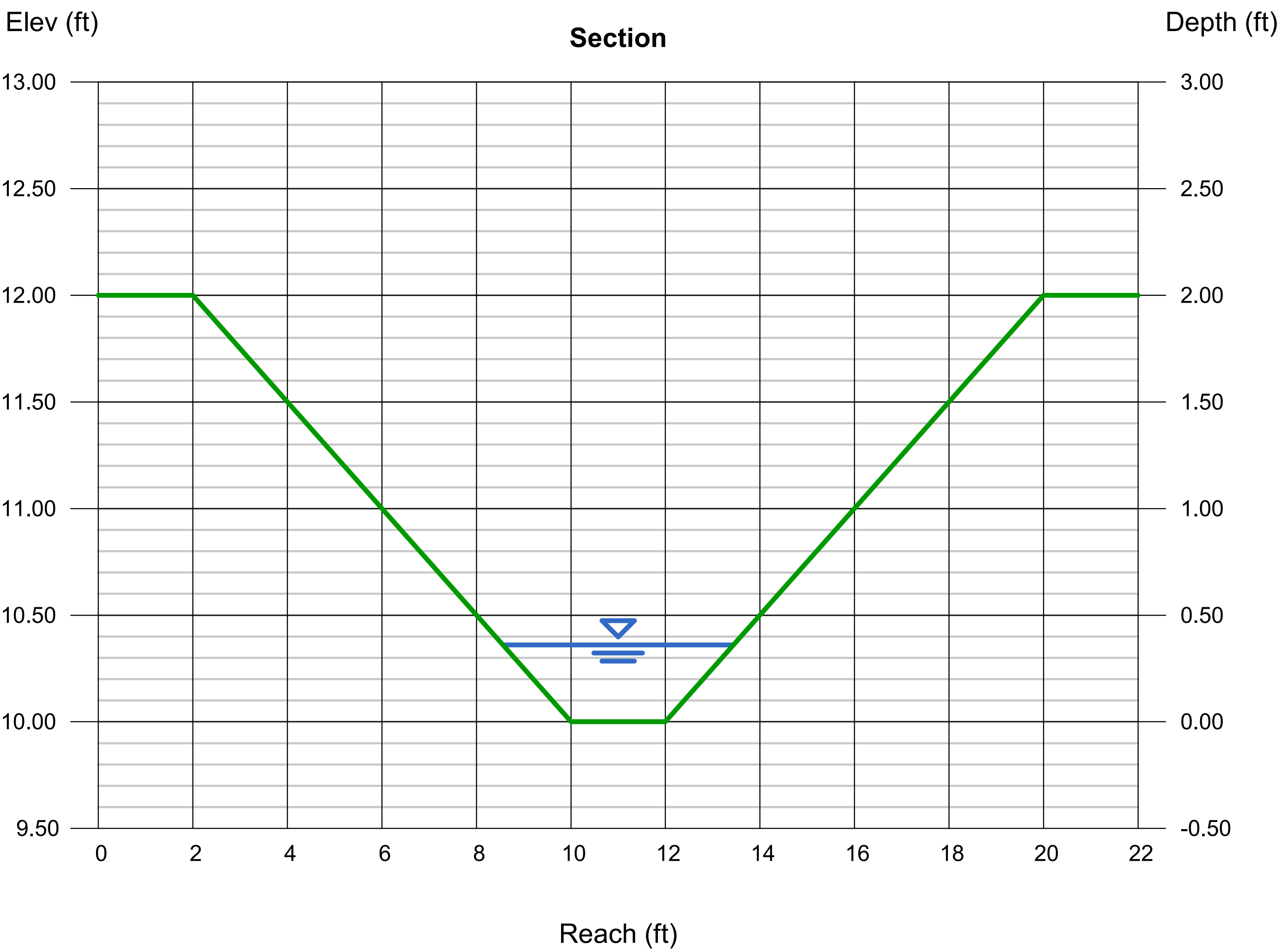


Channel Report

Swale A53 (100-Year)

Trapezoidal	
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 5.00
N-Value	= 0.030
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 5.40

Highlighted	
Depth (ft)	= 0.36
Q (cfs)	= 5.400
Area (sqft)	= 1.24
Velocity (ft/s)	= 4.36
Wetted Perim (ft)	= 4.97
Crit Depth, Yc (ft)	= 0.46
Top Width (ft)	= 4.88
EGL (ft)	= 0.66

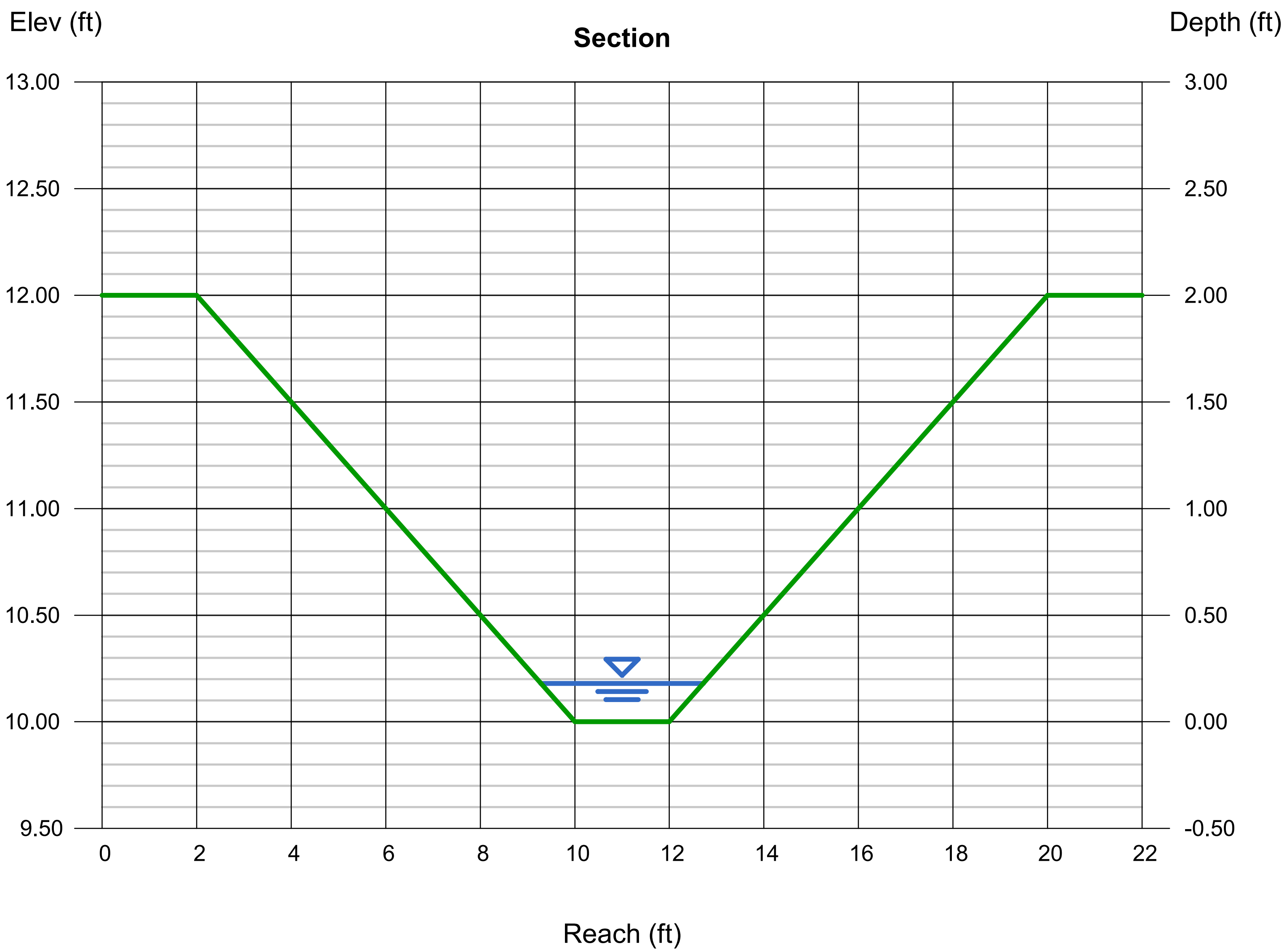


Channel Report

Swale R11 (5-Year)

Trapezoidal	
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 2.00
N-Value	= 0.030
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted	
Depth (ft)	= 0.18
Q (cfs)	= 0.900
Area (sqft)	= 0.49
Velocity (ft/s)	= 1.84
Wetted Perim (ft)	= 3.48
Crit Depth, Yc (ft)	= 0.17
Top Width (ft)	= 3.44
EGL (ft)	= 0.23



Channel Report

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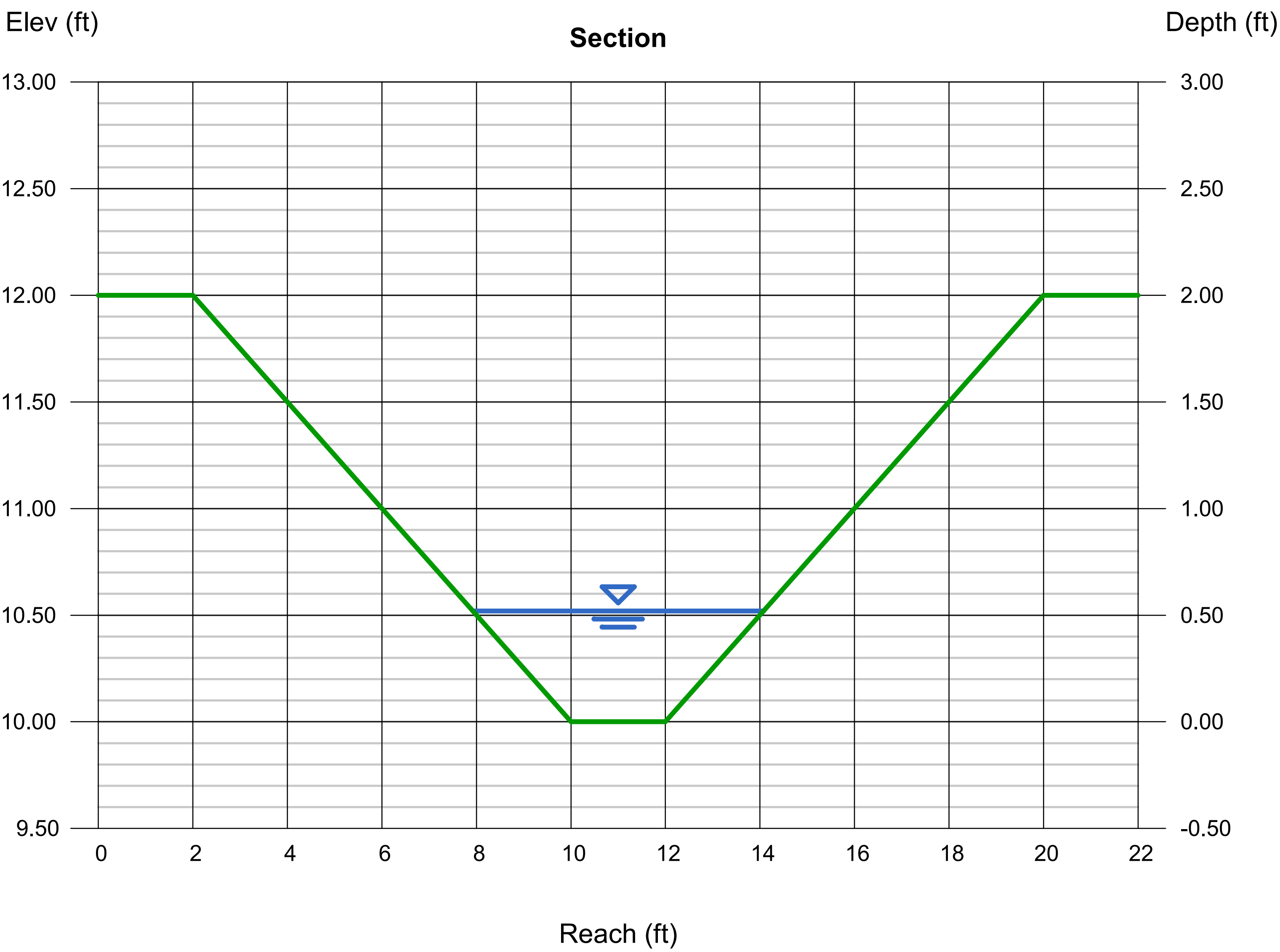
Swale R11 (100-Year)

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 2.00	Depth (ft)	= 0.52
Side Slopes (z:1)	= 4.00, 4.00	Q (cfs)	= 7.000
Total Depth (ft)	= 2.00	Area (sqft)	= 2.12
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 3.30
Slope (%)	= 2.00	Wetted Perim (ft)	= 6.29
N-Value	= 0.030	Crit Depth, Yc (ft)	= 0.52
		Top Width (ft)	= 6.16
Calculations		EGL (ft)	= 0.69
Compute by:	Known Q		
Known Q (cfs)	= 7.00		



APPENDIX D

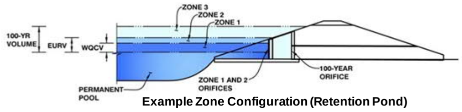
DETENTION AND WATER QAULITY CALCULATIONS

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Ridgegate Southwest Village Filing 1

Basin ID: EURV Pond A



Example Zone Configuration (Retention Pond)

Depth Increment = | 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	--	--	--	200	0.005		
ISD	--	1.00	--	--	--	200	0.005	200	0.005
5980	--	2.00	--	--	--	1,811	0.042	1,205	0.028
5981	--	3.00	--	--	--	15,495	0.356	9,858	0.226
5982	--	4.00	--	--	--	49,747	1.142	42,479	0.975
5983	--	5.00	--	--	--	69,280	1.590	101,992	2.341
5984	--	6.00	--	--	--	75,836	1.741	174,550	4.007
5985	--	7.00	--	--	--	80,381	1.845	252,659	5.800
5986	--	8.00	--	--	--	85,026	1.952	335,362	7.699
5987	--	9.00	--	--	--	89,772	2.061	422,761	9.705
5988	--	10.00	--	--	--	94,618	2.172	514,956	11.822
5989	--	11.00	--	--	--	99,564	2.286	612,047	14.051
5989.5	--	11.50	--	--	--	102,075	2.343	662,457	15.208
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Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	176.58	acres
Watershed Length =	3,577	ft
Watershed Length to Centroid =	1,861	ft
Watershed Slope =	0.031	ft/ft
Watershed Imperviousness =	48.40%	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 =	Lone Tree - Municipal Court	

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) =	2.971	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	8.064	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	7.789	acre-feet	1.06	inches
5-yr Runoff Volume (P1 = 1.43 in.) =	12.710	acre-feet	1.43	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	16.026	acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 1.68 in.) =	16.889	acre-feet		inches
50-yr Runoff Volume (P1 = 2.26 in.) =	25.646	acre-feet	2.26	inches
100-yr Runoff Volume (P1 = 2.6 in.) =	31.483	acre-feet	2.60	inches
500-yr Runoff Volume (P1 = 3.07 in.) =	38.714	acre-feet		inches
Approximate 2-yr Detention Volume =	6.329	acre-feet		
Approximate 5-yr Detention Volume =	10.161	acre-feet		
Approximate 10-yr Detention Volume =	11.528	acre-feet		
Approximate 25-yr Detention Volume =	11.069	acre-feet		
Approximate 50-yr Detention Volume =	13.722	acre-feet		
Approximate 100-yr Detention Volume =	16.141	acre-feet		

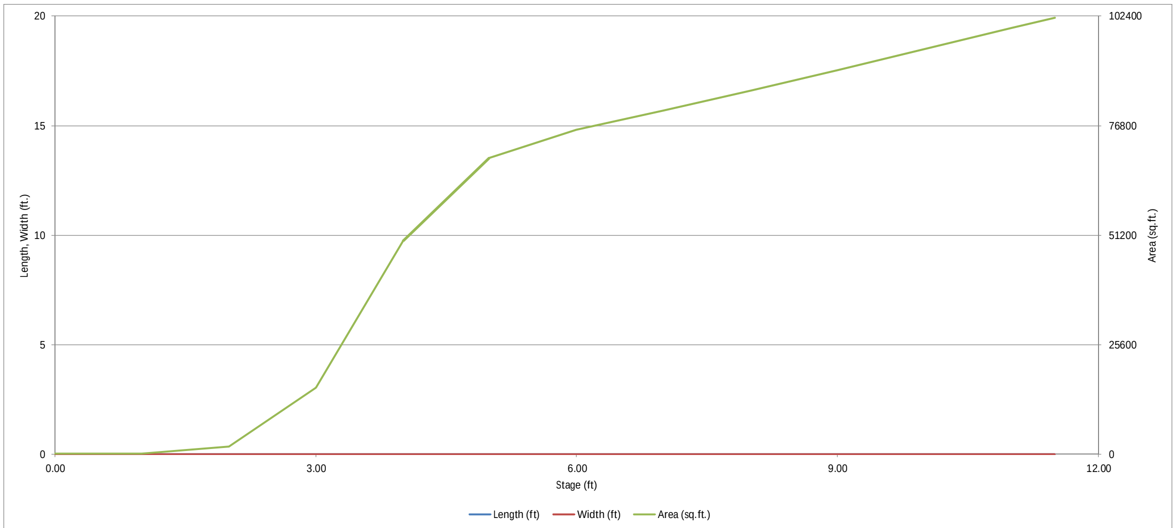
Define Zones and Basin Geometry

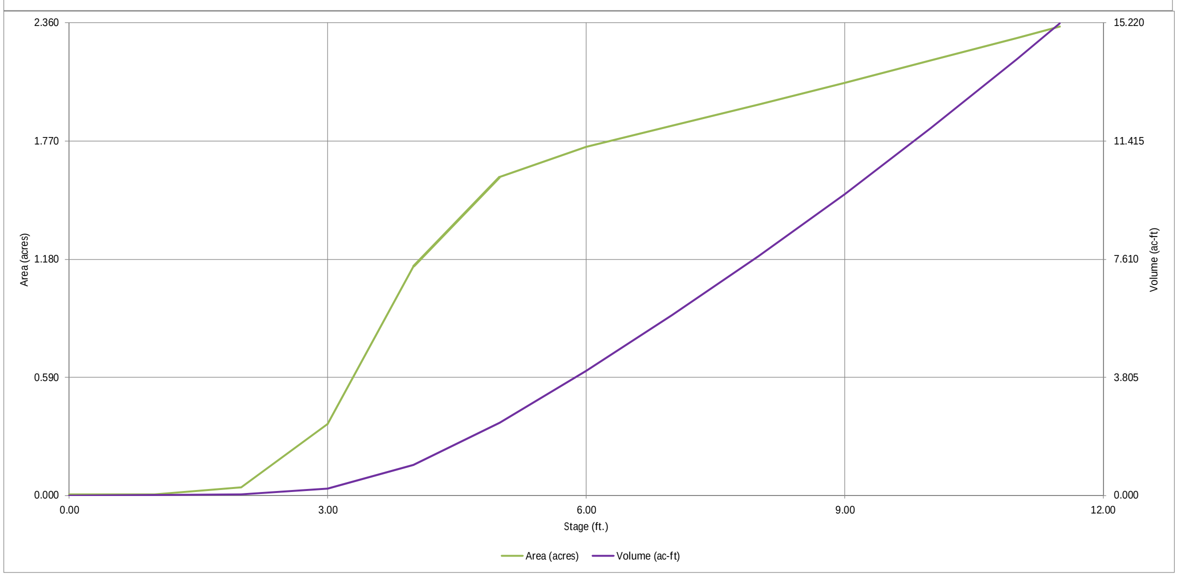
Zone 1 Volume (WQCV) =	2.971	acre-feet
Zone 2 Volume (EURV - Zone 1) =	5.093	acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	8.064	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (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

Total detention volume is less than 100-year volume.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)



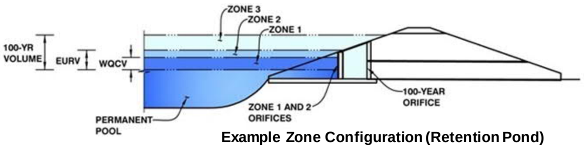


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Ridgegate Southwest Village Filing 1

Basin ID: EURV Pond A



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	5.39	2.971	Orifice Plate
Zone 2 (EURV)	8.19	5.093	Rectangular Orifice
Zone 3			Weir&Pipe (Rect.)
Total (all zones)		8.064	

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

			Calculated Parameters for Underdrain		
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

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)

			Calculated Parameters for Plate		
Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	4.431E-02	ft^2
Depth at top of Zone using Orifice Plate =	5.39	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	21.20	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	6.38	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

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	1.80	3.59					
Orifice Area (sq. inches)	6.38	6.38	6.38					

	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 Rectangular	Not Selected		Calculated Parameters for Vertical Orifice	Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	5.39	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.10	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	8.19	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.13	N/A	feet
Vertical Orifice Height =	3.00	N/A	inches				
Vertical Orifice Width =	4.69		inches				

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		Calculated Parameters for Overflow Weir	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	8.19	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	8.19	N/A	feet
Overflow Weir Front Edge Length =	80.00	N/A	feet	Overflow Weir Slope Length =	15.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	21.00	N/A	
Horiz. Length of Weir Sides =	15.00	N/A	feet	Overflow Grate Open Area w/o Debris =	840.00	N/A	ft^2
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	420.00	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

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

	Zone 3 Rectangular	Not Selected		Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate	Zone 3 Rectangular	Not Selected	
Depth to Invert of Outlet Pipe =	0.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	40.00	N/A	ft^2
Rectangular Orifice Width =	96.00	N/A	inches	Outlet Orifice Centroid =	2.50	N/A	feet
Rectangular Orifice Height =	60.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	9.31	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	1.19	feet
Spillway Crest Length =	128.00	feet	Stage at Top of Freeboard =	11.50	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.34	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	15.21	acre-ft

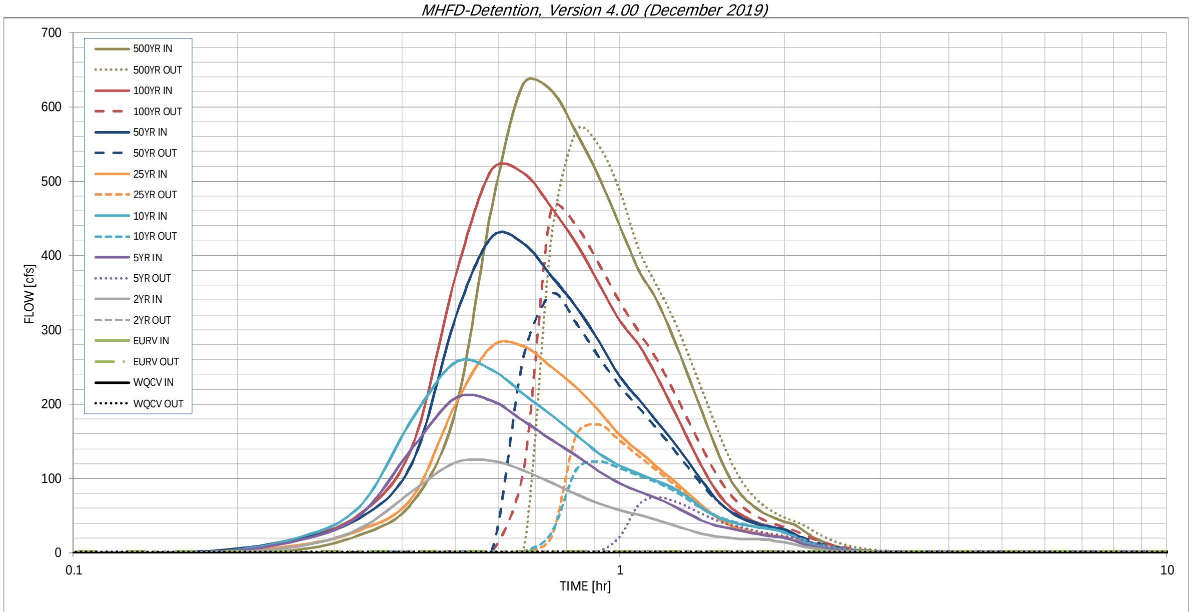
Routed Hydrograph Results

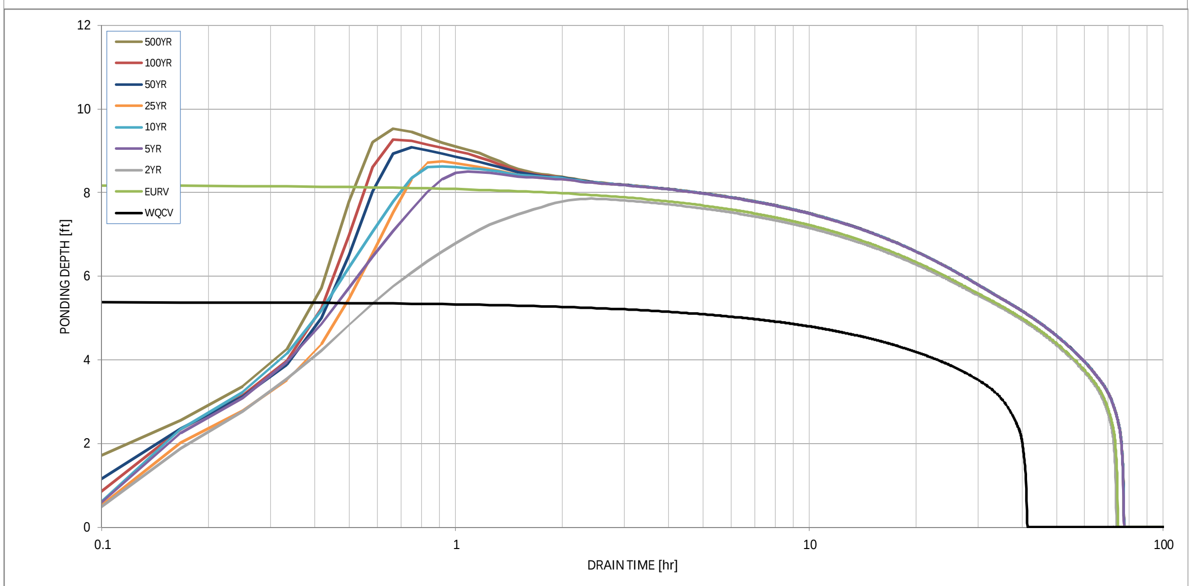
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

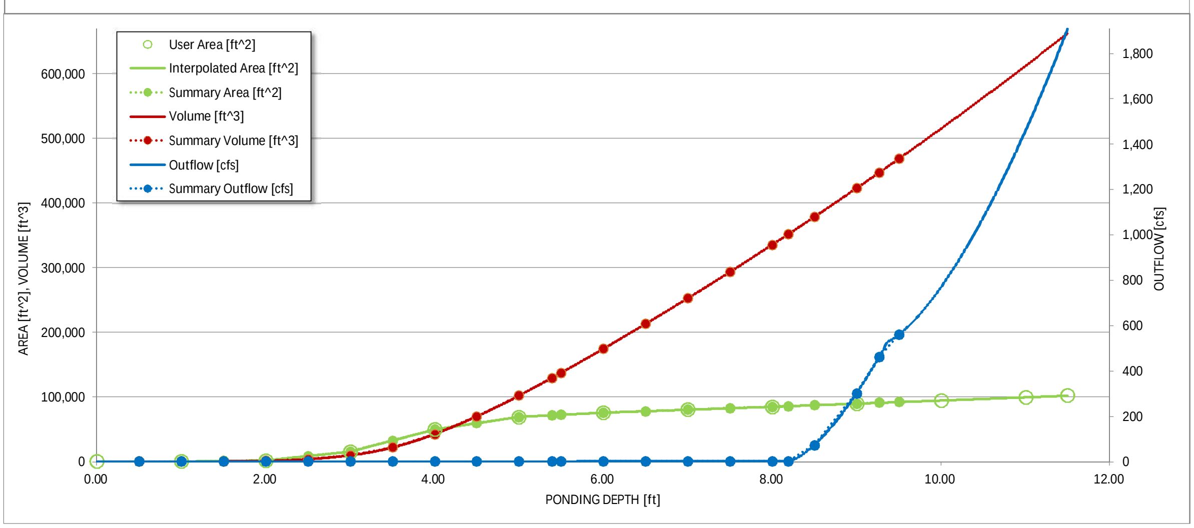
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.06	1.43	1.66	1.68	2.26	2.60	3.07
CUHP Runoff Volume (acre-ft) =	2.971	8.064	7.789	12.710	16.026	16.889	25.646	31.483	38.714
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	7.789	12.710	16.026	16.889	25.646	31.483	38.714
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	18.7	70.0	98.3	122.3	215.3	278.8	354.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.11	0.40	0.56	0.69	1.22	1.58	2.01
Peak Inflow Q (cfs) =	N/A	N/A	123.7	207.8	256.1	277.8	425.0	515.3	630.9
Peak Outflow Q (cfs) =	1.2	2.4	2.3	74.7	123.0	172.5	348.2	464.5	567.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.1	1.3	1.4	1.6	1.7	1.6
Structure Controlling Flow =	Plate	Overflow Weir 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.1	0.2	0.4	0.5	0.6
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) =	39	69	68	69	67	67	62	60	57
Time to Drain 99% of Inflow Volume (hours) =	40	72	71	74	73	73	71	70	69
Maximum Ponding Depth (ft) =	5.39	8.19	7.85	8.50	8.63	8.75	9.08	9.27	9.53
Area at Maximum Ponding Depth (acres) =	1.65	1.97	1.94	2.01	2.02	2.03	2.07	2.09	2.12
Maximum Volume Stored (acre-ft) =	2.973	8.072	7.407	8.688	8.950	9.173	9.870	10.266	10.792

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)







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.

Time Interval	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
	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	1.16	0.57	3.14
	0:15:00	0.00	0.00	7.07	14.35	17.78	8.79	17.00	17.19	23.55
	0:20:00	0.00	0.00	32.15	49.61	61.45	29.90	46.25	51.25	66.77
	0:25:00	0.00	0.00	82.54	140.49	179.33	73.84	120.11	141.95	189.80
	0:30:00	0.00	0.00	121.39	207.83	256.14	199.00	315.46	370.71	464.86
	0:35:00	0.00	0.00	123.73	204.58	246.21	277.56	424.97	515.35	630.88
	0:40:00	0.00	0.00	110.70	177.50	213.51	277.78	416.17	510.90	622.01
	0:45:00	0.00	0.00	94.26	151.93	184.99	249.98	372.34	464.70	565.06
	0:50:00	0.00	0.00	78.69	130.49	158.14	222.22	330.72	415.68	505.10
	0:55:00	0.00	0.00	66.27	109.68	133.64	190.59	283.88	361.92	439.57
	1:00:00	0.00	0.00	57.29	93.52	117.31	158.44	237.19	312.48	380.20
	1:05:00	0.00	0.00	51.14	82.70	106.39	136.57	206.24	279.80	341.03
	1:10:00	0.00	0.00	44.33	73.82	96.96	116.64	177.70	238.69	291.72
	1:15:00	0.00	0.00	37.28	63.79	87.71	97.93	150.58	194.89	239.21
	1:20:00	0.00	0.00	30.99	52.79	74.91	79.79	122.58	153.16	188.06
	1:25:00	0.00	0.00	25.62	43.10	59.82	63.16	96.11	114.89	140.77
	1:30:00	0.00	0.00	21.89	36.82	48.99	47.98	72.58	83.69	102.84
	1:35:00	0.00	0.00	19.90	33.54	42.65	37.29	56.69	63.46	78.45
	1:40:00	0.00	0.00	18.94	29.93	38.44	30.91	47.01	51.36	63.71
	1:45:00	0.00	0.00	18.41	26.46	35.40	26.88	40.71	43.19	53.67
	1:50:00	0.00	0.00	18.06	23.99	33.32	24.17	36.43	37.59	46.80
	1:55:00	0.00	0.00	16.36	22.19	31.13	22.40	33.57	33.63	41.91
	2:00:00	0.00	0.00	14.28	20.41	27.96	21.21	31.56	30.80	38.40
	2:05:00	0.00	0.00	11.36	16.34	22.00	17.18	25.41	24.36	30.36
	2:10:00	0.00	0.00	8.40	11.92	15.91	12.45	18.32	17.50	21.77
	2:15:00	0.00	0.00	6.20	8.72	11.49	9.08	13.27	12.72	15.79
	2:20:00	0.00	0.00	4.53	6.33	8.31	6.62	9.64	9.34	11.59
	2:25:00	0.00	0.00	3.27	4.47	5.95	4.74	6.89	6.72	8.33
	2:30:00	0.00	0.00	2.30	3.08	4.20	3.34	4.84	4.73	5.86
	2:35:00	0.00	0.00	1.58	2.12	2.94	2.38	3.44	3.37	4.16
	2:40:00	0.00	0.00	1.03	1.43	1.95	1.63	2.34	2.29	2.82
	2:45:00	0.00	0.00	0.60	0.89	1.17	1.02	1.45	1.41	1.74
	2:50:00	0.00	0.00	0.30	0.48	0.59	0.55	0.78	0.75	0.91
	2:55:00	0.00	0.00	0.12	0.19	0.22	0.23	0.31	0.29	0.35
	3:00:00	0.00	0.00	0.03	0.04	0.04	0.04	0.05	0.04	0.05
	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
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	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 4.03 (May 2020)

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]
	0.50	200	0.005	100	0.002	0.15
	1.00	200	0.005	200	0.005	0.21
	1.50	1,005	0.023	501	0.012	0.26
	2.00	1,811	0.042	1,205	0.028	0.40
	2.50	8,653	0.199	3,821	0.088	0.52
	3.00	15,495	0.356	9,858	0.226	0.60
	3.50	32,621	0.749	21,887	0.502	0.68
	4.00	49,747	1.142	42,479	0.975	0.88
	4.50	59,513	1.366	69,794	1.602	1.01
	5.00	69,280	1.590	101,992	2.341	1.11
WQCV	5.39	71,837	1.649	129,510	2.973	1.19
	5.50	72,558	1.666	137,452	3.155	1.24
	6.00	75,836	1.741	174,550	4.007	1.62
	6.50	78,108	1.793	213,037	4.891	1.84
	7.00	80,381	1.845	252,659	5.800	2.02
	7.50	82,703	1.899	293,430	6.736	2.18
	8.00	85,026	1.952	335,362	7.699	2.32
EURV	8.19	85,928	1.973	351,603	8.072	2.38
	8.50	87,399	2.006	378,469	8.688	73.17
	9.00	89,772	2.061	422,761	9.705	301.24
100-Year	9.27	91,080	2.091	447,176	10.266	462.46
	9.50	92,195	2.117	468,253	10.750	559.41

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).

FOREBAY VOLUME REQUIREMENTS

Equation 3-1 $WQCV = a(0.91I^3 - 1.19I^2 + 0.781I)$

a=1 (40 hour drain time)

Forebay 1	*I=.454*	*WQCV=*	0.193997
Forebay 2	*I= .604*	*WQCV=*	0.237506

Equation 3-3 $V=(WQCV/12)A$

Forebay 1	A= 126.83 Acres	V= 2.050
Forebay 2	A= 40.83 Acres	V= 0.808

3% OF WQCV

FOREBAY TOTAL VOLUME= .03(V)

VOLUME REQUIRED FOR FOREBAY 1 =	0.062 AC-FT	2679 CF
VOLUME REQUIRED FOR FOREBAY 2 =	0.024 AC-FT	1056 CF
VOLUME PROVIDED FOR FOREBAY 1 =	0.083 AC-FT	3631 CF
VOLUME PROVIDED FOR FOREBAY 2 =	0.038 AC-FT	1649 CF

Q_{100} Discharges 2% OF Q_{100}

Q_{100} Forebay 1= .02*403.2 CFS= 8.06 CFS

Q_{100} Forebay 2= .02*166.8 CFS=3.34 CFS

Weir Report

Forebay #1 Notch

Rectangular Weir

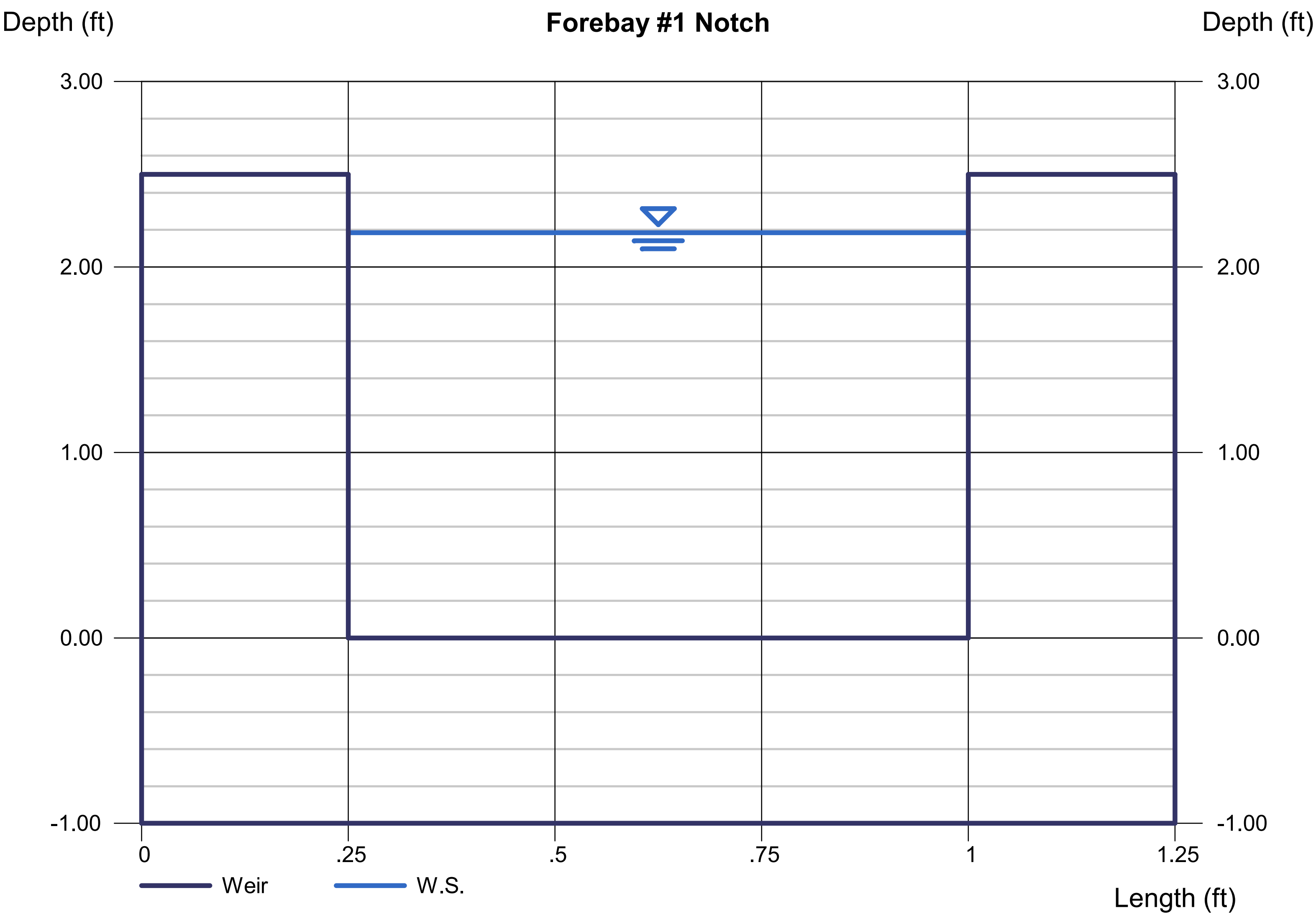
Crest	= Sharp
Bottom Length (ft)	= 0.75
Total Depth (ft)	= 2.50

Calculations

Weir Coeff. Cw	= 3.33
Compute by:	Known Q
Known Q (cfs)	= 8.06

Highlighted

Depth (ft)	= 2.18
Q (cfs)	= 8.060
Area (sqft)	= 1.64
Velocity (ft/s)	= 4.92
Top Width (ft)	= 0.75



Weir Report

Forebay #2 Notch

Rectangular Weir

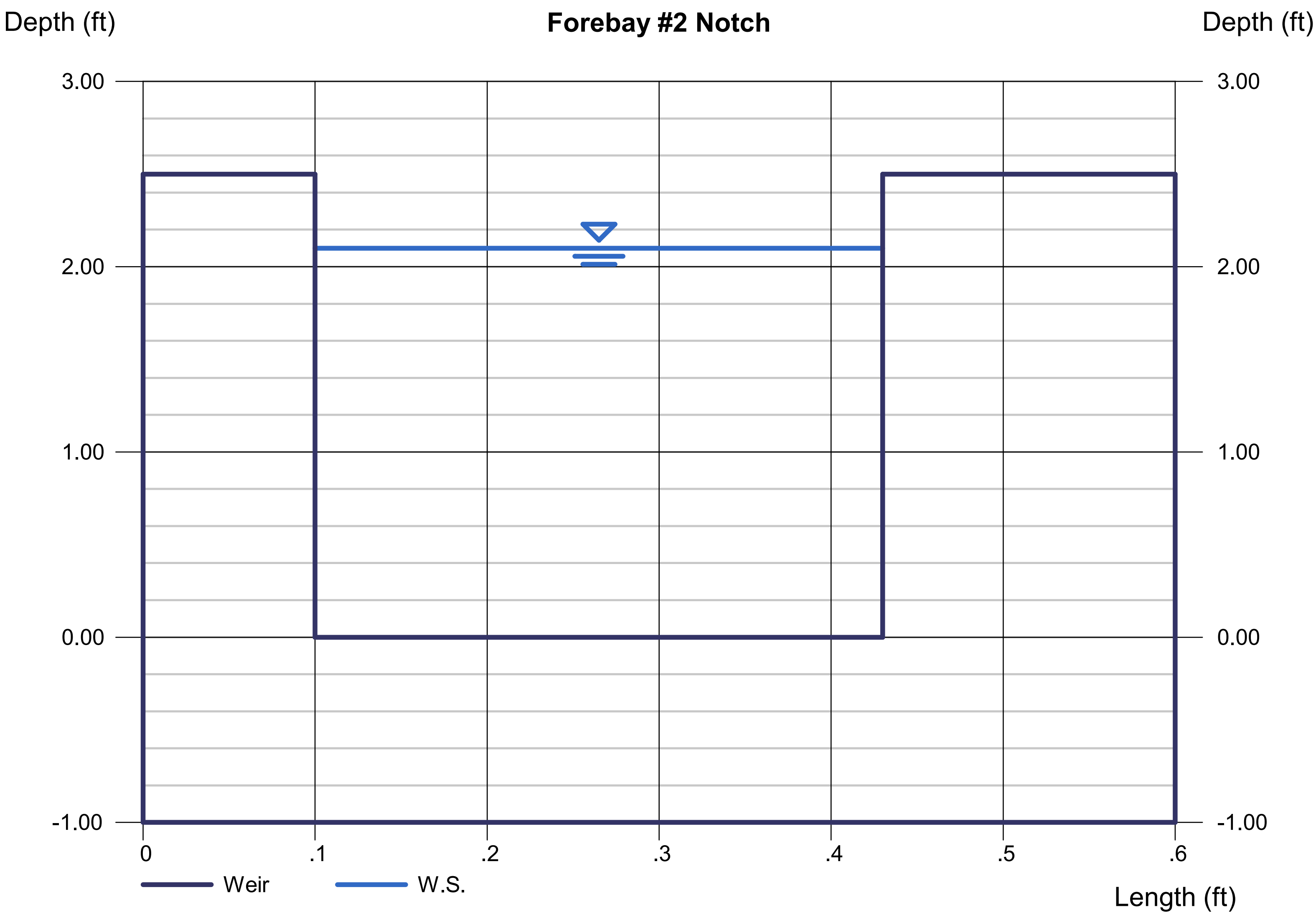
Crest	= Sharp
Bottom Length (ft)	= 0.33
Total Depth (ft)	= 2.50

Calculations

Weir Coeff. Cw	= 3.33
Compute by:	Known Q
Known Q (cfs)	= 3.34

Highlighted

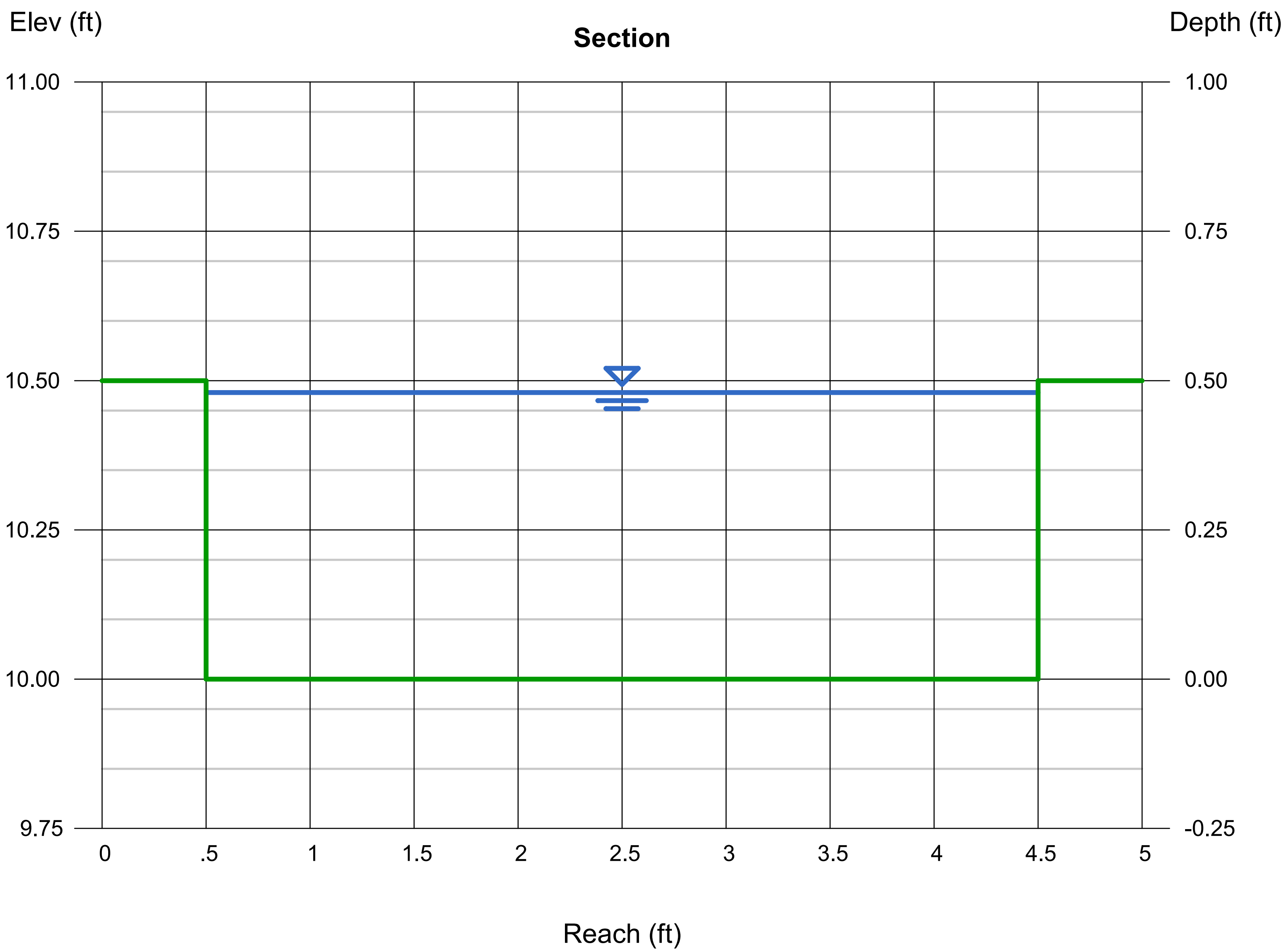
Depth (ft)	= 2.10
Q (cfs)	= 3.340
Area (sqft)	= 0.69
Velocity (ft/s)	= 4.82
Top Width (ft)	= 0.33



Channel Report

Forebay 1 Trickle Channel

Rectangular		**Highlighted**	
Bottom Width (ft)	= 4.00	Depth (ft)	= 0.48
Total Depth (ft)	= 0.50	Q (cfs)	= 8.060
		Area (sqft)	= 1.92
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 4.20
Slope (%)	= 0.50	Wetted Perim (ft)	= 4.96
N-Value	= 0.013	Crit Depth, Yc (ft)	= 0.50
		Top Width (ft)	= 4.00
Calculations		EGL (ft)	= 0.75
Compute by:	Known Q		
Known Q (cfs)	= 8.06		



Channel Report

Forebay 2 Trickle Channel

Rectangular

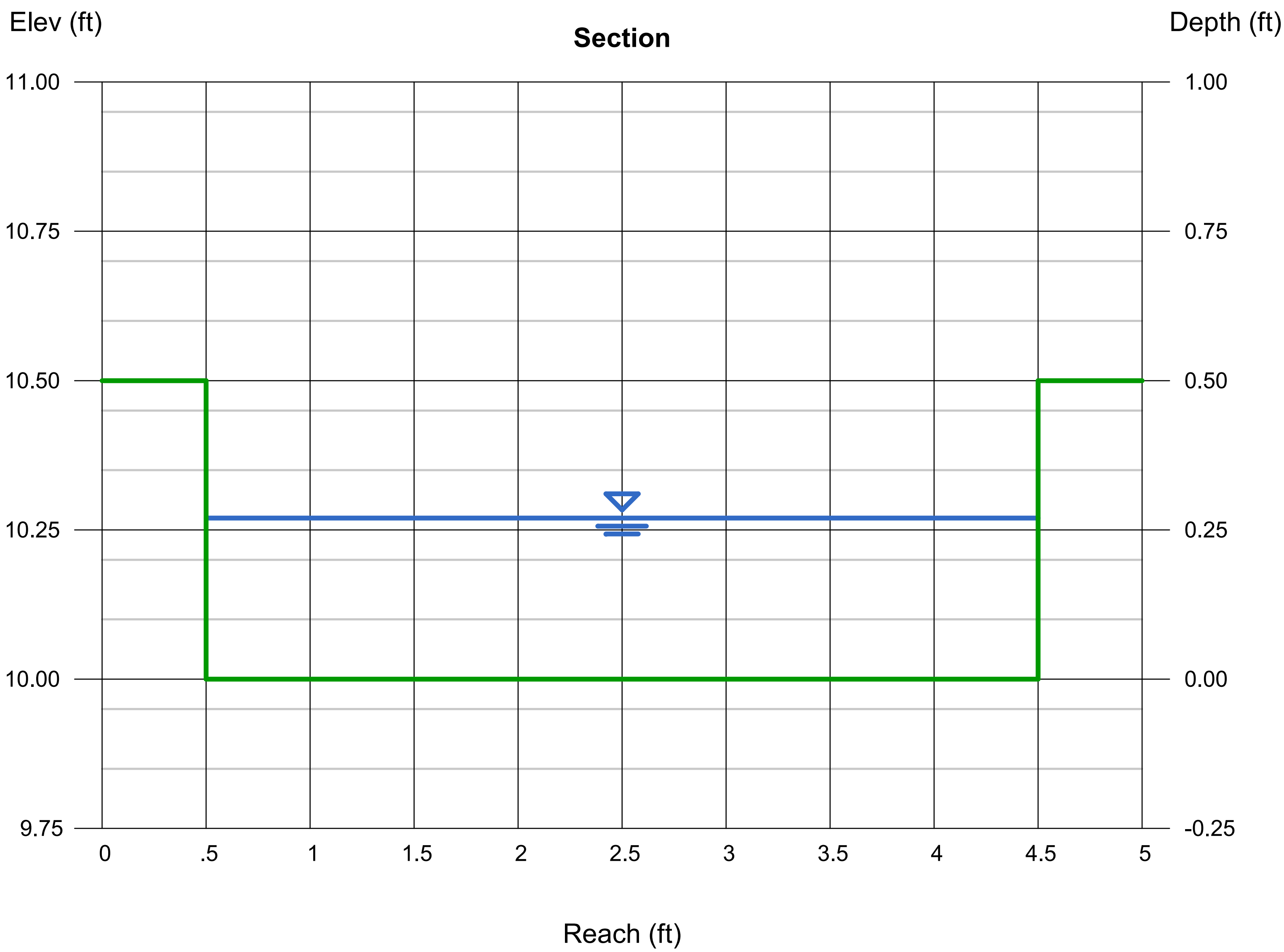
Bottom Width (ft)	= 4.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 10.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.34

Highlighted

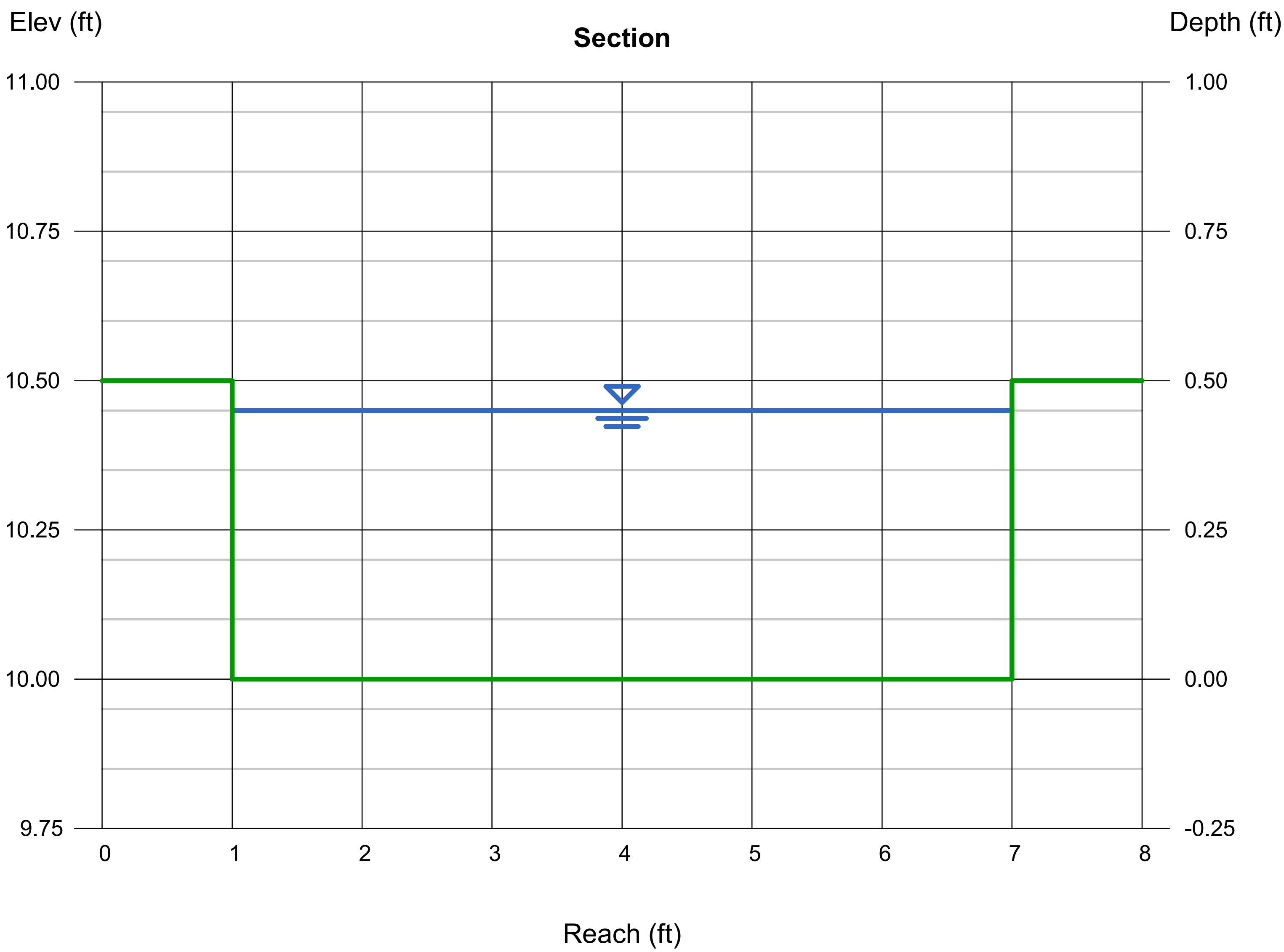
Depth (ft)	= 0.27
Q (cfs)	= 3.340
Area (sqft)	= 1.08
Velocity (ft/s)	= 3.09
Wetted Perim (ft)	= 4.54
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 4.00
EGL (ft)	= 0.42



Channel Report

Combined Trickle Channel

Rectangular		**Highlighted**	
Bottom Width (ft)	= 6.00	Depth (ft)	= 0.45
Total Depth (ft)	= 0.50	Q (cfs)	= 11.39
		Area (sqft)	= 2.70
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 4.22
Slope (%)	= 0.50	Wetted Perim (ft)	= 6.90
N-Value	= 0.013	Crit Depth, Yc (ft)	= 0.49
		Top Width (ft)	= 6.00
Calculations		EGL (ft)	= 0.73
Compute by:	Known Q		
Known Q (cfs)	= 11.39		



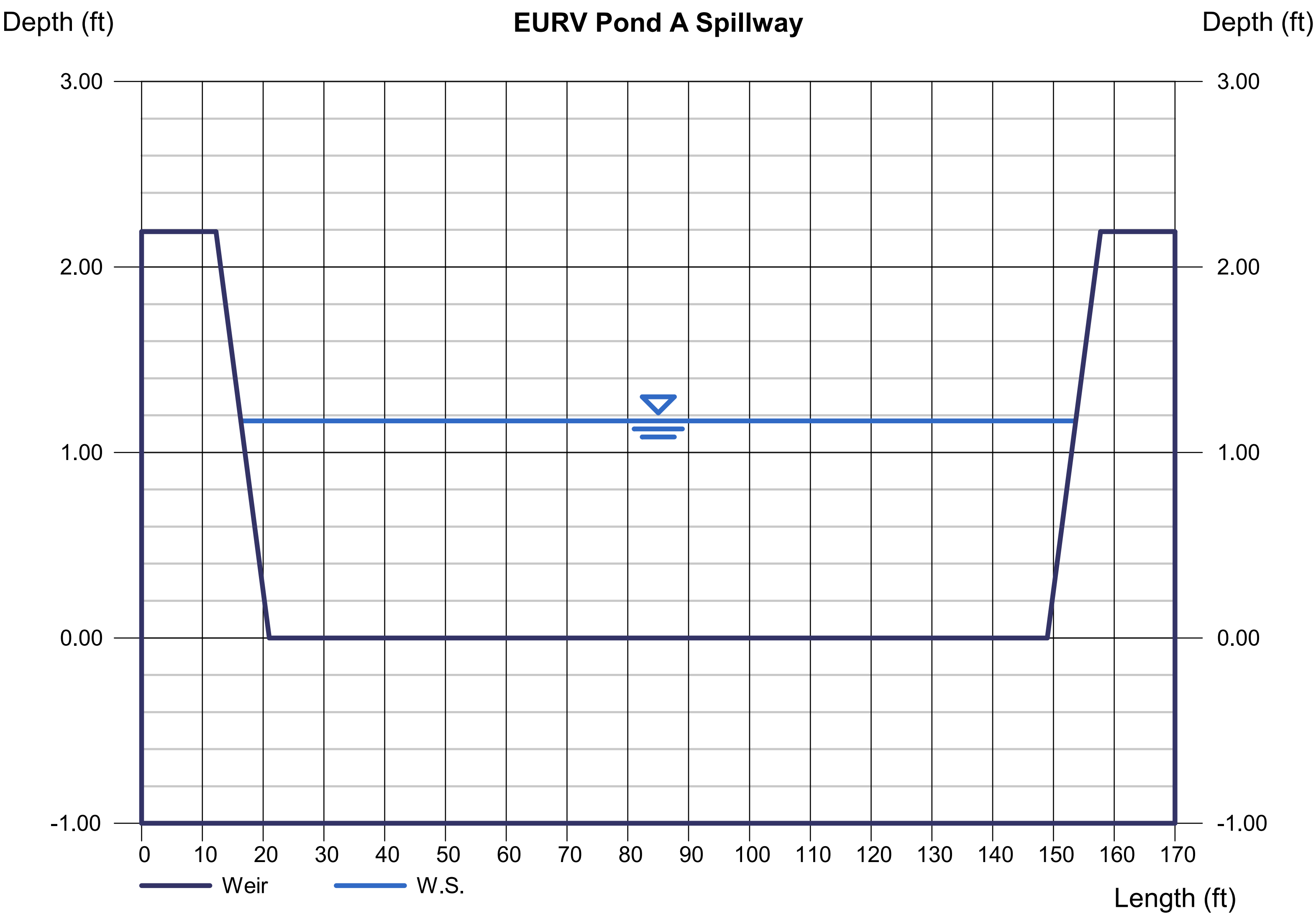
Weir Report

EURV Pond A Spillway

Trapezoidal Weir		**Highlighted**	
Crest	= Sharp	Depth (ft)	= 1.17
Bottom Length (ft)	= 128.00	Q (cfs)	= 515.30
Total Depth (ft)	= 2.19	Area (sqft)	= 155.24
Side Slope (z:1)	= 4.00	Velocity (ft/s)	= 3.32
		Top Width (ft)	= 137.36

Calculations

Weir Coeff. Cw	= 3.10
Compute by:	Known Q
Known Q (cfs)	= 515.30



APPENDIX E

REFERENCE MATERIAL

MASTER DRAINAGE PLAN
FOR
RIDGEGATE – HAPPY CANYON CREEK AND BADGER GULCH
DRAINAGE BASINS

February 2017
Revised May 2017

Prepared For:

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I. EXECUTIVE SUMMARY

The RidgeGate development is comprised of 3,514 acres in Lone Tree, Colorado. There are four major drainage basins within the RidgeGate development including Willow Creek, Cottonwood Creek, Happy Canyon Creek, and Badger Gulch. The overall master drainage plan for the RidgeGate development has been divided into three separate master drainage plans to address the four major drainage basins. This report serves as the Master Drainage Plan for the proposed RidgeGate development located within the Happy Canyon Creek and Badger Gulch Drainage Basins.

This report was authorized by the Rampart Range Metropolitan District No. 1 (RRMD1) to incorporate the latest hydrologic and hydraulic modeling software, incorporate the existing stormwater facilities, update the model to reflect current proposed land use, and provide an updated plan for future drainage improvements including the portion of RidgeGate located in the Happy Canyon Creek and Badger Gulch Basins east of Interstate 25 (I-25). Key updates in this report include:

- An updated development map with the latest proposed uses and drainage basins.
- Updated models using updated software including Colorado Urban Hydrograph Procedure (CUHP) and Storm Water Management Model (SWMM).
- New drainage analyses from I-25 to First Street/W. Parker Road including on-line 100-year peak shaving detention and off-line EURV water quality detention.

The SWMM model results for this report suggest that the objective of detaining the developed condition 100-year storm event to the allowable release rates from the 2014 MDP existing development values has been met and will continue to be met as the Happy Canyon Creek and Badger Gulch Basins continue to develop and drainage improvements are constructed per plan.

As development along Happy Canyon Creek and Badger Gulch progresses, channel stabilization will be evaluated and implemented as required to prevent erosion and maintain water quality. Channel stabilization will be addressed in future phase III drainage reports and associated development plans.

III. DRAINAGE BASINS AND SUB-BASINS

A. Major Drainage Basins

The Site is located in the middle reach of the Happy Canyon Creek Drainage Basin which is tributary to Cherry Creek. The drainage basin generally flows from southwest to northeast. There are no off-site major basins that are tributary to the Site. Badger Gulch is tributary to Happy Canyon Creek and is covered in more detail in the minor basin section to follow.

Once built out, the development will consist of residential mixed-use, commercial mixed-use, mixed-use urban neighborhood (known as "City Center"), rural residential, parks, and open space areas. Runoff in the fully developed condition will generally sheet flow to curb and gutter and/or individual on-site storm drainage collection systems where it will be routed to public storm inlets, through storm conveyance systems, through regional detention/water quality ponds, and will finally be conveyed to Happy Canyon Creek.

The Cottonwood Creek Drainage Basin is also adjacent to, and northwest of the Happy Canyon Creek Drainage Basin. According to the Cottonwood Creek Master Drainage Plan, proposed development will have an impact on the boundary between the Cottonwood Creek and Happy Canyon Creek Basins. The conceptual City Center, as currently proposed, will transfer runoff from 2.6 acres of land in the Cottonwood Creek Drainage Basin to the Happy Canyon Creek Drainage Basin.

The FHAD delineated a 100-year floodplain for Happy Canyon Creek that traverses the site from I-25 to First Street / W. Parker Road. Per the study and as shown in Table 3.1 (pg. 5), the 100-year 2-hour existing development discharge at Happy Canyon Creek and I-25 crossing was calculated as 4,899 cfs. The 100-year 2-hour existing development discharge at the Lincoln Avenue crossing downstream of the confluence with Badger Gulch was calculated as 7,079 cfs.

Historical calculations were not done with this report. Appendix B depicts the minor basins defined in the 2014 MDP. The CUHP and SWMM results for the existing development conditions from the 2014 MDP can also be found in Appendix B.

Table 3.1: Happy Canyon Creek Peak 100-year Runoff Comparison (cfs)

LOCATION	2014 FHAD/MDP*
I-25	4,899
Ridgegate Parkway	5,555
Lincoln Avenue U/S of Badger Gulch	5,897
Lincoln Avenue D/S of Badger Gulch	7,079

*Based on 100-year existing development conditions

Happy Canyon Creek within the site shows moderate channel erosion with some slight aggradation upstream of Ridgegate Parkway. Based on aerial imagery dating back to 1937 this reach of Happy Canyon Creek has been consistently stable laterally with virtually no change in sinuosity.

B. Minor Drainage Basins

The minor basins were established to define the proposed drainage patterns and runoff rates. Impervious values upstream of the site were maintained from the 2014 MDP when possible, unless updated to reflect approved drainage reports or changes to proposed development. The future land use impervious values from the 2014 MDP were used when areas of basins were outside areas that drain through RidgeGate. Impervious values within the site and directly east of I-25 are based on the RPDD4 and DTJ East Village Land Use Maps, shown in Appendix A, and future land use from the 2014 MDP, shown in Appendix B. The impervious values used for Basins A276 and A295 are taken directly from the 2014 MDP. The impervious calculations are presented in Appendix C along with the developed flow rates for each basin from the SWMM model. The developed flow rates for key design points are also summarized and presented in Table 4.1 (pg. 17).

Proposed Developed Minor Drainage Basins

The following describes each of the proposed developed minor basins in more detail. Outside of the RPDD4 map area, the basin names generally correspond with basin names from the 2014 MDP. The associated drainage basin map can be found in Appendix E.

Basin A215 (117.8 acres) is located southwest of Basin A240. The basin has not been changed from the 2014 MDP, and it is not within the proposed RidgeGate development.

Basin A230 (29.9 acres) is located west of Basin A240. The basin has not been changed from the 2014 MDP, and it is not within the proposed RidgeGate development.

Basin A235 (96.9 acres) is located northwest of Basin A240. The basin has not been changed from the 2014 MDP, and it is not within the proposed RidgeGate development.

Basin A240 (86.9 acres) is located in the furthest southwest region of the Site along Happy Canyon. Runoff from Basin A240 travels south to the north where it drains to SWMM node HC017 on Happy Canyon Creek. Approximately 21 acres of Basin A240 are zoned as open space and 2% imperviousness is assumed for the basin in the developed condition. A 13-acre portion of the basin is within the I-25 ROW. Approximately 14 acres are proposed as medium density residential. The remaining 40 acres are not within the proposed development and future developed runoff is assumed.

Basin A245 (33.1 acres) is located northwest of Basin A250. The basin has not been changed from the 2014 MDP, and it is not within the proposed RidgeGate development.

Basin A250 (35.5 acres) is adjacent to Basin A240 along Happy Canyon Creek in the southwest region of the Site. Runoff in the basin flows south to the north where it drains to SWMM node HC018 on Happy Canyon Creek. Approximately 24 acres of Basin A250 are zoned as open space and 2% imperviousness is assumed for the basin in the developed condition. A 7-acre portion of the basin is within the I-25 ROW. The remaining 5 acres of the basin are proposed as medium density residential.

Basin A260 (123.1 acres) is located north of Basin A250 and northwest of Basin A264. Runoff from Basin A260 travels southwest to the northeast where it drains to on-line 100-year peak shaving Pond 1_HC019 on Happy Canyon Creek. Runoff is further conveyed along Happy Canyon Creek to the outlet point of the basin, at SWMM node HC020. Approximately 48 acres of the proposed RidgeGate development is anticipated to drain into Happy Canyon Creek. A 15-acre portion of the basin is within the I-25 ROW, and the remaining 60 acres are not within the proposed development and existing development runoff is assumed. Approximately 17 acres of Basin A260 are zoned as open space and 2% imperviousness is assumed for the basin in the developed condition. Approximately 5 acres in the northwest corner of Basin A260 are proposed as multi-use/commercial, and 8 acres in the southeast corner are proposed as medium density residential. A planned park of 15 acres is anticipated just upstream of the proposed roadway crossing at the north terminus of the basin.

Basin A263 (119.0 acres) is located east and adjacent to Basin A264 and south and adjacent to Basin A265. Runoff travels south to north where it drains to SWMM node HC320. Storm water from Basin A263 will be collected and routed through Basin A265 to off-line EURV Pond 2 before being further conveyed to Happy Canyon Creek at SWMM node HC020. Approximately 85 acres of the proposed RidgeGate development is anticipated to drain into SWMM node HC024. Of this, 53 acres is zoned as parks and open space, and 2% imperviousness is assumed for the proposed condition. Approximately 31 acres in the north portion of Basin A263 is proposed as low density residential. The remaining 34 acres are not within the proposed development and future developed runoff is assumed.

Basin A264 (108.1 acres) is located east and adjacent to Basins A240 and A250. Runoff travels south to the north where it drains to SWMM node HC220. Storm water from Basin A264 will be collected and routed through Basin A265 to off-line EURV Pond 2 before being further conveyed to Happy Canyon Creek at SWMM node HC020. In the developed condition, a roadway will run through the basin, providing access to future rural residential developments near Happy Canyon Creek, per the RPDD4. Approximately 54 acres of the proposed RidgeGate development is anticipated to drain from Basin A264. Of this, 6 acres of the southern portion of the minor basin are proposed as low density residential while 36 acres are proposed as medium density residential. The southernmost proposed are to be developed is zoned as 12 acres of parks and open space. The remaining 55 acres of Basin A264 are not within the proposed development, therefore future developed runoff is assumed for these areas.

Basin A265 (47.6 acres) is located north and adjacent to Basin A263. Runoff travels south to north where it drains to SWMM node HC120. Stormwater from Basin A265 will be collected and routed to off-line EURV Pond 2 before being further conveyed to Happy Canyon Creek at SWMM node HC020. In the developed condition, a roadway network will run through the basin, providing access to an elementary school (7.5 acres) and the future low (17.5 acres) and medium (7.5 acres) density residential developments, per the DTJ Land Use Map. A small portion of 0.5 acres is proposed as multi-use/commercial in the northwest corner. 1.5 acres in the most northern portion of the basin is designated as park area.

Basin A270 (55.4 acres) is located northeast and adjacent to Basin A260. Runoff travels southwest to northeast where it drains to SWMM node HC021 on Happy Canyon Creek. The basin consists of a planned community park within the Happy Canyon Creek floodplain.

Basin A271 (23.3 acres) is located west and adjacent to Basin A275. Runoff drains southwest to northeast where it drains to SWMM node HC520. Stormwater will be collected and routed through Basin A275 to off-line EURV Pond 3 before being conveyed to Happy Canyon Creek at SWMM node HC020. Basin A271 is within the I-25 and Ridgegate Parkway ROW, and contains the ramp connecting the two roads. Basin A271 is not within the proposed RidgeGate development and future developed runoff is assumed.

Basin A275 (57.2 acres) is located west and adjacent to Basin A270. Runoff travels west to southeast where it drains to off-line EURV Pond 3 before being conveyed to Happy Canyon Creek at SWMM node HC020. The planned RidgeGate improvements within the basin consists of a 16-acre multi-use/commercial area between Ridgegate Parkway and South Havana Street. The remaining part of Basin A275 is not within the proposed RidgeGate development and future developed runoff is assumed.

Basin A276 (41.2 acres) is located north and adjacent to Basins A270 and A275. Runoff travels west to east where it drains to off-line EURV Pond 23 before being further conveyed to Happy Canyon Creek at SWMM node HC021. Basin A276 is within Lone Tree City Center and consists of proposed commercial and mixed-use districts.

Basin A280 (55.6 acres) is located east and adjacent to Basin A265. Runoff travels generally east to southwest where it drains to SWMM node HC420. Stormwater is collected and routed through Basin A265 to off-line EURV Pond 2 before being conveyed to Happy Canyon Creek at SWMM node HC020. The basin consists mostly of proposed low and medium density residential development while the upper hillside remains as undeveloped open space.

Basin A282 (104.2 acres) is located northeast and adjacent to Basin A280. Runoff travels south to north where it drains to SWMM node HC121. Stormwater is routed along Ridgegate Parkway and collected at off-line EURV Pond 4 before being further conveyed to Happy Canyon Creek at SWMM node HC021. For the developed condition, the basin consists of multi-use/commercial, high density, medium density, and low density residential. A small portion of the basin consists of park and open space and 2% imperviousness is assumed.

Basin A285 (52.1 acres) is located east and adjacent to Basin A282. Runoff travels south to north where it drains to SWMM node HC327. Stormwater is collected and routed through Basin A314 to off-line EURV Pond 7 before being further conveyed to Happy Canyon Creek at SWMM node HC027. The basin consists of proposed low and medium density residential, as well as multi-function residential development.

Basin A290 (89.2 acres) is located northeast of basin A270 along Happy Canyon Creek. Runoff travels southwest to northeast, towards the existing Meridian development, where it drains to SWMM node HC023. Runoff from Basin A290 will be conveyed to off-line EURV Pond 6 before reaching Happy Canyon Creek, as well as on-line 100-year peak shaving Pond 5_HC022 before reaching the basin outlet at SWMM node HC023. Basin A290 consists of 18.5 acres of proposed medium density residential area, and 34 acres of proposed low density residential to the west of Happy Canyon Creek. The proposed developed area surrounding Happy Canyon Creek on the east side of the basin is zoned as parks and open space, and is approximately 30 acres. The remaining approximately 7 acres of Basin A290 are paved roads, primarily of which is Ridgegate Parkway.

Basin A291 (134.0 acres) is located northeast and adjacent to Basin A282 and east and adjacent to Basin A290. Runoff travels south to north where it drains to SWMM node HC127. Stormwater is collected and routed to off-line EURV Pond 7 before it is further conveyed to Happy Canyon Creek, downstream of Meridian Commons, at SWMM node HC027. For the developed condition, the basin consists of mixture of multi-use/commercial, high density, medium density, and low density residential. A small portion of the basin consists of park and open space. There is approximately 10 acres in the south of the basin designated for institutional use.

Basin A295 (53.3 acres) is located northwest and adjacent to Basin A290. Runoff travels west to east where it drains to off-line EURV Pond 24 before being further conveyed to Happy Canyon Creek at SWMM node HC023. Basin A295 is within Lone Tree City Center, and consists of medium to high density residential districts as well as a portion of mixed-use development.

Basin A300 (83.6 acres) is located north of Basins A290 and A291. Basin A300 is comprised of the neighboring Meridian development and the Happy Canyon Creek floodplain area. No proposed improvements are anticipated within Basin A300 and only the basin boundary was modified from the 2014 MDP in order to match proposed grading. The built out basin drains to Happy Canyon Creek at SWMM node HC027.

Basin A305 (53.1 acres) is located northeast of Basin A291. Runoff drains south to northeast where it drains to SWMM node HC124. Stormwater is collected and routed to off-line EURV Pond 17 before it is further conveyed to Happy Canyon Creek at SWMM node HC024. The proposed development for Basin A305 consists mostly of medium density residential with a small amount of high density residential. The west border of the basin consists of parks and open space and contains off-line EURV Pond 7.

Basin A310 (37.1 acres) is located northeast of Basin A305 in the northeast region of the Site along Happy Canyon Creek. Runoff travels west to east where it drains to SWMM node HC125. Stormwater is collected and routed to off-line EURV Pond 18 before it is further conveyed to Happy Canyon Creek at SWMM node HC029. The southern portion of the basin consists of proposed middle school/high school area, while the northern portion consists of proposed multi-use/commercial area. The area surrounding Happy Canyon Creek in the center of the basin is zoned as parks and open space.

Basin A311 (37.9 acres) is located west of Basin A310 along Happy Canyon Creek. Runoff travels southwest to northeast where it drains to on-line 100-year peak shaving Pond

8_HC028 on Happy Canyon Creek. The northern half of the basin is proposed multi-use/commercial area, and the southern half surrounding the creek is designated as parks and open space area.

Basin A314 (78.3 acres) is located east and adjacent to Basin A291. Runoff travels south to north towards proposed park area, where it drains to SWMM node HC227. Stormwater is collected and conveyed to off-line EURV Pond 7 before being further conveyed to Happy Canyon Creek at SWMM node HC027. For the developed condition, the basin consists of multi-use/commercial area, and high density, medium density, low density, and multi-functional residential. A small portion of the basin consists of park and open space.

Basin A315 (36.8 acres) is located southwest of Basin A310. Runoff travels south to north where it drains to off-line EURV Pond 17 before being further conveyed to Happy Canyon Creek at SWMM node HC024. Basin A315 consists mostly of proposed middle school/high school area. The northern most portion approaching Happy Canyon Creek is designated as parks and open space.

Basin A320a (44.8 acres) is located in the furthest most northeast region of the Site along Happy Canyon Creek. Runoff travels southwest to northeast where it drains to off-line EURV Pond 18 before it is further conveyed to Happy Canyon Creek at SWMM node HC029. The southern portion of the basin consists of 8 acres of proposed middle school/high school area, and the northern portion consists of approximately 11 acres of multi-use/commercial area. The central area of the basin contains Happy Canyon Creek and the surrounding land is designated as parks and open space.

Basin A320b (11.9 acres) is located east and adjacent to Basin A320a along Happy Canyon Creek. Runoff travels southwest to northeast where it drains to Happy Canyon Creek at SWMM node SU_HC025. Basin A320b is not within the proposed RidgeGate development, and therefore future developed runoff is assumed.

Basin E150 (66.9 acres) is located on the southern edge of the proposed development and is southeast of Basin A263. Only 2 acres of the proposed RidgeGate development is anticipated to drain into Badger Gulch from Basin E150. The remaining area is not within the development limits, and therefore future development runoff is assumed. Runoff travels southwest to northeast where it drains to SWMM node BG006 on Badger Gulch.

Basin E160 (130.5 acres) is located on the southern edge of the proposed development and is northeast of Basin E150 along Badger Gulch. Runoff travels south to north where it drains to off-line EURV Pond 19 before reaching Badger Gulch at SWMM node BG007. The basin consists of almost equal parts low density residential and parks and open space.

Basin E170 (60.3 acres) is located along Badger Gulch northeast of Basin E160. Runoff travels southwest to northeast where it drains to on-line 100-year peak shaving Pond 11_BG008. Basin E170 consists of 2 acres of proposed multi-functional residential and 27 acres of proposed low density residential area. The remaining land surrounds Badger Gulch and is zoned as parks and open space.

Basin E171 (35.5 acres) is located on the southern border of the Site and is east of Basin E160. Runoff travels south to north where it drains to SWMM node BG108. Stormwater is collected and routed through Basin E180 to off-line EURV Pond 10 before reaching Badger Gulch at on-line Pond11_BG008. Basin E171 is primarily composed of proposed low density residential area with a small portion of the basin on the top of the hill side designated as parks and open space.

Basin E180 (24.8 acres) is located north of Basin E171. Runoff travels south to north where it drains to off-line EURV Pond 10 before being routed to Badger Gulch at on-line Pond 11_BG008. Basin E180 is a mix of proposed low and medium density residential space. Off-line EURV Pond 10 is located in the northwest corner of the basin.

Basin E182 (79.7acres) is located east of Basin E180. Runoff travels south to north where it drains to off-line EURV Pond 12 before being further conveyed to Badger Gulch at SWMM node BG009. Off-line EURV Pond 12 is located in the designated park area with in the basin. The northeast portion of Basin E182, which is approximately 9.2 acres in size, is proposed area to be used for an elementary school. The remaining area of Basin E182 is proposed low and medium density residential space.

Basin E183 (120.4 acres) is located on the southern edge of the Site, and is south of Basin E182. Runoff travels south to north where it drains to SWMM node BG109. Stormwater is collected and routed through Basin E182 where it is directed to off-line EURV Pond 12 before reaching Badger Gulch at SWMM node BG009. Only 8 acres of the proposed RidgeGate development is anticipated to drain to Badger Gulch from Basin E183. This area is proposed low density residential. The remaining 112 acres are not within the development limits, therefore future development runoff is assumed.

Basin E184 (78.4 acres) is located on the southern border of the Site, and is west of and adjacent to Basin E183. Runoff travels south to northeast where it drains to SWMM node BG109. Stormwater is collected and routed through Basin E182 where it is directed to off-line EURV Pond 12 before reaching Badger Gulch at SWMM node BG009. 16 acres of Basin E184 is proposed as low density residential, and 7 acres is designated as parks and open space. The remaining area in Basin E184 is not within the development limits, and therefore future development runoff is assumed.

Basin E185 (45.3 acres) is located in the most southeast region of the development Site. Runoff travels south to north where it drains to SWMM node BG109. Stormwater is collected and routed through Basin E182 where it is directed to off-line EURV Pond 12 before reaching Badger Gulch at SWMM node BG009. 2 acres of the basin are designated for utilities, and 20 acres are proposed low density residential. The remaining land in Basin E185 is not within the development limits, and therefore future developed runoff is assumed.

Basin E190 (60.0 acres) is located north of Basins E180 and E182 along Badger Gulch. Runoff travels southwest to northeast where it drains to off-line EURV Pond 20 before reaching Badger Gulch at on-line 100-year peak shaving Pond 13_BG010. Pond 13_BG010 will be located in Basin E190 directly upstream of Ridgegate Parkway. A 15-acre portion of Basin E190 is proposed as multi-functional residential. The remaining area surrounding Badger Gulch is zoned as parks and open space.

Basin E200a (102.6 acres) is located east of Basin A314 along Badger Gulch. Runoff travels south to northeast where it drains to off-line EURV Pond 22 before reaching Badger Gulch at on-line 100-year peak shaving Pond 14_BG012. Basin E200a has a proposed area of 9 acres for an elementary school, 11 acres of multi-use/commercial area, and a combined 35 acres of proposed multi-functional, high, medium, and low density residential. Area surrounding Badger Gulch is designated as parks and open space.

Basin E200b (23.5 acres) is located northeast and adjacent to Basin E200a along Badger Gulch. Runoff travels southwest to northeast where it drains to SWMM node BG013 on Badger Gulch. A small part of the basin contains proposed low density residential space and a portion of the proposed middle school/high school area. The majority of the basin is zoned as parks and open space.

Basin E200c (2.2 acres) is located east of Basin E200b along Badger Gulch. Runoff travels southwest to northeast where it reached Badger Gulch at SWMM node BG011. Basin E200c is not within the proposed RidgeGate development and therefore future developed runoff is assumed.

Basin E204a (33.7 acres) is located northeast and adjacent to Basin E182 along the eastern border of the Site. Runoff travels south to northeast where it drains to off-line EURV Pond 15 directly upstream of Ridgegate Parkway. Stormwater is collected and routed through Basin E205b where it is directed to Badger Gulch at SWMM node BG011. Basin E204a is composed of proposed low density and multi-functional residential space.

Basin E204b (8.4 acres) is located northeast and adjacent to Basin E204a. Runoff travels south to north to SWMM node BG111 before being further conveyed through Basin E205b to Badger Gulch at SWMM node BG011. Basin E204b is not within the proposed RidgeGate development and therefore future developed runoff is assumed.

Basin E205a (25.4 acres) is located north of Basin E204a and Ridgegate Parkway. Runoff travels south to north where it drains to SWMM node BG013 on Badger Gulch. Basin E205a is composed mostly of proposed multi-functional and low density residential with a small area of designated parks and open space.

Basin E205b (72.6) is located east and adjacent to Basin E205a. Runoff travels south to north where it drains to Badger Gulch at SWMM node BG011. Basin E205b is not within the proposed RidgeGate development, and therefore future developed runoff is assumed.

Basin E210a (33.1 acres) is located north and adjacent to Basin E200b along the eastern border of the Site. Runoff travels southwest to northeast where it drains to off-line EURV Pond 16 before being further conveyed to Happy Canyon Creek at SWMM node HC029. Pond 16 is located in the northeast corner of the basin. Basin E210a is composed of proposed middle school/high school area with a small portion in the southeast corner designated as parks and open space.

Basin E210b (64.9 acres) is located east and adjacent to Basin E210a along Badger Gulch. Runoff travels south to north where it reaches Badger Gulch at SWMM node BG999. Basin E210b is not within the proposed RidgeGate development, and therefore future developed runoff is assumed.

Basin E215 (15.6 acres) is located north and across Ridgegate Parkway from Basin E190. Runoff travels west to east where it drains to off-line EURV Pond 21 before reaching Badger Gulch at SWMM node BG_RG. A small reach of Badger Gulch is within Basin E215, and the surrounding area is designated parks and open space. The remaining area of Basin E215 is proposed multi-use/commercial area.

Basin F100a (32.4 acres) is located in the most southeast region of the Site, east and adjacent to Basin E182. Runoff travels south to north where it drains to EURV plus 100-year peak shaving Pond 9 before being conveyed off Site. Basin F100a is only proposed as low density residential.

Basin F100b (89.6 acres) is located east and adjacent to Basin F100a. Runoff travels south to northeast off Site. Basin F100b is not within the proposed RidgeGate development and therefore future developed runoff is assumed.

APPENDIX C – IMPERVIOUS, CUHP, AND SWMM CALCULATIONS

MERRICK & COMPANY

Merrick & Company
5970 Greenwood Plaza Blvd.
Greenwood Village, CO 80111
Ph: (303) 751-0741

Job Name: Happy Canyon Creek MDP
Job Number: 65119103
Date: 5/10/2017
By: J. Goldman

Happy Canyon Creek MDP

Composite Runoff Coefficient Calculations

Location: Ridgegate
Municipality: Douglas County/UDFCD
Minor Design Storm: N/A
Major Design Storm: 100
Soil Type: C/D

Basin Design Data		ROADS	SCHOOLS	UTIL	MF/RES	HD RES	MD RES	LD RES	MU/COM	PARK	P/OS	2014 MDP EXISTING DEVELOPMENT							
	I (%) =	100%	55%	85%	75%	50%	35%	25%	85%	10%	2%	2%	50%	75%	85%	95%			I (%)
Basin Name	SWMM Node	$A_{Paved\ Streets}$ (sf)	$A_{SCHOOL/INST}$ (sf)	A_{UTIL} (sf)	$A_{MF/RES}$ (sf)	$A_{HD\ RES}$ (sf)	$A_{MD\ RES}$ (sf)	$A_{LD\ RES}$ (sf)	$A_{Commercial/Mixed\ Use}$ (sf)	A_{PARK} (sf)	$A_{Open\ Space}$ (sf)	(sf)					A_{Total} (sf)	A_{Total} (ac)	Imp (%)
A240	A240						590,813				904,318	1,708,199	581,459				3,784,789	86.9	14.5%
A250	A250						216,756				947,035	81,746	299,576				1,545,113	35.5	15.9%
A260	A260	140,316					328,205		231,304	655,578	719,766	2,640,018	647,026				5,362,213	123.1	16.9%
A263	A263	56,124		33,166				1,353,550			2,284,824	1,457,094					5,184,758	119.0	9.6%
A264	A264	3,548					1,545,748	252,939			504,452	2,401,466					4,708,153	108.1	14.1%
A265	A265	573,636	326,700				326,700	762,300	19,602	64,241							2,073,179	47.6	52.2%
A270	A270	287,807								2,124,857							2,412,664	55.4	20.7%
A271	A271											149,749	866,507				1,016,256	23.3	42.9%
A275	A275	154,669							691,733						1,645,666		2,492,068	57.2	85.9%
A276	A276																1,794,672	41.2	81.8%
A280	A280	281,129					78,408	1,445,900		23,958	591,203						2,420,598	55.6	28.3%
A282	A282	1,266,737				819,364	373,745	1,075,932	603,742	158,679	240,059						4,538,257	104.2	57.5%
A285	A285	125,305			595,429		263,102	1,285,153									2,268,989	52.1	43.4%
A290	A290	305,432					805,424	1,493,672		354,578	926,559						3,885,666	89.2	26.1%
A291	A291	1,303,096	439,520			313,196	2,702,462		1,016,255		64,610						5,839,140	134.0	60.2%

Basin Design Data		ROADS	SCHOOLS	UTIL	MF/RES	HD RES	MD RES	LD RES	MU/COM	PARK	P/OS	2014 MDP EXISTING DEVELOPMENT							
	I (%) =	100%	55%	85%	75%	50%	35%	25%	85%	10%	2%	2%	50%	75%	85%	95%			I (%)
Basin Name	SWMM Node	$A_{Paved Streets}$ (sf)	$A_{SCHOOL/INST}$ (sf)	A_{UTIL} (sf)	$A_{MF/RES}$ (sf)	$A_{HD RES}$ (sf)	$A_{MD RES}$ (sf)	$A_{LD RES}$ (sf)	$A_{Commercial/Mixed Use}$ (sf)	A_{PARK} (sf)	$A_{Open Space}$ (sf)	(sf)					A_{Total} (sf)	A_{Total} (ac)	Imp (%)
A295	A295																2,321,748	53.3	56.3%
A300	A300										603,118		3,040,413				3,643,531	83.6	42.1%
A305	A305	301,980				182,516	1,536,361			208,217	81,893						2,310,967	53.1	41.3%
A310	A310	69,996	430,072						471,880		643,278						1,615,226	37.1	44.6%
A311	A311	80,356							776,923	220,414	498,011		73,498				1,649,202	37.9	49.1%
A314	A314	687,013			256,244	579,227	809,921		880,533	198,634							3,411,572	78.3	65.1%
A315	A315	41,144	1,475,865								84,504						1,601,513	36.8	53.4%
A320a	A320a		346,902						461,295		858,513					285,746	1,952,456	44.8	44.6%
A320b	A320b											516,937					516,937	11.9	2.0%
E150	E150			53,955				35,584			398,931	2,426,438					2,914,908	66.9	3.8%
E160	E160	147,471						3,055,003			2,277,905	206,307					5,686,686	130.5	16.9%
E170	E170	158,972			101,520			1,159,931		116,741	1,088,129						2,625,293	60.3	21.3%
E171	E171	128,626						1,282,249			133,355						1,544,230	35.5	29.3%
E180	E180	171,306					221,376	687,773									1,080,455	24.8	38.9%
E182	E182	389,886	400,884	87,120			448,811	1,510,514		634,360							3,471,575	79.7	36.9%
E183	E183	2,258						343,659			6,853	4,891,837					5,244,607	120.4	3.5%
E184	E184	53,794						715,117			295,900	2,348,346					3,413,157	78.4	8.4%
E185	E185	12,921		87,120				884,021				990,149					1,974,211	45.3	16.6%
E190	E190	594,236			645,995					123,275	1,249,736						2,613,242	60.0	42.7%
E200a	E200a	960,959	372,874		319,795	138,823	760,646	284,017	464,124	245,243	921,525						4,468,005	102.6	50.4%
E200b	E200b		228,840					31,345			762,977						1,023,162	23.5	14.6%
E200c	E200c											96,399					96,399	2.2	2.0%
E204a	E204a	66,989			386,616			1,013,187									1,466,792	33.7	41.6%

Basin Design Data		ROADS	SCHOOLS	UTIL	MF/RES	HD RES	MD RES	LD RES	MU/COM	PARK	P/OS	2014 MDP EXISTING DEVELOPMENT							
	I (%) =	100%	55%	85%	75%	50%	35%	25%	85%	10%	2%	2%	50%	75%	85%	95%			I (%)
Basin Name	SWMM Node	$A_{Paved\ Streets}$ (sf)	$A_{SCHOOL/INST}$ (sf)	A_{UTIL} (sf)	$A_{MF/RES}$ (sf)	$A_{HD\ RES}$ (sf)	$A_{MD\ RES}$ (sf)	$A_{LD\ RES}$ (sf)	$A_{Commercial/Mixed\ Use}$ (sf)	A_{PARK} (sf)	$A_{Open\ Space}$ (sf)	(sf)					A_{Total} (sf)	A_{Total} (ac)	Imp (%)
E204b	E204b												364,139				364,139	8.4	50.0%
E205a	E205a	70,741			264,616			716,011			55,565						1,106,933	25.4	40.6%
E205b	E205b											75,656	3,087,365				3,163,021	72.6	48.9%
E210a	E210a	111,504	1,239,874								90,247						1,441,625	33.1	55.2%
E210b	E210b											794,752	553,589	1,316,061	61,879		2,726,281	62.6	48.9%
E215	E215	136,894							483,679		57,064						677,637	15.6	81.0%
F100a	F100a							1,412,905									1,412,905	32.4	25.0%
F100b	F100b												3,904,801				3,904,801	89.6	50.0%
	TOTAL SITE	8,684,844	5,261,531	261,361	2,570,215	2,033,126	11,008,479	20,800,762	6,101,069	5,128,774	17,290,329	20,785,093	13,418,373	1,316,061	1,707,545	285,746	120,769,727	2772.5	32.9%

**Basins A276 and A295 percent impervious taken directly from 2014 MDP*

PROJECT: HAPPY CANYON CREEK MASTER DRAINAGE PLAN
PROJECT NO: 65119103

100YR-3HR DEVELOPED

Summary of CUHP Input Parameters (Version 2.0.0)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A100	A100	100YR-3HR	0.114	0.256	0.670	0.053	43.1	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.14
A105	A105	100YR-3HR	0.172	0.619	1.018	0.045	20.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.41	0.13	19.11
A110	A110	100YR-3HR	0.121	0.098	0.413	0.046	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	47.06
A120	A120	100YR-3HR	0.170	0.130	0.703	0.036	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	47.06
A125	A125	100YR-3HR	0.117	0.251	0.534	0.035	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	47.06
A130	A130	100YR-3HR	0.073	0.137	0.424	0.034	28.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.56	0.16	26.74
A134	A134	100YR-3HR	0.186	0.295	0.667	0.047	29.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.58	0.17	27.74
A135	A135	100YR-3HR	0.160	0.370	0.835	0.041	32.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.64	0.18	30.78
A140	A140	100YR-3HR	0.182	0.237	0.772	0.045	32.0	0.50	0.10	3.08	0.51	0.0018	0.00	0.64	0.18	30.76
A150	A150	100YR-3HR	0.180	0.144	0.746	0.043	16.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.32	0.12	14.87
A160	A160	100YR-3HR	0.167	0.210	0.598	0.049	11.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.22	0.10	10.04
A170	A170	100YR-3HR	0.136	0.275	0.537	0.041	10.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.20	0.10	9.09
A180	A180	100YR-3HR	0.133	0.158	0.761	0.038	10.0	0.50	0.10	3.38	0.53	0.0018	0.00	0.20	0.10	9.06
A190	A190	100YR-3HR	0.139	0.143	0.595	0.047	10.1	0.50	0.10	3.30	0.52	0.0018	0.00	0.20	0.10	9.17
A195	A195	100YR-3HR	0.118	0.503	0.884	0.040	14.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.28	0.11	12.93
A200	A200	100YR-3HR	0.140	0.171	0.620	0.042	14.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.28	0.11	12.93
A210	A210	100YR-3HR	0.130	0.456	0.808	0.033	20.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.40	0.13	18.82
A215	A215	100YR-3HR	0.184	0.456	0.831	0.052	7.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.14	0.07	6.35
A220	A220	100YR-3HR	0.150	0.203	0.916	0.036	18.6	0.50	0.10	3.00	0.50	0.0018	0.00	0.37	0.13	17.44
A230	A230	100YR-3HR	0.047	0.068	0.329	0.040	11.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	10.27
A234	A234	100YR-3HR	0.133	0.288	0.500	0.054	12.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.25	0.11	11.33
A235	A235	100YR-3HR	0.151	0.255	0.641	0.052	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.70
A240	A240	100YR-3HR	0.136	0.439	0.881	0.052	14.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.29	0.11	13.45
A245	A245	100YR-3HR	0.052	0.154	0.339	0.062	10.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	9.32
A250	A250	100YR-3HR	0.055	0.181	0.407	0.035	15.9	0.50	0.10	3.00	0.50	0.0018	0.00	0.32	0.12	14.81
A260	A260	100YR-3HR	0.192	0.455	2.083	0.023	16.9	0.50	0.10	3.23	0.52	0.0018	0.00	0.34	0.12	15.73
A263	A263	100YR-3HR	0.186	0.257	0.638	0.052	9.6	0.50	0.10	3.15	0.51	0.0018	0.00	0.19	0.10	8.73
A264	A264	100YR-3HR	0.169	0.537	1.042	0.049	14.1	0.50	0.10	3.23	0.52	0.0018	0.00	0.28	0.11	13.02
A265	A265	100YR-3HR	0.074	0.286	0.630	0.052	52.2	0.50	0.10	3.15	0.51	0.0018	0.00	0.86	0.24	51.28
A270	A270	100YR-3HR	0.087	0.395	0.796	0.028	20.7	0.50	0.10	3.08	0.51	0.0018	0.00	0.41	0.13	19.49
A271	A271	100YR-3HR	0.036	0.070	0.308	0.055	42.9	0.50	0.10	3.08	0.51	0.0018	0.00	0.81	0.21	41.92
A275	A275	100YR-3HR	0.089	0.134	0.426	0.055	85.9	0.50	0.10	3.08	0.51	0.0018	0.00	0.95	0.35	85.43
A276	A276	100YR-3HR	0.064	0.126	0.518	0.039	81.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.94	0.34	81.26
A280	A280	100YR-3HR	0.087	0.371	0.567	0.051	28.3	0.50	0.10	3.23	0.52	0.0018	0.00	0.57	0.16	26.98
A282	A282	100YR-3HR	0.163	0.259	0.798	0.051	57.5	0.50	0.10	3.23	0.52	0.0018	0.00	0.89	0.26	56.65

Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Depression Storage: Pervious (inches)	Depression Storage: Imperv. (inches)	Horton's Infiltration Parameters: Initial Rate (in./hr.)	Horton's Infiltration Parameters: Final Rate (in.hr.)	Horton's Infiltration Parameters: Decay Coeff. (1/sec.)	DCIA Level and Fractions: DCIA Level	DCIA Level and Fractions: Dir. Con'ct Imperv. Fraction	DCIA Level and Fractions: Receiv. Perv. Fraction	Percent Eff. Imperv.
A285	A285	100YR-3HR	0.081	0.320	0.665	0.047	43.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.44
A290	A290	100YR-3HR	0.139	0.299	0.730	0.026	26.1	0.50	0.10	3.60	0.54	0.0018	0.00	0.52	0.15	24.69
A291	A291	100YR-3HR	0.209	0.573	0.932	0.031	60.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.90	0.27	59.43
A295	A295	100YR-3HR	0.083	0.112	0.379	0.034	56.3	0.50	0.10	3.38	0.53	0.0018	0.00	0.88	0.26	55.41
A300	A300	100YR-3HR	0.131	0.301	0.665	0.023	42.1	0.50	0.10	3.53	0.54	0.0018	0.00	0.81	0.21	41.04
A305	A305	100YR-3HR	0.083	0.295	0.530	0.031	41.3	0.50	0.10	3.23	0.52	0.0018	0.00	0.81	0.20	40.29
A310	A310	100YR-3HR	0.058	0.190	0.549	0.016	44.6	0.50	0.10	4.05	0.57	0.0018	0.00	0.82	0.21	43.46
A311	A311	100YR-3HR	0.059	0.180	0.314	0.016	49.1	0.50	0.10	4.05	0.57	0.0018	0.00	0.85	0.23	48.00
A314	A314	100YR-3HR	0.122	0.470	0.797	0.028	65.1	0.50	0.10	3.15	0.51	0.0018	0.00	0.91	0.29	64.34
A315	A315	100YR-3HR	0.058	0.285	0.517	0.030	53.4	0.50	0.10	4.13	0.58	0.0018	0.00	0.87	0.24	52.34
A320a	A320a	100YR-3HR	0.070	0.126	0.383	0.016	44.6	0.50	0.10	4.05	0.57	0.0018	0.00	0.82	0.21	43.46
A320b	A320b	100YR-3HR	0.019	0.123	0.226	0.016	2.0	0.50	0.10	4.05	0.57	0.0018	0.00	0.04	0.02	1.76
A325	A325	100YR-3HR	0.133	0.248	0.650	0.022	71.1	0.50	0.10	3.75	0.55	0.0018	0.00	0.92	0.30	70.32
B100	B100	100YR-3HR	0.113	0.151	0.376	0.047	71.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.92	0.31	71.12
B110	B110	100YR-3HR	0.129	0.199	0.530	0.048	28.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.57	0.16	27.24
B120	B120	100YR-3HR	0.119	0.199	0.637	0.041	24.8	0.50	0.10	3.08	0.51	0.0018	0.00	0.50	0.15	23.53
B130	B130	100YR-3HR	0.112	0.234	0.911	0.037	10.8	0.50	0.10	3.23	0.52	0.0018	0.00	0.22	0.10	9.85
B134	B134	100YR-3HR	0.038	0.036	0.293	0.015	40.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.80	0.20	39.33
B135	B135	100YR-3HR	0.196	0.416	0.847	0.040	15.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.32	0.12	14.71
C100	C100	100YR-3HR	0.151	0.240	0.508	0.045	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.70
C110	C110	100YR-3HR	0.164	0.168	0.631	0.050	9.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.18	0.09	8.20
C120	C120	100YR-3HR	0.103	0.275	0.678	0.037	13.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.26	0.11	12.00
C125	C125	100YR-3HR	0.176	0.413	0.859	0.043	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	7.27
C130	C130	100YR-3HR	0.174	0.222	0.629	0.033	36.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.72	0.19	34.87
C140	C140	100YR-3HR	0.085	0.117	0.585	0.038	26.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.52	0.15	24.74
C150	C150	100YR-3HR	0.091	0.272	0.631	0.024	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.70
C153	C153	100YR-3HR	0.195	0.250	0.712	0.044	33.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.66	0.18	31.80
C154	C154	100YR-3HR	0.152	0.212	0.537	0.040	43.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.04
C155	C155	100YR-3HR	0.119	0.312	0.651	0.045	31.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.62	0.17	29.76
C159	C159	100YR-3HR	0.172	0.240	0.684	0.049	29.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.58	0.17	27.74
C160	C160	100YR-3HR	0.179	0.123	0.541	0.050	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	7.27
C170	C170	100YR-3HR	0.169	0.296	0.865	0.032	11.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	10.08
C175	C175	100YR-3HR	0.157	0.346	0.799	0.045	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	7.27
C180	C180	100YR-3HR	0.069	0.129	0.622	0.041	15.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.30	0.12	13.93
C185	C185	100YR-3HR	0.174	0.414	0.816	0.049	10.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.21	0.10	9.60
C190	C190	100YR-3HR	0.119	0.269	0.766	0.031	15.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.30	0.12	13.93
D100	D100	100YR-3HR	0.187	0.282	0.680	0.040	9.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.18	0.09	8.20
D110	D110	100YR-3HR	0.175	0.283	0.619	0.030	11.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	10.08
D120	D120	100YR-3HR	0.115	0.104	0.607	0.047	10.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	9.12
D130	D130	100YR-3HR	0.125	0.282	0.592	0.050	24.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.48	0.15	22.76
E100	E100	100YR-3HR	0.151	0.294	0.702	0.030	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E105	E105	100YR-3HR	0.082	0.212	0.480	0.039	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80

Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Depression Storage: Pervious (inches)	Depression Storage: Imperv. (inches)	Horton's Infiltration Parameters: Initial Rate (in./hr.)	Horton's Infiltration Parameters: Final Rate (in.hr.)	Horton's Infiltration Parameters: Decay Coeff. (1/sec.)	DCIA Level and Fractions: DCIA Level	DCIA Level and Fractions: Dir. Con'ct Imperv. Fraction	DCIA Level and Fractions: Receiv. Perv. Fraction	Percent Eff. Imperv.
E110	E110	100YR-3HR	0.129	0.196	0.468	0.045	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E120	E120	100YR-3HR	0.121	0.202	0.661	0.042	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E125	E125	100YR-3HR	0.115	0.304	0.574	0.050	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E130	E130	100YR-3HR	0.129	0.145	0.691	0.045	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E135	E135	100YR-3HR	0.159	0.329	0.676	0.048	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E140	E140	100YR-3HR	0.142	0.137	0.530	0.034	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E150	E150	100YR-3HR	0.104	0.182	0.537	0.052	3.8	0.50	0.10	3.08	0.51	0.0018	0.00	0.08	0.04	3.42
E155	E155	100YR-3HR	0.198	0.464	0.859	0.051	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E160	E160	100YR-3HR	0.204	0.247	0.634	0.038	16.9	0.50	0.10	3.83	0.56	0.0018	0.00	0.34	0.12	15.60
E170	E170	100YR-3HR	0.094	0.286	0.571	0.060	21.3	0.50	0.10	3.90	0.56	0.0018	0.00	0.43	0.14	19.88
E171	E171	100YR-3HR	0.055	0.126	0.349	0.060	29.3	0.50	0.10	3.90	0.56	0.0018	0.00	0.59	0.17	27.82
E180	E180	100YR-3HR	0.039	0.177	0.472	0.025	38.9	0.50	0.10	4.20	0.58	0.0018	0.00	0.78	0.20	37.66
E182	E182	100YR-3HR	0.125	0.250	0.479	0.039	36.9	0.50	0.10	3.60	0.54	0.0018	0.00	0.74	0.19	35.68
E183	E183	100YR-3HR	0.188	0.485	1.072	0.054	3.5	0.50	0.10	3.38	0.53	0.0018	0.00	0.07	0.04	3.13
E184	E184	100YR-3HR	0.123	0.401	0.794	0.053	8.4	0.50	0.10	3.75	0.55	0.0018	0.00	0.17	0.08	7.53
E185	E185	100YR-3HR	0.071	0.207	0.517	0.039	16.6	0.50	0.10	3.60	0.54	0.0018	0.00	0.33	0.12	15.36
E190	E190	100YR-3HR	0.094	0.190	0.650	0.026	42.7	0.50	0.10	3.75	0.55	0.0018	0.00	0.81	0.21	41.60
E200a	E200a	100YR-3HR	0.160	0.283	0.680	0.023	50.4	0.50	0.10	3.75	0.55	0.0018	0.00	0.85	0.23	49.36
E200b	E200b	100YR-3HR	0.037	0.173	0.347	0.023	14.6	0.50	0.10	3.75	0.55	0.0018	0.00	0.29	0.11	13.39
E200c	E200c	100YR-3HR	0.003	0.053	0.105	0.023	2.0	0.50	0.10	3.75	0.55	0.0018	0.00	0.00	0.02	1.76
E204a	E204a	100YR-3HR	0.053	0.170	0.465	0.029	41.6	0.50	0.10	3.00	0.50	0.0018	0.00	0.81	0.20	40.63
E204b	E204b	100YR-3HR	0.013	0.114	0.268	0.029	50.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.85	0.23	49.08
E205a	E205a	100YR-3HR	0.040	0.194	0.292	0.032	40.6	0.50	0.10	3.15	0.51	0.0018	0.00	0.80	0.20	39.60
E205b	E205b	100YR-3HR	0.113	0.262	0.606	0.032	48.9	0.50	0.10	3.15	0.51	0.0018	0.00	0.84	0.23	47.95
E210a	E210a	100YR-3HR	0.052	0.192	0.420	0.016	55.2	0.50	0.10	3.83	0.56	0.0018	0.00	0.88	0.25	54.22
E210b	E210b	100YR-3HR	0.101	0.396	0.637	0.016	48.9	0.50	0.10	3.83	0.56	0.0018	0.00	0.84	0.23	47.83
E215	E215	100YR-3HR	0.024	0.110	0.253	0.030	81.0	0.50	0.10	4.13	0.58	0.0018	0.00	0.94	0.33	80.34
F100a	F100a	100YR-3HR	0.051	0.076	0.230	0.031	25.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.50	0.15	23.75
F100b	F100b	100YR-3HR	0.140	0.267	0.535	0.031	50.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.85	0.23	49.08
F110	F110	100YR-3HR	0.164	0.167	0.424	0.023	52.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.86	0.24	51.61
F120	F120	100YR-3HR	0.194	0.377	0.668	0.028	55.6	0.50	0.10	3.08	0.51	0.0018	0.00	0.88	0.25	54.74
F125	F125	100YR-3HR	0.109	0.254	0.623	0.025	50.0	0.50	0.10	3.68	0.55	0.0018	0.00	0.85	0.23	48.97
F130	F130	100YR-3HR	0.167	0.287	0.624	0.022	51.4	0.50	0.10	3.68	0.55	0.0018	0.00	0.86	0.24	50.39

Note: Blue highlighted cells indicate basins that have been added or altered in size/ shape, or % impervious for Ridgegate Development

PROJECT: HAPPY CANYON CREEK MASTER DRAINAGE PLAN
PROJECT NO: 65119103

100YR-3HR DEVELOPED

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A100		0.092	0.188	19.9	3.17	10.3	2.24	5.3	172	265,635	2.01	534,784	39.0	180	534,733	2.46
A105		0.112	0.166	53.3	7.08	27.7	5.00	11.8	97	400,194	1.69	676,754	55.0	124	676,741	1.12
A110		0.090	0.204	9.2	1.75	4.8	1.24	2.9	392	280,317	2.08	583,746	35.0	298	583,502	3.86
A120		0.090	0.238	12.4	2.57	6.5	1.82	4.3	410	394,526	2.08	821,579	36.0	364	821,233	3.35
A125		0.090	0.201	17.7	3.05	9.2	2.15	5.1	198	271,954	2.08	566,329	38.0	202	566,231	2.70
A130		0.103	0.117	23.7	2.43	12.3	1.72	4.0	92	169,524	1.80	304,738	41.0	95	304,746	2.02
A134		0.102	0.182	25.0	3.80	13.0	2.68	6.3	224	432,231	1.81	783,051	42.0	237	783,048	1.99
A135		0.099	0.181	31.4	4.67	16.3	3.30	7.8	153	371,991	1.85	689,731	45.0	178	689,715	1.73
A140		0.099	0.192	22.4	3.61	11.6	2.55	6.0	244	423,473	1.85	782,381	41.0	252	782,311	2.16
A150		0.118	0.172	23.4	3.39	12.2	2.39	5.6	231	417,549	1.62	674,928	41.0	222	674,934	1.93
A160		0.126	0.173	26.0	3.75	13.5	2.65	6.3	193	388,904	1.54	598,879	43.0	186	598,853	1.74
A170		0.129	0.161	32.4	4.30	16.8	3.04	7.2	126	315,491	1.53	481,549	46.0	129	481,524	1.49
A180		0.129	0.160	30.2	4.01	15.7	2.83	6.7	132	309,985	1.51	467,947	45.0	132	467,918	1.54
A190		0.129	0.162	23.8	3.26	12.4	2.30	5.4	176	323,273	1.52	491,117	42.0	163	491,101	1.83
A195		0.121	0.144	57.5	6.67	29.9	4.72	11.1	62	275,020	1.59	437,021	56.0	77	437,019	1.01
A200		0.121	0.156	26.5	3.47	13.8	2.45	5.8	158	324,737	1.59	516,023	43.0	156	515,994	1.75
A210		0.112	0.146	50.7	5.98	26.4	4.23	10.0	77	301,737	1.69	509,020	53.0	96	509,011	1.16
A215		0.139	0.170	49.3	6.72	25.6	4.75	11.2	112	427,469	1.51	647,235	54.0	130	647,225	1.11
A220		0.114	0.165	32.2	4.38	16.8	3.09	7.3	140	349,316	1.67	582,587	45.0	153	582,560	1.58
A230		0.125	0.138	14.9	1.88	7.7	1.33	3.1	94	108,703	1.57	170,432	37.0	76	170,407	2.53
A234		0.124	0.162	28.5	3.84	14.8	2.72	6.4	140	309,381	1.58	489,618	44.0	142	489,605	1.66
A235		0.153	0.165	37.0	4.99	19.3	3.52	8.3	123	351,616	1.46	514,953	48.0	128	514,931	1.32
A240		0.120	0.162	44.7	5.87	23.2	4.15	9.8	91	315,447	1.61	508,544	51.0	107	508,531	1.24
A245		0.128	0.140	20.3	2.48	10.5	1.76	4.1	77	120,249	1.55	186,933	40.0	68	186,919	2.05
A250		0.118	0.145	24.4	3.01	12.7	2.13	5.0	68	128,865	1.63	210,186	42.0	67	210,174	1.88
A260		0.116	0.166	79.5	10.45	41.3	7.38	17.4	73	446,853	1.62	724,281	68.0	100	724,275	0.81
A263		0.131	0.159	32.9	4.32	17.1	3.05	7.2	170	431,970	1.53	660,806	46.0	176	660,799	1.48
A264		0.121	0.165	53.6	7.09	27.9	5.01	11.8	95	392,403	1.58	620,878	55.0	115	620,872	1.07
A265		0.088	0.171	21.5	3.12	11.2	2.21	5.2	104	172,788	2.13	368,456	39.0	115	368,408	2.42
A270		0.111	0.165	42.8	5.72	22.3	4.04	9.5	61	201,055	1.69	339,569	51.0	73	339,568	1.31
A271		0.092	0.162	8.5	1.36	4.4	0.96	2.3	128	84,518	2.00	169,441	35.0	91	169,447	3.91
A275		0.076	0.162	11.1	1.68	5.8	1.19	2.8	241	207,537	2.62	544,195	35.0	229	543,911	4.01
A276		0.077	0.145	14.6	1.93	7.6	1.36	3.2	132	149,544	2.56	383,519	36.0	142	383,437	3.44
A280		0.102	0.172	27.0	3.87	14.1	2.73	6.4	96	201,828	1.78	359,447	43.0	103	359,430	1.86

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A282		0.085	0.172	22.3	3.25	11.6	2.29	5.4	219	378,246	2.20	833,859	40.0	251	833,841	2.41
A285		0.092	0.145	29.4	3.58	15.3	2.53	6.0	83	189,082	2.02	381,466	43.0	98	381,462	1.89
A290		0.105	0.172	32.9	4.64	17.1	3.28	7.7	127	323,806	1.71	555,326	46.0	141	555,322	1.59
A291		0.084	0.166	40.7	5.47	21.1	3.86	9.1	155	486,595	2.26	1,097,732	49.0	220	1,097,730	1.64
A295		0.086	0.151	13.2	1.83	6.9	1.29	3.0	189	193,592	2.18	421,724	36.0	175	421,631	3.28
A300		0.093	0.169	29.4	4.12	15.3	2.91	6.9	133	303,468	1.96	594,724	44.0	155	594,677	1.86
A305		0.093	0.147	28.0	3.47	14.6	2.45	5.8	89	192,581	1.97	379,490	42.0	102	379,474	1.92
A310		0.091	0.160	24.4	3.30	12.7	2.33	5.5	71	134,602	1.96	263,968	41.0	78	263,954	2.09
A311		0.089	0.160	17.7	2.48	9.2	1.75	4.1	100	137,577	2.03	279,320	37.0	99	279,347	2.62
A314		0.082	0.161	35.3	4.66	18.4	3.29	7.8	104	284,298	2.32	659,140	46.0	144	659,125	1.84
A315		0.087	0.158	24.0	3.21	12.5	2.27	5.3	72	133,584	2.09	279,497	41.0	81	279,484	2.20
A320a		0.091	0.149	18.3	2.39	9.5	1.69	4.0	115	162,624	1.96	318,921	38.0	112	318,903	2.51
A320b		0.156	0.078	45.9	3.05	23.9	2.15	5.1	12	43,197	1.33	57,629	50.0	12	57,626	1.03
A325		0.080	0.162	24.1	3.29	12.5	2.32	5.5	166	309,892	2.38	738,255	40.0	206	738,227	2.41
B100		0.080	0.234	8.4	1.81	4.4	1.28	3.0	405	263,637	2.42	638,306	33.0	317	637,617	4.36
B110		0.102	0.153	22.0	2.89	11.4	2.04	4.8	176	299,948	1.80	541,294	40.0	177	541,208	2.14
B120		0.106	0.139	28.6	3.35	14.9	2.37	5.6	125	275,415	1.75	480,806	43.0	133	480,782	1.76
B130		0.126	0.145	43.0	5.08	22.3	3.59	8.5	78	260,477	1.54	400,405	50.0	88	400,393	1.22
B134		0.093	0.110	12.2	1.33	6.3	0.94	2.2	94	88,677	1.97	175,034	35.0	79	175,062	3.24
B135		0.118	0.176	41.4	5.89	21.5	4.16	9.8	142	455,812	1.63	742,838	50.0	166	742,823	1.32
C100		0.153	0.153	35.8	4.51	18.6	3.19	7.5	126	350,106	1.46	512,741	47.0	130	512,722	1.35
C110		0.133	0.155	28.1	3.64	14.6	2.58	6.1	175	379,959	1.54	584,850	43.0	173	584,834	1.65
C120		0.122	0.145	39.0	4.63	20.3	3.27	7.7	79	239,824	1.59	381,790	48.0	89	381,784	1.34
C125		0.136	0.169	49.0	6.64	25.5	4.69	11.1	108	409,255	1.53	624,788	54.0	126	624,786	1.12
C130		0.096	0.168	23.6	3.35	12.3	2.37	5.6	221	404,678	1.91	773,562	41.0	237	773,541	2.13
C140		0.105	0.151	19.7	2.59	10.3	1.83	4.3	129	196,914	1.77	348,475	39.0	123	348,479	2.27
C150		0.153	0.153	49.2	6.07	25.6	4.29	10.1	55	211,249	1.46	309,380	53.0	63	309,377	1.08
C153		0.098	0.182	23.3	3.56	12.1	2.52	5.9	251	454,046	1.87	848,359	41.0	265	848,377	2.12
C154		0.092	0.141	23.4	2.84	12.2	2.01	4.7	195	353,382	2.01	710,942	40.0	214	710,848	2.19
C155		0.100	0.155	29.5	3.81	15.3	2.69	6.3	121	275,415	1.84	506,743	43.0	136	506,704	1.79
C159		0.102	0.164	25.2	3.47	13.1	2.45	5.8	205	400,311	1.81	725,222	42.0	217	725,227	1.97
C160		0.136	0.159	22.4	3.03	11.6	2.14	5.1	240	416,643	1.53	636,067	41.0	219	636,022	1.91
C170		0.126	0.146	48.0	5.69	25.0	4.02	9.5	105	391,506	1.57	612,787	52.0	124	612,790	1.15
C175		0.136	0.150	48.1	5.85	25.0	4.13	9.7	98	364,557	1.53	556,549	53.0	113	556,545	1.13
C180		0.119	0.130	27.7	3.06	14.4	2.16	5.1	74	159,395	1.62	258,042	43.0	75	258,020	1.71
C185		0.127	0.161	45.6	5.92	23.7	4.18	9.9	114	403,679	1.56	629,152	52.0	133	629,149	1.19
C190		0.119	0.150	40.3	4.93	20.9	3.48	8.2	88	275,299	1.62	445,678	49.0	101	445,671	1.33
D100		0.133	0.170	35.8	4.98	18.6	3.52	8.3	157	435,391	1.54	670,172	47.0	168	670,161	1.40
D110		0.126	0.168	35.2	4.85	18.3	3.43	8.1	149	406,165	1.57	635,732	47.0	161	635,707	1.44
D120		0.129	0.158	21.2	2.88	11.0	2.03	4.8	162	266,773	1.55	414,004	41.0	147	413,939	2.00

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
D130		0.107	0.160	27.2	3.65	14.1	2.58	6.1	138	290,795	1.74	506,543	43.0	146	506,547	1.82
E100		0.156	0.165	48.2	6.40	25.1	4.52	10.7	94	350,826	1.45	509,498	53.0	105	509,487	1.09
E105		0.156	0.150	35.5	4.40	18.4	3.11	7.3	70	191,501	1.45	278,113	47.0	71	278,117	1.35
E110		0.156	0.161	30.4	4.06	15.8	2.87	6.8	128	300,808	1.45	436,857	45.0	125	436,826	1.50
E120		0.156	0.159	37.5	4.89	19.5	3.45	8.1	97	281,967	1.45	409,494	48.0	101	409,488	1.30
E125		0.156	0.158	41.2	5.30	21.4	3.75	8.8	84	266,727	1.45	387,361	50.0	89	387,351	1.22
E130		0.156	0.161	31.8	4.22	16.5	2.99	7.0	122	299,205	1.45	434,529	46.0	120	434,518	1.46
E135		0.156	0.166	44.5	5.97	23.1	4.22	9.9	107	369,226	1.45	536,219	52.0	118	536,211	1.16
E140		0.156	0.163	28.6	3.89	14.9	2.75	6.5	149	330,243	1.45	479,605	44.0	142	479,584	1.57
E150		0.150	0.156	30.1	3.91	15.7	2.76	6.5	104	242,751	1.47	355,751	45.0	102	355,737	1.52
E155		0.156	0.172	56.0	7.68	29.1	5.43	12.8	106	460,783	1.45	669,186	57.0	124	669,187	0.98
E160		0.117	0.171	28.9	4.09	15.0	2.89	6.8	211	473,715	1.56	739,287	44.0	212	739,200	1.62
E170		0.111	0.165	25.8	3.58	13.4	2.53	6.0	109	218,889	1.62	354,107	42.0	108	354,090	1.79
E171		0.101	0.165	12.6	1.90	6.6	1.34	3.2	132	128,865	1.74	223,783	36.0	105	223,727	2.95
E180		0.094	0.146	22.2	2.79	11.5	1.97	4.7	52	90,024	1.86	167,682	40.0	53	167,657	2.14
E182		0.095	0.146	24.1	3.00	12.5	2.12	5.0	155	289,311	1.88	542,734	41.0	164	542,676	2.05
E183		0.151	0.170	61.4	8.32	31.9	5.88	13.9	92	437,052	1.43	623,456	60.0	108	623,437	0.90
E184		0.135	0.158	46.8	5.98	24.4	4.23	10.0	78	284,592	1.45	412,226	52.0	86	412,214	1.10
E185		0.117	0.172	23.8	3.44	12.4	2.43	5.7	89	164,439	1.58	259,516	42.0	84	259,510	1.86
E190		0.092	0.154	24.8	3.22	12.9	2.28	5.4	114	217,770	1.95	425,227	41.0	124	425,169	2.07
E200a		0.089	0.167	27.8	3.87	14.5	2.74	6.5	173	372,438	2.07	770,354	42.0	205	770,325	2.00
E200b		0.120	0.085	42.5	3.07	22.1	2.17	5.1	26	85,305	1.53	130,933	48.0	28	130,925	1.21
E200c		0.156	0.036	41.2	1.45	21.4	1.03	2.4	3	7,986	1.37	10,907	47.0	2	10,907	1.12
E204a		0.093	0.145	20.6	2.61	10.7	1.84	4.3	77	122,331	1.99	243,698	39.0	80	243,692	2.36
E204b		0.089	0.077	23.6	1.69	12.3	1.20	2.8	17	30,492	2.11	64,363	40.0	19	64,345	2.22
E205a		0.093	0.113	22.4	2.24	11.6	1.58	3.7	53	92,202	1.97	181,303	40.0	56	181,281	2.21
E205b		0.089	0.166	23.8	3.33	12.4	2.35	5.6	143	263,538	2.09	549,488	41.0	162	549,479	2.23
E210a		0.086	0.149	21.9	2.80	11.4	1.98	4.7	71	120,153	2.14	256,723	39.0	78	256,681	2.37
E210b		0.089	0.164	35.5	4.78	18.5	3.38	8.0	86	235,452	2.04	480,572	46.0	109	480,555	1.68
E215		0.077	0.121	12.5	1.46	6.5	1.03	2.4	59	56,628	2.52	142,972	35.0	57	142,950	3.68
F100a		0.106	0.095	17.3	1.56	9.0	1.10	2.6	88	117,612	1.76	206,501	37.0	79	206,459	2.44
F100b		0.089	0.170	22.1	3.19	11.5	2.25	5.3	190	325,248	2.11	686,534	40.0	211	686,491	2.36
F110		0.087	0.163	17.3	2.48	9.0	1.75	4.1	283	380,494	2.15	816,622	37.0	291	816,638	2.78
F120		0.086	0.171	28.7	4.06	14.9	2.87	6.8	203	449,632	2.19	982,818	43.0	253	982,732	2.04
F125		0.089	0.157	26.5	3.49	13.8	2.46	5.8	123	252,625	2.07	522,183	42.0	143	522,158	2.06
F130		0.088	0.167	27.1	3.78	14.1	2.67	6.3	185	388,369	2.09	810,906	42.0	219	810,883	2.04

Note: Blue highlighted cells indicate basins that have been added or altered in size/
shape, or % impervious for Ridgegate Development

PROJECT: HAPPY CANYON CREEK MASTER DRAINAGE PLAN
PROJECT NO: 65119103

100YR-2HR DEVELOPED

Summary of CUHP Input Parameters (Version 2.0.0)

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A100	A100	100YR-2HR	0.114	0.256	0.670	0.053	43.1	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.14
A105	A105	100YR-2HR	0.172	0.619	1.018	0.045	20.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.41	0.13	19.11
A110	A110	100YR-2HR	0.121	0.098	0.413	0.046	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	47.06
A120	A120	100YR-2HR	0.170	0.130	0.703	0.036	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	47.06
A125	A125	100YR-2HR	0.117	0.251	0.534	0.035	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	47.06
A130	A130	100YR-2HR	0.073	0.137	0.424	0.034	28.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.56	0.16	26.74
A134	A134	100YR-2HR	0.186	0.295	0.667	0.047	29.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.58	0.17	27.74
A135	A135	100YR-2HR	0.160	0.370	0.835	0.041	32.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.64	0.18	30.78
A140	A140	100YR-2HR	0.182	0.237	0.772	0.045	32.0	0.50	0.10	3.08	0.51	0.0018	0.00	0.64	0.18	30.76
A150	A150	100YR-2HR	0.180	0.144	0.746	0.043	16.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.32	0.12	14.87
A160	A160	100YR-2HR	0.167	0.210	0.598	0.049	11.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.22	0.10	10.04
A170	A170	100YR-2HR	0.136	0.275	0.537	0.041	10.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.20	0.10	9.09
A180	A180	100YR-2HR	0.133	0.158	0.761	0.038	10.0	0.50	0.10	3.38	0.53	0.0018	0.00	0.20	0.10	9.06
A190	A190	100YR-2HR	0.139	0.143	0.595	0.047	10.1	0.50	0.10	3.30	0.52	0.0018	0.00	0.20	0.10	9.17
A195	A195	100YR-2HR	0.118	0.503	0.884	0.040	14.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.28	0.11	12.93
A200	A200	100YR-2HR	0.140	0.171	0.620	0.042	14.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.28	0.11	12.93
A210	A210	100YR-2HR	0.130	0.456	0.808	0.033	20.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.40	0.13	18.82
A215	A215	100YR-2HR	0.184	0.456	0.831	0.052	7.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.14	0.07	6.35
A220	A220	100YR-2HR	0.150	0.203	0.916	0.036	18.6	0.50	0.10	3.00	0.50	0.0018	0.00	0.37	0.13	17.44
A230	A230	100YR-2HR	0.047	0.068	0.329	0.040	11.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	10.27
A234	A234	100YR-2HR	0.133	0.288	0.500	0.054	12.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.25	0.11	11.33
A235	A235	100YR-2HR	0.151	0.255	0.641	0.052	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.70
A240	A240	100YR-2HR	0.136	0.439	0.881	0.052	14.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.29	0.11	13.45
A245	A245	100YR-2HR	0.052	0.154	0.339	0.062	10.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	9.32
A250	A250	100YR-2HR	0.055	0.181	0.407	0.035	15.9	0.50	0.10	3.00	0.50	0.0018	0.00	0.32	0.12	14.81
A260	A260	100YR-2HR	0.192	0.455	2.083	0.023	16.9	0.50	0.10	3.23	0.52	0.0018	0.00	0.34	0.12	15.73
A263	A263	100YR-2HR	0.186	0.257	0.638	0.052	9.6	0.50	0.10	3.15	0.51	0.0018	0.00	0.19	0.10	8.73
A264	A264	100YR-2HR	0.169	0.537	1.042	0.049	14.1	0.50	0.10	3.23	0.52	0.0018	0.00	0.28	0.11	13.02
A265	A265	100YR-2HR	0.074	0.286	0.630	0.052	52.2	0.50	0.10	3.15	0.51	0.0018	0.00	0.86	0.24	51.28
A270	A270	100YR-2HR	0.087	0.395	0.796	0.028	20.7	0.50	0.10	3.08	0.51	0.0018	0.00	0.41	0.13	19.49
A271	A271	100YR-2HR	0.036	0.070	0.308	0.055	42.9	0.50	0.10	3.08	0.51	0.0018	0.00	0.81	0.21	41.92
A275	A275	100YR-2HR	0.089	0.134	0.426	0.055	85.9	0.50	0.10	3.08	0.51	0.0018	0.00	0.95	0.35	85.43
A276	A276	100YR-2HR	0.064	0.126	0.518	0.039	81.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.94	0.34	81.26
A280	A280	100YR-2HR	0.087	0.371	0.567	0.051	28.3	0.50	0.10	3.23	0.52	0.0018	0.00	0.57	0.16	26.98

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A282	A282	100YR-2HR	0.163	0.259	0.798	0.051	57.5	0.50	0.10	3.23	0.52	0.0018	0.00	0.89	0.26	56.65
A285	A285	100YR-2HR	0.081	0.320	0.665	0.047	43.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.44
A290	A290	100YR-2HR	0.139	0.299	0.730	0.026	26.1	0.50	0.10	3.60	0.54	0.0018	0.00	0.52	0.15	24.69
A291	A291	100YR-2HR	0.209	0.573	0.932	0.031	60.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.90	0.27	59.43
A295	A295	100YR-2HR	0.083	0.112	0.379	0.034	56.3	0.50	0.10	3.38	0.53	0.0018	0.00	0.88	0.26	55.41
A300	A300	100YR-2HR	0.131	0.301	0.665	0.023	42.1	0.50	0.10	3.53	0.54	0.0018	0.00	0.81	0.21	41.04
A305	A305	100YR-2HR	0.083	0.295	0.530	0.031	41.3	0.50	0.10	3.23	0.52	0.0018	0.00	0.81	0.20	40.29
A310	A310	100YR-2HR	0.058	0.190	0.549	0.016	44.6	0.50	0.10	4.05	0.57	0.0018	0.00	0.82	0.21	43.46
A311	A311	100YR-2HR	0.059	0.180	0.314	0.016	49.1	0.50	0.10	4.05	0.57	0.0018	0.00	0.85	0.23	48.00
A314	A314	100YR-2HR	0.122	0.470	0.797	0.028	65.1	0.50	0.10	3.15	0.51	0.0018	0.00	0.91	0.29	64.34
A315	A315	100YR-2HR	0.058	0.285	0.517	0.030	53.4	0.50	0.10	4.13	0.58	0.0018	0.00	0.87	0.24	52.34
A320a	A320a	100YR-2HR	0.070	0.126	0.383	0.016	44.6	0.50	0.10	4.05	0.57	0.0018	0.00	0.82	0.21	43.46
A320b	A320b	100YR-2HR	0.019	0.123	0.226	0.016	2.0	0.50	0.10	4.05	0.57	0.0018	0.00	0.04	0.02	1.76
A325	A325	100YR-2HR	0.133	0.248	0.650	0.022	71.1	0.50	0.10	3.75	0.55	0.0018	0.00	0.92	0.30	70.32
B100	B100	100YR-2HR	0.113	0.151	0.376	0.047	71.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.92	0.31	71.12
B110	B110	100YR-2HR	0.129	0.199	0.530	0.048	28.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.57	0.16	27.24
B120	B120	100YR-2HR	0.119	0.199	0.637	0.041	24.8	0.50	0.10	3.08	0.51	0.0018	0.00	0.50	0.15	23.53
B130	B130	100YR-2HR	0.112	0.234	0.911	0.037	10.8	0.50	0.10	3.23	0.52	0.0018	0.00	0.22	0.10	9.85
B134	B134	100YR-2HR	0.038	0.036	0.293	0.015	40.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.80	0.20	39.33
B135	B135	100YR-2HR	0.196	0.416	0.847	0.040	15.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.32	0.12	14.71
C100	C100	100YR-2HR	0.151	0.240	0.508	0.045	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.70
C110	C110	100YR-2HR	0.164	0.168	0.631	0.050	9.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.18	0.09	8.20
C120	C120	100YR-2HR	0.103	0.275	0.678	0.037	13.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.26	0.11	12.00
C125	C125	100YR-2HR	0.176	0.413	0.859	0.043	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	7.27
C130	C130	100YR-2HR	0.174	0.222	0.629	0.033	36.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.72	0.19	34.87
C140	C140	100YR-2HR	0.085	0.117	0.585	0.038	26.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.52	0.15	24.74
C150	C150	100YR-2HR	0.091	0.272	0.631	0.024	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.70
C153	C153	100YR-2HR	0.195	0.250	0.712	0.044	33.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.66	0.18	31.80
C154	C154	100YR-2HR	0.152	0.212	0.537	0.040	43.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.04
C155	C155	100YR-2HR	0.119	0.312	0.651	0.045	31.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.62	0.17	29.76
C159	C159	100YR-2HR	0.172	0.240	0.684	0.049	29.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.58	0.17	27.74
C160	C160	100YR-2HR	0.179	0.123	0.541	0.050	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	7.27
C170	C170	100YR-2HR	0.169	0.296	0.865	0.032	11.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	10.08
C175	C175	100YR-2HR	0.157	0.346	0.799	0.045	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	7.27
C180	C180	100YR-2HR	0.069	0.129	0.622	0.041	15.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.30	0.12	13.93
C185	C185	100YR-2HR	0.174	0.414	0.816	0.049	10.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.21	0.10	9.60
C190	C190	100YR-2HR	0.119	0.269	0.766	0.031	15.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.30	0.12	13.93
D100	D100	100YR-2HR	0.187	0.282	0.680	0.040	9.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.18	0.09	8.20
D110	D110	100YR-2HR	0.175	0.283	0.619	0.030	11.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	10.08
D120	D120	100YR-2HR	0.115	0.104	0.607	0.047	10.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	9.12
D130	D130	100YR-2HR	0.125	0.282	0.592	0.050	24.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.48	0.15	22.76

								Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	SWMM Node/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
E100	E100	100YR-2HR	0.151	0.294	0.702	0.030	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E105	E105	100YR-2HR	0.082	0.212	0.480	0.039	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E110	E110	100YR-2HR	0.129	0.196	0.468	0.045	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E120	E120	100YR-2HR	0.121	0.202	0.661	0.042	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E125	E125	100YR-2HR	0.115	0.304	0.574	0.050	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E130	E130	100YR-2HR	0.129	0.145	0.691	0.045	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E135	E135	100YR-2HR	0.159	0.329	0.676	0.048	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E140	E140	100YR-2HR	0.142	0.137	0.530	0.034	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E150	E150	100YR-2HR	0.104	0.182	0.537	0.052	3.8	0.50	0.10	3.08	0.51	0.0018	0.00	0.08	0.04	3.42
E155	E155	100YR-2HR	0.198	0.464	0.859	0.051	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.80
E160	E160	100YR-2HR	0.204	0.247	0.634	0.038	16.9	0.50	0.10	3.83	0.56	0.0018	0.00	0.34	0.12	15.60
E170	E170	100YR-2HR	0.094	0.286	0.571	0.060	21.3	0.50	0.10	3.90	0.56	0.0018	0.00	0.43	0.14	19.88
E171	E171	100YR-2HR	0.055	0.126	0.349	0.060	29.3	0.50	0.10	3.90	0.56	0.0018	0.00	0.59	0.17	27.82
E180	E180	100YR-2HR	0.039	0.177	0.472	0.025	38.9	0.50	0.10	4.20	0.58	0.0018	0.00	0.78	0.20	37.66
E182	E182	100YR-2HR	0.125	0.250	0.479	0.039	36.9	0.50	0.10	3.60	0.54	0.0018	0.00	0.74	0.19	35.68
E183	E183	100YR-2HR	0.188	0.485	1.072	0.054	3.5	0.50	0.10	3.38	0.53	0.0018	0.00	0.07	0.04	3.13
E184	E184	100YR-2HR	0.123	0.401	0.794	0.053	8.4	0.50	0.10	3.75	0.55	0.0018	0.00	0.17	0.08	7.53
E185	E185	100YR-2HR	0.071	0.207	0.517	0.039	16.6	0.50	0.10	3.60	0.54	0.0018	0.00	0.33	0.12	15.36
E190	E190	100YR-2HR	0.094	0.190	0.650	0.026	42.7	0.50	0.10	3.75	0.55	0.0018	0.00	0.81	0.21	41.60
E200a	E200a	100YR-2HR	0.160	0.283	0.680	0.023	50.4	0.50	0.10	3.75	0.55	0.0018	0.00	0.85	0.23	49.36
E200b	E200b	100YR-2HR	0.037	0.173	0.347	0.023	14.6	0.50	0.10	3.75	0.55	0.0018	0.00	0.29	0.11	13.39
E200c	E200c	100YR-2HR	0.003	0.053	0.105	0.023	2.0	0.50	0.10	3.75	0.55	0.0018	0.00	0.00	0.02	1.76
E204a	E204a	100YR-2HR	0.053	0.170	0.465	0.029	41.6	0.50	0.10	3.00	0.50	0.0018	0.00	0.81	0.20	40.63
E204b	E204b	100YR-2HR	0.013	0.114	0.268	0.029	50.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.85	0.23	49.08
E205a	E205a	100YR-2HR	0.040	0.194	0.292	0.032	40.6	0.50	0.10	3.15	0.51	0.0018	0.00	0.80	0.20	39.60
E205b	E205b	100YR-2HR	0.113	0.262	0.606	0.032	48.9	0.50	0.10	3.15	0.51	0.0018	0.00	0.84	0.23	47.95
E210a	E210a	100YR-2HR	0.052	0.192	0.420	0.016	55.2	0.50	0.10	3.83	0.56	0.0018	0.00	0.88	0.25	54.22
E210b	E210b	100YR-2HR	0.101	0.396	0.637	0.016	48.9	0.50	0.10	3.83	0.56	0.0018	0.00	0.84	0.23	47.83
E215	E215	100YR-2HR	0.024	0.110	0.253	0.030	81.0	0.50	0.10	4.13	0.58	0.0018	0.00	0.94	0.33	80.34
F100a	F100a	100YR-2HR	0.051	0.076	0.230	0.031	25.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.50	0.15	23.75
F100b	F100b	100YR-2HR	0.140	0.267	0.535	0.031	50.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.85	0.23	49.08
F110	F110	100YR-2HR	0.164	0.167	0.424	0.023	52.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.86	0.24	51.61
F120	F120	100YR-2HR	0.194	0.377	0.668	0.028	55.6	0.50	0.10	3.08	0.51	0.0018	0.00	0.88	0.25	54.74
F125	F125	100YR-2HR	0.109	0.254	0.623	0.025	50.0	0.50	0.10	3.68	0.55	0.0018	0.00	0.85	0.23	48.97
F130	F130	100YR-2HR	0.167	0.287	0.624	0.022	51.4	0.50	0.10	3.68	0.55	0.0018	0.00	0.86	0.24	50.39

PROJECT: HAPPY CANYON CREEK MASTER DRAINAGE PLAN
PROJECT NO: 65119103

100YR-2HR DEVELOPED

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 2.0.0)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A100		0.092	0.188	19.9	3.17	10.3	2.24	5.3	172	265,635	2.01	534,784	39.0	180	534,733	2.46
A105		0.112	0.166	53.3	7.08	27.7	5.00	11.8	97	400,194	1.69	676,754	55.0	124	676,741	1.12
A110		0.090	0.204	9.2	1.75	4.8	1.24	2.9	392	280,317	2.08	583,746	35.0	298	583,502	3.86
A120		0.090	0.238	12.4	2.57	6.5	1.82	4.3	410	394,526	2.08	821,579	36.0	364	821,233	3.35
A125		0.090	0.201	17.7	3.05	9.2	2.15	5.1	198	271,954	2.08	566,329	38.0	202	566,231	2.70
A130		0.103	0.117	23.7	2.43	12.3	1.72	4.0	92	169,524	1.80	304,738	41.0	95	304,746	2.02
A134		0.102	0.182	25.0	3.80	13.0	2.68	6.3	224	432,231	1.81	783,051	42.0	237	783,048	1.99
A135		0.099	0.181	31.4	4.67	16.3	3.30	7.8	153	371,991	1.85	689,731	45.0	178	689,715	1.73
A140		0.099	0.192	22.4	3.61	11.6	2.55	6.0	244	423,473	1.85	782,381	41.0	252	782,311	2.16
A150		0.118	0.172	23.4	3.39	12.2	2.39	5.6	231	417,549	1.62	674,928	41.0	222	674,934	1.93
A160		0.126	0.173	26.0	3.75	13.5	2.65	6.3	193	388,904	1.54	598,879	43.0	186	598,853	1.74
A170		0.129	0.161	32.4	4.30	16.8	3.04	7.2	126	315,491	1.53	481,549	46.0	129	481,524	1.49
A180		0.129	0.160	30.2	4.01	15.7	2.83	6.7	132	309,985	1.51	467,947	45.0	132	467,918	1.54
A190		0.129	0.162	23.8	3.26	12.4	2.30	5.4	176	323,273	1.52	491,117	42.0	163	491,101	1.83
A195		0.121	0.144	57.5	6.67	29.9	4.72	11.1	62	275,020	1.59	437,021	56.0	77	437,019	1.01
A200		0.121	0.156	26.5	3.47	13.8	2.45	5.8	158	324,737	1.59	516,023	43.0	156	515,994	1.75
A210		0.112	0.146	50.7	5.98	26.4	4.23	10.0	77	301,737	1.69	509,020	53.0	96	509,011	1.16
A215		0.139	0.170	49.3	6.72	25.6	4.75	11.2	112	427,469	1.51	647,235	54.0	130	647,225	1.11
A220		0.114	0.165	32.2	4.38	16.8	3.09	7.3	140	349,316	1.66	580,371	45.0	153	580,343	1.58
A230		0.125	0.138	14.9	1.88	7.7	1.33	3.1	94	108,703	1.57	170,182	37.0	76	170,157	2.53
A234		0.124	0.162	28.5	3.84	14.8	2.72	6.4	140	309,381	1.58	488,759	44.0	142	488,747	1.66
A235		0.153	0.165	37.0	4.99	19.3	3.52	8.3	123	351,616	1.46	514,895	48.0	128	514,873	1.32
A240		0.120	0.162	44.7	5.87	23.2	4.15	9.8	91	315,447	1.61	507,327	51.0	107	507,315	1.24
A245		0.128	0.140	20.3	2.48	10.5	1.76	4.1	77	120,249	1.55	186,704	40.0	68	186,690	2.05
A250		0.118	0.145	24.4	3.01	12.7	2.13	5.0	68	128,865	1.63	209,589	42.0	67	209,576	1.88
A260		0.116	0.166	79.5	10.45	41.3	7.38	17.4	73	446,853	1.62	721,940	68.0	100	721,935	0.81
A263		0.131	0.159	32.9	4.32	17.1	3.05	7.2	170	431,970	1.53	660,076	46.0	176	660,069	1.48
A264		0.121	0.165	53.6	7.09	27.9	5.01	11.8	95	392,403	1.58	619,448	55.0	115	619,442	1.07
A265		0.088	0.171	21.5	3.12	11.2	2.21	5.2	104	172,788	2.09	361,335	39.0	115	361,288	2.42
A270		0.111	0.165	42.8	5.72	22.3	4.04	9.5	61	201,055	1.68	337,989	51.0	73	337,988	1.31
A271		0.092	0.162	8.5	1.36	4.4	0.96	2.3	128	84,518	1.97	166,733	35.0	91	166,738	3.91
A275		0.076	0.162	11.1	1.68	5.8	1.19	2.8	241	207,537	2.55	528,635	35.0	229	528,359	4.01
A276		0.077	0.145	14.6	1.93	7.6	1.36	3.2	132	149,544	2.49	372,934	36.0	142	372,854	3.44
A280		0.102	0.172	27.0	3.87	14.1	2.73	6.4	96	201,828	1.77	356,483	43.0	103	356,465	1.86

Catchment Name/ID	User Comment for Catchment	Unit Hydrograph Parameters and Results: CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess Precip.: Excess (inches)	Excess (c.f.)	Storm Hydrograph: Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
A282		0.085	0.172	22.3	3.25	11.6	2.29	5.4	219	378,246	2.16	816,159	40.0	251	816,141	2.41
A285		0.092	0.145	29.4	3.58	15.3	2.53	6.0	83	189,082	1.98	375,318	43.0	98	375,314	1.89
A290		0.105	0.172	32.9	4.64	17.1	3.28	7.7	127	323,806	1.70	551,281	46.0	141	551,277	1.59
A291		0.084	0.166	40.7	5.47	21.1	3.86	9.1	155	486,595	2.21	1,073,545	49.0	220	1,073,543	1.64
A295		0.086	0.151	13.2	1.83	6.9	1.29	3.0	189	193,592	2.13	412,914	36.0	175	412,823	3.28
A300		0.093	0.169	29.4	4.12	15.3	2.91	6.9	133	303,468	1.93	585,229	44.0	155	585,182	1.86
A305		0.093	0.147	28.0	3.47	14.6	2.45	5.8	89	192,581	1.94	373,608	42.0	102	373,592	1.92
A310		0.091	0.160	24.4	3.30	12.7	2.33	5.5	71	134,602	1.93	259,437	41.0	78	259,424	2.09
A311		0.089	0.160	17.7	2.48	9.2	1.75	4.1	100	137,577	1.99	274,083	37.0	99	274,109	2.62
A314		0.082	0.161	35.3	4.66	18.4	3.29	7.8	104	284,298	2.26	643,693	46.0	144	643,678	1.84
A315		0.087	0.158	24.0	3.21	12.5	2.27	5.3	72	133,584	2.05	273,826	41.0	81	273,813	2.20
A320a		0.091	0.149	18.3	2.39	9.5	1.69	4.0	115	162,624	1.93	313,447	38.0	112	313,429	2.51
A320b		0.156	0.078	45.9	3.05	23.9	2.15	5.1	12	43,197	1.33	57,626	50.0	12	57,623	1.03
A325		0.080	0.162	24.1	3.29	12.5	2.32	5.5	166	309,892	2.32	719,623	40.0	206	719,595	2.41
B100		0.080	0.234	8.4	1.81	4.4	1.28	3.0	405	263,637	2.36	622,274	33.0	317	621,602	4.36
B110		0.102	0.153	22.0	2.89	11.4	2.04	4.8	176	299,948	1.79	536,826	40.0	177	536,741	2.14
B120		0.106	0.139	28.6	3.35	14.9	2.37	5.6	125	275,415	1.73	477,700	43.0	133	477,675	1.76
B130		0.126	0.145	43.0	5.08	22.3	3.59	8.5	78	260,477	1.54	399,848	50.0	88	399,836	1.22
B134		0.093	0.110	12.2	1.33	6.3	0.94	2.2	94	88,677	1.94	172,407	35.0	79	172,435	3.24
B135		0.118	0.176	41.4	5.89	21.5	4.16	9.8	142	455,812	1.63	740,752	50.0	166	740,736	1.32
C100		0.153	0.153	35.8	4.51	18.6	3.19	7.5	126	350,106	1.46	512,683	47.0	130	512,664	1.35
C110		0.133	0.155	28.1	3.64	14.6	2.58	6.1	175	379,959	1.54	584,285	43.0	173	584,269	1.65
C120		0.122	0.145	39.0	4.63	20.3	3.27	7.7	79	239,824	1.59	381,046	48.0	89	381,040	1.34
C125		0.136	0.169	49.0	6.64	25.5	4.69	11.1	108	409,255	1.53	624,308	54.0	126	624,306	1.12
C130		0.096	0.168	23.6	3.35	12.3	2.37	5.6	221	404,678	1.89	763,943	41.0	237	763,923	2.13
C140		0.105	0.151	19.7	2.59	10.3	1.83	4.3	129	196,914	1.76	346,034	39.0	123	346,037	2.27
C150		0.153	0.153	49.2	6.07	25.6	4.29	10.1	55	211,249	1.46	309,345	53.0	63	309,342	1.08
C153		0.098	0.182	23.3	3.56	12.1	2.52	5.9	251	454,046	1.85	839,291	41.0	265	839,308	2.12
C154		0.092	0.141	23.4	2.84	12.2	2.01	4.7	195	353,382	1.98	699,586	40.0	214	699,493	2.19
C155		0.100	0.155	29.5	3.81	15.3	2.69	6.3	121	275,415	1.82	501,889	43.0	136	501,851	1.79
C159		0.102	0.164	25.2	3.47	13.1	2.45	5.8	205	400,311	1.80	719,048	42.0	217	719,052	1.97
C160		0.136	0.159	22.4	3.03	11.6	2.14	5.1	240	416,643	1.53	635,578	41.0	219	635,533	1.91
C170		0.126	0.146	48.0	5.69	25.0	4.02	9.5	105	391,506	1.56	611,918	52.0	124	611,921	1.15
C175		0.136	0.150	48.1	5.85	25.0	4.13	9.7	98	364,557	1.53	556,122	53.0	113	556,117	1.13
C180		0.119	0.130	27.7	3.06	14.4	2.16	5.1	74	159,395	1.61	257,384	43.0	75	257,362	1.71
C185		0.127	0.161	45.6	5.92	23.7	4.18	9.9	114	403,679	1.56	628,336	52.0	133	628,332	1.19
C190		0.119	0.150	40.3	4.93	20.9	3.48	8.2	88	275,299	1.61	444,542	49.0	101	444,535	1.33
D100		0.133	0.170	35.8	4.98	18.6	3.52	8.3	157	435,391	1.54	669,526	47.0	168	669,514	1.40
D110		0.126	0.168	35.2	4.85	18.3	3.43	8.1	149	406,165	1.56	634,831	47.0	161	634,805	1.44
D120		0.129	0.158	21.2	2.88	11.0	2.03	4.8	162	266,773	1.55	413,515	41.0	147	413,450	2.00

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph			
Catchment Name/ID	User Comment for Catchment	CT	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)	Runoff per Unit Area (cfs/acre)
D130		0.107	0.160	27.2	3.65	14.1	2.58	6.1	138	290,795	1.73	503,471	43.0	146	503,475	1.82
E100		0.156	0.165	48.2	6.40	25.1	4.52	10.7	94	350,826	1.45	509,472	53.0	105	509,461	1.09
E105		0.156	0.150	35.5	4.40	18.4	3.11	7.3	70	191,501	1.45	278,099	47.0	71	278,103	1.35
E110		0.156	0.161	30.4	4.06	15.8	2.87	6.8	128	300,808	1.45	436,835	45.0	125	436,804	1.50
E120		0.156	0.159	37.5	4.89	19.5	3.45	8.1	97	281,967	1.45	409,474	48.0	101	409,467	1.30
E125		0.156	0.158	41.2	5.30	21.4	3.75	8.8	84	266,727	1.45	387,342	50.0	89	387,332	1.22
E130		0.156	0.161	31.8	4.22	16.5	2.99	7.0	122	299,205	1.45	434,507	46.0	120	434,496	1.46
E135		0.156	0.166	44.5	5.97	23.1	4.22	9.9	107	369,226	1.45	536,192	52.0	118	536,184	1.16
E140		0.156	0.163	28.6	3.89	14.9	2.75	6.5	149	330,243	1.45	479,580	44.0	142	479,559	1.57
E150		0.150	0.156	30.1	3.91	15.7	2.76	6.5	104	242,751	1.47	355,687	45.0	102	355,673	1.52
E155		0.156	0.172	56.0	7.68	29.1	5.43	12.8	106	460,783	1.45	669,152	57.0	124	669,153	0.98
E160		0.117	0.171	28.9	4.09	15.0	2.89	6.8	211	473,715	1.56	736,806	44.0	212	736,719	1.62
E170		0.111	0.165	25.8	3.58	13.4	2.53	6.0	109	218,889	1.61	352,286	42.0	108	352,269	1.79
E171		0.101	0.165	12.6	1.90	6.6	1.34	3.2	132	128,865	1.72	221,754	36.0	105	221,699	2.95
E180		0.094	0.146	22.2	2.79	11.5	1.97	4.7	52	90,024	1.83	165,183	40.0	53	165,159	2.14
E182		0.095	0.146	24.1	3.00	12.5	2.12	5.0	155	289,311	1.85	535,509	41.0	164	535,453	2.05
E183		0.151	0.170	61.4	8.32	31.9	5.88	13.9	92	437,052	1.43	623,358	60.0	108	623,339	0.90
E184		0.135	0.158	46.8	5.98	24.4	4.23	10.0	78	284,592	1.45	411,858	52.0	86	411,846	1.10
E185		0.117	0.172	23.8	3.44	12.4	2.43	5.7	89	164,439	1.57	258,685	42.0	84	258,679	1.86
E190		0.092	0.154	24.8	3.22	12.9	2.28	5.4	114	217,770	1.92	418,290	41.0	124	418,233	2.07
E200a		0.089	0.167	27.8	3.87	14.5	2.74	6.5	173	372,438	2.03	755,688	42.0	205	755,660	2.00
E200b		0.120	0.085	42.5	3.07	22.1	2.17	5.1	26	85,305	1.53	130,599	48.0	28	130,591	1.21
E200c		0.156	0.036	41.2	1.45	21.4	1.03	2.4	3	7,986	1.37	10,907	47.0	2	10,907	1.12
E204a		0.093	0.145	20.6	2.61	10.7	1.84	4.3	77	122,331	1.96	239,927	39.0	80	239,922	2.36
E204b		0.089	0.077	23.6	1.69	12.3	1.20	2.8	17	30,492	2.07	63,174	40.0	19	63,157	2.22
E205a		0.093	0.113	22.4	2.24	11.6	1.58	3.7	53	92,202	1.94	178,547	40.0	56	178,525	2.21
E205b		0.089	0.166	23.8	3.33	12.4	2.35	5.6	143	263,538	2.05	539,508	41.0	162	539,499	2.23
E210a		0.086	0.149	21.9	2.80	11.4	1.98	4.7	71	120,153	2.09	251,395	39.0	78	251,354	2.37
E210b		0.089	0.164	35.5	4.78	18.5	3.38	8.0	86	235,452	2.00	471,656	46.0	109	471,640	1.68
E215		0.077	0.121	12.5	1.46	6.5	1.03	2.4	59	56,628	2.45	139,010	35.0	57	138,988	3.68
F100a		0.106	0.095	17.3	1.56	9.0	1.10	2.6	88	117,612	1.74	205,152	37.0	79	205,111	2.44
F100b		0.089	0.170	22.1	3.19	11.5	2.25	5.3	190	325,248	2.07	673,858	40.0	211	673,816	2.36
F110		0.087	0.163	17.3	2.48	9.0	1.75	4.1	283	380,494	2.10	800,823	37.0	291	800,838	2.78
F120		0.086	0.171	28.7	4.06	14.9	2.87	6.8	203	449,632	2.14	962,690	43.0	253	962,606	2.04
F125		0.089	0.157	26.5	3.49	13.8	2.46	5.8	123	252,625	2.03	512,337	42.0	143	512,313	2.06
F130		0.088	0.167	27.1	3.78	14.1	2.67	6.3	185	388,369	2.05	795,218	42.0	219	795,195	2.04

PROJECT: HAPPY CANYON CREEK MDP & FHAD
PROJECT NO: 65119103

100YR-2HR EXISTING DEVELOPMENT

Summary of CUHP Input Parameters (Version 1.3.3)

							Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A100	100-2HR	0.114	0.256	0.670	0.053	43.1	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	41.59
A105	100-2HR	0.172	0.619	1.018	0.045	20.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.41	0.13	18.49
A110	100-2HR	0.121	0.098	0.413	0.046	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	46.54
A120	100-2HR	0.170	0.130	0.703	0.036	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	46.54
A125	100-2HR	0.117	0.251	0.534	0.035	48.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.84	0.22	46.54
A130	100-2HR	0.073	0.137	0.424	0.034	28.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.56	0.16	26.07
A134	100-2HR	0.186	0.295	0.667	0.047	29.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.58	0.17	27.07
A135	100-2HR	0.160	0.370	0.835	0.041	32.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.64	0.18	30.12
A140	100-2HR	0.182	0.237	0.772	0.045	31.7	0.50	0.10	3.08	0.51	0.0018	0.00	0.63	0.18	29.81
A150	100-2HR	0.180	0.144	0.746	0.043	16.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.32	0.12	14.33
A160	100-2HR	0.167	0.210	0.598	0.049	11.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.22	0.10	9.58
A170	100-2HR	0.136	0.275	0.537	0.041	9.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.18	0.09	7.76
A180	100-2HR	0.133	0.158	0.761	0.038	7.2	0.50	0.10	3.38	0.53	0.0018	0.00	0.14	0.07	6.17
A190	100-2HR	0.139	0.143	0.595	0.047	8.5	0.50	0.10	3.30	0.52	0.0018	0.00	0.17	0.09	7.32
A195	100-2HR	0.118	0.503	0.884	0.040	13.9	0.50	0.10	3.15	0.51	0.0018	0.00	0.28	0.11	12.32
A200	100-2HR	0.140	0.171	0.620	0.042	14.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.28	0.11	12.41
A210	100-2HR	0.130	0.456	0.808	0.033	19.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.40	0.13	18.00
A215	100-2HR	0.184	0.456	0.831	0.052	7.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.14	0.07	6.00
A220	100-2HR	0.150	0.203	0.916	0.036	6.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.13	0.06	5.47
A230	100-2HR	0.047	0.068	0.329	0.040	10.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.21	0.10	9.02
A234	100-2HR	0.133	0.288	0.500	0.054	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
A235	100-2HR	0.151	0.255	0.641	0.052	2.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.37
A240	100-2HR	0.136	0.137	0.756	0.052	10.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	8.65
A245	100-2HR	0.052	0.154	0.339	0.062	10.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	8.83
A250	100-2HR	0.064	0.243	0.526	0.035	11.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	9.77
A260	100-2HR	0.161	0.380	0.817	0.023	9.1	0.50	0.10	3.23	0.52	0.0018	0.00	0.18	0.09	7.85
A263	100-2HR	0.121	0.405	0.790	0.052	2.0	0.50	0.10	3.15	0.51	0.0018	0.00	0.04	0.02	1.69
A264	100-2HR	0.153	0.525	1.027	0.049	2.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.04	0.02	1.69
A265	100-2HR	0.080	0.255	0.656	0.053	2.0	0.50	0.10	3.38	0.53	0.0018	0.00	0.04	0.02	1.69
A270	100-2HR	0.151	0.954	1.402	0.028	2.4	0.50	0.10	3.08	0.51	0.0018	0.00	0.05	0.02	2.03
A275	100-2HR	0.136	0.209	0.536	0.055	14.6	0.50	0.10	3.08	0.51	0.0018	0.00	0.29	0.11	12.99
A276	100-2HR	0.064	0.126	0.518	0.039	10.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	8.65
A280	100-2HR	0.200	0.345	0.797	0.051	3.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.06	0.03	2.54
A285	100-2HR	0.064	0.227	0.600	0.047	3.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.54
A290	100-2HR	0.202	0.318	0.745	0.026	6.2	0.50	0.10	3.60	0.54	0.0018	0.00	0.12	0.06	5.30

							Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
A295	100-2HR	0.083	0.112	0.379	0.034	23.6	0.50	0.10	3.38	0.53	0.0018	0.00	0.47	0.14	21.71
A300	100-2HR	0.181	0.316	0.677	0.023	38.0	0.50	0.10	3.53	0.54	0.0018	0.00	0.76	0.19	36.35
A304	100-2HR	0.156	0.414	0.972	0.031	4.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.09	0.04	3.74
A305	100-2HR	0.072	0.301	0.665	0.031	2.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.04	0.02	1.69
A310	100-2HR	0.123	0.250	0.720	0.016	3.7	0.50	0.10	4.05	0.57	0.0018	0.00	0.07	0.04	3.14
A314	100-2HR	0.129	0.573	1.055	0.028	4.3	0.50	0.10	3.15	0.51	0.0018	0.00	0.09	0.04	3.65
A315	100-2HR	0.112	0.407	1.038	0.030	2.7	0.50	0.10	4.13	0.58	0.0018	0.00	0.05	0.03	2.28
A320	100-2HR	0.089	0.277	0.727	0.016	15.8	0.50	0.10	4.05	0.57	0.0018	0.00	0.32	0.12	14.13
A325	100-2HR	0.133	0.248	0.650	0.022	58.4	0.50	0.10	3.75	0.55	0.0018	0.00	0.89	0.26	57.14
A330	100-2HR	0.158	0.259	0.948	0.019	16.2	0.50	0.10	3.90	0.56	0.0018	0.00	0.32	0.12	14.52
A340	100-2HR	0.174	0.555	1.134	0.019	9.0	0.50	0.10	3.23	0.52	0.0018	0.00	0.18	0.09	7.76
A345	100-2HR	0.061	0.341	0.662	0.015	17.8	0.50	0.10	4.43	0.60	0.0018	0.00	0.36	0.12	16.06
A350	100-2HR	0.100	0.205	0.706	0.020	15.0	0.50	0.10	3.75	0.55	0.0018	0.00	0.30	0.12	13.37
A360	100-2HR	0.181	0.390	0.989	0.015	14.6	0.50	0.10	4.20	0.58	0.0018	0.00	0.29	0.11	12.99
A370	100-2HR	0.116	0.127	0.657	0.018	20.7	0.50	0.10	4.28	0.59	0.0018	0.00	0.41	0.13	18.88
A375	100-2HR	0.143	0.595	1.231	0.022	14.0	0.50	0.10	3.90	0.56	0.0018	0.00	0.28	0.11	12.41
A380	100-2HR	0.177	0.268	0.768	0.014	8.6	0.50	0.10	4.53	0.68	0.0016	0.00	0.17	0.09	7.40
A390	100-2HR	0.173	0.446	0.963	0.016	24.7	0.50	0.10	4.08	0.65	0.0016	0.00	0.49	0.15	22.79
A395	100-2HR	0.051	0.100	0.266	0.026	23.0	0.50	0.10	4.50	0.60	0.0018	0.00	0.46	0.14	21.12
A400	100-2HR	0.166	0.281	0.742	0.026	55.4	0.50	0.10	3.60	0.54	0.0018	0.00	0.88	0.25	54.06
B100	100-2HR	0.113	0.151	0.376	0.047	44.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.90
B110	100-2HR	0.129	0.199	0.530	0.048	28.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.57	0.16	26.57
B120	100-2HR	0.119	0.199	0.637	0.041	24.8	0.50	0.10	3.08	0.51	0.0018	0.00	0.50	0.15	22.89
B130	100-2HR	0.112	0.234	0.911	0.037	9.5	0.50	0.10	3.23	0.52	0.0018	0.00	0.19	0.10	8.20
B134	100-2HR	0.038	0.036	0.293	0.015	40.3	0.50	0.10	3.00	0.50	0.0018	0.00	0.80	0.20	38.78
B135	100-2HR	0.196	0.416	0.847	0.040	15.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.31	0.12	13.75
C100	100-2HR	0.151	0.240	0.508	0.045	2.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.05	0.03	2.11
C110	100-2HR	0.164	0.168	0.631	0.050	9.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.18	0.09	7.76
C120	100-2HR	0.103	0.275	0.678	0.037	13.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.26	0.11	11.46
C125	100-2HR	0.176	0.413	0.859	0.043	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	6.87
C130	100-2HR	0.174	0.222	0.629	0.033	36.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.72	0.19	34.25
C140	100-2HR	0.085	0.117	0.585	0.038	26.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.52	0.15	24.08
C150	100-2HR	0.091	0.272	0.631	0.024	2.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.06	0.03	2.37
C153	100-2HR	0.195	0.250	0.712	0.044	33.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.66	0.18	31.14
C154	100-2HR	0.152	0.212	0.537	0.040	43.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	41.49
C155	100-2HR	0.119	0.312	0.651	0.045	31.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.62	0.17	29.09
C159	100-2HR	0.172	0.240	0.684	0.049	29.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.58	0.17	27.07
C160	100-2HR	0.179	0.123	0.541	0.050	7.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.15	0.08	6.44
C170	100-2HR	0.169	0.296	0.865	0.032	11.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	9.58
C175	100-2HR	0.157	0.346	0.799	0.045	8.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.16	0.08	6.87
C180	100-2HR	0.069	0.129	0.622	0.041	14.8	0.50	0.10	3.00	0.50	0.0018	0.00	0.30	0.11	13.18
C185	100-2HR	0.174	0.414	0.816	0.049	7.7	0.50	0.10	3.00	0.50	0.0018	0.00	0.15	0.08	6.61

							Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
C190	100-2HR	0.119	0.269	0.766	0.031	10.7	0.50	0.10	3.00	0.50	0.0018	0.00	0.21	0.10	9.30
D100	100-2HR	0.187	0.282	0.680	0.040	9.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.18	0.09	7.76
D110	100-2HR	0.175	0.283	0.619	0.030	11.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.22	0.10	9.58
D120	100-2HR	0.115	0.104	0.607	0.047	10.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.20	0.10	8.65
D130	100-2HR	0.125	0.282	0.592	0.050	24.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.48	0.15	22.10
E100	100-2HR	0.151	0.294	0.702	0.030	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E105	100-2HR	0.082	0.212	0.480	0.039	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E110	100-2HR	0.129	0.196	0.468	0.045	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E120	100-2HR	0.121	0.202	0.661	0.042	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E125	100-2HR	0.115	0.304	0.574	0.050	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E130	100-2HR	0.129	0.145	0.691	0.045	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E135	100-2HR	0.159	0.329	0.676	0.048	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E140	100-2HR	0.142	0.137	0.530	0.034	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E150	100-2HR	0.104	0.182	0.537	0.052	2.0	0.50	0.10	3.08	0.51	0.0018	0.00	0.04	0.02	1.69
E155	100-2HR	0.198	0.464	0.859	0.051	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E160	100-2HR	0.191	0.275	0.659	0.038	2.0	0.50	0.10	3.83	0.56	0.0018	0.00	0.04	0.02	1.69
E170	100-2HR	0.155	0.236	0.541	0.060	2.0	0.50	0.10	3.90	0.56	0.0018	0.00	0.04	0.02	1.69
E180	100-2HR	0.068	0.323	0.527	0.025	2.0	0.50	0.10	4.20	0.58	0.0018	0.00	0.04	0.02	1.69
E183	100-2HR	0.187	0.477	0.855	0.054	2.0	0.50	0.10	3.38	0.53	0.0018	0.00	0.04	0.02	1.69
E184	100-2HR	0.114	0.331	0.728	0.053	2.0	0.50	0.10	3.75	0.55	0.0018	0.00	0.04	0.02	1.69
E185	100-2HR	0.199	0.358	1.043	0.039	2.0	0.50	0.10	3.60	0.54	0.0018	0.00	0.04	0.02	1.69
E190	100-2HR	0.095	0.124	0.521	0.026	2.0	0.50	0.10	3.75	0.55	0.0018	0.00	0.04	0.02	1.69
E200	100-2HR	0.168	0.543	0.870	0.023	5.4	0.50	0.10	3.75	0.55	0.0018	0.00	0.11	0.05	4.60
E204	100-2HR	0.066	0.202	0.481	0.029	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
E205	100-2HR	0.156	0.369	0.798	0.032	35.2	0.50	0.10	3.15	0.51	0.0018	0.00	0.70	0.19	33.42
E210	100-2HR	0.150	0.507	1.092	0.016	9.2	0.50	0.10	3.83	0.56	0.0018	0.00	0.18	0.09	7.93
F100	100-2HR	0.145	0.152	0.511	0.031	2.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.04	0.02	1.69
F110	100-2HR	0.164	0.167	0.424	0.023	6.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.13	0.07	5.56
F120	100-2HR	0.194	0.377	0.668	0.028	38.3	0.50	0.10	3.08	0.51	0.0018	0.00	0.77	0.19	36.67
F125	100-2HR	0.109	0.254	0.623	0.025	2.0	0.50	0.10	3.68	0.55	0.0018	0.00	0.04	0.02	1.69
F130	100-2HR	0.167	0.287	0.624	0.022	4.7	0.50	0.10	3.68	0.55	0.0018	0.00	0.09	0.05	4.00
F140	100-2HR	0.085	0.380	0.782	0.022	19.6	0.50	0.10	4.05	0.57	0.0018	0.00	0.39	0.13	17.81
G100	100-2HR	0.176	0.586	1.270	0.015	2.0	0.50	0.10	3.08	0.51	0.0018	0.00	0.04	0.02	1.69
G105	100-2HR	0.067	0.231	0.584	0.019	50.0	0.50	0.10	3.83	0.56	0.0018	0.00	0.85	0.23	48.57
G110	100-2HR	0.115	0.302	0.646	0.023	22.8	0.50	0.10	4.05	0.57	0.0018	0.00	0.46	0.14	20.92
G120	100-2HR	0.136	0.457	0.934	0.022	50.5	0.50	0.10	4.50	0.60	0.0018	0.00	0.85	0.23	49.07
H100	100-2HR	0.191	0.255	1.013	0.012	51.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.86	0.23	49.78
H110	100-2HR	0.154	0.240	0.571	0.020	44.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.90
H115	100-2HR	0.086	0.131	0.290	0.013	44.4	0.50	0.10	3.00	0.50	0.0018	0.00	0.82	0.21	42.90
H120	100-2HR	0.092	0.290	0.473	0.017	19.5	0.50	0.10	3.00	0.50	0.0018	0.00	0.39	0.13	17.71
H130	100-2HR	0.057	0.153	0.400	0.017	15.2	0.50	0.10	3.00	0.50	0.0018	0.00	0.30	0.12	13.56
H140	100-2HR	0.056	0.331	0.578	0.024	3.5	0.50	0.10	3.38	0.53	0.0018	0.00	0.07	0.04	2.97

							Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
H145	100-2HR	0.182	0.465	1.088	0.017	10.2	0.50	0.10	3.08	0.51	0.0018	0.00	0.20	0.10	8.83
H150	100-2HR	0.153	0.121	0.491	0.032	2.0	0.50	0.10	3.60	0.54	0.0018	0.00	0.04	0.02	1.69
H160	100-2HR	0.167	0.655	1.321	0.017	5.2	0.50	0.10	3.68	0.55	0.0018	0.00	0.10	0.05	4.43
H170	100-2HR	0.115	0.360	0.820	0.021	10.0	0.50	0.10	3.75	0.55	0.0018	0.00	0.20	0.10	8.65
H180	100-2HR	0.145	0.207	0.744	0.019	21.1	0.50	0.10	3.75	0.55	0.0018	0.00	0.42	0.13	19.27
H185	100-2HR	0.185	0.350	0.966	0.022	19.0	0.50	0.10	3.00	0.50	0.0018	0.00	0.38	0.13	17.22
H190	100-2HR	0.150	0.106	0.543	0.035	43.8	0.50	0.10	3.38	0.53	0.0018	0.00	0.82	0.21	42.30
H200	100-2HR	0.130	0.234	0.691	0.019	23.4	0.50	0.10	3.90	0.56	0.0018	0.00	0.47	0.14	21.51
H205	100-2HR	0.101	0.155	0.360	0.035	35.8	0.50	0.10	3.75	0.55	0.0018	0.00	0.72	0.19	34.04
H210	100-2HR	0.187	0.288	0.629	0.022	4.9	0.50	0.10	3.80	0.59	0.0017	0.00	0.10	0.05	4.17
H220	100-2HR	0.079	0.290	0.472	0.027	4.4	0.50	0.10	3.55	0.61	0.0016	0.00	0.09	0.04	3.74

PROJECT: HAPPY CANYON CREEK MDP & FHAD
PROJECT NO: 65119103

100YR-2HR EXISTING DEVELOPMENT

Summary of Unit Hydrograph Parameters Used By Program and Calculated Results (Version 1.3.3)

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph		
Catchment Name/ID	User Comment for Catchment	Ct	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)
A100		0.118	0.390	12.2	3.97	6.4	2.81	6.6	280	265,635	1.98	526,223	37.0	246	526,087
A105		0.126	0.240	41.6	7.96	21.6	5.62	13.3	124	400,194	1.68	673,729	52.0	150	673,722
A110		0.113	0.431	5.5	1.93	2.9	1.29	3.5	658	280,317	2.05	573,381	32.0	386	572,367
A120		0.101	0.453	7.4	2.58	3.8	1.72	4.8	692	394,526	2.05	806,992	34.0	479	806,231
A125		0.114	0.429	10.6	3.70	5.5	2.47	6.3	332	271,954	2.05	556,274	36.0	279	556,103
A130		0.151	0.245	16.7	3.43	8.7	2.43	5.7	131	169,524	1.78	302,301	38.0	121	302,217
A134		0.112	0.288	17.4	4.15	9.0	2.93	6.9	321	432,231	1.80	776,384	39.0	304	776,142
A135		0.114	0.304	21.6	5.34	11.2	3.77	8.9	222	371,991	1.84	682,745	42.0	232	682,707
A140		0.110	0.307	15.6	3.97	8.1	2.81	6.6	351	423,473	1.82	772,754	38.0	323	772,516
A150		0.131	0.228	19.6	3.74	10.2	2.64	6.2	275	417,549	1.61	672,968	40.0	251	672,934
A160		0.144	0.221	23.3	4.26	12.1	3.01	7.1	216	388,904	1.54	598,016	42.0	203	597,964
A170		0.162	0.220	29.6	5.31	15.4	3.75	8.9	138	315,491	1.51	477,032	45.0	138	477,022
A180		0.170	0.226	28.1	5.17	14.6	3.65	8.6	142	309,985	1.47	456,461	45.0	138	456,448
A190		0.163	0.223	21.8	4.04	11.4	2.85	6.7	191	323,273	1.50	484,003	41.0	172	483,945
A195		0.154	0.211	50.0	8.40	26.0	5.93	14.0	71	275,020	1.58	435,672	55.0	86	435,658
A200		0.146	0.216	23.0	4.12	11.9	2.91	6.9	183	324,737	1.59	514,856	42.0	174	514,768
A210		0.138	0.228	40.1	7.32	20.9	5.18	12.2	97	301,737	1.68	506,023	51.0	116	505,996
A215		0.155	0.170	54.6	7.42	28.4	5.24	12.4	101	427,469	1.51	646,851	56.0	121	646,848
A220		0.167	0.165	47.2	6.27	24.6	4.43	10.4	96	349,316	1.51	526,023	53.0	109	526,009
A230		0.218	0.138	25.8	3.04	13.4	2.15	5.1	54	108,703	1.56	169,058	42.0	52	169,042
A234		0.190	0.162	44.0	5.76	22.9	4.07	9.6	91	309,381	1.45	449,284	51.0	99	449,284
A235		0.180	0.165	43.6	5.81	22.7	4.11	9.7	104	351,616	1.46	514,039	51.0	114	514,036
A240		0.158	0.162	31.2	4.19	16.2	2.96	7.0	131	316,188	1.55	490,110	45.0	135	490,071
A245		0.212	0.140	33.5	3.90	17.4	2.76	6.5	46	120,249	1.55	186,704	46.0	49	186,692
A250		0.194	0.145	52.2	6.09	27.1	4.31	10.2	37	147,546	1.57	230,995	54.0	44	230,988
A260		0.153	0.166	61.3	8.12	31.9	5.74	13.5	79	373,245	1.51	564,825	60.0	96	564,820
A263		0.196	0.159	68.0	8.62	35.4	6.09	14.4	53	280,689	1.43	402,578	64.0	64	402,578
A264		0.182	0.165	79.5	10.38	41.4	7.33	17.3	58	354,497	1.43	505,255	68.0	72	505,251
A265		0.223	0.150	59.9	7.19	31.1	5.08	12.0	40	185,926	1.41	261,714	58.0	46	261,707
A270		0.182	0.165	140.4	18.05	73.0	12.75	30.1	32	349,735	1.45	506,455	83.0	45	506,455
A275		0.146	0.162	29.6	3.98	15.4	2.81	6.6	137	314,979	1.60	504,425	44.0	142	504,386
A276		0.199	0.145	38.0	4.53	19.8	3.20	7.5	51	149,544	1.55	231,803	48.0	55	231,796
A280		0.165	0.172	49.5	6.82	25.7	4.82	11.4	121	463,571	1.44	666,430	54.0	135	666,427
A285		0.234	0.145	60.4	7.02	31.4	4.96	11.7	32	149,335	1.46	218,681	58.0	38	218,678
A290		0.153	0.172	50.0	6.90	26.0	4.88	11.5	121	468,961	1.43	672,959	54.0	135	672,961

Catchment Name/ID	User Comment for Catchment	Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph		
		Ct	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)
A295		0.152	0.151	23.4	3.01	12.2	2.12	5.0	107	193,592	1.69	327,096	41.0	105	327,047
A300		0.105	0.169	34.3	4.76	17.9	3.37	7.9	158	421,266	1.87	788,630	46.0	191	788,635
A304		0.172	0.166	72.8	9.55	37.8	6.75	15.9	64	362,652	1.48	537,241	66.0	82	537,232
A305		0.230	0.147	78.0	9.14	40.6	6.46	15.2	28	167,874	1.43	239,267	67.0	35	239,266
A310		0.188	0.160	65.4	8.32	34.0	5.88	13.9	56	285,707	1.36	387,354	62.0	64	387,341
A314		0.183	0.161	99.2	12.55	51.6	8.87	20.9	39	298,810	1.46	437,011	73.0	52	437,010
A315		0.198	0.158	90.4	11.24	47.0	7.94	18.7	37	261,035	1.34	348,542	71.0	45	348,539
A320		0.164	0.149	65.2	7.73	33.9	5.46	12.9	41	205,696	1.52	312,378	61.0	50	312,379
A325		0.103	0.162	31.0	4.15	16.1	2.93	6.9	129	309,892	2.14	663,666	44.0	164	663,599
A330		0.136	0.149	56.5	6.75	29.4	4.77	11.3	84	367,414	1.54	565,220	56.0	101	565,215
A340		0.150	0.153	95.2	11.49	49.5	8.12	19.2	55	404,446	1.51	611,535	72.0	75	611,531
A345		0.179	0.126	90.2	9.03	46.9	6.38	15.0	20	141,901	1.51	214,680	69.0	27	214,681
A350		0.159	0.139	54.9	6.14	28.5	4.34	10.2	55	232,552	1.54	357,311	55.0	65	357,305
A360		0.133	0.151	71.2	8.58	37.0	6.06	14.3	76	419,663	1.49	624,218	65.0	95	624,216
A370		0.142	0.142	37.5	4.38	19.5	3.10	7.3	93	270,118	1.57	423,464	48.0	101	423,467
A375		0.145	0.145	100.8	11.50	52.4	8.13	19.2	43	332,636	1.51	501,528	73.0	58	501,525
A380		0.151	0.169	54.4	7.34	28.3	5.19	12.2	98	410,695	1.27	521,042	56.0	100	521,036
A390		0.120	0.168	60.3	8.08	31.4	5.71	13.5	86	401,844	1.55	623,292	58.0	106	623,282
A395		0.178	0.140	25.1	3.00	13.0	2.12	5.0	61	118,901	1.58	188,031	42.0	59	188,000
A400		0.098	0.166	31.3	4.28	16.3	3.03	7.1	160	386,673	2.11	814,978	44.0	202	814,965
B100		0.117	0.400	7.2	2.52	3.7	1.78	4.2	472	263,637	2.00	526,770	33.0	317	526,232
B110		0.126	0.270	15.4	3.49	8.0	2.47	5.8	251	299,948	1.79	536,826	38.0	226	536,828
B120		0.134	0.246	20.5	4.17	10.6	2.94	6.9	174	275,415	1.73	477,700	40.0	170	477,663
B130		0.170	0.213	39.3	6.72	20.4	4.75	11.2	86	260,477	1.52	395,475	50.0	94	395,464
B134		0.168	0.309	7.8	2.15	4.1	1.52	3.6	147	88,677	1.94	172,407	33.0	100	172,221
B135		0.129	0.230	34.5	6.40	17.9	4.52	10.7	171	455,812	1.62	738,388	48.0	190	738,354
C100		0.181	0.153	42.4	5.29	22.1	3.74	8.8	107	350,106	1.46	510,554	51.0	115	510,531
C110		0.153	0.155	32.4	4.16	16.8	2.94	6.9	151	379,959	1.54	584,285	46.0	157	584,233
C120		0.162	0.145	51.6	6.04	26.8	4.27	10.1	60	239,824	1.59	381,046	54.0	73	381,043
C125		0.153	0.169	55.1	7.44	28.7	5.25	12.4	96	409,255	1.53	624,308	56.0	115	624,298
C130		0.108	0.168	26.5	3.72	13.8	2.63	6.2	197	404,678	1.89	763,943	42.0	220	763,933
C140		0.147	0.151	27.7	3.52	14.4	2.49	5.9	92	196,914	1.76	346,034	43.0	98	346,017
C150		0.211	0.153	67.8	8.25	35.3	5.83	13.7	40	211,249	1.46	308,831	63.0	49	308,826
C153		0.106	0.182	25.3	3.84	13.1	2.71	6.4	232	454,046	1.85	839,291	42.0	251	839,246
C154		0.108	0.141	27.3	3.27	14.2	2.31	5.4	167	353,382	1.98	699,586	42.0	193	699,579
C155		0.126	0.155	37.3	4.74	19.4	3.35	7.9	95	275,415	1.82	501,889	47.0	116	501,872
C159		0.115	0.164	28.5	3.88	14.8	2.74	6.5	181	400,311	1.80	719,048	43.0	200	719,019
C160		0.154	0.159	25.4	3.39	13.2	2.40	5.7	212	416,643	1.52	633,022	42.0	201	633,027
C170		0.144	0.146	54.9	6.47	28.6	4.57	10.8	92	391,506	1.56	611,918	55.0	112	611,910
C175		0.159	0.150	56.1	6.77	29.2	4.79	11.3	84	364,557	1.53	556,122	56.0	101	556,124
C180		0.180	0.130	41.8	4.46	21.7	3.15	7.4	49	159,395	1.61	256,971	49.0	57	256,966
C185		0.155	0.161	55.4	7.13	28.8	5.04	11.9	94	403,679	1.52	614,316	56.0	113	614,306

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph		
Catchment Name/ID	User Comment for Catchment	Ct	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)
C190		0.162	0.150	54.6	6.58	28.4	4.65	11.0	65	275,299	1.56	429,221	55.0	79	429,219
D100		0.147	0.170	39.6	5.48	20.6	3.87	9.1	142	435,391	1.54	669,526	49.0	157	669,511
D110		0.142	0.168	39.8	5.45	20.7	3.85	9.1	132	406,165	1.56	634,831	49.0	147	634,815
D120		0.166	0.158	27.3	3.62	14.2	2.56	6.0	126	266,773	1.55	413,515	43.0	124	413,518
D130		0.133	0.160	33.9	4.47	17.6	3.16	7.5	111	290,795	1.73	503,471	46.0	126	503,454
E100		0.183	0.165	56.5	7.45	29.4	5.26	12.4	80	350,826	1.45	509,472	57.0	94	509,472
E105		0.221	0.150	50.1	6.09	26.1	4.30	10.1	49	191,501	1.45	278,099	54.0	56	278,092
E110		0.192	0.161	37.3	4.91	19.4	3.47	8.2	104	300,808	1.45	436,835	48.0	108	436,825
E120		0.196	0.159	47.0	6.05	24.4	4.27	10.1	78	281,967	1.45	409,474	53.0	86	409,464
E125		0.199	0.158	52.5	6.68	27.3	4.72	11.1	66	266,727	1.45	387,342	55.0	75	387,342
E130		0.192	0.161	39.1	5.13	20.3	3.62	8.5	99	299,205	1.45	434,507	49.0	104	434,492
E135		0.180	0.166	51.2	6.83	26.6	4.83	11.4	93	369,226	1.45	536,192	55.0	106	536,187
E140		0.187	0.163	34.2	4.58	17.8	3.24	7.6	125	330,243	1.45	479,580	47.0	126	479,565
E150		0.205	0.156	41.2	5.23	21.4	3.69	8.7	76	242,751	1.44	350,345	50.0	81	350,332
E155		0.168	0.172	60.3	8.24	31.3	5.83	13.7	99	460,783	1.45	669,152	60.0	117	669,140
E160		0.170	0.171	45.3	6.23	23.5	4.40	10.4	126	443,522	1.36	602,141	52.0	132	602,128
E170		0.182	0.165	37.7	5.09	19.6	3.59	8.5	123	360,096	1.35	485,967	49.0	121	485,947
E180		0.234	0.146	77.6	9.01	40.3	6.36	15.0	26	158,256	1.32	208,662	67.0	31	208,660
E183		0.171	0.170	61.9	8.38	32.2	5.92	14.0	91	433,649	1.41	610,415	60.0	105	610,405
E184		0.200	0.158	60.6	7.65	31.5	5.41	12.8	56	264,659	1.37	361,462	59.0	63	361,460
E185		0.168	0.172	62.3	8.52	32.4	6.02	14.2	96	463,246	1.38	640,220	61.0	110	640,216
E190		0.211	0.154	41.5	5.20	21.6	3.67	8.7	69	220,797	1.37	301,557	50.0	70	301,545
E200		0.165	0.167	79.6	10.53	41.4	7.44	17.6	63	391,180	1.41	551,124	68.0	79	551,122
E204		0.237	0.145	58.0	6.78	30.2	4.79	11.3	34	153,447	1.45	222,837	57.0	40	222,838
E205		0.112	0.166	40.3	5.42	20.9	3.83	9.0	116	362,884	1.86	676,638	49.0	147	676,620
E210		0.156	0.164	90.7	11.76	47.2	8.31	19.6	49	347,458	1.45	503,678	71.0	64	503,679
F100		0.185	0.170	34.5	4.81	17.9	3.40	8.0	126	337,120	1.45	489,567	47.0	128	489,563
F110		0.162	0.163	32.2	4.33	16.7	3.06	7.2	153	380,494	1.51	573,437	46.0	156	573,401
F120		0.103	0.171	34.1	4.78	17.8	3.38	8.0	170	449,632	1.91	859,653	46.0	208	859,644
F125		0.203	0.157	60.5	7.59	31.5	5.36	12.6	54	252,625	1.37	347,081	59.0	61	347,080
F130		0.168	0.167	51.6	6.93	26.8	4.90	11.5	97	388,369	1.41	546,824	55.0	108	546,822
F140		0.158	0.132	79.1	8.30	41.1	5.86	13.8	32	197,681	1.57	310,794	67.0	43	310,789
G100		0.175	0.168	114.9	15.16	59.7	10.71	25.3	46	407,815	1.44	588,569	78.0	62	588,569
G105		0.134	0.146	42.4	5.04	22.1	3.56	8.4	47	154,655	2.02	312,216	49.0	63	312,203
G110		0.139	0.146	50.4	5.96	26.2	4.21	9.9	68	266,030	1.62	430,192	53.0	82	430,181
G120		0.107	0.160	52.2	6.72	27.2	4.75	11.2	78	316,722	1.99	629,083	54.0	111	629,085
H100		0.096	0.171	39.6	5.49	20.6	3.88	9.1	145	444,358	2.09	927,642	48.0	197	927,625
H110		0.106	0.168	29.1	4.06	15.1	2.87	6.8	159	357,448	2.00	714,213	43.0	189	714,116
H115		0.128	0.151	23.3	3.01	12.1	2.12	5.0	110	199,284	2.00	398,188	40.0	122	398,118
H120		0.155	0.147	50.9	6.05	26.5	4.28	10.1	54	212,968	1.67	356,324	53.0	68	356,316
H130		0.190	0.142	43.4	5.04	22.6	3.56	8.4	39	131,400	1.62	212,520	50.0	46	212,515
H140		0.241	0.142	88.5	9.95	46.0	7.03	16.6	19	130,819	1.43	186,585	70.0	24	186,585

		Unit Hydrograph Parameters and Results									Excess Precip.		Storm Hydrograph		
Catchment Name/ID	User Comment for Catchment	Ct	Cp	W50 (min.)	W50 Before Peak	W75 (min.)	W75 Before Peak	Time to Peak (min.)	Peak (cfs)	Volume (c.f)	Excess (inches)	Excess (c.f.)	Time to Peak (min.)	Peak Flow (cfs)	Total Volume (c.f.)
H145		0.144	0.169	76.5	10.25	39.8	7.25	17.1	71	422,195	1.54	651,932	68.0	94	651,930
H150		0.182	0.165	30.5	4.16	15.8	2.94	6.9	151	355,031	1.38	490,664	45.0	141	490,622
H160		0.166	0.166	116.1	15.08	60.4	10.66	25.1	43	387,068	1.41	547,445	77.0	57	547,444
H170		0.167	0.142	76.9	8.70	40.0	6.15	14.5	45	266,355	1.47	390,936	67.0	57	390,937
H180		0.132	0.156	41.6	5.29	21.6	3.74	8.8	105	337,840	1.62	547,486	50.0	121	547,466
H185		0.125	0.170	51.5	7.01	26.8	4.95	11.7	108	429,188	1.67	715,303	54.0	135	715,298
H190		0.108	0.165	17.4	2.50	9.1	1.77	4.2	259	349,595	1.96	686,110	37.0	254	686,127
H200		0.133	0.161	41.8	5.47	21.7	3.87	9.1	93	300,878	1.64	493,015	50.0	108	493,002
H205		0.128	0.155	21.6	2.87	11.2	2.03	4.8	140	233,737	1.82	426,366	40.0	140	426,260
H210		0.161	0.170	48.8	6.68	25.4	4.72	11.1	115	434,183	1.34	582,696	54.0	121	582,695
H220		0.213	0.149	61.3	7.34	31.9	5.18	12.2	38	182,813	1.31	238,802	59.0	42	238,796

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.021)

HAPPY CANYON CREEK MDP & FHAD
BASELINE HYDROLOGY SWMM MODEL
100-YR, 2-HR STORM, EXISTING DEVELOPMENT

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NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units .... CFS
Process Models:
  Rainfall/Runoff .... NO
  Snowmelt .... NO
  Groundwater .... NO
  Flow Routing .... YES
  Ponding Allowed .... NO
  Water Quality .... NO
Flow Routing Method ...... KINWAVE
Starting Date JAN-01-2005 00:00:00
Ending Date JAN-05-2005 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Routing Time Step .... 30.00 sec

WARNING 08: elevation drop exceeds length for Conduit A320-DF

************************** Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	1487.642	484.770
External Outflow	1509.145	491.777
Internal Outflow	0.000	0.000
Storage Losses	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	2.768	0.902
Continuity Error (%)	-1.631	

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Highest Flow Instability Indexes
****
Link HC036-DF (49)
Link H22 (40)
Link GA999-DF (40)
Link H20 (39)
Link H18 (38)

****
Routing Time Step Summary
****
Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days	hr:min
A100	JUNCTION	0.00	0.00	6401.00	0	00:00
A105	JUNCTION	0.00	0.00	6401.00	0	00:00
A110	JUNCTION	0.00	0.00	6386.00	0	00:00
A120	JUNCTION	0.00	0.00	6347.00	0	00:00
A125	JUNCTION	0.00	0.00	6361.00	0	00:00
A130	JUNCTION	0.00	0.00	6319.00	0	00:00
A134	JUNCTION	0.00	0.00	6387.00	0	00:00
A135	JUNCTION	0.00	0.00	6319.00	0	00:00
A140	JUNCTION	0.00	0.00	6306.00	0	00:00
A150	JUNCTION	0.00	0.00	6281.00	0	00:00
A160	JUNCTION	0.00	0.00	6258.00	0	00:00
A170	JUNCTION	0.00	0.00	6239.00	0	00:00
A180	JUNCTION	0.00	0.00	6201.00	0	00:00
A190	JUNCTION	0.00	0.00	6190.00	0	00:00
A195	JUNCTION	0.00	0.00	6190.00	0	00:00
A200	JUNCTION	0.00	0.00	6161.00	0	00:00
A210	JUNCTION	0.00	0.00	6109.00	0	00:00
A215	JUNCTION	0.00	0.00	6095.00	0	00:00
A220	JUNCTION	0.00	0.00	6095.00	0	00:00
A230	JUNCTION	0.00	0.00	6086.00	0	00:00
A234	JUNCTION	0.00	0.00	6084.00	0	00:00
A235	JUNCTION	0.00	0.00	6069.00	0	00:00
A240	JUNCTION	0.00	0.00	6068.00	0	00:00
A245	JUNCTION	0.00	0.00	6047.00	0	00:00
A250	JUNCTION	0.00	0.00	6051.00	0	00:00
A260	JUNCTION	0.00	0.00	5991.00	0	00:00
A263	JUNCTION	0.00	0.00	6066.00	0	00:00
A264	JUNCTION	0.00	0.00	6066.00	0	00:00
A265	JUNCTION	0.00	0.00	6006.00	0	00:00
A270	JUNCTION	0.00	0.00	5966.00	0	00:00
A275	JUNCTION	0.00	0.00	5971.00	0	00:00
A276	JUNCTION	0.00	0.00	5971.00	0	00:00
A280	JUNCTION	0.00	0.00	5961.00	0	00:00
A285	JUNCTION	0.00	0.00	6016.00	0	00:00
A290	JUNCTION	0.00	0.00	5929.00	0	00:00
A295	JUNCTION	0.02	1.66	5994.66	0	00:41
A300	JUNCTION	0.00	0.00	5886.00	0	00:00
A304	JUNCTION	0.00	0.00	5971.00	0	00:00
A305	JUNCTION	0.00	0.00	5891.00	0	00:00
A310	JUNCTION	0.00	0.00	5870.00	0	00:00
A314	JUNCTION	0.00	0.00	5916.00	0	00:00
A315	JUNCTION	0.00	0.00	5870.00	0	00:00
A320	JUNCTION	0.00	0.00	5870.00	0	00:00
A325	JUNCTION	0.00	0.00	5836.00	0	00:00
A330	JUNCTION	0.00	0.00	5815.00	0	00:00
A340	JUNCTION	0.00	0.00	5809.00	0	00:00
A345	JUNCTION	0.00	0.00	5809.00	0	00:00
A350	JUNCTION	0.00	0.00	5795.00	0	00:00
A360	JUNCTION	0.00	0.00	5781.00	0	00:00
A370	JUNCTION	0.00	0.00	5760.00	0	00:00
A375	JUNCTION	0.00	0.00	5760.00	0	00:00
A380	JUNCTION	0.00	0.00	5737.00	0	00:00
A390	JUNCTION	0.00	0.00	5698.00	0	00:00
A395	JUNCTION	0.00	0.00	5696.00	0	00:00
A400	JUNCTION	0.00	0.00	5668.00	0	00:00
B100	JUNCTION	0.00	0.00	6381.00	0	00:00
B110	JUNCTION	0.00	0.00	6316.00	0	00:00
B120	JUNCTION	0.00	0.00	6301.00	0	00:00
B130	JUNCTION	0.00	0.00	6239.00	0	00:00
B134	JUNCTION	0.00	0.00	6361.00	0	00:00
B135	JUNCTION	0.00	0.00	6239.00	0	00:00

BG001	JUNCTION	0.05	2.43	6277.43	0	00:56
BG002	JUNCTION	0.07	2.96	6242.96	0	00:59
BG003	JUNCTION	0.08	3.72	6198.72	0	01:03
BG004	JUNCTION	0.10	4.43	6164.43	0	01:05
BG005	JUNCTION	0.11	4.71	6129.71	0	01:08
BG006	JUNCTION	0.13	5.22	6090.22	0	01:11
BG007	JUNCTION	0.14	5.46	6050.46	0	01:15
BG008	JUNCTION	0.15	5.68	6020.68	0	01:18
BG009	JUNCTION	0.18	6.18	5981.18	0	01:22
BG010	JUNCTION	0.18	6.17	5953.17	0	01:26
BG011	JUNCTION	0.18	5.70	5890.70	0	01:37
BG109	JUNCTION	0.07	2.88	6057.88	0	01:00
BG111	JUNCTION	0.04	1.75	5948.75	0	00:57
BG999	JUNCTION	0.18	5.67	5840.67	0	01:45
BH001	JUNCTION	0.02	2.97	6382.97	0	00:33
BH002	JUNCTION	0.03	2.84	6317.84	0	00:39
BH003	JUNCTION	0.04	2.92	6302.92	0	00:44
BH100	JUNCTION	0.00	0.48	6360.48	0	00:33
BH999	JUNCTION	0.04	2.80	6240.80	0	00:53
C100	JUNCTION	0.00	0.00	6441.00	0	00:00
C110	JUNCTION	0.00	0.00	6396.00	0	00:00
C120	JUNCTION	0.00	0.00	6351.00	0	00:00
C125	JUNCTION	0.00	0.00	6351.00	0	00:00
C130	JUNCTION	0.00	0.00	6311.00	0	00:00
C140	JUNCTION	0.00	0.00	6283.00	0	00:00
C150	JUNCTION	0.00	0.00	6246.00	0	00:00
C153	JUNCTION	0.00	0.00	6376.00	0	00:00
C154	JUNCTION	0.00	0.00	6307.00	0	00:00
C155	JUNCTION	0.00	0.00	6256.00	0	00:00
C159	JUNCTION	0.00	0.00	6246.00	0	00:00
C160	JUNCTION	0.00	0.00	6216.00	0	00:00
C170	JUNCTION	0.00	0.00	6171.00	0	00:00
C175	JUNCTION	0.00	0.00	6171.00	0	00:00
C180	JUNCTION	0.00	0.00	6150.00	0	00:00
C185	JUNCTION	0.00	0.00	6150.00	0	00:00
C190	JUNCTION	0.00	0.00	6109.00	0	00:00
D100	JUNCTION	0.00	0.00	6281.00	0	00:00
D110	JUNCTION	0.00	0.00	6221.00	0	00:00
D120	JUNCTION	0.00	0.00	6196.00	0	00:00
D130	JUNCTION	0.00	0.00	6109.00	0	00:00
E100	JUNCTION	0.00	0.00	6276.00	0	00:00
E105	JUNCTION	0.00	0.00	6276.00	0	00:00
E110	JUNCTION	0.00	0.00	6241.00	0	00:00
E120	JUNCTION	0.00	0.00	6196.00	0	00:00
E125	JUNCTION	0.00	0.00	6196.00	0	00:00
E130	JUNCTION	0.00	0.00	6161.00	0	00:00
E135	JUNCTION	0.00	0.00	6161.00	0	00:00
E140	JUNCTION	0.00	0.00	6126.00	0	00:00
E150	JUNCTION	0.00	0.00	6086.00	0	00:00
E155	JUNCTION	0.00	0.00	6086.00	0	00:00
E160	JUNCTION	0.00	0.00	6046.00	0	00:00
E170	JUNCTION	0.00	0.00	6021.00	0	00:00
E180	JUNCTION	0.00	0.00	5981.00	0	00:00
E183	JUNCTION	0.00	0.00	6056.00	0	00:00
E184	JUNCTION	0.00	0.00	6056.00	0	00:00
E185	JUNCTION	0.00	0.00	5981.00	0	00:00
E190	JUNCTION	0.00	0.00	5948.00	0	00:00
E200	JUNCTION	0.00	0.00	5891.00	0	00:00
E204	JUNCTION	0.00	0.00	5948.00	0	00:00
E205	JUNCTION	0.00	0.00	5886.00	0	00:00
E210	JUNCTION	0.00	0.00	5836.00	0	00:00
F100	JUNCTION	0.00	0.00	6008.00	0	00:00
F110	JUNCTION	0.00	0.00	5978.00	0	00:00
F120	JUNCTION	0.00	0.00	5906.00	0	00:00
F125	JUNCTION	0.00	0.00	5906.00	0	00:00
F130	JUNCTION	0.00	0.00	5853.00	0	00:00
F140	JUNCTION	0.00	0.00	5809.00	0	00:00
G100	JUNCTION	0.00	0.00	5887.00	0	00:00
G105	JUNCTION	0.00	0.00	5885.00	0	00:00
G110	JUNCTION	0.00	0.00	5842.00	0	00:00

G120	JUNCTION	0.00	0.00	5760.00	0	00:00
GA001	JUNCTION	0.05	2.81	5952.81	0	00:48
GA002	JUNCTION	0.08	4.02	5920.02	0	01:14
GA003	JUNCTION	0.08	1.83	5894.83	0	02:15
GA004	JUNCTION	0.17	2.06	5890.06	0	02:16
GA005	JUNCTION	0.19	2.35	5866.35	0	01:43
GA006	JUNCTION	0.20	2.35	5845.35	0	01:54
GA007	JUNCTION	0.22	2.79	5794.79	0	02:02
GA008	JUNCTION	0.17	3.07	5783.07	0	02:07
GA009	JUNCTION	0.20	3.28	5775.28	0	01:21
GA010	JUNCTION	0.21	3.51	5765.51	0	01:14
GA011	JUNCTION	0.22	4.07	5740.07	0	01:09
GA012	JUNCTION	0.23	4.29	5725.29	0	01:12
GA999	JUNCTION	0.23	4.29	5711.29	0	01:14
GV001	JUNCTION	0.04	1.88	6008.88	0	01:23
GV002	JUNCTION	0.17	1.89	5974.89	0	01:38
GV003	JUNCTION	0.21	3.11	5908.11	0	01:19
GV999	JUNCTION	0.29	3.50	5811.50	0	00:42
H100	JUNCTION	0.00	0.00	5951.00	0	00:00
H110	JUNCTION	0.00	0.00	5919.00	0	00:00
H115	JUNCTION	0.00	0.00	5919.00	0	00:00
H120	JUNCTION	0.00	0.00	5896.00	0	00:00
H130	JUNCTION	0.00	0.00	5892.00	0	00:00
H140	JUNCTION	0.00	0.00	5865.00	0	00:00
H145	JUNCTION	0.00	0.00	5865.00	0	00:00
H150	JUNCTION	0.00	0.00	5844.00	0	00:00
H160	JUNCTION	0.00	0.00	5793.00	0	00:00
H170	JUNCTION	0.00	0.00	5783.00	0	00:00
H180	JUNCTION	0.00	0.00	5783.00	0	00:00
H185	JUNCTION	0.05	2.29	5818.29	0	00:54
H190	JUNCTION	0.00	0.00	5763.00	0	00:00
H200	JUNCTION	0.00	0.00	5737.00	0	00:00
H205	JUNCTION	0.03	1.77	5738.77	0	00:40
H210	JUNCTION	0.00	0.00	5722.00	0	00:00
H220	JUNCTION	0.00	0.00	5708.00	0	00:00
HC001	JUNCTION	0.07	4.03	6404.03	0	00:41
HC002	JUNCTION	0.07	4.03	6389.03	0	00:43
HC003	JUNCTION	0.08	3.70	6343.70	0	01:02
HC004	JUNCTION	0.08	4.06	6322.06	0	00:47
HC005	JUNCTION	0.13	6.48	6306.48	0	00:58
HC006	JUNCTION	0.13	6.48	6286.48	0	00:59
HC007	JUNCTION	0.09	5.15	6262.15	0	01:02
HC008	JUNCTION	0.05	3.08	6241.08	0	01:05
HC009	JUNCTION	0.09	5.28	6242.28	0	01:03
HC010	JUNCTION	0.10	5.25	6205.25	0	01:08
HC011	JUNCTION	0.12	6.26	6195.26	0	01:09
HC012	JUNCTION	0.13	6.46	6166.46	0	01:12
HC013	JUNCTION	0.13	6.43	6114.43	0	01:17
HC014	JUNCTION	0.35	10.94	6117.94	0	01:19
HC015	JUNCTION	0.36	10.93	6104.93	0	01:21
HC016	JUNCTION	0.32	9.53	6094.53	0	01:22
HC017	JUNCTION	0.29	8.38	6075.38	0	01:24
HC018	JUNCTION	0.17	6.73	6051.73	0	01:27
HC019	JUNCTION	0.43	13.64	6013.64	0	01:31
HC020	JUNCTION	0.44	13.62	5978.62	0	01:35
HC021	JUNCTION	0.41	11.82	5966.82	0	01:36
HC022	JUNCTION	0.22	7.72	5930.72	0	01:40
HC023	JUNCTION	0.20	6.68	5891.68	0	01:45
HC024	JUNCTION	0.19	5.96	5869.96	0	01:49
HC025	JUNCTION	0.18	5.92	5840.92	0	01:53
HC026	JUNCTION	0.41	10.15	5844.15	0	01:52
HC027	JUNCTION	0.42	10.23	5824.23	0	01:56
HC028	JUNCTION	0.39	10.23	5818.23	0	01:58
HC029	JUNCTION	0.39	10.38	5817.38	0	01:57
HC030	JUNCTION	0.40	10.37	5804.37	0	01:59
HC031	JUNCTION	0.35	7.92	5787.92	0	02:03
HC032	JUNCTION	0.31	7.69	5766.69	0	02:07
HC033	JUNCTION	0.42	9.07	5767.07	0	02:06
HC034	JUNCTION	0.44	9.70	5745.70	0	02:11
HC035	JUNCTION	0.43	9.63	5715.63	0	02:20

HC036	JUNCTION	0.00	0.00	5698.00	0	00:00
HC037	JUNCTION	0.36	7.70	5702.70	0	02:19
HC103	JUNCTION	0.02	2.45	6362.45	0	00:36
HC104	JUNCTION	0.03	2.42	6388.42	0	00:39
HC116	JUNCTION	0.05	2.82	6085.82	0	00:51
HC117	JUNCTION	0.06	2.77	6070.77	0	01:02
HC119	JUNCTION	0.08	2.62	6067.62	0	01:07
HC122	JUNCTION	0.04	1.52	6016.52	0	00:58
HC123	JUNCTION	0.06	2.14	5972.14	0	01:06
HC124	JUNCTION	0.03	0.98	5915.98	0	01:13
HC999	JUNCTION	0.36	7.69	5674.69	0	02:24
MT100	JUNCTION	0.01	0.78	6375.78	0	00:42
MT110	JUNCTION	0.07	2.38	6302.38	0	01:17
OH001	JUNCTION	0.03	1.46	6441.46	0	00:51
OH002	JUNCTION	0.06	3.17	6398.17	0	00:52
OH003	JUNCTION	0.08	3.95	6353.95	0	00:57
OH004	JUNCTION	0.09	3.31	6312.31	0	01:36
OH005	JUNCTION	0.12	4.02	6285.02	0	01:28
OH006	JUNCTION	0.16	5.29	6260.29	0	01:17
OH007	JUNCTION	0.17	5.29	6250.29	0	01:20
OH008	JUNCTION	0.16	4.75	6219.75	0	01:14
OH009	JUNCTION	0.17	4.91	6174.91	0	01:22
OH010	JUNCTION	0.16	4.91	6153.91	0	01:24
OH999	JUNCTION	0.15	4.21	6112.21	0	01:29
OR001	JUNCTION	0.04	2.31	6282.31	0	00:49
OR002	JUNCTION	0.05	2.26	6222.26	0	01:03
OR003	JUNCTION	0.09	4.37	6199.37	0	01:02
OR999	JUNCTION	0.10	4.34	6112.34	0	01:11
SG001	JUNCTION	0.23	1.05	5886.05	0	03:47
SG002	JUNCTION	0.25	1.74	5885.74	0	00:50
SG003	JUNCTION	0.26	1.50	5840.50	0	02:03
SG999	JUNCTION	0.26	1.50	5760.50	0	02:07
HC-OUTFALL	OUTFALL	0.00	0.00	5666.00	0	00:00
GV004	DIVIDER	0.29	3.50	5855.50	0	00:38
GA309	STORAGE	0.17	8.52	5925.52	0	01:14
GA310	STORAGE	0.36	10.90	5904.90	0	02:15
GA311	STORAGE	2.59	6.46	5895.46	0	02:16
GA350	STORAGE	0.10	3.07	5784.07	0	02:07
HC310	STORAGE	0.24	17.28	6362.28	0	01:02
HC320	STORAGE	0.16	10.20	6311.20	0	00:58
MT300	STORAGE	0.34	8.66	6309.66	0	01:17
OH310	STORAGE	0.49	19.48	6329.48	0	01:36
OH320	STORAGE	0.36	11.40	6293.40	0	01:28
SG310	STORAGE	2.76	7.23	5893.23	0	03:47
SG320	STORAGE	2.24	6.89	5846.89	0	02:03
HC326	STORAGE	1.05	6.68	5844.68	0	02:03
GV301	STORAGE	0.10	4.95	6012.45	0	01:23
GV302	STORAGE	1.14	3.93	5977.43	0	01:38

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal
A100	JUNCTION	245.99	245.99	0	00:37	3.935	3.935
A105	JUNCTION	150.43	150.43	0	00:52	5.039	5.039
A110	JUNCTION	385.69	385.69	0	00:32	4.281	4.281
A120	JUNCTION	478.66	478.66	0	00:34	6.031	6.031
A125	JUNCTION	279.30	279.30	0	00:36	4.160	4.160
A130	JUNCTION	121.04	121.04	0	00:38	2.261	2.261
A134	JUNCTION	304.21	304.21	0	00:39	5.806	5.806
A135	JUNCTION	232.31	232.31	0	00:42	5.107	5.107
A140	JUNCTION	322.55	322.55	0	00:38	5.778	5.778
A150	JUNCTION	251.19	251.19	0	00:40	5.034	5.034

A160	JUNCTION	202.65	202.65	0 00:42	4.473	4.473
A170	JUNCTION	138.38	138.38	0 00:45	3.568	3.568
A180	JUNCTION	138.30	138.30	0 00:45	3.414	3.414
A190	JUNCTION	172.35	172.35	0 00:41	3.620	3.620
A195	JUNCTION	86.28	86.28	0 00:55	3.259	3.259
A200	JUNCTION	174.04	174.04	0 00:42	3.850	3.850
A210	JUNCTION	115.75	115.75	0 00:51	3.785	3.785
A215	JUNCTION	120.62	120.62	0 00:56	4.838	4.838
A220	JUNCTION	109.24	109.24	0 00:53	3.935	3.935
A230	JUNCTION	52.48	52.48	0 00:42	1.264	1.264
A234	JUNCTION	99.17	99.17	0 00:51	3.361	3.361
A235	JUNCTION	114.10	114.10	0 00:51	3.845	3.845
A240	JUNCTION	134.66	134.66	0 00:45	3.666	3.666
A245	JUNCTION	48.68	48.68	0 00:46	1.396	1.396
A250	JUNCTION	43.90	43.90	0 00:54	1.728	1.728
A260	JUNCTION	96.48	96.48	0 01:00	4.225	4.225
A263	JUNCTION	64.49	64.49	0 01:04	3.011	3.011
A264	JUNCTION	72.31	72.31	0 01:08	3.779	3.779
A265	JUNCTION	46.07	46.07	0 00:58	1.958	1.958
A270	JUNCTION	44.59	44.59	0 01:23	3.788	3.788
A275	JUNCTION	142.05	142.05	0 00:44	3.773	3.773
A276	JUNCTION	55.47	55.47	0 00:48	1.734	1.734
A280	JUNCTION	135.48	135.48	0 00:54	4.985	4.985
A285	JUNCTION	37.95	37.95	0 00:58	1.636	1.636
A290	JUNCTION	135.47	135.47	0 00:54	5.034	5.034
A295	JUNCTION	105.27	105.27	0 00:41	2.446	2.446
A300	JUNCTION	190.55	190.55	0 00:46	5.899	5.899
A304	JUNCTION	81.59	81.59	0 01:06	4.018	4.018
A305	JUNCTION	34.62	34.62	0 01:07	1.790	1.790
A310	JUNCTION	64.32	64.32	0 01:02	2.897	2.897
A314	JUNCTION	52.05	52.05	0 01:13	3.269	3.269
A315	JUNCTION	45.32	45.32	0 01:11	2.607	2.607
A320	JUNCTION	50.37	50.37	0 01:01	2.337	2.337
A325	JUNCTION	164.42	164.42	0 00:44	4.964	4.964
A330	JUNCTION	101.02	101.02	0 00:56	4.228	4.228
A340	JUNCTION	74.70	74.70	0 01:12	4.574	4.574
A345	JUNCTION	26.99	26.99	0 01:09	1.606	1.606
A350	JUNCTION	65.25	65.25	0 00:55	2.673	2.673
A360	JUNCTION	94.86	94.86	0 01:05	4.669	4.669
A370	JUNCTION	100.78	100.78	0 00:48	3.168	3.168
A375	JUNCTION	58.06	58.06	0 01:13	3.751	3.751
A380	JUNCTION	100.32	100.32	0 00:56	3.897	3.897
A390	JUNCTION	105.54	105.54	0 00:58	4.662	4.662
A395	JUNCTION	58.63	58.63	0 00:42	1.406	1.406
A400	JUNCTION	202.04	202.04	0 00:44	6.096	6.096
B100	JUNCTION	316.73	316.73	0 00:33	3.936	3.936
B110	JUNCTION	226.41	226.41	0 00:38	4.015	4.015
B120	JUNCTION	169.68	169.68	0 00:40	3.573	3.573
B130	JUNCTION	94.23	94.23	0 00:50	2.958	2.958
B134	JUNCTION	99.89	99.89	0 00:33	1.288	1.288
B135	JUNCTION	189.76	189.76	0 00:48	5.523	5.523
BG001	JUNCTION	0.00	148.94	0 00:56	0.000	5.891
BG002	JUNCTION	0.00	246.54	0 00:59	0.000	9.212
BG003	JUNCTION	0.00	399.81	0 01:03	0.000	15.210
BG004	JUNCTION	0.00	592.15	0 01:05	0.000	22.521
BG005	JUNCTION	0.00	693.03	0 01:08	0.000	26.179
BG006	JUNCTION	0.00	869.91	0 01:11	0.000	33.860
BG007	JUNCTION	0.00	971.84	0 01:15	0.000	38.454
BG008	JUNCTION	0.00	1053.14	0 01:18	0.000	42.142
BG009	JUNCTION	0.00	1320.62	0 01:22	0.000	55.954
BG010	JUNCTION	0.00	1361.96	0 01:26	0.000	58.250
BG011	JUNCTION	0.00	1488.59	0 01:37	0.000	69.536
BG109	JUNCTION	0.00	168.87	0 01:00	0.000	7.270
BG111	JUNCTION	0.00	39.95	0 00:57	0.000	1.667
BG999	JUNCTION	0.00	1521.52	0 01:45	0.000	73.503
BH001	JUNCTION	0.00	316.73	0 00:33	0.000	3.936
BH002	JUNCTION	0.00	513.50	0 00:39	0.000	7.987
BH003	JUNCTION	0.00	656.40	0 00:44	0.000	11.588
BH100	JUNCTION	0.00	99.89	0 00:33	0.000	1.288
BH999	JUNCTION	0.00	919.88	0 00:52	0.000	21.558

C100	JUNCTION	115.18	115.18	0 00:51	3.819	3.819
C110	JUNCTION	156.70	156.70	0 00:46	4.370	4.370
C120	JUNCTION	72.65	72.65	0 00:54	2.850	2.850
C125	JUNCTION	115.36	115.36	0 00:56	4.670	4.670
C130	JUNCTION	219.71	219.71	0 00:42	5.714	5.714
C140	JUNCTION	98.49	98.49	0 00:43	2.588	2.588
C150	JUNCTION	49.36	49.36	0 01:03	2.310	2.310
C153	JUNCTION	251.46	251.46	0 00:42	6.278	6.278
C154	JUNCTION	193.03	193.03	0 00:42	5.233	5.233
C155	JUNCTION	115.64	115.64	0 00:47	3.754	3.754
C159	JUNCTION	200.17	200.17	0 00:43	5.378	5.378
C160	JUNCTION	201.22	201.22	0 00:42	4.735	4.735
C170	JUNCTION	112.01	112.01	0 00:55	4.577	4.577
C175	JUNCTION	101.03	101.03	0 00:56	4.160	4.160
C180	JUNCTION	56.56	56.56	0 00:49	1.922	1.922
C185	JUNCTION	112.99	112.99	0 00:56	4.595	4.595
C190	JUNCTION	79.02	79.02	0 00:55	3.211	3.211
D100	JUNCTION	156.75	156.75	0 00:49	5.008	5.008
D110	JUNCTION	147.41	147.41	0 00:49	4.748	4.748
D120	JUNCTION	124.16	124.16	0 00:43	3.093	3.093
D130	JUNCTION	126.01	126.01	0 00:46	3.766	3.766
E100	JUNCTION	93.60	93.60	0 00:57	3.811	3.811
E105	JUNCTION	55.68	55.68	0 00:54	2.080	2.080
E110	JUNCTION	108.24	108.24	0 00:48	3.267	3.267
E120	JUNCTION	86.16	86.16	0 00:53	3.063	3.063
E125	JUNCTION	75.03	75.03	0 00:55	2.897	2.897
E130	JUNCTION	104.22	104.22	0 00:49	3.250	3.250
E135	JUNCTION	105.97	105.97	0 00:55	4.011	4.011
E140	JUNCTION	126.38	126.38	0 00:47	3.587	3.587
E150	JUNCTION	81.04	81.04	0 00:50	2.620	2.620
E155	JUNCTION	117.32	117.32	0 01:00	5.005	5.005
E160	JUNCTION	131.98	131.98	0 00:52	4.504	4.504
E170	JUNCTION	121.34	121.34	0 00:49	3.635	3.635
E180	JUNCTION	30.62	30.62	0 01:07	1.561	1.561
E183	JUNCTION	105.42	105.42	0 01:00	4.566	4.566
E184	JUNCTION	63.48	63.48	0 00:59	2.704	2.704
E185	JUNCTION	110.30	110.30	0 01:01	4.789	4.789
E190	JUNCTION	70.03	70.03	0 00:50	2.256	2.256
E200	JUNCTION	78.74	78.74	0 01:08	4.122	4.122
E204	JUNCTION	39.95	39.95	0 00:57	1.667	1.667
E205	JUNCTION	146.99	146.99	0 00:49	5.061	5.061
E210	JUNCTION	64.44	64.44	0 01:11	3.768	3.768
F100	JUNCTION	128.32	128.32	0 00:47	3.662	3.662
F110	JUNCTION	155.75	155.75	0 00:46	4.289	4.289
F120	JUNCTION	207.77	207.77	0 00:46	6.430	6.430
F125	JUNCTION	60.97	60.97	0 00:59	2.596	2.596
F130	JUNCTION	107.81	107.81	0 00:55	4.090	4.090
F140	JUNCTION	42.96	42.96	0 01:07	2.325	2.325
G100	JUNCTION	62.10	62.10	0 01:18	4.402	4.402
G105	JUNCTION	63.40	63.40	0 00:49	2.335	2.335
G110	JUNCTION	82.35	82.35	0 00:53	3.218	3.218
G120	JUNCTION	110.89	110.89	0 00:54	4.706	4.706
GA001	JUNCTION	0.00	197.33	0 00:48	0.000	6.939
GA002	JUNCTION	0.00	360.86	0 01:14	0.000	15.231
GA003	JUNCTION	0.00	201.04	0 02:15	0.000	17.882
GA004	JUNCTION	0.00	212.37	0 02:16	0.000	19.252
GA005	JUNCTION	0.00	288.41	0 01:43	0.000	25.571
GA006	JUNCTION	0.00	320.14	0 01:46	0.000	29.313
GA007	JUNCTION	0.00	354.50	0 02:02	0.000	33.743
GA008	JUNCTION	0.00	419.98	0 02:07	0.000	40.626
GA009	JUNCTION	0.00	494.80	0 01:21	0.000	45.969
GA010	JUNCTION	0.00	579.66	0 01:14	0.000	51.144
GA011	JUNCTION	0.00	740.41	0 01:09	0.000	58.090
GA012	JUNCTION	0.00	844.26	0 01:12	0.000	62.565
GA999	JUNCTION	0.00	882.05	0 01:14	0.000	64.387
GV001	JUNCTION	0.00	78.11	0 01:23	0.000	3.661
GV002	JUNCTION	0.00	133.11	0 01:38	0.000	7.478
GV003	JUNCTION	0.00	290.39	0 01:19	0.000	16.487
GV999	JUNCTION	0.00	393.74	0 01:36	0.000	23.448
H100	JUNCTION	197.33	197.33	0 00:48	6.939	6.939

H110	JUNCTION	189.32	189.32	0 00:43	5.342	5.342
H115	JUNCTION	121.67	121.67	0 00:40	2.978	2.978
H120	JUNCTION	67.54	67.54	0 00:53	2.665	2.665
H130	JUNCTION	45.62	45.62	0 00:50	1.590	1.590
H140	JUNCTION	24.43	24.43	0 01:10	1.396	1.396
H145	JUNCTION	94.41	94.41	0 01:08	4.876	4.876
H150	JUNCTION	141.15	141.15	0 00:45	3.670	3.670
H160	JUNCTION	57.13	57.13	0 01:17	4.095	4.095
H170	JUNCTION	56.51	56.51	0 01:07	2.924	2.924
H180	JUNCTION	120.67	120.67	0 00:50	4.095	4.095
H185	JUNCTION	135.39	135.39	0 00:54	5.350	5.350
H190	JUNCTION	254.00	254.00	0 00:37	5.132	5.132
H200	JUNCTION	107.94	107.94	0 00:50	3.688	3.688
H205	JUNCTION	140.34	140.34	0 00:40	3.188	3.188
H210	JUNCTION	121.01	121.01	0 00:54	4.359	4.359
H220	JUNCTION	41.78	41.78	0 00:59	1.786	1.786
HC001	JUNCTION	0.00	356.06	0 00:41	0.000	8.975
HC002	JUNCTION	0.00	635.26	0 00:37	0.000	13.260
HC003	JUNCTION	0.00	491.09	0 01:02	0.000	19.341
HC004	JUNCTION	0.00	1258.74	0 00:47	0.000	36.894
HC005	JUNCTION	0.00	1408.18	0 00:58	0.000	42.678
HC006	JUNCTION	0.00	1591.38	0 00:58	0.000	47.715
HC007	JUNCTION	0.00	1733.18	0 01:02	0.000	52.254
HC008	JUNCTION	0.00	1831.71	0 01:05	0.000	55.965
HC009	JUNCTION	0.00	2598.33	0 01:03	0.000	77.522
HC010	JUNCTION	0.00	2676.25	0 01:08	0.000	81.199
HC011	JUNCTION	0.00	2857.58	0 01:09	0.000	88.124
HC012	JUNCTION	0.00	2948.15	0 01:12	0.000	92.083
HC013	JUNCTION	0.00	3011.78	0 01:16	0.000	96.087
HC014	JUNCTION	0.00	4699.51	0 01:19	0.000	183.749
HC015	JUNCTION	0.00	4878.68	0 01:20	0.000	192.528
HC016	JUNCTION	0.00	4898.95	0 01:22	0.000	193.813
HC017	JUNCTION	0.00	5124.02	0 01:24	0.000	204.757
HC018	JUNCTION	0.00	5168.88	0 01:27	0.000	208.075
HC019	JUNCTION	0.00	5369.37	0 01:31	0.000	221.311
HC020	JUNCTION	0.00	5476.40	0 01:35	0.000	230.687
HC021	JUNCTION	0.00	5555.02	0 01:36	0.000	235.683
HC022	JUNCTION	0.00	5667.82	0 01:40	0.000	245.170
HC023	JUNCTION	0.00	5801.31	0 01:44	0.000	257.281
HC024	JUNCTION	0.00	5884.28	0 01:49	0.000	266.315
HC025	JUNCTION	0.00	5897.15	0 01:53	0.000	268.873
HC026	JUNCTION	0.00	7419.88	0 01:52	0.000	347.337
HC027	JUNCTION	0.00	7439.83	0 01:56	0.000	351.665
HC028	JUNCTION	0.00	7506.86	0 01:58	0.000	357.857
HC029	JUNCTION	0.00	7866.73	0 01:57	0.000	381.305
HC030	JUNCTION	0.00	7889.86	0 01:59	0.000	384.028
HC031	JUNCTION	0.00	7920.64	0 02:03	0.000	388.758
HC032	JUNCTION	0.00	7964.00	0 02:06	0.000	395.755
HC033	JUNCTION	0.00	8077.13	0 02:06	0.000	410.454
HC034	JUNCTION	0.00	8068.47	0 02:11	0.000	414.540
HC035	JUNCTION	0.00	7993.11	0 02:20	0.000	419.655
HC036	JUNCTION	0.00	8564.34	0 02:19	0.000	484.042
HC037	JUNCTION	0.00	8566.05	0 02:19	0.000	485.449
HC103	JUNCTION	0.00	279.30	0 00:36	0.000	4.160
HC104	JUNCTION	0.00	304.21	0 00:39	0.000	5.806
HC116	JUNCTION	0.00	99.17	0 00:51	0.000	3.361
HC117	JUNCTION	0.00	205.27	0 00:58	0.000	7.262
HC119	JUNCTION	0.00	136.48	0 01:07	0.000	6.791
HC122	JUNCTION	0.00	37.95	0 00:58	0.000	1.636
HC123	JUNCTION	0.00	81.59	0 01:06	0.000	4.018
HC124	JUNCTION	0.00	52.05	0 01:13	0.000	3.269
HC999	JUNCTION	0.00	8557.27	0 02:24	0.000	491.741
MT100	JUNCTION	0.00	251.46	0 00:42	0.000	6.278
MT110	JUNCTION	0.00	264.65	0 01:17	0.000	11.505
OH001	JUNCTION	0.00	115.18	0 00:51	0.000	3.819
OH002	JUNCTION	0.00	264.05	0 00:52	0.000	8.220
OH003	JUNCTION	0.00	448.24	0 00:57	0.000	15.794
OH004	JUNCTION	0.00	384.35	0 01:36	0.000	21.565
OH005	JUNCTION	0.00	423.52	0 01:28	0.000	24.152
OH006	JUNCTION	0.00	767.07	0 01:17	0.000	39.432

OH007	JUNCTION	0.00	940.15	0 01:13	0.000	47.126
OH008	JUNCTION	0.00	1050.57	0 01:14	0.000	51.876
OH009	JUNCTION	0.00	1199.89	0 01:22	0.000	60.898
OH010	JUNCTION	0.00	1327.50	0 01:23	0.000	67.434
OH999	JUNCTION	0.00	1374.39	0 01:29	0.000	70.774
OR001	JUNCTION	0.00	156.75	0 00:49	0.000	5.008
OR002	JUNCTION	0.00	286.68	0 00:59	0.000	9.876
OR003	JUNCTION	0.00	385.65	0 01:02	0.000	13.010
OR999	JUNCTION	0.00	482.38	0 01:08	0.000	16.888
SG001	JUNCTION	0.00	20.51	0 03:47	0.000	4.401
SG002	JUNCTION	0.00	64.13	0 00:50	0.000	6.737
SG003	JUNCTION	0.00	65.19	0 02:03	0.000	9.997
SG999	JUNCTION	0.00	130.87	0 01:35	0.000	14.699
HC-OUTFALL	OUTFALL	0.00	8557.27	0 02:24	0.000	491.741
GV004	DIVIDER	0.00	364.33	0 01:21	0.000	20.766
GA309	STORAGE	0.00	498.75	0 00:45	0.000	15.234
GA310	STORAGE	0.00	420.33	0 01:13	0.000	17.883
GA311	STORAGE	0.00	212.77	0 02:11	0.000	19.474
GA350	STORAGE	0.00	422.38	0 02:01	0.000	40.781
HC310	STORAGE	0.00	1001.07	0 00:39	0.000	19.343
HC320	STORAGE	0.00	1517.22	0 00:49	0.000	42.702
MT300	STORAGE	0.00	443.92	0 00:42	0.000	11.512
OH310	STORAGE	0.00	621.82	0 01:00	0.000	21.566
OH320	STORAGE	0.00	429.97	0 01:13	0.000	24.160
SG310	STORAGE	0.00	62.10	0 01:18	0.000	4.402
SG320	STORAGE	0.00	138.93	0 01:02	0.000	10.003
HC326	STORAGE	0.00	164.42	0 00:44	0.000	4.964
GV301	STORAGE	0.00	128.32	0 00:47	0.000	3.662
GV302	STORAGE	0.00	210.13	0 00:52	0.000	7.940

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
A100	JUNCTION	96.01	0.000	0.000
A105	JUNCTION	96.01	0.000	0.000
A110	JUNCTION	96.01	0.000	0.000
A120	JUNCTION	96.01	0.000	0.000
A125	JUNCTION	96.01	0.000	0.000
A130	JUNCTION	96.01	0.000	0.000
A134	JUNCTION	96.01	0.000	0.000
A135	JUNCTION	96.01	0.000	0.000
A140	JUNCTION	96.01	0.000	0.000
A150	JUNCTION	96.01	0.000	0.000
A160	JUNCTION	96.01	0.000	0.000
A170	JUNCTION	96.01	0.000	0.000
A180	JUNCTION	96.01	0.000	0.000
A190	JUNCTION	96.01	0.000	0.000
A195	JUNCTION	96.01	0.000	0.000
A200	JUNCTION	96.01	0.000	0.000
A210	JUNCTION	96.01	0.000	0.000
A215	JUNCTION	96.01	0.000	0.000
A220	JUNCTION	96.01	0.000	0.000
A230	JUNCTION	96.01	0.000	0.000
A234	JUNCTION	96.01	0.000	0.000
A235	JUNCTION	96.01	0.000	0.000
A240	JUNCTION	96.01	0.000	0.000
A245	JUNCTION	96.01	0.000	0.000
A250	JUNCTION	96.01	0.000	0.000
A260	JUNCTION	96.01	0.000	0.000
A263	JUNCTION	96.01	0.000	0.000
A264	JUNCTION	96.01	0.000	0.000
A265	JUNCTION	96.01	0.000	0.000

A270	JUNCTION	96.01	0.000	0.000
A275	JUNCTION	96.01	0.000	0.000
A276	JUNCTION	96.01	0.000	0.000
A280	JUNCTION	96.01	0.000	0.000
A285	JUNCTION	96.01	0.000	0.000
A290	JUNCTION	96.01	0.000	0.000
A300	JUNCTION	96.01	0.000	0.000
A304	JUNCTION	96.01	0.000	0.000
A305	JUNCTION	96.01	0.000	0.000
A310	JUNCTION	96.01	0.000	0.000
A314	JUNCTION	96.01	0.000	0.000
A315	JUNCTION	96.01	0.000	0.000
A320	JUNCTION	96.01	0.000	0.000
A325	JUNCTION	96.01	0.000	0.000
A330	JUNCTION	96.01	0.000	0.000
A340	JUNCTION	96.01	0.000	0.000
A345	JUNCTION	96.01	0.000	0.000
A350	JUNCTION	96.01	0.000	0.000
A360	JUNCTION	96.01	0.000	0.000
A370	JUNCTION	96.01	0.000	0.000
A375	JUNCTION	96.01	0.000	0.000
A380	JUNCTION	96.01	0.000	0.000
A390	JUNCTION	96.01	0.000	0.000
A395	JUNCTION	96.01	0.000	0.000
A400	JUNCTION	96.01	0.000	0.000
B100	JUNCTION	96.01	0.000	0.000
B110	JUNCTION	96.01	0.000	0.000
B120	JUNCTION	96.01	0.000	0.000
B130	JUNCTION	96.01	0.000	0.000
B134	JUNCTION	96.01	0.000	0.000
B135	JUNCTION	96.01	0.000	0.000
C100	JUNCTION	96.01	0.000	0.000
C110	JUNCTION	96.01	0.000	0.000
C120	JUNCTION	96.01	0.000	0.000
C125	JUNCTION	96.01	0.000	0.000
C130	JUNCTION	96.01	0.000	0.000
C140	JUNCTION	96.01	0.000	0.000
C150	JUNCTION	96.01	0.000	0.000
C153	JUNCTION	96.01	0.000	0.000
C154	JUNCTION	96.01	0.000	0.000
C155	JUNCTION	96.01	0.000	0.000
C159	JUNCTION	96.01	0.000	0.000
C160	JUNCTION	96.01	0.000	0.000
C170	JUNCTION	96.01	0.000	0.000
C175	JUNCTION	96.01	0.000	0.000
C180	JUNCTION	96.01	0.000	0.000
C185	JUNCTION	96.01	0.000	0.000
C190	JUNCTION	96.01	0.000	0.000
D100	JUNCTION	96.01	0.000	0.000
D110	JUNCTION	96.01	0.000	0.000
D120	JUNCTION	96.01	0.000	0.000
D130	JUNCTION	96.01	0.000	0.000
E100	JUNCTION	96.01	0.000	0.000
E105	JUNCTION	96.01	0.000	0.000
E110	JUNCTION	96.01	0.000	0.000
E120	JUNCTION	96.01	0.000	0.000
E125	JUNCTION	96.01	0.000	0.000
E130	JUNCTION	96.01	0.000	0.000
E135	JUNCTION	96.01	0.000	0.000
E140	JUNCTION	96.01	0.000	0.000
E150	JUNCTION	96.01	0.000	0.000
E155	JUNCTION	96.01	0.000	0.000
E160	JUNCTION	96.01	0.000	0.000
E170	JUNCTION	96.01	0.000	0.000
E180	JUNCTION	96.01	0.000	0.000
E183	JUNCTION	96.01	0.000	0.000
E184	JUNCTION	96.01	0.000	0.000
E185	JUNCTION	96.01	0.000	0.000
E190	JUNCTION	96.01	0.000	0.000
E200	JUNCTION	96.01	0.000	0.000

E204	JUNCTION	96.01	0.000	0.000
E205	JUNCTION	96.01	0.000	0.000
E210	JUNCTION	96.01	0.000	0.000
F100	JUNCTION	96.01	0.000	0.000
F110	JUNCTION	96.01	0.000	0.000
F120	JUNCTION	96.01	0.000	0.000
F125	JUNCTION	96.01	0.000	0.000
F130	JUNCTION	96.01	0.000	0.000
F140	JUNCTION	96.01	0.000	0.000
G100	JUNCTION	96.01	0.000	0.000
G105	JUNCTION	96.01	0.000	0.000
G110	JUNCTION	96.01	0.000	0.000
G120	JUNCTION	96.01	0.000	0.000
H100	JUNCTION	96.01	0.000	0.000
H110	JUNCTION	96.01	0.000	0.000
H115	JUNCTION	96.01	0.000	0.000
H120	JUNCTION	96.01	0.000	0.000
H130	JUNCTION	96.01	0.000	0.000
H140	JUNCTION	96.01	0.000	0.000
H145	JUNCTION	96.01	0.000	0.000
H150	JUNCTION	96.01	0.000	0.000
H160	JUNCTION	96.01	0.000	0.000
H170	JUNCTION	96.01	0.000	0.000
H180	JUNCTION	96.01	0.000	0.000
H190	JUNCTION	96.01	0.000	0.000
H200	JUNCTION	96.01	0.000	0.000
H210	JUNCTION	96.01	0.000	0.000
H220	JUNCTION	96.01	0.000	0.000
HC036	JUNCTION	96.01	0.000	0.000
GA309	STORAGE	1.45	2.521	1.479
GA310	STORAGE	3.04	4.904	3.596
HC310	STORAGE	1.18	7.282	5.718
HC320	STORAGE	0.27	0.199	1.801
OH310	STORAGE	2.51	9.480	0.520
OH320	STORAGE	1.79	1.397	9.603
SG310	STORAGE	96.01	7.228	5.772
HC326	STORAGE	96.01	6.679	3.321
GV301	STORAGE	96.01	4.954	3.546

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
GA309	6.392	1	0	473.773	63	0 01:14	360.86
GA310	26.276	1	0	1087.331	62	0 02:14	201.04
GA311	88.391	16	0	348.710	62	0 02:15	212.37
GA350	1.155	0	0	54.730	5	0 02:06	419.98
HC310	6.171	0	0	655.424	50	0 01:02	491.09
HC320	8.662	1	0	714.640	71	0 00:57	1408.18
MT300	14.898	1	0	642.838	50	0 01:16	264.65
OH310	13.245	2	0	776.413	94	0 01:35	384.35
OH320	2.716	0	0	116.997	14	0 01:27	423.52
SG310	79.086	7	0	370.846	33	0 03:47	20.51
SG320	66.045	6	0	390.520	37	0 02:02	65.19
HC326	34.451	3	0	472.321	43	0 02:03	39.37
GV301	2.175	0	0	152.142	32	0 01:23	78.11
GV302	123.718	9	0	488.053	34	0 01:38	133.11

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Outfall Loading Summary
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Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal
HC-OUTFALL	99.84	190.50	8557.27	491.741
System	99.84	190.50	8557.27	491.741

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Link Flow Summary
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Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
A100-DF	DUMMY	245.99	0 00:37			
A105-DF	DUMMY	150.43	0 00:52			
A11	CONDUIT	354.68	0 00:43	4.19	0.11	0.40
A110-DF	DUMMY	385.69	0 00:32			
A12	CONDUIT	607.20	0 00:42	4.60	0.10	0.32
A120-DF	DUMMY	478.66	0 00:34			
A125-DF	DUMMY	279.30	0 00:36			
A13	CONDUIT	490.82	0 01:06	4.71	0.09	0.37
A130	CONDUIT	266.43	0 00:41	3.91	0.05	0.24
A130-DF	DUMMY	121.04	0 00:38			
A134-DF	DUMMY	304.21	0 00:39			
A135	CONDUIT	268.43	0 00:52	3.31	0.03	0.23
A135-DF	DUMMY	232.31	0 00:42			
A14	CONDUIT	1253.85	0 00:50	5.33	0.14	0.40
A140-DF	DUMMY	322.55	0 00:38			
A15	CONDUIT	1406.78	0 00:59	6.37	0.34	0.65
A150-DF	DUMMY	251.19	0 00:40			
A16	CONDUIT	1577.91	0 01:02	6.11	0.26	0.51
A160-DF	DUMMY	202.65	0 00:42			
A17	CONDUIT	1718.78	0 01:05	4.75	0.12	0.31
A170-DF	DUMMY	138.38	0 00:45			
A18	CONDUIT	2569.81	0 01:08	6.52	0.28	0.52
A180-DF	DUMMY	138.30	0 00:45			
A19	CONDUIT	2671.63	0 01:10	5.66	0.20	0.43
A190-DF	DUMMY	172.35	0 00:41			
A195-DF	DUMMY	86.28	0 00:55			
A20	CONDUIT	2846.43	0 01:12	7.42	0.40	0.62
A200-DF	DUMMY	174.04	0 00:42			
A21	CONDUIT	2921.05	0 01:17	7.77	0.43	0.64
A210-DF	DUMMY	115.75	0 00:51			
A215-DF	DUMMY	120.62	0 00:56			
A22	CONDUIT	4694.83	0 01:21	8.83	0.21	0.55
A220-DF	DUMMY	109.24	0 00:53			
A23	CONDUIT	4875.23	0 01:22	7.66	0.15	0.48
A230-DF	DUMMY	52.48	0 00:42			
A234-DF	DUMMY	99.17	0 00:51			
A235	CONDUIT	95.82	0 01:02	3.37	0.06	0.28
A235-DF	DUMMY	114.10	0 00:51			
A24	CONDUIT	4893.14	0 01:24	7.28	0.10	0.42
A240-DF	DUMMY	134.66	0 00:45			
A245-DF	DUMMY	48.68	0 00:46			
A25	CONDUIT	5111.65	0 01:27	7.07	0.08	0.30
A250-DF	DUMMY	43.90	0 00:54			
A26	CONDUIT	5145.51	0 01:32	7.99	0.12	0.34
A260-DF	DUMMY	96.48	0 01:00			

A263-DF	DUMMY	64.49	0	01:04			
A264-DF	DUMMY	72.31	0	01:08			
A265	CONDUIT	135.89	0	01:12	3.41	0.04	0.26
A265-DF	DUMMY	46.07	0	00:58			
A27	CONDUIT	5353.92	0	01:35	10.62	0.40	0.68
A270-DF	DUMMY	44.59	0	01:23			
A275-DF	DUMMY	142.05	0	00:44			
A276-DF	DUMMY	55.47	0	00:48			
A28	CONDUIT	5473.42	0	01:36	9.03	0.27	0.59
A280-DF	DUMMY	135.48	0	00:54			
A285-DF	DUMMY	37.95	0	00:58			
A29	CONDUIT	5536.25	0	01:40	8.68	0.16	0.39
A290	CONDUIT	36.16	0	01:18	2.34	0.01	0.15
A290-DF	DUMMY	135.47	0	00:54			
A295	CONDUIT	105.21	0	00:41	21.41	0.36	0.41
A30	CONDUIT	5641.38	0	01:45	7.98	0.12	0.33
A300-DF	DUMMY	190.55	0	00:46			
A304-DF	DUMMY	81.59	0	01:06			
A305	CONDUIT	79.83	0	01:17	2.88	0.02	0.21
A305-DF	DUMMY	34.62	0	01:07			
A31	CONDUIT	5772.45	0	01:49	6.60	0.09	0.30
A310-DF	DUMMY	64.32	0	01:02			
A314-DF	DUMMY	52.05	0	01:13			
A315	CONDUIT	52.00	0	01:16	5.95	0.01	0.10
A315-DF	DUMMY	45.32	0	01:11			
A32	CONDUIT	5867.66	0	01:53	7.45	0.11	0.30
A320-DF	DUMMY	50.37	0	01:01			
A325-DF	DUMMY	164.42	0	00:44			
A33	CONDUIT	7389.18	0	01:56	8.08	0.19	0.51
A330-DF	DUMMY	101.02	0	00:56			
A34	CONDUIT	7436.85	0	01:58	8.44	0.21	0.51
A340-DF	DUMMY	74.70	0	01:12			
A345-DF	DUMMY	26.99	0	01:09			
A35	CONDUIT	7859.74	0	01:59	9.32	0.24	0.52
A350-DF	DUMMY	65.25	0	00:55			
A36	CONDUIT	7868.51	0	02:03	6.79	0.11	0.40
A360-DF	DUMMY	94.86	0	01:05			
A37	CONDUIT	7900.94	0	02:07	7.33	0.12	0.38
A370-DF	DUMMY	100.78	0	00:48			
A375-DF	DUMMY	58.06	0	01:13			
A38	CONDUIT	8034.13	0	02:11	7.96	0.16	0.45
A380-DF	DUMMY	100.32	0	00:56			
A39	CONDUIT	7953.59	0	02:20	7.78	0.20	0.48
A390-DF	DUMMY	105.54	0	00:58			
A395-DF	DUMMY	58.63	0	00:42			
A40	CONDUIT	8537.96	0	02:24	7.89	0.13	0.38
A400-DF	DUMMY	202.04	0	00:44			
B100-DF	DUMMY	316.73	0	00:33			
B11	CONDUIT	289.17	0	00:39	4.14	0.07	0.28
B110-DF	DUMMY	226.41	0	00:38			
B12	CONDUIT	490.55	0	00:44	3.45	0.05	0.26
B120-DF	DUMMY	169.68	0	00:40			
B13	CONDUIT	591.79	0	00:53	3.42	0.04	0.28
B130-DF	DUMMY	94.23	0	00:50			
B134-DF	DUMMY	99.89	0	00:33			
B135	CONDUIT	98.63	0	00:37	15.33	0.00	0.05
B135-DF	DUMMY	189.76	0	00:48			
BG999-DF	DUMMY	1521.52	0	01:45			
BH999-DF	DUMMY	919.88	0	00:52			
C100-DF	DUMMY	115.18	0	00:51			
C11	CONDUIT	113.89	0	00:56	2.62	0.02	0.14
C110-DF	DUMMY	156.70	0	00:46			
C12	CONDUIT	261.01	0	00:58	4.30	0.08	0.31
C120-DF	DUMMY	72.65	0	00:54			
C125-DF	DUMMY	115.36	0	00:56			
C13	CONDUIT	443.93	0	01:03	5.21	0.13	0.39
C130-DF	DUMMY	219.71	0	00:42			
C14	CONDUIT	384.32	0	01:38	4.68	0.10	0.33
C140-DF	DUMMY	98.49	0	00:43			
C150-DF	DUMMY	49.36	0	01:03			

C153-DF	DUMMY	251.46	0	00:42			
C154	CONDUIT	251.16	0	00:43	19.76	0.00	0.08
C154-DF	DUMMY	193.03	0	00:42			
C155	CONDUIT	264.66	0	01:24	3.89	0.03	0.24
C155-DF	DUMMY	115.64	0	00:47			
C159-DF	DUMMY	200.17	0	00:43			
C15A	CONDUIT	423.46	0	01:31	4.79	0.13	0.40
C15B	CONDUIT	766.75	0	01:20	5.61	0.24	0.53
C16	CONDUIT	937.59	0	01:17	4.60	0.10	0.38
C160-DF	DUMMY	201.22	0	00:42			
C17	CONDUIT	1028.75	0	01:24	5.16	0.16	0.47
C170-DF	DUMMY	112.01	0	00:55			
C175-DF	DUMMY	101.03	0	00:56			
C18	CONDUIT	1198.75	0	01:24	6.17	0.22	0.49
C180-DF	DUMMY	56.56	0	00:49			
C185-DF	DUMMY	112.99	0	00:56			
C19	CONDUIT	1317.14	0	01:29	4.82	0.12	0.42
C190-DF	DUMMY	79.02	0	00:55			
D100-DF	DUMMY	156.75	0	00:49			
D11	CONDUIT	148.66	0	01:03	3.21	0.03	0.22
D110-DF	DUMMY	147.41	0	00:49			
D12	CONDUIT	285.01	0	01:05	3.07	0.03	0.22
D120-DF	DUMMY	124.16	0	00:43			
D13	CONDUIT	380.19	0	01:11	4.99	0.14	0.43
D130-DF	DUMMY	126.01	0	00:46			
E100-DF	DUMMY	93.60	0	00:57			
E105-DF	DUMMY	55.68	0	00:54			
E11	CONDUIT	147.01	0	01:03	3.14	0.04	0.24
E110-DF	DUMMY	108.24	0	00:48			
E12	CONDUIT	245.35	0	01:05	3.83	0.06	0.30
E120-DF	DUMMY	86.16	0	00:53			
E125-DF	DUMMY	75.03	0	00:55			
E13	CONDUIT	398.50	0	01:08	4.36	0.10	0.37
E130-DF	DUMMY	104.22	0	00:49			
E135-DF	DUMMY	105.97	0	00:55			
E14	CONDUIT	589.98	0	01:10	4.86	0.15	0.44
E140-DF	DUMMY	126.38	0	00:47			
E15	CONDUIT	690.43	0	01:13	5.13	0.17	0.47
E150-DF	DUMMY	81.04	0	00:50			
E155-DF	DUMMY	117.32	0	01:00			
E16	CONDUIT	864.64	0	01:16	5.45	0.22	0.52
E160-DF	DUMMY	131.98	0	00:52			
E17	CONDUIT	968.30	0	01:19	5.63	0.24	0.54
E170-DF	DUMMY	121.34	0	00:49			
E18	CONDUIT	1045.28	0	01:24	5.73	0.26	0.57
E180-DF	DUMMY	30.62	0	01:07			
E183-DF	DUMMY	105.42	0	01:00			
E184-DF	DUMMY	63.48	0	00:59			
E185	CONDUIT	166.03	0	01:11	3.61	0.05	0.29
E185-DF	DUMMY	110.30	0	01:01			
E19	CONDUIT	1317.33	0	01:26	6.19	0.32	0.62
E190-DF	DUMMY	70.03	0	00:50			
E20	CONDUIT	1318.40	0	01:39	4.88	0.14	0.44
E200-DF	DUMMY	78.74	0	01:08			
E204-DF	DUMMY	39.95	0	00:57			
E205	CONDUIT	36.58	0	01:23	1.99	0.02	0.17
E205-DF	DUMMY	146.99	0	00:49			
E21	CONDUIT	1472.40	0	01:45	6.18	0.29	0.57
E210-DF	DUMMY	64.44	0	01:11			
F100-DF	DUMMY	128.32	0	00:47			
F11	CONDUIT	78.09	0	01:25	11.62	0.30	0.37
F110-DF	DUMMY	155.75	0	00:46			
F12	CONDUIT	132.99	0	01:41	13.74	0.10	0.21
F120-DF	DUMMY	207.77	0	00:46			
F125-DF	DUMMY	60.97	0	00:59			
F13	CONDUIT	286.82	0	01:31	3.73	0.07	0.31
F130-DF	DUMMY	107.81	0	00:55			
F14	CONDUIT	108.42	0	03:08	12.55	1.08	1.00
F140-DF	DUMMY	42.96	0	01:07			
F14-Overflow	CONDUIT	260.01	0	01:38	5.49	0.02	0.22

G10	CONDUIT	20.51	0 03:47	6.24	0.07	0.17
G100-DF	DUMMY	62.10	0 01:18			
G105-DF	DUMMY	63.40	0 00:49			
G11	CONDUIT	60.59	0 01:10	2.22	0.02	0.17
G110-DF	DUMMY	82.35	0 00:53			
G12	CONDUIT	65.18	0 02:07	11.87	0.14	0.25
G120-DF	DUMMY	110.89	0 00:54			
GA999-DF	DUMMY	882.05	0 01:14			
GV999-DF	DUMMY	393.74	0 01:36			
H100-DF	DUMMY	197.33	0 00:48			
H11	CONDUIT	197.10	0 00:50	15.21	0.45	0.47
H110-DF	DUMMY	189.32	0 00:43			
H115-DF	DUMMY	121.67	0 00:40			
H12	CONDUIT	360.80	0 01:15	17.91	0.79	0.67
H120-DF	DUMMY	67.54	0 00:53			
H13	CONDUIT	201.02	0 02:17	3.99	0.01	0.18
H130-DF	DUMMY	45.62	0 00:50			
H14	CONDUIT	212.31	0 02:22	2.53	0.02	0.21
H140-DF	DUMMY	24.43	0 01:10			
H145-DF	DUMMY	94.41	0 01:08			
H15	CONDUIT	286.49	0 01:54	2.71	0.03	0.23
H150-DF	DUMMY	141.15	0 00:45			
H16	CONDUIT	312.25	0 02:05	2.60	0.02	0.22
H160-DF	DUMMY	57.13	0 01:17			
H17	CONDUIT	354.06	0 02:07	3.75	0.07	0.28
H170-DF	DUMMY	56.51	0 01:07			
H18	CONDUIT	419.93	0 02:08	16.97	0.25	0.31
H180-DF	DUMMY	120.67	0 00:50			
H185	CONDUIT	135.05	0 00:57	15.49	0.43	0.46
H19	CONDUIT	494.32	0 01:24	4.35	0.11	0.33
H190-DF	DUMMY	254.00	0 00:37			
H20	CONDUIT	577.71	0 01:20	4.69	0.13	0.35
H200-DF	DUMMY	107.94	0 00:50			
H205	CONDUIT	139.75	0 00:42	3.43	0.01	0.18
H21	CONDUIT	738.89	0 01:15	4.90	0.17	0.41
H210-DF	DUMMY	121.01	0 00:54			
H22	CONDUIT	843.75	0 01:14	5.20	0.19	0.43
H220-DF	DUMMY	41.78	0 00:59			
HC008-DF	DUMMY	1831.71	0 01:05			
HC013-DF	DUMMY	3011.78	0 01:16			
HC025-DF	DUMMY	5897.15	0 01:53			
HC028-DF	DUMMY	7506.86	0 01:58			
HC032-DF	DUMMY	7964.00	0 02:06			
HC035-DF	DUMMY	7993.11	0 02:20			
HC036-DF	DUMMY	8564.34	0 02:19			
HC117-DF	DUMMY	205.27	0 00:58			
HC999-DF	DUMMY	8557.27	0 02:24			
OH999-DF	DUMMY	1374.39	0 01:29			
OR999-DF	DUMMY	482.38	0 01:08			
SG999-DF	DUMMY	130.87	0 01:35			
GA309-OUT	DUMMY	360.86	0 01:14			
GA310-OUT	DUMMY	201.04	0 02:15			
GA311-OUT	DUMMY	212.37	0 02:16			
GA350-OUT	DUMMY	419.98	0 02:07			
GV301-OUT	DUMMY	78.11	0 01:23			
GV302-OUT	DUMMY	133.11	0 01:38			
HC310-OUT	DUMMY	491.09	0 01:02			
HC320-OUT	DUMMY	1408.18	0 00:58			
HC326-OUT	DUMMY	39.37	0 02:03			
MT300-OUT	DUMMY	264.65	0 01:17			
OH310-OUT	DUMMY	384.35	0 01:36			
OH320-OUT	DUMMY	423.52	0 01:28			
SG310-OUT	DUMMY	20.51	0 03:47			
SG320-OUT	DUMMY	65.19	0 02:03			

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Conduit Surcharge Summary
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Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
A100-DF	0.01	0.01	0.01	96.01	0.01
A105-DF	0.01	0.01	0.01	96.01	0.01
A110-DF	0.01	0.01	0.01	96.01	0.01
A120-DF	0.01	0.01	0.01	96.01	0.01
A125-DF	0.01	0.01	0.01	96.01	0.01
A130-DF	0.01	0.01	0.01	96.01	0.01
A134-DF	0.01	0.01	0.01	96.01	0.01
A135-DF	0.01	0.01	0.01	96.01	0.01
A140-DF	0.01	0.01	0.01	96.01	0.01
A150-DF	0.01	0.01	0.01	96.01	0.01
A160-DF	0.01	0.01	0.01	96.01	0.01
A170-DF	0.01	0.01	0.01	96.01	0.01
A180-DF	0.01	0.01	0.01	96.01	0.01
A190-DF	0.01	0.01	0.01	96.01	0.01
A195-DF	0.01	0.01	0.01	96.01	0.01
A200-DF	0.01	0.01	0.01	96.01	0.01
A210-DF	0.01	0.01	0.01	96.01	0.01
A215-DF	0.01	0.01	0.01	96.01	0.01
A220-DF	0.01	0.01	0.01	96.01	0.01
A230-DF	0.01	0.01	0.01	96.01	0.01
A234-DF	0.01	0.01	0.01	96.01	0.01
A235-DF	0.01	0.01	0.01	96.01	0.01
A240-DF	0.01	0.01	0.01	96.01	0.01
A245-DF	0.01	0.01	0.01	96.01	0.01
A250-DF	0.01	0.01	0.01	96.01	0.01
A260-DF	0.01	0.01	0.01	96.01	0.01
A263-DF	0.01	0.01	0.01	96.01	0.01
A264-DF	0.01	0.01	0.01	96.01	0.01
A265-DF	0.01	0.01	0.01	96.01	0.01
A270-DF	0.01	0.01	0.01	96.01	0.01
A275-DF	0.01	0.01	0.01	96.01	0.01
A276-DF	0.01	0.01	0.01	96.01	0.01
A280-DF	0.01	0.01	0.01	96.01	0.01
A285-DF	0.01	0.01	0.01	96.01	0.01
A290-DF	0.01	0.01	0.01	96.01	0.01
A300-DF	0.01	0.01	0.01	96.01	0.01
A304-DF	0.01	0.01	0.01	96.01	0.01
A305-DF	0.01	0.01	0.01	96.01	0.01
A310-DF	0.01	0.01	0.01	96.01	0.01
A314-DF	0.01	0.01	0.01	96.01	0.01
A315-DF	0.01	0.01	0.01	96.01	0.01
A320-DF	0.01	0.01	0.01	96.01	0.01
A325-DF	0.01	0.01	0.01	96.01	0.01
A330-DF	0.01	0.01	0.01	96.01	0.01
A340-DF	0.01	0.01	0.01	96.01	0.01
A345-DF	0.01	0.01	0.01	96.01	0.01
A350-DF	0.01	0.01	0.01	96.01	0.01
A360-DF	0.01	0.01	0.01	96.01	0.01
A370-DF	0.01	0.01	0.01	96.01	0.01
A375-DF	0.01	0.01	0.01	96.01	0.01
A380-DF	0.01	0.01	0.01	96.01	0.01
A390-DF	0.01	0.01	0.01	96.01	0.01
A395-DF	0.01	0.01	0.01	96.01	0.01
A400-DF	0.01	0.01	0.01	96.01	0.01
B100-DF	0.01	0.01	0.01	96.01	0.01
B110-DF	0.01	0.01	0.01	96.01	0.01
B120-DF	0.01	0.01	0.01	96.01	0.01
B130-DF	0.01	0.01	0.01	96.01	0.01
B134-DF	0.01	0.01	0.01	96.01	0.01
B135-DF	0.01	0.01	0.01	96.01	0.01
BG999-DF	0.01	0.01	0.01	96.01	0.01
BH999-DF	0.01	0.01	0.01	96.01	0.01
C100-DF	0.01	0.01	0.01	96.01	0.01
C110-DF	0.01	0.01	0.01	96.01	0.01
C120-DF	0.01	0.01	0.01	96.01	0.01

C125-DF	0.01	0.01	0.01	96.01	0.01
C130-DF	0.01	0.01	0.01	96.01	0.01
C140-DF	0.01	0.01	0.01	96.01	0.01
C150-DF	0.01	0.01	0.01	96.01	0.01
C153-DF	0.01	0.01	0.01	96.01	0.01
C154-DF	0.01	0.01	0.01	96.01	0.01
C155-DF	0.01	0.01	0.01	96.01	0.01
C159-DF	0.01	0.01	0.01	96.01	0.01
C160-DF	0.01	0.01	0.01	96.01	0.01
C170-DF	0.01	0.01	0.01	96.01	0.01
C175-DF	0.01	0.01	0.01	96.01	0.01
C180-DF	0.01	0.01	0.01	96.01	0.01
C185-DF	0.01	0.01	0.01	96.01	0.01
C190-DF	0.01	0.01	0.01	96.01	0.01
D100-DF	0.01	0.01	0.01	96.01	0.01
D110-DF	0.01	0.01	0.01	96.01	0.01
D120-DF	0.01	0.01	0.01	96.01	0.01
D130-DF	0.01	0.01	0.01	96.01	0.01
E100-DF	0.01	0.01	0.01	96.01	0.01
E105-DF	0.01	0.01	0.01	96.01	0.01
E110-DF	0.01	0.01	0.01	96.01	0.01
E120-DF	0.01	0.01	0.01	96.01	0.01
E125-DF	0.01	0.01	0.01	96.01	0.01
E130-DF	0.01	0.01	0.01	96.01	0.01
E135-DF	0.01	0.01	0.01	96.01	0.01
E140-DF	0.01	0.01	0.01	96.01	0.01
E150-DF	0.01	0.01	0.01	96.01	0.01
E155-DF	0.01	0.01	0.01	96.01	0.01
E160-DF	0.01	0.01	0.01	96.01	0.01
E170-DF	0.01	0.01	0.01	96.01	0.01
E180-DF	0.01	0.01	0.01	96.01	0.01
E183-DF	0.01	0.01	0.01	96.01	0.01
E184-DF	0.01	0.01	0.01	96.01	0.01
E185-DF	0.01	0.01	0.01	96.01	0.01
E190-DF	0.01	0.01	0.01	96.01	0.01
E200-DF	0.01	0.01	0.01	96.01	0.01
E204-DF	0.01	0.01	0.01	96.01	0.01
E205-DF	0.01	0.01	0.01	96.01	0.01
E210-DF	0.01	0.01	0.01	96.01	0.01
F100-DF	0.01	0.01	0.01	96.01	0.01
F110-DF	0.01	0.01	0.01	96.01	0.01
F120-DF	0.01	0.01	0.01	96.01	0.01
F125-DF	0.01	0.01	0.01	96.01	0.01
F130-DF	0.01	0.01	0.01	96.01	0.01
F14	2.38	2.45	2.42	2.50	2.45
F140-DF	0.01	0.01	0.01	96.01	0.01
G100-DF	0.01	0.01	0.01	96.01	0.01
G105-DF	0.01	0.01	0.01	96.01	0.01
G110-DF	0.01	0.01	0.01	96.01	0.01
G120-DF	0.01	0.01	0.01	96.01	0.01
GA999-DF	0.01	0.01	0.01	96.01	0.01
GV999-DF	0.01	0.01	0.01	96.01	0.01
H100-DF	0.01	0.01	0.01	96.01	0.01
H110-DF	0.01	0.01	0.01	96.01	0.01
H115-DF	0.01	0.01	0.01	96.01	0.01
H120-DF	0.01	0.01	0.01	96.01	0.01
H130-DF	0.01	0.01	0.01	96.01	0.01
H140-DF	0.01	0.01	0.01	96.01	0.01
H145-DF	0.01	0.01	0.01	96.01	0.01
H150-DF	0.01	0.01	0.01	96.01	0.01
H160-DF	0.01	0.01	0.01	96.01	0.01
H170-DF	0.01	0.01	0.01	96.01	0.01
H180-DF	0.01	0.01	0.01	96.01	0.01
H190-DF	0.01	0.01	0.01	96.01	0.01
H200-DF	0.01	0.01	0.01	96.01	0.01
H210-DF	0.01	0.01	0.01	96.01	0.01
H220-DF	0.01	0.01	0.01	96.01	0.01
HC008-DF	0.01	0.01	0.01	96.01	0.01
HC013-DF	0.01	0.01	0.01	96.01	0.01
HC025-DF	0.01	0.01	0.01	96.01	0.01

HC028-DF	0.01	0.01	0.01	96.01	0.01
HC032-DF	0.01	0.01	0.01	96.01	0.01
HC035-DF	0.01	0.01	0.01	96.01	0.01
HC036-DF	0.01	0.01	0.01	96.01	0.01
HC117-DF	0.01	0.01	0.01	96.01	0.01
HC999-DF	0.01	0.01	0.01	96.01	0.01
OH999-DF	0.01	0.01	0.01	96.01	0.01
OR999-DF	0.01	0.01	0.01	96.01	0.01
SG999-DF	0.01	0.01	0.01	96.01	0.01

Analysis begun on: Fri Jul 19 10:56:21 2013
Analysis ended on: Fri Jul 19 10:56:24 2013
Total elapsed time: 00:00:03

No.	DATE	REVISIONS	APPR.

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 SOUTH WADSWORTH BLVD. 4-100
LAKEWOOD, COLORADO
80226 (303) 988-4939

PROJECT NO. 12-010.01

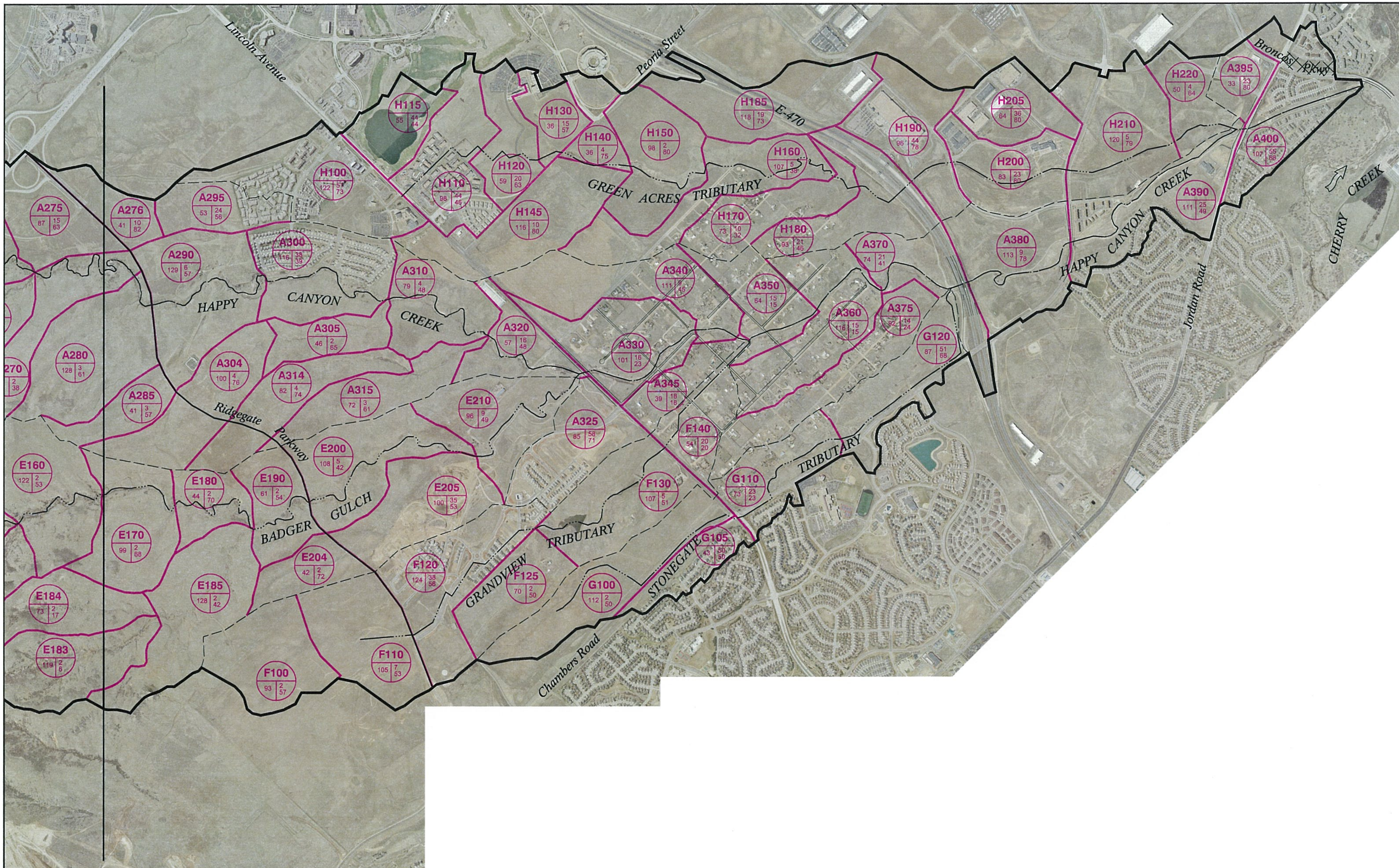
DESIGN MDC
DRAWN JHK
CHECK JTW

HAPPY CANYON CREEK
MAJOR DRAINAGEWAY PLAN

Historical Drainage Map - Minor Basins

DATE JULY 2013

FIGURE NO. 1 of 2



No.	DATE	REVISIONS	APPR.

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CONSULTING ENGINEERS
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LAKEWOOD, COLORADO
80226 (303) 988-4939

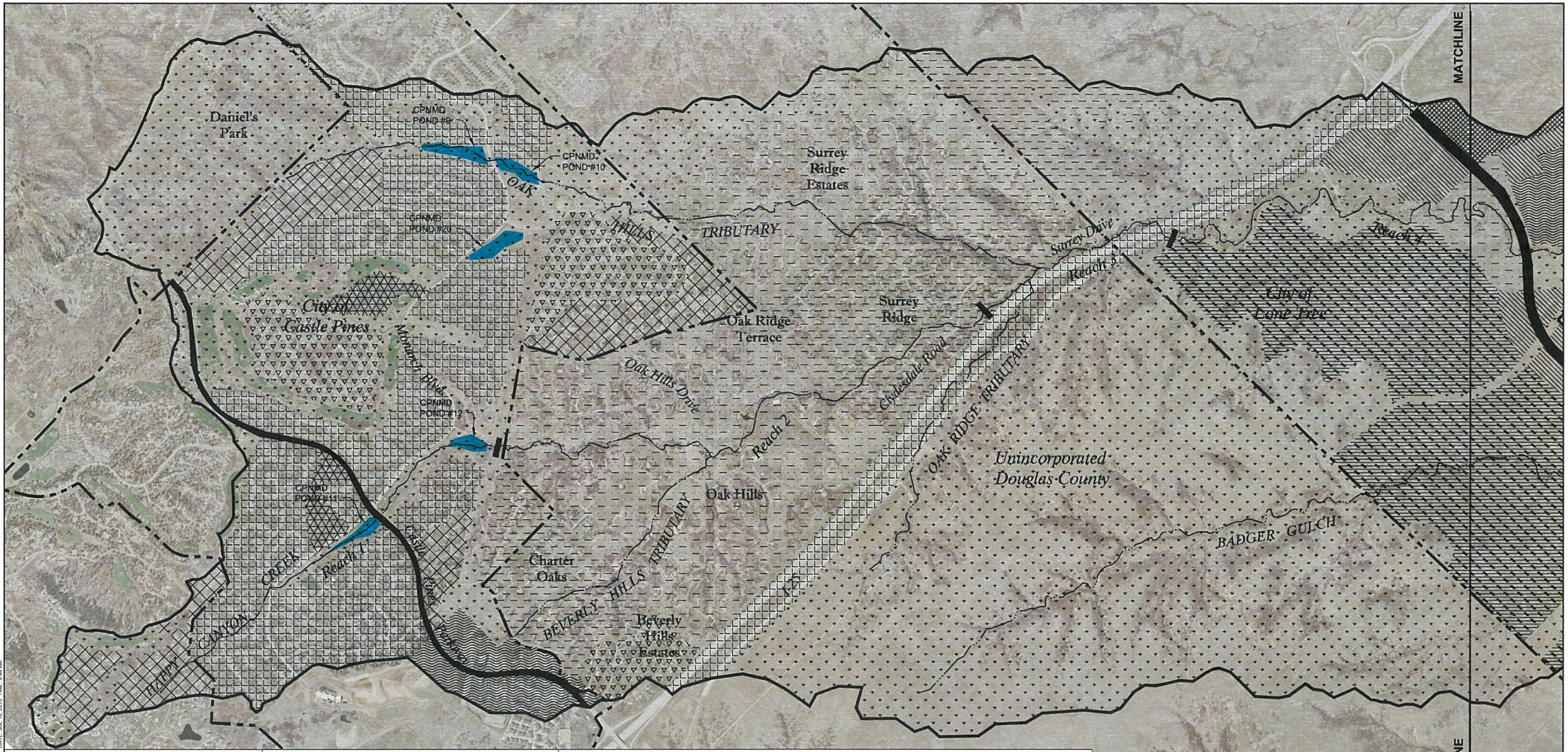
PROJECT NO. 12-010.01

DESIGN MDC
DRAWN JHK
CHECK JTW

HAPPY CANYON CREEK
MAJOR DRAINAGEWAY PLAN

Historical Drainage Map - Minor Basins

DATE JULY 2013
FIGURE NO. 1 of 2



Map Controls (Select from Below):

- Study Area Map
- Soil Survey Map
- Existing Land Use Map
- Future Land Use Map
- Subwatershed Boundaries Map
- Baseline Hydrology SWMM Routing Map

The Map Controls set the visibility of the layers automatically for the selected map. Additional layer control is available through the "Layers" Navigation Panel which can be accessed from the View Menu under Navigation Panels. In the Panel, the visibility of layers and layer groups can be changed by clicking the square left of the layer/group. An eye in the square indicated that the layer is on. An empty square indicates that the layer is off. Layer groups can be expanded and reduced by clicking the +/- symbol left of the layer/group.

Map Legend

- Watershed Boundary
- Major Basin Boundary
- Sub-basin Boundary
- Jurisdiction Boundary
- Existing Regional Detention
- Reach Delimeter
- BASIN ID / AREA (AC) / Ex % Imp / Fu % Imp — Subwatershed Label
- BH 001 — Design Point
- B100 — SWMM Subwatershed
- A12 — Conveyance Element
- OH310 — Detention Facility
- BH 999 — Outfall

Soil Type

- A
- B
- C/D

Imperviousness (%)

2, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 75, 80, 85, 95, 100

0' 450' 900' 1800'

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LAKEWOOD, COLORADO
80226 (303) 988-4939
PROJECT NO. 12-010.01

DESIGN MDC
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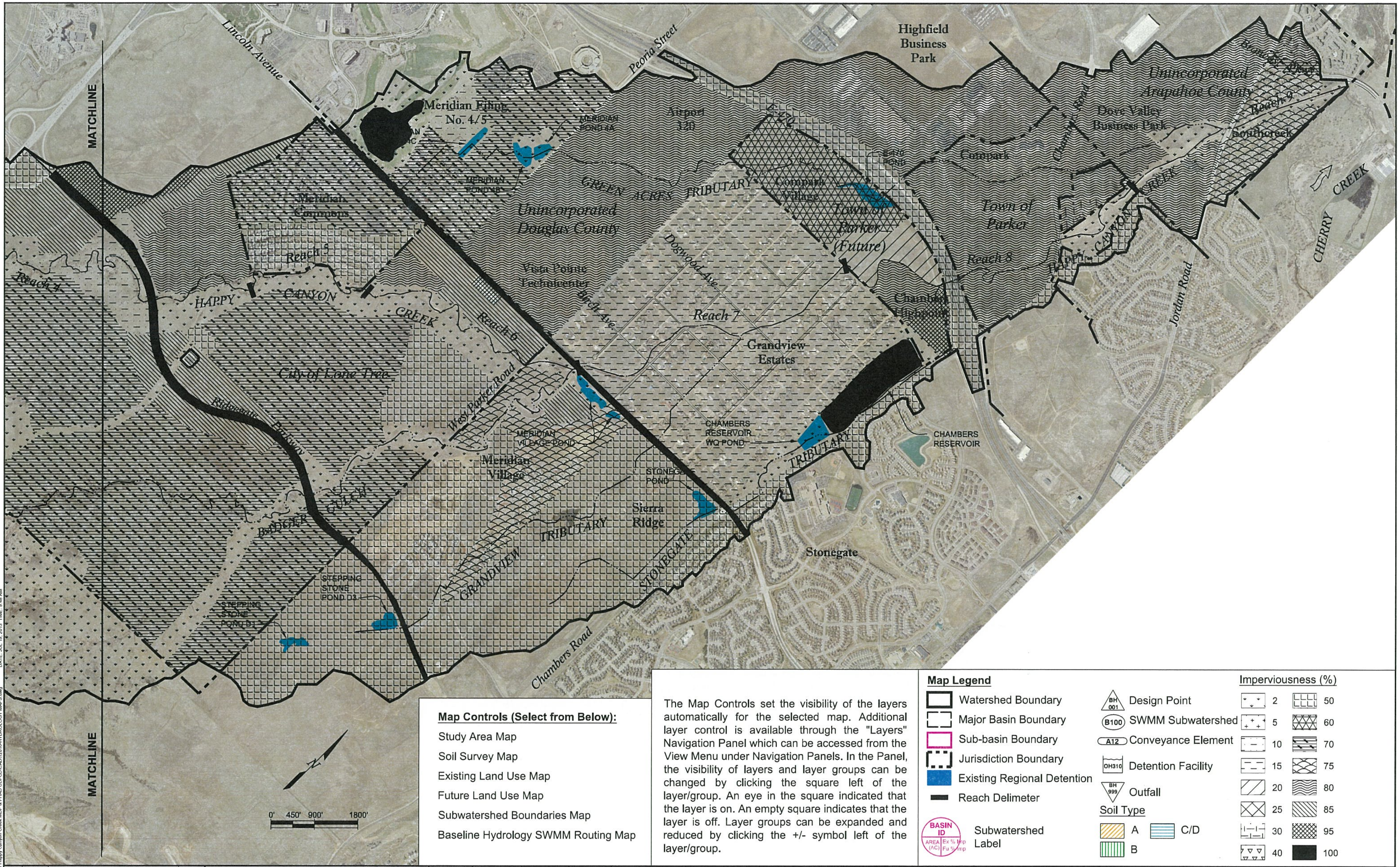
Town of Parker COLORADO
Southeast Metro Stormwater Authority

HAPPY CANYON CREEK MAJOR DRAINAGEWAY PLAN

INTERACTIVE HYDROLOGY MAP STUDY AREA

DATE JULY 2013

FIGURE NO. B-1



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LAKEWOOD, COLORADO 80226 (303) 988-4939
PROJECT NO. 12-010.01

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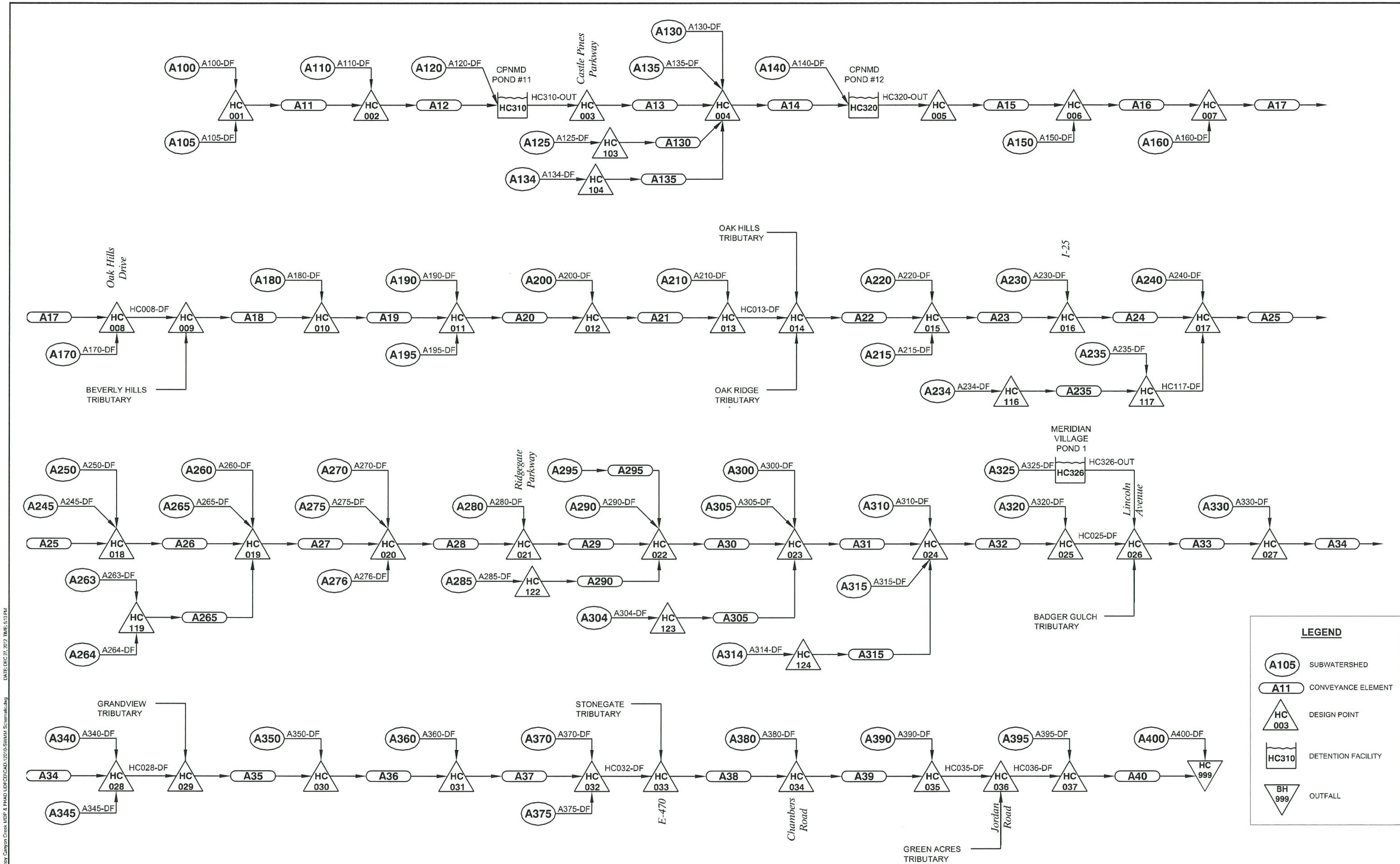
HAPPY CANYON CREEK MAJOR DRAINAGEWAY PLAN

INTERACTIVE HYDROLOGY MAP
STUDY AREA

DATE JULY 2013
FIGURE NO. B-2



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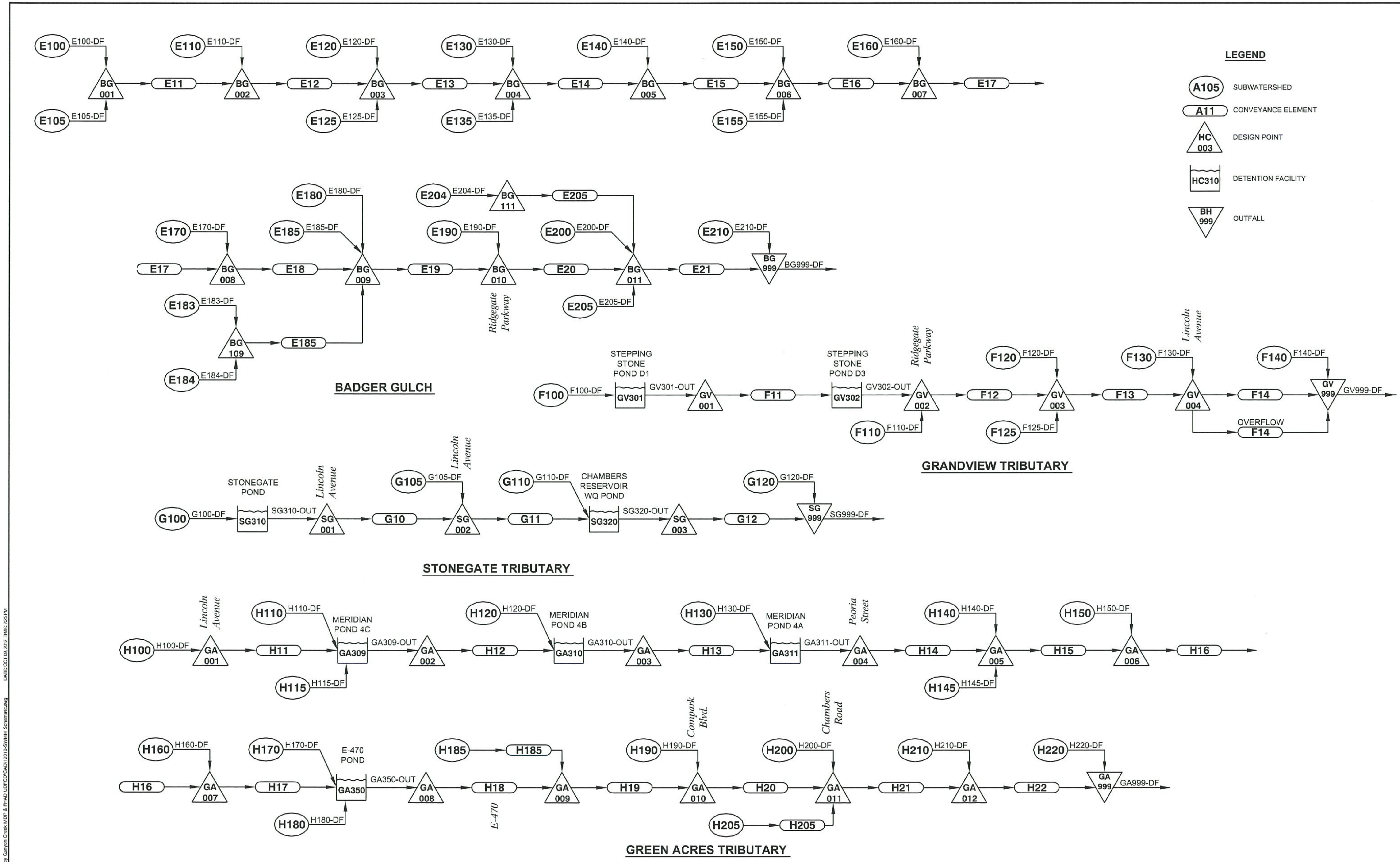
CHECK JTW

HAPPY CANYON CREEK
MAJOR DRAINAGEWAY PLAN

SWMM SCHEMATIC
HAPPY CANYON CREEK

DATE JULY 2013
FIGURE NO. B-3



No.	DATE	REVISIONS	APPR.

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80226 (303) 988-4939
PROJECT NO. 12-010.01

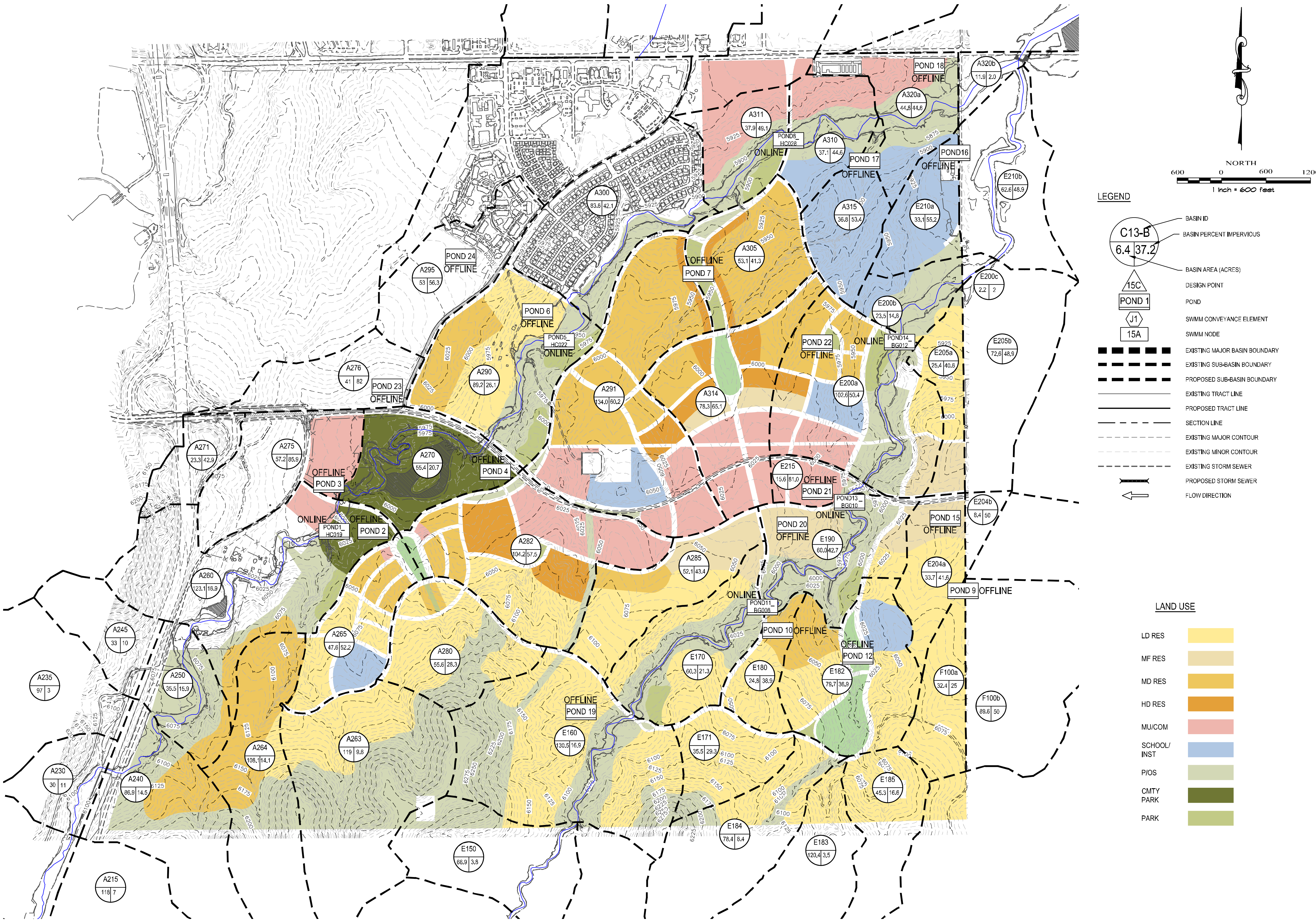
DESIGN MDC
DRAWN JHK
CHECK JTW

Parker COLORADO
Southeast Metro Stormwater Authority

HAPPY CANYON CREEK
MAJOR DRAINAGEWAY PLAN

SWMM SCHEMATIC
LOWER TRIBUTARIES

DATE JULY 2013
FIGURE NO. B-5



MERRICK & COMPANY

REVISIONS:

REV	REVISION DESCRIPTION	DATE	CHANGE BY	CHECKED BY	APPROVED BY

DESIGN BY: CM
DRAWN BY: JG
CHECKED BY: CB
APPROVED BY: CM

HAPPY CANYON CREEK MASTER DRAINAGE PLAN

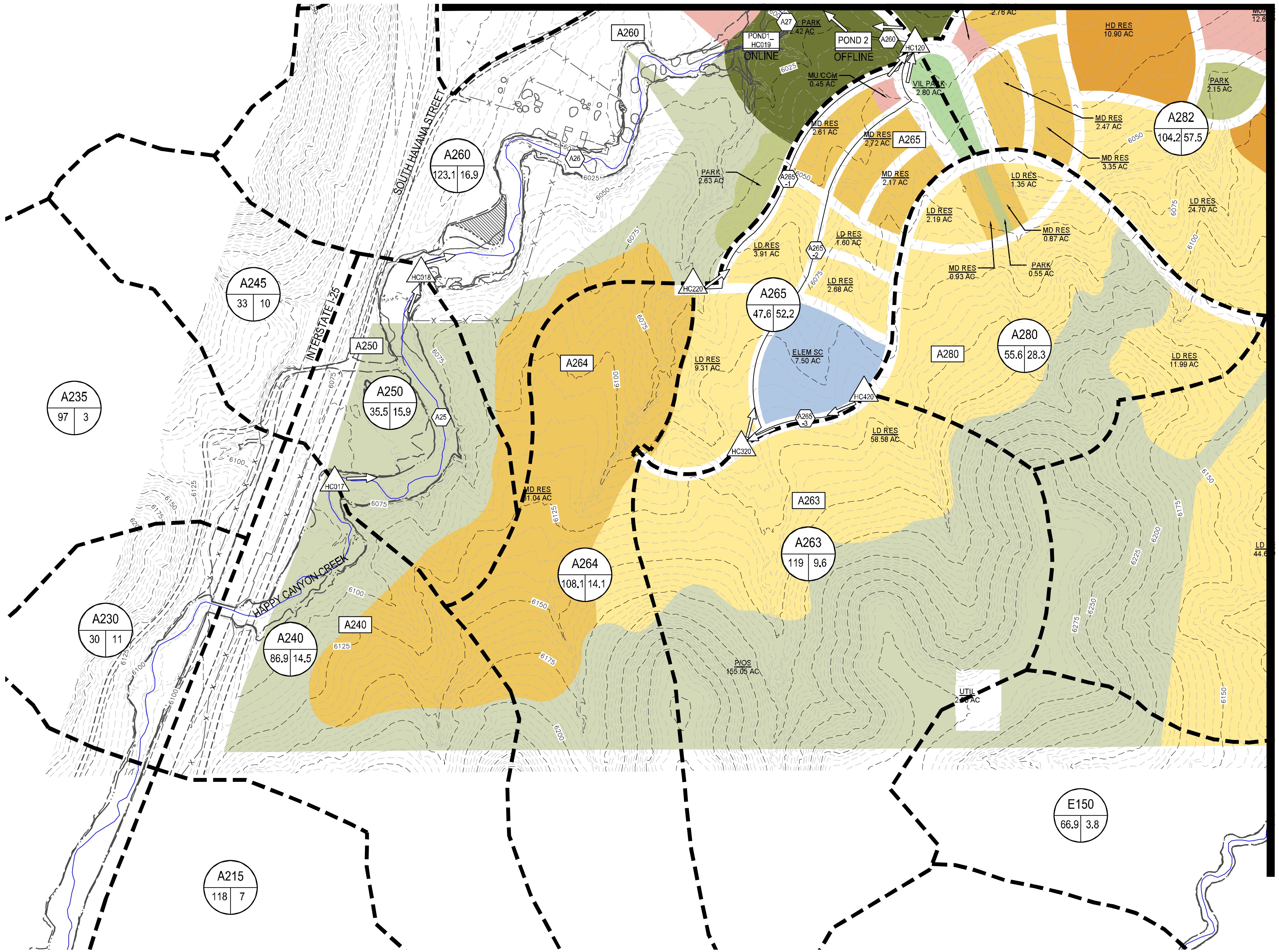
OVERALL DRAINAGE MAP DEVELOPED CONDITION

JOB NO: 65119103

DATE: 11/23/2016

SHEET: DR-1

MATCH LINE - SEE SHEET DR-4



NORTH

300 0 300 600

1 inch = 300 feet

LEGEND

C13-B / 6.4 / 37.2	BASIN ID; BASIN PERCENT IMPERVIOUS; BASIN AREA (ACRES)
15C	DESIGN POINT
POND 1	POND
J1	SWMM CONVEYANCE ELEMENT
15A	SWMM NODE
	EXISTING MAJOR BASIN BOUNDARY
	EXISTING SUB-BASIN BOUNDARY
	PROPOSED SUB-BASIN BOUNDARY
	EXISTING TRACT LINE
	PROPOSED TRACT LINE
	SECTION LINE
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING STORM SEWER
	PROPOSED STORM SEWER
	FLOW DIRECTION

LAND USE

- LD RES
- MF RES
- MD RES
- HD RES
- MU/COM
- SCHOOL/ INST
- P/OS
- CMTY PARK
- PARK

MERRICK & COMPANY

REVISIONS:

REV | REVISION DESCRIPTION

DESIGN BY: CM
DRAWN BY: JG
CHECKED BY: CB
APPROVED BY: CM

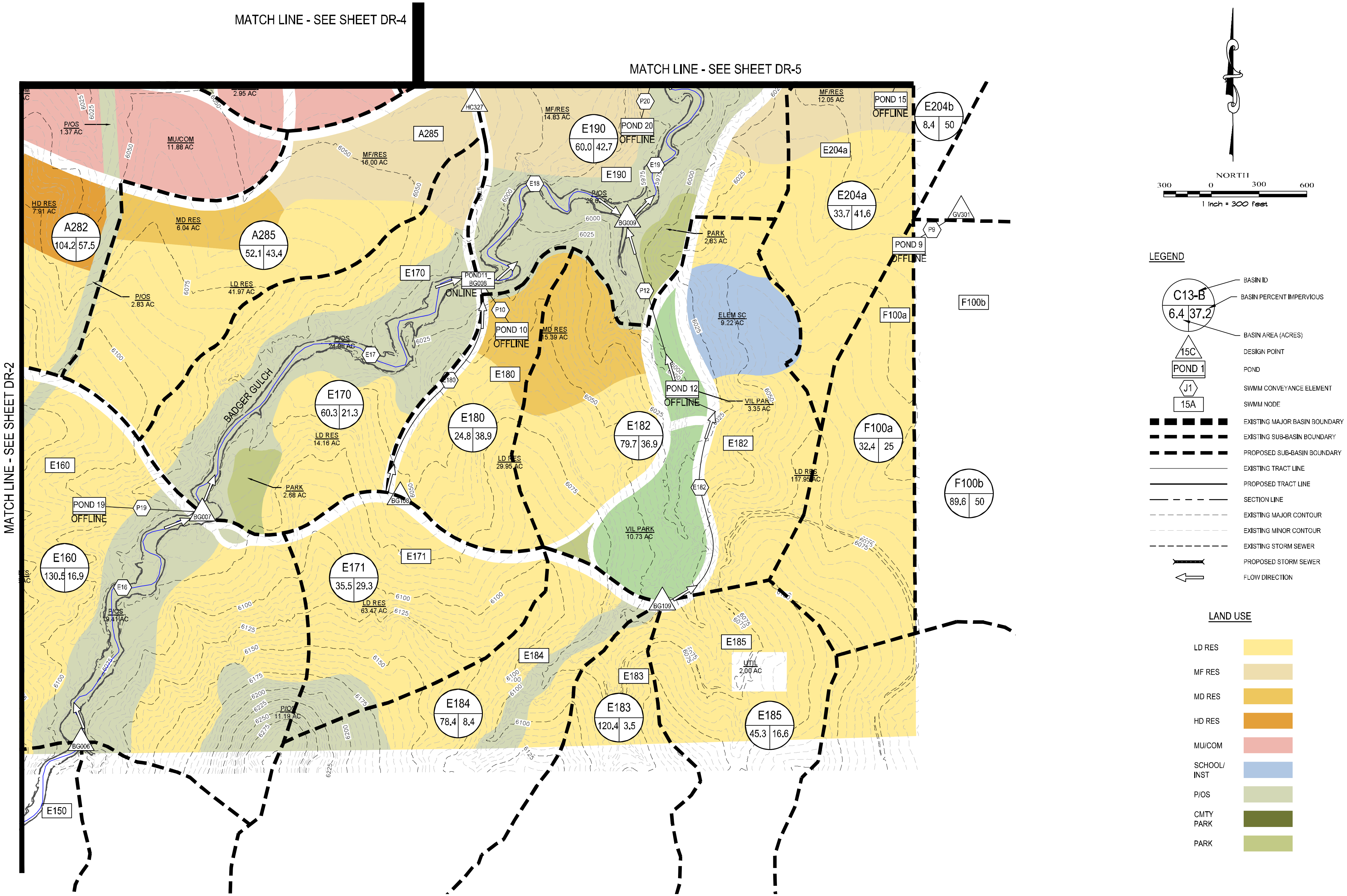
HAPPY CANYON CREEK MASTER DRAINAGE PLAN

DEVELOPED DRAINAGE MAP SOUTHWEST PART

JOB NO: 65119103

DATE: 11/23/2016

SHEET: DR-2



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REV	REVISION DESCRIPTION	DATE	CHANGED BY:	CHECKED BY:	APPROVED BY:

DESIGN BY:	CM
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CHECKED BY:	CB
APPROVED BY:	CM

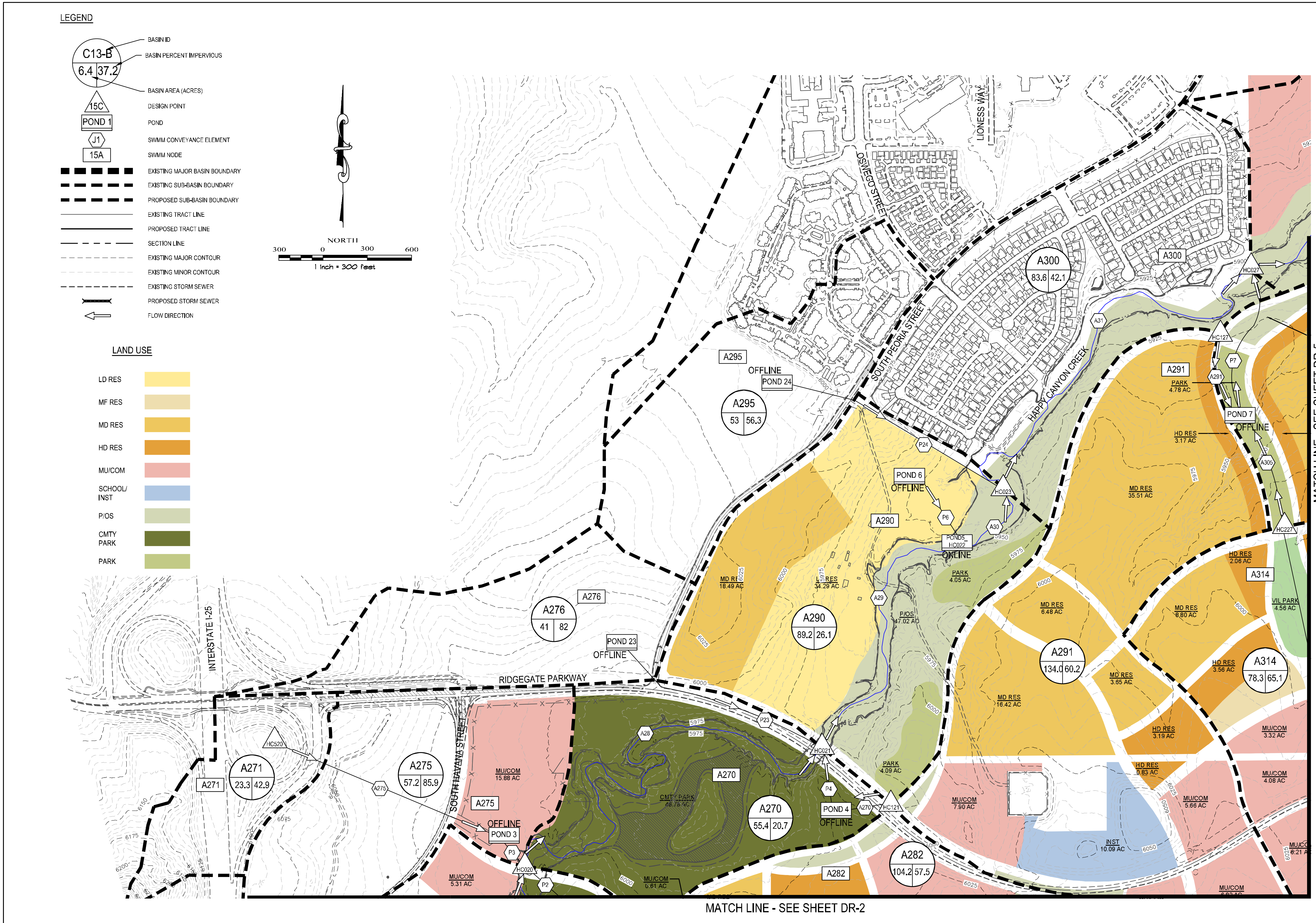
HAPPY CANYON CREEK MASTER DRAINAGE PLAN

DEVELOPED DRAINAGE MAP SOUTHEAST PART

JOB NO: 65119103

DATE: 11/23/2016

SHEET: DR-3



HAPPY CANYON CREEK MASTER DRAINAGE PLAN

DEVELOPED DRAINAGE MAP NORTHWEST PART

MERRICK & COMPANY

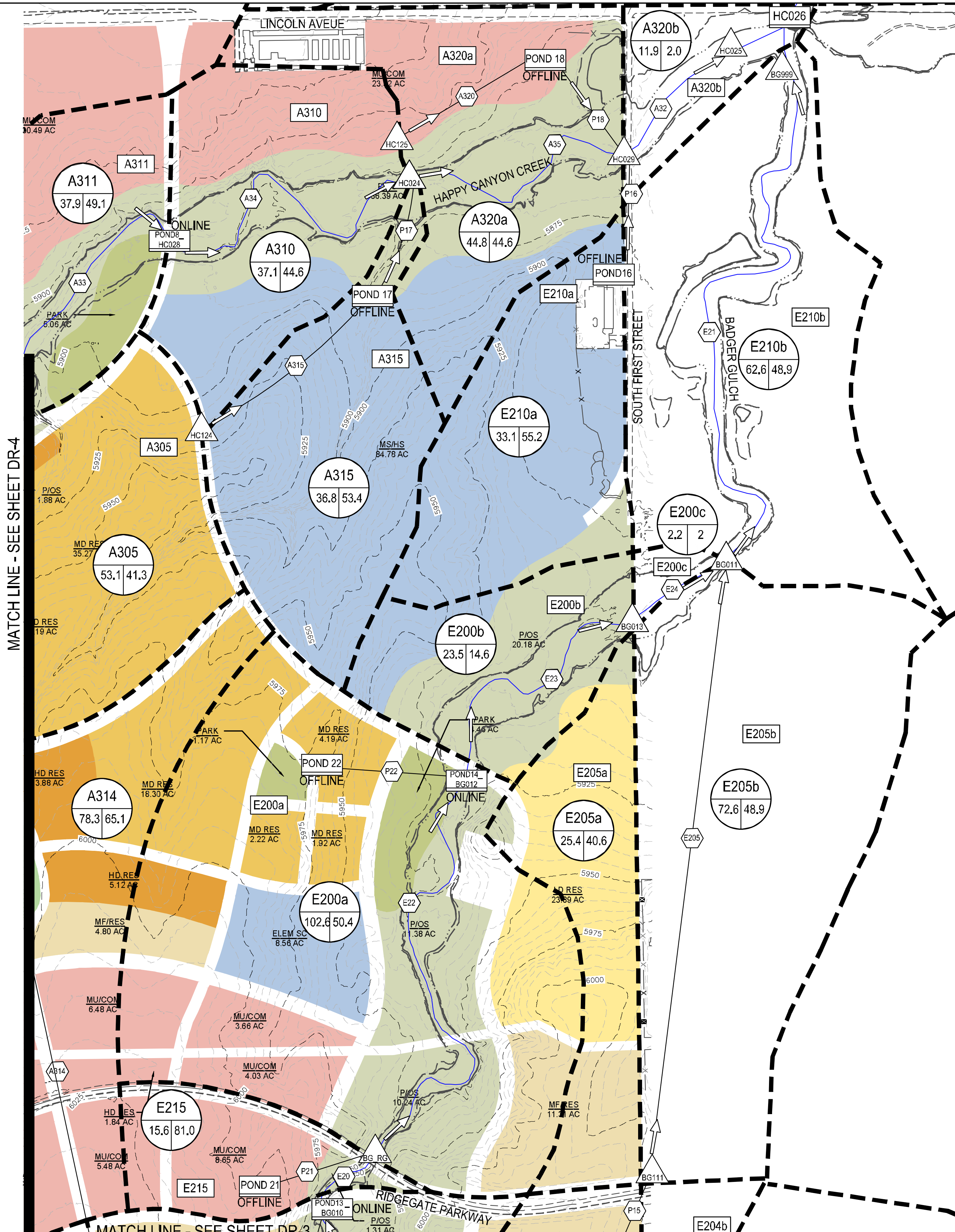
DESIGN BY:	CM
DRAWN BY:	JG
CHECKED BY:	CB
APPROVED BY:	CM

REVISIONS:

JOB NO: 65119103

DATE: 11/23/2016

SHEET: DR-4



NORTH

300 0 300 600

1 Inch = 300 feet

LEGEND

C13-B 6.4 | 37.2 — BASIN ID; BASIN PERCENT IMPERVIOUS; BASIN AREA (ACRES)

15C — DESIGN POINT

POND 1 — POND

J1 — SWMM CONVEYANCE ELEMENT

15A — SWMM NODE

EXISTING MAJOR BASIN BOUNDARY

EXISTING SUB-BASIN BOUNDARY

PROPOSED SUB-BASIN BOUNDARY

EXISTING TRACT LINE

PROPOSED TRACT LINE

SECTION LINE

EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

EXISTING STORM SEWER

PROPOSED STORM SEWER

FLOW DIRECTION

PROPOSED RIDGEGATE DEVELOPMENT BOUNDARY

LAND USE

LD RES

MF RES

MD RES

HD RES

MU/COM

SCHOOL/ INST

P/OS

CMTY PARK

PARK

MERRICK & COMPANY

REVISIONS:

REV | REVISION DESCRIPTION

DESIGN BY: CM
DRAWN BY: JG
CHECKED BY: CB
APPROVED BY: CM

HAPPY CANYON CREEK MASTER DRAINAGE PLAN

DEVELOPED DRAINAGE MAP NORTHEAST PART

JOB NO: 65119103

DATE: 11/23/2016

SHEET: DR-5

PHASE III DRAINAGE REPORT
FOR
RIDGEGATE PARKWAY EXPANSION – PHASE I
LONE TREE, CO

October 2018

Prepared For:

City of Lone Tree
9220 Kimmer Dr., Suite 100
Lone Tree, Colorado 80124
Phone: (303) 708-1818

Prepared By:

MERRICK & COMPANY

5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111
Phone: (303) 751-0741

Merrick Job No. 65119564

Basin B1	
Location:	South side of Ridgegate Parkway
Existing Conditions:	Existing roadway
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond.
Proposed Conditions:	Phase II construction will add a cycle track on the south side of the roadway.
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the existing and proposed storm system and conveyed to Water Quality Pond B.

Basin B2	
Location:	North side of Ridgegate Parkway
Existing Conditions:	Existing ground
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond.
Proposed Conditions:	Ridgegate Parkway roadway expansion, curb and gutter, and sidewalk to be constructed in Phase I
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin B3	
Location:	South side of Ridgegate Parkway
Existing Conditions:	Existing roadway
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond. The existing flow pattern will be maintained until Phase II construction.
Proposed Conditions:	Phase II construction will add a cycle track on the south side of the roadway.
Proposed Flow Pattern:	Drainage will generally flow from east to west. The existing storm system will be upsized during Phase II construction to accommodate the flows for future development, which will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin B3-F is the future, full build-out condition of Basin B3. In the future, the proposed development south of Basin B3 will minimize the tributary area for Basin B3-F.

Basin B4	
Location:	North side of Ridgegate Parkway
Existing Conditions:	Existing ground
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond.
Proposed Conditions:	Ridgegate Parkway roadway expansion, curb and gutter, and sidewalk to be constructed in Phase I
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin B5	
Location:	South side of Ridgegate Parkway
Existing Conditions:	Existing roadway
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond. The existing flow pattern will be maintained until Phase II construction.
Proposed Conditions:	Phase II construction will add a cycle track on the south side of the roadway.
Proposed Flow Pattern:	Drainage will generally flow from east to west. The existing storm system will be upsized during Phase II construction to accommodate the flows for future development, which will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin B5-F is the future, full build-out condition of Basin B5. In the future, the proposed development south of Basin B5 will minimize the tributary area for Basin B5-F.

Basin B6	
Location:	North side of Ridgegate Parkway
Existing Conditions:	Existing ground
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond.
Proposed Conditions:	Ridgegate Parkway roadway expansion, curb and gutter, and sidewalk to be constructed in Phase I
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin B8-F is a future proposed basin located on the south side of Ridgegate Parkway. In the future, Basin B8-F will be a commercial site that will connect into the proposed storm system at design point B1.

Major Basin C is broken up into 4 minor basins that cover the area on the western edge of the couplet and a portion of the southern couplet. Flows from these basins are captured by existing and proposed inlets and conveyed to Water Quality Pond B by proposed and existing storm sewer. Major Basin C will be constructed in *Ridgegate Parkway Expansion – Phase II* but is included with this report to size the storm system accordingly.

Basin C1	
Location:	North side of Ridgegate Parkway
Existing Conditions:	Existing ground and existing roadway
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to the existing water quality pond.
Proposed Conditions:	Ridgegate Parkway roadway expansion and a portion of the north couplet, curb and gutter, and sidewalk to be constructed in Phase II
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin C2	
Location:	South side of Ridgegate Parkway
Existing Conditions:	Existing ground and existing roadway
Existing Flow Pattern:	Drainage from this basin generally flows from south to north. Flows are captured by the existing storm system and conveyed to the existing water quality pond.
Proposed Conditions:	Ridgegate Parkway roadway expansion and a portion of the southern couplet, curb and gutter, and cycle track to be constructed in Phase II
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin C2-F is the future, full build-out condition of Basin C2. In the future, the proposed development south of Basin C2 will minimize the tributary area for Basin C2-F.

Basin C3	
Location:	South couplet of Ridgegate Parkway
Existing Conditions:	Existing ground
Existing Flow Pattern:	Drainage from this basin generally flows from south to north. Flows are overland through the basin, eventually captured by an existing culvert and bypassed under Ridgegate Parkway.
Proposed Conditions:	Ridgegate Parkway south couplet, curb and gutter, and cycle track to be constructed in Phase II
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin C3-F is the future, full build-out condition of Basin C3. In the future, the proposed development south of Basin C3 will minimize the tributary area for Basin C3-F.

Basin C4	
Location:	South couplet of Ridgegate Parkway
Existing Conditions:	Existing ground
Existing Flow Pattern:	Drainage from this basin generally flows from south to north. Flows are overland through the basin, eventually captured by an existing culvert and bypassed under Ridgegate Parkway.
Proposed Conditions:	Ridgegate Parkway south couplet, curb and gutter, and cycle track to be constructed in Phase II
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin C5-O	
Location:	South of southern couplet of Ridgegate Parkway
Existing Conditions:	Existing ground
Existing Flow Pattern:	Drainage from this basin generally flows from south to north. Flows are overland through the basin, eventually captured by an existing culvert and bypassed under Ridgegate Parkway.
Proposed Conditions:	No proposed development in Phase I or Phase II
Proposed Flow Pattern:	Drainage will generally flow from south to north. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond B.

Basin C6-F is located south of Ridgegate Parkway and is comprised of a future medium density and low density residential development. Once constructed, the development will tie into the proposed Phase II storm system stub out near the high point of the south couplet.

Basin C7-F is located south of Ridgegate Parkway and is comprised of a future commercial development. Once constructed, the development will tie into the proposed Phase II storm system at design point C2.

Basins B1-B6 and C1-C4 will all flow through a combination of proposed and/or existing storm sewer to Water Quality Pond B. Water Quality Pond B is discussed in Section III.E Water Quality Enhancement.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

The UDFCD Drainage Criteria Manual (UD-DCM), and the Douglas County Drainage Design and Technical Criteria Manual (DC-DCM) were used in the preparation of this report. The DC-DCM was the primary manual used for design and the UD-DCM was used when referenced by the DC-DCM.

B. Drainage Studies, Outfall Systems Plans, Site Constraints

There are five previous drainage studies that were referenced for the design of *Ridgegate Parkway Expansion – Phase I.*

The two main governing documents for drainage improvements in the Happy Canyon Creek and Badger Gulch Drainage Basins of the RidgeGate Development are the MDP-14 and MDP-17. This report is in compliance with both of the master drainage reports.

The Phase III Drainage Study for the Ridgegate Parkway East/Mainstreet Extension, from Peoria Street to Meridian Village Parkway, by FHU was approved for the original Ridgegate Parkway roadway project. The *Ridgegate Parkway Expansion* drainage design utilizes some of the existing infrastructure designed in the FHU report.

The Phase III Drainage Report for Ridgegate Parkway & Peoria Street Extensions Phase I, by TST Inc. was approved for the original Ridgegate Parkway and Peoria Street intersection

Table IV.1: A Basins – Area and Discharge

Basin	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)
A1	2.50	6.7	14.5
A2	2.43	4.8	10.7
A3	1.36	1.9	5.2
A4	2.42	1.7	6.8
A5	0.31	0.7	1.5
A6	1.79	1.3	5.8
A7	0.07	0.3	0.5
A8	0.22	0.7	1.4
A9	1.09	3.0	6.4
A10	3.20	1.9	9.1
A11	0.77	2.1	4.6
A12	0.98	3.3	6.7
A13	1.31	3.3	7.7

Basin B1 flows are captured by an existing 10' Type R inlet on the west end of the basin.

Basin B2 flows are captured by a proposed 10' Type R inlet on the west end of the basin.

Basin B3 flows are captured by an existing 10' Type R inlet on the west end of the basin. For Phase I, the existing storm system will continue to convey flows to Pond B.

Basin B3-F flows are captured by a proposed 10' Type R inlet on the west end of the basin. For Phase II, the existing storm system will be abandoned and the proposed 10' Type R inlet will connect to the proposed storm sewer system.

Basin B4 flows are captured by a proposed 10' Type R inlet on the west end of the basin.

Basin B5 flows are captured by an existing 10' Type R inlet on the west end of the basin. For Phase I, the existing storm system will continue to convey flows to Pond B.

Basin B5-F flows are captured by a proposed 10' Type R inlet on the west end of the basin. For Phase II, the existing storm system will be abandoned and the proposed 10' Type R inlet will connect to the proposed storm sewer system.

Basin B6 flows are captured by a proposed 10' Type R inlet on the west end of the basin.

Basin B8-F flows will be captured by a future storm system and tie into the Ridgegate Parkway storm system at design point B1.

Basin B areas and flows are summarized in Table IV.2:

Table IV.2: B Basins – Area and Discharge

Basin	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)
B1	1.91	1.9	7.1
B2	0.63	2.0	4.3
B3	1.58	2.4	7.8
B3-F	1.03	2.3	5.9
B4	1.00	2.2	6.1
B5	2.15	2.6	8.5
B5-F	1.10	3.3	7.1
B6	1.34	3.1	8.3
B8-F	11.87	35.1	72.6

Basin C1 flows are captured by a proposed 10' Type R inlet on the west end of the basin.

Basin C2 flows are captured by an existing 10' Type R inlet on the west end of the basin. For Phase I, the existing storm system will continue to convey flows to Pond B.

Basin C2-F flows are captured by a proposed 10' Type R inlet on the west end of the basin. For Phase II, the existing storm system will be abandoned and the proposed 10' Type R inlet will connect to the proposed storm sewer system.

Basin C3 flows are captured by a proposed 10' Type R inlet on the west end of the basin.

Basin C3-F flows are captured by a proposed 10' Type R inlet on the west end of the basin.

Basin C4 flows are captured by a proposed 10' Type R inlet on the east end of the basin.

Basin C5-O flows are captured by a proposed concrete FES to be installed in Phase II on the north end of the basin. In the future, this basin will be replaced by basins C6-F and C7-F.

Basin C6-F flows will be captured by a future storm system and tie into the Ridgegate Parkway storm system at the storm stub just east of the high point in the south couplet.

Basin C7-F flows will be captured by a future storm system and tie into the Ridgegate Parkway storm system at design point C2.

Basin C areas and flows are summarized in Table IV.3:

Table IV.3: C Basins – Area and Discharge

Basin	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)
C1	1.86	2.7	8.9
C2	3.73	2.9	12.1
C2-F	1.76	3.5	9.0
C3	2.22	1.5	6.1
C3-F	0.97	2.2	5.5
C4	0.26	0.6	1.5
C5-O	27.94	2.4	41.3
C6-F	24.11	29.4	85.5
C7-F	14.26	33.1	72.8

Riprap and concrete mats will be used for energy dissipation at the storm outfall into each pond, the pond outfall pipes, and the emergency spillways.

Runoff from the ponds will be conveyed by pipe or emergency spillway to Happy Canyon Creek.

B. Stormwater Storage Facilities

No stormwater storage facilities are proposed with the development of *Ridgegate Parkway Expansion – Phase I*. Water quality ponds are proposed to provide water quality for the existing and proposed roadway.

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Ph: (303) 751-0741

Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 9/26/2018
By: A. Jenne

Ridgegate Parkway Expansion

Composite Runoff Coefficient Calculations

Location: Douglas County
Municipality: Douglas County
Minor Design Storm: 5
Major Design Storm: 100
Soil Type: C/D

Runoff Coefficient (UDFCD Vol 1, Chp 6, Sec. 2.5.1)

NRCS Soil Group	Storm Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	C=0.84i^1.302	C=0.86i^1.276	C=0.87i^1.232	C=0.84i^1.124	C=0.85i+0.025	C=0.78i+0.110
B	C=0.84i^1.169	C=0.86i^1.088	C=0.81i+0.057	C=0.63i+0.249	C=0.56i+0.328	C=0.47i+0.426
C/D	C=0.83i^1.122	C=0.82i+0.035	C=0.74i+0.132	C=0.56i+0.319	C=0.49i+0.393	C=0.41i+0.484

Basin Design Data

	I (%) =											i (%)	Runoff Coeff's			
Basin Name	Design Point	$A_{paved\ streets}$ (sf)	$A_{drives/walks}$ (sf)	$A_{MU/COM/FIRE}$ (sf)	$A_{MF/RES}$ (sf)	$A_{MD\ RES}$ (sf)	$A_{LD\ RES}$ (sf)	$A_{lscape\ (B\ soil)}$ (sf)	$A_{lscape\ (C/D\ soil)}$ (sf)	A_{Total} (sf)	A_{Total} (ac)	Imp (%)	C2	C5	C10	C100
										83,395	1.91	31.7%	0.23	0.30	0.37	0.61
										27,442	0.63	82.1%	0.67	0.71	0.74	0.82
										68,898	1.58	39.2%	0.29	0.36	0.42	0.64
										45,056	1.03	58.9%	0.46	0.52	0.57	0.73
										43,421	1.00	52.1%	0.40	0.46	0.52	0.70
										93,684	2.15	40.6%	0.30	0.37	0.43	0.65
										48,016	1.10	77.2%	0.62	0.67	0.70	0.80
										58,328	1.34	54.1%	0.42	0.48	0.53	0.71
										516,895	11.87	85.0%	0.69	0.73	0.76	0.83
	Pond B	90,947	81,338	0	0	0	0	0	202,883	375,168	8.61	44.8%	0.34	0.40	0.46	0.67

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By: A. Jenne

Ridgegate Parkway Expansion

Time of Concentration Calculations

Location: Douglas County
Municipality: Douglas County
Minor Design Storm: 5
Major Design Storm: 100
Soil Type: C/D

t_i=(0.395(1.1-C_5)(L_i^0.5))/(S_o^0.33)
t_t=L_t/(60V_t)
Urban t_c=(26-17i)+L_t/(60(14i+9)*(S_T^.5))

Sub-Basin Data					Initial Overland Time (t_i)			Travel Time (t_t) t_t=Length/(Velocity x 60)						t_c Comp	tc Urbanized Check ON			t_c Final
Basin Name	Design Point	A_{Total} (ac)	i (%)	C5			t_i (min)				C_v	Velocity (fps)	t_t (min)	Time of Conc $t_i + t_t = t_c$	L_t (ft)	S_T (%)	Urban t_c	Min t_c
B1	-	1.91	31.7%	0.30			11.9				20	2.6	2.3	14.1	656.0	4.2%	24.6	14.1
B2	-	0.63	82.1%	0.71			3.9				20	2.8	2.4	6.3	459.0	2.1%	14.6	6.3
B3	-	1.58	39.2%	0.36			5.6				20	2.8	2.4	8.0	514.0	3.6%	22.4	8.0
B3-F	-	1.03	58.9%	0.52			5.0				20	2.8	2.4	7.4	441.0	2.0%	19.0	7.4
B4	-	1.00	52.1%	0.46			4.6				20	2.7	2.4	7.0	485.0	2.9%	0.0	5.0
B5	-	2.15	40.6%	0.37			11.2				20	3.3	2.9	14.1	892.0	4.3%	24.0	14.1
B5-F	-	1.10	77.2%	0.67			4.0				20	3.3	2.9	6.9	659.0	2.9%	16.1	6.9
B6	-	1.34	54.1%	0.48			5.0				20	3.2	0.9	6.0	312.0	6.5%	0.0	5.0
B8-F	-	11.87	85.0%	0.73			5.4				20	2.8	5.3	10.7	1000.0	2.0%	8.9	8.9

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By: A. Jenne

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **5 Year**   Point Hour Rainfall (P_1) : **1.43**   I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)								Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
PHASE I																								
	-	1.34	0.48	5.0	0.64	4.85	3.1												18.7		2.6	0.19	5.19	
	-	1.00	0.46	5.0	0.46	4.85	2.2												10.5		1.9	0.26	5.26	
	B4			Combined Flows (B6, B4)						4.79	5.3								222.5		1.5	2.21	7.47	
	-	2.15	0.37	14.1	0.79	3.34	2.6												11.1		2.2	3.15	17.25	
	-	1.58	0.36	8.0	0.56	4.20	2.4												11.3		2.0	0.14	8.14	
	B3			Combined Flows (B5, B3)						3.03	4.1								27.7		2.6	2.52	19.78	
	-	1.91	0.30	14.1	0.57	3.34	1.9												11.0		1.6	0.19	14.29	
	B7			Combined Flows (B5, B3, B1)						2.83	5.4								27.9		3.5	0.24	20.01	
	-	0.63	0.71	6.3	0.45	4.54	2.0												10.5		1.7	0.29	6.59	
	B5			Combined Flows (B5, B3-B1)						2.81	6.7								42.2		3.4	1.00	21.02	
	B6			Combined Flows (B6-B1)						2.74	9.5								85.4		3.5	0.63	21.65	
PHASE II																								
	C1			Combined Flows (C5-O-C1)						1.33	5.1								181.7		20.2	0.45	50.82	
	-	1.34	0.48	5.0	0.64	4.85	3.1												18.7		2.6	0.19	5.19	
	-	2.15	0.37	14.1	0.79	3.34	2.6												11.1		2.2	3.15	17.25	
	B2			Combined Flows (C, B6-B5)						1.61	8.5								246.4		2.4	2.75	53.57	
	-	1.00	0.46	5.0	0.46	4.85	2.2												10.5		1.9	0.26	5.26	
	-	1.58	0.36	8.0	0.56	4.20	2.4												11.3		2.0	0.14	8.14	
	B4			Combined Flows (C, B6-B3)						1.56	9.8								222.5		2.8	1.19	54.77	
	-	0.63	0.71	6.3	0.45	4.54	2.0												10.5		1.7	0.29	6.59	
	-	1.91	0.30	14.1	0.57	3.34	1.9												11.0		1.6	0.19	14.29	
	B5			Combined Flows (B2-B1)						3.32	3.4								42.2		1.7	1.99	16.28	
	B6			Combined Flows (C, B6-B1)						1.54	11.2								85.4		4.1	0.53	55.30	

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Date: 9/26/2018
By: A. Jenne

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **5 Year**

Point Hour Rainfall (P_1) : **1.43**

I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)								Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
FUTURE																								
	C1			Combined Flows (C7-F-C1)						2.73	59.6								181.7		58.2	0.16	20.03	
	-	1.34	0.48	5.0	0.64	4.85	3.1												18.8		2.6	0.19	5.19	
	-	11.87	0.73	8.9	8.69	4.04	35.1												94.3		14.9	0.04	8.94	
	-	1.10	0.67	6.9	0.74	4.42	3.3																	
	B1			Combined Flows (B8-F, B5-F)						4.04	38.1								118.0		16.1	0.07	9.01	
	B2			Combined Flows (C, B8-F, B6, B5-F)						2.73	87.1								246.4		24.6	0.27	21.44	
	-	1.00	0.46	5.0	0.46	4.85	2.2												10.5		1.9	0.26	5.26	
	-	1.03	0.52	7.4	0.54	4.32	2.3												26.2		2.0	0.56	7.96	
	B4			Combined Flows (C, B8-F-B3-F)						2.71	89.2								222.5		25.2	0.13	21.57	
	-	1.91	0.30	14.1	0.57	3.34	1.9												11.0		1.6	0.19	14.29	
	-	0.63	0.71	6.3	0.45	4.54	2.0												10.5		1.7	0.29	6.59	
	B5			Combined Flows (B2-B1)						3.32	3.4								42.2		1.7	1.99	16.28	
	B6			Combined Flows (C,B8-F-B1)						2.70	91.7								260.4		23.3	0.07	21.65	

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Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **10 Year** Point Hour Rainfall (P_1) : **1.66**

	Direct Runoff							Total Runoff		Pipe	Pipe/Swale Travel Time		
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	Approx. Max Pipe Capacity (cfs)	Velocity (fps)	tt (min)	Total Time (min)
PHASE I													
	-	1.34	0.53	5.0	0.71	5.63	4.0			18.7	2.6	0.19	5.19
	-	1.00	0.52	5.0	0.52	5.63	2.9			10.5	1.9	0.26	5.26
	B4			Combined Flows (B6, B4)				5.55	6.8	222.5	1.9	1.71	6.97
	-	2.15	0.43	14.1	0.93	3.88	3.6			11.1	2.2	3.15	17.25
	-	1.58	0.42	8.0	0.67	4.88	3.3			11.3	2.0	0.14	8.14
	B3			Combined Flows (B5, B3)				3.52	5.6	27.7	3.6	1.84	19.10
	-	1.91	0.37	14.1	0.70	3.88	2.7			11.0	1.6	0.19	14.29
	B7			Combined Flows (B5, B3, B1)				3.34	7.7	27.9	4.9	0.17	19.26
	-	0.63	0.74	6.3	0.47	5.27	2.5			10.5	1.7	0.29	6.59
	B5			Combined Flows (B5, B3-B1)				3.33	9.2	42.2	4.7	0.73	19.99
	B6			Combined Flows (B6-B1)				3.27	13.0	85.4	4.7	0.46	20.45
PHASE II													
	C1			Combined Flows (C5-O-C1)				1.77	12.5	181.7	20.2	0.45	50.82
	-	1.34	0.53	5.0	0.71	5.63	4.0			18.7	2.6	0.19	5.19
	-	2.15	0.43	14.1	0.93	3.88	3.6			11.1	2.2	3.15	17.25
	B2			Combined Flows (C, B6-B5)				1.87	16.4	246.4	4.6	1.43	52.25
	-	1.00	0.52	5.0	0.52	5.63	2.9			10.5	1.9	0.26	5.26
	-	1.58	0.42	8.0	0.67	4.88	3.3			11.3	2.0	0.14	8.14
	B4			Combined Flows (C, B6-B3)				1.84	18.2	222.5	5.2	0.64	52.89
	-	0.63	0.74	6.3	0.47	5.27	2.5			10.5	1.7	0.29	6.59
	-	1.91	0.37	14.1	0.70	3.88	2.7			11.0	1.6	0.19	14.29
	B5			Combined Flows (B2-B1)				3.85	4.5	42.2	2.3	1.48	15.77
	B6			Combined Flows (C, B6-B1)				1.83	20.2	85.4	7.4	0.30	53.18
FUTURE													
	C1			Combined Flows (C7-F-C1)						181.7	58.2	0.16	20.03
	-	1.34	0.53	5.0	0.71	5.63	4.0			18.8	2.6	0.19	5.19
	-	11.87	0.76	8.9	9.03	4.70	42.4			94.3	18.0	0.03	8.93
	-	1.10	0.70	6.9	0.78	5.13	4.0						
	B1			Combined Flows (B8-F, B5-F)				4.69	46.0	118.0	19.5	0.06	8.99
	B2			Combined Flows (C, B8-F, B6, B5-F)				3.21	111.0	246.4	31.4	0.21	20.90
	-	1.00	0.52	5.0	0.52	5.63	2.9			10.5	1.9	0.26	5.26
	-	1.03	0.57	7.4	0.59	5.01	2.9			26.2	2.0	0.56	7.96
	B4			Combined Flows (C, B8-F-B3-F)				3.19	113.9	222.5	32.2	0.10	21.00
	-	1.91	0.37	14.1	0.70	3.88	2.7			11.0	1.6	0.19	14.29
	-	0.63	0.74	6.3	0.47	5.27	2.5			10.5	1.7	0.29	6.59
	B5			Combined Flows (B2-B1)				3.85	4.5	42.2	2.3	1.48	15.77
	B6			Combined Flows (C,B8-F-B1)				3.18	117.3	260.4	29.9	0.06	21.06

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Job Number: 65119564
Date: 9/26/2018
By: A. Jenne

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **100 Year**

Point Hour Rainfall (P_1) : **2.60**

I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)								Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
PHASE I																								
	-	1.34	0.71	5.0	0.95	8.82	8.3												18.7		6.6	0.07	5.07	
	-	1.00	0.70	5.0	0.70	8.82	6.1												10.5		6.0	0.08	5.08	
	B4			Combined Flows (B6, B4)						8.78	14.4								222.5		4.1	0.81	5.89	
	-	2.15	0.65	14.1	1.40	6.08	8.5												11.1		7.1	0.99	15.09	
	-	1.58	0.64	8.0	1.02	7.64	7.8												11.3		6.9	0.04	8.04	
	B3			Combined Flows (B5, B3)						5.89	14.2								27.7		9.1	0.73	15.82	
	-	1.91	0.61	14.1	1.18	6.08	7.1												11.0		6.6	0.05	14.15	
	B7			Combined Flows (B5, B3, B1)						5.75	20.7								27.9		13.2	0.06	15.88	
	-	0.63	0.82	6.3	0.52	8.26	4.3												10.5		4.9	0.10	6.40	
	B5			Combined Flows (B5, B3-B1)						5.74	23.6								42.2		12.0	0.28	16.17	
	B6			Combined Flows (B6-B1)						5.69	32.8								85.4		11.9	0.18	16.35	
PHASE II																								
	C1			Combined Flows (C5-O-C1)						2.95	55.5								181.7		20.2	0.45	50.82	
	-	1.34	0.71	5.0	0.95	8.82	8.3												18.7		6.6	0.07	5.07	
	-	2.15	0.65	14.1	1.40	6.08	8.5												11.1		7.1	0.99	15.09	
	B2			Combined Flows (C, B6-B5)						2.93	62.1								246.4		17.6	0.38	51.20	
	-	1.00	0.70	5.0	0.70	8.82	6.1												10.5		6.0	0.08	5.08	
	-	1.58	0.64	8.0	1.02	7.64	7.8												11.3		6.9	0.04	8.04	
	B4			Combined Flows (C, B6-B3)						2.92	66.8								222.5		18.9	0.17	51.37	
	-	0.63	0.82	6.3	0.52	8.26	4.3												10.5		4.9	0.10	6.40	
	-	1.91	0.61	14.1	1.18	6.08	7.1												11.0		6.6	0.05	14.15	
	B5			Combined Flows (B2-B1)						6.07	10.3								42.2		5.2	0.65	14.80	
	B6			Combined Flows (C, B6-B1)						2.91	71.6								85.4		26.0	0.08	51.46	

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 9/26/2018
By: A. Jenne

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **100 Year**

Point Hour Rainfall (P_1) : **2.60**

I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)								Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
FUTURE																								
	C1			Combined Flows (C7-F-C1)						5.13	160.0								181.7		58.2	0.16	20.03	
	-	1.34	0.71	5.0	0.95	8.82	8.3												18.8		6.6	0.07	5.07	
	-	11.87	0.83	8.9	9.88	7.35	72.6												94.3		30.8	0.02	8.92	
	-	1.10	0.80	6.9	0.88	8.03	7.1																	
	B1			Combined Flows (B8-F, B5-F)						7.35	79.1								118.0		33.6	0.03	8.95	
	B2			Combined Flows (C, B8-F, B6, B5-F)						5.11	219.2								246.4		62.0	0.11	20.14	
	-	1.00	0.70	5.0	0.70	8.82	6.1												10.5		6.0	0.08	5.08	
	-	1.03	0.73	7.4	0.75	7.85	5.9												26.2		6.9	0.16	7.56	
	B4			Combined Flows (C, B8-F-B3-F)						5.10	225.9								222.5		63.9	0.05	20.19	
	-	1.91	0.61	14.1	1.18	6.08	7.1												11.0		6.6	0.05	14.15	
	-	0.63	0.82	6.3	0.52	8.26	4.3												10.5		4.9	0.10	6.40	
	B5			Combined Flows (B2-B1)						6.07	10.3								42.2		5.2	0.65	14.80	
	B6			Combined Flows (C,B8-F-B1)						5.09	234.3								260.4		59.6	0.03	20.22	

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 9/26/2018
By: G. LEE

Ridgegate Parkway Expansion

Composite Runoff Coefficient Calculations

Location: Douglas County
Municipality: Douglas County
Minor Design Storm: 5
Major Design Storm: 100
Soil Type: C/D

Runoff Coefficient (UDFCD Vol 1, Chp 6, Sec. 2.5.1)

NRCS Soil Group	Storm Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	C=0.84i^1.302	C=0.86i^1.276	C=0.87i^1.232	C=0.84i^1.124	C=0.85i+0.025	C=0.78i+0.110
B	C=0.84i^1.169	C=0.86i^1.088	C=0.81i+0.057	C=0.63i+0.249	C=0.56i+0.328	C=0.47i+0.426
C/D	C=0.83i^1.122	C=0.82i+0.035	C=0.74i+0.132	C=0.56i+0.319	C=0.49i+0.393	C=0.41i+0.484

Basin Design Data

	I (%) =											i (%)	Runoff Coeff's			
Basin Name	Design Point	A_{paved} streets (sf)	$A_{drives/}$ walks (sf)	$A_{MU/COM/FIRE}$ (sf)	$A_{MF/RES}$ (sf)	$A_{MD\ RES}$ (sf)	$A_{LD\ RES}$ (sf)	A_{lscape} (C/D soil) (sf)	$A_{lscape\ (C/D}$ soil) (sf)	A_{Total} (sf)	A_{Total} (ac)	Imp (%)	C2	C5	C10	C100
										101,574	2.33	31.6%	0.23	0.29	0.37	0.61
										157,050	3.61	28.9%	0.21	0.27	0.35	0.60
										71,064	1.63	61.4%	0.48	0.54	0.59	0.74
										91,289	2.10	28.9%	0.21	0.27	0.35	0.60
										37,290	0.86	67.9%	0.54	0.59	0.63	0.76
										10,975	0.25	68.2%	0.54	0.59	0.64	0.76
										1,217,202	27.94	2.0%	0.01	0.05	0.15	0.49
										1,050,302	24.11	47.5%	0.36	0.42	0.48	0.68
										620,974	14.26	76.1%	0.61	0.66	0.70	0.80
	Pond B	66,215	44,493	0	0	0	0	0	1,467,382	1,578,090	36.23	8.6%	0.05	0.11	0.20	0.52

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 9/26/2018
By: G. LEE

Ridgegate Parkway Expansion

Time of Concentration Calculations

Location: Douglas County
Municipality: Douglas County
Minor Design Storm: 5
Major Design Storm: 100
Soil Type: C/D

$t_i=(0.395(1.1-C_5)(L_i\text{^}0.5))/(S_o\text{^}0.33)$
$t_t=L_t/(60V_t)$
Urban $t_c=(26-17i)+L_t/(60(14i+9)*(S_T\text{^}.5))$

Sub-Basin Data					Initial Overland Time (t_i)			Travel Time (t_t) t_t=Length/(Velocity x 60)						t_c Comp	tc Urbanized Check ON			t_c Final
Basin Name	Design Point	A_{Total} (ac)	i (%)	C5			t_i (min)				C_v	Velocity (fps)	t_t (min)	Time of Conc $t_i + t_t = t_c$	L_t (ft)	S_T (%)	Urban t_c	Min t_c
C1	-	2.33	31.6%	29.4%			5.6				20	3.4	3.4	9.1	732.0	2.9%	26.0	9.1
C2	-	3.61	28.9%	0.27			14.4				20	3.6	3.5	17.9	1055.0	3.9%	27.9	17.9
C2-F	-	1.63	61.4%	0.54			5.9				20	3.6	3.5	9.4	807.0	3.1%	19.9	9.4
C3	-	2.10	28.9%	0.27			20.9				20	2.4	3.0	23.8	734.0	1.7%	28.3	23.8
C3-F	-	0.86	67.9%	0.59			5.1				20	2.4	1.9	7.0	331.0	1.6%	16.8	7.0
C4	-	0.25	68.2%	0.59			6.3				20	1.8	1.2	7.5	200.0	1.1%	16.1	7.5
C5-O	-	27.94	2.0%	0.05			25.1				7	1.2	26.1	51.2	2300.0	3.1%	49.1	49.1
C6-F	-	24.11	47.5%	0.42			9.8				20	4.0	9.4	19.2	2347.0	3.9%	30.6	19.2
C7-F	-	14.26	76.1%	0.66			6.4				20	4.0	6.1	12.5	1555.0	3.8%	19.8	12.5

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 9/26/2018
By: G. LEE

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **5 Year**

Point Hour Rainfall (P_1) : **1.43**

I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)	Inlet Type							Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
PHASE II																								
	-	27.94	0.05	49.1	1.44	1.65	2.4												58.0		1.2	0.92	50.02	
	-	0.25	0.59	7.5	0.15	4.30	0.6												29.7		0.5	4.27	11.77	
	C5				Combined Flows (C5-O-C4)					1.63	2.6								66.7		1.1	6.89	56.92	
	-	2.10	0.27	23.8	0.57	2.56	1.5												29.7		1.2	0.25	24.05	
	C3			Combined Flows (C5-O, C4, C3)						1.50	3.2								180.0		1.2	11.09	68.00	
	-	3.61	0.27	17.9	0.98	2.98	2.9												98.3		1.2	0.91	18.81	
	-	2.33	0.29	9.1	0.68	4.01	2.7												29.7		2.3	0.21	9.31	
	C1				Combined Flows (C5-O-C1)					1.33	5.1								181.7		1.8	4.96	72.97	
FUTURE																								
	-	24.11	0.42	19.2	10.23	2.87	29.4												71.2		12.5	0.20	19.40	
	-	0.25	0.59	7.5	0.15	4.30	0.6												29.7		0.5	0.57	8.07	
	C4				Combined Flows (C6-F-C4)					2.86	29.7								74.9		12.6	0.77	20.17	
	-	0.86	0.59	7.0	0.51	4.40	2.2												29.7		1.2	0.25	7.25	
	C3			Combined Flows (C6-F, C4, C3-F)						2.80	30.5								111.6		12.9	1.01	21.17	
	-	14.26	0.66	12.50	9.40	3.53	33.1												94.3		14.1	0.04	12.54	
	-	1.63	0.54	9.40	0.88	3.96	3.5																	
	C2				Combined Flows (C7-F,C2-F)					3.52	36.2								98.3		15.4	0.09	12.63	
	-	2.33	0.29	9.1	0.68	4.01	2.7												29.7		2.3	0.21	9.31	
	C1				Combined Flows (C7-F-C1)					2.73	59.6								181.7		21.7	0.42	21.60	

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Job Name: Ridgegate Parkway Expansion
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By: G. LEE

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **10 Year**

Point Hour Rainfall (P_1) : **1.66**

	Direct Runoff							Total Runoff				Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)					Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
PHASE II																					
	-	27.94	0.15	49.1	4.10	1.92	7.9									58.0		4.0	0.28	49.38	
	-	0.25	0.64	7.5	0.16	4.99	0.8									29.7		0.5	4.27	11.77	
	C5			Combined Flows (C5-O-C4)						1.91	8.1					66.7		3.5	2.19	51.57	
	-	2.10	0.35	23.8	0.72	2.97	2.2									29.7		1.2	0.25	24.05	
	C3			Combined Flows (C5-O, C4, C3)						1.86	9.3					180.0		3.4	3.87	55.44	
	-	3.61	0.35	17.9	1.25	3.46	4.3									98.3		1.2	0.91	18.81	
	-	2.33	0.37	9.1	0.85	4.66	4.0									29.7		2.3	0.21	9.31	
	C1			Combined Flows (C5-O-C1)						1.77	12.5					181.7		4.6	2.01	57.44	
FUTURE																					
	-	24.11	0.48	19.2	11.65	3.34	38.9									71.2		16.5	0.15	19.35	
	-	0.25	0.64	7.5	0.16	4.99	0.8									29.7		0.5	0.57	8.07	
	C4			Combined Flows (C6-F-C4)						3.32	39.2					74.9		16.7	0.58	19.93	
	-	0.86	0.63	7.0	0.54	5.10	2.8									29.7		1.2	0.25	7.25	
	C3			Combined Flows (C6-F, C4, C3-F)						3.27	40.4					111.6		17.2	0.76	20.69	
	-	14.26	0.70	12.50	9.91	4.09	40.6									94.3		17.2	0.03	12.53	
	-	1.63	0.59	9.40	0.96	4.60	4.4														
	C2			Combined Flows (C7-F,C2-F)						4.09	44.4					98.3		18.9	0.07	12.60	
	-	2.33	0.37	9.1	0.85	4.66	4.0									29.7		2.3	0.21	9.31	
	C1			Combined Flows (C7-F-C1)						3.21	77.2					181.7		28.1	0.33	21.02	

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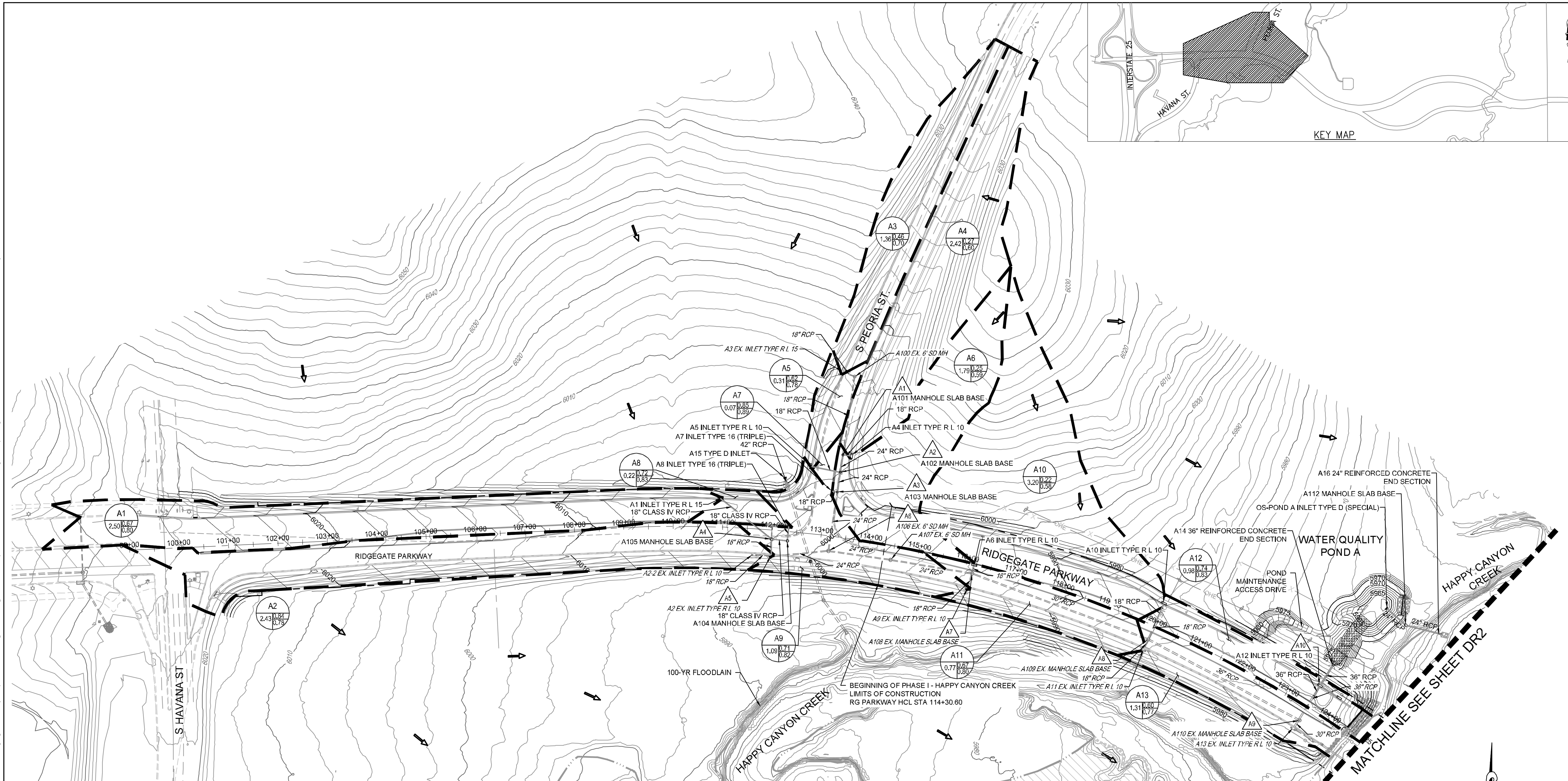
Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 9/26/2018
By: G. LEE

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **100 Year**   Point Hour Rainfall (P_1) : **2.60**   I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)	Inlet Type							Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
PHASE II																								
	-	27.94	0.49	49.1	13.75	3.00	41.3												58.0		21.0	0.05	49.15	
	-	0.25	0.76	7.5	0.19	7.81	1.5												29.7		1.3	1.82	9.32	
	C5				Combined Flows (C5-O-C4)					3.00	41.8								66.7		17.8	0.43	49.58	
	-	2.10	0.60	23.8	1.26	4.66	5.9												29.7		3.9	0.08	23.88	
	C3			Combined Flows (C5-O, C4, C3)						2.98	45.4								180.0		16.5	0.79	50.37	
	-	3.61	0.60	17.9	2.17	5.41	11.8												98.3		3.5	0.32	18.22	
	-	2.33	0.61	9.1	1.43	7.29	10.4												29.7		6.3	0.08	9.18	
	C1				Combined Flows (C5-O-C1)					2.95	55.5								181.7		20.2	0.45	50.82	
FUTURE																								
	-	24.11	0.68	19.2	16.36	5.22	85.5												71.2		36.3	0.07	19.27	
	-	0.25	0.76	7.5	0.19	7.81	1.5												29.7		1.3	0.24	7.74	
	C4				Combined Flows (C6-F-C4)					5.21	86.3								74.9		36.6	0.26	19.53	
	-	0.86	0.76	7.0	0.65	7.99	5.2												29.7		3.9	0.08	7.08	
	C3			Combined Flows (C6-F, C4, C3-F)						5.18	89.1								111.6		37.8	0.34	19.88	
	-	14.26	0.80	12.50	11.35	6.41	72.8												94.3		30.9	0.02	12.52	
	-	1.63	0.74	9.40	1.20	7.20	8.6																	
	C2			Combined Flows (C7-F,C2-F)						6.41	80.4								98.3		34.1	0.04	12.56	
	-	2.33	0.61	9.1	1.43	7.29	10.4												29.7		6.3	0.08	9.18	
	C1			Combined Flows (C7-F-C1)						5.13	160.0								181.7		58.2	0.16	20.03	



LEGEND

BASIN ID / 5-YEAR RUNOFF COEFFICIENT / 100-YEAR RUNOFF COEFFICIENT / BASIN AREA (ACRES)	PROPOSED FLOW OF WATER	EXISTING MINOR CONTOUR
DESIGN POINT	EXISTING FLOW OF WATER	PROPOSED MAJOR CONTOUR
	PROPOSED MANHOLE AND STORM SEWER	PROPOSED MINOR CONTOUR
	EXISTING MANHOLE AND STORM SEWER	PROPOSED BASIN BOUNDARY
	EXISTING MAJOR CONTOUR	INTERIM BASIN BOUNDARY

PRELIMINARY
NOT FOR CONSTRUCTION

811 Know what's below. Call before you dig.

NOTE:
THE EXISTING STORM SYSTEM IN BASIN B AND A PORTION OF BASIN C WILL CONTINUE TO CONVEY FLOWS UNTIL PHASE II STORM IMPROVEMENTS ARE CONSTRUCTED.

City of Lone Tree

These construction plans have been reviewed by the City of Lone Tree for street and drainage improvements only.

Engineering Division Acceptance Block

1" = 100' HOR.

Computer File Information	Sheet Revisions	
Print Date: 9/26/18	Date:	Comments
Drawing File Name: 9564 Drainage Map.dwg		
Horiz. Scale: AS SHOWN Vert. Scale: AS SHOWN		

CITY OF LONE TREE

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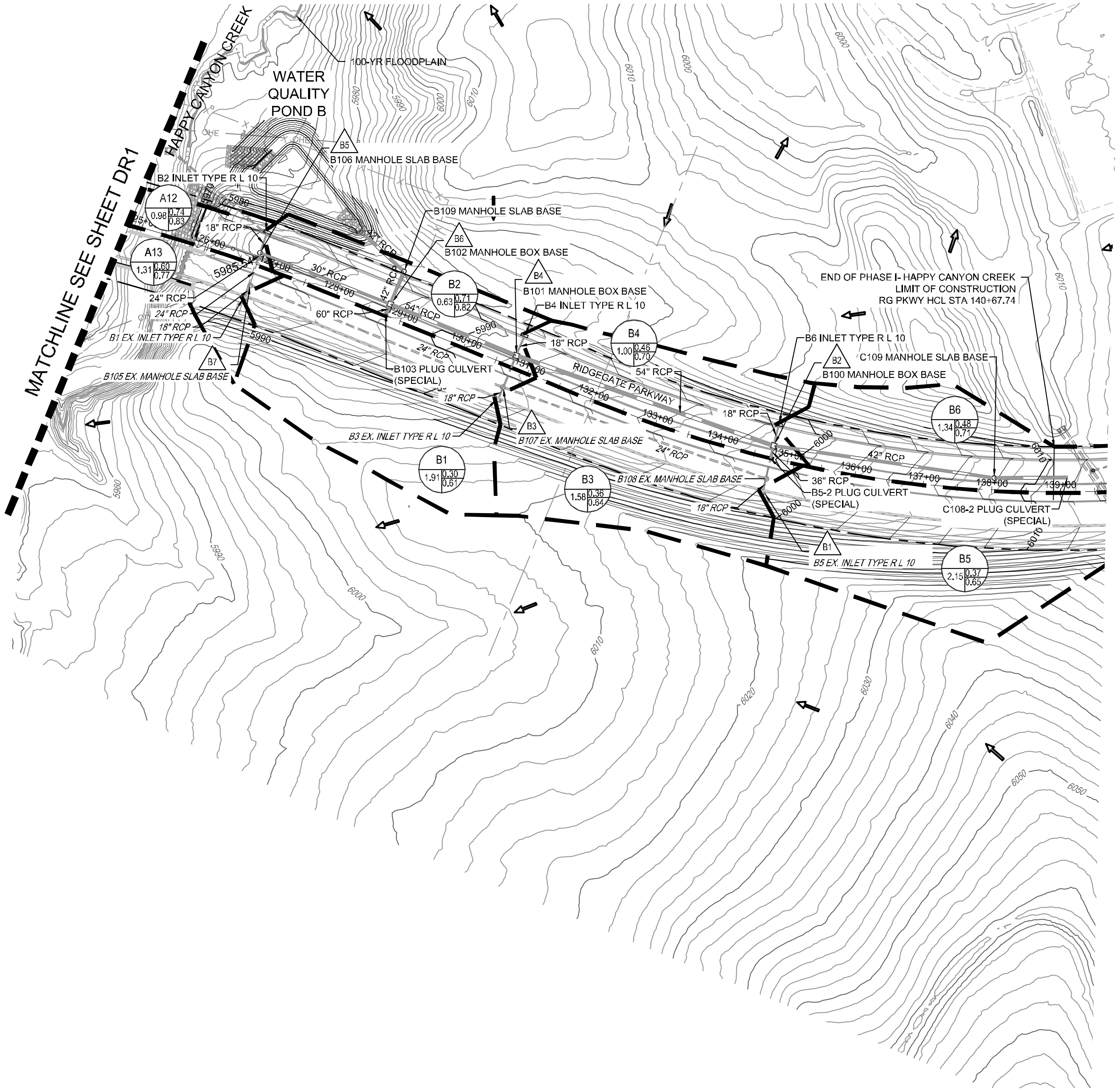
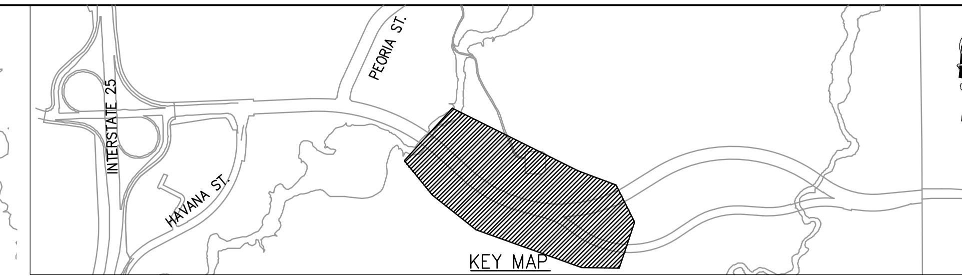
As Constructed	RIDGEGATE PARKWAY EXPANSION DRAINAGE MAP	Project No./Code
No Revisions:		21911
Revised:	Designer: / QC Review:	
	Detailer: / Approved:	
Void:	Sheet Subset: / Subset Sheet:	Sheet Number: DR1

File Location:Q:\DEN\Projects\5087-02-RRMD Overall East\Projects\9564-Ridgegate Pkwy Expansion\Design\Drainage\Basin Maps\PHASE I\9564 Drainage Map.dwg Plot Date:9/26/2018 2:00 PM Last Saved By: CDAVIDS





LEGEND

BASIN ID	PROPOSED FLOW OF WATER	EXISTING MINOR CONTOUR
5-YEAR RUNOFF COEFFICIENT	EXISTING FLOW OF WATER	4920 PROPOSED MAJOR CONTOUR
100-YEAR RUNOFF COEFFICIENT	PROPOSED MANHOLE AND STORM SEWER	PROPOSED MINOR CONTOUR
BASIN AREA (ACRES)	EXISTING MANHOLE AND STORM SEWER	PROPOSED BASIN BOUNDARY
DESIGN POINT	EXISTING MAJOR CONTOUR	INTERIM BASIN BOUNDARY

NOTE:
THE EXISTING STORM SYSTEM IN BASIN B AND A PORTION OF BASIN C WILL CONTINUE TO CONVEY FLOWS UNTIL PHASE II STORM IMPROVEMENTS ARE CONSTRUCTED.

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NOT FOR CONSTRUCTION

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Engineering Division Acceptance Block

100' 0 50' 100' 200'
1" = 100' HOR.

Computer File Information	
Print Date: 9/26/18	
Drawing File Name: 9564 Drainage Map.dwg	
Horiz. Scale: AS SHOWN	Vert. Scale: AS SHOWN

Sheet Revisions	
Date:	Comments

CITY OF LONE TREE

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5970 GREENWOOD PLAZA BLVD, GREENWOOD VILLAGE, CO 80111
PH: (303) 751-0741

As Constructed
No Revisions:
Revised:
Void:

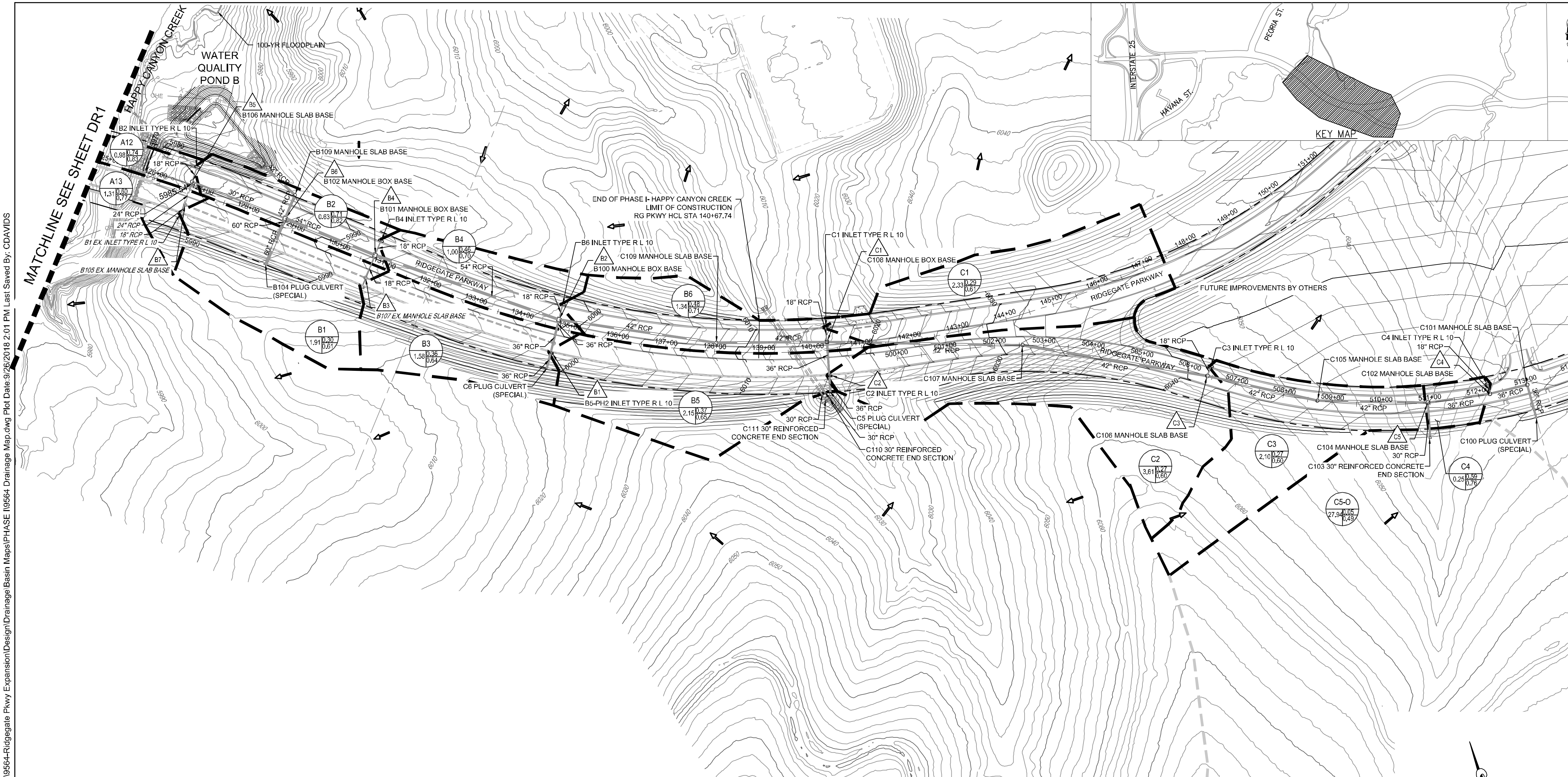
RIDGEGATE PARKWAY EXPANSION
PHASE I DRAINAGE MAP
(BASINS FOR INLET SIZING)

Designer: | QC Review:
Detailer: | Approved:
Sheet Subset: | Subset Sheet:

Project No./Code
21911

Sheet Number: DR2-PH1

File Location:Q:\DEN\Projects\5087-02-RRMD Overall East\Projects\9564-Ridgegate Pkwy Expansion\Design\Drainage\Basin Maps\PHASE I\9564 Drainage Map.dwg Plot Date:9/26/2018 2:01 PM Last Saved By: CDAVIDS



LEGEND

BASIN ID; 5-YEAR RUNOFF COEFFICIENT; 100-YEAR RUNOFF COEFFICIENT; BASIN AREA (ACRES)	PROPOSED FLOW OF WATER	EXISTING MINOR CONTOUR
DESIGN POINT	EXISTING FLOW OF WATER	PROPOSED MAJOR CONTOUR
	PROPOSED MANHOLE AND STORM SEWER	PROPOSED MINOR CONTOUR
	EXISTING MANHOLE AND STORM SEWER	PROPOSED BASIN BOUNDARY
	EXISTING MAJOR CONTOUR	INTERIM BASIN BOUNDARY

PRELIMINARY
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Engineering Division Acceptance Block

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NOTE:
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Computer File Information	
Print Date: 9/26/18	
Drawing File Name: 9564 Drainage Map.dwg	
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Sheet Revisions	
Date:	Comments

CITY OF LONE TREE

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RIDGEGATE PARKWAY EXPANSION
PHASE II DRAINAGE MAP
(BASINS FOR INLET SIZING)

Designer:	QC Review:
Detailer:	Approved:
Sheet Subset:	Subset Sheet:

Project No./Code: 21911

Sheet Number: DR2-PH2

LEGEND

BASIN ID / 5-YEAR RUNOFF COEFFICIENT / 100-YEAR RUNOFF COEFFICIENT / BASIN AREA (ACRES)	PROPOSED FLOW OF WATER	EXISTING MINOR CONTOUR
DESIGN POINT	EXISTING FLOW OF WATER	PROPOSED MAJOR CONTOUR
	PROPOSED MANHOLE AND STORM SEWER	PROPOSED MINOR CONTOUR
	EXISTING MANHOLE AND STORM SEWER	PROPOSED BASIN BOUNDARY
	EXISTING MAJOR CONTOUR	INTERIM BASIN BOUNDARY

PRELIMINARY
NOT FOR CONSTRUCTION

Know what's below. Call before you dig.

NOTE:
THE EXISTING STORM SYSTEM IN BASIN B AND A PORTION OF BASIN C WILL CONTINUE TO CONVEY FLOWS UNTIL PHASE II STORM IMPROVEMENTS ARE CONSTRUCTED.

City of Lone Tree

These construction plans have been reviewed by the City of Lone Tree for street and drainage improvements only.

Engineering Division Acceptance Block

1" = 100' HOR.

Computer File Information	
Print Date: 9/26/18	
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RIDGEGATE PARKWAY EXPANSION
FUTURE DRAINAGE MAP
(BASINS FOR PIPE SIZING)

Designer: | QC Review:
Detailer: | Approved:
Sheet Subset: | Subset Sheet:

Project No./Code: 21911

Sheet Number: DR3

File Location:Q:\DEN\Projects\5087-02-RRMD Overall East\Projects\9564-Ridgegate Pkwy Expansion\Design\Drainage\Basin Maps\PHASE II\9564 Drainage Map.dwg Plot Date:9/26/2018 2:02 PM Last Saved By: CDAVIDS

PHASE III DRAINAGE REPORT
FOR
RIDGEGATE PARKWAY EXPANSION – PHASE II
LONE TREE, CO

October 2018

Prepared For:

City of Lone Tree
9220 Kimmer Dr., Suite 100
Lone Tree, Colorado 80124
Phone: (720) 509-1241

Prepared By:

MERRICK & COMPANY

5970 Greenwood Plaza Blvd
Greenwood Village, CO 80111
Phone: (303) 751-0741

Merrick Job No. 65119564

Basin E1	
Location:	South couplet, east of western future couplet road
Existing Conditions:	Native grass
Existing Flow Pattern:	Drainage from this basin generally sheet flows south to north.
Proposed Conditions:	Roadway, curb and gutter, and sidewalks
Proposed Flow Pattern:	Drainage will generally flow from west to east. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond E.

Basin E2-O	
Location:	South of the south couplet road
Existing Conditions:	Native grass
Existing Flow Pattern:	Drainage from this basin generally sheet flows south to north.
Proposed Conditions:	Native grass and roadside swale to divert offsite, undeveloped flows
Proposed Flow Pattern:	Drainage will generally flow from west to east. Flows will be captured by the proposed roadside swale and conveyed to Badger Gulch.

Basin E2-F is a portion of the future, full build-out condition of Basin E2. In the future, the proposed development will likely increase impervious and minimize the tributary area of Basin E2.

Basin E3	
Location:	South couplet, west of the proposed Badger Gulch Bridge
Existing Conditions:	Native grass
Existing Flow Pattern:	Drainage from this basin generally sheet flows west to east.
Proposed Conditions:	Roadway, curb and gutter, and sidewalks
Proposed Flow Pattern:	Drainage will generally flow from west to east. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond E.

Basin E4-F is a portion of the future, full build-out condition of Basin E2. In the future, the proposed development will likely increase impervious and minimize the tributary area of Basin E2.

Basin E5-F is the future, full build-out condition of high density residential parcel as defined by DTJ. Basin E5-F is used to determine the size of Water Quality Pond E.

Major Basin F is broken up into 4 minor basins that covers the areas east of Badger Gulch. Flows from these basins are captured by existing and proposed inlets and conveyed to Water Quality Pond F by proposed and existing storm sewer.

Basin F1	
Location:	South couplet, east of the proposed Badger Gulch Bridge
Existing Conditions:	Native grass
Existing Flow Pattern:	Drainage from this basin generally sheet flows east to west.
Proposed Conditions:	Roadway, curb and gutter, and sidewalks
Proposed Flow Pattern:	Drainage will generally flow from west to east. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond F.

Basin F2	
Location:	Ridgegate Parkway, east of the existing Badger Gulch Bridge
Existing Conditions:	Existing roadway
Existing Flow Pattern:	Drainage from this basin generally flows from east to west. Flows are captured by the existing storm system and conveyed to an existing water quality pond.
Proposed Conditions:	Roadway expansion, curb and gutter, and sidewalks
Proposed Flow Pattern:	Drainage will generally flow from east to west. Flows will be captured by the proposed storm system and conveyed to Water Quality Pond F.

Basin E5-F flows are captured by a future storm system that is anticipated to outfall at Water Quality Pond E.

Basin E areas and flows are summarized in Table IV.2:

Table IV.2: E Basins – Area and Discharge

Basin	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)
E1	2.43	4.3	10.2
E2-O	15.95	1.3	23.2
E2-F	8.14	18.3	40.6
E3	1.29	2.9	6.9
E4-F	4.10	10.6	23.6
E5-F	8.53	21.4	47.3

Basin F1 flows are captured by a 10' Type R inlet in sump in the center of the basin.

Basin F2 flows are captured by a 10' Type R inlet at the northwest end of the basin.

Basin F3 flows are captured by a 10' Type R inlet at the west end of the basin.

Basin F4 flows are captured by a 10' Type R inlet at the west end of the basin.

Basin F areas and flows are summarized in Table IV.3:

Table IV.3: F Basins – Area and Discharge

Basin	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)
F1	2.33	4.0	10.6
F2	0.60	1.0	2.9
F3	0.58	1.7	3.6
F4	7.35	2.1	18.3

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Ph: (303) 751-0741

Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 10/5/2018
By: G. LEE

Ridgegate Parkway Expansion

Composite Runoff Coefficient Calculations

Location: Douglas County
Municipality: Douglas County
Minor Design Storm: 5
Major Design Storm: 100
Soil Type: C/D

Runoff Coefficient (UDFCD Vol 1, Chp 6, Sec. 2.5.1)

NRCS Soil Group	Storm Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	C=0.84i^1.302	C=0.86i^1.276	C=0.87i^1.232	C=0.84i^1.124	C=0.85i+0.025	C=0.78i+0.110
B	C=0.84i^1.169	C=0.86i^1.088	C=0.81i+0.057	C=0.63i+0.249	C=0.56i+0.328	C=0.47i+0.426
C/D	C=0.83i^1.122	C=0.82i+0.035	C=0.74i+0.132	C=0.56i+0.319	C=0.49i+0.393	C=0.41i+0.484

Basin Design Data

	I (%) =											i (%)	Runoff Coeff's			
Basin Name	Design Point	$A_{paved\ streets}$ (sf)	$A_{drives/walks}$ (sf)	$A_{MU/COM/FIRE}$ (sf)	$A_{MF/RES}$ (sf)	$A_{MD\ RES}$ (sf)	$A_{LD\ RES}$ (sf)	$A_{lscape\ (B\ soil)}$ (sf)	$A_{lscape\ (C/D\ soil)}$ (sf)	A_{Total} (sf)	A_{Total} (ac)	Imp (%)	C2	C5	C10	C100
										106,038	2.43	67.9%	0.54	0.59	0.63	0.76
										694,570	15.95	2.0%	0.01	0.05	0.15	0.49
										354,703	8.14	75.0%	0.60	0.65	0.69	0.79
										56,187	1.29	68.2%	0.54	0.59	0.64	0.76
										178,581	4.10	75.0%	0.60	0.65	0.69	0.79
										371,373	8.53	75.0%	0.60	0.65	0.69	0.79
	WQ Pond E	60,836	53,898	0	904,657	0	0	0	47,491	1,066,882	24.49	73.9%	0.59	0.64	0.68	0.79

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 10/5/2018
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Ridgegate Parkway Expansion

Time of Concentration Calculations

Location: Douglas County
Municipality: Douglas County
Minor Design Storm: 5
Major Design Storm: 100
Soil Type: C/D

t_i=(0.395(1.1-C_5)(L_i^0.5))/(S_o^0.33)
t_t=L_t/(60V_t)
Urban t_c=(26-17i)+L_t/(60(14i+9)*(S_O^.5))

Sub-Basin Data					Initial Overland Time (t_i)			Travel Time (t_t) t_t=Length/(Velocity x 60)						t_c Comp	tc Urbanized Check ON			t_c Final
Basin Name	Design Point	A_{Total} (ac)	i (%)	C5			t_i (min)				C_v	Velocity (fps)	t_t (min)	Time of Conc $t_i + t_t = t_c$	L_t (ft)	S_O (%)	Urban t_c	Min t_c
E1	-	2.43	67.9%	0.59			7.8				20	2.0	9.7	17.5	1275.0	1.1%	25.6	17.5
E2-O	-	15.95	2.0%	0.05			31.7				7	1.1	24.9	56.6	2108.0	2.4%	50.2	50.2
E2-F	-	8.14	75.0%	0.65			6.5				20	2.8	6.5	13.0	1198.0	2.0%	20.5	13.0
E3	-	1.29	68.2%	0.59			7.2				20	3.8	2.9	10.2	775.0	3.4%	18.2	10.2
E4-F	-	4.10	75.0%	0.65			6.5				20	4.1	2.7	9.2	762.0	3.9%	16.5	9.2
E5-F	-	8.53	75.0%	0.65			6.5				20	5.1	3.6	10.1	1196.0	5.9%	17.4	10.1

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 10/10/2018
By: G. LEE

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **5 Year**

Point Hour Rainfall (P_1) : **1.43**

I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)								Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
	-	15.95	0.05	50.2	0.82	1.63	1.3																	
	-	2.43	0.59	17.5	1.44	3.01	4.3												10.5		3.7	0.42	17.92	
	-	8.14	0.65	13.0	5.29	3.47	18.3												58.0		9.3	0.10	13.10	
	E1				Combined Flows (E1-E2-F)					2.98	20.0								76.5		10.2	1.16	19.08	
	-	1.29	0.59	10.2	0.77	3.84	2.9												10.5		2.5	0.12	10.32	
	-	4.10	0.65	9.2	2.66	3.99	10.6												32.0		6.8	0.13	9.33	
	E2				Combined Flows (E1-E4-F)					2.88	29.3								194.1		12.4	0.49	19.57	
	-	8.53	0.65	10.1	5.54	3.85	21.4																	
					Combined Flows (E1-E5-F)					2.84	44.7													

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Job Name: Ridgegate Parkway Expansion
Job Number: 65119564
Date: 10/10/2018
By: G. LEE

Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **10 Year**

Point Hour Rainfall (P_1) : **1.66**

	Direct Runoff							Total Runoff				Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)					Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
	-	15.95	0.15	50.2	2.34	1.89	4.4														
	-	2.43	0.63	17.5	1.54	3.50	5.4									10.5		8.1	0.19	17.69	
	-	8.14	0.69	13.0	5.59	4.02	22.5									58.0		11.5	0.08	13.08	
	E1				Combined Flows (E1-E2-F)					3.48	24.8					76.5		12.6	0.94	18.63	
	-	1.29	0.64	10.2	0.82	4.46	3.7									10.5		4.3	0.07	10.27	
	-	4.10	0.69	9.2	2.82	4.64	13.1									32.0		8.3	0.11	9.31	
	E2				Combined Flows (E1-E4-F)					3.39	36.5					194.1		15.5	0.39	19.02	
	-	8.53	0.69	10.1	5.86	4.47	26.2														
					Combined Flows (E1-E5-F)					3.35	55.7										

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Ridgegate Parkway Expansion

Developed Storm Runoff Calculations

Design Storm : **100 Year**

Point Hour Rainfall (P_1) : **2.60**

I = (28.5 P1) / ((10 + TC)^0.786)

	Direct Runoff							Total Runoff				Inlets			Pipe					Pipe/Swale Travel Time				
	Design Point	Area (ac)	Runoff Coeff	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)			I (in/hr)	Q (cfs)								Approx. Max Pipe Capacity (cfs)		Velocity (fps)	tt (min)	Total Time (min)	
	-	15.95	0.49	50.2	7.85	2.96	23.2																	
	-	2.43	0.76	17.5	1.86	5.48	10.2												10.5		8.1	0.19	17.69	
	-	8.14	0.79	13.0	6.45	6.30	40.6												58.0		20.7	0.04	13.04	
	E1				Combined Flows (E1-E2-F)					5.45	45.2								76.5		23.0	0.51	18.21	
	-	1.29	0.76	10.2	0.99	6.98	6.9												10.5		4.3	0.07	10.27	
	-	4.10	0.79	9.2	3.24	7.26	23.6												32.0		15.0	0.06	9.26	
	E2				Combined Flows (E1-E4-F)					5.37	67.3								194.1		28.5	0.21	18.42	
	-	8.53	0.79	10.1	6.75	7.01	47.3																	
					Combined Flows (E1-E5-F)					5.34	102.9													

Culvert Report

Pond E Outfall Pipe

Invert Elev Dn (ft)	= 5959.12
Pipe Length (ft)	= 81.40
Slope (%)	= 0.87
Invert Elev Up (ft)	= 5959.83
Rise (in)	= 30.0
Shape	= Circular
Span (in)	= 30.0
No. Barrels	= 1
n-Value	= 0.013
Culvert Type	= Circular Concrete
Culvert Entrance	= Square edge w/headwall (C)
Coeff. K,M,c,Y,k	= 0.0098, 2, 0.0398, 0.67, 0.5

Embankment

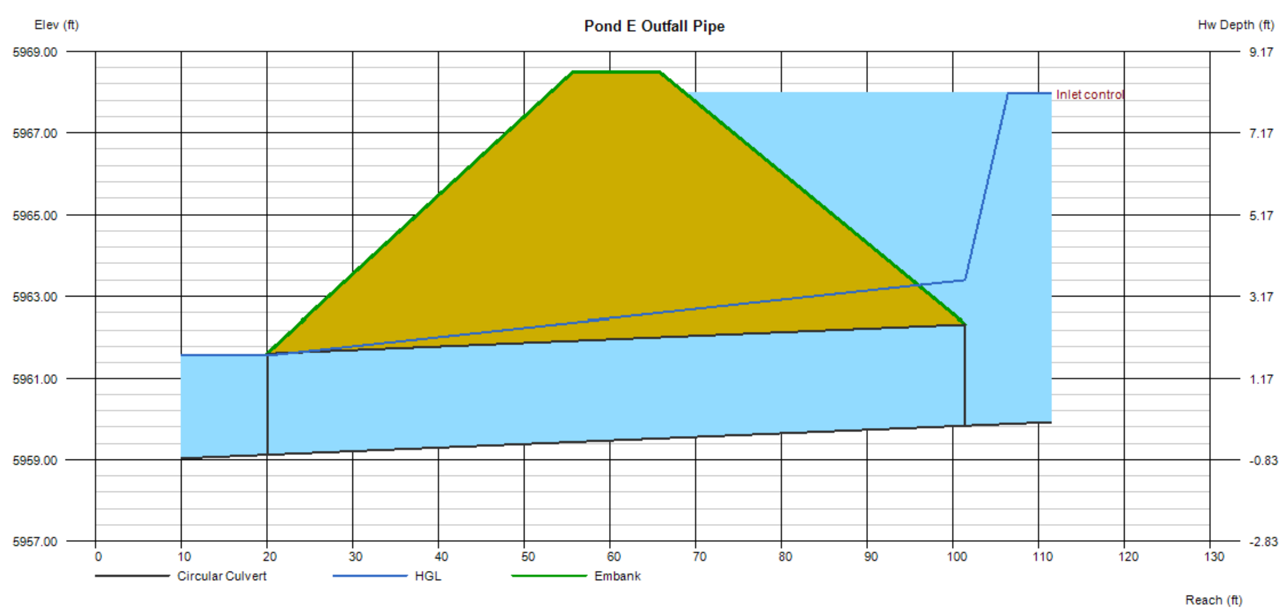
Top Elevation (ft)	= 5968.50
Top Width (ft)	= 10.00
Crest Width (ft)	= 25.00

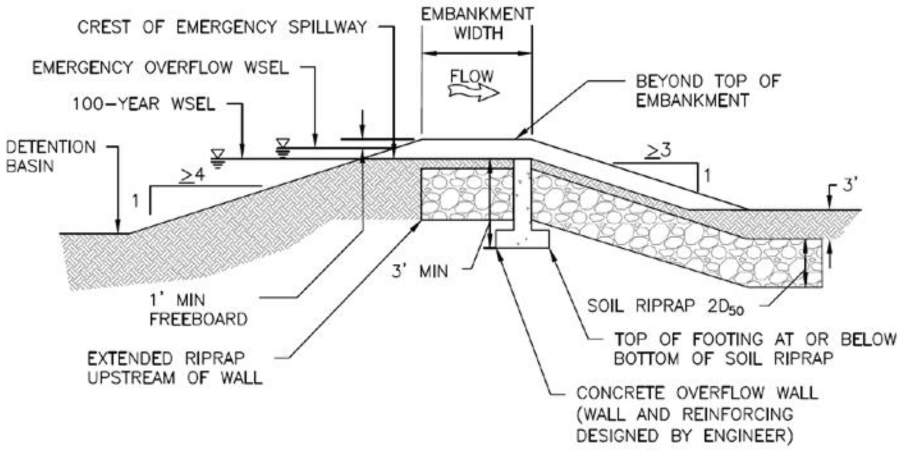
Calculations

Qmin (cfs)	= 62.60
Qmax (cfs)	= 62.60
Tailwater Elev (ft)	= (dc+D)/2

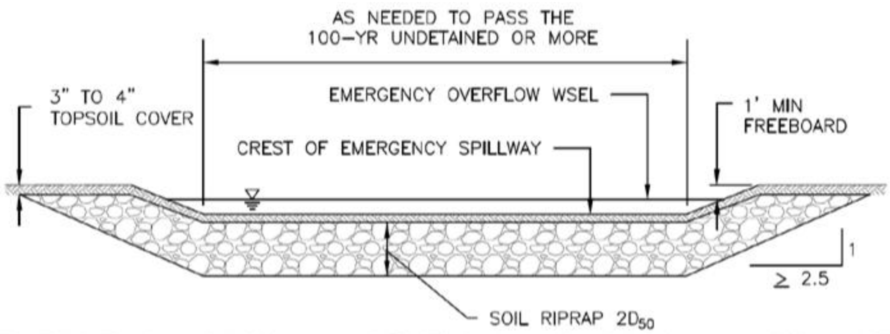
Highlighted

Qtotal (cfs)	= 62.60
Qpipe (cfs)	= 62.60
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 12.81
Veloc Up (ft/s)	= 12.75
HGL Dn (ft)	= 5961.57
HGL Up (ft)	= 5963.40
Hw Elev (ft)	= 5967.97
Hw/D (ft)	= 3.25
Flow Regime	= Inlet Control





EMERGENCY SPILLWAY PROFILE



EMERGENCY SPILLWAY SECTION AND SPILLWAY CHANNEL

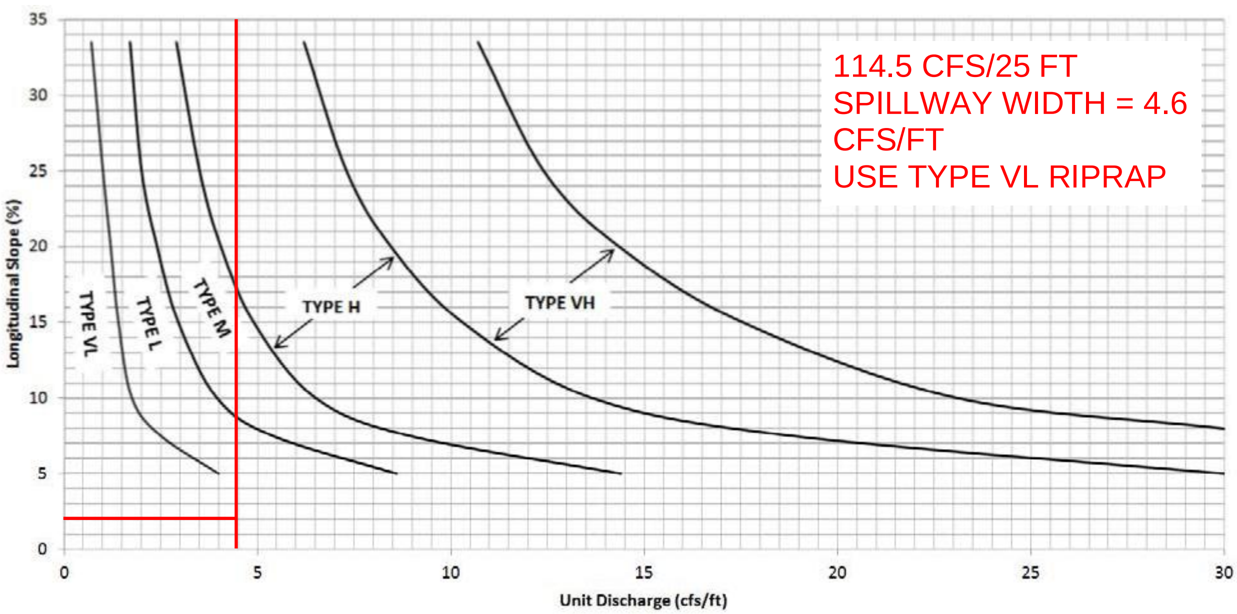
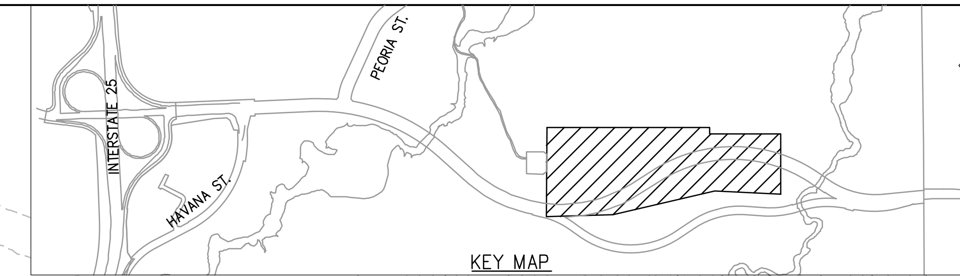
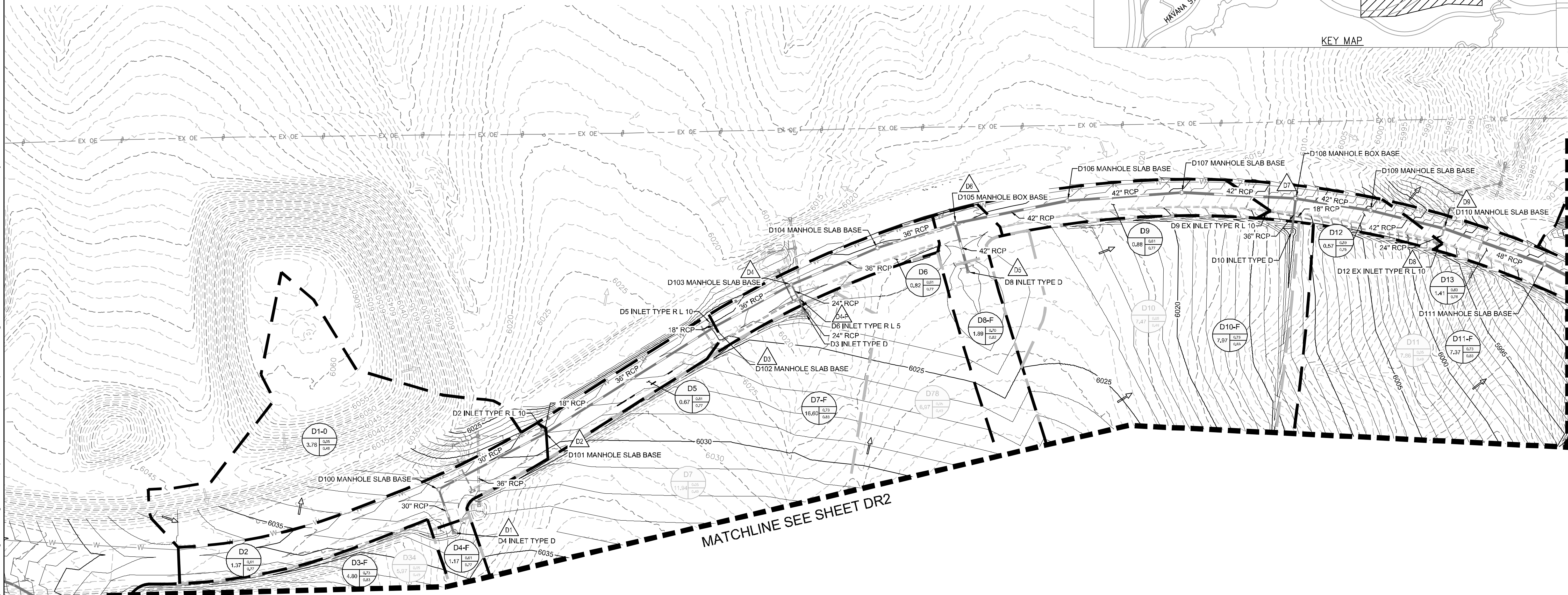


Figure 12-21. Embankment protection details and rock sizing chart (adapted from Arapahoe County)





LEGEND

- BASIN ID
- 5-YEAR RUNOFF COEFFICIENT
- 100-YEAR RUNOFF COEFFICIENT
- BASIN AREA (ACRES)
- DESIGN POINT
- PROPOSED FLOW OF WATER
- EXISTING FLOW OF WATER
- PROPOSED MANHOLE AND STORM SEWER
- EXISTING MANHOLE AND STORM SEWER
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 4920 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- FUTURE BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY

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Engineering Division Acceptance Block

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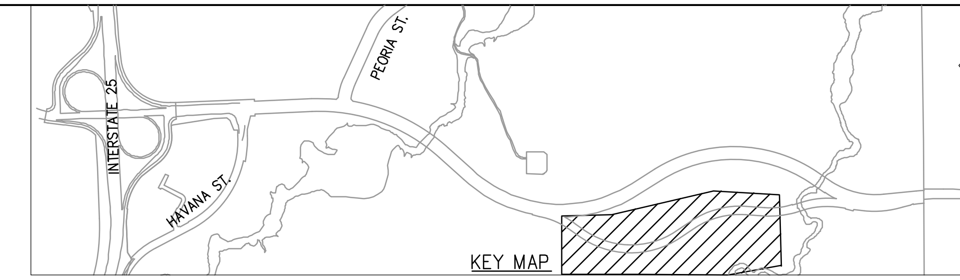
RIDGEGATE PARKWAY EXPANSION DRAINAGE MAP

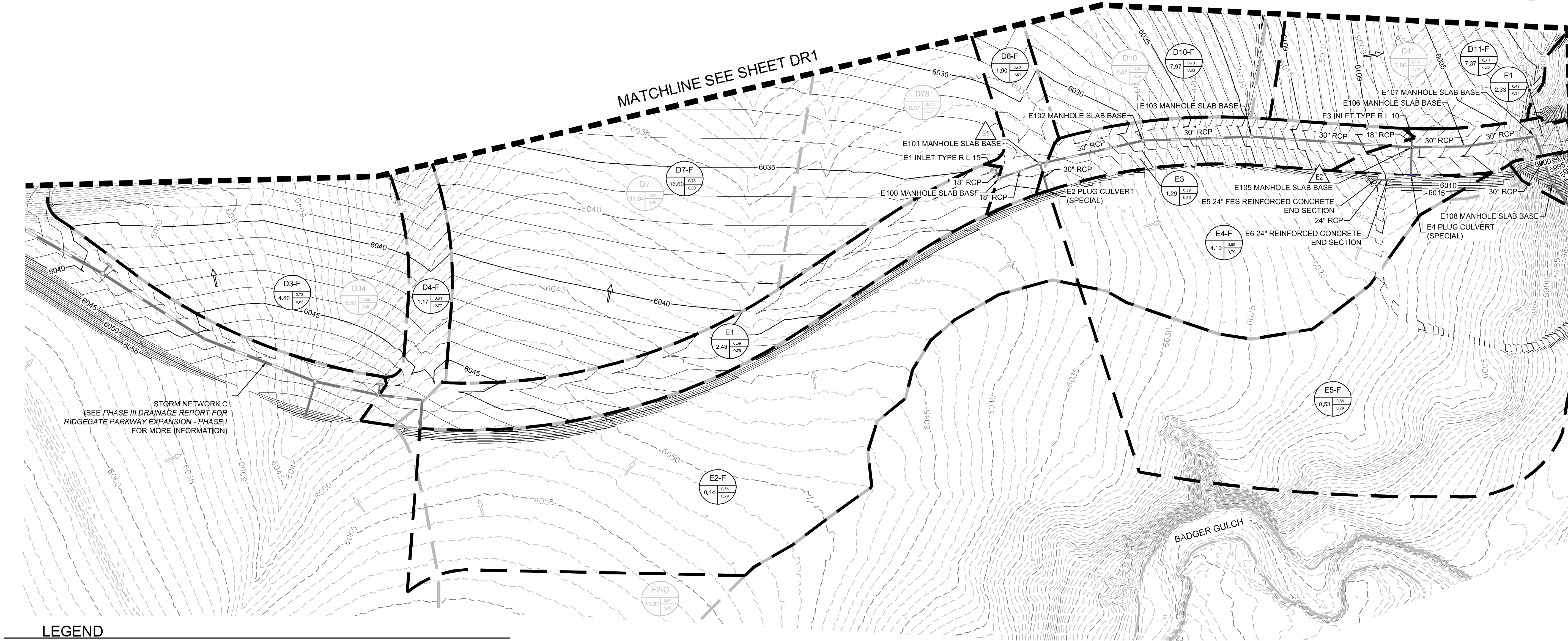
Designer:
Detailer:
Sheet Subset:
QC Review:
Approved:
Subset Sheet:

Project No./Code

Sheet Number: DR1

File Location:Q:\DEN\Projects\5087-02-RRMD Overall East\Projects\9564-Ridgegate Pkwy Expansion\Design\Drainage\Basin Maps\PHASE II\9564 Dmap-CLEAN.dwg Plot Date:2/1/2019 2:36 PM Last Saved By: CDAVIDS





LEGEND

	BASIN ID		PROPOSED FLOW OF WATER		EXISTING MINOR CONTOUR
A3 1.45 0.43 0.71	5-YEAR RUNOFF COEFFICIENT		EXISTING FLOW OF WATER	4920	PROPOSED MAJOR CONTOUR
	100-YEAR RUNOFF COEFFICIENT		PROPOSED MANHOLE AND STORM SEWER		PROPOSED MINOR CONTOUR
	BASIN AREA (ACRES)		EXISTING MANHOLE AND STORM SEWER		FUTURE BASIN BOUNDARY
A1	DESIGN POINT		EXISTING MAJOR CONTOUR		PROPOSED BASIN BOUNDARY

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100' 0 50' 100' 200'
1" = 100' HOR.

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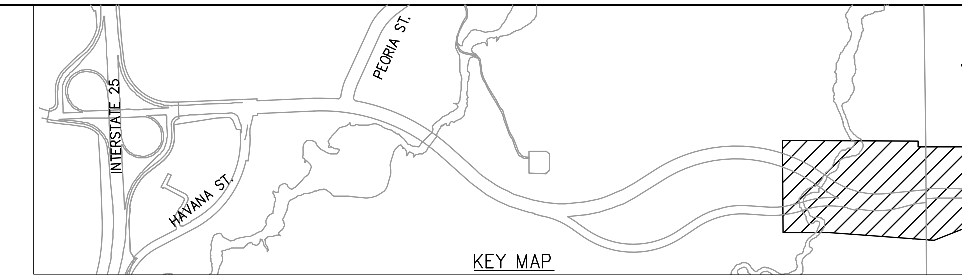
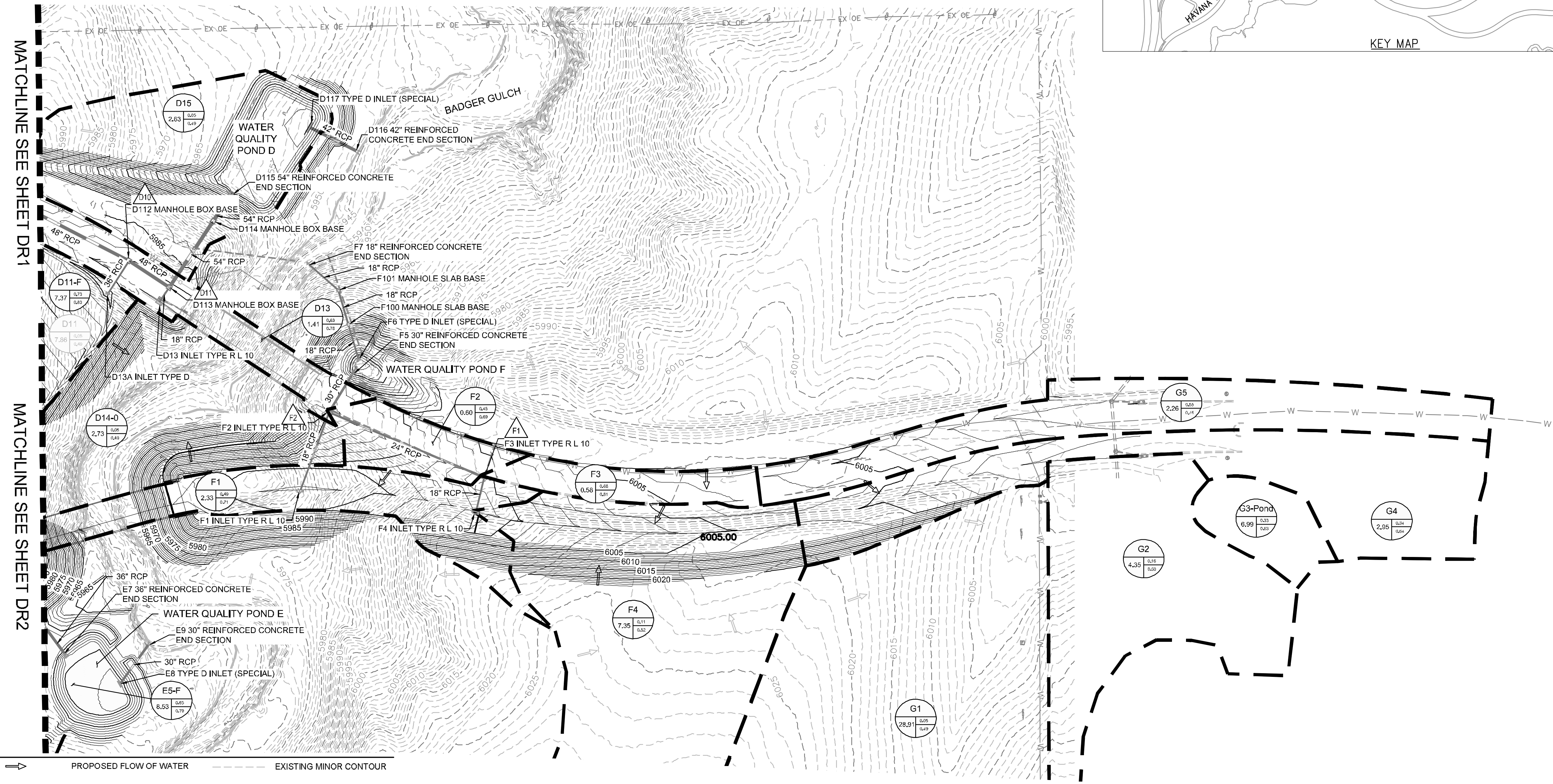
As Constructed	RIDGEGATE PARKWAY EXPANSION DRAINAGE MAP		Project No./Code
No Revisions:			----
Revised:	Designer:	QC Review:	
	Detailer:	Approved:	
Void:	Sheet Subset:	Subset Sheet:	Sheet Number: DR2

File Location:Q:\DEN\Projects\5087-02-RRMD Overall East\Projects\9564-Ridgegate Pkwy Expansion\Design\Drainage\Basin Maps\PHASE II\9564 Dmap-CLEAN.dwg Plot Date:2/1/2019 2:36 PM Last Saved By: CDAVIDS





LEGEND

BASIN ID	PROPOSED FLOW OF WATER		EXISTING MINOR CONTOUR
5-YEAR RUNOFF COEFFICIENT	EXISTING FLOW OF WATER	4920	PROPOSED MAJOR CONTOUR
100-YEAR RUNOFF COEFFICIENT	PROPOSED MANHOLE AND STORM SEWER		PROPOSED MINOR CONTOUR
BASIN AREA (ACRES)	EXISTING MANHOLE AND STORM SEWER		FUTURE BASIN BOUNDARY
DESIGN POINT	EXISTING MAJOR CONTOUR		PROPOSED BASIN BOUNDARY

811 Know what's below. Call before you dig.

City of Lone Tree

These construction plans have been reviewed by the City of Lone Tree for street and drainage improvements only.

Engineering Division Acceptance Block

100' 0 50' 100' 200'
1" = 100' HOR.

Computer File Information	
Print Date:	2/1/19
Drawing File Name:	9564 Dmap-CLEAN.dwg
Horiz. Scale: AS SHOWN	Vert. Scale: AS SHOWN

Sheet Revisions	
Date:	Comments

CITY OF LONE TREE

MERRICK®
5970 GREENWOOD PLAZA BLVD, GREENWOOD VILLAGE, CO 80111
PH: (303) 751-0741

As Constructed
No Revisions:
Revised:
Void:

RIDGEGATE PARKWAY EXPANSION DRAINAGE MAP

Designer:
Detailer:
Sheet Subset:
QC Review:
Approved:
Subset Sheet:

Project No./Code

Sheet Number: DR3

Happy Canyon Creek
Flood Hazard Area Delineation (FHAD)

July 2014

Urban Drainage and Flood Control District

Douglas County Colorado

City of Lone Tree

Town of Parker Colorado

Southeast Metro Stormwater Authority

MULLER

SECTION 2 – STUDY AREA DESCRIPTION

2.1 Project Area

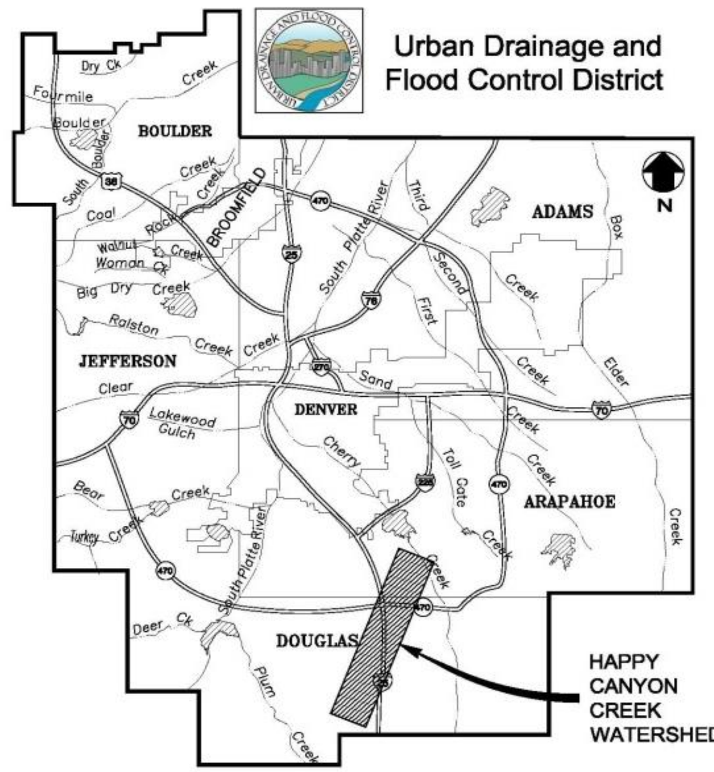


Figure 2-1. Vicinity Map

Happy Canyon Creek originates in the City of Castle Pines, south of the Denver metropolitan area and west of I-25. The creek flows in a northeasterly direction through unincorporated Douglas County, crossing I-25 near Surrey Ridge. It then passes through the RidgeGate PDD in the City of Lone Tree before joining with its major tributary, Badger Gulch, just south of Lincoln Avenue within the Meridian International Business Center. North of Lincoln, Happy Canyon Creek flows through Grandview Estates, then through the Compark development adjacent to E-470. Compark extends to the Douglas-Arapahoe county line, and is primarily within the Town of Parker's current and future annexation boundaries. Happy Canyon Creek then enters Arapahoe County in the Dove Valley Business Park, crosses Jordan Road into the Southcreek subdivision, and finally joins with Cherry Creek just south of Broncos Parkway in the Cherry Creek Valley Ecological Park. Table 2-1 contains the names and lengths of the eight major reaches identified within the watershed boundary. Watershed limits, tributary channels, jurisdictional boundaries, and major landmarks are shown in Figure 2-2.

The Happy Canyon Creek watershed is approximately 10.2 miles in length and has an average width of 2.1 miles for most of its length, tapering to 0.5 miles wide at the north end. The total area is 17.5 square miles or 11,200 acres. Approximately 40% of this area is developed. The highest and lowest points are 6680 and 5668 feet above mean sea level, respectively; the average watershed slope is 1.8%. Underlying soils are hydrologic group C through much of the watershed, with type B soils increasing to the north and a few small areas of type A near the Douglas-Arapahoe county line. A map of soil classifications is included in Appendix B.

Happy Canyon Creek is UDFCD Project Reuse watershed No. 4609; Badger Gulch is Project Reuse watershed #4610.

The FHAD project area includes Happy Canyon Creek from the confluence with Cherry Creek to the northern boundary of the City of Castle Pines; the portion of the Green Acres Tributary in Arapahoe County, and Badger Gulch. Approximately 11.3 miles of the Happy Canyon Creek, 0.5 miles of Green Acres Tributary, and 4.9 miles of Badger Gulch were included in the hydraulic model.

Table 2-1
Major Drainageway Inventory

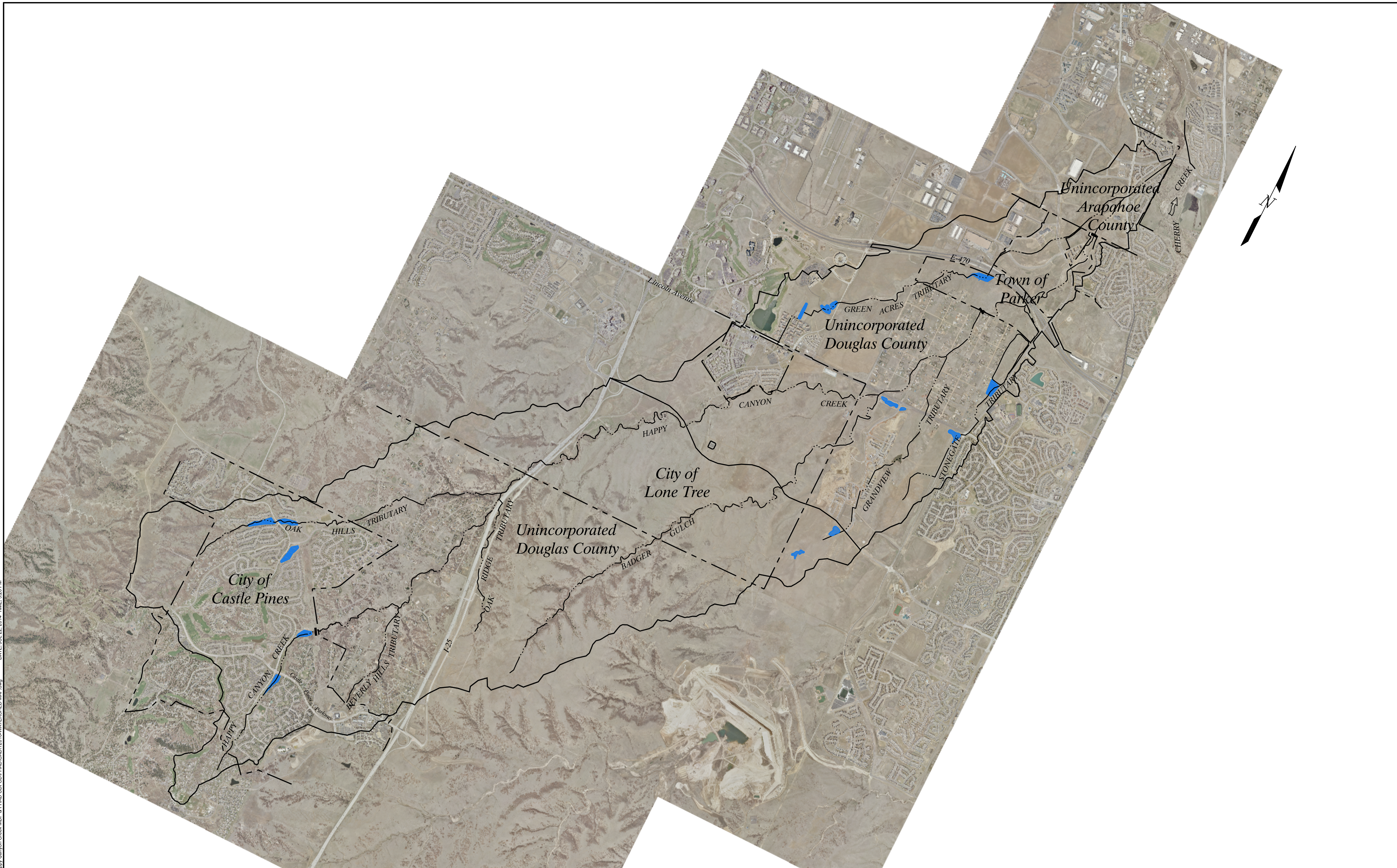
Major Drainageway	Confluence at Mainstem Reach	Length (mi)
Happy Canyon Creek	N/A	12.8 (11.3 modeled)
Beverly Hills Tributary	*Reach 2 – Douglas County South*	*1.2*
Oak Ridge Tributary	*Reach 3 – I-25 Right-of-Way*	*1.3*
Oak Hills Tributary	*Reach 3 – I-25 Right-of-Way*	*3.0*
Badger Gulch	Reach 7 – Grandview Estates	4.9
Grandview Tributary	*Reach 7 – Grandview Estates*	*2.1*
Stonegate Tributary	*Reach 8 – Compark*	*2.3*
Green Acres Tributary	Reach 9 – Arapahoe County	3.7 (0.5 modeled)

Italicized entries were not hydraulically modeled in this study.

2.2 Land Use

Land use within the Happy Canyon Creek watershed varies considerably by location, from agricultural and open space to high-density city center. Existing development conditions are generally based on visual assessment of the aerial photography provided by UDFCD, and future development conditions are based on information provided by project sponsors and stakeholders, including planning documents, zoning, master drainage plans, and direct input. In a few cases, roads were identified separately in land use analysis: the I-25 and E-470 corridors are reflected as 50% impervious to reflect separation between travel lanes and additional right-of-way included in the corridor, while Castle Pines Parkway, RidgeGate Parkway, and Lincoln Avenue are assumed 100% impervious (50% build-out of RidgeGate Parkway is reflected in the existing condition). All other existing or planned roads are assumed to be accounted for in the impervious values of adjacent development.

The overall existing weighted impervious value for the Happy Canyon Creek watershed is 15.9%. Future development is projected to increase watershed imperviousness to 36.3%. The interactive hydrology map in Appendix B shows existing and future land use boundaries and impervious values (Figures B-1 and B-2).



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No.	DATE	REVISIONS	APPR.

MULLER

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 SOUTH WADSWORTH BLVD. 4-100
LAKEWOOD, COLORADO
80226 (303) 988-4939

PROJECT NO. 12-010.01

DESIGN ASP
DRAWN SAR
CHECK JTW

HAPPY CANYON CREEK
FLOOD HAZARD AREA DELINEATION

WATERSHED MAP

DATE JULY 2014
FIGURE NO. 2-2

Upper Watershed: West of I-25
The upper watershed includes approximately one third of the total area and is essentially fully developed. The City of Castle Pines is primarily small lot residential, with some medium lot residential and a small commercial area along Castle Pines Parkway near I-25. Small lot residential developments were grouped by density based on visual assessment, and an average % impervious was assigned to each group ranging from 40% to 60%. Undeveloped commercial parcels, golf courses, and other open space areas were assigned 2%, school sites were assigned 50%, and commercial areas were assigned 80%. Outside of Castle Pines, unincorporated Douglas County is dominated by large lot residential. Areas were separated into two groups based on lot size and average imperviousness values of 10% and 15% were calculated for the two groups. For future conditions, undeveloped areas were assumed to develop according to the surrounding areas.

The weighted impervious values for the upper watershed are 21.6 % for existing development and 22.5 % for future development.

Middle Watershed: I-25 to Lincoln Avenue
The middle watershed, which represents nearly half of the total watershed area, is largely undeveloped. This area will see significant growth, however, within the planned RidgeGate development in the City of Lone Tree's jurisdiction. RidgeGate is a 3500 acre planned development that extends from the eastern edge of Lone Tree west across I-25 to Yosemite Street. Land use within RidgeGate will run the gamut from an ultra-dense city center just east of I-25 to rural residential and dedicated open space. Within the Happy Canyon Creek watershed, future land use is based on the PDD document and is largely residential mixed use. Impervious values for the various mixed use/residential planning areas were calculated based on maximum allowable ratios of commercial and multi-family residential development indicated in the PDD, with 85% applied to commercial areas, 80% for multi-family residential, and 50% for single family residential in the remaining area. Other land uses and their associated % impervious values within RidgeGate include city center (95%), commercial mixed use (85%), institutional (50%), rural residential (15%), central community park (10%), and open space (2%). RidgeGate Parkway, which has been constructed at half of its ultimate design width, is reflected as 50% impervious in the existing condition and 100% in the future.

South of RidgeGate, unincorporated Douglas County is zoned for agricultural use. This area is slated for another planned development, Freshfields, under the same landowner/developer as RidgeGate; however, planning for Freshfields has not yet begun and development is not expected to begin until RidgeGate is built out. Because that timeline exceeds the expected life of this plan, no future development is reflected.

Several other planned developments are located within the middle watershed. Surrounded on three sides by RidgeGate, Meridian Commons is a mixed-use/residential filing of the Meridian International Business Center (Meridian). East of Lone Tree, Meridian Filing No. 7 is under active development. Sierra Ridge is located along the west side of Chambers Road and is currently undeveloped. Future land use for each of these planned developments is based on master drainage plans.

Overall weighted impervious values for the middle watershed are 9.8 % for existing development and 36.8 % for future development.

Lower Watershed: Lincoln Avenue to Cherry Creek
North of Lincoln Avenue, Happy Canyon Creek bisects Grandview Estates, an established large lot residential area in unincorporated Douglas County. Impervious values are set at 15% for both existing and future conditions. East of Grandview Estates, Chambers Reservoir is currently under construction. For the purpose of this study, the reservoir is assumed complete and is reflected as 100% impervious. West of Peoria Street lies additional Meridian planned development. Undeveloped industrial/business parks are located between Meridian and Grandview Estates. North of Grandview Estates, the Compark planned development spans both sides of E-470 to the Douglas-Arapahoe County line. Portions of Compark north of E-470 are within the Town of Parker; the area south of E-470 is a proposed annexation to the Town. Future impervious values for Meridian and Compark planned development areas are based on master drainage plans. Industrial/business parks are assumed to develop to 80% impervious.

North of Compark, the Happy Canyon Creek watershed crosses into Arapahoe County. The Dove Valley Business Park stretches from the county line to Jordan Road and is largely undeveloped. Future development is reflected as 80% impervious. East of Jordan Road, the creek is flanked by residential development in the Southcreek subdivision.

Weighted impervious values for the lower watershed are 19.6% for existing development and 54.2% for future development.

2.3 Reach Description

The Happy Canyon Creek channel character varies widely along its length. The character of each segment is heavily influenced by the surrounding land use; because land use varies by jurisdiction, the creek is easily divided into nine distinct reaches at the jurisdictional boundaries. A description of each reach follows; reach limits are shown in Figures B-1 and B-2.

Happy Canyon Creek Reach 1 – Castle Pines
Within the City of Castle Pines, Happy Canyon Creek lies within a dedicated open space corridor adjacent to Monarch Boulevard. The channel is generally stable and well-vegetated, with significant wetland growth supported by a base flow. Five online regional detention ponds are located within Castle Pines on Happy Canyon Creek and its tributaries; the ponds are maintained by the Castle Pines North Metro District (CPNMD). The two mainstem ponds are located at Castle Pines Parkway

Happy Canyon Creek Reach 2

Happy Canyon Creek Reach 3

Happy Canyon Creek Reach 4

(CPNMD Pond #11) and near the city limit (CPNMD Pond #12). In the lower portion of the reach downstream of Pond #12, Happy Canyon Creek has not been stabilized and is experiencing severe bank erosion and channel degradation as relatively clear water from the stabilized channel upstream enters an unimproved, natural channel. Reach 1 is not included in the FHAD study area.

Happy Canyon Creek Reach 2 – Douglas County South

Immediately downstream of Castle Pines, the severe channel degradation observed in the lower portion of Reach 1 continues over a distance of approximately 850 feet, then transitions to a moderately stable, well-vegetated stream as it passes through large lot development in unincorporated Douglas County. Any future stabilization of the eroded areas will have the potential to shift the degradation downstream as it reduces the quantity of sediment being supplied to downstream reaches. UDFCD and Douglas County have implemented a project that constructed several low-flow grade control structures downstream of Oak Hills Drive.

Major crossings include a box culvert at Oak Hills Drive and a small double-barrel CMP culvert at Clydesdale Road. Because the channel is located on private property through most of this reach, access is limited.

Happy Canyon Creek Reach 3 – I-25 Corridor

Reach 3 is located adjacent to the west side of I-25 and is overall the most damaged reach of Happy Canyon Creek. There is severe erosion downstream of the confluence with the Oak Hills Tributary, and the channel is constricted between I-25 and Surrey Drive with steep banks on both sides and failed slope paving along the east (I-25) bank. At the downstream end of this reach, bridges allow Happy Canyon Creek to cross under I-25 and Havana Street.

Happy Canyon Creek Reach 4 – Lone Tree South

East of I-25, Reach 4 is characterized by wide meanders and fairly dense natural vegetation in the overbanks. In many areas, the creek is flanked by high bluffs on one side, with an open, gentle floodplain on the other. The upper portion of the reach shows moderate channel erosion; this transitions to slight aggradation in the middle of the reach. The RidgeGate property is currently used for livestock operations; damage to the channel from the cattle is apparent, with trampled banks unable to support vegetation immediately adjacent to the channel. The recently constructed RidgeGate Parkway crosses the creek via a bridge.

Happy Canyon Creek Reach 5

Happy Canyon Creek Reach 6

Happy Canyon Creek Reach 7

Happy Canyon Creek Reach 5 – Meridian Commons

Midway between RidgeGate Parkway and Lincoln Avenue, a 2700' reach of Happy Canyon Creek runs adjacent to Meridian Commons, passing back and forth along the property line between Meridian Commons and RidgeGate. Though the natural channel character mimics reach 4, this reach is fenced off from livestock. As a result, the overall channel health is much improved, with healthy wetland vegetation along the low flow channel. This reach was stabilized during development with several check structures and a sloping grouted boulder drop structure at the downstream end.

Happy Canyon Creek Reach 6 – Lone Tree North

Beyond Meridian Commons, Happy Canyon again runs through Lone Tree in the future RidgeGate area to West Parker Road at the city limit. With the continuation of unrestricted livestock access in Lone Tree, creekside vegetation is again limited and bank stability suffers. The channel bottom is moderately stable with evidence of substantial sediment transport. The crossing at West Parker Road is a bridge. *Note: West Parker Road, from Lincoln Avenue south in Lone Tree, was renamed to First Street in 2012. However, consistent with historical knowledge and most of the available area maps, the West Parker Road name has been used throughout this report.*

Happy Canyon Creek Reach 7 – Douglas County North (Grandview Estates)

Beyond West Parker Road, Happy Canyon Creek crosses through a corner of Meridian Village in unincorporated Douglas County before passing through the Lincoln Avenue bridge and into Grandview Estates. The Meridian Village portion of the reach has been stabilized with two sloping grouted boulder drop structures and is in good condition. Grandview Estates is a large lot residential development north of Lincoln Avenue in unincorporated Douglas County. A segment of the reach, from Lincoln Avenue to Birch Avenue, is located within Douglas County Open Space. The remainder of reach 7 crosses private residential lots with no drainage easement and limited channel access. There is a bridge crossing at Birch Avenue and a triple 48" CMP culvert crossing at Dogwood Avenue. The base flow disappears within this reach, and there is evidence of aggradation in the wide, sandy channel bottom.

Reach 7 was the subject of a 2001 study and initial phase of design by HDR, Inc. for Douglas County and UDFCD. The HDR project had "dual goals of flood control and bank and streambed stabilization." At the time, there were numerous flooding concerns related to the Dogwood crossing and the Grandview Tributary, as well as channel and bank stabilization issues and aesthetic considerations due to debris that had been placed along the banks by the residents in stabilization efforts. Several projects have been completed since the HDR study.

Happy Canyon Creek Reach 8 – Town of Parker

Happy Canyon Creek takes a sharp turn to the east as it exits Grandview Estates, and meanders widely before crossing under dual bridges at E-470. The dry, sandy bottom continues through this reach, and the channel takes a sharp turn to the west before crossing under a bridge at Chambers Road. This bend was stabilized with soil riprap toe protection during the Chambers Road bridge construction. There is very little if any wetland vegetation in this reach, as there is no base flow to support it. Reach 8 is primarily undeveloped at this point, but lies within several planned developments. A future bridge crossing for Belford Avenue, just south of E-470, will connect two proposed Town of Parker annexations: Compark Village South and Chambers Highpoint, located on the west and east sides of the creek, respectively. North of E-470, various filings of Compark are located within current Town of Parker boundaries. Drainage tracts and/or easements have been, or will be, dedicated throughout the planned developments. The channel invert through Compark has been stabilized with drop structures at each crossing and several check structures.

Happy Canyon Creek Reach 9 – Arapahoe County

The final reach of Happy Canyon Creek extends from the Douglas-Arapahoe County line to its confluence with Cherry Creek. West of Jordan Road, it passes through the Dove Valley Business Park, which is largely undeveloped. Channel stabilization measures and an access trail have been implemented along one developed parcel that is adjacent to the creek, and there is a sloping grouted boulder drop structure upstream of the bridge at Jordan Road. East of Jordan Road, the creek is located in a wide Arapahoe County open space tract between two built out residential developments that are part of the Southcreek subdivision. Three sloping grouted boulder drop structures and a concrete box culvert pedestrian crossing were constructed with the development.

Happy Canyon joins Cherry Creek just upstream of the Broncos Parkway bridge, within the Cherry Creek Valley Ecological Park. Historically, the creek paralleled the east side of Jordan Road for a distance before turning to the east toward Cherry Creek. In 1975, the channel was realigned and the confluence moved approximately 2000' upstream to its current location. The channel character in reach 9 is unappealing, with its wide sandy bottom, straight alignment, and dry, upland plains vegetation.

Happy Canyon Creek Reach 8

Happy Canyon Creek Reach 9

Badger Gulch Reach 1 – Upper Watershed

The upstream limits of Badger Gulch lie less than a half-mile north of Hess Road in Douglas County. From the headwaters, Badger Gulch flows in a narrow and winding natural channel. The channel is presently stable, though evidence of historic bank erosion and degradation, likely exacerbated by past overgrazing, is evident throughout. Much of the upper Badger Gulch reach is inaccessible private property.

Badger Gulch Reach 2 – Meridian Village

About a mile from the mainstem confluence, the longitudinal grade of Badger Gulch begins to flatten. The steep overbanks of the upper watershed give way to flat, rolling grades with relatively little evidence of degradation. Within a half-mile of the confluence, Badger Gulch enters an engineered trapezoidal channel constructed as part of the Meridian Village development. At the time of the site survey, the civil site work had been partially completed and home construction had begun. A new channel crossing at Bristleridge Drive was installed as part of the development.

Badger Gulch Reach 2

Green Acres Tributary – Arapahoe County

The Green Acres Tributary within Arapahoe County has a very similar characteristic to Reach 8 of Happy Canyon Creek – a dry sandy channel with little to no wetland vegetation. There are no crossings of the tributary within the study limits.

Table 2-2
Major Crossing Inventory

Crossing Location	Reach	Type
HAPPY CANYON CREEK		
Oak Hills Drive	Reach 2 – Douglas County South	Double 6’x8’ Box Culvert
Clydesdale Road	Reach 2 – Douglas County South	Double 72” CMP Culvert
Interstate 25	Reach 3 – I-25 Corridor	Single Span Bridge
I-25 Frontage Road	Reach 3 – I-25 Corridor	Single Span Bridge
RidgeGate Parkway	Reach 4 – Lone Tree South	Single Span Bridge
West Parker Road/First Street	Reach 6 – Lone Tree North	Double Span Bridge
Lincoln Avenue	Reach 6 – Lone Tree North	Triple Span Bridge
Birch Avenue	Reach 7 – Grandview Estates	Double Span Bridge
Dogwood Avenue	Reach 7 – Grandview Estates	Triple 48” CMP
E-470	Reach 8 – Compark	Two Single Span Bridges
Chambers Road	Reach 8 – Compark	Single Span Bridge
Jordan Road	Reach 9 – Arapahoe County	Single Span Bridge
BADGER GULCH		
RidgeGate Parkway	Badger Gulch Reach 1	Triple Span Bridge
Bristleridge Drive	Badger Gulch Reach 2	36’ Conspan Arch

2.4 Flood History

There is limited information on history of flooding along Happy Canyon Creek, though there are many published accounts of flooding on nearby Cherry Creek. Much of the Happy Canyon Creek channel is located within open space tracts that provide adequate floodplain capacity; areas of flood concern are primarily located within Grandview Estates. Residents mentioned various high flow events causing overtopping of local streets and/or flood waters approaching their homes over the years; the 1993 OSP indicates previous accounts of road overtopping during heavy rainfall events. There are no stream gages on Happy Canyon Creek.

2.5 Environmental Assessment

Wetland zones are present along much of Happy Canyon Creek, though they markedly decrease in the downstream portions of the watershed where there is no base flow. An inventory of wetland and riparian areas is included in Appendix E.

The 1993 OSP includes correspondence from the Colorado Division of Wildlife (DOW) regarding wildlife habitat within the watershed. The DOW described three different zones of vegetation with varying wildlife value. The lower zone, from Lincoln Avenue to Cherry Creek, was described as relatively dry with sparse riparian vegetation and only marginal wildlife value. The potential for creation of wetlands was noted, as the floodplain is wide and open. The middle zone, from I-25 to Lincoln Avenue, was described as the most valuable reach for wildlife, with “a broad band of riparian vegetation including an abundance of willows and cottonwoods.” The DOW commented on the desire to protect this reach in as natural a state as possible, not only for habitat benefit, but also for water quality through a meandering riparian ribbon. The upper zone, from Castle Pines to I-25, was seen as less valuable to wildlife than the middle zone, with less extensive riparian vegetation in the ponderosa pine forest. Wetland vegetation within Castle Pines seems to have increased substantially since this time. Overall, the value of maintaining a preserved open space corridor through the drainageway was emphasized for the benefit of wildlife habitat. This approach is in line with the local jurisdictions’ policies of floodplain preservation and creation of open space corridors.

No federally threatened or endangered species have been identified within the project area; however, a project site-specific review should be conducted prior to implementing any recommended improvements. In addition, any work along the creek corridor should consider non-protected species in the area and avoid impacts during sensitive periods such as nesting/mating season.

SECTION 3 – HYDROLOGIC ANALYSIS

3.1 Overview

In watersheds where hydrologic models exist, master planning efforts generally utilize the existing models as a starting point for baseline hydrology, with revisions made as necessary to reflect changes in the watershed and to update the models to current software. For Happy Canyon Creek, hydrologic models from the 1993 OSP were provided by UDFCD. Electronic AutoCAD or GIS files were not available for the subwatershed delineation. While reviewing and attempting to recreate the boundaries based on the Hydrological Basin Map from the 1993 report, it became apparent that a number of changes would need to be made in order to reflect recent or upcoming development, position design points at desired locations such as detention ponds and road crossings, and to meet as closely as possible UDFCD's guidelines on subwatershed size, which include a target size of 90-100 acres with a maximum size of 130 acres. As a result, though the 1993 boundaries were used as a guide, a new subwatershed delineation was performed. These watersheds were evaluated using UDFCD's Colorado Urban Hydrograph Procedure (CUHP) 2005, version 1.3.3 (release date January 2010). Hydrographs generated in CUHP were then routed through the Environmental Protection Agency's (EPA) Storm Water Management Model (SWMM), version 5.0.021. Due to the numerous changes that would have been needed to reflect the updated delineation, the design team elected to create a new SWMM model as well rather than update the previous model. This facilitated numerous improvements to the model to make it more user-friendly with the current software, including a revised naming scheme for subwatersheds, conveyance elements, and design points; layout of the SWMM model elements in the graphical user interface (GUI) over a background image of the watershed; and updating SWMM node elevations to match the project mapping.

Draft baseline hydrology for Happy Canyon Creek was submitted to UDFCD for review in July 2012. Comments were received in August, and the final baseline hydrology was resubmitted and accepted in October 2012.

3.2 Design Rainfall

One-hour point rainfall depths for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events were obtained from UDFCD rainfall maps for the project area and compared with the values used in the 1993 OSP. Current values are slightly lower than those used in 1993 for all but the 50-year storm, as shown in Table 3-1. Because the Happy Canyon Creek watershed is greater than 10 square miles, UDFCD criteria require use of a 3-hour storm with area adjustment. In order to calculate the 3-hour storm distribution, 6-hour point rainfall depths were also obtained from UDFCD rainfall maps and are included in Table 3-1. Design rainfall distributions for both the 2-hour and 3-hour storm were then calculated within CUHP based on the distributions identified in the Urban Storm Drainage Criteria Manual (USDCM), with the areal adjustment also incorporated into the 3-hour distribution.

Table 3-1
Point Rainfall Depths

Storm Event	Rainfall Depth (in)		
	One-Hour (1993 OSP)	One-Hour	Six-Hour
2-year	1.06	0.95	1.42
5-year	1.43	1.40	1.97
10-year	1.66	1.63	2.26
25-year	N/A	1.98	2.80
50-year	2.26	2.28	3.06
100-year	2.60	2.58	3.42

Table 3-2
Area Adjustment Factors

Time (min)	10-20 Square Mile Area Adjustment Factor	
	2-, 5-, and 10-Year Design Rainfall	25-, 50-, and 100-Year Design Rainfall
5	1.00	1.00
10	1.00	1.00
15	1.00	1.00
20	0.90	1.00
25	0.90	0.90
30	0.90	0.90
35	1.00	0.90
40	1.00	1.00
45	1.00	1.00
50	1.00	1.00
55	1.00	1.00
60	1.00	1.00
65-120	1.00	1.00
125-180	1.00	1.00

Area adjustment factors for the 3-hour design storm are shown in Table 3-2; rainfall distributions for both design storm durations and all return periods are listed in Table B-1, Appendix B.

3.3 Subwatershed Characteristics

Subwatershed characteristics were defined according to the revised delineation and current mapping and land use information. For each subwatershed, the flow path from the highest point in the basin was determined from the project mapping and used to define the length and distance to centroid. The length-weighted slope along the flow path was then calculated according to the method described in the USDCM. Existing and future imperviousness was determined based on the land use assumptions outlined in Section 2.2. Hydrologic soil group classifications were determined via the Natural Resources Conservation Service Web Soil Survey, and weighted values were calculated for initial and final infiltration rates as well as for the Horton's decay coefficient. Depression losses in pervious and impervious areas were set at 0.5 and 0.1, respectively, to match the values used in the 1993 OSP.

A total of 130 subwatersheds were defined. Areas ranged from 24 acres to 129 acres, with an average size of 86 acres.

3.4 Hydrograph Routing

A new SWMM model was created for routing of the hydrographs generated in CUHP. Channel geometry was approximated from the project mapping, utilizing 2' interval topography north of Lincoln Avenue and along the main stem south of Lincoln, and 5' interval topography in the remainder of the watershed. Where only 5' topography was available, channel geometry used in the 1993 OSP was referenced as well. Pipe elements were defined along tributary channels in locations where review of design plans indicated that the channel is or will be piped for long distances. An overflow channel was added for the Grandview Tributary from Lincoln Avenue to the confluence with Happy Canyon Creek; storm sewer was installed in this reach in 2010, but the capacity is less than the 100-year event until a planned detention pond upstream of Lincoln Avenue is constructed. All other piped reaches were assumed to carry the 100-year event; pipe diameters were set large enough to not constrict flow in the SWMM model. SWMM determines channel slopes based on the segment length and elevations of upstream and downstream nodes; node elevations were defined based on the project mapping. Manning's n values were calculated according to the procedures outlined in the USDCM. Design points were placed at the downstream end of each subwatershed, with additional points included to reflect flow rates before and after the confluence with each tributary channel.

Fourteen existing regional detention ponds have been identified as eligible for inclusion in the baseline hydrology. Five of these are located in the City of Castle Pines and are maintained by the Castle Pines North Metro District: CPNMD Ponds #9, #10, #11, #12, and #20. Ponds #9 and #10 are located on the Oak Hills Tributary, just upstream and downstream of Monarch Blvd, respectively. Both ponds are 10-Yr/100-Yr ponds with a reinforced concrete pipe (RCP) flared end section (FES) controlling the lower stage and a drop box controlling the upper stage. Design reports and as-built drawings were utilized to generate the storage and discharge curves.

CPNMD Pond #20 is located on the Monarch Tributary, which joins the Oak Hills Tributary near the city limit. Pond #20 was constructed as a water quality (WQ)/10-Year/100-Year pond; however, the water quality orifice has been removed. Record drawings and the Phase III Drainage Report were used to determine the storage and discharge curves; discharge is based on the current condition (no water quality orifice). Pond #20 is UDFCD maintenance eligible; the remaining nine facilities are not.

CPNMD Pond #11 is located on the main stem of Happy Canyon Creek, just upstream of Castle Pines Parkway. This pond was included in the 1993 OSP baseline hydrology, but has been retrofitted since that time to a 10-Year/100-Year pond, with three large diameter orifices providing the first stage control and a drop box with orifice plates on the three outlet pipes providing second stage control. The storage curve was defined based on the 2' interval project channel topography, and the discharge curve was generated with UDFCD's UD-Detention spreadsheet based on measurements and elevations from the project crossing survey.

CPNMD Pond #12 is located downstream of Pond #11 at the Castle Pines city limit. A weir upstream of the outlet seems to provide flow measurement capabilities; the outlet is a quintuple pipe single stage outlet. The storage curve was defined based on the 2' interval project channel topography, and the discharge curve was generated with UD-Detention based on measurements and elevations from the project crossing survey.

The Meridian Metropolitan District owns and maintains six ponds located in various filings of the Meridian International Business Center. Meridian Village Pond 1 is located just south of Lincoln Avenue adjacent to the confluence of Happy Canyon Creek and Badger Gulch. This offline facility has three cells that are designed to function as a single pond; the storage curve was taken from the Phase III Drainage Report and the discharge curve was generated with UD-Detention based on the construction drawings.

Stepping Stone Ponds D1 and D3 are located on the Grandview Tributary in Meridian Filing No. 7 to the south of RidgeGate Parkway/Main Street. These ponds are under construction at the time of this report. Storage curves are from the Phase III Drainage Report, and discharge curves were generated with UD-Detention based on the construction drawings.

Meridian Ponds 4A, 4B, and 4C are located on the Green Acres Tributary in Meridian Filings 4/5, adjacent to Peoria Street. An interim version of Pond 4A is currently in place, but plans have been approved for the expansion and addition of two additional ponds in series. They are included in the baseline hydrology because construction is expected to occur during the timeframe of this master plan. Storage and discharge curves are based on information provided in the Phase III Master Drainage Report.

Another facility on the Green Acres Tributary is the E-470 Pond, located immediately upstream of its namesake. It is unclear if this facility was intentionally designed as a pond or if it merely provides inadvertent storage; the pond is controlled by a 12'x10' concrete box culvert with no formal outlet structure, and provides little peak flow attenuation. However, because the pond was included in the 1993 OSP baseline hydrology, it has been included in the baseline hydrology for this MDP.

Finally, the Stonegate Tributary has two online regional detention ponds: the Stonegate Pond and the Chambers Reservoir WQ Pond. The Stonegate Pond is located at the southwest corner of Lincoln Avenue and Chambers Road. It was initially constructed as a WQ/10-Year/100-Year pond to provide treatment for Chambers Road, but is being expanded and converted to full spectrum detention for the upstream portion of the Sierra Ridge planned development. The baseline hydrology reflects the expanded FSD version of the pond, which is under construction at the time of this report. The storage curve was taken from the Phase III Drainage Report, and the discharge curve was generated with UD-Detention based on the construction drawings.

The Chambers WQ Pond is a full spectrum detention pond recently constructed just upstream of the in-progress Chambers Reservoir. Storage and discharge curves were taken from the Phase III Drainage Report for the Chambers Dam & Reservoir.

Stage-area and stage-discharge curves for all detention ponds are included in Table B-3, Appendix B.

For each return period and each development condition, the SWMM model was run with both a 2-hour and a 3-hour design storm applied uniformly over the entire watershed. Results from the 2-hour run were used for all design points in all tributary basins and for all main stem design points upstream of Badger Gulch. Results from the 3-hour model run were used for all main stem design points downstream of Badger Gulch, where the accumulated drainage area exceeds 10 square miles.

3.5 Previous Studies

Happy Canyon Creek was previously analyzed in the 1977 FHAD and the 1993 OSP. The FHAD included a portion of Badger Gulch and established the regulatory FEMA flow rates. Hydrographs were based on a 24-hour design storm with a Type IIA SCS rainfall distribution; peak discharges were calculated with the Soil Conservation Service's computer programs WSP2 and TR20. According to the 1993 OSP, the FHAD study assumed fairly uniform land use throughout the watershed, with a future development weighted average of 20% impervious. The study extended upstream to I-25.

The 1993 OSP utilized 2-hour and 3-hour design storms. Hydrographs were generated with the PC version of CUHP and routed through UDSWM2-PC. The future development imperviousness was 28%. The two design storms were applied differently in the OSP than in this study: the 3-hour storm results were used for all main stem design points, including those above Badger Gulch.

Table 3-4 includes peak flow rates from both studies. Regulatory flow rates in Douglas County mirror the FHAD. The Arapahoe County FIS lists a single flow rate of 3690 cfs for the 100-year event on Happy Canyon Creek. The source of this flow rate is unknown: it does not match any known studies, and documentation within the FIS is unclear. Examination of the FEMA effective mapped floodplain within Arapahoe County at the confluence of Cherry Creek with Happy Canyon Creek indicates that it is based on the 1993 OSP future development condition, which has a 100-year peak of 7303 cfs.

3.6 Model Calibration

Standard practice for master planning studies on previously studied watersheds includes calibration of the hydrologic model to reconcile the results within 10% of the previously published data. This practice ensures that changes in baseline hydrology are due to changes within the watershed or updates to criteria rather than differences in software. Calibration is generally done through adjustment of Cp and/or Ct values in CUHP, which impact the peak flow rates and the time to peak, respectively. This study targeted the 1993 OSP existing condition peak flow rates for reconciliation. A calibration model was prepared that mimicked the 1993 existing conditions impervious values and utilized the same 100-year 2-hour and 3-hour rainfall distributions as the 1993 OSP. Initial results were significantly higher, with a downstream 100-year peak of 7500 cfs vs. 5279 in the 1993 OSP. The models compared favorably upstream of the Oak Hills Tributary. Because this study utilized newly created models rather than modifications of the previous models, the 1993 CUHP and SWMM data was converted to the current software utilizing UDFCD's CUHP SWMM Converter. This converted model indicated a downstream peak flow rate of 6200 cfs, indicating that the difference is partially attributed to software differences and partially attributed to the model construction, which may include differences in watershed discretization, definition of subwatershed parameters, or definition of SWMM element parameters. An overall review of subwatershed and SWMM element parameters was conducted to verify that no large-scale, persistent differences existed between the 1993 and current models; the two seemed comparable.

As another point of reference, results were compared with the unit peak flow rates for Cottonwood Creek as published in a 2010 OSP. The Cottonwood Creek watershed abuts the Happy Canyon Creek watershed to the north and has similar characteristics to the Happy Canyon Creek watershed. To avoid differences based on development conditions and detention in the watershed, the historic conditions Cottonwood Creek model was used for comparison; this model reflects 2% impervious throughout the watershed and no detention facilities. (Weighted average imperviousness for the 1993 existing conditions model is 5.4%). Cottonwood Creek's watershed area is approximately 8 square miles, so the peaks are based on a 2-hour design storm with no areal adjustment. Unit peak flows for Cottonwood Creek were determined based on accumulated drainage area, then applied to the drainage area at various design points on Happy Canyon Creek and plotted against 2-hour design storm results for the calibration model. This comparison indicated a difference of 10-15% between the Oak Hills Tributary and Badger Gulch, with good correlation upstream of the Oak Hills Tributary.

At the direction of UDFCD, Cp values were adjusted in CUHP for all subwatersheds except those contributing to the design point immediately upstream of the Oak Hills Tributary confluence. Several trials indicated that an adjustment factor of 0.65 (multiplied with the normal calculated Cp values) provided good correlation between the 2-hour design storm calibration model and the Cottonwood Creek historic conditions model. This factor was then applied to the 3-hour design storm and the results compared with the 1993 OSP published values. The calibrated model peak flow rates range from 25% lower than the 1993 OSP at the upstream end of the watershed to 22% higher at the downstream end of the watershed. Results of the calibration effort are indicated in Table 3-3; a peak flow diagram of the various models utilized is included at the end of Appendix B.

Table 3-3
Model Calibration

				A	B	C	D	E		F		G	
Station (ft)	**Location**	**Tributary Area (ac)**	**Cottonwood OSP unit peak for similar drainage area (cfs/ac)**	**1993 Published Values (cfs)**	**1993 Model, Current Software (cfs)**	**Unadjusted Calibration Model (3-Hour) (cfs)**	**Unadjusted Calibration Model (2-Hour) (cfs)**	**Cottonwood OSP equivalent peaks (cfs)**	**Delta (D-E)/E (%)**	**Calibrated Model (2-Hour) (cfs)**	**Delta (F-E)/E (%)**	**Calibrated Model (3-Hour) (cfs)**	**Delta (G-A)/A (%)**
0	Cherry Creek			5279	6200	7501	9650			8589		6750	28%
2600	Green Acres Tributary (D/S)			5357	6262	7514	9666			8590		6752	26%
2600	Green Acres Tributary (U/S)			4940	5710	6903	8875			7866		6182	25%
10500	Stonegate Tributary (D/S)			4961	5735	7005	9011			7979		6269	26%
10500	Stonegate Tributary (U/S)			4961	5735	6896	8865			7848		6167	24%
16200	Grandview Tributary (D/S)			4939	5626	6847	8804			7774		6109	24%
16200	Grandview Tributary (U/S)			4939	5626	6523	8374			7388		5812	18%
20100	Badger Gulch (D/S)			4705	5355	6467	8302			7319		5756	22%
20100	Badger Gulch (U/S)			3831	4350	5057	6494			5813		4565	19%
22600				3831	4350	5055	6491			5811		4562	19%
32000	RidgeGate Parkway	5233	1.08	3873	4241	4831	6191	5652	10%	5519	-2%	4337	12%
43600	I-25	4209	1.15	3922	3947	4324	5511	4840	14%	4889	1%	3854	-2%
46100	Oak Hills Tributary (D/S)	3965	1.15	3733	3784	4155	5289	4560	16%	4699	3%	3706	-1%
46100	Oak Hills Tributary (U/S)	2014	1.37	2318	2352	2085	2699	2759	-2%	2699	-2%	2085	-10%
54500	Oak Hills Drive			1780	1694	1765	2279			2279		1765	-1%
54500				1185	1059	1238	1616			1616		1238	4%
61000	Castle Pines Parkway			835	723	762	968			968		762	-9%
62500	Pond 353 Outflow			385	327	344	414			414		344	-11%
62500	Pond 353 Inflow			688	470	548	766			766		548	-20%

Note: all peak flow rates shown are based on a 100-year storm and 1993 existing development conditions.

3.7 Results of Analysis

Once the calibration effort was completed, the model was updated to reflect current existing and future development conditions, current rainfall point values and distributions, and to incorporate existing regional detention facilities described in Section 3.4. Happy Canyon Creek was then analyzed for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events under existing and future development conditions, and with both 3-hour and 2-hour design storms. Peak flow rates at each design point are listed in Table B-4. Runoff volumes and accumulated drainage areas at key locations are listed in Tables B-5 and B-6. Hydrographs at key locations for the 2-year and 100-year events are shown in Figures B-6 and B-7. Peak flow profiles for all storm events on the main stem of Happy Canyon Creek are shown in Figures B-8 and B-9. All tables and figures reflect 3-hour storm results downstream of Lincoln Avenue (confluence with Badger Gulch) and 2-hour storm results for the remainder of the watershed.

Table 3-4 summarizes the results in comparison to the previous studies. The current study indicates peak flow rates averaging 25% higher than the 1993 OSP. Upstream of Lincoln Avenue, this is primarily due to the use of a 2-hour design storm versus the 3-hour design storm used in the 1993 OSP. Downstream of Lincoln Avenue, both studies use a 3-hour design storm; higher peak flow rates are due in part to the increases seen in the calibration effort, described above, and in part to the increased development projections (future imperviousness of 28% in the 1993 OSP versus 36% in the current study.)

In comparison with the 1977 FHAD, the current study predicts nearly 40% greater peak flow rates. These differences are attributed primarily to the different design rainfalls used (SCS 24-hour rainfall distribution in the FHAD versus 2-hour and 3-hour storms per current USDCM guidelines) and to the increased development projections (20% future imperviousness in the FHAD versus 36% in the current study).

Table 3-4
Comparison to Previous Studies

Location	FHAD Cross Section	OSP Design Point	Current Design Point	1977 FHAD 100-Yr (cfs)	1993 OSP 2-Yr Existing (cfs)	1993 OSP 100-Yr Existing (cfs)	1993 OSP 2-Yr Future (cfs)	1993 OSP 100-Yr Future (cfs)	Current Study 2-Yr Existing (cfs)	Current Study 100-Yr Existing (cfs)	Current Study 2-Yr Future (cfs)	Current Study 100-Yr Future (cfs)	% Increase from 1993 OSP*	% Increase from 1977 FHAD*
Cherry Creek	60	228	HC999	6744	63	5279	741	7303	322	8161	836	9234	26%	37%
Jordan Road	56	217	HC036	6800	73	5357	741	7344	326	8166	828	9228	26%	36%
E-470	49	213	HC033	5700	89	4961	467	6523	309	7702	652	8474	30%	49%
Dogwood Ave / Grandview Trib	43	208	HC029	5650	97	4939	428	6390	313	7502	624	8245	29%	46%
Lincoln Avenue D/S of Badger Gulch	33A	207	HC026	5520	102	4705	346	6044	311	7079	572	7663	27%	39%
Lincoln Avenue U/S of Badger Gulch	33	190	HC025	4070	103	3831	231	4729	316	5897	465	6247	32%	53%
RidgeGate Parkway	11	186	HC021	4240	118	3873	224	4771	370	5555	452	5726	20%	35%
I-25	3	179	HC016	4390	139	3922	227	4739	407	4899	433	4920	4%	12%
Oak Hills Tributary		160	HC014		141	3733	222	4527	407	4700	430	4708	4%	
Oak Hills Drive		172	HC009		117	1780	119	2030	352	2598	372	2591	28%	
Castle Pines Parkway (1300' N)		165	HC004		85	835	85	910	251	1259	251	1259	38%	

*Comparisons are based on 100-Yr Future development conditions

3.8 Comparison of Existing and Future Development Conditions

It is FEMA policy that Floodplain Insurance Rate Maps (FIRMs) reflect watershed conditions at the time the study is conducted, not projected future conditions. However, it is UDFCD policy to prepare FHADs based on future development conditions in order to guide the limits of development along major drainageways. FEMA will accept hydrologic studies based on future development if the following criteria are met: 1) the future development peak flow rate exceeds the existing condition peak flow rate by no more than 30-percent, and 2) the water surface elevation (WSEL) generated by the future development peak flow rate exceeds the WSEL of the existing condition peak flow rate by no more than 0.5-feet. If these criteria are not met, the floodplain mapping set forth in the FHAD cannot be submitted for acceptance by FEMA, and a separate DFIRM analysis must be conducted based on the existing development conditions.

Comparison of the existing and future development peak flow rates for Happy Canyon Creek and Badger Gulch indicate that the future development peak flow rates never exceed the existing development peak flow rates by more than 30-percent. Estimated future development WSELs remain within 0.5-feet of existing development WSELs along most of the study length, with minor and sporadic exceedances at the downstream end of Happy Canyon Creek, between Chambers Road and the Cherry Creek Confluence. This information was presented to the project sponsors at the progress meeting in August 2012. The project sponsors determined that the results are within the guidelines, such that a separate DFIRM analysis is not required for regulatory purposes.

The comparison figure for the 30-percent and 0.5-foot criteria has been included in Appendix C. No separate hydraulic analysis was conducted using the existing conditions flowrates.

SECTION 4 – HYDRAULIC ANALYSIS

4.1 Overview

Hydraulic modeling and floodplain delineation was performed for 11.3 miles of the Happy Canyon Creek mainstem and 4.9 miles of Badger Gulch. The United States Army Corps of Engineers (USACE) maintains the Hydraulic Engineering Center (HEC) which publishes the 1-D hydraulic modeling software *River Analysis System (HEC-RAS).* The most recent version of the software, 4.1.0 dated January 2010, was used for the hydraulic analysis. Results of the HEC-RAS analysis have been published in tabular form as the Floodplain and Floodway Data Tables in Appendix D. Flood maps showing the 100- and 500-year floodplains based on the HEC-RAS output have been included in Appendix F. Flood profiles based on the same output have been included in Appendix G.

4.2 Evaluation of Existing Facilities

The Happy Canyon Creek and Badger Gulch channels are generally well-defined, resulting in few problems related to capacity. Areas with poorly defined or insufficient conveyance are generally confined to the mainstem channel downstream of Lincoln Ave. The area of Grandview Estates, in particular, was noted as having an undersized channel, resulting in many structures in the floodplain (see Section 4.3).

Channel capacity was determined by modeling the channel in HEC-RAS using 502 cross-sections at an average spacing of 180-feet. Pursuant to the UDFCD DFHAD Guidelines (July, 2012), the Happy Canyon Creek and Badger Gulch centerlines uniformly follow the low-flow path rather than the floodplain flow path. In most cases the two are coincident; however, in areas where the main path of major flood flows differs from the low-flow centerline, the reach lengths are conservatively estimated based on the longer low-flow path. With the exception of an area of particular sinuosity south of RidgeGate Parkway, distances between adjacent cross-sections do not exceed 500-feet, in accordance with the requirements of the DFHAD Guidelines (July, 2012). In the area noted, cross section spacing was increased to simplify the modeling at UDFCD's request. Left and right overbank reach lengths were determined initially with the aid of software, and have been adjusted as necessary, particularly in areas with sharp channel radii.

Bank stations have been set to model a narrow (typically 10 to 15-feet wide) main channel with vegetated overbanks in most locations, so that the channel typically conveys the 2-year flow or less before spilling into the overbanks. While an effort was made to keep the horizontal layout of the hydraulic cross-sections straight, some cross-sections were "bent" at one or more locations to remain generally perpendicular to the centerline alignment and the overall flood flow areas in highly meandering reaches. In some cases, the BFE lines are shown "bent" to reflect the prevailing direction of overbank flows.

Ineffective flow areas were added as indicated by the presence of structures or the surrounding topography of the channel. Contraction and expansion coefficients are typically 0.1 and 0.3, respectively, however, these values were increased to 0.3 and 0.5 adjacent to many hydraulic structures. Cross-sections surrounding the hydraulic structures were placed so as to model the expansion and contraction losses into the structure in accordance with the HEC-RAS Hydraulic Reference Manual (typically a 2:1 expansion and 1:1 contraction). Hydraulic structures were incorporated based on the ground survey information.

Portions of mainstem Happy Canyon Creek and Badger Gulch are sandy, ephemeral streams, with poor density and quality of stream-side vegetation. With the anticipation of a more consistent base flow and the associated increase in vegetation, Manning's 'n' values were generally selected on the high end of typical ranges. This will allow for minimal future maintenance requirements to sustain conveyance capacity while providing for a healthier stream corridor. In areas where capacity is limited, lower to mid-range 'n' values were selected in consideration of the additional maintenance that may be performed to maintain conveyance capacity.

Figure 4-1 shows an area where healthy existing vegetation was modeled with no adjustment to the roughness values. Figures 4-2 and 4-3 show the lower watershed where the roughness values were increased slightly to account for a more stable existing infrastructure. A summary of the selected 'n' values along with a description of each reach has been provided in Appendix C.

Figure 4-1 - Reach 2 – Douglas County South
Meandering with slight incision. Dense, healthy vegetation with some vertical banks.
Manning's 'n': 0.1 (overbank) / 0.05 (channel)

Figure 4-2 - Reach 4 – Lone Tree South
Overgrazed area with sparse short vegetation
Mid-Range Manning's 'n': 0.035 (overbank) / 0.03 (channel)
High-Range Manning's 'n': 0.045 (overbank) / 0.035 (channel)

Figure 4-3 - Reach 8 – Town of Parker
Sparse, bunchy vegetation with sandy, aggraded low-flow
Mid-Range Manning's 'n': 0.03 (overbank) / 0.03 (channel)
High-Range Manning's 'n': 0.04 (overbank) / 0.035 (channel)

Bridges and culvert crossings were modeled in HEC-RAS using the bridge routine. A total of fourteen major roadway crossings and three minor crossings were identified and surveyed within the study reach. Two of the major crossings are on Badger Gulch, and the remainder are at various locations along the mainstem. Of the seventeen identified crossings, sixteen were modeled using HEC-RAS bridge or culvert routines. The exception is the E-470 trail crossing, which is a low-flow crossing consisting of (2) 24" CMP culverts beneath a concrete trail. These culverts tend be largely blocked due to accumulated debris; the channel cross section at 10749 was set based on the concrete trail elevation, and no conveyance through the culverts was considered. Bridge and culvert modeling routines are based on ground survey points and measurements, and supplemented by measurements and observations during a field visit in October 2012. Major structure capacities are summarized in Table 4-1. Additional information regarding spill flow analysis at overtopping structures can be found in Section 4.3, below.

Floodplain delineation was accomplished with the aid of terrain modeling software. The hydraulic cross-sections were exported to a HEC-RAS GIS file (.sdf), with each of the cross-sections at the appropriate WSEL (either 100-year or 500-year). The terrain modeling software was used to interpolate water surface elevations between the hydraulic sections, and this information was then translated into a floodplain boundary. The delineation was reviewed and adjusted by hand where necessary.

The floodway locations were discussed with the project sponsors prior to the preliminary submittal. Since the majority of Happy Canyon Creek is contained in a well-defined channel, floodways have generally been set coincident to the floodplain with no additional analysis performed. In certain areas of overbank flooding (particularly within the Grandview Estates development), separate floodways have been computed. In these areas, the floodway was delineated for a 0.5-foot rise for both hydraulic grade line and energy grade line.

Floodway analysis on Badger Gulch was conducted in one area: downstream of Bristleridge Drive in the vicinity of a detention pond adjacent to the channel. No separate floodway analysis was conducted for the Green Acres Tributary.

Table 4-1
Capacity of Major Structures

Location	Station	I.D.	Structure Description	Overtopping 10-Yr	50-Yr	100-Yr	500-Yr
HAPPY CANYON CREEK							
Jordan Rd.	2600	23	Single 100-ft Span Concrete Bridge			x^4	x^4
Chambers Rd.	7300	22	Single 100-ft Span Concrete Bridge				x^1
E-470	10500	21	Single 132-ft Span Concrete Bridge				
Dogwood Ave.	15800	19	Triple 48" CMP	x^1	x	x	x
Birch Ave.	18500	18	Double 34-ft Span Steel Bridge			x	x
Lincoln Ave.	20080	17	Triple 42-ft Span Concrete Bridge			x^2	x^2
W. Parker Rd.	21250	16	Double 57-ft Span Concrete Bridge		x	x	x
RidgeGate Pkwy.	32000	14	Single 135' Span Concrete Bridge				
Havana St.	43200	13	Single 111' Span Concrete Bridge				
I-25	43400	12	Single 62' Span Concrete Bridge				x^3
Clydesdale Road	48100	11	Double 72" CMP	x^1	x	x	x
Oak Hills Drive	54950	10	Double 8' x 6' CBC		x	x	x
BADGER GULCH							
Bristleridge Dr.	132400		Single 36' Conspan Arch				x
RidgeGate Pkwy.	138100		Triple 72-ft Span Concrete Bridge				

Notes:
1. Indicates minor overtopping with ponding on top of the structure.
2. Overtopping flows proceed east into the Meridian Detention Ponds before spilling onto Lincoln Ave.
3. Shallow flooding onto I-25 (unlikely IEFA due to traffic barrier). No overtopping of roadway crown.
4. Overtopping south of bridge caused by a side spill in the channel upstream; bridge capacity is adequate.

4.3 Flood Hazards

In areas where a portion of the channel or existing crossing structure was determined to possess insufficient capacity for any of the peak flow profiles, a special hydraulic analysis was performed to determine the approximate extent and peak volume of the overtopping. This analysis consisted of either a spill flow HEC-RAS model, open channel and weir flow calculations, or a visual approximation of the spill flow extent for minor spill areas. The results of the flood hazard investigation can be grouped broadly into categories: 1) overtopping, for localized overtopping of a bridge, culvert, or embankment, and 2) side spill, generally in areas with insufficient main channel capacities. The paragraphs below summarize each flood hazard area identified. The results of the special analyses used to predict the overtopping potential of each hazard area have been included in Appendix C.

Areas of Overtopping:

- Chambers Rd., Sta. 73+00: 500-year ponding approaches the roadway crown but does not overtop the road.

- Dogwood Ave., Sta. 159+00: The crossing is severely undersized, with capacity estimated at less than the 2-year event.

- Birch Ave., Sta. 185+00: The existing bridge is overtopped in flood events exceeding the 50-year return interval. The 100- and 500-year events overtop the bridge just to the west of the bridge rail. The 500-year also spills to the east along Birch Ave., and fills a sump just south of the road. The flow will also overtop 3rd St. and proceed northeast, reconnecting with the floodplain near Dogwood Ave. A normal depth model was created to determine the amount of overtopping east of the mainstem, using a headwater taken from the mainstem HEC-RAS model.

- Lincoln Avenue, Sta. 202+00: There is an existing pond spillway approximately 50-feet upstream of the Lincoln Avenue bridge. The existing bridge is a hydraulic constriction, causing significant backwater in the 100- and 500-year events. There is also a major detention facility east of the bridge crossing (part of the Meridian Village development), with an emergency spillway discharging into Happy Canyon Creek just south of the bridge opening. The 100- and 500- year WSELs in Happy Canyon exceed the elevation of the emergency spillway, and will cause a backwater into the pond at peak flows. Though the narrow width of the spillway weir may limit the ability for the WSELs to fully equalize, a major event on Happy Canyon could damage the embankment and therefore allow equalization to occur. In anticipation of this scenario, the channel overbank south-east of the Lincoln Avenue bridge has been modeled as effective conveyance, and an overtopping weir has been set between Lincoln Avenue and the existing pond. This overtopping weir follows the pond embankment east of Happy Canyon to the Meridian Village Parkway intersection. Overtopping flows in the 100- and 500- year events will spill through the pond and over the Lincoln Avenue embankment, before rejoining the Happy Canyon mainstem to the north. No existing structures were identified within the path of overtopping.

- West Parker Road, Sta. 212+50: The existing bridge is offset from the location of the existing low point in the roadway profile. In the 50-year peak flow and above, overtopping flows will cross the roadway north of the bridge crossing and spill back into the mainstem.

- North Clydesdale Road, Sta. 481+00: The crossing is severely undersized for the 10-year peak flowrate and above. The steep roadway fill slope is susceptible to erosion should overtopping occur.

- West Oak Hills Drive, Sta. 550+00: The crossing is undersized for the 50-year peak flow and above. Overtopping flows will spread into the open field to the east of the mainstem before spilling back into the mainstem farther north.

- Bristleridge Drive, Sta. 1324+00: The Conspan arch located under the crossing conveys the 100-year peak flows. The road overtops in the 500-year peak flow.

Areas of Channel Overflow or Side Spill:

- Left Overbank near Southcreek Residential Development, Station 15+00: Channel overflow occurs in the 500-year storm near the southwest end of the neighborhood. The overflow was determined by analyzing the ineffective flow area in the left overbank at Cross Section 1500 in HEC-RAS. Given this area and the velocity in the channel at this section, hand-calculations determined that an approximate flow of 57 cfs spills onto Joplin Court beginning at Station 17+00. The 500-year overflow was delineated based on topographic data from the GESC plans for "South Creek Filing No. 7", completed in May 2005 by Carroll & Lange, Inc. Shallow flooding is conveyed along Joplin Court until it spills northwest onto Broncos Parkway at Station 6+00.

- Right Overbank at the Joint Water Purification Plan (JWPP), Station 35+00: Recent channel improvements in this area post-date the 2008 LiDAR survey. Additional ground survey was obtained to model a new concrete trail, a small floodwall, and the Happy Canyon Creek channel cross-section. In addition, overlot grading of the parcel and paved access roads to the treatment plant were added to the model using design plans for "Dove Valley V, Filing No. 2" provided by SEMSWA. The Happy Canyon Creek thalweg based on the ground survey was found to be 1.0 to 1.5-feet lower than the LiDAR mapping had indicated. Channel overflow occurs in the 100- and 500-year storms. Overflow was computed using a lateral weir in HEC-RAS following the profile of high ground in Dove Valley design plans. The 100-year flow is relatively minor and does not appear to threaten the treatment plant structure. Shallow flooding will proceed east across Jordan Road. The 100-year flooding ponds at the bottom of the sag vertical curve in Jordan Road, while the 500-year shallow flooding proceeds east down Nichols Avenue

- Grandview Estates, Sta. 130+00: In the 100- and 500-year peak flows, 5th Street will overtop and shallow flooding will occur in a low area east of the mainstem. Shallow flooding was computed using normal depth calculations for the overflow channel based on the starting WSEL from HEC-RAS. The limits shown in the flood maps reflect these normal depths.

- Interstate 25, Sta. 435+00: The channel will overflow to the north just upstream of I-25 in the 500-year peak flow. Shallow flooding was computed using weir calculations based on the headwater in the channel at the overflow location. The overtopping flow is distributed to a series of three cross culverts north of the Happy Canyon bridge; it is then conveyed through the culverts under I-25 to rejoin the Happy Canyon floodplain.

Threatened Structures:

Structures showing a high probability of inundation during the 100- or 500-year peak floods have been identified on the flood maps with a red or purple hatch. Many of the threatened structures were not surveyed; therefore, the delineation is approximate based on the LiDAR or aerial topography available. A summary of structures threatened by a 100-year event is included as Table C-4 in Appendix C.

Flooding hazards from other sources not studied as part of this FHAD may threaten structures within the study area. In particular, the Grandview Tributary is mapped as Zone X (shaded) between Birch Avenue and Dogwood Avenue, just east of the mainstem. The flooding hazards from the Grandview Tributary, as well as other named and unnamed tributaries within the watershed, have not been identified in this FHAD.

4.4 Previous Analyses

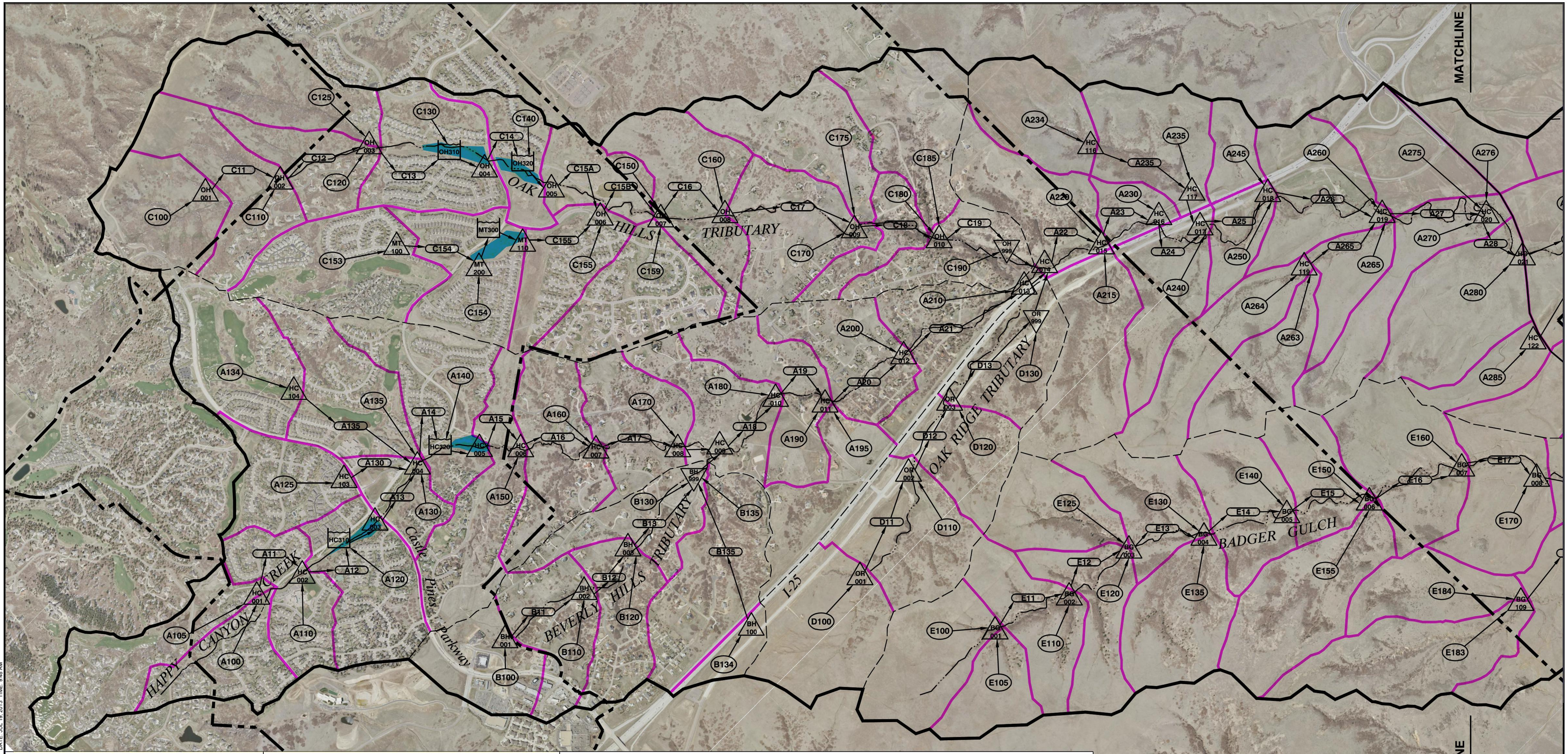
The WSEL obtained from the preliminary FHAD HEC-RAS model was compared to the following studies. See the accompanying documentation for copies of the comparison tables.

- FEMA regulatory WSEL at Sections A thru AB: The regulatory elevations were taken from the latest Douglas County FIS study, except for XS R through AB, which were modified by a LOMR in 2006 and were taken from a copy of that LOMR report (FEMA Case No. 06-08-B443P). The horizontal locations of the regulatory sections were determined from GIS data provided by Douglas County, and are shown on the floodplain maps in Appendix F. The FHAD study water surfaces are generally 1.0 to 1.5-feet over the FIS water surfaces due to the increase in peak flow rates in the current study. The largest differences in water surface occur at regulatory Sections K and X (FHAD Study XS 15746 and 21209). Both sections are located close to road crossings: Section K is directly downstream of the Dogwood Crossing, and Section X is similarly located downstream of the West Parker Road/First Street crossing. These increases in water surface elevation are likely attributable to an increase in peak flowrates between studies, as discussed in Section 3.

- 2011 RidgeGate Parkway Badger Gulch LOMR (11-08-0846P): The LOMR for the RidgeGate Parkway Crossing of Badger Gulch was performed in 2011 by FHU, Inc. Except for immediately downstream of the RidgeGate Parkway bridge, the FHAD water surface elevations are generally 0.5-feet to 1.5-feet lower than the corresponding LOMR water surfaces. The differences are attributable to the reduced peak flowrates modeled in the FHAD study. The LOMR used a peak Q_{100} = 1,870 cfs, while the FHAD study peak Q_{100} is between 1,531 cfs and 1,571 cfs within the LOMR project reach.

- 2011 RidgeGate Parkway Happy Canyon Creek Mainstem LOMR (11-08-0846P) : The LOMR for the RidgeGate Parkway Crossing of Happy Canyon Creek was performed in 2011 by FHU, Inc. A comparison with the FHAD shows the FHAD water surface elevations generally exceed the LOMR WSELs by several feet. The FHAD peak 100-year flowrates at the RidgeGate Crossing are more than 1,400 cfs higher than the LOMR flowrates; the increased flowrates account for much of the difference. The greatest difference in water surface occurs at the upstream face of the RidgeGate bridge. It should be noted that the FHAD model indicates the RidgeGate bridge will have still have ample (over 8-feet) freeboard in the 100-year event.

- 2006 Grandview Estates LOMR (06-08-B443P): The LOMR for channel improvements in the Grandview Estates reach was completed by ICON Engineering in 2006. A comparison with the FHAD shows the FHAD water surface elevations exceed the LOMR by between 0.5 and 3.0-feet. These differences are primarily attributable to the increase in peak flowrates (approximately 50% higher than the FIS).



Map Controls (Select from Below):

Study Area Map
Soil Survey Map
Existing Land Use Map
Future Land Use Map
Subwatershed Boundaries Map
Baseline Hydrology SWMM Routing Map

The Map Controls set the visibility of the layers automatically for the selected map. Additional layer control is available through the "Layers" Navigation Panel which can be accessed from the View Menu under Navigation Panels. In the Panel, the visibility of layers and layer groups can be changed by clicking the square left of the layer/group. An eye in the square indicated that the layer is on. An empty square indicates that the layer is off. Layer groups can be expanded and reduced by clicking the +/- symbol left of the layer/group.

Map Legend

- Watershed Boundary
- Major Basin Boundary
- Sub-basin Boundary
- Jurisdiction Boundary
- Existing Regional Detention
- Reach Delimeter
- BASIN ID / AREA (AC) / Ex % Imp / Fu % Imp — Subwatershed Label
- BH 001 — Design Point
- B100 — SWMM Subwatershed
- A12 — Conveyance Element
- OH310 — Detention Facility
- BH 999 — Outfall

Soil Type

- A
- B
- C/D

Imperviousness (%)

2, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 75, 80, 85, 95, 100

No.	DATE	REVISIONS	APPR.

MULLER

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 SOUTH WADSWORTH BLVD. 4-100
LAKEWOOD, COLORADO
80226 (303) 988-4939
PROJECT NO. 12-010.01

DESIGN MDC
DRAWN JHK
CHECK JTW

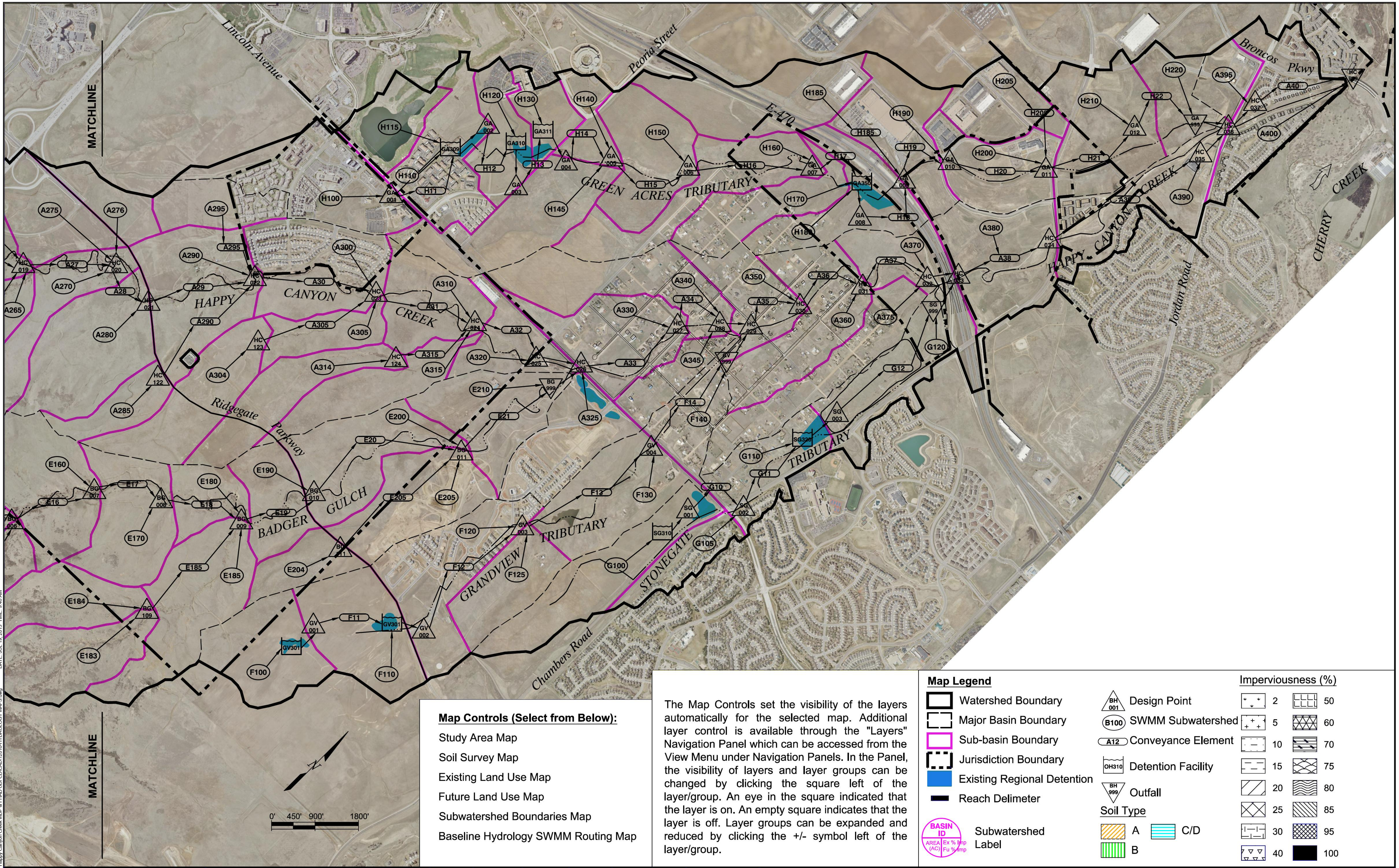
Town of Parker COLORADO
Southeast Metro Stormwater Authority

HAPPY CANYON CREEK MAJOR DRAINAGEWAY PLAN

INTERACTIVE HYDROLOGY MAP
BASELINE HYDROLOGY SWMM ROUTING

DATE JULY 2013
FIGURE NO. B-1

DATE: JUL 19, 2013 TIME: 9:48 AM



Map Controls (Select from Below):

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Map Legend

- Watershed Boundary
- Major Basin Boundary
- Sub-basin Boundary
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- Existing Regional Detention
- Reach Delimeter
- BH 001 Design Point
- B100 SWMM Subwatershed
- A12 Conveyance Element
- OH310 Detention Facility
- BH 999 Outfall

Soil Type: A, B, C/D

BASIN ID, AREA (AC), Ex % Imp, Fu % Imp — Subwatershed Label

Imperviousness (%): 2, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 75, 80, 85, 95, 100

No.	DATE	REVISIONS	APPR.

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DESIGN MDC
DRAWN JHK
CHECK JTW

HAPPY CANYON CREEK
MAJOR DRAINAGEWAY PLAN

INTERACTIVE HYDROLOGY MAP
BASELINE HYDROLOGY SWMM ROUTING

DATE JULY 2013
FIGURE NO. B-2

NAME: P:\12-010.01 Happy Canyon Creek MDP & FHAD UDFCD\CAD\12010-HYDROLOGY MAPS.dwg DATE: JUL 19, 2013 TIME: 9:48 AM

PHASE II DRAINAGE REPORT
FOR
RIDGEGATE SOUTHWEST VILLAGE

Prepared For:

Shea Homes
9380 Station Street, Suite 600
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(303) 791-8180
Contact: Ryan McDermed

Prepared By:

JR Engineering, LLC

7200 South Alton Way Suite C400
Centennial, CO 80112
(303) 267-6220
Contact: Aaron Clutter

October 28, 2020

Engineer's Certification

I affirm that this report and plan for the Phase II drainage design of Ridgegate Southwest Village was prepared by me (or under my direct supervision) in accordance with the provisions of Douglas County Drainage Design and Technical Criteria for the owners thereof. I understand that City of Lone Tree does not and will not assume liability for drainage facilities designed by others.

____

Aaron Clutter, P.E. Date

State of Colorado No. 36742

For and on Behalf of JR Engineering

TABLE OF CONTENTS

I. GENERAL LOCATION AND DESCRIPTION

A. Site Location

The proposed Ridgegate Southwest Village site is located in Sections 23 and 24, Township 6 South, Range 69 West and Section 18, Township 6 South, Range 67 West of the 6th Principal Meridian. The site is located to the south of Ridgegate Parkway, east of Interstate Highway 25 (I-25), and north of the public service right-of-way. The site is bisected by reaches of Happy Canyon Creek and Badger Gulch run adjacent to the site on the west and east. The site is shown in the figure below.

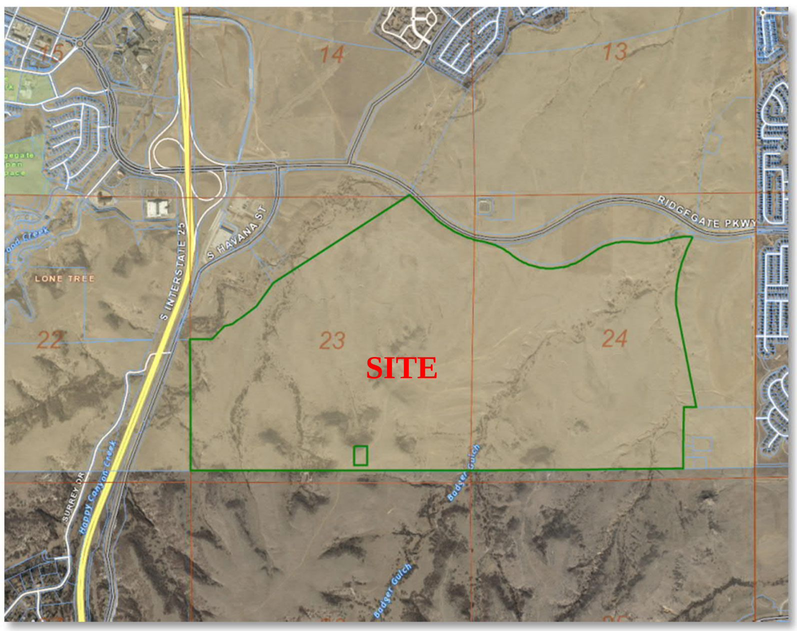


Figure 1: Vicinity Map

B. Description of Property

The proposed Ridgegate Southwest Village site consists of approximately 716 acres of undeveloped land. The proposed development will consist of a school site, parks, a recreation center, commercial lots, district roadways, and approximately 1590 residential lots with a mixture of single and multi-family. The site is currently unoccupied and undeveloped and is vegetated with native grasses and shrubs. The majority of soil in the proposed development is classified by the Natural Resource Conservation Service (NRCS) as Hydrologic Group C and D with small portions of the site consisting of Hydrologic Group B. Hydrologic Group B soils are described as "soils that have a moderate infiltration rate when thoroughly wetted and consists primarily of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures." Hydrologic Group C soils are described as "soils that have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure." Hydrologic Group D soils are described as "soils that have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material."

The site slopes average 0-25% with some areas up to and over 33%. The terrain is mountainous and relatively steep throughout. The historic drainage patterns for the site are split in two directions. The western half of the site drains north and west to Happy Canyon Creek, while the eastern half of the site drains to the north and east to Badger Gulch.

The site is shown on the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) Community Panels No. 08035C0063H and 08035C0064G, September 4, 2020 and March 16, 2016 respectively. The majority of the site lies within Zone X which is the flood insurance rate zone that corresponds to areas outside the one percent annual chance floodplain. See the FIRM Map located in **Appendix A**. Portions of the site, consisting of approximately 50 acres, are located within the 100 year floodplains of Happy Canyon Creek and Badger Gulch. These 100 year floodplains are further discussed in the "Happy Canyon Creek Flood Hazard Area Delineation", by Muller Engineering Company, dated July 2014. There will be no proposed development of these areas.

There are two major drainage ways located adjacent to the site: Happy Canyon Creek and Badger Gulch. Happy Canyon Creek is located on the western edge of the site while Badger Gulch is located on the eastern edge of the site and is tributary to Happy Canyon Creek. Happy Canyon Creek and Badger Gulch each lie within a 100-year floodplain identified as Zone A in the FEMA FIRM Panels No. 08035C0063H and 08035C0064G.

There is one irrigation canal located on site: Arapahoe Canal. This is an abandoned irrigation canal that crosses the proposed development.

There are no active ditch facilities located within the site. There are no significant geologic features within the area to be developed, and areas of higher topography within the site will remain undeveloped under a conservation easement.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Drainage Basins

The Ridgegate Southwest Village site lies within the Happy Canyon Creek and Badger Gulch drainage basins, which are left bank tributaries of Cherry Creek. The Badger Gulch drainageway is tributary to Happy Canyon Creek. This report has been prepared in conformance with the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017.

In the existing conditions, storm runoff from the undeveloped site on the western half of the site drains into Happy Canyon Creek via overland sheet flow and natural drainage channels. Storm runoff on the eastern half of the site drains into Badger Gulch via overland sheet flow and natural channels. The historic drainage basin map can be referenced in the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017, and is included in **Appendix D**.

Development of the project site will result in increased runoff volume to Happy Canyon Creek and Badger Gulch. Onsite WQ/EURV ponds will be provided. Some incidental detention is provided due to the filling of the pond and the routing of the flows through the outlet structure. The design discharge is greater than or equal to 90% of the un-detained 100-year peak flows in all Ponds except for EURV Pond R. These discharge percentages of the 100-year developed flows has been established in coordination with Merrick & Company in order to minimize the sizing of the outlet structures as well as minimizing the adverse effects of the peak discharge from the Ridgegate Southwest Village site coinciding with the peaks in the respective receiving drainageways. Online detention is proposed in Happy Canyon Creek and Badger Gulch (by others). The inflows into Happy Canyon Creek and Badger Gulch will be analyzed in a separate drainage report by Merrick & Company. Per the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017, creek stabilization improvements are proposed (by others) within the channels to stabilize the drainageways and protect against the effects of urbanization in the watersheds.

B. Proposed Drainage Basins

There are eight developed condition basins denoted within this report. Each basin is representative of a particular storm sewer system and outfall location. The majority of the basins are routed to the EURV ponds A, B, C, E, F, and R as well as WQ Pond D and the existing WQ pond E. The existing WQ Pond E was constructed as part of the Ridgegate Parkway Improvement project. The proposed WQ Pond D is planned to be constructed with the Southern Suburban Park project. Excerpts are included in **Appendix D**.

The **EURV Pond A Basin** consists of 22 proposed sub-basins A0-A12 with three offsite sub-basins OS7a, OS7b and OS8 combining for a total of 129.8 acres with an imperviousness of 46%. This basin represents the northwestern portion of the proposed development. These sub-basins are primarily a school site, roadways, parks, commercial lots, and residential lots. Stormwater runoff is conveyed via curb & gutter and swales. Runoff is captured via a series of proposed on-grade and sump inlets as well as area inlets in the open space swales. Runoff is then piped north to the proposed EURV Pond A. The treated/detained pond releases are discharged to Happy Canyon Creek. Pond A has been design to capture primarily Phase 1 and a portion of Phase 2 of the Ridgegate Southwest Village site.

The **EURV Pond B Basin** consists of 19 proposed sub-basins B0-B7 with 10 offsite sub-basins OS2b-OS6b combining for a total of 256.0 acres with an imperviousness of 22%. This basin represents the western portion of the proposed development. These sub-basins are primarily residential lots, roadways, and open space. Stormwater runoff is conveyed via curb & gutter and swales. Runoff is captured via a series of proposed on-grade and sump inlets as well as area inlets in the open space minor drainageways. Runoff is then piped north to the EURV Pond B.

The treated/detained pond releases are discharged to Happy Canyon Creek. Pond B has been design to capture primarily Phase 2 and a portion of Phase 3 of the Ridgegate Southwest Village site.

The **EURV Pond C Basin** consists of three proposed sub-basins C0-C1b with two offsite sub-basins OS1 and OS2a combining for a total of 59.7 acres with an imperviousness of 12%. This basin represents the southwestern portion of the proposed development. These sub-basins are primarily residential lots, roadways and open space. Stormwater runoff is conveyed via curb & gutter and swales. Runoff is captured via a series of proposed sump inlets as well as area inlets in the open space minor drainageways. Runoff is then piped north to the proposed EURV Pond C. The treated/detained pond releases are discharged to Happy Canyon Creek. Pond C has been design to capture a portion of Phase 3 of the Ridgegate Southwest Village site.

The **WQ Pond D Basin** consists of three proposed sub-basins D0-D2 combining for a total of 22.8 acres with an imperviousness of 24%. This basin represents the western portion of the proposed development. These sub-basins include the South Suburban Park. Stormwater runoff is conveyed northwest to the WQ Pond D. The treated/detained pond releases are discharged to Happy Canyon Creek. Pond D is planned to be constructed with the park project.

The **EURV Pond E Basin** consists of 11 proposed sub-basins E0-E8 combining for a total of 41.7 acres with an imperviousness of 54%. This basin represents the northeastern portion of the proposed development. These sub-basins are primarily residential lots, roadways, and parks. A portion of the stormwater runoff is conveyed via curb & gutter. Runoff is captured via proposed sump inlets. Runoff is then piped west to the proposed EURV Pond E. The treated/detained pond releases are discharged to Badger Gulch. Pond E has been design to capture a portion of Phase 4 of the Ridgegate Southwest Village site.

The **EURV Pond F Basin** consists of 9 proposed sub-basins F0-F8 with one offsite sub-basin OS9 combining for a total of 74.6 acres with an imperviousness of 37%. This basin represents the southeastern portion of the proposed development. These sub-basins are primarily residential lots, roadways, and minor open spaces. Stormwater runoff is conveyed via curb & gutter and swales. Runoff is captured via a series of proposed on-grade and sump inlets as well as area inlets in the minor drainageways. Runoff is then piped east to the proposed EURV Pond F. The treated/detained pond releases are discharged to Badger Gulch. Pond F has been design to capture primarily Phase 5 of the Ridgegate Southwest Village site.

The **EURV Pond R Basin** consists of 31 sub-basins R0-R5, RB1-RB8b, RC1-RC6f combining for a total of 102.9 acres with an imperviousness of 56%. These basins are primarily residential lots, commercial lots, roadways, and include a portion of Ridgegate Parkway. The stormwater runoff is conveyed via curb & gutter and swales. Runoff is captured via a series of existing and proposed on-grade and sump inlets. Runoff is then routed via existing pipe west within Ridgegate Parkway to the proposed EURV Pond R. The treated water is then released to an outfall, which discharges into Happy Canyon Creek. EURV Pond R will replace the existing WQ Pond B located on the north side of Ridgegate Parkway. This existing water quality pond was installed with the Ridgegate Parkway expansion and was planned to be temporary, so it will be removed and all stormwater runoff will be rerouted to EURV Pond R. Pond R has been design to capture a portion of Phase 1, 3 and 4 of the Ridgegate Southwest Village site.

The **Existing Water Quality Pond E Basin** consists of six sub-basins RE1-RE5 combining for a total of 20.4 acres with an imperviousness of 71%. These basins are primarily residential lots, roadways, and minor open spaces. The stormwater runoff is conveyed via curb & gutter and swales. Runoff is captured via a series of existing and proposed on-grade and sump inlets. Runoff is then routed via existing pipe east within Ridgegate Parkway to the existing WQ Pond E. The treated water is then released to an outfall, which discharges into Badger Gulch. Existing WQ Pond E has been design to capture a portion of Phase 4 of the Ridgegate Southwest Village site.

Sub-basins OF2 - OF8 are not proposed to be routed to the EURV ponds based on the locations as permitted per the current MS4 permit requirements effective effect July 1, 2019 (COR090000). Sub-basin OF1 includes a portion of the only proposed roadway and is located in close proximity to the Happy Canyon roadway crossing. Basin OF1 is designed to discharge to the future Transit Oriented Development (TOD) Pond located east of Happy Canyon. This pond is planned to be designed and constructed by others per a separate drainage report by Merrick & Company. Sub-basin OF2 includes a portion of the only proposed roadway and is located in close proximity to the Badger Gulch roadway crossing. Basin OF2 is proposed to discharge directly into the Badger Gulch.

Sub-basins OF3 – OF8 include the back half of proposed residential single family lots. The sub-basins back up to Happy Canyon or Badger Gulch and are not proposed to be routed to a EURV pond. A grass buffer is proposed on the back side of each lot to provide water quality for the back of the lots discharging towards the channel. Refer to **Appendix C** for the design procedure form for the grass buffer calculations.

Table 1 – Basin Summary Table

	Sub-basin	Area (ac)	% Imp.	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
EURV POND A	A0	3.10	13%	0.12	0.52	10.8	1.4	10.9
	A1	6.58	25%	0.20	0.55	27.6	3.1	15.6
	A2a	1.40	44%	0.39	0.66	8.1	2.3	7.1
	A2b	2.69	63%	0.55	0.74	8.8	6.0	14.7
	A2c	0.40	90%	0.77	0.85	5.0	1.5	3.0
	A3a	2.04	75%	0.65	0.79	7.9	5.6	12.4
	A3b	8.57	54%	0.48	0.71	17.3	12.5	33.3
	A3c	1.23	75%	0.65	0.79	7.7	3.4	7.5
	A4	6.97	78%	0.68	0.81	9.7	18.5	39.9
	A5	8.14	75%	0.65	0.79	7.6	22.6	50.1
	A6a	5.03	74%	0.64	0.79	14.9	10.5	23.5
	A6b	2.82	85%	0.73	0.83	5.0	10.0	20.7
	A6c	2.24	55%	0.49	0.71	13.8	3.7	9.7
	A6d	10.83	55%	0.49	0.71	15.4	16.9	44.8
	A7	5.38	55%	0.49	0.71	11.4	9.6	25.4
	A8	12.71	41%	0.37	0.65	11.9	17.0	54.4
	A9a	4.31	82%	0.71	0.82	9.3	12.1	25.5
	A9b	6.79	41%	0.37	0.65	13.8	8.4	27.1
	A10a	0.86	90%	0.77	0.85	5.0	3.2	6.5
	A10b	0.85	90%	0.77	0.85	5.0	3.2	6.4
	A11	13.90	20%	0.20	0.56	15.8	8.7	45.2
	A12	3.92	69%	0.60	0.77	8.7	9.7	22.4
	OS7a	6.75	5%	0.08	0.50	14.0	1.7	20.7
	OS7b	6.56	5%	0.08	0.50	22.7	1.3	15.8
	OS8	5.68	6%	0.09	0.51	21.3	1.3	14.3
	Basin A Total	129.75	46%	0.41	0.67		110.8	350.9
EURV POND B	B0	2.64	13%	0.14	0.54	9.4	1.5	10.2
	B1a	5.80	57%	0.50	0.71	15.3	9.3	24.2
	B1b	7.42	58%	0.48	0.70	13.8	12.1	32.1
	B1c	2.71	84%	0.73	0.83	9.3	7.8	16.2
	B1d	2.85	56%	0.50	0.71	6.3	6.4	16.9
	B1e	6.28	55%	0.46	0.69	14.5	9.5	26.0
	B1f	1.76	75%	0.65	0.79	8.1	4.8	10.6
	B1g	3.31	55%	0.48	0.71	11.9	5.8	15.3
	B2	8.15	55%	0.48	0.71	8.8	16.0	42.7
	B3a	7.64	60%	0.51	0.72	14.7	12.9	32.9
	B3b	1.68	55%	0.48	0.70	13.7	2.7	7.3
	B4	4.08	52%	0.47	0.70	12.6	6.7	18.2
	B5a	5.60	48%	0.42	0.68	18.1	7.0	20.4
	B5b	5.20	72%	0.63	0.78	13.0	11.3	25.6
	B5c	3.83	54%	0.45	0.69	14.5	5.7	15.8
	B5d	3.76	55%	0.49	0.71	8.0	7.7	20.4
	B6a	3.65	55%	0.49	0.71	13.1	6.1	16.3
	B6b	2.38	55%	0.49	0.71	14.3	3.8	10.2
	B7	4.23	55%	0.49	0.71	6.7	9.2	24.4
	OS3	72.31	5%	0.07	0.50	52.4	8.5	104.5
	OS2b	1.81	5%	0.08	0.50	11.8	0.5	6.0
	OS4a	3.10	7%	0.05	0.46	20.8	0.4	7.2
	OS4b	3.04	5%	0.08	0.50	13.6	0.8	9.5
	OS5a	1.90	5%	0.08	0.50	13.8	0.5	5.9
	OS5b	59.27	5%	0.08	0.50	39.4	8.6	103.1
	OS5c	2.48	5%	0.08	0.50	16.6	0.6	7.0
	OS5d	1.11	5%	0.08	0.50	13.5	0.3	3.5
	OS6a	4.84	5%	0.08	0.50	13.3	1.3	15.2
	OS6b	23.13	5%	0.08	0.50	23.1	4.6	55.1
	Basin B Total	255.96	22%	0.21	0.57		80.9	408.2

Table 1 – Basin Summary Table (Continued)

	Sub-basin	Area (ac)	% Imp.	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
EURV POND C	C0	1.74	16%	0.17	0.55	13.6	1.0	5.9
	C1a	2.43	82%	0.70	0.82	7.4	7.4	15.6
	C1b	5.28	47%	0.42	0.68	13.5	7.6	22.2
	OS1	10.85	5%	0.08	0.50	13.3	2.8	34.2
	OS2a	39.42	5%	0.08	0.50	40.6	5.6	67.4
	Basin C Total	59.72	12%	0.13	0.53		10.3	93.1
WQ POND D	D0	1.21	12%	0.14	0.53	8.6	0.7	4.8
	D1	8.23	25%	0.24	0.58	17.7	5.8	26.1
	D2	13.34	25%	0.21	0.56	23.3	7.3	35.3
	Basin D Total	22.78	24%	0.22	0.57		12.2	59.2
EURV POND R	R0	2.95	14%	0.12	0.51	9.0	1.4	11.0
	R1	4.65	74%	0.64	0.79	9.1	12.0	26.7
	R2	14.66	24%	0.22	0.57	20.9	8.7	41.7
	R3	14.64	56%	0.50	0.71	17.7	21.8	57.0
	R4a	2.37	89%	0.76	0.85	6.5	8.1	16.5
	R4b	4.90	75%	0.65	0.79	12.2	11.3	25.1
	R4c	5.76	55%	0.49	0.71	9.4	11.1	29.5
	R5a	0.63	90%	0.77	0.85	5.0	2.4	4.7
	R5b	1.16	90%	0.77	0.85	5.0	4.3	8.7
	R5c	2.83	55%	0.49	0.71	12.4	4.9	12.9
	R5d	4.77	54%	0.48	0.70	15.0	7.4	19.9
	RB1	0.87	68%	0.57	0.75	7.6	2.1	5.1
	RB2	0.63	81%	0.69	0.81	6.4	2.0	4.2
	RB3	0.28	59%	0.52	0.73	6.7	0.6	1.7
	RB4	1.00	51%	0.45	0.69	7.0	2.0	5.5
	RB5	2.55	35%	0.32	0.63	7.9	3.4	12.3
	RB6	1.34	53%	0.47	0.70	6.0	2.9	7.9
	RB8a	7.16	75%	0.65	0.79	5.0	22.6	50.0
	RB8b	2.23	10%	0.12	0.52	11.5	1.0	7.8
	RC1	2.33	30%	0.28	0.61	9.1	2.6	10.3
	RC2	3.36	30%	0.28	0.61	14.1	3.2	12.4
	RC3	1.10	53%	0.47	0.70	12.2	1.8	5.0
	RC4	0.28	61%	0.53	0.73	8.2	0.6	1.6
	RC7	9.82	85%	0.73	0.83	6.7	32.1	66.3
	RC6a	0.75	90%	0.77	0.85	5.1	2.8	5.6
	RC6b	2.29	75%	0.65	0.79	6.8	6.6	14.6
	RC6c	1.45	90%	0.77	0.85	6.5	5.0	10.1
	RC6d	0.44	75%	0.65	0.79	6.2	1.3	2.9
	RC6e	0.36	75%	0.65	0.79	6.2	1.1	2.4
	RC6f	3.47	61%	0.54	0.74	8.4	7.7	19.2
	R6	1.87	71%	0.61	0.77	5.0	5.5	12.7
	Basin R Total	102.90	56%	0.48	0.70		135.4	368.1
On-site HC Pond Total		1142.22	33%	0.30	0.61	---	350.2	1281.0

Table 1 – Basin Summary Table (Continued)

	Sub-basin	Area (ac)	% Imp.	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
EURV POND E	E0	2.94	17%	0.12	0.50	9.8	1.4	10.5
	E1	6.91	26%	0.20	0.55	22.6	3.6	18.2
	E2a	3.44	82%	0.70	0.81	10.2	9.2	19.5
	E2b	5.70	55%	0.48	0.70	17.3	8.3	22.1
	E2c	1.17	90%	0.77	0.85	5.2	4.3	8.7
	E3	3.99	55%	0.48	0.70	8.7	7.7	20.8
	E4	4.77	55%	0.46	0.69	10.5	8.4	22.8
	E5	0.45	90%	0.77	0.85	5.0	1.7	3.4
	E6	3.68	57%	0.47	0.70	7.8	7.4	19.8
	E7	4.77	75%	0.64	0.79	5.0	14.8	33.1
	E8	3.84	55%	0.47	0.70	8.3	7.4	20.1
	Basin E Total	41.66	54%	0.45	0.69		49.5	136.9
EURV POND F	F0	2.53	24%	0.19	0.54	7.5	2.0	10.7
	F1	11.50	55%	0.46	0.69	14.7	17.4	47.5
	F2	7.82	55%	0.45	0.69	11.6	12.9	35.5
	F3	6.07	55%	0.49	0.71	8.9	11.9	31.7
	F4	3.02	32%	0.26	0.58	13.7	2.6	10.8
	F5	5.38	38%	0.32	0.62	7.8	7.2	25.5
	F6	6.69	54%	0.48	0.71	11.4	11.8	31.6
	F7	5.41	75%	0.63	0.78	5.9	15.7	35.4
	F8	1.20	90%	0.77	0.85	5.9	4.3	8.6
	OS9	25.01	5%	0.06	0.48	19.2	4.3	63.2
	Basin F Total	74.63	37%	0.32	0.62		57.2	208.1
EX WQ POND E	RE1	3.00	61%	0.53	0.73	18.2	4.7	11.8
	RE2a	5.16	75%	0.65	0.79	10.5	12.7	28.1
	RE2b	2.53	75%	0.65	0.79	5.6	7.7	17.1
	RE3	1.58	56%	0.48	0.71	11.7	2.8	7.4
	RE4	4.09	75%	0.64	0.79	9.4	10.4	23.1
	RE5	4.01	75%	0.63	0.78	9.6	9.9	22.4
	Ex. Basin E Total	20.37	71%	0.61	0.77		36.8	84.3
On-site BG Pond Total		273.32	47%	0.40	0.66	---	143.6	429.3

III. DRAINAGE DESIGN CRITERIA

A. Regulations

Storm drainage analysis and design criteria for this project were taken from the “Storm Drainage Design and Technical Criteria Manual” (SDDTCM) by Douglas County and the “Urban Storm Drainage Criteria Manual” (USDCM) by Mile High Flood Control District (MHFD).

B. Drainage Studies

The site has previously been studied by multiple reports. The “Master Drainage Plan for Ridgegate-Happy Canyon Creek and Badger Gulch Drainage Basins”, by Merrick & Company, revised May 2017, has been utilized for the overall master planning of the site.

The “Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I”, by Merrick & Company, dated October 2018, and the “Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II”, by Merrick & Company, dated October 2018, have been utilized to confirm that this drainage report is in conformance with the allowable inflows into the existing storm sewer system located in Ridgegate Parkway. The allowable versus the proposed inflows into the existing storm sewer systems is presented in **Table 2**.

The “Happy Canyon Creek Flood Hazard Area Delineation”, by Muller Engineering Company, dated July 2014, has been utilized for 100 year floodplain mapping.

C. Water Quality and MS4 Permit Requirements

The Ridgegate Southwest Village site is subject to the requirements of the MS4 standards that went into effect July 1, 2019 (COR090000), or the standards in place at the time of submittal.

D. Hydrology

The Rational method was utilized to determine the hydrology of the site. The watershed areas for each inflow point into the ponds are less than 160 acres and do not require MHFD’s Colorado Urban Hydrograph Procedure (CUHP). The overall EURV Pond B watershed has been split into two separate inflow points into the pond, each of which does not exceed 160 acres and does not require CUHP.

Rational method calculations were prepared for the sub-basins that directly impact the sizing of minor drainageways and pipe sizing. The 5-year storm was analyzed as the minor storm and the 100-year storm was analyzed as the major storm for aspects of design. The site is located in Douglas County Rainfall Zone 1. One-hour point rainfall values were taken from the SDDTCM and used in equation 5-1 from the USDCM to calculate intensities. 1-hour point rainfall values of 1.43 inches and 2.60 inches were used for a 5-year and 100-year storm events respectively.

Standard Forms SF-2 and SF-3 were used to determine the runoff from the minor and major storms on this site. Runoff coefficients were determined based on data presented in Table 6-5 from the USDCM. Basin percent impervious values were calculated based on proposed future land use and from data on Table 6-3 from the USDCM. Times of concentration were developed using equations from the USDCM. All runoff calculations and applicable charts and graphs are included in Appendix B of this report.

The hydrology calculations are presented in **Appendix B.**

E. Hydraulics

The sizing for the minor drainageways and swales throughout the site will be provided with the Phase III Drainage reports for the site. The locations of the minor drainageways/swales are primarily located in the open space and the maintenance responsibilities will be under the City of Lone Tree.

The sizing for the pond emergency overflow spillways, forebays and trickle channels will be provided with the Phase III Drainage reports for the site. The maintenance responsibilities for the ponds will be under the Rampart Range Metro District.

All curb and area inlet sizing and street capacity calculations will be provided with the Phase III Drainage reports for the site.

For this Phase II report, all storm sewer sizes shown on the drainage maps and in the calculations are preliminary. The pipes have been sized using only Manning's equation and are included in the SF-3 Rational Method calculations. At this time, profiles have not been completed for the storm sewer; therefore all slopes are reasonable assumptions to obtain a preliminary size. Hydraulic grade calculations and final storm sewer sizing will be prepared with the Phase III Drainage reports prepared for this project.

F.Pond Calculations and Water Quality Enhancement

The Ridgegate Southwest Village site will be serviced by six EURV ponds, one proposed WQ Pond and one existing WQ pond. Outlet structures for these ponds will feature perforated plates for the WQCV and EURV discharge. These ponds were sized and designed per Mile High Flood Control District (MHFD) methods and criteria using the MHFD-Detention_v4.03 workbook as the primary design tool. The MHFD-Detention workbook utilizes CUHP and was used to calculate detention volume requirements and to size the outlet structure. The UD-BMP_v3.07 workbook (MHFD) was used to design the grass buffers. The grass buffers are designed to provide water quality to the basins not routed to the EURV ponds The MHFD-Detention and BMP calculations are presented in **Appendix C**.

All runoff from the proposed site will be primarily captured and piped to six proposed EURV ponds located offline from the receiving drainageways. The runoff from a portion of the future South Suburban Park is planned to be routed to the proposed WQ Pond D. Prior to being released into Happy Canyon Creek or Badger Gulch, the stormwater runoff will receive water quality in the proposed offline ponds, which will mitigate adverse impacts to stormwater quality. Detention will be provided in Happy Canyon Creek and Badger Gulch per the "Master Drainage Plan for Ridgegate – Happy Canyon Creek and Badger Gulch Drainage Basins", by Merrick & Company, revised May 2017. As a result, detention is not required in the on-site ponds within the Ridgegate Southwest Village site and will be required to only provide the WQCV and EURV volumes.

As stated previously, the minimum design discharge is 90% of the 100-year developed inflow for all ponds except EURV Pond R. The design discharge from Pond R is approximately 85%, as it was found that the 90% of the 100-year developed flow discharge could not be achieved despite attempts to increase the discharge by increasing the overflow weir area. It was found that by increasing the overflow weir area decreased flow depth over the weir resulted in a lower discharge from the pond. These discharge percentages of the 100-year developed flows has been established in coordination with Merrick & Company in their design of the in-line ponds within the channels. The pond outfalls to the receiving drainageways will include energy dissipation for the 100-year outfall and are planned to include low tail-water basins. The outfalls will be armored with soil riprap into Happy Canyon Creek or Badger Gulch to either the thalwag of the channel or the 100-year floodplain.

IV. STORMWATER MANAGEMENT FACILITY DESIGN

A. Stormwater Conveyance Facilities

The conveyance system within the Ridgegate Southwest Village site is that of a typical subdivision with curb and gutter capturing and conveying flows to on-grade and sump storm sewer inlets. Concentrated off-site flows are proposed to be channelized via minor drainageways and routed into the proposed storm sewer system and to the ponds.

For this submittal, all critical design points have been evaluated for preliminary pipe sizing. On-grade inlets have been preliminarily located to determine storm sewer sizing. Street capacity calculations, inlet calculations and storm pipe HGL's will be evaluated in the Phase III Drainage reports for this site.

All storm sewer pipes, inlets, and streets will be public improvements. The EURV ponds will reside on property owned by the City of Lone Tree but will be maintained by the Rampart Range Metro District. Easements and tracts will be established to allow for maintenance access to drainage facilities. Offsite drainageways will be located in easements.

B. Stormwater Storage Facilities

There are seven proposed EURV ponds within this project: five of which will outfall into Happy Canyon Creek, two will outfall into Badger Gulch. In-line detention is planned to be provided within Happy Canyon and Badger Gulch (by others) per the *Ridgegate Master Drainage Report* and will not be provided in the on-site ponds. It should be noted that the overall EURV Pond B watershed has been split into two separate inflow points into the pond, each of which do not exceed 160 acres and does not require MHFD's Colorado Urban Hydrograph Procedure (CUHP).

The proposed EURV ponds will utilize forebays at each outfall point into the pond in order to dissipate the energy from the storm runoff and collect sediment. Trickle channels will then convey the runoff to the outlet structure. The outlet structure will include micropools and contain the respective initial surcharge volumes. The outlet structure will utilize orifice plates for both the water quality capture volume (WQCV) and EURV. The outlets structure orifice plate will be sized to release the WQCV event over a period of 40 hours. For the developed 100-year inflows, an overflow grate on the top of the outlet structure will be used in order to pass discharges above the EURV level and minimize incidental detention. All flows up to the 100-year discharging from the pond will then enter the channel via pipe. The ponds will also have emergency spillways to discharge emergency flows above the 100-year level. Trash racks will be used to prevent any trash from escaping the development and for easy cleaning. A maintenance access trail will be constructed for easy access to the outlet structure and forebays for maintenance and repairs.

All pond outfalls will be riprapped into Happy Canyon Creek or Badger Gulch. The flows from the ponds are proposed to discharge into Happy Canyon Creek or Badger Gulch upstream of the 100-year floodplain and include a low-tailwater basin. In the situation that grading is done within the 100 year floodplain, a no-rise certification and a floodplain permit will be required. The preliminary pond volumes and water surface elevations for the WQCV, EURV, and 100 year storm events for each pond are shown in the table below.

A. Water Quality Enhancement Best Management Practices

Water quality is generally being provided for the site in the seven water quality and EURV ponds prior to entering Happy Canyon Creek and Badger Gulch. The ponds will be designed as Full-Spectrum Detention/EURV Ponds and will utilize forebays and an outlet structure to treat storm water runoff from the proposed development. The forebays will be used to dissipate the energy of the runoff and allow any remaining sediment to settle out of the water before it departs the pond. The outlet structure has been design with an orifice plate and designed to release the WQCV event over a period of 40 hours.

Table 1: EURV Pond Parameters

POND	Area (ac)	% Imp.	WQCV (ac-ft)	WQCV WSEL	EURV (ac-ft)	EURV WSEL	100 yr (ac-ft)	100 yr WSEL
EURV POND A	129.8	46%	2.12	5,976.24	5.65	5,980.46	22.73	5,981.90
EURV POND B	256.0	22%	2.67	5,963.01	5.15	5,965.96	39.03	5,967.95
EURV POND C	59.7	12%	0.39	6,098.74	0.61	6,099.88	8.57	6,102.98
WQ POND D	22.8	24%	0.25	6,011.29	0.51	6,013.92	3.32	6,013.23
EURV POND E	41.7	54%	0.76	6,012.63	2.32	6,017.09	7.28	6,017.97
EURV POND F	74.6	37%	1.07	6,064.24	2.72	6,068.07	12.06	6,069.40
EURV POND R	102.9	56%	1.92	6,077.70	5.55	6,084.97	18.73	6,084.97

Proposed sub-basins OF3 – OF8 include the back half of proposed residential single family lots. The sub-basins back up to Happy Canyon or Badger Gulch and are not proposed to be routed to a EURV pond. A four foot side grass buffer is proposed on the back side of the lot to provide water quality. Each lot is expected to have an inflow of no more than 0.2 cfs in the two-year storm and spans a minimum of approximately 45 feet along the channel. Per MHFD criteria, a 4 foot wide grass buffer is required to provide water quality. The maximum slope is expected to be no more than 6%. Refer to **Appendix C** for the design procedure form for the grass buffer calculations.

Sub-basin OF2 is located in close proximity to the Happy Canyon and Badger Gulch drainageways and includes proposed roadways. The low point of the road is located near the channel crossings and it is proposed to discharge directly into the channel without being routed to a EURV pond. As stated previously, Sub-Basin OF1 is proposed to be routed to a future Transit Oriented Development (TOD) Pond located east of Happy Canyon. This pond is planned to be designed and constructed by others per a separate drainage report by Merrick & Company.

Table 2: Proposed Sub-basins Routed Off-site

	Sub-basin	Area (ac)	% Imp.	C_2	C_5	C_{100}	t_c (min)	Q_2 (cfs)	Q_5 (cfs)	Q_{100} (cfs)
OFFSITE - DRAINAGEWAYS	OF1	1.88	90%	0.74	0.77	0.85	7.8	5.9	6.1	12.3
	OF3	1.38	29%	0.21	0.28	0.60	5.5	1.4	1.8	7.2
	OF4	0.57	45%	0.34	0.40	0.67	5.0	0.9	1.1	3.4
	OF5	0.87	36%	0.26	0.32	0.62	5.2	1.1	1.3	4.7
	OF6	0.33	45%	0.34	0.40	0.67	5.0	0.5	0.6	1.9
	HC Total	2.82	35%	0.25	0.31	0.62	---	3.4	4.2	15.3
	OF2	0.65	90%	0.77	0.85	5.0	2.4	4.9	3.1	33.2
	OF7	1.40	45%	0.33	0.36	0.64	5.0	2.2	2.5	7.9
	OF8	1.33	45%	0.33	0.36	0.64	5.0	2.1	2.3	7.5
	BG Total	2.73	45%	0.33	0.36	0.64	---	4.4	4.8	15.3

B. Existing Ridgegate Parkway Storm Sewer

There is an existing storm sewer system located in Ridgegate Parkway that will be used to pipe flows to the EURV Pond R and the existing WQ Pond E. The proposed design flows that enter the existing storm sewer system located in Ridgegate Parkway are all within the allowable limit. The flows at design points RC4, RC3, RC1, RB5, and RE4 have design flows that are greater than the allowable inflows that were specified in the following reports: “Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I”, by Merrick & Company, dated October 2018, and the “Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II”, by Merrick & Company, dated October 2018. While the flows may be greater than originally designed for, they are not expected to cause adverse impacts to the existing storm sewer system as shown in the calculations for Pond R and Ex. WQ Pond E in the SF-3 Minor and Major calculations located in **Appendix B**. The allowable and proposed inflows for the 5-year and 100-year storm events entering the existing storm sewer system are shown in the table below.

Table 2: Allowable vs. Proposed Inflows into Existing Ridgegate Storm Sewer System

RIDGEGATE PARKWAY STORM SEWER ALLOWABLE INFLOWS						
Design Point	5-yr Minor Storm			100 yr- Major Storm		
	Allowable Inflow (cfs)	Proposed Inflow (cfs)	Δ Inflow (cfs)	Allowable Inflow (cfs)	Proposed Inflow (cfs)	Δ Inflow (cfs)
EURV POND R						
RC4	29.7	26.7	-3.0	86.3	61.6	-24.7
RC3	30.5	26.4	-4.1	89.1	60.3	-28.8
RC2	36.2	28.1	-8.1	80.4	69.1	-11.3
RC1	59.6	54.9	-4.7	160	134.1	-25.9
RB1	38.1	20.9	-17.2	79.1	56.0	-23.1
RB2	87.1	76.2	-10.9	219.2	191.0	-28.2
RB3	2.3	0.7	-1.6	5.9	1.6	-4.3
RB4	89.2	78.2	-11.0	225.9	196.4	-29.5
RB5	3.4	4.0	0.6	10.3	9.0	-1.3
RB6	91.7	81.3	-10.4	234.3	203.5	-30.8
EX WQ POND E						
RE1	20.0	19.4	-0.6	45.2	44.4	-0.8
RE2	18.3	2.8	-15.5	40.6	7.3	-33.3
RE3	10.6	10.4	-0.2	23.6	23.1	-0.5
RE4	29.3	29.4	0.1	67.3	67.5	0.2
RE5	21.4	9.9	-11.5	47.3	22.3	-25.0
Ex. Pond E Outfall	44.7	36.8	-7.9	102.9	84.3	-18.6

C. Floodplain Modification

There are no modifications proposed to any floodplain. The project site is outside the one percent annual chance floodplain, and there are no CLOMR, LOMR, or floodplain permitting requirements. In the situation that grading is done within the 100 year floodplain, a no-rise certification and a floodplain permit will be required.

D. Additional Permitting Requirements

An Approved Jurisdictional Determination, provided by the U.S. Army Corps of Engineers, Corps File No. MWO-2019-01406-DEN, has determined that there are no water resources of the U.S. on this site; therefore, a Department of the Army permit will not be required for this site. There are currently no endangered species located on the site. There are no other permitting requirements placed on the site.

V. CONCLUSIONS

A. Compliance with Standards

This report is in compliance with the standards set forth in the “Storm Drainage Design and Technical Criteria Manual” by Douglas County as well as the “Urban Storm Drainage Criteria Manual” by the Mile High Flood Control District (MHFD).

B. Variances

No variances are requested at this time.

C. Drainage Concept

All proposed runoff will be safely conveyed through the site and release at allowable rates at the existing outfall points from the site. Water quality is currently or will be provided at the outfall locations in exclusion of at the roadway crossings over the drainageways. Minimal to no adverse effects to the Happy Canyon Creek or Badger Gulch and downstream infrastructure are expected as a result of the proposed Ridgegate Southwest Village improvements. Minimal to no impacts are expected with respect to stormwater quality, quantity, or timing.

REFERENCES

1. Happy Canyon Creek Flood Hazard Area Delineation, by Muller Engineering Company, dated July 2014.

2. Master Drainage Plan for Ridgegate-Happy Canyon Creek and Badger Gulch Drainage Basins, Merrick & Company, Revised May 2017.

3. Phase III Drainage Report for Ridgegate Parkway Expansion – Phase I, by Merrick & Company, dated October 2018.

4. Phase III Drainage Report for Ridgegate Parkway Expansion – Phase II, by Merrick & Company, dated October 2018.

5. Storm Drainage Design and Technical Criteria Manual, Douglas County, July 2008.

6. Urban Storm Drainage Criteria Manual, Mile High Flood Control District, Latest Revision.

Crossing Data - Ridgegate 60

60" RCP Only - Total Flow

Crossing Properties

Name: Ridgegate 60

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	4.000	ft
Side Slope (H:V)	2.000	_:1
Channel Slope	0.0050	ft/ft
Manning's n (channel)	0.035	
Channel Invert Elevation	75.110	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	ft
Crest Length	100.000	ft
Crest Elevation	87.800	ft
Roadway Surface	Paved	
Top Width	50.000	ft

Culvert Properties

60

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	60	
Shape	Circular	
Material	Concrete	
Diameter	5.000	ft
Embedment Depth	0.000	in
Manning's n	0.013	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	75.460	ft
Outlet Station	50.000	ft
Outlet Elevation	75.110	ft
Number of Barrels	1	

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

60" RCP Only - Total Flow

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Ridgegate 60

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	60 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
79.47	5-yr	90.00	90.00	0.00	1
83.04	100-yr	203.50	203.50	0.00	1
87.80	Overtopping	296.03	296.03	0.00	Overtopping

100-yr HW for all flow thru 60" RCP = elev. 83.04
Use for ~ 100-yr split flow HW elev.

Crossing Data - Ridgegate 42

42" RCP Only - Total Flow

Crossing Properties

Name: Ridgegate 42

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	4.000	ft
Side Slope (H:V)	2.000	_:1
Channel Slope	0.0050	ft/ft
Manning's n (channel)	0.035	
Channel Invert Elevation	75.110	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	ft
Crest Length	100.000	ft
Crest Elevation	87.800	ft
Roadway Surface	Paved	
Top Width	50.000	ft

Culvert Properties

42

Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	42	
Shape	Circular	
Material	Concrete	
Diameter	3.500	ft
Embedment Depth	0.000	in
Manning's n	0.013	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	75.460	ft
Outlet Station	50.000	ft
Outlet Elevation	75.110	ft
Number of Barrels	1	

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel

42" RCP Only - Total Flow

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Ridgegate 42

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	42 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
77.83	WQ	28.00	28.00	0.00	1
80.80		84.00	84.00	0.00	1
81.24	5-yr	90.00	90.00	0.00	1
87.80	Overtopping	151.78	151.78	0.00	Overtopping

WQ elev. 77.83 = 2.37' Depth (77.83-75.46) = 28.44 inches

Used 29 inches for top of plate = 2.42' deep

Crossing Data - Ridgegate MH Split

42" RCP with Plate - Split Flow

Crossing Properties

Name: Ridgegate MH Split

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	4.000	ft
Side Slope (H:V)	2.000	_:1
Channel Slope	0.0050	ft/ft
Manning's n (channel)	0.035	
Channel Invert Elevation	75.110	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	ft
Crest Length	100.000	ft
Crest Elevation	87.800	ft
Roadway Surface	Paved	
Top Width	50.000	ft

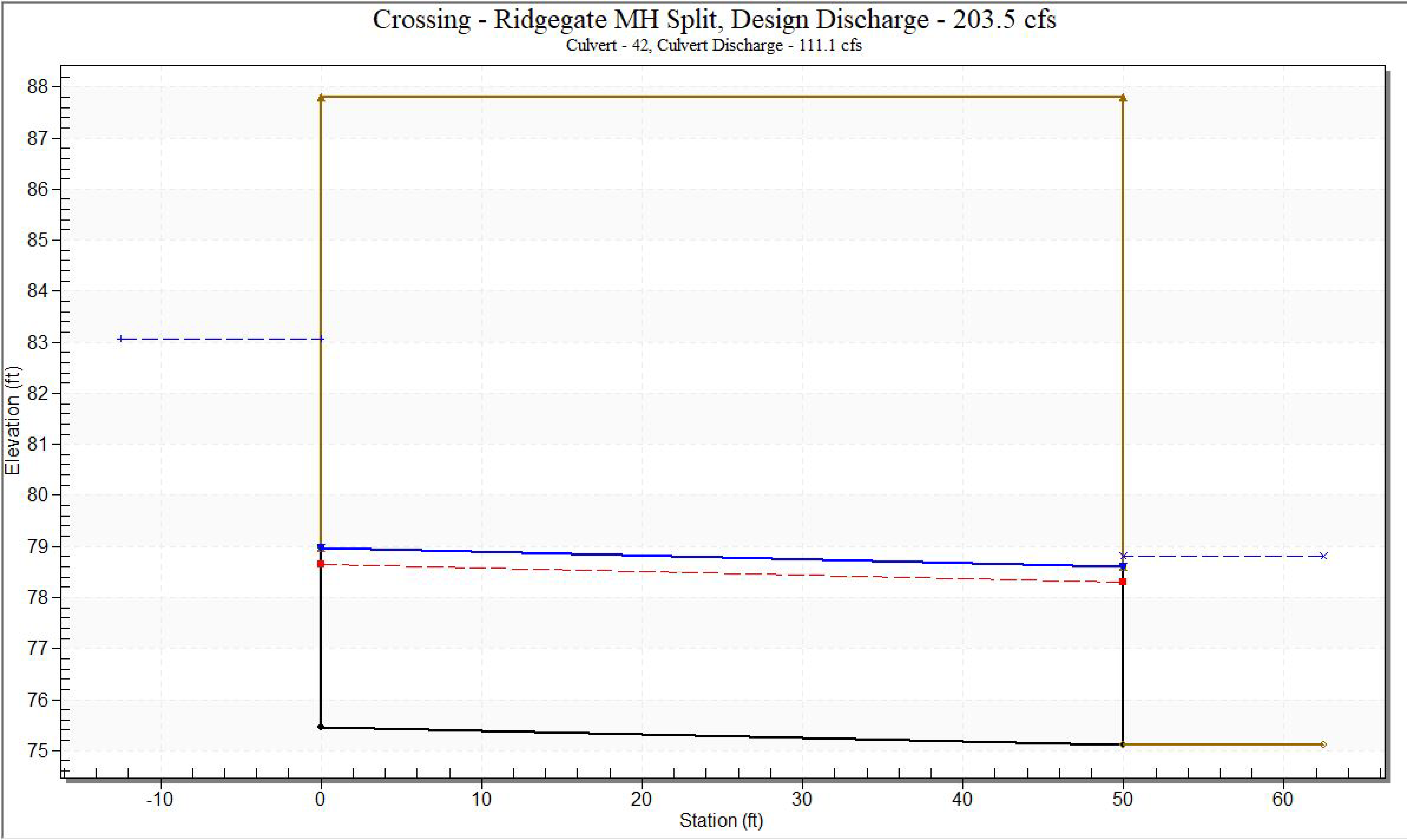
Culvert Properties

42
60

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	42	
Shape	Circular	
Material	Concrete	
Diameter	3.500	ft
Embedment Depth	0.000	in
Manning's n	0.013	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	75.460	ft
Outlet Station	50.000	ft
Outlet Elevation	75.110	ft
Number of Barrels	1	

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel



Crossing - Ridgegate MH Split, Design Discharge - 203.5 cfs
Culvert - 42, Culvert Discharge - 111.1 cfs
Elevation (ft)
Station (ft)
88
87
86
85
84
83
82
81
80
79
78
77
76
75
-10
0
10
20
30
40
50
60

Crossing Data - Ridgegate MH Split

60" RCP with Plate - Split Flow

Crossing Properties

Name: Ridgegate MH Split

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	4.000	ft
Side Slope (H:V)	2.000	_:1
Channel Slope	0.0050	ft/ft
Manning's n (channel)	0.035	
Channel Invert Elevation	75.110	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	ft
Crest Length	100.000	ft
Crest Elevation	87.800	ft
Roadway Surface	Paved	
Top Width	50.000	ft

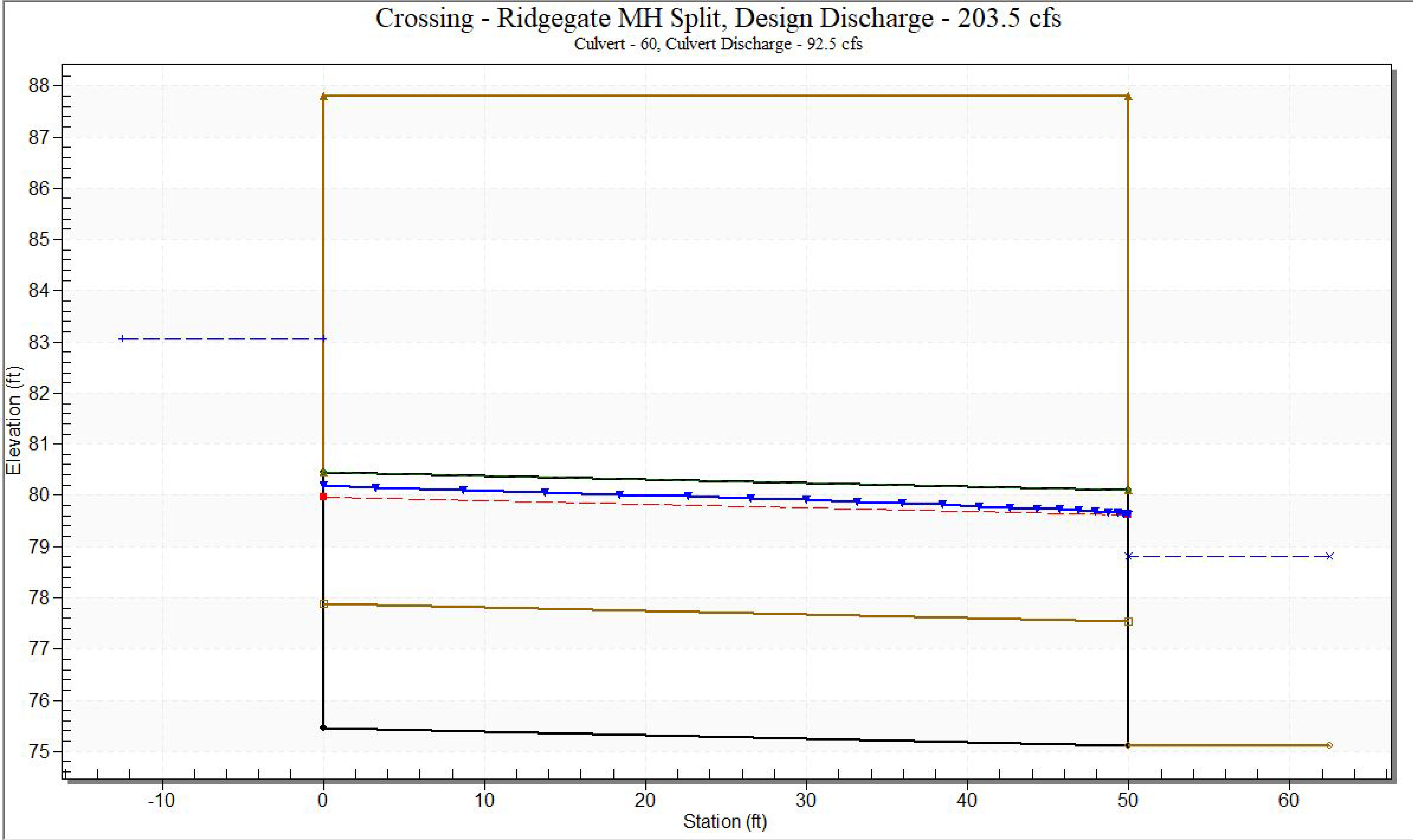
Culvert Properties

42
60

Add Culvert
Duplicate Culvert
Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	60	
Shape	Circular	
Material	Concrete	
Diameter	5.000	ft
Embedment Depth	29.000	in
Manning's n (Top/Sides)	0.013	
Manning's n (Bottom)	0.013	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	75.460	ft
Outlet Station	50.000	ft
Outlet Elevation	75.110	ft
Number of Barrels	1	

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Cancel


Crossing - Ridgegate MH Split, Design Discharge - 203.5 cfs
Culvert - 60, Culvert Discharge - 92.5 cfs
Elevation (ft)
Station (ft)
88
87
86
85
84
83
82
81
80
79
78
77
76
75
-10
0
10
20
30
40
50
60

42" and 60" RCP with Plate - Split Flow

HY-8 Analysis Results

Crossing Summary Table

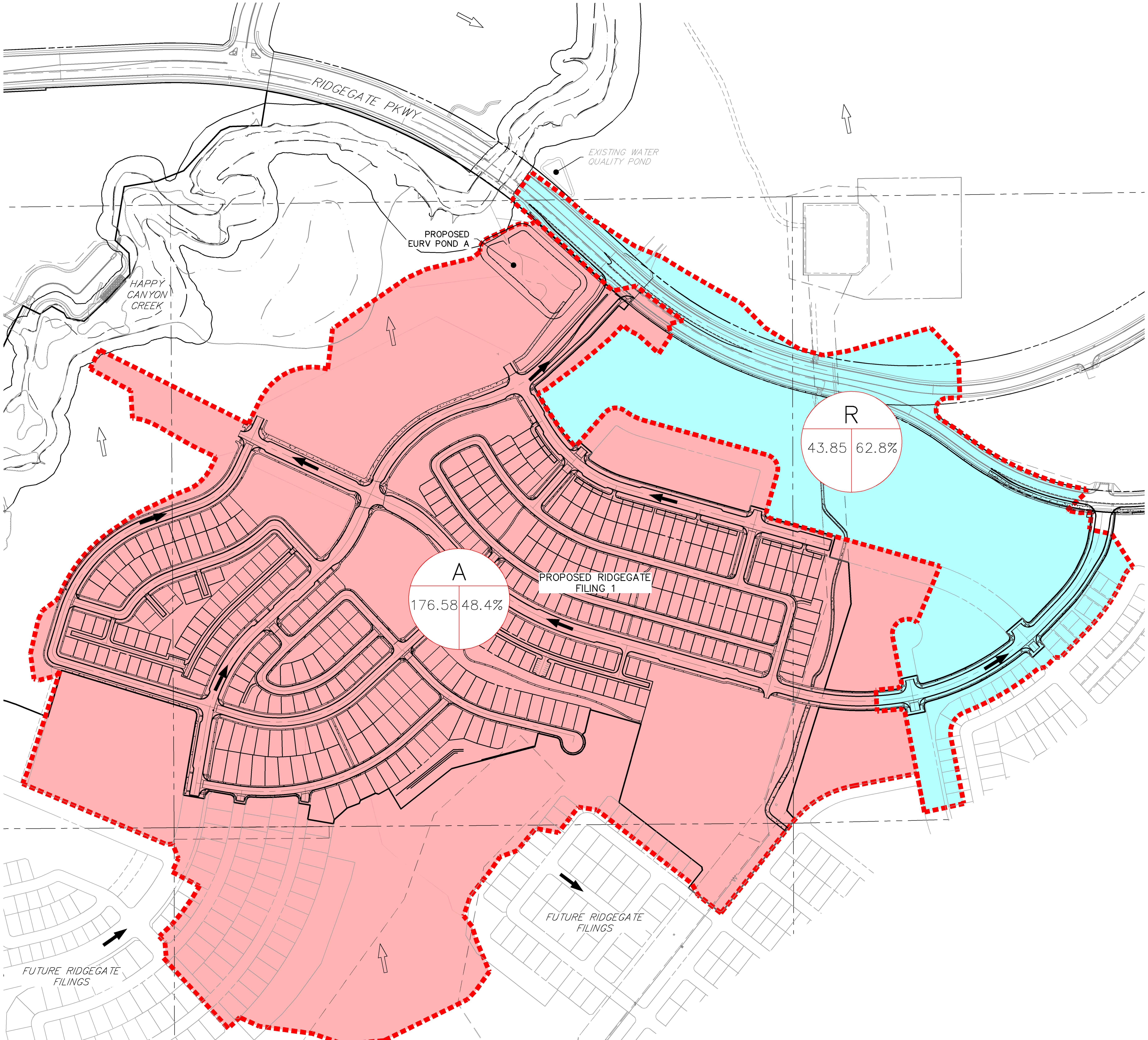
Culvert Crossing: Ridgegate MH Split

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	42 Discharge (cfs)	60 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
77.83	WQ	28.00	27.97	0.00	0.00	7
79.53	5-yr	90.00	63.25	26.75	0.00	4
83.06	100-yr	203.50	111.05	92.46	0.00	6
87.80	Overtopping	291.93	151.77	140.16	0.00	Overtopping

- WQ event - all flow thru 42" RCP to the north
- 5-yr event - flows split to the north and south
- 100-yr event - flows split to the north and south with HW = 83.06 ~ the HW for all flow thru 60" RCP without plate

APPENDIX F

DRAINAGE MAPS



DRAINAGE LEGEND

A=BASIN DESIGNATION
B=BASIN AREA
C=PERCENT IMPERVIOUS (%)
POND BASIN BOUNDARY
6100 PROPOSED CONTOURS
6100 EXISTING CONTOURS
PROP DRAINAGE ARROW
EX DRAINAGE ARROW

200 100 0 200 400
ORIGINAL SCALE: 1" = 200'

POND A EXHIBIT
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
12/2/20
SHEET 1 OF 1

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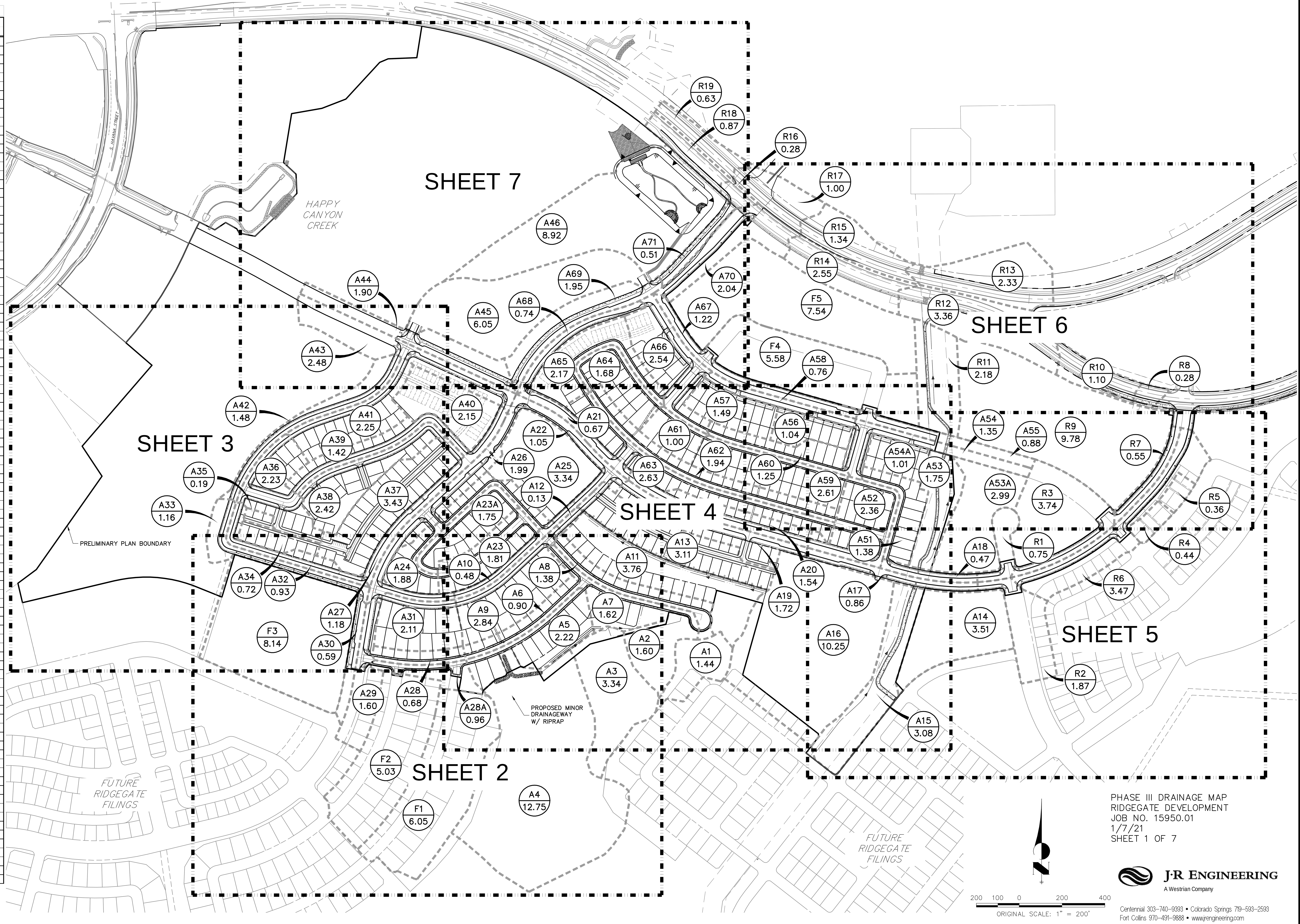
RIDGEGATE FILING 1 DEVELOPMENT

PHASE III DRAINAGE REPORT

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A1	1.44	10%	0.12	0.52	8.2	0.7	5.8
A2	1.60	2%	0.05	0.49	10.6	0.3	5.4
A3	3.34	2%	0.05	0.49	15.0	0.6	9.7
A4	12.75	2%	0.05	0.49	14.3	2.2	37.9
A5	2.22	44%	0.39	0.66	13.0	3.1	9.2
A6	0.90	64%	0.56	0.75	7.0	2.3	5.4
A7	1.62	52%	0.46	0.70	8.8	3.1	8.4
A8	1.38	70%	0.61	0.77	7.6	3.7	8.2
A9	2.84	48%	0.43	0.68	11.2	4.6	13.0
A10	0.48	69%	0.60	0.77	5.2	1.4	3.2
A11	3.76	19%	0.19	0.56	14.2	2.4	12.8
A12	0.13	60%	0.52	0.73	5.0	0.3	0.9
A13	3.11	60%	0.53	0.73	8.6	6.9	17.0
A14	3.51	74%	0.64	0.79	8.1	9.7	21.1
A15	3.08	7%	0.10	0.51	16.9	0.9	8.8
A16	10.25	13%	0.14	0.54	19.4	4.1	28.5
A17	0.86	76%	0.66	0.80	5.0	2.8	6.0
A18	0.47	75%	0.65	0.79	5.0	1.5	3.3
A19	1.94	57%	0.50	0.72	9.7	3.9	9.9
A20	1.54	61%	0.54	0.73	8.8	3.4	8.3
A21	0.67	80%	0.69	0.81	5.0	2.3	4.8
A22	1.05	81%	0.70	0.82	6.3	3.4	7.1
A23	1.81	61%	0.53	0.73	7.0	4.3	10.6
A23A	1.75	46%	0.41	0.67	10.1	2.8	8.2
A24	1.88	58%	0.51	0.72	7.9	4.2	10.4
A25	3.34	82%	0.71	0.82	7.0	10.6	21.9
A26	1.99	67%	0.58	0.76	9.4	4.7	10.9
A27	1.18	78%	0.67	0.80	7.7	3.4	7.3
A28A	0.96	69%	0.60	0.76	8.9	2.4	5.4
A28	0.68	66%	0.58	0.75	6.6	1.8	4.1
A29	1.60	55%	0.49	0.71	11.3	2.9	7.6
A30	0.59	78%	0.68	0.81	5.1	2.0	4.1
A31	2.11	48%	0.43	0.68	9.9	3.6	10.1
A32	0.93	61%	0.53	0.73	8.3	2.1	5.1
A33	1.16	46%	0.41	0.67	9.4	1.9	5.6
A34	0.74	55%	0.49	0.71	7.6	1.6	4.0
A35	0.18	62%	0.54	0.74	5.9	0.5	1.1
A36	2.22	56%	0.50	0.71	10.2	4.3	11.1
A37	3.43	57%	0.50	0.72	9.2	7.0	17.9
A38	2.42	44%	0.40	0.67	14.7	3.2	9.6
A39	1.42	58%	0.51	0.72	9.0	3.0	7.5
A40	2.15	75%	0.65	0.79	7.8	6.0	13.1
A41	2.25	52%	0.46	0.70	10.5	4.0	10.8
A42	1.48	41%	0.37	0.65	8.9	2.3	7.1
A43	2.48	48%	0.43	0.68	9.8	4.2	11.9
A44	1.90	56%	0.49	0.71	10.7	3.6	9.2
A45	6.05	73%	0.64	0.79	12.4	13.9	30.5
A46	8.92	36%	0.33	0.63	23.2	7.9	26.7
A51	1.38	55%	0.49	0.71	10.6	2.6	6.7
A52	2.36	63%	0.55	0.74	9.7	5.1	12.4
A53A	2.99	75%	0.65	0.79	11.2	7.3	15.9
A53	1.75	8%	0.10	0.51	14.7	0.6	5.4
A54A	1.01	52%	0.46	0.69	8.4	1.9	5.3
A54	1.35	68%	0.59	0.76	6.4	3.7	8.5
A55	0.88	76%	0.65	0.79	5.4	2.8	6.1
A56	1.04	53%	0.47	0.70	9.5	2.0	5.2
A57	1.49	51%	0.45	0.69	10.4	2.6	7.1
A58	0.67	75%	0.65	0.79	5.7	2.1	4.5
A59	2.61	49%	0.44	0.69	9.2	4.6	13.0
A60	1.25	61%	0.54	0.73	10.8	2.6	6.3
A61	1.00	44%	0.39	0.66	7.0	1.7	5.3
A62	1.94	61%	0.54	0.73	11.3	3.9	9.5
A63	2.63	63%	0.55	0.74	13.0	5.1	12.3
A64	1.68	52%	0.46	0.70	8.7	3.2	8.7
A65	2.17	69%	0.60	0.76	10.3	5.1	11.5
A66	2.54	65%	0.56	0.75	8.8	5.9	14.1
A67	1.22	77%	0.66	0.80	7.3	3.6	7.7
A68	0.74	74%	0.64	0.79	6.2	2.2	4.8
A69	1.95	43%	0.39	0.66	12.2	2.8	8.4
A70	2.04	62%	0.54	0.74	6.5	5.0	12.3
A71	0.51	83%	0.71	0.82	5.0	1.8	3.7
R1	0.75	90%	0.77	0.85	5.1	2.9	5.6
R2	1.87	71%	0.62	0.77	7.0	5.2	11.6
R3	3.74	81%	0.70	0.81	6.4	12.1	25.1
R4	0.44	75%	0.65	0.79	6.2	1.4	2.9
R5	0.36	75%	0.65	0.79	6.2	1.1	2.3
R6	2.90	51%	0.45	0.69	10.7	5.0	13.7
R7	0.55	73%	0.64	0.78	5.0	1.7	3.8
R8	0.28	61%	0.53	0.73	8.2	0.6	1.6
R9	9.78	85%	0.73	0.83	6.7	32.6	66.1
R10	1.10	53%	0.47	0.70	12.2	1.9	5.0
R11	2.18	10%	0.12	0.52	13.9	0.9	7.0
R12	3.36	30%	0.28	0.61	14.1	3.2	12.4
R13	2.33	30%	0.28	0.61	9.1	2.7	10.4
R14	2.55	35%	0.32	0.63	7.9	3.5	12.3
R15	1.34	53%	0.47	0.70	6.0	3.0	7.9
R16	0.28	59%	0.52	0.73	6.7	0.7	1.6
R17	1.00	51%	0.45	0.69	7.0	2.0	5.5
R18	0.87	68%	0.59	0.76	7.5	2.2	5.2
R19	0.63	81%	0.70	0.81	6.4	2.0	4.2
F1	6.05	42%	0.38	0.65	12.1	8.3	25.7
F2	5.03	53%	0.47	0.70	11.8	8.7	23.2
F3	8.14	75%	0.65	0.79	7.6	23.1	50.1
F4	5.58	66%	0.58	0.75	13.3	11.3	26.3
F5	7.54	75%	0.65	0.79	9.0	20.1	43.6



PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
1/7/21
SHEET 1 OF 7

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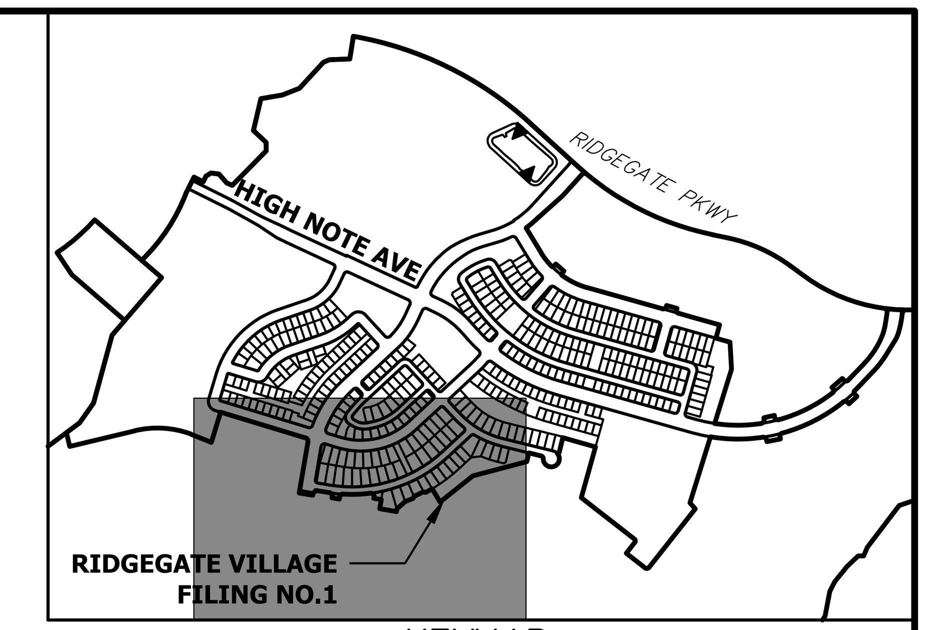
RIDEGATE FILING 1 DEVELOPMENT

PHASE III DRAINAGE REPORT



KEYMAP
SCALE: 1"=1000'

NOTE:
ALL PIPES ARE 18" UNLESS OTHERWISE NOTED.

80 40 0 80 160
ORIGINAL SCALE: 1" = 80'

LEGEND:

PROPOSED STORM SEWER
6000 PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
6000 EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
DRAINAGE BASIN
A = BASIN DESIGNATION
B = AREA IN ACRES
C = 5-YR RUNOFF COEFFICIENT
DESIGN POINT
HP HIGH POINT
LP LOW POINT
DRAINAGE ARROW
EXISTING DRAINAGE ARROW
PROPOSED DRAINAGE SWALE

PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
12/2/20
SHEET 2 OF 7

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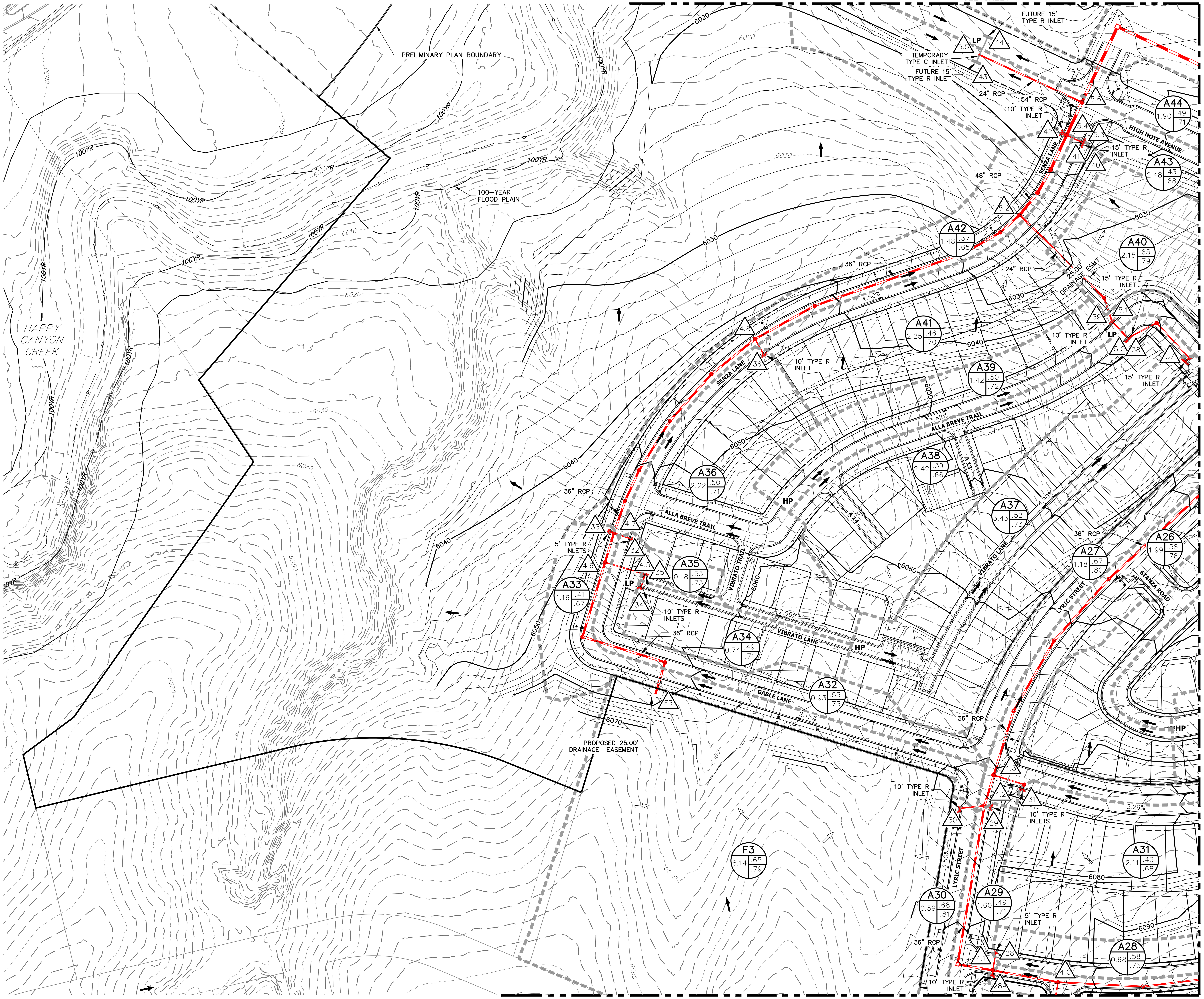
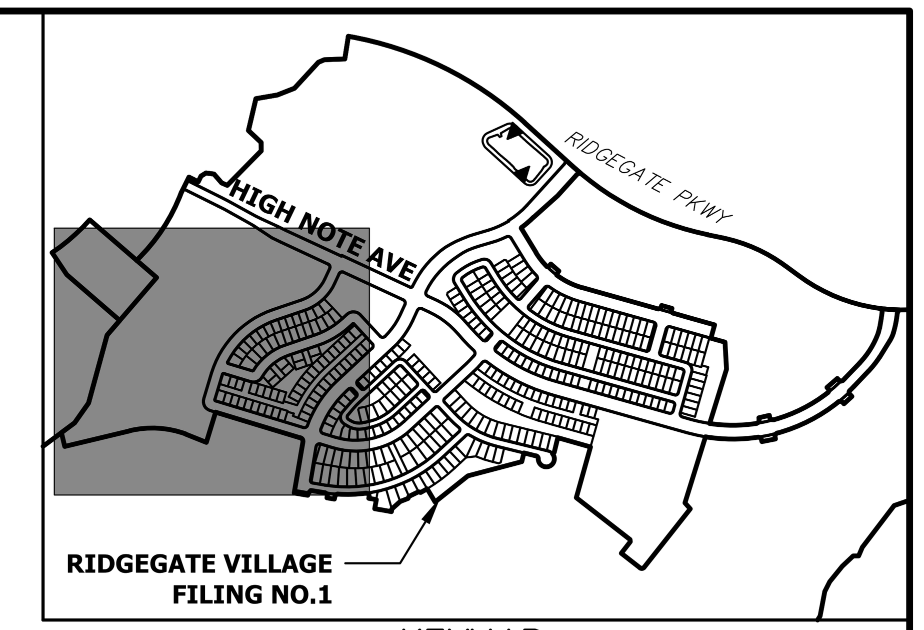
RIDGEGATE FILING 1 DEVELOPMENT

PHASE III DRAINAGE REPORT





KEYMAP

SCALE: 1"=1000'

NOTE:
ALL PIPES ARE 18" UNLESS OTHERWISE NOTED.

80 40 0 80 160

ORIGINAL SCALE: 1" = 80'

LEGEND:

- PROPOSED STORM SEWER
- 6000 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 6000 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A B C D: A = BASIN DESIGNATION, B = AREA IN ACRES, C = 5-YR RUNOFF COEFFICIENT
- 1 DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- PROPOSED DRAINAGE SWALE

PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
12/2/20
SHEET 3 OF 7

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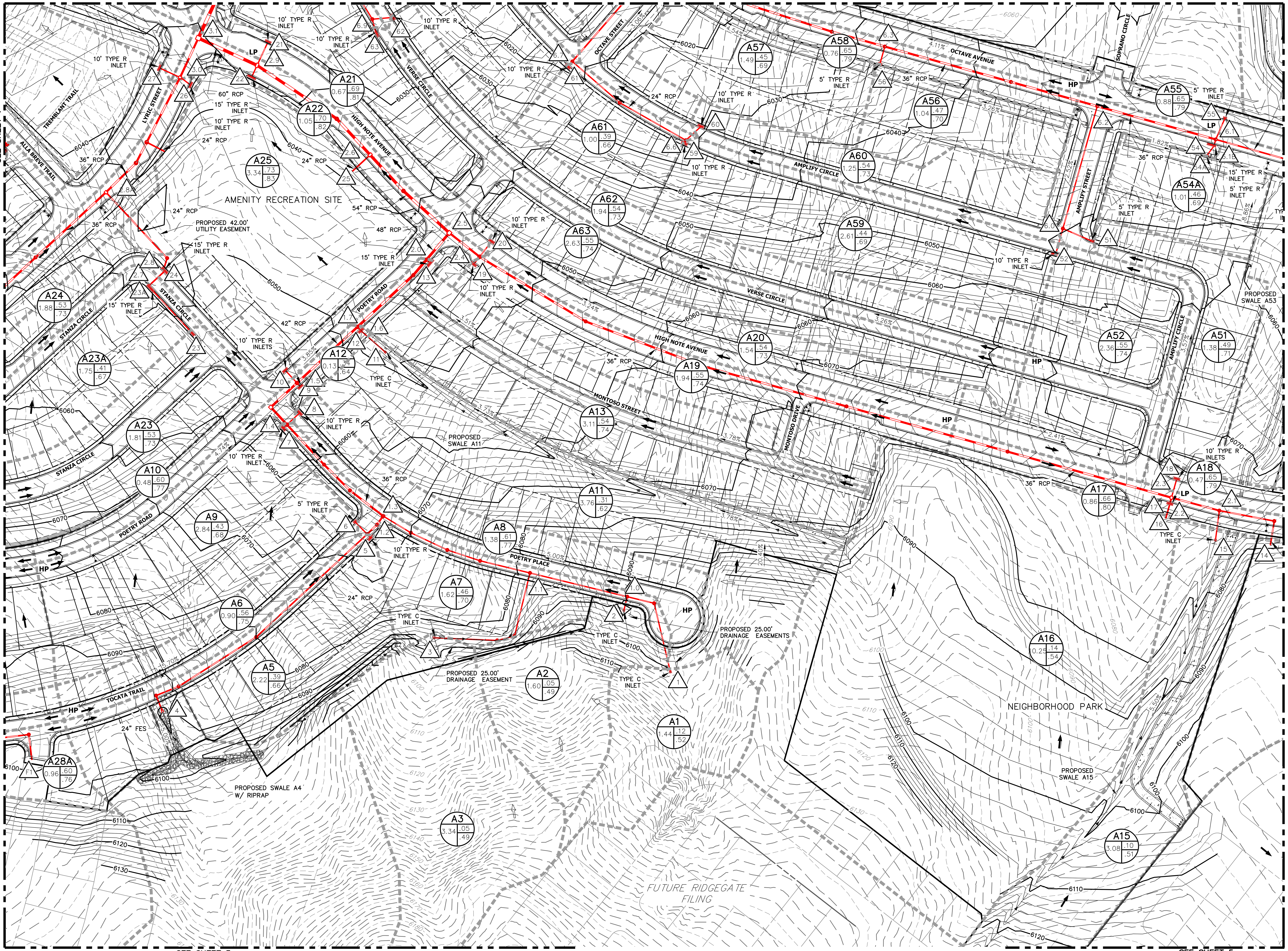
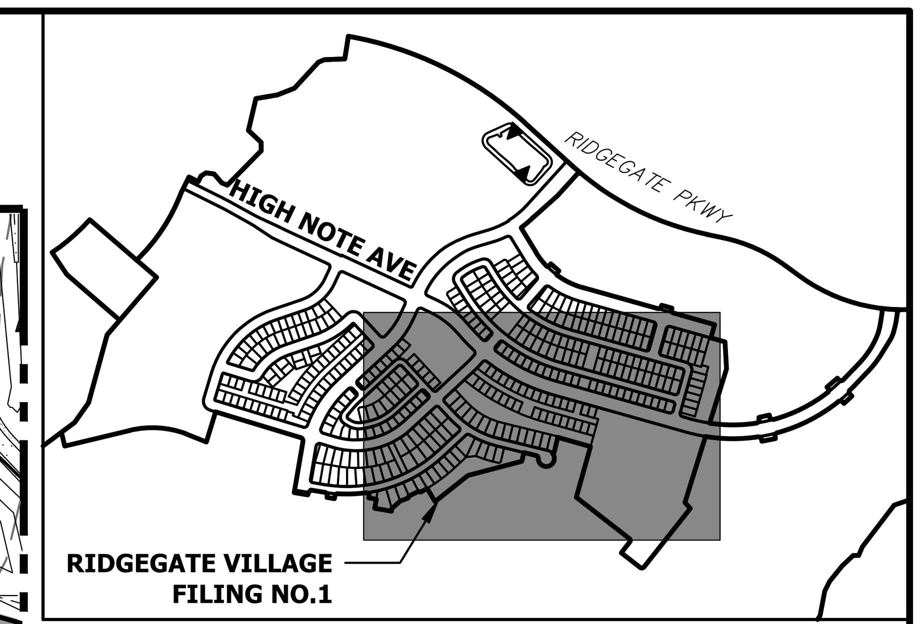
RIDGEGATE FILING 1 DEVELOPMENT

PHASE III DRAINAGE REPORT





KEYMAP

SCALE: 1"=1000'

NOTE:
ALL PIPES ARE 18" UNLESS OTHERWISE NOTED.

80 40 0 80 160

ORIGINAL SCALE: 1" = 80'

LEGEND:

- PROPOSED STORM SEWER
- 6000 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 6000 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION
- B = AREA IN ACRES
- C = 5-YR RUNOFF COEFFICIENT
- DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- PROPOSED DRAINAGE SWALE

PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
12/2/20
SHEET 4 OF 7

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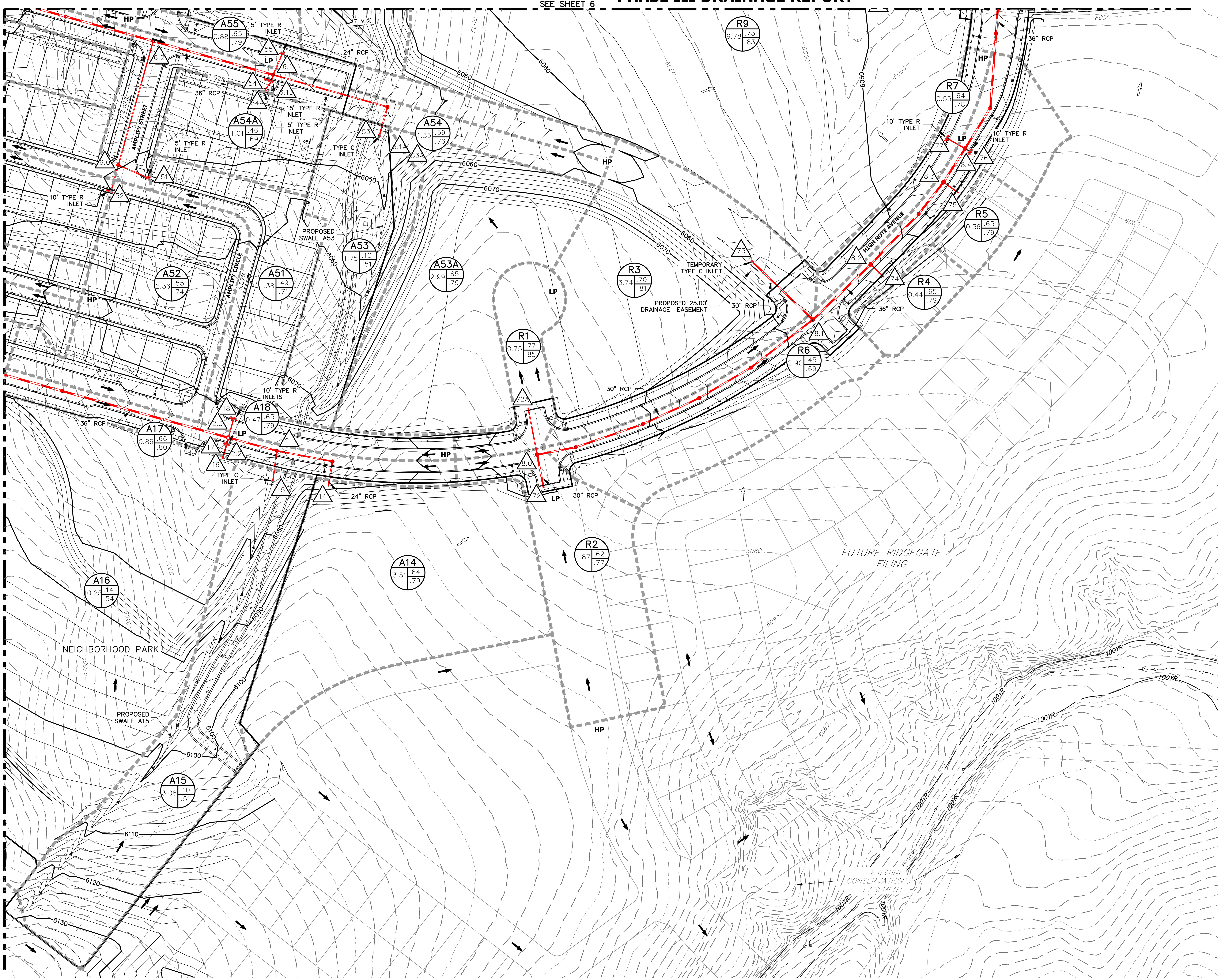
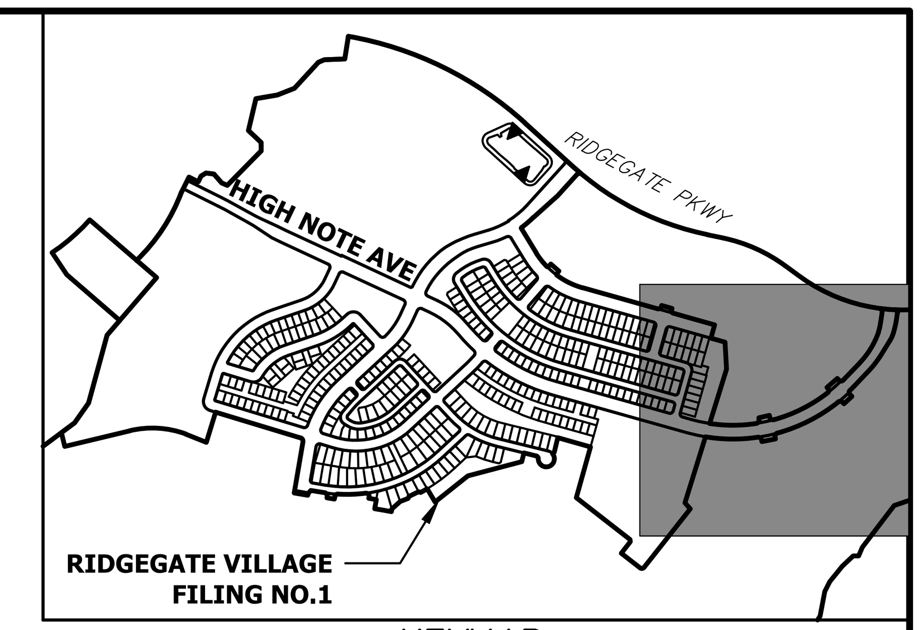
RIDEGATE FILING 1 DEVELOPMENT
PHASE III DRAINAGE REPORT





KEYMAP
SCALE: 1"=1000'

NOTE:
ALL PIPES ARE 18" UNLESS OTHERWISE NOTED.

80 40 0 80 160
ORIGINAL SCALE: 1" = 80'

LEGEND:

PROPOSED STORM SEWER
6000 PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
6000 EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
DRAINAGE BASIN
A = BASIN DESIGNATION
B = AREA IN ACRES
C = 5-YR RUNOFF COEFFICIENT
DESIGN POINT
HP HIGH POINT
LP LOW POINT
DRAINAGE ARROW
EXISTING DRAINAGE ARROW
PROPOSED DRAINAGE SWALE

PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
12/2/20
SHEET 5 OF 7

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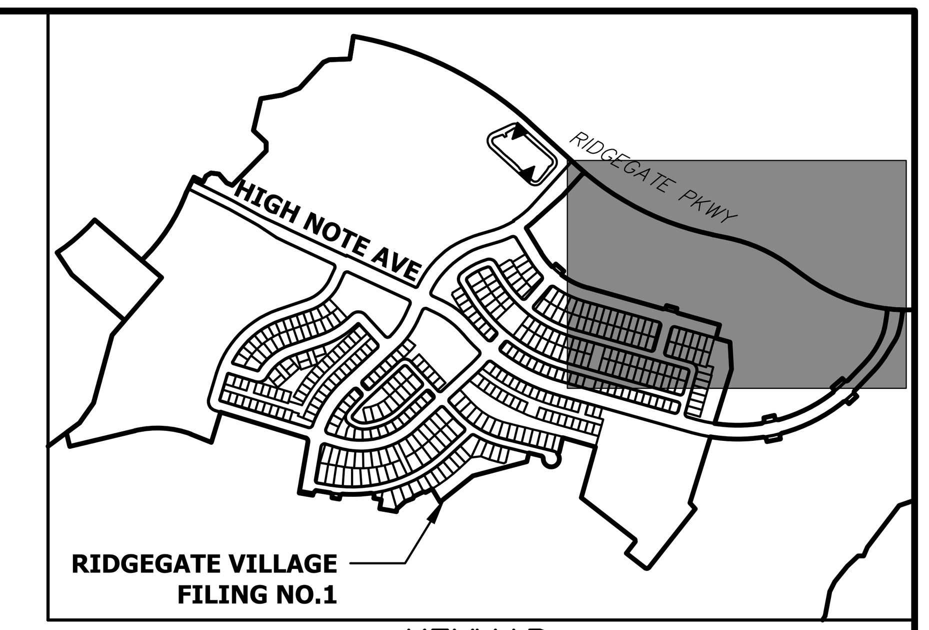
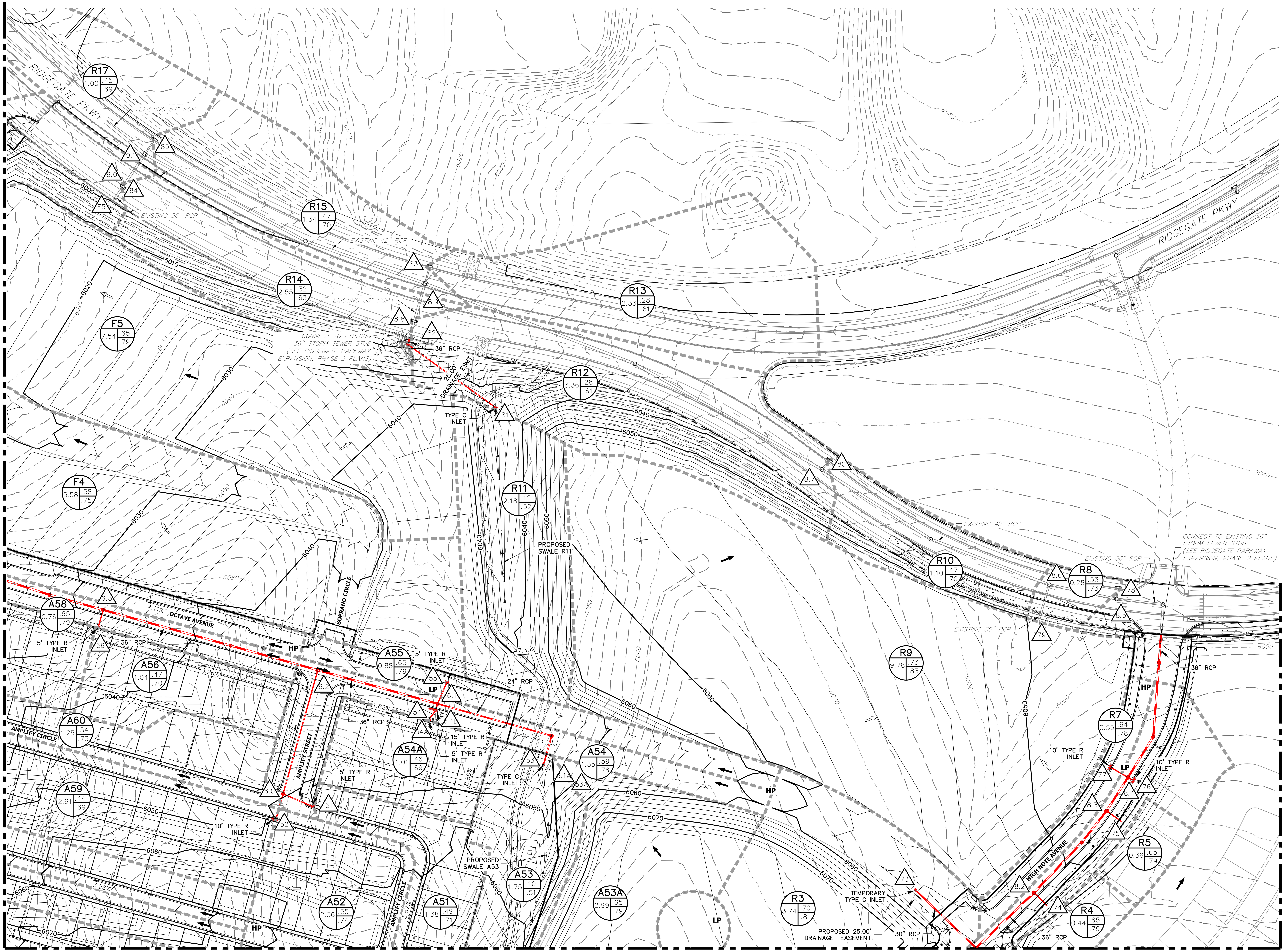
RIDEGATE FILING 1 DEVELOPMENT

PHASE III DRAINAGE REPORT



KEYMAP
SCALE:1"=1000'



NOTE:
ALL PIPES ARE 18" UNLESS OTHERWISE NOTED.

80 40 0 80 160
ORIGINAL SCALE: 1" = 80'

LEGEND:

- PROPOSED STORM SEWER
- 6000 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 6000 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION; B = AREA IN ACRES; C = 5-YR RUNOFF COEFFICIENT
- DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- PROPOSED DRAINAGE SWALE

PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
JOB NO. 15950.01
12/2/20
SHEET 6 OF 7

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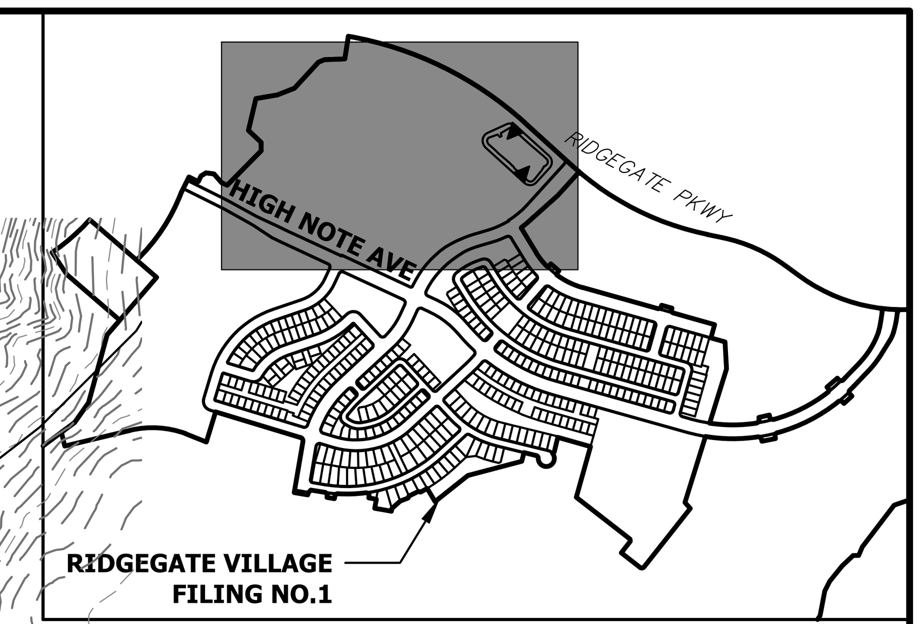
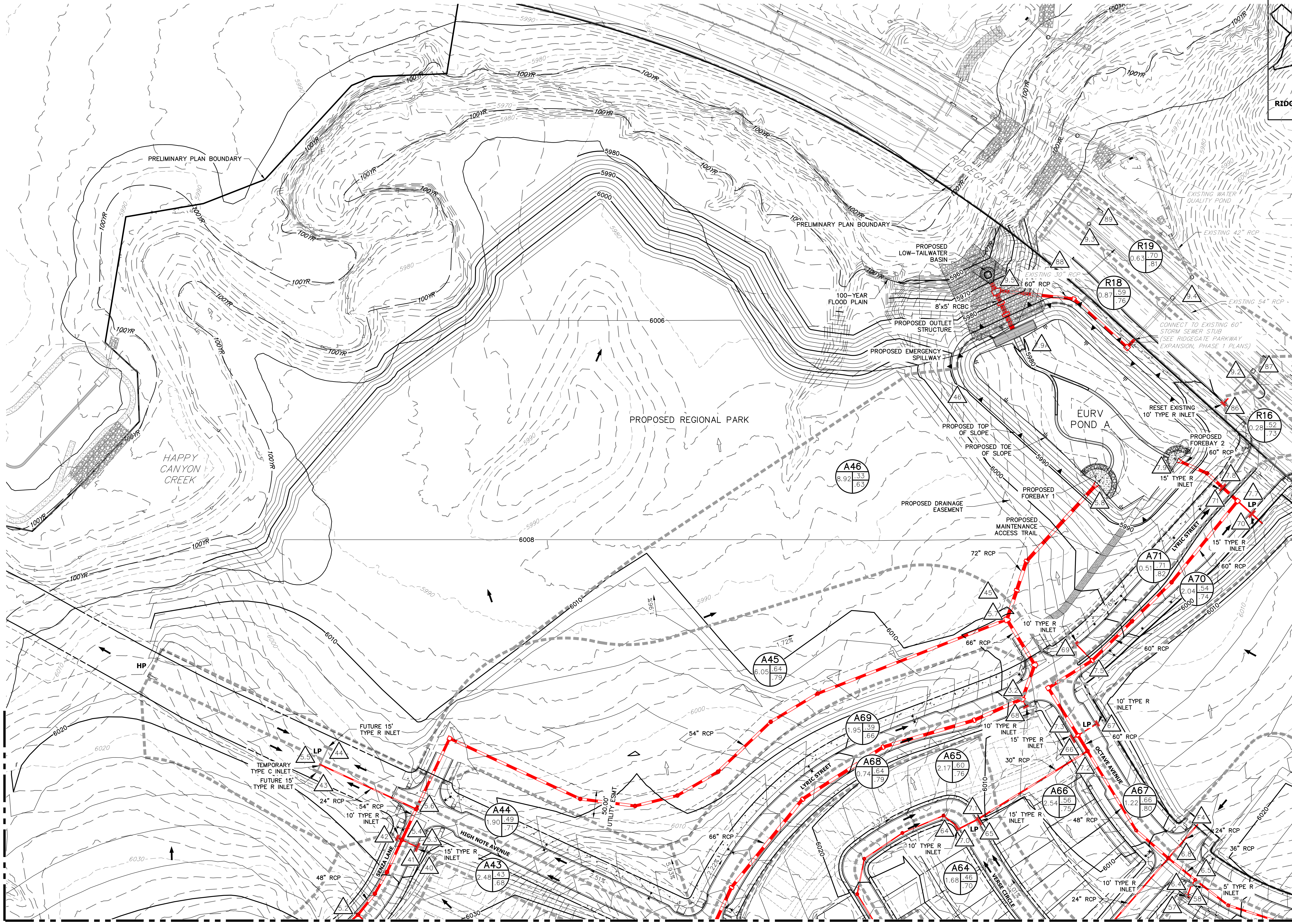
RIDGEGATE FILING 1 DEVELOPMENT

PHASE III DRAINAGE REPORT



KEYMAP
SCALE: 1"=1000'



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PHASE III DRAINAGE MAP
RIDGEGATE DEVELOPMENT
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SHEET 7 OF 7

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