



MDDP & DBPS AMENDMENT

BENT GRASS DEVELOPMENT

El Paso County, Colorado

PREPARED FOR:
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Colorado Springs, CO 80920

PREPARED BY:
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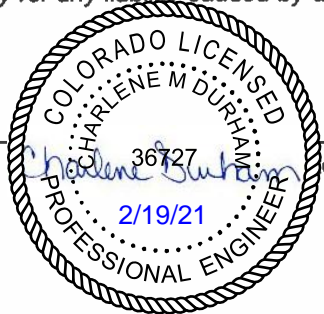
PUDSP-20-005



ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

Charlene Durham, P.E. #36727
For and on behalf of Galloway & Company, Inc.



DEVELOPER'S CERTIFICATION

I, The developer, have read and will comply with all of the requirements specified in this drainage report and plan.

By: _____

2/19/21

Date

Address: Challenger Homes
8605 Explorer Dr., Suite 250
Colorado Springs, CO 80920

By: _____

2/19/21

Date

Address: Better Land LLC
8605 Explorer Dr., Suite 250
Colorado Springs, CO 80920

EL PASO COUNTY CERTIFICATION

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Irvine, P.E.
County Engineer/ECM Administrator

Date

Conditions:

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I. Purpose

This document is to serve as an amendment to the previously approved Master Development Drainage Plan (MDDP) for Bent Grass Meadows, submitted in 2019, and to the Falcon Drainage Basin Planning Study (DBPS). The changes to the MDDP include the analysis of the flow from Meadows Filing 3 subdivision, which is now routed to the east and through the Middle Tributary of the Falcon Basin, as opposed to the West Tributary as previously studied. Drainage calculations, including an update to the HEC-HMS from the approved DBPS has been included as a portion of this report.

II. General Description

The site is located in the Northwest $\frac{1}{4}$ and Southwest $\frac{1}{4}$ of Section 1, Township 13S, Range 65W, of the Sixth Principal Meridian, County of El Paso, State of Colorado. This report will incorporate the improvements previously approved with Bent Grass Residential Filing No. 2 FDR, the Meridian Road/Bent Grass Meadows FDR, and the proposed development known as Bent Grass West. A Vicinity Map is included in Appendix A.

The existing soil type within the proposed site as determined by the NRCS Web Soil Survey for El Paso County Area consists of Columbine gravelly sandy loam which is defined as having a hydrologic soil group A. See the soils map included in Appendix A.

III. Previous Reports

The proposed site has been included in multiple drainage studies in the past. The following is a composite list of the existing reports pertaining to this site and adjacent sites.

1. *Falcon Drainage Basin Planning Study*, by Matrix Design Group, September 2015.
2. *Master Development Drainage Plan and Preliminary Drainage Plan – Bent Grass Subdivision*, by Kiowa Engineering Corporation, December 2006.
3. *Final Drainage and Erosion Control for The Meadows Filing 3 Subdivision*, by LADD Engineering, July 2000.
4. *Final Drainage Report for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2014.
5. *Final Drainage Report Addendum for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2015.
6. *Final Drainage Report for Bent Grass Residential Filing No. 2*, by Galloway & Company, April 2020.
7. *Meridian Road & Bent Grass Meadows Drive*, by Galloway & Company, September 2020.
8. *Preliminary Drainage Report Falcon Meadows at Bent Grass*, by Galloway & Company, December 2020.

IV. Drainage Criteria

Hydrology calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014.

The drainage calculations were based on the criteria manual Figure 6-5 and IDF equations to determine the intensity and are listed in Table 1 below.

Table 1 - Precipitation Data

Return Period	One Hour Depth (in).	Intensity (in/hr)
5-year	1.50	5.17
100-year	2.52	8.68

The rational method was used to calculate peak flows as the tributary areas are less than 100 acres. The rational method has been proven to be accurate for basins of this size and is based on the following formula:

$$Q = CIA$$

Where:

Q = Peak Discharge (cfs)

C = Runoff Coefficient

I = Runoff intensity (inches/hour)

A = Drainage area (acres)

The runoff coefficients are calculated based on land use, percent imperviousness, and design storm for each basin, as shown in the drainage criteria manual (Table 6-6). Composite percent impervious and C values were calculated using the residential, streets, roofs, and lawns coefficients found in Table 6-6 of the manual.

The 100-year event was used as the major storm event and the 5-year event was used as the minor event.

For the analysis of the existing channel adjacent to Meridian Road and the preliminary design of the proposed channel, Bentley Flowmaster was utilized. Flowmaster was used to evaluate velocity, Froude number, and channel depth. A Manning's n value of 0.035 was utilized for the channel which is appropriate for the existing native grass that comprises the channel section. The proposed channel was designed to have a maximum depth of 5' per the criteria manual and have a maximum velocity of 5 ft/s with a maximum Froude number of 0.6.

The West Tributary channel will be designed to meet the following criteria, maximum depth of 5' per the criteria manual and have a maximum velocity of 5 ft/s with a maximum Froude number of 0.9. The West Tributary channel is comprised of channel reaches RWT202, RWT204 and RWT210 in the HEC-HMS models. A preliminary HEC-RAS analysis has been done for the channel. Per the DBPS, reaches RWT202 and RWT204 will require small drop structures, while Reach RWT210 is a natural channel design. If RWT210 cannot meet the design requirements, small grade control structures may be used to reach those requirements.

V. Current Drainage Conditions

A historic/existing conditions drainage map has been prepared for this area to analyze the area prior to any of the new Bent Grass residential development. This scenario resembles the existing conditions shown in the previous FDR for Bent Grass Residential Filing No. 2. Hydrology calculations for this scenario have been provided in Appendix B.

A Current Conditions drainage basin map has also been provided. This scenario includes the development of Bent Grass residential Filing No. 2. Hydrology Calculations for this scenario have been provided in Appendix B. This was also provided as the existing conditions map and calculations in the Bent Grass West PDR.

Individual basin descriptions have not been included here, as they have been addressed in previously stated reports. General overall descriptions of the drainage patterns have been provided.

The Bent Grass development will impact the West Tributary and the Middle Tributary of the Falcon Basin. All development from the west side of Bent Grass Residential Filing No. 1 and west will be contained within the West Tributary. Everything east of that property line, including the Bent Grass Meadows/Meridian Road intersection, will impact the Middle Tributary.

MIDDLE TRIBUTARY

The Middle Tributary drainage begins at Design Point 30.

Design Point 30 (225.0 AC, $Q_5 = 2.1$ cfs, $Q_{100} = 63.5$ cfs): is the release rate of the existing Meadows Pond #3, located in Meadows Filing No. 3, just north of Woodmen Hills Drive. The flows are based on the revised HEC-HMS (Current and Future Models), which is located in Appendix B. Flows will cross under Woodmen Hills Drive via an existing culvert, then sheet flow to the southeast, passing through Basin OS-25 to DP 31. The DBPS by Matrix had 160 cfs at this location under the "Do Nothing Analysis" and 99 cfs under the "Regional" and "Sub-Regional" design alternatives. Minor flows were not provided in the report. The flows are lower in the current HEC-HMS report, as more accurate design data and as-built information for the existing Meadows Pond 2 was utilized in the pond stage/storage and storage/discharge tables.

Design Point 30 will combine with offsite basins OS-25 & OS-26, until they reach an existing sedimentation pond at DP-32, located north of Bent Grass Meadows Drive, on what's referred to as the "school" site. The current configuration of the pond has release rates of 2.1 and 63.5 cfs for the 5 and 100-year storm events, under the Current HEC HMS model. These flows will continue south to Bent Grass Meadows Drive. Curb and gutter in the roadway is able to handle 7.4 and 33.2 cfs in the minor and major storms. It is assumed that the max gutter flow will continue to the east and any remaining flow, of 30.3 cfs, will be directed to the south through the Bent Grass Filing No. 1 development. Flow will travel through curb and gutter and existing storm systems within Bent Grass Filing No. 1, ultimately out falling to Bent Grass Pond 1. Based on the local street section and slopes, flows were routed through the development based on overtopping and flows splitting at intersections. The routing of the storm flow can be found in Appendix B, under Surface Routing.

The existing detention pond, Pond 1 Bent Grass Filing No. 1, was analyzed with the additional flow and contributing area. From the FDR for Bent Grass Residential, Pond 1 had a 5-year release rate of 0.4 cfs and a 100-year release rate of 6.8 cfs. The 100-year water surface elevation was 6937.61. With the additional flow being re-routed to Pond 1, the current release rates for Pond 1 are 0.5 cfs for the 5-year event and 22.0 cfs for the 100-year event. The pond will have a 100-year water surface elevation of 6938.08. The spillway elevation for the pond is 6939.61.

Flows in Bent Grass Meadows will continue east, on the north side of the roadway, where they will combine with offsite flows from BG 50 (5-year flow is 280 cfs, 100-year flow=850 cfs), which is the flow obtained from the Falcon DBPS. There are 3 existing 45" x 29" elliptical rcp's. For the current condition, the approved FDR for Meridian Road is allowing 2 additional elliptical rcp's, which will handle the flow

from Bent Grass Meadows at Design Point 15n (5-year flow = 13.4 cfs, 100-year flow=62.2 cfs). Design Point 20 (5-year flow=304.8, 100-year flow=961.8 cfs) combines the roadside flow from offsite with the flow from Bent Grass Meadows Drive. Flows will then continue south in a roadside ditch along Meridian Road, on the west side. The Meridian Road ditch also captures flows from the Bent Grass East Commercial developments. Existing water quality facilities intercept the runoff and treat it, prior to being released into the ditch. Flows will eventually be intercepted by a set of existing twin 36" cmp's at Owl Place, at Design Point BG 25 (Q100=837.4, Q5=256.3 cfs). From the Meridian Road/Bent Grass Meadows FDR, it is shown that the existing culverts at Bent Grass Meadows Drive and Owl Place and the channel connecting the culverts are undersized and will need to be improved in the future to properly convey the flows outlined in the DBPS. Flow will continue through an existing channel and release into Pond SR-4.

The "school site" and areas north of it (Rational Basins OS-25 & OS-26), are now referred to as Basin MT060a in the HEC HMS model. MT060a is 19.8 acres and generates 8.3 cfs for the 5-year event and 28.3 cfs for the 100-year event. These flows are directed to an existing "sediment pond" which is referred to as the "School Pond". This area is a localized low area which holds flows and releases them through an existing spillway. This "pond" has been included in the "Current HEC_HMS model". Basin MT060-N is the area east of MT060a and north of Bent Grass Meadows Drive. MT060-N is 28.2 acres and flows towards the east to Meridian Road. MT060-N generates 17.6 cfs for the 5-year storm and 59.6 cfs for the 100-year storm. MT060-S is 70.9 acres and is south of Bent Grass Meadows Drive, It encompasses the remainder of the original DBPS MT060 basin and flows through an existing channel to the south. MT060-S generates 37.8 cfs for the 5-year storm and 125.7 cfs for the 100-year storm. These flows are released directly into Pond SR-4.

WEST TRIBUTARY

For the West Tributary of Falcon Basin, the hydrology analysis has the Bent Grass Residential Filing No. 2 as being constructed, as it is currently under construction. The basins for this development are part of the hydrology calculations which are provided in Appendix B, but a complete description of each of these basins has not been provided, as they can be referenced in the approved FDR for Bent Grass Residential Filing No. 2. With this development, there were 2 water quality ponds built, which release into the West Tributary channel. The offsite basins have also been discussed in the Bent Grass Filing No. 2 FDR.

The currently undeveloped portion of the Bent Grass site, referred to as Bent Grass West, is comprised of 8 undeveloped basins. Below is a brief description of them.

Basin EX-1 (1.19 AC, $Q_5 = 0.4$ cfs, $Q_{100} = 2.5$ cfs): is associated with the northeastern portion of the Bent Grass West site east of the existing channel. The basin is currently undeveloped. Runoff from the basin generally flows to the southwest, into Basin EX-2 at **DP 10**.

Basin EX-2 (1.56 AC, $Q_5 = 0.5$ cfs, $Q_{100} = 3.7$ cfs): is along the eastern boundary portion of the proposed site and is south of Basin EX-1, east of the existing channel. The basin is currently undeveloped and receives flows from Basins OS-4 & OS-5. Runoff from the basin generally flows to the southeast into Basin EX-3 at **DP 14** combined with flows from **DP 11 & 12**.

Basin EX-3 (0.62 AC, $Q_5 = 0.2$ cfs, $Q_{100} = 1.5$ cfs): is along the eastern boundary of the proposed site south of Basin EX-2 and east of the existing channel. The basin currently contains an existing WQCV pond created as part of Bent Grass Residential Filing No. 2. This basin receives flows from **DP 14** and **DP 8**.

Basin EX-4 (12.49 AC, $Q_5 = 3.7$ cfs, $Q_{100} = 25.1$ cfs): is located along the northern boundary, just south of the swale built with Bent Grass Meadows Drive and west of the existing channel. The basin is currently undeveloped. Runoff from the basin generally flows to the south onto Bent Grass Meadows Drive at **DP 6**. From there, it flows via curb & gutter to the east into an existing sump inlet, ultimately discharging into the existing WQCV pond located in Basin EX-3.

Basin EX-5 (5.15 AC, $Q_5 = 1.6$ cfs, $Q_{100} = 10.6$ cfs): is west of Basin EX-4 and north of Bent Grass Meadows Drive. The basin is currently undeveloped. Runoff from the basin generally flows to the south onto Bent Grass Meadows Drive at **DP 7**. From there, it flows via curb & gutter to the east into an existing sump inlet, ultimately discharging into the existing WQCV pond located in Basin EX-3.

Basin EX-6 (9.53 AC, $Q_5 = 2.7$ cfs, $Q_{100} = 17.8$ cfs): is along the west boundary of the site. The basin is currently undeveloped and receives off-site flows from Basins OS-2 & OS-3. Runoff from the basin generally flows to the south into the existing drainage ditch entering an existing inlet at **DP 22** and flowing under Bent Grass Meadows Drive and discharging into an existing drainage swale in Basin EX-8.

Basin EX-7 (9.16 AC, $Q_5 = 2.8$ cfs, $Q_{100} = 18.9$ cfs): is north & west of Bent Grass Meadows Drive, between Basins EX-5 & EX-6. The basin is currently undeveloped. Runoff from the basin generally flows to the southeast into Bent Grass Meadows Drive at **DP 21**. From there, it flows via curb & gutter to the south into an existing sump inlet, ultimately discharging into the existing sediment pond located in Basin EX-8.

Basin EX-8 (21.3 AC, $Q_5 = 6.6$ cfs, $Q_{100} = 43.9$ cfs): is a portion of the site south and east of Bent Grass Meadows Drive, north of the south property line and west of Bent Grass Filing No. 2. The basin is currently undeveloped and contains two drainage ditches, a sediment pond, and a portion of the creek associated with Basin WT200 from the Falcon DBPS. Runoff from the basin generally flows to the southeast into the existing channel.

Overall flows exiting the Bent Grass Site at **DP CC** are 278.3 cfs for the minor storm and 1224.7 cfs for the major storm. These flows were determined using the rational method through the Falcon Meadows site combined with DBPS flows entering the site from basin WT200 which include channel reaches RWT202 & RWT204. The entirety of the Falcon Meadows property is considered to be undeveloped in the Current Models (HMS and Rational). Flows exiting the site are a mix of DBPS and rational flows. The flow will continue south through an existing leg of the West Tributary channel of the Falcon Basin.

The HEC-HMS model was revised to include Falcon Meadows as a separate basin, as requested by El Paso County Staff. Refer to the Revised SCS Basin Hydrology Map in Appendix B, which accompanies the HMS model. To accomplish this, revisions were made to Basins WT200, WT210 & WT220 in the West Tributary and to Basins MT060 and MT070 in the Middle Tributary. Middle Tributary is discussed in the previous section. The portion of Basin WT-200, north of Falcon Meadows, has been divided into two basins, WT200-N and WT200-W. WT200-N accounts for the area west of channel reach RWT204. WT200-W accounts for the portion of WT200 east of RWT204. This basin also includes a portion of what had originally been in Basin MT-070, in the middle tributary. Due to development and grading changes in the area, this additional area has been rerouted into the West Tributary of the Falcon Basin. The revised HEC-HMS models account for this increased area.

A new basin, Basin BG was created in the HMS model to represent Falcon Meadows. This basin includes small portions of each of the original basins WT200, WT210 and WT220. The area of the new basin is 117.9 acres. Basins WT200, WT210 and WT220 were updated accordingly see below for additional information. The flow from basin BG is 89.9 cfs for the 5-year storm and 255.6 cfs for the 100-year storm.

This flow will combine with the upstream flows (basins north of Falcon Meadows) and exit Falcon Meadows at **DP CC**. The corresponding flows at **DP CC** from the revised HMS model in this report are 186.2 cfs for the 5-year storm and 1044.6 cfs for the 100-year storm. The DBPS model did not have a corresponding design point to this location.

Remaining portions of two basins (WT210 and WT220, as shown in the DBPS) were assigned new basin designations. Basin WT210 is located on the west side of the channel. Basin WT220 is located south of Falcon Meadows, on the east side of the channel. These basins were revised in the HEC-HMS model. A portion of each of these basins has been moved into the BG basin, which represents Falcon Meadows. WT210 was divided into 2 basins, WT210-N, which accounts for the portion of the original WT210 that is west of Falcon Meadows and WT210-S represents the portion of the original basin south of Falcon Meadows. Basin WT220-S, represents the portion of the original WT220 basin which was not included in the BG basin. Refer to the Revised SCS Basin Hydrology Map in Appendix B for reconfiguration of the basins.

Basin WT210-N contains 47.5 acres and will continue to flow to the southeast. Flows for the basin are 24.9 cfs and 77.5 cfs for the minor and major events. Basin WT210-S contains 74.9 acres and flows generated from this basin are 57.9 and 173.3 cfs for the minor and major storm events. Basin WT220-S is 75.7 acres. Flows generated by this basin area 61.6 cfs and 178.8 cfs for the minor and major storm events. WT210-S and WT220-S combine in the existing channel, flowing south to design point **JWT210** which is located at Woodmen Road. Revised flows at this location, based on the HMS model, are 189.8 cfs for the 5-year storm and 1054.7 cfs for the 100-year storm. DBPS flows at this location were 50 cfs and 950 cfs under existing conditions. The HMS model increase in flow, as compared to the DBPS flows, is caused by increases in area for WT200-W (WT200-W was increased as required by El Paso County Staff)(also, see Revised Basin Hydrology exhibit in Appendix B).

VI. Four Step Process

The Four Step Process is used to minimize the adverse impacts of urbanization and is a vital component of developing a balanced, sustainable project. Below identifies the approach to the four-step process:

1. Employ Runoff Reduction Practices

The proposed development uses Low Impact Development (LID) practices to reduce runoff at the source. Generally, rather than creating point discharges that are directly connected to impervious areas, runoff is routed through pervious areas to promote infiltration. In general, single family developments are good at promoting LID practices. The project site has incorporated open and vegetated areas throughout the area to help disconnect pervious areas. Grass buffers and swales are used where practical, specifically around the property boundary. These items will help in reducing runoff volumes.

2. Stabilize Drainageways

This step implements stabilization to the channel to accommodate developed flows while protecting infrastructure and controlling sediment loading from erosion in the drainageways. Erosion protection in the form of riprap pads at all outfall points to the channel to prevent scouring of the channel from point discharges.

A stability analysis on the existing roadside ditch along Meridian Road was conducted with results shown in Appendix C. From the analysis, it was determined that the existing ditch is not in stable condition with existing DBPS flows. Improvements are anticipated to be made in the future, per

recommendations from the Falcon DBPS, when additional land is obtained to expand the ROW along the southbound portion of Meridian Road.

In the interim condition, it has been proposed to add a temporary lining to the existing channel to handle the excess velocities and depth associated with the DBPS flows and Bent Grass development re-routed flows. This analysis has been included in the Appendix.

The West Tributary Channel will be natural, vegetated facility, helping to ensure that the overall velocities will be reduced, flow depth will not exceed 5' and minimize any potential for scour. If needed, grade control structures may be designed **as proposed in the DBPS** to ensure these criteria are met.

3. Implement BMPs That Provide a Water Quality Capture Volume with Slow Release

This step utilizes formalized water quality capture volume to slow the release of runoff from the site. The WQCV will release in no less than 40 hours. On-site water quality control volume detention ponds will provide water quality treatment prior to the runoff being released into the channel. WQCV facilities will be designed as Extended Detention Basins.

The Falcon Meadows at Bent Grass development, west of Bent Grass Residential, Filing No. 1 and No. 2, will include several water quality ponds throughout the site to ensure flows will be treated prior to being released into the West Tributary Channel, running through the site. Only a small area, less than 1.0 acres will not be treated prior to releasing into the channel.

Currently, the existing **Meridian Road** roadside ditch, ultimately conveys runoff to the existing detention and water quality pond MN, as shown and discussed in the Falcon DBPS. The Falcon DBPS also shows a future detention and water quality pond SR-4 that is to receive flows from basin MT060 and discharge into basin MT070, ultimately routing to existing Pond MN. Flows from Bent Grass Meadows Drive are listed in basin MT060 but are being routed to the existing roadside ditch along Meridian Road, which is in basin MT070. The flows from the "School Site" and upstream basins will release into the east side of Pond SR-4 (west of Falcon Market Place). Pond SR-4 is currently under construction. The proposed improvements impact on the existing drainage basin and both Pond MN and Pond SR-4 are discussed later in the report.

4. Consider Need for Industrial and Commercial BMPs

Source control BMPs for homeowners include the use of garages as the primary area where pollutants can be stored. The single-family detached homes provide garages which can act as storage areas. The proposed development does not include outdoor storage or the potential for introduction of contaminants to the Counties' MS4, thus no targeted source control BMPs are necessary. The biggest source control BMP is public education and discuss topics such as: pet waste, car washing, lawn care, fall leaves, and snow melt and deicer.

Bent Grass East Commercial Filing No. 1 contains commercial development. This area will need to consider the need for Industrial & Commercial BMPs. No industrial uses or outside storage is proposed for this area. Drainage will be routed through water quality ponds prior to leaving the site to minimize contaminants into the public system.

VII. Future Drainage Conditions

MIDDLE TRIBUTARY

Design Point 30 and Basins OS-25 and OS-26 are as described under Existing Drainage Conditions. However, Basins OS-25 and OS-26 now route through proposed “future” detention pond, on what’s been previously referred to as the “School Site”, north of Bent Grass Meadows Drive and just west of Bent Grass Filing No. 2. This “future” pond will replace the current sedimentation pond on the “School Site”. Upon any additional development within the Middle Tributary area of the Bent Grass Development and north of Bent Grass Meadows Drive, this pond will need to be constructed to accommodate the re-routed flows from the Meadows Pond #2 at DP 30.

This future facility will need to provide 2.76 ac-ft of water quality, 6.26 ac-ft for EURV and 11.98 ac-ft for 100-year storage volume. Preliminary release rates for the 5 and 100-year storms are 3.8 cfs and 32.2 cfs. These flows were then routed to Bent Grass Meadows to the south. With the decrease in flows, flows will not overtop Bent Grass Meadows Drive and continue east to the future box culvert under Bent Grass Meadows Drive at DP BG20 (5-year flow=292.5 cfs, 100-year flow=909.3 cfs). Flows were still checked against street capacity on the north and south side of Bent Grass Meadows Drive, as it continues to the east. With the construction of the future pond, Bent Grass Meadows Drive will be able to adequately handle the flows and no additional storm infrastructure would need to be built to carry these future developed flows. Any area north of Bent Grass Meadows Drive that will develop in the future will need to provide its own on-site detention. Should future development not be able to release flows into Bent Grass Meadows Drive, a 42” RCP would be able to convey the flows of DP BG 15n (Q100=40.9 cfs, Q5=8.8 cfs) to the northwest corner of the Bent Grass Meadows Drive and Meridian Road intersection. Analysis for this culvert sizing has been included in the appendix.

At the Bent Grass Meadows Drive/Meridian Road intersection, the elliptical rcp’s will need to be replaced with a double 16’ x 4’ rcbc. The future roadside ditch will have a 15’ wide bottom channel with 4:1 side slope, 6.5’ deep and a longitudinal slope of 0.30%. This will result in a flow depth of 5.15’ and velocity of 5.04 fps. This channel will direct flows to Owl Place where the existing twin cmp’s will be replaced with a 20’ x 4’ rcbc or equivalent. This structure will need to be built when any development west of Meridian Road at the intersection of Owl Place happens. With future development, it is anticipated that the existing channel conveying flows to the south will be removed to accommodate the new development. The new channel will need to be a 35’ wide bottom channel with 4:1 sides, 5’ deep and a longitudinal slope of 0.30%. This will produce a flow depth of 3.7’ and a velocity of 4.6 fps. If the channel option is not viable, twin 78” rcp’s at a minimum 0.50% slope would be able to handle this future flow. Analysis for this design option has been included in the appendix.

Calculations are provided in Appendix C for the future culverts and roadside channel.

WEST TRIBUTARY

Offsite flows entering the west tributary location of Bent Grass have not changed from what was discussed under Current Conditions. Reach RWT202 at the northwest corner of the development has a 100-year flow of 1000 cfs and Reach RWT204 has a flow of 43 cfs. These were obtained from the DBPS by Matrix. The Flood Insurance Study (FIS) by FEMA does not have flows evaluated this far north. The have a flow of 1482 cfs beginning at RWT210. The 8 undeveloped on-site basins for Bent Grass West have been replaced with 17 developed basins. These basins are found in the Falcon Meadows for Bent Grass PDR. A summary of these basins is provided below and are part of the hydrology analysis provided in Appendix B.

Basin AA-1 (2.57 AC, Q5 = 4.2 cfs, Q100 = 9.9 cfs): a basin that includes residential lots & east half of Lemon Grass Road. It encompasses single-family residential lots. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 4**. Flows will then enter a proposed CDOT Type 'R' inlet and will be piped into the existing Bent Grass Filing No. 2 WQCV pond located in Basin A-2 at **DP 6**.

Basin AA-2 (2.28 AC, Q5 = 4.2 cfs, Q100 = 9.3 cfs): a basin that includes the west half of Lemon Grass Road and encompasses single-family residential lots. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 5**. Flows will then enter a proposed CDOT Type 'R' inlet where it will be piped into the existing Bent Grass Filing No. 2 WQCV pond located in the south end of the basin.

From the existing WQCV in Bent Grass Filing No. 2, flows will be released into the West Tributary Channel, combining with the channel flows at **DP AA**. This design point corresponds to the upstream side of a twin set of box culverts crossing beneath Bent Grass Meadows Drive. Combined flows at this location are 270.3 cfs and 1188.7 cfs for the minor and major storm events. Design of these structures was part of the FDR for Bent Grass Residential Filing No. 1.

Basin B-1 (5.25 AC, Q5 = 2.3 cfs, Q100 = 10.7 cfs): a basin that is in the center of the site and encompasses the existing rerouted channel RWT202 and existing improved channel RWT204, as well as a portion of rear lots. Flows will sheet flow into the existing channel where they will then be conveyed to **DP AA**.

Basin CC-1 (9.07 AC, Q5 = 16.9 cfs, Q100 = 36.0 cfs): a basin that includes Sophia Lane, the west half of Sarin Trail, north portion of Kittrick Place, and encompasses single-family residential lots. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 15**. Flows will then enter a proposed CDOT Type 'R' inlet where it will be piped to the proposed north WQCV pond at **DP 10**.

Basin CC-2 (1.53 AC, Q5 = 4.6 cfs, Q100 = 9.8 cfs): It encompasses single-family residential lots including the east half of Sarin Trail. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 12**. Flows will then enter a proposed CDOT Type 'R' inlet where it will be piped to the proposed north WQCV pond at **DP 10**.

Basin CC-3 (1.88 AC, Q5 = 6.4 cfs, Q100 = 12.1 cfs): It encompasses Kittrick Place between Sarin Trail & Daelyn Drive, as well as single-family residential lots. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to the intersection of Sarin Trail & Kittrick Place. Flows will then continue as gutter to the south in Sarin Trail to **DP 15**. Flows will then enter a proposed CDOT Type 'R' inlet where it will be piped to the proposed north WQCV pond at **DP 10**. Flowby from **DP 15** will continue to the south to Bent Grass Meadows Drive where flows will be intercepted by the existing inlet at **DP 8**. Flows will then enter an existing CDOT Type 'R' inlet on the north side of Bent Grass Meadows Drive, where it will then be released into the existing Filing No. 2 North WQCV Pond.

Basin CC-4 (3.64 AC, Q5 = 6.2 cfs, Q100 = 16.0 cfs): It encompasses residential lots and open space between Sarin Trail & Bent Grass Meadows Drive. Runoff will flow from each lot onto the proposed open space, eventually releasing into the public R.O.W. of Bent Grass Meadows Drive, where existing curb and gutter will convey flows to **DP 8**. Flows will then enter an existing CDOT Type 'R' inlet where it will then be released into the existing Filing No. 2 North WQCV Pond.

Basin CC-5 (0.45 AC, Q5 = 0.2 cfs, Q100 = 1.4 cfs): It encompasses the proposed north WQCV pond area. The stormwater within the proposed north WQCV pond will be released at a controlled rate, via an outlet structure with orifice holes, into the existing channel RWT204.

Basin D-1 (9.07 AC, Q5 = 11.2 cfs, Q100 = 26.6 cfs): a basin along the west property line of the site. It encompasses single-family residential lots, Isabel Place, & west half of Daelyn Drive. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 22**. Flows will then enter a proposed CDOT Type 'R' inlet where it will then be piped and ultimately outfall in the proposed south WQCV pond at **DP 45**.

Basin D-2 (7.42 AC, Q5 = 15.5 cfs, Q100 = 32.2 cfs): a basin east of Basin D-1. It encompasses single-family residential lots, Isabel Place, Raylan Loop, Jolie Court, as well as the east half of Daelyn Drive. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 21**. Flows will then enter a proposed CDOT Type 'R' inlet where it will then be piped and ultimately outfall in the proposed south WQCV pond at **DP 45**.

Basin D-3 (2.03 AC, Q5 = 0.8 cfs, Q100 = 2.3 cfs): a basin that is in the southwest corner of the site, south of Basin D-1. It encompasses the backs of several proposed residential lots as well as proposed Swale D, along the west property line and Swale E (existing) along the south property line. Runoff will flow from basin OS-2 and OS-3 into Swale D and convey flows to the existing drainage swale (Swale E) which will convey flows to an existing area inlet at **DP 23**. This inlet will connect to a propose storm system which will route flows through the development and ultimately outfall at the south WQCV pond at **DP 45**.

Basin D-4 (4.38 AC, Q5 = 7.8 cfs, Q100 = 16.6 cfs): a basin that is east of Bent Grass Meadows Drive. It encompasses single-family residential lots, Rowena Way, & portions of Linley Way, Jayla Trail, and Henzlee Place. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 42**. Flows will then enter a proposed CDOT Type 'R' inlet where it will then be piped and ultimately outfall in the proposed south WQCV pond at **DP 45**.

Basin D-5 (1.08 AC, Q5 = 2.2 cfs, Q100 = 4.6 cfs): a basin that is located at the southwest corner of Bent Grass Meadows Drive and Henzlee Place. It includes residential lots, as well as a portion of the north half of Nico Way and west half of Henzlee Place. Flows will be directed towards the public R.O.W. where proposed curb and gutter will convey flows to the south along Henzlee Place to **DP 43**. Flows will then enter a proposed CDOT Type 'R' inlet where it will then be piped and ultimately outfall in the proposed south WQCV pond at **DP 45**.

Basin D-6 (4.01 AC, Q5 = 8.2 cfs, Q100 = 17.2 cfs): a basin that is south of Basin D-5 & east of Basin D-4. It encompasses single-family residential lots & half of Linley Way, Jayla Trail, Henzlee Place, & Nico Way. Runoff will flow from each lot onto the proposed public R.O.W. where proposed mountable curb and gutter will convey flows to **DP 43**. Flows will then enter a proposed CDOT Type 'R' inlet where it will then be piped and ultimately outfall in the proposed south WQCV pond at **DP 45**.

Basin D-7 (6.39 AC, Q5 = 3.2 cfs, Q100 = 14.8 cfs): a basin that is in the south end of the site, east of Bent Grass Meadows Drive & west of the existing channel. It encompasses the back half of several single-family residential lots as well as proposed south WQCV pond, an existing sediment basin, and an existing drainage ditch. Runoff will flow, via sheet flow, until it enters the existing drainage ditch, Swale F, and is conveyed to the proposed south WQCV pond or will directly flow into the proposed south WQCV pond.

Basin D-8 (1.69 AC, Q5 = 1.3 cfs, Q100 = 4.5 cfs): a basin that is west of the existing channel & south of Bent Grass Meadows Drive. It encompasses the back half of single-family residential lots. Runoff will flow from each lot and discharge into a proposed drainage ditch. The drainage ditch (Swale C) will then convey flows, ultimately discharging into the proposed south WQCV pond at **DP 44**.

Basin B-2 (4.16 AC, Q5 = 1.4 cfs, Q100 = 9.1 cfs): a basin that is in the south area of the site and encompasses the existing channel RWT210. Flows will sheet flow into the existing channel where they will then be conveyed to **DP CC** exiting the site.

Basins E-1 thru E-5 are the same as discussed under the Existing Conditions Section, as these basins represent the already built Bent Grass Meadows Drive through the proposed site.

The Bent Grass West development accounts for 2 additional water quality facilities to be built. These items were preliminarily designed in the Falcon Meadows for Bent Grass PDR and will be final designed with the FDR's for **Falcon Meadows at Bent Grass Meadows Filing No. 1 & No. 2**.

Final flows exiting the site from the West Tributary, based on rational method calculations, at **DP CC** for the future design analysis are 266.2 cfs for the 5-year storm and 1183.4 cfs for the 100-year storm. This includes flows from RWT202, RWT 204 and Basin WT200. These flows are less than the current conditions (Q100=1224.7 cfs, Q5=278.3 cfs) at this location, due to the additional WQ ponds being built and storm infrastructure with the "future" development. This allows for additional flow to be "held back" and longer routing of flows through the site. Flows will continue offsite through the West Tributary, eventually reaching the existing Pond WU. Flows exiting the project site correspond to channel reach RWT210 in the HEC HMS models.

Upon exiting the Falcon Meadows development at **DP CC**, the basin hydrology and routing remains the unchanged from the Current Conditions Section. From the Future HEC-HMS model, which accounts for Basin BG being fully developed, there is a minor flow of 191.9 cfs and a major flow of 1075.3 cfs. These flows are larger than the previous HMS flows (minor 186.2 cfs and major 1,044.6 cfs).

At design point **JWT210**, located at Woodmen Road, HMS flows are 195.7 cfs for the 5-year storm and 1093.7 cfs for the 100-year storm. DBPS flows under future conditions at this location are 250 cfs and 1,300 cfs for the minor and major storm events. The HMS model flows are less than the future (developed) DBPS flows (250 cfs and 1,300 cfs) at this location but are greater than the existing (undeveloped) DBPS flows (50 cfs and 950 cfs).

A future conditions drainage map has been prepared for this area. The proposed map is included in Appendix D.

VIII. Proposed Channel Improvements

MIDDLE TRIBUTARY

Although the existing channel and culverts are undersized and improvements will need to be made in the future, minimal channel improvements are being proposed at this time, along Meridian Road. With the construction of the right turn lane on Bent Grass Meadows Drive, the three RCP culverts will be extended approximately 15' to span the extended width of the roadway. Additionally, two more 45"x29" Elliptical RCP pipes will be installed under Bent Grass Meadows Drive to convey the flows for DP 20. The existing channel will need to be lined with a temporary turf reinforcement mat (TRM) due to the excessive velocities

(9.91 fps), high shear stress (5.11lbs/ft²) & high Froude Number (1.12). With the TRM added to the channel sides, the allowable velocity is 25 fps and permissible shear stress is 12 lbs/ft². An analysis of the channel with the TRM is provided in the Appendix.

In the future, El Paso County will need to improve the existing culverts and channel to adequately convey the flow outlined in the DBPS. These necessary improvements and associated calculations are described further below. A preliminary grading exhibit has been prepared showing these improvements and included in Appendix C.

Similar to the existing channel, Bentley Flowmaster was also used to design the future proposed channel section. The future channel was designed to have a maximum depth of 5' per the criteria manual and have a maximum velocity of 5 ft/s with a maximum Froude number of 0.6. The flow rate used for the design, 925 cfs, was taken from the Falcon DBPS flow combined with the additional off-site drainage coming from the "School Site" and

The future channel section was designed as trapezoidal shape with a 15' bottom width, 4:1 side slope, and 0.3% longitudinal slope. The total depth of the channel will be 6', providing 1' of freeboard for the 5' of water depth. The velocity of the proposed channel is 4.93 ft/s.

The Federal Highway Administration's HY-8 program was also utilized to design the future culverts that will run beneath Bent Grass Meadows Drive. The calculations included in Appendix C show that in order to adequately convey the 915 cfs in the future conditions, two 16'x4' concrete box culverts will need to replace the existing elliptical RCP's. In order to construct the box culverts, the channel will need to be flattened from downstream to create roughly 5' of additional clearance below the road.

WEST TRIBUTARY

The Falcon Area DBPS made recommendations for the channels as they run through the project site. RWT202 was rerouted on the north property line to convey flows to RWT204. Improvements were designed as part of the Bent Grass Residential Filing No. 2 development.

Existing RWT204 is grossly oversized for the actual flows expected through it, with a 5-year flow of 7 cfs and a 100-year flow for 43 cfs from the DBPS study. The future rational calculations have a total flow of 267 cfs for the 5-year flow and 1189 cfs for the 100-year flow at DP AA, the location of the proposed box culvert crossing at Bent Grass Meadows Drive in Reach RWT204. The FEMA flow reported in this section of channel is 1,400 cfs. Improvements to this section of the channel will adhere and be equivalent to the recommendations in the Falcon Basin DBPS.

RWT204 will generally stay in a location similar to where it is in existing conditions but will have new designed channel sections. The channels will have longitudinal slopes flattened to below 1% in order to reduce the scour potential of the channel. Grouted Sloping Boulder Drops may be utilized within the channel as grade controls (maximum height of 4' with 4:1 slope). It is anticipated that 7 grade control structures will be utilized within the channel. This may change when final design of the channel is completed.

RWT210 is the section of the channel south of Bent Grass Meadows Drive and continues south to Woodmen Road. The channel location will shift slightly to the east and "straighten" out the overall flow path. It will be located within a drainage easement. The channel will have a design with a longitudinal slope less than 1.5%, bottom width of 38', and 4:1 side slopes. The Falcon DBPS recommendations for

the channel are to remain as a natural drainage channel. Grade control structures may be utilized within the channel to meet design requirements.

Improvements to the existing channel are outlined in the DBPS. At this time, it is assumed that the DBPS recommended channel improvements will be sufficient to handle the final developed channel flow. At the time of final design of the channel, if it is determined that additional improvements are necessary, they will be designed at that time and will be incorporated into the corresponding Final Drainage Report for the channel improvements. **DBPS report and channel plans currently show approximately 16 rock cross vanes in channel Section RWT210. See Appendix C for location and detail of structures.**

The West Trib Channel (RWT202, RWT204 & RWT210) will be maintained by the Bent Grass Metropolitan District. For channel improvements offsite of the Falcon Meadows at Bent Grass Filing No. 1 and Bent Grass Residential Filing 2 property, specifically south of the development, it is agreed that the developer will be responsible future channel improvements, south of the development, to the existing improvements north of Woodmen Road if the current property owners have not initiated the future improvements themselves. Or the developer will work with the current property owners to reach an agreement on design/construction, costs, and timing of the channel improvements. An agreement and schedule will be in place prior to approval of Falcon Meadows at Bent Grass Filing No. 1. And improvements shall be complete within three years of the recordation of Falcon Meadows at Bent Grass Filing No. 4.

IX. Proposed & Future Hydrology Modeling (HEC-HMS)

The updated Falcon Basin DBPS by Matrix looked at several design alternatives for the area to help with undersized ponds throughout the area. The preferred method for dealing with this deficiency was the design and construction of sub-regional ponds throughout the area. The Bent Grass development site impacts one of these ponds, SR4.

The HEC-HMS model, which was used in the Falcon DBPS, was updated. Updates to the model included:

- Meadows Pond #2 stage/storage & stage/elevation data based on stage/storage data in DBPS
- Adding in existing sedimentation pond at "school site" location
- Breaking up Basin MT060 into 3 basins (MT060a, MT060-N & MT060-W) to account "school site" pond
- Updated Pond SR4 based on approved construction drawing information
- Basin MT070 updated to show future improvements within the basin
- **Falcon Meadows at Bent Grass turned into a new basin by itself. Undeveloped in Current model & developed in Future Model**
- **Basins WT200, WT210 revised due to addition of Basin BG**

As previously mentioned, the DBPS identified a pond named SR3 at the junction of RWT202 and RWT204 near the south end of the Bent Grass Residential Subdivision. Per the approved FDR for Bent Grass Filing No. 2 and the PDR for Falcon Meadows at Bent Grass, 4 separate water quality ponds will be situated through the Bent Grass site to in lieu of the SR3 pond. The 4 ponds were small enough in volume that they were not incorporated into the HMS model, but are accounted for in the rational modeling within the site.

These on-site water quality pond will treat runoff prior to releasing it into the channel. The two water quality ponds associated with the Bent Grass Filing No. 2 have a volume of approximately 1 acre-foot just for water quality and therefore eliminating the SR3 pond, which never provided detention. The existing channel will remain in place.

X. Proposed Water Quality

The Middle Tributary site does not include the addition of any proposed water quality or detention ponds, under the current scenario. Under future conditions, additional water quality facilities will be necessary for any new development and detention will be required for new development north of Bent Grass Meadows Drive. Also, in the future conditions scenario, Pond SR-4 and existing Pond MN from the Falcon DBPS will receive flows from the improved school site. The HEC-HMS has been updated and is included in Appendix B. As discussed previously, the "School Site" have been added as an additional Basin MT060a, which is routed to the regional detention facility SR-4.

Basin MT070, described in the Falcon DBPS, was analyzed to include the improvements made to the site within Basin MT070 and the effects it has on existing Pond MN.

From the analysis, Pond SR-4's 100-yr. receiving flows increased from 1,000 cfs to 1072.8 cfs. Based on the increase in impervious area, Basin MT070's Curve Number increased from 67 to 68. Subsequently, the 100-yr. receiving flows entering existing Pond MN decreased to 727.3 cfs from 850 cfs.

Release rates for SR-4 are 14.8 cfs for the 2-year storm and 700.3 cfs for the 100-year storm. Falcon DBPS has 2-year storm listed as 27 cfs and 100-year storm as 730 cfs. This gives a decrease of 12.2 cfs and 29.7 cfs for the 2 and 100-year events respectively.

Pond MN release rates 14.4 cfs for the 2-year storm and 691.7 cfs for the 100-year storm. The DBPS has release rates listed as 32 cfs for the 2-year storm and 820 cfs for the 100-year storm. This gives a decrease of 17.6 cfs and 128.3 cfs for the 2 and 100-year events respectively.

The West Tributary site does include the addition of proposed water quality ponds with the Bent Grass development, under the current scenario. Under future conditions, additional water quality facilities will be necessary for any other new developments. Existing Pond WU, further south in the West Tributary, near Highway 24, is a regional detention facility for areas (approximately 2,312 acres) just upstream of the pond, as well as providing water quality for the west side of the same Falcon Highlands area.

Pond WU release rates 45.9 for the 2-year storm and 921.2 cfs for the 100-year storm. The DBPS has release rates listed as 55 cfs for the 2-year storm and 1000 cfs for the 100-year storm. This gives a decrease of 9.1 cfs and 78.8 cfs for the 2 and 100-year events respectively.

XI. Maintenance

The proposed channels are to be private facilities. They will be maintained by the Bent Grass Metropolitan district. When completion of future DBPS construction improvements and upon the Board of County Commissioners acceptance the channels, Reaches RWT 204 & RWT210, will then be owned and maintained by El Paso County along with all drainage facilities within the public Right-of-Way.

XII. Wetlands Mitigation

No wetlands are located on site.

XIII. Floodplain Statement

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map number 08041C0553G, effective December 7, 2018, there is a floodplain in a portion of the project area. A copy of the FIRM Panel is included in Appendix A.

The portion of channel that has a floodplain designation is only the RWT210 and RWT204 portions of the channel. It is unknown why the western channel, RWT202 is unmapped since it is the larger contributor regarding flow rates. Since there is a discrepancy between the DPBS and FEMA maps, the RWT202 channel has been rerouted to follow the north Bent Grass property line and connect to the RWT204 channel. No-rise certifications are complete, and permit issued. No LOMR is anticipated or proposed at this time.

XIV. Fee Development

At this time, it is being requested to add the improvement of the culverts at the Bent Grass Meadows Drive/Meridian Road intersection to the reimbursable list of storm facilities presented in the Falcon DBPS. Based on the estimate shown below, the box culvert would add \$429,749.00 to the overall bridge construction costs.

Item	Quantity	Unit	Unit Cost	Cost
Culvert (Concrete Box Culvert) (Public) – Bent Grass Meadows Drive				
6' x 16' Concrete Box Culvert (Double)	120	LF	\$ 2,000.00	\$ 240,000.00
30" Grouted Boulders	164	SY	\$ 190.00	\$ 31,160.00
Soil Rip Rap - Type M	55	CY	\$ 100.00	\$ 5,500.00
Headwalls - Concrete	35	CY	\$ 850.00	\$ 29,750.00
Wingwalls - Concrete	60	CY	\$ 850.00	\$ 51,000.00
Headwalls - Steel Reinforcement	1300	LBS	\$ 1.50	\$ 1,950.00
Wingwalls - Steel Reinforcement	4430	LBS	\$ 1.50	\$ 6,645.00
Subtotal				\$ 366,005.00
Culvert (Concrete Box Culvert) (Public) – Meridian Road				
4' x 16' Concrete Box Culvert (Double)	190	LF	\$ 1,600.00	\$ 304,000.00
Soil Rip Rap - Type M	45	CY	\$ 100.00	\$ 4,500.00
Headwalls - Concrete	30	CY	\$ 850.00	\$ 25,500.00
Wingwalls - Concrete	60	CY	\$ 850.00	\$ 51,000.00
Headwalls - Steel Reinforcement	975	LBS	\$ 1.50	\$ 1,462.50
Wingwalls - Steel Reinforcement	4430	LBS	\$ 1.50	\$ 6,645.00
Subtotal				\$ 393,107.50
Total				\$ 759,112.50

In Section 7.0 Fee Development of the Falcon Basin DBPS, it was shown that the Development Cost for Bridge Improvements was \$2,058,474. With the addition of the box culvert at Bent Grass Meadows Drive/Meridian Road, this estimate would raise to \$2,488,223. The Drainage Improvement costs shown in the DBPS for Development were \$14,988,251. The DBPS fees were based off 645.58 impervious acres. (Refer to DBPS for detailed information on area breakdown).

The Bridge Fee per Impervious acre was \$3,189 and Drainage Fee was \$23,217. There are no improvements to facilities falling under the Drainage Fee criteria. The Bridge fee will increase. Based on the new overall bridge development fee of \$2,488,223, the fee per impervious acre will be \$3,793, an increase of \$604 per impervious acre. **This cost will need to be verified with the final platted areas.**

It is requested that the Drainage Board will approve the above increase to the Falcon Basin Bridge Fees.

XV. Conclusion

This report has been prepared using the criteria and methods as described in the El Paso County Drainage Criteria Manual. For the Middle Tributary portion of the site, it has been shown that under current conditions, existing facilities will function. Recommendations for future facilities have been provided for an EURV pond on the “school site”, Bent Grass Meadows Drive/Meridian Road intersection and the Owl Place crossing. Also, it has been noted that any new development in this area will need to provide their own on-site water quality and detention. Under the current conditions, there are no adverse impacts to the sub-regional SR4 pond or the Regional Pond MN, further downstream.

For the West Tributary areas, several water quality facilities are being proposed/constructed. These items will treat developed flows prior to being released into the channel for the West Tributary. The West Tributary Channel will meet the design requirements of the Falcon DBPS. Bent Grass Metropolitan District will maintain the channel. If after a pre-determined amount of the time, current property owners have not initiated any of channel improvements themselves, the developer will build the remaining channel improvements to Woodmen Road. Or the developer may work with the current property owners to reach a pre-approved agreement on design/construction, costs and timing of these channel improvements, which would need to be “in-place” prior to the approval for the first plat of the Falcon Meadows at Bent Grass development. An agreement and schedule will be in place prior to approval of Falcon Meadows at Bent Grass Filing No. 1.

Upon entering the channel, flows will leave the Bent Grass property and continue south, eventually reaching the Regional Pond WU. There are no adverse impacts to this facility.

XVI. References

1. *City of Colorado Springs/County of El Paso Drainage Criteria Manual*, October 1991.
2. *Drainage Criteria Manual, Volume 2*, City of Colorado Springs, November 2002.
3. *Urban Storm Drainage Criteria Manual*, Urban Drainage and Flood Control District, January 2016 (with current revisions).
4. *Falcon Drainage Basin Planning Study*, by Matrix Design Group, September 2015.
5. *Master Development Drainage Plan and Preliminary Drainage Plan – Bent Grass Subdivision*, by Kiowa Engineering Corporation, December 2006.
6. *Final Drainage Report for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2014.
7. *Final Drainage Report Addendum for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2015.
8. *Master Development Drainage Plan – Bent Grass Residential Subdivision*, by Galloway & Company, May 2019.
9. *Final Drainage and Erosion Control for The Meadows Filing 3 Subdivision*, by LADD Engineering, July 2000.

10. *Final Drainage Report for Bent Grass Residential Filing No. 2*, by Galloway & Company, April 2020.
11. *Meridian Road & Bent Grass Meadows Drive*, by Galloway & Company, September 2020.
12. *Preliminary Drainage Report Falcon Meadows at Bent Grass*, by Galloway & Company, December 2020.
13. *Preliminary Drainage Report for Bent Grass East Commercial-Phase 1 (Preliminary Plan) -Final Drainage Report for Bent Grass East Commercial Filing No. 1-Lot 1 (Final Plat) & Addendum No. 1 (7-11 Development)*, by Classic Consulting Engineers & Surveyors, LLC, April 2013.
14. *Final Drainage Report for Bent Grass East Commercial Filing No. 2*, by Classic Consulting Engineers & Surveyors, July 2014.
15. *Drainage Letter Report for Falcon Dental Lot 2A, Bent Grass East Commercial Filing No. 2A*, by JPS Engineering, April 2016.

APPENDIX A
Exhibits and Figures



FALCON MEADOWS AT BENT GRASS

BENT GRASS MEADOWS DRIVE

SCALE: 1"=2,000'

VICINITY MAP

Project No: CLH000017.20

Drawn By: TJE

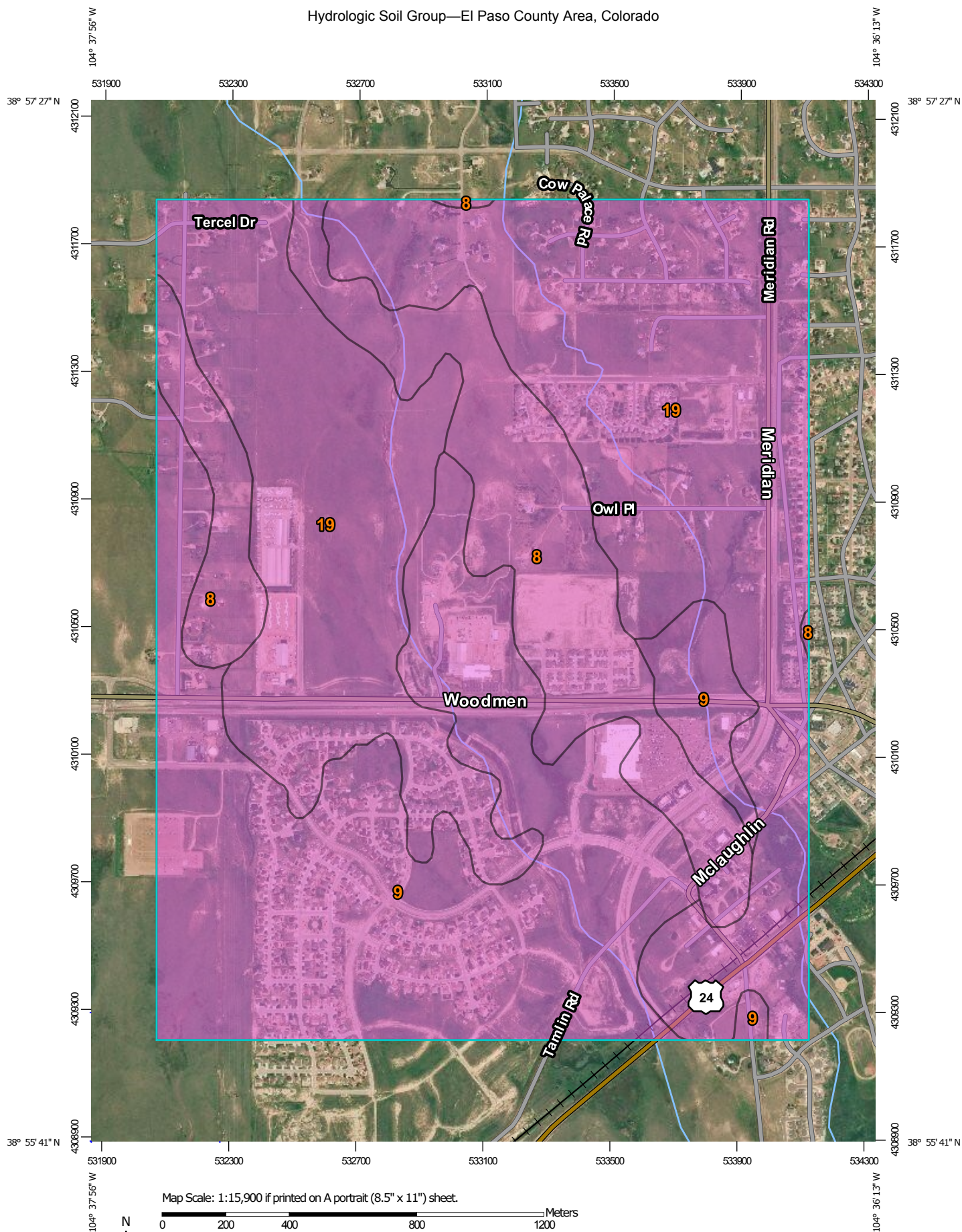
Checked By: CMD

Date: 06/19/2020

Galloway

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Colorado Springs, CO 80920
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Hydrologic Soil Group—El Paso County Area, Colorado




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

4/2/2019
Page 1 of 4

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 1:24,000.

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: El Paso County Area, Colorado
 Survey Area Data: Version 16, 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: Jun 7, 2016—Aug 17, 2017

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
8	Blakeland loamy sand, 1 to 9 percent slopes	A	214.3	16.0%
9	Blakeland-Fluvaquentic Haplaquolls	A	465.8	34.7%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	662.6	49.3%
Totals for Area of Interest			1,342.6	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

NOTES TO USERS

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

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

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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

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

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones 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 (NAVD88)**. 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, NIMS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

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. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

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

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

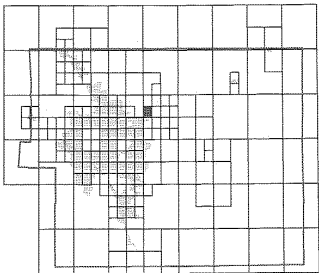
Contact **FEMA Map Service Center (MSC)** via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9820 and its website at <http://www.msc.fema.gov/>.

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

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).



Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Base Flood Elevation line and value; elevation in feet* (EL 987)

Base Flood Elevation value where uniform within zone; elevation in feet*

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

Cross section line

Transect line

67° 07' 30.00" 32° 22' 30.00" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4750000N 1000-meter Universal Transverse Mercator grid ticks, zone 13

6000000 FT 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPS ZONE 0552), Lambert Conformal Conic Projection

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

MARCH 17, 1997

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

DECEMBER 7, 2018: To update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and 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.

FALCON DRAINAGE BASIN PLANNING STUDY

SELECTED PLAN REPORT

FINAL - SEPTEMBER 2015

Prepared for:



El Paso County Public Services Department
3275 Akers Drive
Colorado Springs, CO 80922

Prepared By:

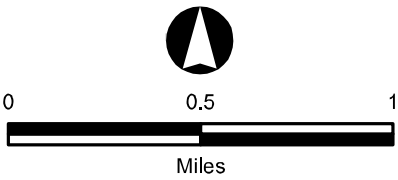


Matrix Design Group
2435 Research Parkway, Suite 300
Colorado Springs, CO 80920

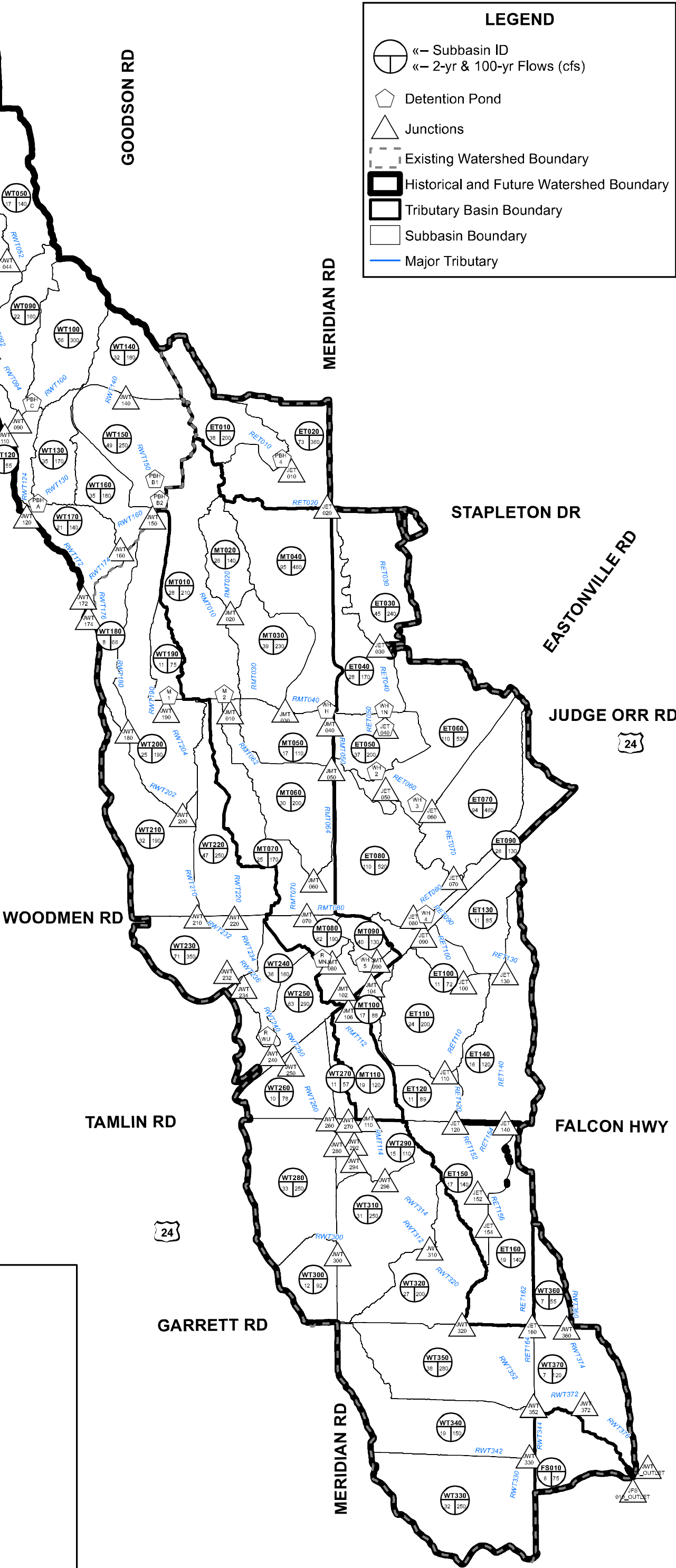
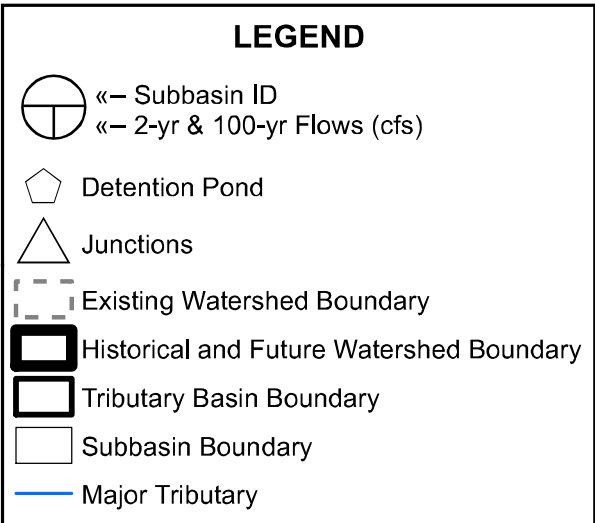
Matrix Project No. 10.122.003

Hydrologic Element	Area (sq mi)	Future Peak Flows (cfs)		Hydrologic Element	Area (sq mi)	Future Peak Flows (cfs)	
		2-year	100-year			2-year	100-year
ET010	0.15	38	200	RET050	0.71	27	570
ET030	0.21	73	360	RET060	0.83	11	530
ET020	0.20	45	240	RET070	1.11	13	430
ET040	0.15	28	170	RET080	1.36	65	420
ET050	0.12	37	200	RET090	1.66	15	350
ET060	0.29	110	530	RET100	1.78	26	390
ET070	0.25	64	460	RET110	1.83	27	390
ET080	0.29	130	520	RET120	2.25	39	430
ET090	0.12	26	130	RET140	0.13	11	85
ET100	0.05	11	72	RET152	2.16	49	450
ET110	0.23	24	200	RET154	0.40	26	200
ET120	0.41	11	89	RET156	2.57	50	650
ET130	0.13	11	85	RET162	2.74	59	680
ET140	0.27	16	120	RET164	2.93	66	710
ET150	0.16	17	140	RMT030	0.29	25	140
ET160	0.19	19	140	RMT040	0.25	49	290
FS010	0.12	6	75	RMT050	0.56	110	750
JET010	0.15	29	150	RMT062	0.29	1	160
JET020	0.36	74	390	RMT064	0.67	120	850
JET030	0.56	97	580	RMT070	1.16	130	1,000
JET040	0.71	27	520	RMT080	1.36	150	1,200
JET050	0.93	11	530	RMT090	0.04	9	32
JET060	1.11	13	430	RMT102	1.42	86	1,200
JET070	1.36	94	480	RMT104	0.01	9	32
JET080	1.66	15	350	RMT106	1.46	91	1,200
JET090	1.78	26	390	RMT112	1.52	92	1,200
JET100	1.83	27	390	RMT114	1.54	94	1,200
JET110	2.25	40	440	RMT130	0.07	4	42
JET120	2.16	49	450	RMT042	0.14	9	85
JET130	0.13	11	85	RMT044	0.14	9	89
JET140	0.40	26	200	RMT046	0.28	15	170
JET152	2.57	51	650	RMT054	0.46	24	260
JET154	2.74	62	680	RMT090	0.17	14	130
JET160	2.93	66	710	RMT092	0.85	43	480
JFS010				RMT094	1.09	54	610
JOUTLET	0.12	6	75	RMT122	1.43	68	730
JMT010	0.29	1	160	RMT124	1.63	77	840
JMT020	0.09	26	140	RMT150	0.13	32	180
JMT030	0.25	50	290	RMT160	0.36	15	170
JMT040	0.56	130	750	RMT172	1.77	85	920
JMT050	0.67	120	850	RMT174	0.47	35	180
JMT060	1.16	130	1,000	RMT176	2.24	98	960
JMT070	1.36	150	1,200	RMT180	2.36	100	990
JMT080	1.42	86	1,200	RMT202	2.46	100	1,000
JMT090	0.04	9	32	RMT204	0.06	4	43
JMT100	1.46	91	1,200	RMT210	2.82	110	1,200
JMT104	0.04	7	32	RMT232	3.29	126	1,300
JMT106	1.52	92	1,200	RMT234	0.19	47	250
JMT110	1.64	94	1,200	RMT236	3.28	120	1,400
JMT1010	0.14	9	89	RMT240	3.47	130	1,400
JMT1020	0.07	4	42	RMT240			
JMT1030	0.14	9	85	Diversion			
JMT1062	0.28	15	120	Resort	9.00	39	39
JMT1044	0.46	24	260	RMT250	3.55	83	1,100
JMT1050	0.85	43	480	RMT260	3.70	85	1,100
JMT1070	0.17	14	130	RMT251	3.84	86	1,100
JMT1080	1.09	54	610	RMT292	0.03	11	57
JMT1090	1.43	68	730	RMT294	0.27	33	250
JMT110	1.63	77	840	RMT295	3.87	86	1,100
JMT1120	1.77	85	920	RMT296	4.12	94	1,100
JMT1140	0.13	32	180	RMT312	0.10	12	91
JMT1150	0.36	15	170	RMT314	5.88	160	1,700
JMT1160	0.47	35	190	RMT320	6.25	160	1,700
JMT1172	2.24	99	960	RMT344	0.33	32	250
JMT1174	2.36	100	990	RMT352	6.46	160	1,700
JMT1180	2.46	100	1,000	RMT354	9.69	210	2,400
JMT1190	0.06	4	43	RMT321	10.30	230	2,500
JMT1200	2.82	110	1,200	RMT374	0.07	7	55
JMT1210	3.09	120	1,300	RMT376	10.36	230	2,500
JMT1220	0.19	47	250	M1	0.06	4	43
JMT1232	3.28	120	1,400	M2	0.29	1	160
JMT1234	3.47	130	1,400	WH1 North	0.71	88	570
JMT1240	3.55	83	1,100	WH1 South	0.71	27	570
JMT1250	3.70	85	1,100	WH2	0.83	11	530
JMT1260	3.84	86	1,100	WH3	1.11	13	430
JMT1270	0.03	11	57	WH4	1.66	15	350
JMT1280	0.27	33	250	WH5	0.04	9	32
JMT1292	3.87	86	1,100	WHH	0.56	110	750
JMT1294	4.13	96	1,100	WT010	0.14	9	89
JMT1296	5.88	160	1,200	WT020	0.07	4	42
JMT1300	0.10	12	92	WT030	0.08	9	75
JMT1310	6.25	160	1,700	WT040	0.19	9	93
JMT1320	6.46	160	1,700	WT050	0.19	17	140
JMT1330	0.33	32	250	WT060	0.20	14	120
JMT1352	9.69	210	2,400	WT070	0.17	14	130
JMT1354	10.30	230	2,500	WT080	0.07	9	67
JMT1360	0.07	7	55	WT090	0.15	22	160
JMT1372	10.36	230	2,500	WT100	0.19	56	300
JMT1374				WT110	0.19	22	170
JMT1374 OUTLET	10.58	230	2,500	WT120	0.05	8	55
NMT010	0.29	28	210	WT130	0.10	35	170
NMT020	0.09	26	140	WT140	0.13	32	180
NMT030	0.16	39	230	WT150	0.23	49	250
NMT040	0.31	95	460	WT160	0.11	35	180
NMT050	0.12	17	110	WT170	0.12	21	140
NMT060	0.19	30	200	WT180	0.10	8	66
NMT070	0.20	25	170	WT190	0.06	11	75
NMT080	0.06	62	190	WT200	0.30	25	190
NMT090	0.04	40	130	WT210	0.27	32	190
NMT100	0.06	17	88	WT220	0.19	47	250
NMT110	0.12	19	120	WT230	0.20	71	350
PBH4	0.15	29	150	WT240	0.08	36	160
PBH4A	0.10	10	130	WT250	0.15	63	290
PBH4B	0.36	51	270	WT260	0.14	10	78
PBH4C	0.36	15	170	WT270	0.03	11	57
PBH4C	0.19	11	160	WT280	0.27	33	250
RMN	1.42	86	1,200	WT290	0.10	15	110
RWU				WT300	0.10	12	92
Diversion	3.55	83	1,300	WT310	0.28	31	250
RWU North	3.55	130	1,400	WT320	0.21	27	200
RWU South	3.55	55	1,000	WT330	0.33	32	250
RET020	0.15	29	150	WT340	0.28	19	150
RET030	0.36	71	380	WT350	0.30	38	280
RET040	0.56	95	580	WT360	0.07	7	55
				WT370	0.21	7	120

Figure 3-13
Future Hydrology
Falcon DBPS
El Paso County, CO



NOTE: FIGURE MUST BE VIEWED IN COLOR



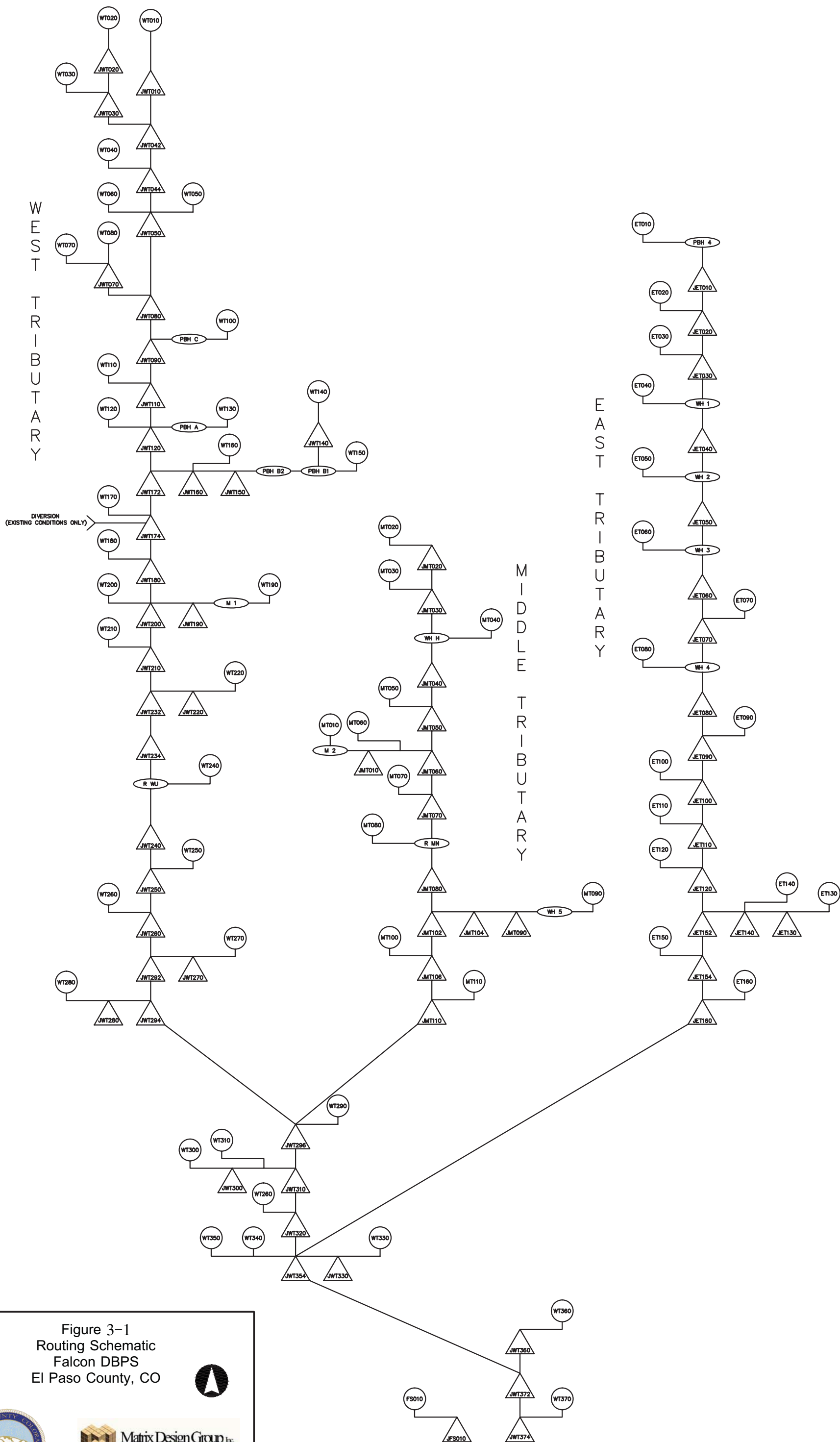


Figure 3-1
Routing Schematic
Falcon DBPS
El Paso County, CO



DRAWING NOT TO SCALE

BURGESS RD

GOODSON RD

STAPLETON DR

EASTONVILLE RD

JUDGE ORR RD

WOODMEN RD

TAMLIN RD

GARRETT RD

MERIDIAN RD

FALCON HWY

Sub Regional Detention Alternative ¹						
Pond		Q ₂ In (cfs)	Q ₂ Out (cfs)	Q ₁₀₀ In (cfs)	Q ₁₀₀ Out (cfs)	Required Volume (AF) ²
Paint Brush Hills Pond #4	PBH 4	38	29	200	150	1.34
Paint Brush Hills Pond A	PBH A	35	7	170	140	2.62
Paint Brush Hills Pond B1	PBH B1	80	51	420	270	9.17
Paint Brush Hills Pond B2	PBH B2	51	10	270	180	12.09
Paint Brush Hills Pond C	PBH C	56	3	300	140	6.77
Regional Pond MN	R MN	65	32	850	820	7.53
Regional Pond R1	R R1	110	77	1,600	1,500	25.00
Regional Pond R2	R R2	140	140	2,100	2,100	7.90
Regional Pond WU South	R WU	47	22	1,070	930	39.54
Sub Regional Pond SR1	SR 1	54	42	610	510	11.03
Sub Regional Pond SR2	SR 2	65	65	840	840	2.05
Sub Regional Pond SR3	SR 3	72	72	910	910	1.03
Sub Regional Pond SR4	SR 4	130	27	1,000	730	19.37
Sub Regional Pond SR6	SR 6	74	9	390	200	11.82
The Meadows Pond #1	M 1	11	0	75	2	3.25
The Meadows Pond #2	M 2	28	5	210	99	7.94
Woodmen Hills Pond #1 North	WH 1N	65	61	390	260	7.13
Woodmen Hills Pond #1 South	WH 1S	61	10	260	260	8.78
Woodmen Hills Pond #2	WH 2	37	10	270	250	9.18
Woodmen Hills Pond #3	WH 3	105	13	530	360	8.35
Woodmen Hills Pond #4	WH 4	110	15	790	260	40.45
Woodmen Hills Pond #5	WH 5	40	1	130	19	4.10
Woodmen Hills Pond H	WH H	140	110	750	750	2.66

Notes

1: Represents future hydrology with retrofit existing detention ponds and 5 new subregional detention ponds

2: Required volume to highest WSE

Reach Alternative	Total (ft)
Protect In Place	30,066
Natural Channel Design	32,359
Small Drop Structures w/ Toe Protection	76,812
Large Drop Structures w/ Toe Protection	0

DIVERSION

CHANGE DUE TO
BENT GRASS R2
(RWT200)

DELETE POND WITH
WQCV REPLACEMENTS &
CHANNEL IMPROVEMENTS

CHANGE DUE TO
BENT GRASS R1
(RMT063)

LEGEND

Detention Pond

- Existing
- Proposed

Watershed Boundary

- Existing Watershed Boundary
- Historical and Future Watershed Boundary
- Tributary Basin Boundary
- Subbasin Boundary

Major Tributary

- Major Tributary

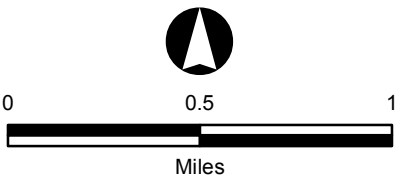
Immediate Action Required to Preserve Existing Condition

- Immediate Action Required to Preserve Existing Condition

Reach Alternative

- Protect In Place
- Natural Channel Design
- Small Drop Structures w/ Toe Protection

Figure 5-3
Sub-Regional Detention Alternative
Falcon DBPS
El Paso County, CO



NOTE: FIGURE MUST BE VIEWED IN COLOR

Falcon DBPS
Peak Flow Results

Hydrologic Element	Area (sq mi)	Future Peak Flows (cfs)					
		2-year	5-year	10-year	25-year	50-year	100-year
WT060	0.20	14	30	44	77	96	120
WT070	0.17	14	33	49	87	110	130
WT080	0.07	9	19	27	45	56	67
WT090	0.15	22	46	65	110	140	160
WT100	0.19	56	100	140	210	260	300
WT110	0.19	22	47	67	110	140	170
WT120	0.05	8	16	22	37	46	55
WT130	0.10	35	61	81	120	150	170
WT140	0.13	32	59	80	130	150	180
WT150	0.23	49	86	110	180	210	250
WT160	0.11	35	64	85	130	160	180
WT170	0.12	21	43	60	99	120	140
WT180	0.10	8	17	25	43	54	66
WT190	0.06	11	23	31	51	63	75
WT200	0.30	25	52	74	130	160	190
WT210	0.27	32	60	81	130	160	190
WT220	0.19	47	85	110	180	210	250
WT230	0.20	71	120	160	250	300	350
WT240	0.08	36	61	79	120	140	160
WT250	0.15	63	110	140	210	250	290
WT260	0.14	10	21	30	52	64	78
WT270	0.03	11	20	27	41	49	57
WT280	0.27	33	70	100	170	210	250
WT290	0.10	15	31	44	75	92	110
WT300	0.10	12	26	36	62	76	92
WT310	0.28	31	67	96	170	210	250
WT320	0.21	27	56	80	140	170	200
WT330	0.33	32	68	98	170	210	250
WT340	0.28	19	40	57	98	120	150
WT350	0.30	38	79	110	190	230	280
WT360	0.07	7	15	21	37	46	55
WT370	0.21	7	23	38	76	99	120

Hydrologic Element	Area (sq mi)	Future Peak Flows (cfs) - Regional Detention					
		2-year	5-year	10-year	25-year	50-year	100-year
WT040	0.19	9	0	0	0	0	93
WT050	0.19	17	0	0	0	0	140
WT060	0.20	14	0	0	0	0	120
WT070	0.17	14	0	0	0	0	130
WT080	0.07	9	0	0	0	0	67
WT090	0.15	22	0	0	0	0	160
WT100	0.19	56	0	0	0	0	300
WT110	0.19	22	0	0	0	0	170
WT120	0.05	8	0	0	0	0	55
WT130	0.10	35	0	0	0	0	170
WT140	0.13	32	0	0	0	0	180
WT150	0.23	49	0	0	0	0	250
WT160	0.11	35	0	0	0	0	180
WT170	0.12	21	0	0	0	0	140
WT180	0.10	8	0	0	0	0	66
WT190	0.06	11	0	0	0	0	75
WT200	0.30	25	0	0	0	0	190
WT210	0.27	32	0	0	0	0	190
WT220	0.19	47	0	0	0	0	250
WT230	0.20	71	0	0	0	0	350
WT240	0.08	36	0	0	0	0	160
WT250	0.15	63	0	0	0	0	290
WT260	0.14	10	0	0	0	0	78
WT270	0.03	11	0	0	0	0	57
WT280	0.27	33	0	0	0	0	250
WT290	0.10	15	0	0	0	0	110
WT300	0.10	12	0	0	0	0	92
WT310	0.28	31	0	0	0	0	250
WT320	0.21	27	0	0	0	0	200
WT330	0.33	32	0	0	0	0	250
WT340	0.28	19	0	0	0	0	150
WT350	0.30	38	0	0	0	0	280
WT360	0.07	7	0	0	0	0	55
WT370	0.21	7	0	0	0	0	120

Hydrologic Element	Area (sq mi)	Future Peak Flows (cfs) - Sub Regional Detention					
		2-year	5-year	10-year	25-year	50-year	100-year
Woodmen Hills Pond #5	0.04	1	0	0	0	0	19
Woodmen Hills Pond H	0.56	110	0	0	0	0	750
WT010	0.14	9	0	0	0	0	89
WT020	0.07	4	0	0	0	0	42
WT030	0.08	9	0	0	0	0	75
WT040	0.19	9	0	0	0	0	93
WT050	0.19	17	0	0	0	0	140
WT060	0.20	14	0	0	0	0	120
WT070	0.17	14	0	0	0	0	130
WT080	0.07	9	0	0	0	0	67
WT090	0.15	22	0	0	0	0	160
WT100	0.19	56	0	0	0	0	300
WT110	0.19	22	0	0	0	0	170
WT120	0.05	8	0	0	0	0	55
WT130	0.10	35	0	0	0	0	170
WT140	0.13	32	0	0	0	0	180
WT150	0.23	49	0	0	0	0	250
WT160	0.11	35	0	0	0	0	180
WT170	0.12	21	0	0	0	0	140
WT180	0.10	8	0	0	0	0	66
WT190	0.06	11	0	0	0	0	75
WT200	0.30	25	0	0	0	0	190
WT210	0.27	32	0	0	0	0	190
WT220	0.19	47	0	0	0	0	250
WT230	0.20	71	0	0	0	0	350
WT240	0.08	36	0	0	0	0	160
WT250	0.15	63	0	0	0	0	290
WT260	0.14	10	0	0	0	0	78
WT270	0.03	11	0	0	0	0	57
WT280	0.27	33	0	0	0	0	250
WT290	0.10	15	0	0	0	0	110
WT300	0.10	12	0	0	0	0	92
WT310	0.28	31	0	0	0	0	250
WT320	0.21	27	0	0	0	0	200
WT330	0.33	32	0	0	0	0	250
WT340	0.28	19	0	0	0	0	150
WT350	0.30	38	0	0	0	0	280
WT360	0.07	7	0	0	0	0	55
WT370	0.21	7	0	0	0	0	120

Project Summary

Title	BENT GRASS RESIDENTIAL FILING NO.1
Engineer	MAW
Company	CLASSIC CONSULTING
Date	7/10/2014

Notes	POND 1 2 YEAR
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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
Basins	Post-Development 2 Year	2	0.411	0.300	14.96

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 2 Year	2	0.335	0.650	0.32

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 1 (IN)	Post-Development 2 Year	2	0.411	0.300	14.96	(N/A)	(N/A)
Pond 1 (OUT)	Post-Development 2 Year	2	0.335	0.650	0.32	6,934.59	0.402

Subsection: I-D-F Table
Label: CO SPRINGS

Return Event: 2 years
Storm Event: CO SPRINGS - 2 Year

I-D-F Curve

Time (hours)	Intensity (In/h)
0.083	3.710
0.167	2.980
0.250	2.520
0.333	2.190
0.417	1.950
0.500	1.760
0.583	1.610
0.667	1.490
0.750	1.380
0.833	1.290
0.917	1.220
1.000	1.150

Subsection: Elevation-Area Volume Curve

Label: Pond 1

Return Event: 2 years

Storm Event: CO SPRINGS - 2 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sq (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
6,932.00	0.0	0.005	0.000	0.000	0.000
6,934.00	0.0	0.292	0.335	0.223	0.223
6,936.00	0.0	0.367	0.986	0.658	0.881
6,938.00	0.0	0.451	1.225	0.817	1.698
6,940.00	0.0	0.545	1.492	0.995	2.692

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: CO SPRINGS - 2 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	6,932.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	6,940.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Inlet Box	Riser - 1	Forward	Culvert - 1	6,937.00	6,940.00
Orifice-Area	Orifice - 1	Forward	Culvert - 1	6,933.00	6,940.00
Culvert-Circular	Culvert - 1	Forward	TW	6,932.00	6,940.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Return Event: 2 years

Storm Event: CO SPRINGS - 2 Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
Number of Openings	1
Elevation	6,937.00 ft
Orifice Area	10.2 ft ²
Orifice Coefficient	0.600
Weir Length	4.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: CO SPRINGS - 2 Year

Structure ID: Culvert - 1	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 in
Length	60.00 ft
Length (Computed Barrel)	60.03 ft
Slope (Computed)	0.033 ft/ft
Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.012
Kr	0.000
Convergence Tolerance	0.00 ft
Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	0.000
T2 ratio (HW/D)	1.181
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.

Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...

T1 Elevation	6,932.00 ft	T1 Flow	15.55 ft ³ /s
T2 Elevation	6,934.36 ft	T2 Flow	17.77 ft ³ /s

Subsection: Outlet Input Data
Label: Composite Outlet Structure - 1

Return Event: 2 years
Storm Event: CO SPRINGS - 2 Year

Structure ID: Orifice - 1	
Structure Type: Orifice-Area	
Number of Openings	12
Elevation	6,933.00 ft
Orifice Area	0.0 ft ²
Top Elevation	6,937.00 ft
Datum Elevation	6,933.00 ft
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: CO SPRINGS - 2 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)
 Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.00	0.00	0.00	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.00	0.00	0.00	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.00	0.00	0.00	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.00	0.00	0.00	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.00	0.00	0.00	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.00	0.00	0.00	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.00	0.00	0.00	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.00	0.00	0.00	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	4.24	6,937.50	Free Outfall	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	12.00	6,938.00	Free Outfall	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	22.05	6,938.50	Free Outfall	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	33.94	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	47.43	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	62.35	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 Weir: H =0.5ft
 Weir: H =1ft
 Weir: H =1.5ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2.5ft

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 2 years
Storm Event: CO SPRINGS - 2 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 1 (Culvert-Circular)

Message

FULLY CHARGED RISER: ADJUSTED TO
WEIR: H =3ft

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 2 years
 Storm Event: CO SPRINGS - 2 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s
 Upstream ID = Riser - 1, Orifice - 1
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,932.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,932.21	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,932.26	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,932.30	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,932.34	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.00	0.61	6,932.38	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,932.40	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,932.43	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.50	5.07	6,933.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.00	12.79	6,933.96	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.50	22.77	6,935.01	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.00	34.46	6,937.16	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.50	43.77	6,939.50	Free Outfall	Free Outfall	0.00	3.67	(N/A)	0.00
6,940.00	45.51	6,940.00	Free Outfall	Free Outfall	0.00	16.84	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 CRIT.DEPTH CONTROL Vh= .036ft
 Dcr= .107ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 CRIT.DEPTH CONTROL Vh= .083ft
 Dcr= .242ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 2 years
Storm Event: CO SPRINGS - 2 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s
Upstream ID = Riser - 1, Orifice - 1
Downstream ID = Tailwater (Pond Outfall)

Message

CRIT.DEPTH CONTROL Vh= .099ft Dcr= .286ft CRIT.DEPTH Hev= .00ft CRIT.DEPTH CONTROL Vh= .106ft Dcr= .306ft CRIT.DEPTH Hev= .00ft FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE CRIT.DEPTH CONTROL Vh= .557ft Dcr= 1.287ft CRIT.DEPTH Hev= .00ft INLET CONTROL... Submerged: HW =3.01 INLET CONTROL... Submerged: HW =5.16 INLET CONTROL... Submerged: HW =7.50 INLET CONTROL... Submerged: HW =8.00
--

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 2 years
Storm Event: CO SPRINGS - 2 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(Into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,933.50	Free Outfall	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,934.00	Free Outfall	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,934.50	Free Outfall	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,935.00	Free Outfall	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,935.50	Free Outfall	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.60	6,936.00	Free Outfall	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,936.50	Free Outfall	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,937.00	Free Outfall	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	0.83	6,937.50	6,933.15	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	0.80	6,938.00	6,933.96	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	0.74	6,938.50	6,935.01	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	0.54	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	0.00	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	0.00	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an Invert; no flow.
WS below an Invert; no flow.
WS below an Invert; no flow.
Hi=.50; Ht=4.00; Qt=.07
Hi=1.00; Ht=4.00; Qt=.07
Hi=1.50; Ht=4.00; Qt=.07
Hi=2.00; Ht=4.00; Qt=.07
Hi=2.50; Ht=4.00; Qt=.07
Hi=3.00; Ht=4.00; Qt=.07
Hi=3.50; Ht=4.00; Qt=.07
H =4.00
H =4.35
H =4.04
H =3.49
H =1.84
FLOW PRECEDENCE SET TO
DOWNSTREAM CONTROLLING
STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 2 years
Storm Event: CO SPRINGS - 2 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 1 (Culvert-Circular)

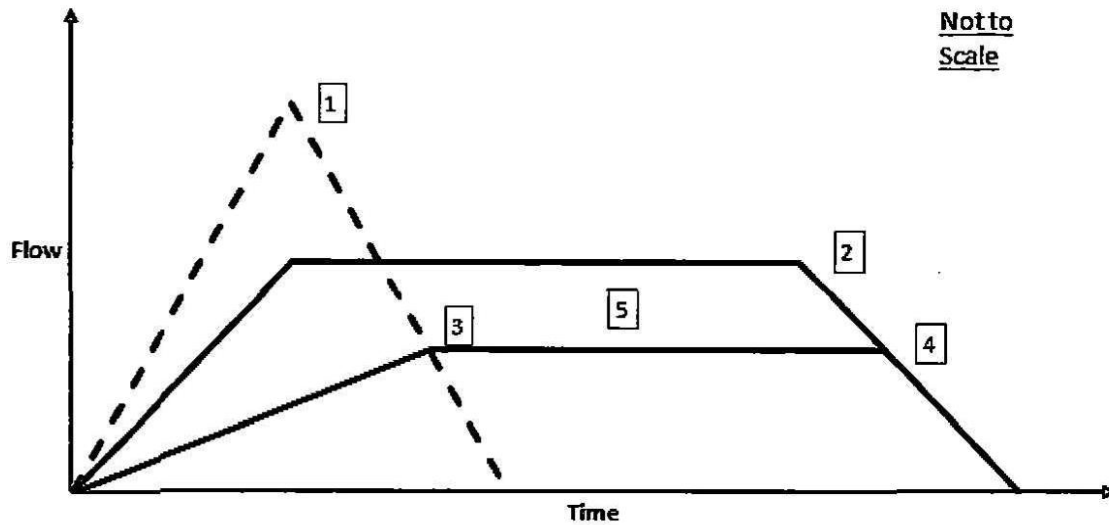
Message

FLOW PRECEDENCE SET TO DOWNSTREAM CONTROLLING STRUCTURE

Subsection: Modified Rational Graph
 Label: Basins

Return Event: 2 years
 Storm Event: CO SPRINGS - 2 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	0.333 hours



[1]	[2]
Time of Concentration (Modified Rational, Composite)	0.288 hours
Intensity (Modified Rational, Peak)	2.368 in/h
Flow (Modified Rational, Peak)	16.18 ft ³ /s
	Time of Duration (Modified Rational, Critical)
	0.333 hours
	Intensity (Modified Rational, Critical)
	2.190 in/h
	Flow (Modified Rational, Critical)
	14.96 ft ³ /s

[3]
First Outflow Breakpoint (Modified Rational, Method T)
0.390 hours
Flow (Modified Rational, Allowable)
12.00 ft ³ /s

[4]	[5]
Second Outflow Breakpoint (Modified Rational)	0.363 hours
Flow (Modified Rational, Allowable)	12.00 ft ³ /s
	Storage (Modified Rational, Estimated)
	0.090 ac-ft

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Project Summary

Title	BENT GRASS RESIDENTIAL FILING NO.1
Engineer	MAW
Company	CLASSIC CONSULTING
Date	7/10/2014

Notes	POND 1 5 YEAR
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Pond 1 (IN)		
	Pond Inflow Summary, 5 years	18
Basins	Modified Rational Graph, 5 years	19

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
Basins	Post-Development 5 Year	5	0.582	0.300	20.11

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 5 Year	5	0.470	0.650	0.42

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 1 (IN)	Post-Development 5 Year	5	0.582	0.300	20.11	(N/A)	(N/A)
Pond 1 (OUT)	Post-Development 5 Year	5	0.470	0.650	0.42	6,935.11	0.569

Subsection: I-D-F Table
Label: CO SPRINGS

Return Event: 5 years
Storm Event: CO SPRINGS - 5 Year

I-D-F Curve

Time (hours)	Intensity (In/h)
0.083	5.100
0.167	4.100
0.250	3.460
0.333	3.010
0.417	2.680
0.500	2.420
0.583	2.210
0.667	2.040
0.750	1.900
0.833	1.780
0.917	1.670
1.000	1.580

Subsection: Elevation-Area Volume Curve

Label: Pond 1

Return Event: 5 years

Storm Event: CO SPRINGS - 5 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
6,932.00	0.0	0.005	0.000	0.000	0.000
6,934.00	0.0	0.292	0.335	0.223	0.223
6,936.00	0.0	0.367	0.986	0.658	0.881
6,938.00	0.0	0.451	1.225	0.817	1.698
6,940.00	0.0	0.545	1.492	0.995	2.692

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: CO SPRINGS - 5 Year

Requested Pond Water Surface Elevations

Minimum (Headwater)	6,932.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	6,940.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Inlet Box	Riser - 1	Forward	Culvert - 1	6,937.00	6,940.00
Orifice-Area	Orifice - 1	Forward	Culvert - 1	6,933.00	6,940.00
Culvert-Circular	Culvert - 1	Forward	TW	6,932.00	6,940.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: Composite Outlet Structure - 1

Return Event: 5 years
Storm Event: CO SPRINGS - 5 Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
Number of Openings	1
Elevation	6,937.00 ft
Orifice Area	10.2 ft ²
Orifice Coefficient	0.600
Weir Length	4.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: CO SPRINGS - 5 Year

Structure ID: Culvert - 1	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 in
Length	60.00 ft
Length (Computed Barrel)	60.03 ft
Slope (Computed)	0.033 ft/ft
Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.012
Kr	0.000
Convergence Tolerance	0.00 ft
Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.079
T2 ratio (HW/D)	1.181
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.

Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

T1 Elevation	6,934.16 ft	T1 Flow	15.55 ft ³ /s
T2 Elevation	6,934.36 ft	T2 Flow	17.77 ft ³ /s

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: CO SPRINGS - 5 Year

Structure ID: Orifice - 1	
Structure Type: Orifice-Area	
Number of Openings	12
Elevation	6,933.00 ft
Orifice Area	0.0 ft ²
Top Elevation	6,937.00 ft
Datum Elevation	6,933.00 ft
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: CO SPRINGS - 5 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)
 Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(Into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.00	0.00	0.00	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.00	0.00	0.00	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.00	0.00	0.00	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.00	0.00	0.00	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.00	0.00	0.00	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.00	0.00	0.00	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.00	0.00	0.00	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.00	0.00	0.00	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	4.24	6,937.50	Free Outfall	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	12.00	6,938.00	Free Outfall	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	22.05	6,938.50	Free Outfall	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	33.94	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	47.43	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	62.35	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 Weir: H =0.5ft
 Weir: H =1ft
 Weir: H =1.5ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2.5ft

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 5 years
Storm Event: CO SPRINGS - 5 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message

FULLY CHARGED RISER: ADJUSTED TO WEIR: H =3ft
--

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 5 years
 Storm Event: CO SPRINGS - 5 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s
 Upstream ID = Riser - 1, Orifice - 1
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,932.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,932.21	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,932.26	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,932.30	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,932.34	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.00	0.61	6,932.38	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,932.40	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,932.43	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.50	5.07	6,933.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.00	12.79	6,933.96	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.50	22.77	6,935.01	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.00	34.46	6,937.16	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.50	43.77	6,939.50	Free Outfall	Free Outfall	0.00	3.67	(N/A)	0.00
6,940.00	45.51	6,940.00	Free Outfall	Free Outfall	0.00	16.84	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 CRIT.DEPTH CONTROL Vh= .036ft
 Dcr= .107ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 CRIT.DEPTH CONTROL Vh= .083ft
 Dcr= .242ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 5 years
Storm Event: CO SPRINGS - 5 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s

Upstream ID = Riser - 1, Orifice - 1

Downstream ID = Tailwater (Pond Outfall)

Message

CRIT.DEPTH CONTROL Vh= .099ft Dcr= .286ft CRIT.DEPTH Hev= .00ft CRIT.DEPTH CONTROL Vh= .106ft Dcr= .306ft CRIT.DEPTH Hev= .00ft FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE CRIT.DEPTH CONTROL Vh= .557ft Dcr= 1.287ft CRIT.DEPTH Hev= .00ft INLET CONTROL... Submerged: HW =3.01 INLET CONTROL... Submerged: HW =5.16 INLET CONTROL... Submerged: HW =7.50 INLET CONTROL... Submerged: HW =8.00
--

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 5 years
Storm Event: CO SPRINGS - 5 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(Into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,933.50	Free Outfall	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,934.00	Free Outfall	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,934.50	Free Outfall	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,935.00	Free Outfall	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,935.50	Free Outfall	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.60	6,936.00	Free Outfall	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,936.50	Free Outfall	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,937.00	Free Outfall	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	0.83	6,937.50	6,933.15	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	0.80	6,938.00	6,933.96	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	0.74	6,938.50	6,935.01	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	0.54	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	0.00	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	0.00	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
Hi=.50; Ht=4.00; Qt=.07
Hi=1.00; Ht=4.00; Qt=.07
Hi=1.50; Ht=4.00; Qt=.07
Hi=2.00; Ht=4.00; Qt=.07
Hi=2.50; Ht=4.00; Qt=.07
Hi=3.00; Ht=4.00; Qt=.07
Hi=3.50; Ht=4.00; Qt=.07
H =4.00
H =4.35
H =4.04
H =3.49
H =1.84
FLOW PRECEDENCE SET TO
DOWNSTREAM CONTROLLING
STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 5 years
Storm Event: CO SPRINGS - 5 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

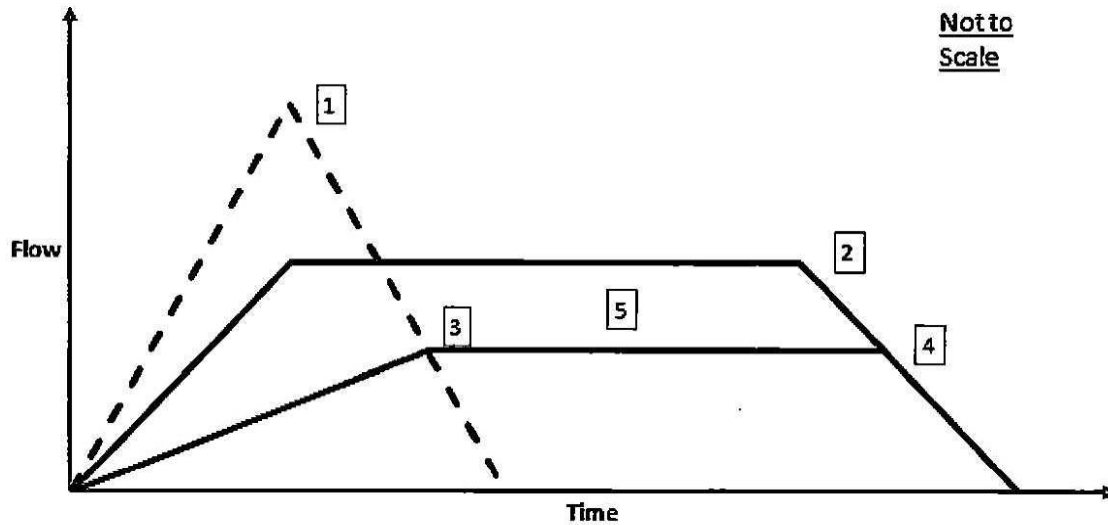
Message

FLOW PRECEDENCE SET TO
DOWNSTREAM CONTROLLING
STRUCTURE

Subsection: Modified Rational Graph
 Label: Basins

Return Event: 5 years
 Storm Event: CO SPRINGS - 5 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	0.350 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	0.288	hours	Time of Duration (Modified Rational, Critical)	0.350	hours
Intensity (Modified Rational, Peak)	3.253	in/h	Intensity (Modified Rational, Critical)	2.944	in/h
Flow (Modified Rational, Peak)	22.22	ft ³ /s	Flow (Modified Rational, Critical)	20.11	ft ³ /s

[3]		
First Outflow Breakpoint (Modified Rational, Method T)	0.466	hours
Flow (Modified Rational, Allowable)	12.00	ft ³ /s

[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	0.421	hours	Storage (Modified Rational, Estimated)	0.243	ac-ft
Flow (Modified Rational, Allowable)	12.00	ft ³ /s			

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Title	BENT GRASS RESIDENTIAL FILING NO.1
Engineer	MAW
Company	CLASSIC CONSULTING
Date	7/10/2014
Notes	POND 1 10 YEAR

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
Basins	Post-Development 10 Year	10	0.710	0.300	22.45

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 10 Year	10	0.565	0.700	0.49

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 1 (IN)	Post-Development 10 Year	10	0.710	0.300	22.45	(N/A)	(N/A)
Pond 1 (OUT)	Post-Development 10 Year	10	0.565	0.700	0.49	6,935.48	0.694

Subsection: I-D-F Table
Label: CO SPRINGS

Return Event: 10 years
Storm Event: CO SPRINGS - 10 Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.083	5.960
0.167	4.790
0.250	4.040
0.333	3.520
0.417	3.130
0.500	2.830
0.583	2.580
0.667	2.390
0.750	2.220
0.833	2.080
0.917	1.950
1.000	1.850

Subsection: Elevation-Area Volume Curve

Label: Pond 1

Return Event: 10 years

Storm Event: CO SPRINGS - 10 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
6,932.00	0.0	0.005	0.000	0.000	0.000
6,934.00	0.0	0.292	0.335	0.223	0.223
6,936.00	0.0	0.367	0.986	0.658	0.881
6,938.00	0.0	0.451	1.225	0.817	1.698
6,940.00	0.0	0.545	1.492	0.995	2.692

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: CO SPRINGS - 10 Year

Requested Pond Water Surface Elevations

Minimum (Headwater)	6,932.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	6,940.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Inlet Box	Riser - 1	Forward	Culvert - 1	6,937.00	6,940.00
Orifice-Area	Orifice - 1	Forward	Culvert - 1	6,933.00	6,940.00
Culvert-Circular	Culvert - 1	Forward	TW	6,932.00	6,940.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: Composite Outlet Structure - 1

Return Event: 10 years
Storm Event: CO SPRINGS - 10 Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
Number of Openings	1
Elevation	6,937.00 ft
Orifice Area	10.2 ft ²
Orifice Coefficient	0.600
Weir Length	4.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: CO SPRINGS - 10 Year

Structure ID: Culvert - 1	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 In
Length	60.00 ft
Length (Computed Barrel)	60.03 ft
Slope (Computed)	0.033 ft/ft
Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.012
Kr	0.000
Convergence Tolerance	0.00 ft
Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.079
T2 ratio (HW/D)	1.181
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.

Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control, interpolate between flows at T1 & T2...

T1 Elevation	6,934.16 ft	T1 Flow	15.55 ft ³ /s
T2 Elevation	6,934.36 ft	T2 Flow	17.77 ft ³ /s

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: CO SPRINGS - 10 Year

Structure ID: Orifice - 1	
Structure Type: Orifice-Area	
Number of Openings	12
Elevation	6,933.00 ft
Orifice Area	0.0 ft ²
Top Elevation	6,937.00 ft
Datum Elevation	6,933.00 ft
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: CO SPRINGS - 10 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)
 Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(Into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.00	0.00	0.00	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.00	0.00	0.00	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.00	0.00	0.00	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.00	0.00	0.00	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.00	0.00	0.00	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.00	0.00	0.00	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.00	0.00	0.00	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.00	0.00	0.00	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	4.24	6,937.50	Free Outfall	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	12.00	6,938.00	Free Outfall	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	22.05	6,938.50	Free Outfall	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	33.94	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	47.43	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	62.35	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 Weir: H =0.5ft
 Weir: H =1ft
 Weir: H =1.5ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2.5ft

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 10 years
Storm Event: CO SPRINGS - 10 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message

FULLY CHARGED RISER: ADJUSTED TO WEIR: H =3ft
--

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: CO SPRINGS - 10 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s

Upstream ID = Riser - 1, Orifice - 1

Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,932.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,932.21	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,932.26	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,932.30	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,932.34	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.00	0.61	6,932.38	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,932.40	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,932.43	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.50	5.07	6,933.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.00	12.79	6,933.96	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.50	22.77	6,935.01	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.00	34.46	6,937.16	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.50	43.77	6,939.50	Free Outfall	Free Outfall	0.00	3.67	(N/A)	0.00
6,940.00	45.51	6,940.00	Free Outfall	Free Outfall	0.00	16.84	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an Invert; no flow.
 CRIT.DEPTH CONTROL Vh= .036ft
 Dcr= .107ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 CRIT.DEPTH CONTROL Vh= .083ft
 Dcr= .242ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 10 years
Storm Event: CO SPRINGS - 10 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s

Upstream ID = Riser - 1, Orifice - 1

Downstream ID = Tailwater (Pond Outfall)

Message

CRIT.DEPTH CONTROL Vh= .099ft Dcr= .286ft CRIT.DEPTH Hev= .00ft CRIT.DEPTH CONTROL Vh= .106ft Dcr= .306ft CRIT.DEPTH Hev= .00ft FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE CRIT.DEPTH CONTROL Vh= .557ft Dcr= 1.287ft CRIT.DEPTH Hev= .00ft INLET CONTROL... Submerged: HW =3.01 INLET CONTROL... Submerged: HW =5.16 INLET CONTROL... Submerged: HW =7.50 INLET CONTROL... Submerged: HW =8.00
--

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 10 years
 Storm Event: CO SPRINGS - 10 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)
 Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(Into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,933.50	Free Outfall	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,934.00	Free Outfall	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,934.50	Free Outfall	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,935.00	Free Outfall	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,935.50	Free Outfall	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.60	6,936.00	Free Outfall	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,936.50	Free Outfall	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,937.00	Free Outfall	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	0.83	6,937.50	6,933.15	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	0.80	6,938.00	6,933.96	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	0.74	6,938.50	6,935.01	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	0.54	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	0.00	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	0.00	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 HI=.50; Ht=4.00; Qt=.07
 HI=1.00; Ht=4.00; Qt=.07
 HI=1.50; Ht=4.00; Qt=.07
 HI=2.00; Ht=4.00; Qt=.07
 HI=2.50; Ht=4.00; Qt=.07
 HI=3.00; Ht=4.00; Qt=.07
 HI=3.50; Ht=4.00; Qt=.07
 H =4.00
 H =4.35
 H =4.04
 H =3.49
 H =1.84
 FLOW PRECEDENCE SET TO
 DOWNSTREAM CONTROLLING
 STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 10 years
Storm Event: CO SPRINGS - 10 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 1 (Culvert-Circular)

Message

FLOW PRECEDENCE SET TO
DOWNSTREAM CONTROLLING
STRUCTURE

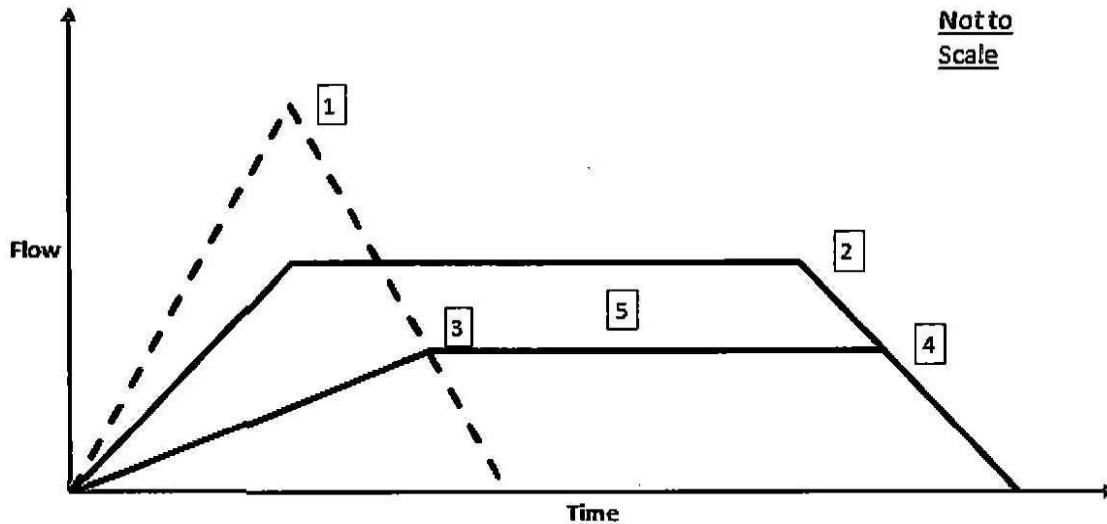
Subsection: Modified Rational Graph

Label: Basins

Return Event: 10 years

Storm Event: CO SPRINGS - 10 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	0.383 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	0.288	hours	Time of Duration (Modified Rational, Critical)	0.383	hours
Intensity (Modified Rational, Peak)	3.801	in/h	Intensity (Modified Rational, Critical)	3.286	in/h
Flow (Modified Rational, Peak)	25.96	ft ³ /s	Flow (Modified Rational, Critical)	22.45	ft ³ /s
[3]			[5]		
First Outflow Breakpoint (Modified Rational, Method T)		0.518 hours			
Flow (Modified Rational, Allowable)		12.00 ft ³ /s			
[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	0.443	hours	Storage (Modified Rational, Estimated)	0.341	ac-ft
Flow (Modified Rational, Allowable)	12.00	ft ³ /s			

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Project Summary

Title	BENT GRASS RESIDENTIAL FILING NO.1
Engineer	MAW
Company	CLASSIC CONSULTING
Date	7/10/2014

Notes	POND 1 100 YEAR
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Pond 1 (IN)		
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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
Basins	Post-Development 100 Year	100	1.657	0.300	28.64

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	Post-Development 100 Year	100	1.305	0.900	6.77

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 1 (IN)	Post-Development 100 Year	100	1.657	0.300	28.64	(N/A)	(N/A)
Pond 1 (OUT)	Post-Development 100 Year	100	1.305	0.900	6.77	6,937.61	1.525

Subsection: I-D-F Table
Label: CO SPRINGS

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.083	9.070
0.167	7.290
0.250	6.160
0.333	5.360
0.417	4.770
0.500	4.310
0.583	3.940
0.667	3.630
0.750	3.380
0.833	3.160
0.917	2.980
1.000	2.810

Subsection: Elevation-Area Volume Curve

Return Event: 100 years

Label: Pond 1

Storm Event: CO SPRINGS - 100 Year

Elevation (ft)	Planimeter (ft ²)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
6,932.00	0.0	0.005	0.000	0.000	0.000
6,934.00	0.0	0.292	0.335	0.223	0.223
6,936.00	0.0	0.367	0.986	0.658	0.881
6,938.00	0.0	0.451	1.225	0.817	1.698
6,940.00	0.0	0.545	1.492	0.995	2.692

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: CO SPRINGS - 100 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	6,932.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	6,940.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Inlet Box	Riser - 1	Forward	Culvert - 1	6,937.00	6,940.00
Orifice-Area	Orifice - 1	Forward	Culvert - 1	6,933.00	6,940.00
Culvert-Circular	Culvert - 1	Forward	TW	6,932.00	6,940.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: Composite Outlet Structure - 1

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
Number of Openings	1
Elevation	6,937.00 ft
Orifice Area	10.2 ft ²
Orifice Coefficient	0.600
Weir Length	4.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Subsection: Outlet Input Data
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: CO SPRINGS - 100 Year

Structure ID: Culvert - 1	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 in
Length	60.00 ft
Length (Computed Barrel)	60.03 ft
Slope (Computed)	0.033 ft/ft
Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.012
Kr	0.000
Convergence Tolerance	0.00 ft
Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.079
T2 ratio (HW/D)	1.181
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
 Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...

T1 Elevation	6,934.16 ft	T1 Flow	15.55 ft ³ /s
T2 Elevation	6,934.36 ft	T2 Flow	17.77 ft ³ /s

Subsection: Outlet Input Data
Label: Composite Outlet Structure - 1

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

Structure ID: Orifice - 1	
Structure Type: Orifice-Area	
Number of Openings	12
Elevation	6,933.00 ft
Orifice Area	0.0 ft ²
Top Elevation	6,937.00 ft
Datum Elevation	6,933.00 ft
Orifice Coefficient	0.600
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall
Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: CO SPRINGS - 100 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)
 Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.00	0.00	0.00	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.00	0.00	0.00	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.00	0.00	0.00	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.00	0.00	0.00	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.00	0.00	0.00	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.00	0.00	0.00	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.00	0.00	0.00	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.00	0.00	0.00	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	4.24	6,937.50	Free Outfall	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	12.00	6,938.00	Free Outfall	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	22.05	6,938.50	Free Outfall	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	33.94	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	47.43	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	62.35	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 Weir: H =0.5ft
 Weir: H =1ft
 Weir: H =1.5ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2ft
 FULLY CHARGED RISER: ADJUSTED TO
 WEIR: H =2.5ft

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Riser - 1 (Inlet Box)

Upstream ID = (Pond Water Surface)

Downstream ID = Culvert - 1 (Culvert-Circular)

Message

FULLY CHARGED RISER: ADJUSTED TO WEIR: H = 3ft

Subsection: Individual Outlet Curves
 Label: Composite Outlet Structure - 1

Return Event: 100 years
 Storm Event: CO SPRINGS - 100 Year

RATING TABLE FOR ONE OUTLET TYPE
 Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s
 Upstream ID = Riser - 1, Orifice - 1
 Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	Free Outfall	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,932.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,932.21	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,932.26	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,932.30	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,932.34	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.00	0.61	6,932.38	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,932.40	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,932.43	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,937.50	5.07	6,933.15	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.00	12.79	6,933.96	Free Outfall	Free Outfall	0.00	0.00	(N/A)	0.00
6,938.50	22.77	6,935.01	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.00	34.46	6,937.16	Free Outfall	Free Outfall	0.00	0.02	(N/A)	0.00
6,939.50	43.77	6,939.50	Free Outfall	Free Outfall	0.00	3.67	(N/A)	0.00
6,940.00	45.51	6,940.00	Free Outfall	Free Outfall	0.00	16.84	(N/A)	0.00

Message

WS below an invert; no flow.
 WS below an invert; no flow.
 WS below an invert; no flow.
 CRIT.DEPTH CONTROL Vh= .036ft
 Dcr= .107ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE
 CRIT.DEPTH CONTROL Vh= .083ft
 Dcr= .242ft CRIT.DEPTH Hev= .00ft
 FLOW PRECEDENCE SET TO
 UPSTREAM CONTROLLING
 STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 44.43 ft³/s

Upstream ID = Riser - 1, Orifice - 1

Downstream ID = Tailwater (Pond Outfall)

Message

CRIT.DEPTH CONTROL Vh= .099ft Dcr= .286ft CRIT.DEPTH Hev= .00ft CRIT.DEPTH CONTROL Vh= .106ft Dcr= .306ft CRIT.DEPTH Hev= .00ft FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE CRIT.DEPTH CONTROL Vh= .557ft Dcr= 1.287ft CRIT.DEPTH Hev= .00ft INLET CONTROL... Submerged: HW =3.01 INLET CONTROL... Submerged: HW =5.16 INLET CONTROL... Submerged: HW =7.50 INLET CONTROL... Submerged: HW =8.00
--

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft ³ /s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft ³ /s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
6,932.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,932.50	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.00	0.00	0.00	0.00	0.00	0.00	0.00	(N/A)	0.00
6,933.50	0.10	6,933.50	Free Outfall	6,932.15	0.00	0.00	(N/A)	0.00
6,934.00	0.20	6,934.00	Free Outfall	6,932.21	0.00	0.00	(N/A)	0.00
6,934.50	0.30	6,934.50	Free Outfall	6,932.26	0.00	0.00	(N/A)	0.00
6,935.00	0.40	6,935.00	Free Outfall	6,932.30	0.00	0.00	(N/A)	0.00
6,935.50	0.50	6,935.50	Free Outfall	6,932.34	0.00	0.00	(N/A)	0.00
6,936.00	0.60	6,936.00	Free Outfall	6,932.38	0.00	0.00	(N/A)	0.00
6,936.50	0.69	6,936.50	Free Outfall	6,932.40	0.00	0.00	(N/A)	0.00
6,937.00	0.79	6,937.00	Free Outfall	6,932.43	0.00	0.00	(N/A)	0.00
6,937.50	0.83	6,937.50	6,933.15	6,933.15	0.00	0.00	(N/A)	0.00
6,938.00	0.80	6,938.00	6,933.96	6,933.96	0.00	0.00	(N/A)	0.00
6,938.50	0.74	6,938.50	6,935.01	6,935.01	0.00	0.00	(N/A)	0.00
6,939.00	0.54	6,939.00	6,937.16	6,937.16	0.00	0.00	(N/A)	0.00
6,939.50	0.00	6,939.50	6,939.50	6,939.50	0.00	0.00	(N/A)	0.00
6,940.00	0.00	6,940.00	6,940.00	6,940.00	0.00	0.00	(N/A)	0.00

Message

WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
Hi=.50; Ht=4.00; Qt=.07
Hi=1.00; Ht=4.00; Qt=.07
Hi=1.50; Ht=4.00; Qt=.07
Hi=2.00; Ht=4.00; Qt=.07
Hi=2.50; Ht=4.00; Qt=.07
Hi=3.00; Ht=4.00; Qt=.07
Hi=3.50; Ht=4.00; Qt=.07
H =4.00
H =4.35
H =4.04
H =3.49
H =1.84
FLOW PRECEDENCE SET TO
DOWNSTREAM CONTROLLING
STRUCTURE

Subsection: Individual Outlet Curves
Label: Composite Outlet Structure - 1

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Area)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

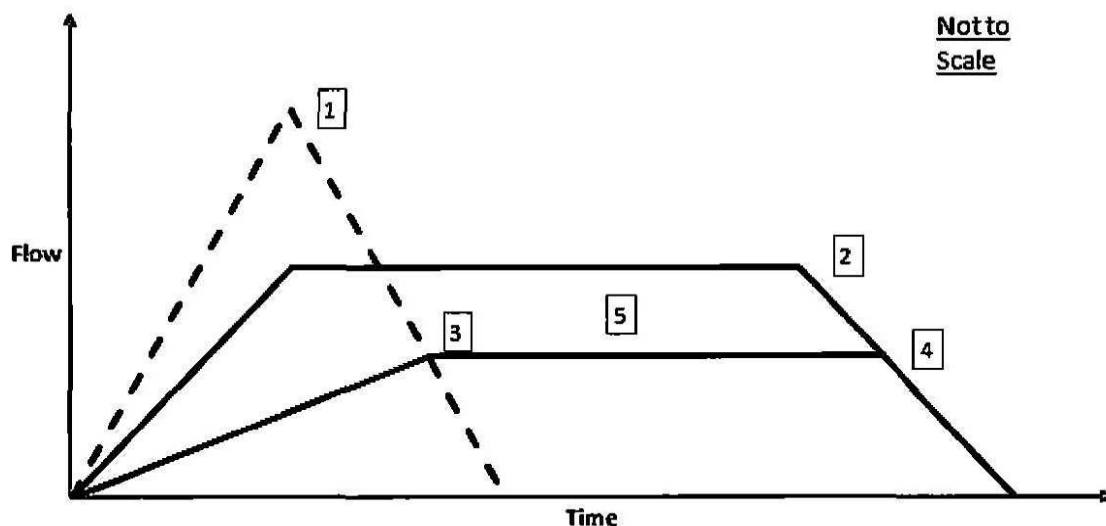
Message

FLOW PRECEDENCE SET TO
DOWNSTREAM CONTROLLING
STRUCTURE

Subsection: Modified Rational Graph
Label: Basins

Return Event: 100 years
Storm Event: CO SPRINGS - 100 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	0.700 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	0.288	hours	Time of Duration (Modified Rational, Critical)	0.700	hours
Intensity (Modified Rational, Peak)	5.792	in/h	Intensity (Modified Rational, Critical)	3.530	in/h
Flow (Modified Rational, Peak)	46.99	ft ³ /s	Flow (Modified Rational, Critical)	28.64	ft ³ /s
[3]			[5]		
First Outflow Breakpoint (Modified Rational, Method T)		0.867 hours	Storage (Modified Rational, Estimated)	0.986	ac-ft
Flow (Modified Rational, Allowable)		12.00 ft ³ /s			
[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	0.503	hours	Storage (Modified Rational, Estimated)	0.986	ac-ft
Flow (Modified Rational, Allowable)	12.00	ft ³ /s			

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Composite Outlet Structure - 1 (Outlet Input Data, 100 years)...5, 6, 7, 8

M

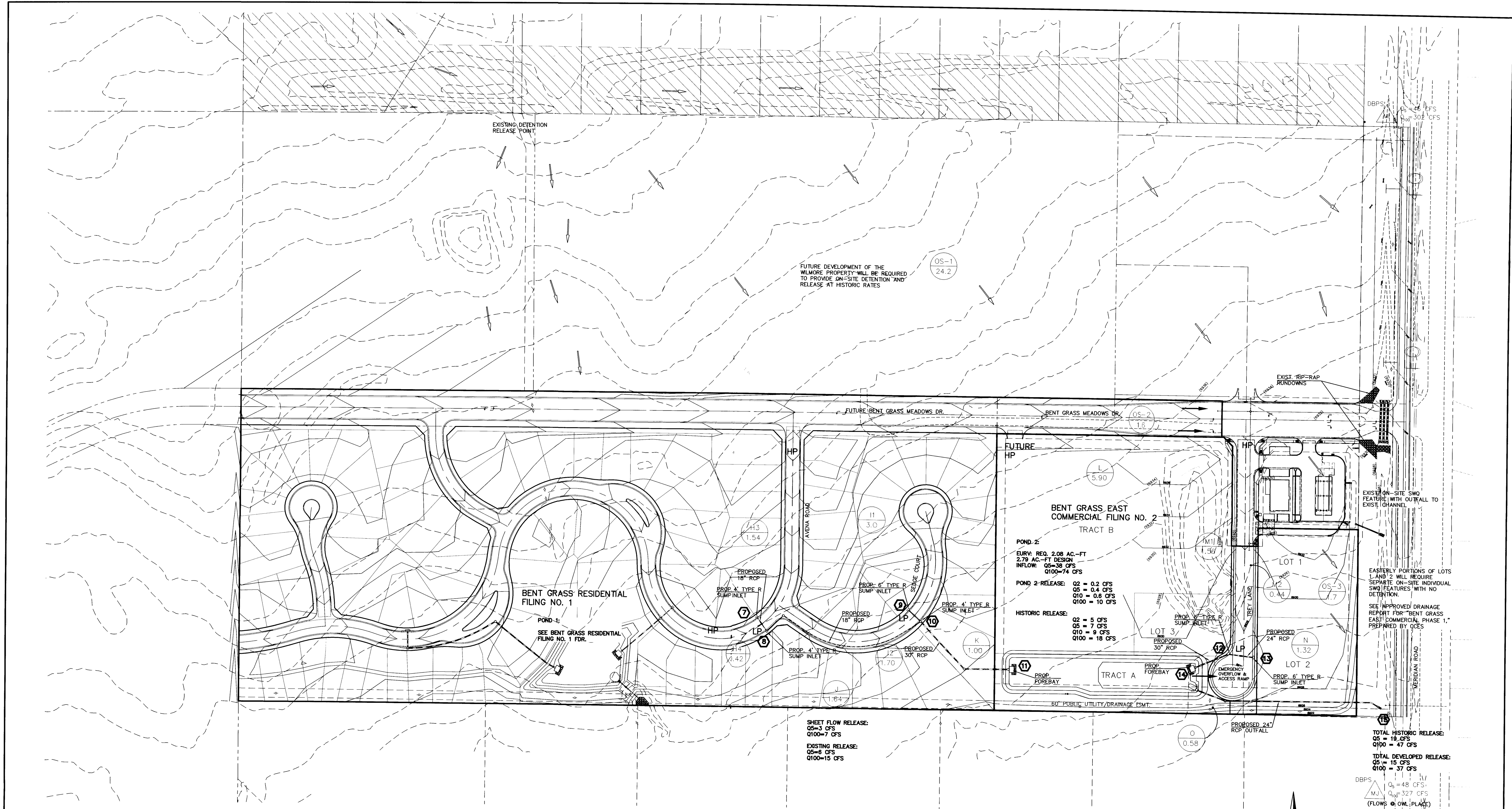
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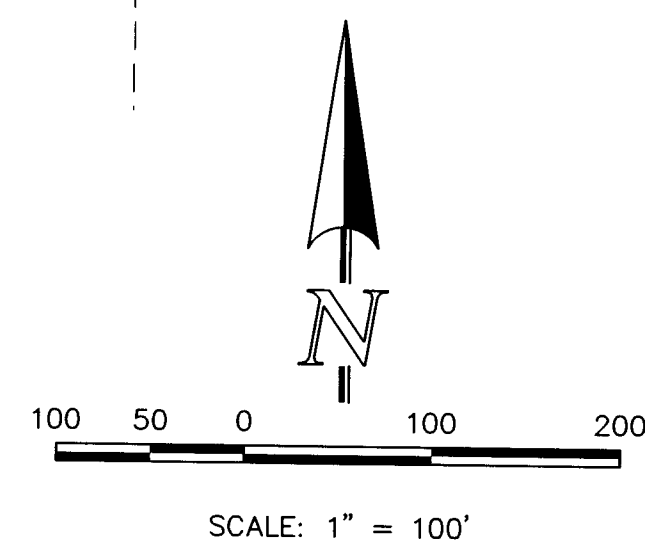


LEGEND

- EXISTING GROUND CONTOUR 5910
PROPOSED FINISHED CONTOUR 5910
SUBDIVISION BOUNDARY
LOT LINE
PROPOSED BASIN BOUNDARY
DIRECTION OF DRAINAGE
EXISTING STORM SEWER
EXISTING STORM INLET
- PROPOSED STORM SEWER
PROPOSED STORM INLET
LOW POINT/HIGH POINT
BASIN IDENTIFIER
AREA IN ACRES
DESIGN POINT
- LP/HP
1.41

FINAL DRAINAGE REPORT - BASIN RUNOFF SUMMARY																								
BASIN	WEIGHTED CA(5)	CA(100)	OVERLAND		STREET / CHANNEL FLOW		Tc (min)	INTENSITY										TOTAL FLOWS						
			C(5)	Length (ft)	Height (ft)	Tc (min)		Q(5)	Q(10)	Q(25)	Q(50)	Q(100)	Q(2)	Q(5)	Q(10)	Q(25)	Q(50)	Q(100)						
OS-1	8.05	8.47	0.25	950	22	37.1																		
OS-2	1.38	1.46	0.25	50	37.1	1.55	2.14	2.49	3.21	3.63	3.90	4.15	4.39	4.63	4.87	5.11	5.35	5.59	5.83	6.07	6.31	6.55	6.79	7.03
OS-3	1.34	1.44	0.25	30	0.6	6.9	200	1.5%	4.3	0.8	7.7	3.27	4.50	5.25	6.75	7.85	8.95	10.05	11.15	12.25	13.35	14.45	15.55	16.65
H3	0.85	1.00	0.25	100	2	12.8	350	2.0%	4.9	1.2	13.8	2.61	3.59	4.19	5.39	6.11	6.91	7.71	8.51	9.31	10.11	10.91	11.71	12.51
H4	0.23	0.27	0.25	50	1	8.9	150	2.0%	4.9	0.5	9.4	3.05	4.15	4.65	5.95	6.75	7.55	8.35	9.15	9.95	10.75	11.55	12.35	13.15
I1	1.65	1.95	0.25	50	1	8.9	550	2.0%	4.9	1.9	10.8	2.89	3.95	4.65	5.97	6.77	7.58	8.38	9.18	9.98	10.78	11.58	12.38	13.18
I2	0.94	1.11	0.25	50	1	8.9	300	2.0%	4.9	1.0	10.0	2.99	4.11	4.79	6.16	6.99	7.81	8.64	9.47	10.30	11.13	11.96	12.79	13.62
J	0.66	0.90	0.25	75	4	7.9																		
K	0.40	0.55	0.25	65	3	7.7																		
L	4.00	4.93	0.25	30	0.6	6.9	800	1.0%	3.5	3.8	10.7	2.90	3.99	4.65	5.99	6.78	7.57	8.36	9.15	9.94	10.73	11.52	12.31	13.10
M	1.33	1.40	0.25	30	0.6	6.9	300	1.0%	3.5	1.4	8.4	3.18	4.38	5.11	6.57	7.44	8.31	9.18	10.05	10.92	11.79	12.66	13.53	14.40
M2	0.37	0.40	0.25																					
N	1.12	1.19	0.25	20	0.4	5.7	300	2.0%	4.9	1.1	6.8	3.41	4.69	5.47	7.04	7.97	8.94	9.91	10.88	11.85	12.82	13.79	14.76	15.73
O	0.15	0.20	0.25	60	5	6.1																		

FINAL DRAINAGE REPORT - SURFACE ROUTING SUMMARY													
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity				Flow				Facility Size
					I(5)	I(100)	Q(5)	Q(100)	Q(5)	Q(100)	Q(5)	Q(100)	
7	H3	0.85	1.00	13.8	3.59	6.38	3	6	4" TYPE R SUMP INLET				
8	H4	0.23	0.27	9.4	4.19	7.45	1	2	4" TYPE R SUMP INLET				
9	I1	1.65	1.95	10.8	3.98	7.08	7	14	6" TYPE R SUMP INLET				
10	I2	0.94	1.11	10.0	4.11	7.31	4	8	4" TYPE R SUMP INLET				
11	DP 7 - DP 10 (Westerly Flow into Pond 2)	3.66	4.33	16.9	3.27	5.82	12	25	30" RCP				
12	M1	1.33	1.40	8.4	4.38	7.78	6	11	4" TYPE R SUMP INLET				
13	M2 & N	1.50	1.58	6.8	4.69	8.34	7	13	6" TYPE R SUMP INLET				
14	DP 12 & DP 13 (Easterly Flow into Pond 2)	2.82	2.99	8.9	4.29	7.63	12	23	30" RCP				
15	Total Flow into Pond 2 (incl. Basins K & L) OS-1, OS-2, OS-3, O AND POND 2 RELEASE	11.48	12.79	16.9	3.27	5.82	38	74	23 AC-FT POND 2				



CLASSIC CONSULTING ENGINEERS & SURVEYORS

6385 Corporate Drive, Suite 101
Colorado Springs, Colorado 80919

(719) 785-0790
(719) 785-0799 (Fax)

BENT GRASS EAST COMM. FILING NO. 2

FINAL DRAINAGE REPORT
DEVELOPED CONDITIONS MAP

DESIGNED BY	MAW	SCALE	DATE
DRAWN BY	MAW	(H) 1" = 100'	SHEET 1 OF 1
CHECKED BY	(V) 1" = N/A	JOB NO.	2177-53

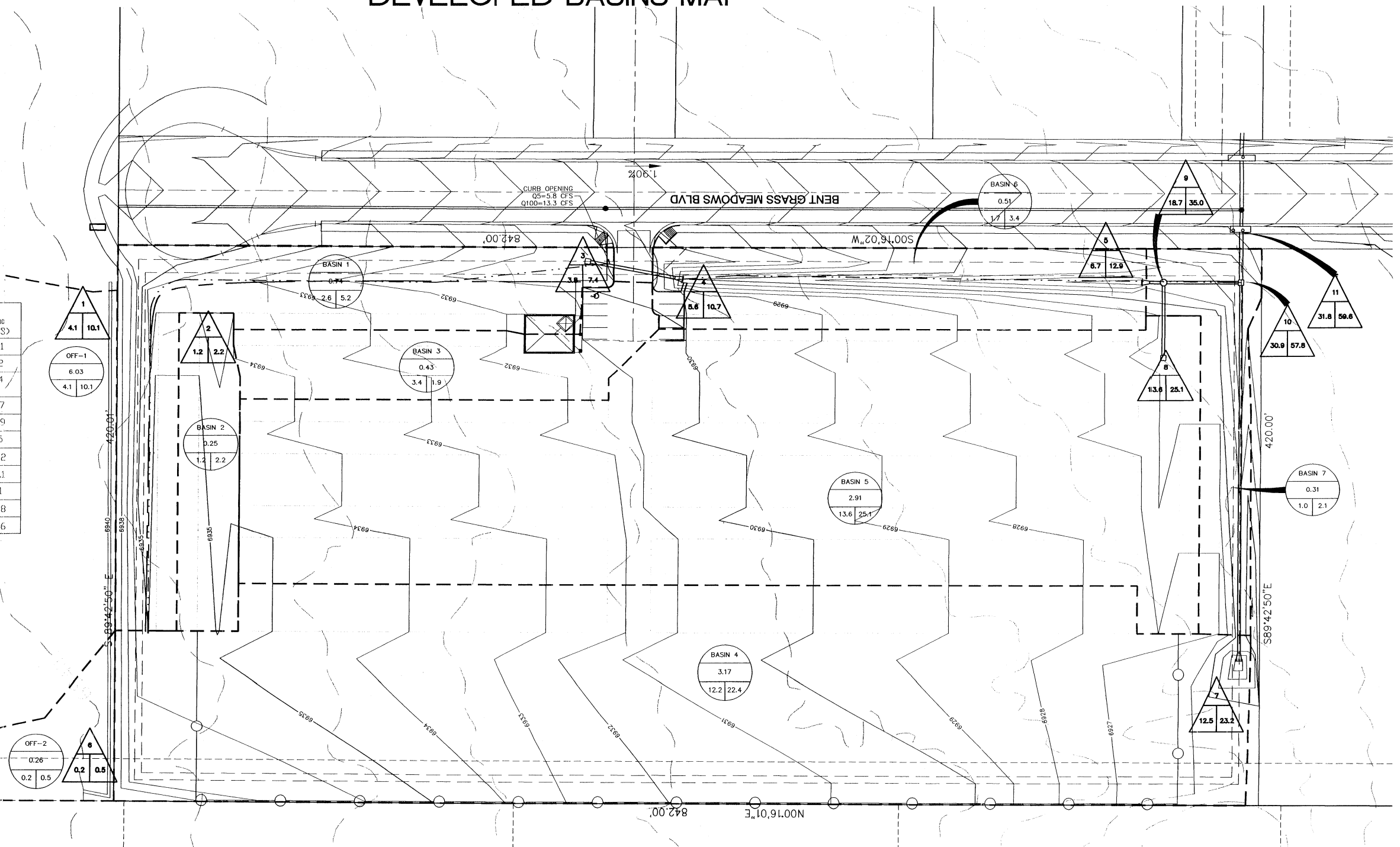


SCALE: 1"=40'



LOT 1 LATIGO BUSINESS CENTER DEVELOPED BASINS MAP

DESIGN POINT	CONTRIBUTING BASINS	TIME OF CONCENTRATION (MINUTES)	Q ₅ (CFS)	Q ₁₀₀ (CFS)
1	OFF-1	22.6	4.1	10.1
2	BASIN 2	5.0	1.2	2.2
3	BASIN 1, BASIN 2	5.2	3.8	7.4
4	DP-3, BASIN 3	5.3	5.6	10.7
5	DP-4, BASIN 6	7.3	6.7	12.9
6	OFF-2	17.5	0.2	0.5
7	DP-6, BASIN 4	7.1	12.5	23.2
8	BASIN 5	5.0	13.6	25.1
9	BASIN 7	6.4	1.0	2.1
10	DP-9, DP-7	7.4	30.9	57.8
11	DP-10, BASIN 7	7.4	31.8	59.6



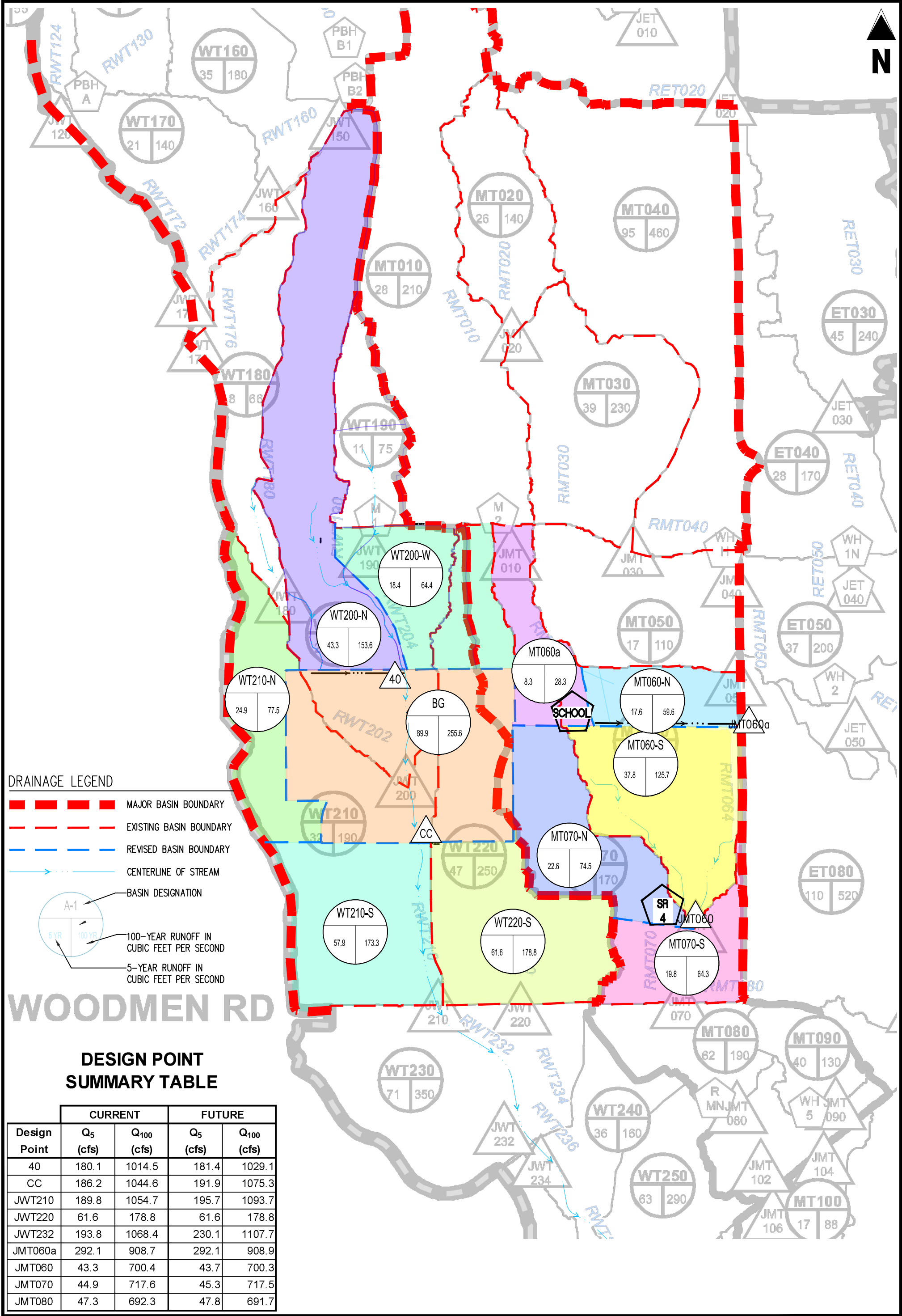
REVISIONS:		
NO.	DESCRIPTION	DATE

ENGINEER: _____
DESIGNED BY: DC DATE: 7/17/04
DRAWN BY: DC DATE: 7/17/04
CHECKED BY: XXX DATE: XX/XX/XX

48 HOURS BEFORE YOU DIG,
CALL UTILITY LOCATORS
1-800-922-1987
(SEE COVER FOR LIST OF UTILITY CONTACTS)

PROJECT LATIGO BUSINESS CENTER LOT 1
SHEET TITLE NA
FROM _____ TO _____
JOB NO. 2004-1 SHEET 2 OF 2

APPENDIX B
Hydrologic Computations



FALCON MEADOWS AT BENT GRASS
MDDP

REVISED BASIN HYDROLOGY - HMS MODEL

Project No:	CLH0017
Drawn By:	CMD
Checked By:	GD
Date:	06/16/21

Galloway

6162 S. Willow Drive, Suite 320
Greenwood Village, CO 80111
303.770.8884 • GallowayUS.com

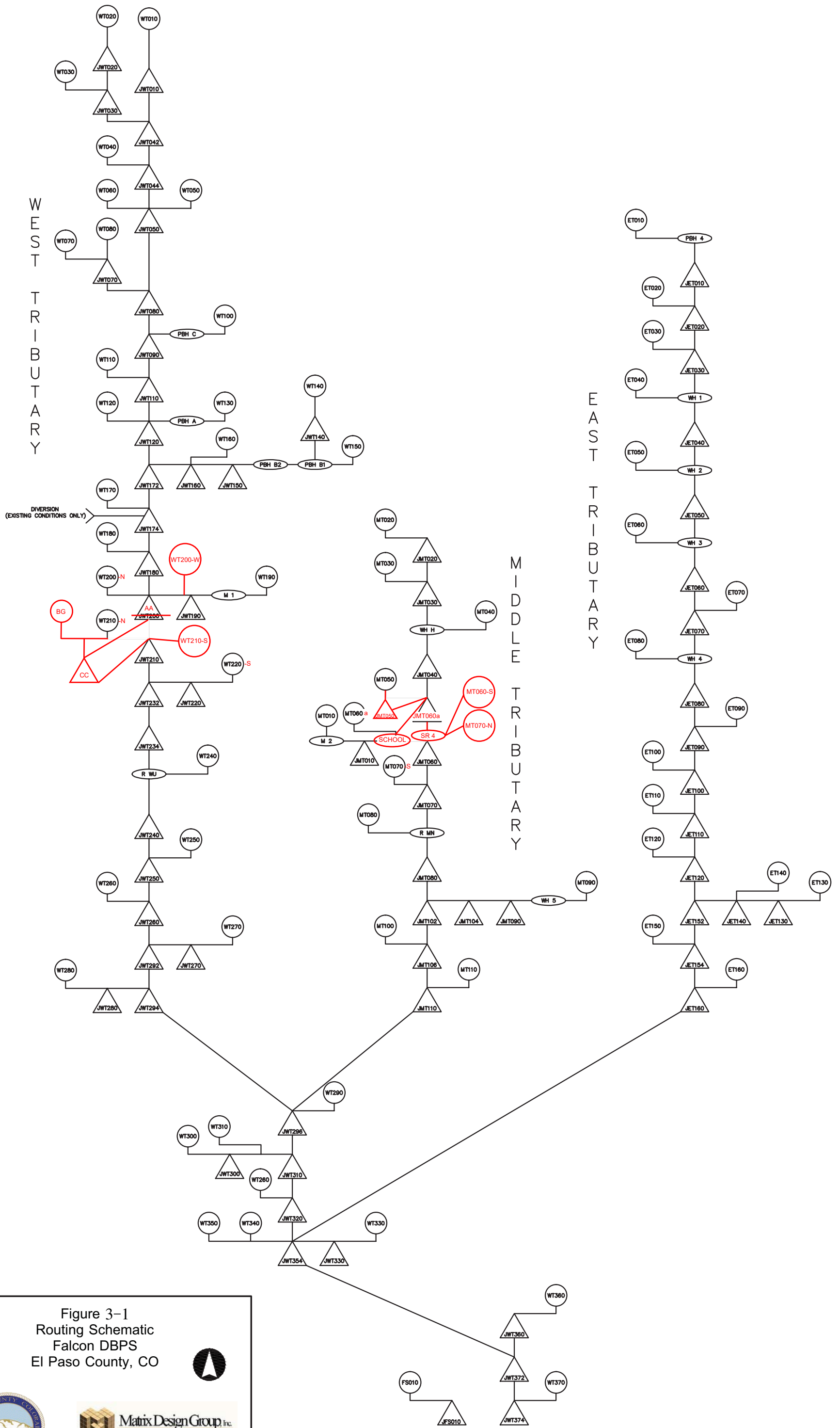


Figure 3-1
Routing Schematic
Falcon DBPS
El Paso County, CO



DRAWING NOT TO SCALE

Current HMS Model

REVISED BASINS - FALCON DBPS MODEL

BASIN	AREA (AC)	AREA (mi ²)	CURVE NUMBER	LAG TIME (MIN)*
<i>West Tributary</i>				
WT200-N	122.5	0.191	64	0.446
WT200-W	43.5	0.068	64	0.350
WT210-N	47.5	0.074	70	0.430
BG	117.9	0.184	55 (Current) 80 (Future)	0.430
WT210-S	74.9	0.117	70	0.464
WT220-S	75.7	0.118	72	0.258
<i>Middle Tributary</i>				
MT060a	19.8	0.031	66	0.420
MT060-N	28.2	0.062	66	0.386
MT060-S	70.9	0.111	66	0.296
MT070-N	53.9	0.084	68	0.480
MT070-S	37.3	0.058	68	0.346

*Lag time = 0.6 t₀

CURRENT HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT020	0.0671383	41.9	01Jan2011, 06:21	4.8
JWT020	0.0671383	41.9	01Jan2011, 06:21	4.8
RWT030	0.0671383	41.9	01Jan2011, 06:29	4.8
WT030	0.0764732	75.3	01Jan2011, 06:07	5.5
JWT030	0.1436115	85.4	01Jan2011, 06:09	10.3
RWT042	0.1436115	85.3	01Jan2011, 06:15	10.3
WT010	0.13533	88.9	01Jan2011, 06:17	9.3
JWT010	0.13533	88.9	01Jan2011, 06:17	9.3
RWT044	0.13533	88.8	01Jan2011, 06:24	9.3
JWT042	0.2789415	167	01Jan2011, 06:21	19.6
RWT046	0.2789415	166.7	01Jan2011, 06:28	19.6
WT040	0.18506	92.7	01Jan2011, 06:28	12.8
JWT044	0.4640015	259.4	01Jan2011, 06:28	32.4
RWT054	0.4640015	258.8	01Jan2011, 06:35	32.3
WT060	0.19563	116.8	01Jan2011, 06:26	15.1
WT050	0.18993	139.4	01Jan2011, 06:19	15.3
JWT050	0.8495615	475.4	01Jan2011, 06:31	62.7
RWT092	0.8495615	475.2	01Jan2011, 06:32	62.7
WT070	0.1711	133.9	01Jan2011, 06:12	11.8
JWT070	0.1711	133.9	01Jan2011, 06:12	11.8
RWT080	0.1711	133.4	01Jan2011, 06:22	11.8
WT080	0.0691596	67.3	01Jan2011, 06:10	5.6
Sub Regional Pond SR1	1.0898211	513.2	01Jan2011, 06:40	78.4
JWT080	1.0898211	513.2	01Jan2011, 06:40	78.4
RWT094	1.0898211	512.4	01Jan2011, 06:45	78.3
WT100-REV	0.12927	203	01Jan2011, 06:04	12.9
W26-REV	0.072	103.6	01Jan2011, 06:03	6.4
WS3-1	0.072	102.8	01Jan2011, 06:10	6.4
Paint Brush Hills Pond C	0.20127	64.4	01Jan2011, 06:26	19.2
WT090	0.15333	162.4	01Jan2011, 06:09	12.8
JWT090	1.4444211	595.9	01Jan2011, 06:44	110.2
RWT122	1.4444211	595.5	01Jan2011, 06:45	110.2
WT110	0.19428	169.9	01Jan2011, 06:14	16.2
JWT110	1.6387011	651	01Jan2011, 06:43	126.4
RWT124	1.6387011	650.8	01Jan2011, 06:47	126.3
WT130-REV	0.101625	130	01Jan2011, 06:11	10.9
Paint Brush Hills Pond A	0.101625	53.8	01Jan2011, 06:32	10.9
WT120-REV	0.04303	51.1	01Jan2011, 06:08	3.8
JWT120	1.7833561	703.6	01Jan2011, 06:46	140.9
RWT172	1.7833561	702.5	01Jan2011, 06:58	140.5
WT140-REV	0.14453	194.2	01Jan2011, 06:12	16.8
JWT140	0.14453	194.2	01Jan2011, 06:12	16.8

CURRENT HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT150	0.14453	193.3	01Jan2011, 06:22	16.8
WT150-REV	0.13081	202.5	01Jan2011, 06:08	15
Paint Brush Hills Pond B1	0.27534	235.6	01Jan2011, 06:29	31.8
W34B2-REV	0.09359	141.8	01Jan2011, 06:07	10.2
Paint Brush Hills Pond B2	0.36893	234.3	01Jan2011, 06:43	38.9
JWT150	0.36893	234.3	01Jan2011, 06:43	38.9
RWT160	0.36893	234.2	01Jan2011, 06:49	38.8
WT160-REV	0.07348	109.9	01Jan2011, 06:06	7.5
JWT160	0.44241	244.8	01Jan2011, 06:48	46.3
RWT174	0.44241	244.7	01Jan2011, 06:56	46.2
WT170-REV	0.106015	85.2	01Jan2011, 06:19	9.2
W34-CY-REV	0.0465469	38.1	01Jan2011, 06:16	3.8
JWT172	2.378328	981.9	01Jan2011, 06:56	199.7
RWT176	2.378328	981.6	01Jan2011, 06:57	199.7
Sub Regional Pond SR2	2.378328	972.9	01Jan2011, 07:01	194.8
JWT174	2.378328	972.9	01Jan2011, 07:01	194.8
RWT180	2.378328	972.1	01Jan2011, 07:10	194.2
WT180-REV	0.04094	29.3	01Jan2011, 06:19	3.2
JWT180	2.419268	978	01Jan2011, 07:10	197.4
RWT202	2.419268	977.7	01Jan2011, 07:16	197.1
WT200-N	0.191	153.6	01Jan2011, 06:19	16.5
WT200-W	0.068	64.4	01Jan2011, 06:13	5.9
WT190	0.0574561	74.7	01Jan2011, 06:05	5
The Meadows Pond #1	0.0574561	2.1	01Jan2011, 08:29	2.8
JWT190	0.0574561	2.1	01Jan2011, 08:29	2.8
RWT204	0.0574561	2.1	01Jan2011, 08:46	2.7
→ 40	2.7357241	1014.5	01Jan2011, 07:15	222.2
RWT206	2.7357241	1013.2	01Jan2011, 07:18	221.9
→ BG	0.184	125	01Jan2011, 06:18	13.3
WT210-N	0.074	77.5	01Jan2011, 06:17	7.8
→ CC	2.9937241	1044.6	01Jan2011, 07:17	243
→ RWT210	2.9937241	1044.2	01Jan2011, 07:21	242.7
WT210-S	0.117	173.3	01Jan2011, 06:07	12.4
JWT210	3.1107241	1054.7	01Jan2011, 07:21	255.1
RWT232	3.1107241	1054.3	01Jan2011, 07:25	254.7
WT220-S	0.118	178.8	01Jan2011, 06:08	13.3
JWT220	0.118	178.8	01Jan2011, 06:08	13.3
RWT234	0.118	177.6	01Jan2011, 06:18	13.3
JWT232	3.2287241	1068.4	01Jan2011, 07:24	268
RWT236	3.2287241	1068.3	01Jan2011, 07:24	268
WT230	0.19818	346.7	01Jan2011, 06:05	23.1
JWT234	3.4269041	1085.8	01Jan2011, 07:24	291

CURRENT HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT240	3.4269041	1085.2	01Jan2011, 07:27	290.8
WT240	0.0761461	160.3	01Jan2011, 06:01	9.1
Regional Pond WU North	3.5030502	1091.2	01Jan2011, 07:28	298.7
Regional Pond WU Diversion	3.5030502	1052.5	01Jan2011, 07:28	255.7
Old Meridian	0.03359	85	01Jan2011, 06:07	6.1
RWT-OM	0.03359	84.2	01Jan2011, 06:12	6.1
→ Regional Pond WU South	3.5366402	882.4	01Jan2011, 07:49	254.7
RWT240_Diversion Reach	0	38.7	01Jan2011, 07:33	42.8
JWT240	3.5366402	920.8	01Jan2011, 07:49	297.5
RWT250	3.5366402	920.6	01Jan2011, 07:50	297.4
WT250	0.14695	291.4	01Jan2011, 06:02	17.1
JWT250	3.6835902	932.9	01Jan2011, 07:50	314.5
RWT260	3.6835902	932.4	01Jan2011, 08:01	313.5
WT260	0.1388002	77.5	01Jan2011, 06:34	11.5
JWT260	3.8223904	946.2	01Jan2011, 08:00	325
RWT291	3.8223904	946.2	01Jan2011, 08:02	324.8
WT270	0.0324738	57.1	01Jan2011, 06:04	3.6
JWT270	0.0324738	57.1	01Jan2011, 06:04	3.6
RWT292	0.0324738	56.9	01Jan2011, 06:08	3.5
JWT292	3.8548642	948.8	01Jan2011, 08:02	328.3
RWT295	3.8548642	948.6	01Jan2011, 08:03	328.2
WT280	0.26695	251.8	01Jan2011, 06:12	22.3
JWT280	0.26695	251.8	01Jan2011, 06:12	22.3
RWT294	0.26695	251.2	01Jan2011, 06:15	22.2
JWT294	4.1218142	966.4	01Jan2011, 08:03	350.4
RWT296	4.1218142	965.9	01Jan2011, 08:09	349.7
MT040	0.30842	455.2	01Jan2011, 06:11	38.1
MT030	0.15663	228.6	01Jan2011, 06:05	15.1
MT020	0.0902033	143.1	01Jan2011, 06:04	9
JMT020	0.0902033	143.1	01Jan2011, 06:04	9
RMT030	0.0902033	141.8	01Jan2011, 06:17	8.9
JMT030	0.2468333	294.4	01Jan2011, 06:07	24
RMT040	0.2468333	293	01Jan2011, 06:11	24
Woodmen Hills Pond H	0.5552533	751.7	01Jan2011, 06:11	61.7
JMT040	0.5552533	751.7	01Jan2011, 06:11	61.7
RMT050	0.5552533	745.8	01Jan2011, 06:14	61.7
MT050	0.11861	109.7	01Jan2011, 06:18	11.4
JMT050	0.6738633	851.9	01Jan2011, 06:14	73.1
→ RMT062	0.6738633	849.2	01Jan2011, 06:16	73
MT010	0.28989	139.9	01Jan2011, 06:24	17.7
The Meadows Pond #2	0.28989	63.4	01Jan2011, 06:55	14.1
JMT010	0.28989	63.4	01Jan2011, 06:55	14.1

CURRENT HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
MT060a	0.0311	28.3	01Jan2011, 06:17	2.9
School Site	0.32099	60.1	01Jan2011, 07:16	16.1
RMT060a	0.32099	60.1	01Jan2011, 07:21	16.1
MT060-N	0.062	59.6	01Jan2011, 06:15	5.7
JMT060a	1.0568533	908.7	01Jan2011, 06:16	94.9
RMT064	1.0568533	905.9	01Jan2011, 06:20	94.8
MT060-S	0.111	125.7	01Jan2011, 06:10	10.3
MT070-N	0.084	74.5	01Jan2011, 06:20	8.3
Sub Regional Pond SR4	1.2518533	700.4	01Jan2011, 06:36	98.8
JMT060	1.2518533	700.4	01Jan2011, 06:36	98.8
RMT070	1.2518533	698	01Jan2011, 06:42	98.6
MT070-S	0.058	64.3	01Jan2011, 06:13	5.7
JMT070	1.3098533	717.6	01Jan2011, 06:41	104.3
RMT080	1.3098533	717.2	01Jan2011, 06:43	104.2
MT080	0.0638371	191.9	01Jan2011, 06:00	11
Regional Pond MN	1.3736904	692.3	01Jan2011, 06:49	112.7
JMT080	1.3736904	692.3	01Jan2011, 06:49	112.7
RMT102	1.3736904	689.6	01Jan2011, 06:56	112.4
MT090	0.0435103	127.4	01Jan2011, 06:00	7.1
Woodmen Hills Pond #5	0.0435103	18.6	01Jan2011, 06:07	5.9
JMT090	0.0435103	18.6	01Jan2011, 06:07	5.9
RMT090	0.0435103	18.6	01Jan2011, 06:08	5.9
JMT104	0.0435103	18.6	01Jan2011, 06:08	5.9
RMT104	0.0435103	18.6	01Jan2011, 06:12	5.9
JMT102	1.4172007	704.6	01Jan2011, 06:56	118.3
RMT106	1.4172007	698.9	01Jan2011, 06:57	118.2
MT100	0.0557682	88.2	01Jan2011, 06:05	5.9
JMT106	1.4729689	705.7	01Jan2011, 06:57	124.1
RMT112	1.4729689	702.5	01Jan2011, 07:10	123.5
MT110	0.11639	117.4	01Jan2011, 06:16	11.5
JMT110	1.5893589	721.5	01Jan2011, 07:10	135
RMT114	1.5893589	720.2	01Jan2011, 07:15	134.7
WT290	0.10378	110.3	01Jan2011, 06:09	8.7
Regional Pond R1	5.8149531	1354.4	01Jan2011, 07:22	485.6
JWT296	5.8149531	1354.4	01Jan2011, 07:22	485.6
RWT314	5.8149531	1353.7	01Jan2011, 07:28	484.7
WT300	0.0970199	91.6	01Jan2011, 06:12	8.1
JWT300	0.0970199	91.6	01Jan2011, 06:12	8.1
RWT312	0.0970199	91.1	01Jan2011, 06:29	8.1
WT310	0.27742	246.7	01Jan2011, 06:13	22.3
JWT310	6.189393	1387.9	01Jan2011, 07:27	515.1
RWT320	6.189393	1385.8	01Jan2011, 07:34	514.1

CURRENT HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT320	0.20614	200.6	01Jan2011, 06:11	17.2
JWT320	6.395533	1400.7	01Jan2011, 07:33	531.3
RWT352	6.395533	1398.5	01Jan2011, 07:43	530.2
ET020	0.21317	360.5	01Jan2011, 06:06	24.8
ET010	0.14513	198.3	01Jan2011, 06:11	16.4
Paint Brush Hills Pond #4	0.14513	150.9	01Jan2011, 06:20	16.3
JET010	0.14513	150.9	01Jan2011, 06:20	16.3
RET020	0.14513	150	01Jan2011, 06:37	16.3
Sub Regional Pond SR6	0.3583	195.4	01Jan2011, 06:41	37.9
JET020	0.3583	195.4	01Jan2011, 06:41	37.9
RET030	0.3583	194.9	01Jan2011, 07:02	37.5
ET030	0.20428	242	01Jan2011, 06:15	23
JET030	0.56258	266	01Jan2011, 06:43	60.5
RET040	0.56258	265.2	01Jan2011, 06:50	60.3
Woodmen Hills Pond #1 North	0.71172	263.5	01Jan2011, 07:09	75.5
ET040	0.14914	165.7	01Jan2011, 06:14	15.3
Woodmen Hills Pond #1 South	0.71172	261.1	01Jan2011, 07:18	69.5
JET040	0.71172	261.1	01Jan2011, 07:18	69.5
RET050	0.71172	261.1	01Jan2011, 07:23	69.4
ET050	0.11719	197.1	01Jan2011, 06:03	11.6
Woodmen Hills Pond #2	0.82891	250.3	01Jan2011, 07:46	79.3
JET050	0.82891	250.3	01Jan2011, 07:46	79.3
RET060	0.82891	250.3	01Jan2011, 07:53	79.1
ET060	0.28543	529.3	01Jan2011, 06:01	29.3
Woodmen Hills Pond #3	1.11434	360.9	01Jan2011, 06:06	105.9
JET060	1.11434	360.9	01Jan2011, 06:06	105.9
RET070	1.11434	356.7	01Jan2011, 06:16	105.6
ET070	0.24975	461	01Jan2011, 06:02	27.3
JET070	1.36409	636.4	01Jan2011, 06:04	132.9
RET080	1.36409	517.5	01Jan2011, 06:23	131.3
ET080	0.29164	517.9	01Jan2011, 06:07	37.1
Woodmen Hills Pond #4	1.65573	288	01Jan2011, 07:00	139.2
JET080	1.65573	288	01Jan2011, 07:00	139.2
RET090	1.65573	287.3	01Jan2011, 07:03	139
ET090	0.12424	133	01Jan2011, 06:22	14.9
JET090	1.77997	330.8	01Jan2011, 06:59	153.9
RET100	1.77997	330.7	01Jan2011, 07:01	153.8
ET100	0.0480615	72	01Jan2011, 06:02	4
JET100	1.8280315	335.4	01Jan2011, 07:01	157.8
RET110	1.8280315	335.2	01Jan2011, 07:05	157.6
ET110	0.22603	198.8	01Jan2011, 06:12	17.5
JET110	2.0540615	362.1	01Jan2011, 07:03	175.1

CURRENT HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RET120	2.0540615	361.3	01Jan2011, 07:09	174.7
ET120	0.10913	89.4	01Jan2011, 06:14	8.5
JET120	2.1631915	403.2	01Jan2011, 06:17	183.2
RET152	2.1631915	402.2	01Jan2011, 06:24	182.9
ET130	0.13481	85.4	01Jan2011, 06:27	11.2
JET130	0.13481	85.4	01Jan2011, 06:27	11.2
RET140	0.13481	84.7	01Jan2011, 06:54	11.1
ET140	0.26759	122.8	01Jan2011, 06:46	22.2
JET140	0.4024	204.8	01Jan2011, 06:51	33.3
RET154	0.4024	204.4	01Jan2011, 07:05	33.2
JET152	2.5655915	572.3	01Jan2011, 07:10	216.1
RET156	2.5655915	572	01Jan2011, 07:14	215.8
ET150	0.17773	136.2	01Jan2011, 06:18	14.3
JET154	2.7433215	595.8	01Jan2011, 07:12	230.1
RET162	2.7433215	595.1	01Jan2011, 07:25	228.9
ET160	0.18892	137.2	01Jan2011, 06:23	16.3
JET160	2.9322415	633.6	01Jan2011, 06:38	245.2
RET164	2.9322415	629	01Jan2011, 06:47	244.7
WT350	0.30377	276.7	01Jan2011, 06:14	26.3
JWT352	9.6315445	2022.8	01Jan2011, 07:40	801.2
RWT354	9.6315445	2022.7	01Jan2011, 07:40	801.2
WT330	0.32668	249.3	01Jan2011, 06:19	27.2
JWT330	0.32668	249.3	01Jan2011, 06:19	27.2
RWT344	0.32668	248.4	01Jan2011, 06:25	27.2
WT340	0.278	147.3	01Jan2011, 06:37	23.1
JWT354	10.2362245	2098.2	01Jan2011, 07:40	851.4
RWT372	10.2362245	2095.5	01Jan2011, 07:46	850.4
WT360	0.065683	54.8	01Jan2011, 06:15	5.3
JWT360	0.065683	54.8	01Jan2011, 06:15	5.3
RWT374	0.065683	54.6	01Jan2011, 06:24	5.3
Regional Pond R2	10.3019075	2098.7	01Jan2011, 07:47	852.3
JWT372	10.3019075	2098.7	01Jan2011, 07:47	852.3
RWT376	10.3019075	2093.2	01Jan2011, 07:57	850.2
WT370	0.21476	123.3	01Jan2011, 06:12	11.5
JWT374_OUTLET	10.5166675	2103.3	01Jan2011, 07:57	861.7
FS010	0.122	74.9	01Jan2011, 06:16	7.7
JFS010_OUTLET	0.122	74.9	01Jan2011, 06:16	7.7

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	15Jun2021, 10:47:37	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	71.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:51
Peak Outflow :	60.1 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 07:16
Total Inflow :	17.0 (AC-FT)	Peak Storage :	2.8 (AC-FT)
Total Outflow :	16.1 (AC-FT)	Peak Elevation :	6958.3 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	15Jun2021, 10:47:37	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	1072.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:20
Peak Outflow :	700.4 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:36
Total Inflow :	113.3 (AC-FT)	Peak Storage :	27.5 (AC-FT)
Total Outflow :	98.8 (AC-FT)	Peak Elevation :	6897.2 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	15Jun2021, 10:47:37	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	727.4 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:43
Peak Outflow :	692.3 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:49
Total Inflow :	115.3 (AC-FT)	Peak Storage :	6.7 (AC-FT)
Total Outflow :	112.7 (AC-FT)	Peak Elevation :	6853.6 (FT)

CURRENT HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT020	0.0671383	10.3	01Jan2011, 06:23	1.4
JWT020	0.0671383	10.3	01Jan2011, 06:23	1.4
RWT030	0.0671383	10.3	01Jan2011, 06:34	1.4
WT030	0.0764732	19.5	01Jan2011, 06:08	1.6
JWT030	0.1436115	20	01Jan2011, 06:09	3
RWT042	0.1436115	19.9	01Jan2011, 06:18	3
WT010	0.13533	21.2	01Jan2011, 06:19	2.6
JWT010	0.13533	21.2	01Jan2011, 06:19	2.6
RWT044	0.13533	21.2	01Jan2011, 06:29	2.6
JWT042	0.2789415	37.2	01Jan2011, 06:24	5.6
RWT046	0.2789415	37.2	01Jan2011, 06:35	5.6
WT040	0.18506	21.9	01Jan2011, 06:31	3.6
JWT044	0.4640015	58.9	01Jan2011, 06:34	9.2
RWT054	0.4640015	58.7	01Jan2011, 06:43	9.2
WT060	0.19563	30.1	01Jan2011, 06:29	4.5
WT050	0.18993	37.3	01Jan2011, 06:21	4.7
JWT050	0.8495615	108.6	01Jan2011, 06:38	18.4
RWT092	0.8495615	108.5	01Jan2011, 06:39	18.4
WT070	0.1711	32.6	01Jan2011, 06:13	3.4
JWT070	0.1711	32.6	01Jan2011, 06:13	3.4
RWT080	0.1711	32.5	01Jan2011, 06:28	3.3
WT080	0.0691596	18.5	01Jan2011, 06:12	1.7
Sub Regional Pond SR1	1.0898211	113.8	01Jan2011, 06:50	21.9
JWT080	1.0898211	113.8	01Jan2011, 06:50	21.9
RWT094	1.0898211	113.7	01Jan2011, 06:58	21.8
WT100-REV	0.12927	67.7	01Jan2011, 06:05	4.5
W26-REV	0.072	33.7	01Jan2011, 06:04	2.1
WS3-1	0.072	33.4	01Jan2011, 06:13	2.1
Paint Brush Hills Pond C	0.20127	14	01Jan2011, 06:38	6.5
WT090	0.15333	46	01Jan2011, 06:10	4
JWT090	1.4444211	133.8	01Jan2011, 06:57	32.3
RWT122	1.4444211	133.7	01Jan2011, 07:01	32.3
WT110	0.19428	47	01Jan2011, 06:16	5.1
JWT110	1.6387011	144	01Jan2011, 07:00	37.4
RWT124	1.6387011	144	01Jan2011, 07:08	37.3
WT130-REV	0.101625	43.5	01Jan2011, 06:12	3.9
Paint Brush Hills Pond A	0.101625	9.3	01Jan2011, 06:49	3.9
WT120-REV	0.04303	14.8	01Jan2011, 06:09	1.2
JWT120	1.7833561	154.4	01Jan2011, 07:08	42.4
RWT172	1.7833561	154.2	01Jan2011, 07:18	42.2
WT140-REV	0.14453	65.2	01Jan2011, 06:14	6.1
JWT140	0.14453	65.2	01Jan2011, 06:14	6.1

CURRENT HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT150	0.14453	64.9	01Jan2011, 06:24	6.1
WT150-REV	0.13081	71.3	01Jan2011, 06:08	5.5
Paint Brush Hills Pond B1	0.27534	110.4	01Jan2011, 06:15	11.6
W34B2-REV	0.09359	49.1	01Jan2011, 06:08	3.7
Paint Brush Hills Pond B2	0.36893	20.1	01Jan2011, 07:15	13.8
JWT150	0.36893	20.1	01Jan2011, 07:15	13.8
RWT160	0.36893	20	01Jan2011, 07:24	13.8
WT160-REV	0.07348	36.3	01Jan2011, 06:07	2.6
JWT160	0.44241	37.3	01Jan2011, 06:07	16.4
RWT174	0.44241	36.9	01Jan2011, 06:20	16.3
WT170-REV	0.106015	24	01Jan2011, 06:21	2.9
W34-CY-REV	0.0465469	10.7	01Jan2011, 06:18	1.2
JWT172	2.378328	181.3	01Jan2011, 07:17	62.6
RWT176	2.378328	181.2	01Jan2011, 07:18	62.6
Sub Regional Pond SR2	2.378328	171.7	01Jan2011, 07:30	59.3
JWT174	2.378328	171.7	01Jan2011, 07:30	59.3
RWT180	2.378328	171.6	01Jan2011, 07:45	59
WT180-REV	0.04094	7.6	01Jan2011, 06:21	1
JWT180	2.419268	172.6	01Jan2011, 07:45	59.9
RWT202	2.419268	172.6	01Jan2011, 07:55	59.7
WT200-N	0.191	43.3	01Jan2011, 06:21	5.3
WT200-W	0.068	18.4	01Jan2011, 06:15	1.9
WT190	0.0574561	22.5	01Jan2011, 06:06	1.6
The Meadows Pond #1	0.0574561	0.6	01Jan2011, 10:18	0.9
JWT190	0.0574561	0.6	01Jan2011, 10:18	0.9
RWT204	0.0574561	0.6	01Jan2011, 10:42	0.8
→ 40	2.7357241	180.1	01Jan2011, 07:55	67.6
RWT206	2.7357241	179.9	01Jan2011, 07:59	67.5
→ BG	0.184	36.8	01Jan2011, 06:19	4.3
WT210-N	0.074	24.9	01Jan2011, 06:19	2.8
→ CC	2.9937241	186.2	01Jan2011, 07:59	74.5
→ RWT210	2.9937241	186.2	01Jan2011, 08:04	74.3
WT210-S	0.117	57.9	01Jan2011, 06:08	4.4
JWT210	3.1107241	189.8	01Jan2011, 08:04	78.7
RWT232	3.1107241	189.8	01Jan2011, 08:11	78.4
WT220-S	0.118	61.6	01Jan2011, 06:09	4.8
JWT220	0.118	61.6	01Jan2011, 06:09	4.8
RWT234	0.118	61.2	01Jan2011, 06:21	4.8
JWT232	3.2287241	193.8	01Jan2011, 08:11	83.3
RWT236	3.2287241	193.7	01Jan2011, 08:11	83.3
WT230	0.19818	124	01Jan2011, 06:06	8.5
JWT234	3.4269041	203.6	01Jan2011, 06:28	91.8

CURRENT HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RWT240	3.4269041	203.2	01Jan2011, 06:33	91.6
WT240	0.0761461	61	01Jan2011, 06:02	3.4
Regional Pond WU North	3.5030502	209.2	01Jan2011, 06:34	93.9
Regional Pond WU Diversion	3.5030502	172.1	01Jan2011, 06:34	62.9
Old Meridian	0.03359	38.2	01Jan2011, 06:09	2.8
RWT-OM	0.03359	37.8	01Jan2011, 06:14	2.8
→ Regional Pond WU South	3.5366402	159.3	01Jan2011, 08:28	59.4
RWT240_Diversion Reach	0	37.1	01Jan2011, 06:39	30.9
JWT240	3.5366402	196.3	01Jan2011, 08:28	90.2
RWT250	3.5366402	196.2	01Jan2011, 08:29	90.2
WT250	0.14695	107.5	01Jan2011, 06:03	6.3
JWT250	3.6835902	198.8	01Jan2011, 08:29	96.5
RWT260	3.6835902	198.5	01Jan2011, 08:44	96
WT260	0.1388002	21	01Jan2011, 06:36	3.6
JWT260	3.8223904	201.4	01Jan2011, 08:44	99.6
RWT291	3.8223904	201.3	01Jan2011, 08:48	99.4
WT270	0.0324738	20	01Jan2011, 06:04	1.3
JWT270	0.0324738	20	01Jan2011, 06:04	1.3
RWT292	0.0324738	19.9	01Jan2011, 06:10	1.3
JWT292	3.8548642	201.9	01Jan2011, 08:48	100.7
RWT295	3.8548642	201.8	01Jan2011, 08:49	100.6
WT280	0.26695	70.1	01Jan2011, 06:14	6.9
JWT280	0.26695	70.1	01Jan2011, 06:14	6.9
RWT294	0.26695	70	01Jan2011, 06:17	6.9
JWT294	4.1218142	205.3	01Jan2011, 08:49	107.6
RWT296	4.1218142	205.1	01Jan2011, 08:57	107.2
MT040	0.30842	163.5	01Jan2011, 06:12	14.5
MT030	0.15663	73.4	01Jan2011, 06:06	5.1
MT020	0.0902033	47.3	01Jan2011, 06:05	3.1
JMT020	0.0902033	47.3	01Jan2011, 06:05	3.1
RMT030	0.0902033	46.8	01Jan2011, 06:21	3.1
JMT030	0.2468333	93.6	01Jan2011, 06:07	8.1
RMT040	0.2468333	92.8	01Jan2011, 06:12	8.1
Woodmen Hills Pond H	0.5552533	242.5	01Jan2011, 06:16	22.5
JMT040	0.5552533	242.5	01Jan2011, 06:16	22.5
RMT050	0.5552533	242.2	01Jan2011, 06:19	22.5
MT050	0.11861	33.2	01Jan2011, 06:20	3.8
JMT050	0.6738633	275.4	01Jan2011, 06:19	26.3
→ RMT062	0.6738633	274.9	01Jan2011, 06:20	26.3
MT010	0.28989	36.7	01Jan2011, 06:26	5.2
The Meadows Pond #2	0.28989	2.1	01Jan2011, 10:50	1.8
JMT010	0.28989	2.1	01Jan2011, 10:50	1.8

CURRENT HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
MT060a	0.0311	8.3	01Jan2011, 06:19	0.9
School Site	0.32099	2.3	01Jan2011, 13:40	1.9
RMT060a	0.32099	2.3	01Jan2011, 13:51	1.9
MT060-N	0.062	17.6	01Jan2011, 06:17	1.9
JMT060a	1.0568533	292.1	01Jan2011, 06:20	30.1
RMT064	1.0568533	290	01Jan2011, 06:27	30
MT060-S	0.111	37.8	01Jan2011, 06:11	3.4
MT070-N	0.084	22.6	01Jan2011, 06:22	2.8
Sub Regional Pond SR4	1.2518533	43.3	01Jan2011, 07:53	25.7
JMT060	1.2518533	43.3	01Jan2011, 07:53	25.7
RMT070	1.2518533	43.2	01Jan2011, 08:00	25.5
MT070-S	0.058	19.8	01Jan2011, 06:14	1.9
JMT070	1.3098533	44.9	01Jan2011, 08:00	27.5
RMT080	1.3098533	44.9	01Jan2011, 08:03	27.4
MT080	0.0638371	91.5	01Jan2011, 06:00	5
Regional Pond MN	1.3736904	47.3	01Jan2011, 08:05	29.9
JMT080	1.3736904	47.3	01Jan2011, 08:05	29.9
RMT102	1.3736904	47.3	01Jan2011, 08:15	29.7
MT090	0.0435103	59.3	01Jan2011, 06:00	3.2
Woodmen Hills Pond #5	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT104	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT104	0.0435103	2.2	01Jan2011, 08:07	2.3
JMT102	1.4172007	49.4	01Jan2011, 08:15	32
RMT106	1.4172007	49.3	01Jan2011, 08:18	32
MT100	0.0557682	29.8	01Jan2011, 06:06	2.1
JMT106	1.4729689	52	01Jan2011, 06:20	34.1
RMT112	1.4729689	46.4	01Jan2011, 09:18	32.9
MT110	0.11639	36.3	01Jan2011, 06:18	3.9
JMT110	1.5893589	55.7	01Jan2011, 06:57	36.9
RMT114	1.5893589	55.4	01Jan2011, 07:06	36.6
WT290	0.10378	31.2	01Jan2011, 06:10	2.7
Regional Pond R1	5.8149531	245.8	01Jan2011, 09:09	139.5
JWT296	5.8149531	245.8	01Jan2011, 09:09	139.5
RWT314	5.8149531	245.7	01Jan2011, 09:17	138.8
WT300	0.0970199	25.5	01Jan2011, 06:14	2.5
JWT300	0.0970199	25.5	01Jan2011, 06:14	2.5
RWT312	0.0970199	25.4	01Jan2011, 06:34	2.5
WT310	0.27742	67.1	01Jan2011, 06:14	6.9
JWT310	6.189393	250.2	01Jan2011, 09:17	148.2
RWT320	6.189393	250	01Jan2011, 09:24	147.4

CURRENT HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT320	0.20614	56.1	01Jan2011, 06:13	5.4
JWT320	6.395533	252.6	01Jan2011, 09:24	152.8
RWT352	6.395533	252.4	01Jan2011, 09:33	152
ET020	0.21317	128.1	01Jan2011, 06:07	9.2
ET010	0.14513	67.4	01Jan2011, 06:12	5.9
Paint Brush Hills Pond #4	0.14513	48.8	01Jan2011, 06:22	5.9
JET010	0.14513	48.8	01Jan2011, 06:22	5.9
RET020	0.14513	48.7	01Jan2011, 06:37	5.9
Sub Regional Pond SR6	0.3583	19.9	01Jan2011, 07:26	13.5
JET020	0.3583	19.9	01Jan2011, 07:26	13.5
RET030	0.3583	19.7	01Jan2011, 08:14	13.1
ET030	0.20428	81.2	01Jan2011, 06:17	8.4
JET030	0.56258	81.2	01Jan2011, 06:17	21.5
RET040	0.56258	80.9	01Jan2011, 06:28	21.4
Woodmen Hills Pond #1 North	0.71172	103.5	01Jan2011, 06:35	26.6
ET040	0.14914	52.6	01Jan2011, 06:15	5.3
Woodmen Hills Pond #1 South	0.71172	32.8	01Jan2011, 07:14	21.7
JET040	0.71172	32.8	01Jan2011, 07:14	21.7
RET050	0.71172	32.8	01Jan2011, 07:22	21.6
ET050	0.11719	66.6	01Jan2011, 06:03	4
Woodmen Hills Pond #2	0.82891	29.6	01Jan2011, 08:07	23.9
JET050	0.82891	29.6	01Jan2011, 08:07	23.9
RET060	0.82891	29.6	01Jan2011, 08:19	23.7
ET060	0.28543	185.5	01Jan2011, 06:02	10.2
Woodmen Hills Pond #3	1.11434	82.1	01Jan2011, 06:08	31.5
JET060	1.11434	82.1	01Jan2011, 06:08	31.5
RET070	1.11434	81	01Jan2011, 06:18	31.2
ET070	0.24975	164.1	01Jan2011, 06:03	9.8
JET070	1.36409	164.5	01Jan2011, 06:03	41
RET080	1.36409	123.5	01Jan2011, 06:29	40.2
ET080	0.29164	192.2	01Jan2011, 06:08	14.3
Woodmen Hills Pond #4	1.65573	26.7	01Jan2011, 14:58	26.8
JET080	1.65573	26.7	01Jan2011, 14:58	26.8
RET090	1.65573	26.7	01Jan2011, 15:03	26.6
ET090	0.12424	46	01Jan2011, 06:23	5.6
JET090	1.77997	50.6	01Jan2011, 06:24	32.2
RET100	1.77997	50.6	01Jan2011, 06:28	32.1
ET100	0.0480615	22.3	01Jan2011, 06:02	1.3
JET100	1.8280315	53.2	01Jan2011, 06:28	33.3
RET110	1.8280315	53.1	01Jan2011, 06:35	33.1
ET110	0.22603	52.7	01Jan2011, 06:13	5.3
JET110	2.0540615	86	01Jan2011, 06:13	38.4

CURRENT HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RET120	2.0540615	85.1	01Jan2011, 06:19	38.1
ET120	0.10913	23.5	01Jan2011, 06:16	2.5
JET120	2.1631915	107.9	01Jan2011, 06:19	40.7
RET152	2.1631915	107.7	01Jan2011, 06:25	40.4
ET130	0.13481	23.2	01Jan2011, 06:30	3.5
JET130	0.13481	23.2	01Jan2011, 06:30	3.5
RET140	0.13481	23.1	01Jan2011, 07:00	3.5
ET140	0.26759	33.4	01Jan2011, 06:49	6.9
JET140	0.4024	55.3	01Jan2011, 06:56	10.4
RET154	0.4024	55.2	01Jan2011, 07:19	10.3
JET152	2.5655915	108.6	01Jan2011, 06:26	50.8
RET156	2.5655915	108.3	01Jan2011, 06:30	50.6
ET150	0.17773	36.6	01Jan2011, 06:20	4.4
JET154	2.7433215	138.8	01Jan2011, 06:29	55
RET162	2.7433215	135.5	01Jan2011, 06:54	54.2
ET160	0.18892	38.5	01Jan2011, 06:25	5.2
JET160	2.9322415	154.7	01Jan2011, 06:53	59.4
RET164	2.9322415	154.3	01Jan2011, 06:58	59.2
WT350	0.30377	78.7	01Jan2011, 06:16	8.4
JWT352	9.6315445	345.8	01Jan2011, 07:54	219.5
RWT354	9.6315445	345.8	01Jan2011, 07:54	219.5
WT330	0.32668	68.2	01Jan2011, 06:21	8.5
JWT330	0.32668	68.2	01Jan2011, 06:21	8.5
RWT344	0.32668	67.9	01Jan2011, 06:30	8.5
WT340	0.278	40	01Jan2011, 06:39	7.2
JWT354	10.2362245	366.6	01Jan2011, 07:53	235.2
RWT372	10.2362245	366.4	01Jan2011, 07:57	234.6
WT360	0.065683	14.8	01Jan2011, 06:17	1.6
JWT360	0.065683	14.8	01Jan2011, 06:17	1.6
RWT374	0.065683	14.7	01Jan2011, 06:32	1.6
Regional Pond R2	10.3019075	367.7	01Jan2011, 07:59	232.9
JWT372	10.3019075	367.7	01Jan2011, 07:59	232.9
RWT376	10.3019075	367.1	01Jan2011, 08:08	231.8
WT370	0.21476	23.4	01Jan2011, 06:15	2.8
JWT374_OUTLET	10.5166675	370	01Jan2011, 08:08	234.6
FS010	0.122	16.6	01Jan2011, 06:18	2.1
JFS010_OUTLET	0.122	16.6	01Jan2011, 06:18	2.1

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	15Jun2021, 10:59:19	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	8.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:19
Peak Outflow :	2.3 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 13:40
Total Inflow :	2.7 (AC-FT)	Peak Storage :	0.9 (AC-FT)
Total Outflow :	1.9 (AC-FT)	Peak Elevation :	6956.3 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	15Jun2021, 10:59:19	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	331.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:27
Peak Outflow :	43.3 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 07:53
Total Inflow :	36.2 (AC-FT)	Peak Storage :	16.8 (AC-FT)
Total Outflow :	25.7 (AC-FT)	Peak Elevation :	6894.1 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	15Jun2021, 10:59:19	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	97.2 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:01
Peak Outflow :	47.3 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:05
Total Inflow :	32.4 (AC-FT)	Peak Storage :	2.7 (AC-FT)
Total Outflow :	29.9 (AC-FT)	Peak Elevation :	6851.5 (FT)

CURRENT HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT020	0.0671383	4.4	01Jan2011, 06:25	0.7
JWT020	0.0671383	4.4	01Jan2011, 06:25	0.7
RWT030	0.0671383	4.4	01Jan2011, 06:39	0.7
WT030	0.0764732	8.6	01Jan2011, 06:09	0.8
JWT030	0.1436115	8.7	01Jan2011, 06:09	1.5
RWT042	0.1436115	8.7	01Jan2011, 06:20	1.5
WT010	0.13533	8.8	01Jan2011, 06:21	1.3
JWT010	0.13533	8.8	01Jan2011, 06:21	1.3
RWT044	0.13533	8.8	01Jan2011, 06:33	1.3
JWT042	0.2789415	15.1	01Jan2011, 06:26	2.8
RWT046	0.2789415	15.1	01Jan2011, 06:40	2.8
WT040	0.18506	9.1	01Jan2011, 06:34	1.8
JWT044	0.4640015	23.9	01Jan2011, 06:39	4.5
RWT054	0.4640015	23.8	01Jan2011, 06:50	4.5
WT060	0.19563	13.6	01Jan2011, 06:30	2.3
WT050	0.18993	17.3	01Jan2011, 06:23	2.4
JWT050	0.8495615	42.8	01Jan2011, 06:47	9.3
RWT092	0.8495615	42.7	01Jan2011, 06:49	9.3
WT070	0.1711	13.6	01Jan2011, 06:15	1.6
JWT070	0.1711	13.6	01Jan2011, 06:15	1.6
RWT080	0.1711	13.6	01Jan2011, 06:34	1.6
WT080	0.0691596	8.7	01Jan2011, 06:13	0.9
Sub Regional Pond SR1	1.0898211	41.9	01Jan2011, 07:03	10.4
JWT080	1.0898211	41.9	01Jan2011, 07:03	10.4
RWT094	1.0898211	41.9	01Jan2011, 07:14	10.3
WT100-REV	0.12927	37	01Jan2011, 06:05	2.5
W26-REV	0.072	18.4	01Jan2011, 06:04	1.2
WS3-1	0.072	18.1	01Jan2011, 06:15	1.2
Paint Brush Hills Pond C	0.20127	10.4	01Jan2011, 06:34	3.7
WT090	0.15333	22.1	01Jan2011, 06:11	2.1
JWT090	1.4444211	54.5	01Jan2011, 07:12	16.1
RWT122	1.4444211	54.5	01Jan2011, 07:17	16.1
WT110	0.19428	22.3	01Jan2011, 06:17	2.7
JWT110	1.6387011	58.6	01Jan2011, 07:16	18.7
RWT124	1.6387011	58.6	01Jan2011, 07:26	18.7
WT130-REV	0.101625	24	01Jan2011, 06:13	2.3
Paint Brush Hills Pond A	0.101625	4.8	01Jan2011, 06:53	2.3
WT120-REV	0.04303	7.2	01Jan2011, 06:09	0.6
JWT120	1.7833561	63.9	01Jan2011, 07:26	21.6
RWT172	1.7833561	63.8	01Jan2011, 07:38	21.5
WT140-REV	0.14453	35.7	01Jan2011, 06:14	3.6
JWT140	0.14453	35.7	01Jan2011, 06:14	3.6

CURRENT HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT150	0.14453	35.5	01Jan2011, 06:25	3.6
WT150-REV	0.13081	40.8	01Jan2011, 06:09	3.3
Paint Brush Hills Pond B1	0.27534	58.7	01Jan2011, 06:19	6.8
W34B2-REV	0.09359	27.9	01Jan2011, 06:08	2.2
Paint Brush Hills Pond B2	0.36893	9.8	01Jan2011, 07:30	8
JWT150	0.36893	9.8	01Jan2011, 07:30	8
RWT160	0.36893	9.8	01Jan2011, 07:40	8
WT160-REV	0.07348	19.7	01Jan2011, 06:07	1.5
JWT160	0.44241	20.1	01Jan2011, 06:07	9.5
RWT174	0.44241	19.8	01Jan2011, 06:23	9.4
WT170-REV	0.106015	11.6	01Jan2011, 06:22	1.6
W34-CY-REV	0.0465469	5.2	01Jan2011, 06:19	0.6
JWT172	2.378328	81.2	01Jan2011, 06:39	33.1
RWT176	2.378328	81.1	01Jan2011, 06:40	33.1
Sub Regional Pond SR2	2.378328	66.8	01Jan2011, 08:06	30
JWT174	2.378328	66.8	01Jan2011, 08:06	30
RWT180	2.378328	66.8	01Jan2011, 08:25	29.7
WT180-REV	0.04094	3.4	01Jan2011, 06:22	0.5
JWT180	2.419268	67.2	01Jan2011, 08:25	30.2
RWT202	2.419268	67.2	01Jan2011, 08:39	30.1
WT200-N	0.191	21	01Jan2011, 06:22	2.8
WT200-W	0.068	9	01Jan2011, 06:16	1
WT190	0.0574561	11.3	01Jan2011, 06:07	0.9
The Meadows Pond #1	0.0574561	0.3	01Jan2011, 13:19	0.4
JWT190	0.0574561	0.3	01Jan2011, 13:19	0.4
RWT204	0.0574561	0.3	01Jan2011, 13:56	0.4
→ 40	2.7357241	69.9	01Jan2011, 08:38	34.3
RWT206	2.7357241	69.8	01Jan2011, 08:43	34.2
→ BG	0.184	19.1	01Jan2011, 06:20	2.3
WT210-N	0.074	13.4	01Jan2011, 06:20	1.6
→ CC	2.9937241	72.1	01Jan2011, 08:43	38.1
→ RWT210	2.9937241	72.1	01Jan2011, 08:50	38
WT210-S	0.117	31.7	01Jan2011, 06:08	2.5
JWT210	3.1107241	73.2	01Jan2011, 08:50	40.5
RWT232	3.1107241	73.2	01Jan2011, 09:00	40.2
WT220-S	0.118	34.5	01Jan2011, 06:09	2.8
JWT220	0.118	34.5	01Jan2011, 06:09	2.8
RWT234	0.118	34.3	01Jan2011, 06:23	2.8
JWT232	3.2287241	85.3	01Jan2011, 06:37	43
RWT236	3.2287241	85.3	01Jan2011, 06:37	43
WT230	0.19818	71.3	01Jan2011, 06:06	5
JWT234	3.4269041	96.9	01Jan2011, 06:36	48.1

CURRENT HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RWT240	3.4269041	96.6	01Jan2011, 06:41	48
WT240	0.0761461	36.4	01Jan2011, 06:02	2.1
Regional Pond WU North	3.5030502	99.1	01Jan2011, 06:42	48.9
Regional Pond WU Diversion	3.5030502	70.5	01Jan2011, 06:42	26.5
Old Meridian	0.03359	24.6	01Jan2011, 06:09	1.9
RWT-OM	0.03359	24.3	01Jan2011, 06:16	1.8
→ Regional Pond WU South	3.5366402	43.4	01Jan2011, 09:45	22.1
RWT240_Diversion Reach	0	28.6	01Jan2011, 06:47	22.3
JWT240	3.5366402	66.7	01Jan2011, 09:38	44.4
RWT250	3.5366402	66.7	01Jan2011, 09:39	44.4
WT250	0.14695	63	01Jan2011, 06:03	3.7
JWT250	3.6835902	68.4	01Jan2011, 09:39	48.1
RWT260	3.6835902	68.3	01Jan2011, 10:00	47.8
WT260	0.1388002	9.9	01Jan2011, 06:38	1.9
JWT260	3.8223904	69.4	01Jan2011, 10:00	49.7
RWT291	3.8223904	69.4	01Jan2011, 10:04	49.5
WT270	0.0324738	11.3	01Jan2011, 06:05	0.7
JWT270	0.0324738	11.3	01Jan2011, 06:05	0.7
RWT292	0.0324738	11.2	01Jan2011, 06:11	0.7
JWT292	3.8548642	71.9	01Jan2011, 06:29	50.3
RWT295	3.8548642	71.5	01Jan2011, 06:31	50.2
WT280	0.26695	33.4	01Jan2011, 06:15	3.7
JWT280	0.26695	33.4	01Jan2011, 06:15	3.7
RWT294	0.26695	33.4	01Jan2011, 06:18	3.7
JWT294	4.1218142	94.1	01Jan2011, 06:30	53.9
RWT296	4.1218142	91.9	01Jan2011, 06:40	53.6
MT040	0.30842	94.6	01Jan2011, 06:13	8.8
MT030	0.15663	39	01Jan2011, 06:06	2.8
MT020	0.0902033	25.8	01Jan2011, 06:05	1.7
JMT020	0.0902033	25.8	01Jan2011, 06:05	1.7
RMT030	0.0902033	25.4	01Jan2011, 06:20	1.7
JMT030	0.2468333	50.1	01Jan2011, 06:10	4.5
RMT040	0.2468333	49.3	01Jan2011, 06:16	4.5
Woodmen Hills Pond H	0.5552533	107.8	01Jan2011, 06:25	13.2
JMT040	0.5552533	107.8	01Jan2011, 06:25	13.2
RMT050	0.5552533	107.4	01Jan2011, 06:28	13.2
MT050	0.11861	17	01Jan2011, 06:21	2.1
JMT050	0.6738633	123.1	01Jan2011, 06:27	15.3
→ RMT062	0.6738633	122.8	01Jan2011, 06:29	15.3
MT010	0.28989	17.3	01Jan2011, 06:28	2.7
The Meadows Pond #2	0.28989	0	01Jan2011, 00:00	0
JMT010	0.28989	0	01Jan2011, 00:00	0

CURRENT HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
MT060a	0.0311	4.2	01Jan2011, 06:20	0.5
School Site	0.32099	0	01Jan2011, 00:00	0
RMT060a	0.32099	0	01Jan2011, 00:00	0
MT060-N	0.062	8.9	01Jan2011, 06:18	1
JMT060a	1.0568533	129.7	01Jan2011, 06:29	16.3
RMT064	1.0568533	128.1	01Jan2011, 06:38	16.3
MT060-S	0.111	19.2	01Jan2011, 06:12	1.9
MT070-N	0.084	11.6	01Jan2011, 06:23	1.6
Sub Regional Pond SR4	1.2518533	11.8	01Jan2011, 09:35	14.7
JMT060	1.2518533	11.8	01Jan2011, 09:35	14.7
RMT070	1.2518533	11.8	01Jan2011, 09:45	14.5
MT070-S	0.058	10.3	01Jan2011, 06:15	1.1
JMT070	1.3098533	12.4	01Jan2011, 09:50	15.6
RMT080	1.3098533	12.4	01Jan2011, 09:54	15.5
MT080	0.0638371	62.4	01Jan2011, 06:00	3.4
Regional Pond MN	1.3736904	14.4	01Jan2011, 08:02	16.4
JMT080	1.3736904	14.4	01Jan2011, 08:02	16.4
RMT102	1.3736904	14.4	01Jan2011, 08:13	16.3
MT090	0.0435103	39.9	01Jan2011, 06:00	2.1
Woodmen Hills Pond #5	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT104	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT104	0.0435103	1.4	01Jan2011, 08:09	1.5
JMT102	1.4172007	15.8	01Jan2011, 08:13	17.8
RMT106	1.4172007	15.8	01Jan2011, 08:15	17.8
MT100	0.0557682	16.5	01Jan2011, 06:06	1.2
JMT106	1.4729689	17.7	01Jan2011, 06:07	19
RMT112	1.4729689	16.7	01Jan2011, 06:52	18.2
MT110	0.11639	18.9	01Jan2011, 06:19	2.2
JMT110	1.5893589	23.4	01Jan2011, 06:51	20.4
RMT114	1.5893589	23	01Jan2011, 07:03	20.2
WT290	0.10378	15	01Jan2011, 06:11	1.4
Regional Pond R1	5.8149531	88.1	01Jan2011, 10:26	68.4
JWT296	5.8149531	88.1	01Jan2011, 10:26	68.4
RWT314	5.8149531	88.1	01Jan2011, 10:37	67.8
WT300	0.0970199	12.2	01Jan2011, 06:15	1.3
JWT300	0.0970199	12.2	01Jan2011, 06:15	1.3
RWT312	0.0970199	12.1	01Jan2011, 06:39	1.3
WT310	0.27742	31.3	01Jan2011, 06:16	3.6
JWT310	6.189393	90.4	01Jan2011, 10:37	72.7
RWT320	6.189393	90.3	01Jan2011, 10:46	72.2

CURRENT HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT320	0.20614	26.8	01Jan2011, 06:14	2.8
JWT320	6.395533	91.5	01Jan2011, 10:46	75
RWT352	6.395533	91.5	01Jan2011, 10:57	74.3
ET020	0.21317	73.4	01Jan2011, 06:07	5.4
ET010	0.14513	37.5	01Jan2011, 06:12	3.5
Paint Brush Hills Pond #4	0.14513	29.4	01Jan2011, 06:21	3.5
JET010	0.14513	29.4	01Jan2011, 06:21	3.5
RET020	0.14513	29.3	01Jan2011, 06:37	3.5
Sub Regional Pond SR6	0.3583	9.3	01Jan2011, 07:43	7.9
JET020	0.3583	9.3	01Jan2011, 07:43	7.9
RET030	0.3583	9.3	01Jan2011, 08:37	7.6
ET030	0.20428	44.9	01Jan2011, 06:17	4.9
JET030	0.56258	44.9	01Jan2011, 06:17	12.5
RET040	0.56258	44.6	01Jan2011, 06:30	12.4
Woodmen Hills Pond #1 North	0.71172	60.8	01Jan2011, 06:33	15.4
ET040	0.14914	27.9	01Jan2011, 06:16	3
Woodmen Hills Pond #1 South	0.71172	9.6	01Jan2011, 12:57	12
JET040	0.71172	9.6	01Jan2011, 12:57	12
RET050	0.71172	9.6	01Jan2011, 13:08	11.8
ET050	0.11719	36.5	01Jan2011, 06:03	2.2
Woodmen Hills Pond #2	0.82891	10.4	01Jan2011, 13:06	12.5
JET050	0.82891	10.4	01Jan2011, 13:06	12.5
RET060	0.82891	10.4	01Jan2011, 13:21	12.3
ET060	0.28543	105	01Jan2011, 06:02	5.8
Woodmen Hills Pond #3	1.11434	12.6	01Jan2011, 13:03	15.7
JET060	1.11434	12.6	01Jan2011, 13:03	15.7
RET070	1.11434	12.6	01Jan2011, 13:18	15.5
ET070	0.24975	93.5	01Jan2011, 06:03	5.7
JET070	1.36409	93.6	01Jan2011, 06:03	21.2
RET080	1.36409	64.9	01Jan2011, 06:31	20.7
ET080	0.29164	113.3	01Jan2011, 06:08	8.7
Woodmen Hills Pond #4	1.65573	9.8	02Jan2011, 00:00	12
JET080	1.65573	9.8	02Jan2011, 00:00	12
RET090	1.65573	9.8	02Jan2011, 00:00	11.9
ET090	0.12424	26	01Jan2011, 06:24	3.3
JET090	1.77997	29.2	01Jan2011, 06:25	15.3
RET100	1.77997	29.1	01Jan2011, 06:30	15.2
ET100	0.0480615	11.4	01Jan2011, 06:02	0.7
JET100	1.8280315	30.6	01Jan2011, 06:30	15.8
RET110	1.8280315	30.6	01Jan2011, 06:38	15.7
ET110	0.22603	24	01Jan2011, 06:15	2.7
JET110	2.0540615	41.4	01Jan2011, 06:32	18.4

CURRENT HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RET120	2.0540615	41.4	01Jan2011, 06:39	18.2
ET120	0.10913	10.7	01Jan2011, 06:17	1.3
JET120	2.1631915	49.7	01Jan2011, 06:21	19.5
RET152	2.1631915	49.5	01Jan2011, 06:29	19.4
ET130	0.13481	10.9	01Jan2011, 06:31	1.8
JET130	0.13481	10.9	01Jan2011, 06:31	1.8
RET140	0.13481	10.9	01Jan2011, 07:06	1.8
ET140	0.26759	15.9	01Jan2011, 06:51	3.6
JET140	0.4024	25.8	01Jan2011, 07:01	5.5
RET154	0.4024	25.7	01Jan2011, 07:27	5.4
JET152	2.5655915	53.7	01Jan2011, 07:01	24.8
RET156	2.5655915	53.5	01Jan2011, 07:06	24.7
ET150	0.17773	17	01Jan2011, 06:21	2.3
JET154	2.7433215	62.3	01Jan2011, 06:34	27
RET162	2.7433215	59.6	01Jan2011, 07:07	26.4
ET160	0.18892	18.6	01Jan2011, 06:26	2.8
JET160	2.9322415	66.8	01Jan2011, 07:06	29.2
RET164	2.9322415	66.5	01Jan2011, 07:12	29.1
WT350	0.30377	38.3	01Jan2011, 06:17	4.5
JWT352	9.6315445	127.1	01Jan2011, 08:08	107.9
RWT354	9.6315445	127.1	01Jan2011, 08:08	107.9
WT330	0.32668	32.2	01Jan2011, 06:23	4.5
JWT330	0.32668	32.2	01Jan2011, 06:23	4.5
RWT344	0.32668	32	01Jan2011, 06:34	4.5
WT340	0.278	18.9	01Jan2011, 06:42	3.8
JWT354	10.2362245	137	01Jan2011, 06:36	116.2
RWT372	10.2362245	136.7	01Jan2011, 08:13	115.7
WT360	0.065683	6.9	01Jan2011, 06:18	0.8
JWT360	0.065683	6.9	01Jan2011, 06:18	0.8
RWT374	0.065683	6.9	01Jan2011, 06:36	0.8
Regional Pond R2	10.3019075	139.7	01Jan2011, 06:45	113.4
JWT372	10.3019075	139.7	01Jan2011, 06:45	113.4
RWT376	10.3019075	137.9	01Jan2011, 06:55	112.6
WT370	0.21476	7.2	01Jan2011, 06:17	1.2
JWT374_OUTLET	10.5166675	140.4	01Jan2011, 06:55	113.8
FS010	0.122	6.3	01Jan2011, 06:20	1
JFS010_OUTLET	0.122	6.3	01Jan2011, 06:20	1

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	15Jun2021, 10:53:59	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	4.2 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:20
Peak Outflow :	0.0 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 00:00
Total Inflow :	0.5 (AC-FT)	Peak Storage :	0.5 (AC-FT)
Total Outflow :	0.0 (AC-FT)	Peak Elevation :	6955.5 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	15Jun2021, 10:53:59	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	143.2 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:38
Peak Outflow :	11.8 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 09:35
Total Inflow :	19.7 (AC-FT)	Peak Storage :	9.9 (AC-FT)
Total Outflow :	14.7 (AC-FT)	Peak Elevation :	6891.8 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	15Jun2021, 10:53:59	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	63.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:01
Peak Outflow :	14.4 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:02
Total Inflow :	18.9 (AC-FT)	Peak Storage :	2.5 (AC-FT)
Total Outflow :	16.4 (AC-FT)	Peak Elevation :	6851.4 (FT)

Stage Storage Discharge

Data for spillway and embankment: The Meadows Pond #2

References: Topo and field survey

<i>Spillway Length (ft) =</i>	115
<i>Spillway Elevation (ft) =</i>	7011.0
<i>Spillway C_d¹ =</i>	0.56
<i>Embankment Length (ft) =</i>	62.5
<i>Embankment Elevation (ft) =</i>	7012.0
<i>Embankment C_d¹ =</i>	0.56
<i>Acceleration due to Gravity, g (ft/s²) =</i>	32.2

Data for outlet pipe and grate:

<i>Type</i>		<i>Width (ft)</i>	<i>Height (ft)</i>	<i>Diameter (in)</i>	<i>C_d¹</i>	<i>Area (ft²)</i>	<i>Centerline Elevation (ft)</i>	<i>Bottom Elevation² (ft)</i>	<i>Top Elevation³ (ft)</i>
<i>Orifice 1:</i>	Rectangular	5	1.75		0.6	8.75	7009.30	7008.43	7010.18
<i>Orifice 2:</i>	Rectangular	5	1.75		0.6	8.75	7009.30	7008.43	7010.18
<i>Orifice 3:</i>	None Selected					0.00		0.00	0.00
<i>Orifice 4:</i>	None Selected					0.00		0.00	0.00

Stand Pipe Dimensions:

<i>Type</i>		<i>Width (ft)</i>	<i>Height (ft)</i>	<i>Diameter (ft)</i>	<i>C_d¹</i>	<i>Area (ft²)</i>	<i>Elevation (ft)</i>	<i>Perimeter (ft)</i>
<i>Grate :</i>	Rectangular	5.5	7.5		0.6	41.25	7011.0	26.00

Stage			Storage			Area		Volume ⁴		Spillway ⁵ (cfs)	Embankment ⁵ (cfs)	Discharge				Total Flow ⁶ (cfs)
Stage	Elevation (ft)	Height (ft)	(ft ²)	(acres)		(ac-ft)	(cum ac-ft)	Orifice (max outflow cfs)				Grate (max outflow cfs)				
												1	2	3	4	
	7004.0	0.0	1202	0.03		0.00	0.00	-	-	-	-	-	-	-	-	-
	7006.0	2.0	46729	1.07		1.10	1.10	-	-	-	-	-	-	-	-	-
	7008.0	4.0	55287	1.27		2.34	3.44	-	-	-	-	-	-	-	-	-
	7010.0	6.0	67516	1.55		2.82	6.26	-	-	-	-	31.72	31.72	-	-	63.45
	7012.0	8.0	90179	2.07		3.62	9.88	344.54	-	-	-	69.23	69.23	-	-	566.45

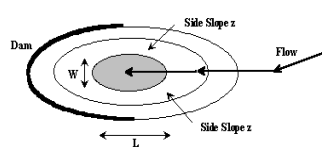
DO NOT INCLUDE WATER QUALITY CAPTURE VOLUME IN THIS STORAGE AREA.

- Notes:
- 1) Coefficient of discharge, C_d, taken from Hydrology and Hydraulic Systems by R.S. Gupta, 2001, page 303
 - 2) Bottom Elevation is the Centerline Elevation minus half the Height or the Diameter, example: 6132.25ft-0.5*30in/(12ft/in)=6131.00ft
 - 3) Top Elevation is the Centerline Elevation plus half the Height of the Diameter, example: 6132.25ft+0.5*30in/(12ft/in)=6133.50ft
 - 4) Volume for each elevation is calculated using the average end area and then accumulated, example: (5ft-3ft)(16.8ac+15.78ac)*0.5=64.43ac-ft
 - 5) Weir equation for Embankment and Spill way is fromHydrology and Hydraulic Systems by R.S. Gupta, 2001, equation 6.22: Q= ²/₅ C_d (C_g)^{0.5} L H^{1.5}
 - 6) Total Flow is the sum of the flows through the Embankment, Spillway, and Culvert (Does not account for outlet capacity, this needs to be checked seperately.)

Calculated by: BAS
Date: _____
Checked by: _____
Date: _____

STAGE-STORAGE SIZING FOR DETENTION BASINS

Project: Falcon Meadows at Bent Grass
Basin ID: School Pond



Design Information (Input):

Width of Basin Bottom, W	=	<input type="text"/>	ft
Length of Basin Bottom, L	=	<input type="text"/>	ft
Dam Side-slope (H:V), Z_d	=	<input type="text"/>	ft/ft

Right Triangle		OR...
Isosceles Triangle		OR...
Rectangle		OR...
Circle / Ellipse		OR...
Irregular		(Use Override values in cells G32:G52)

MINOR	MAJOR	
		acre-ft.
		acre-ft.
		acre-ft.

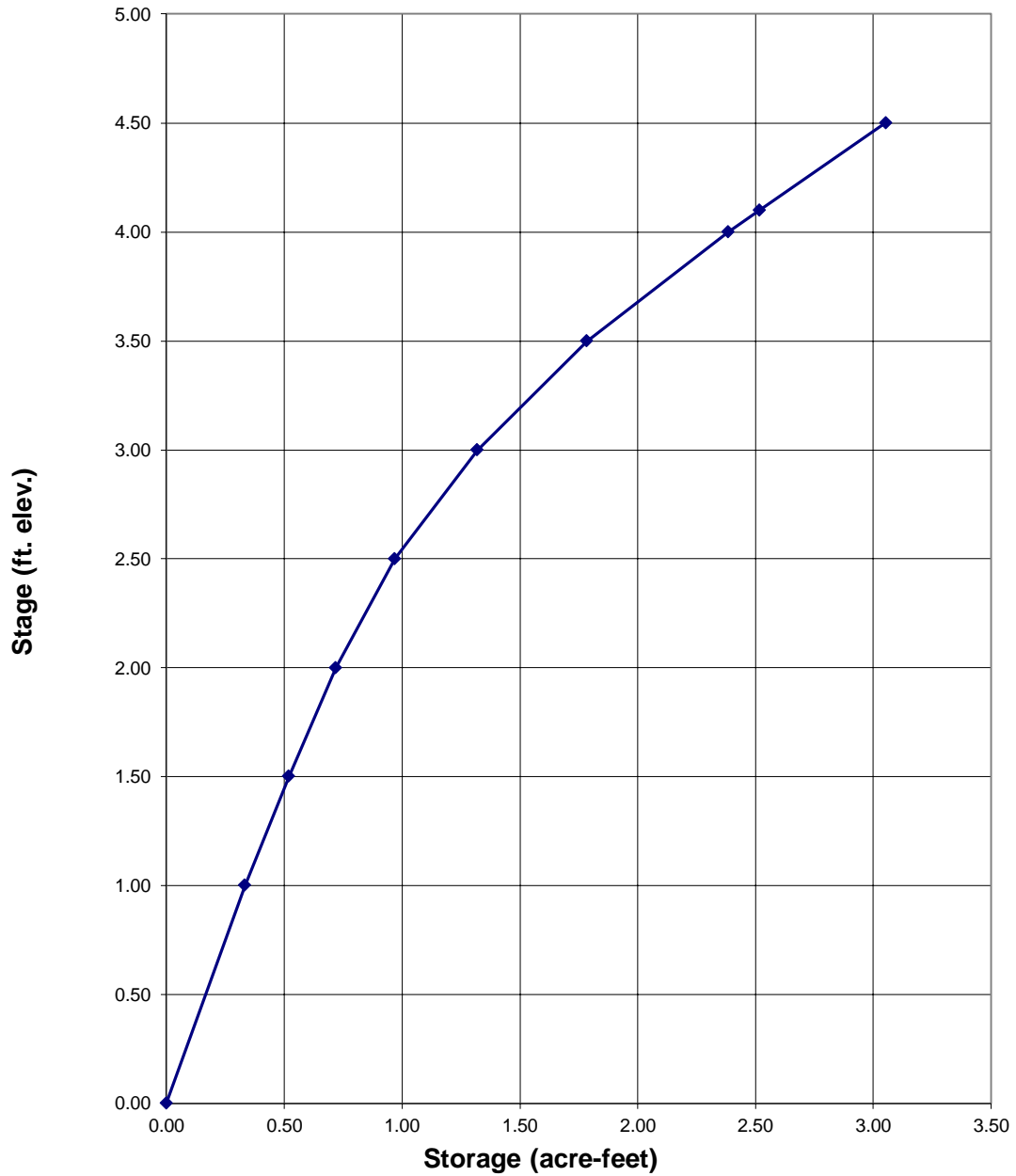
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STAGE-STORAGE SIZING FOR DETENTION BASINS

Project: _____

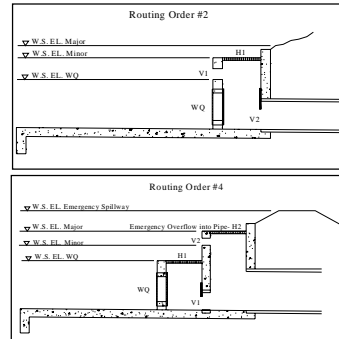
Basin ID: _____

STAGE-STORAGE CURVE FOR THE POND



STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)
--

Project: Falcon Meadows at Bent Grass
Basin ID: School Site Pond - Current Conditions



Design Information (Input):

	#1 Horiz.	#2 Horiz.	#1 Vert.	#2 Vert.	
Dia. =	12.00				inches
W =					ft.
L or H =					ft.
% open =	100				%
C _o =	0.60				
C _w =	3.00				
E _o =	2.00				ft.

Net Opening Area (after Trash Rack Reduction)
 OPTIONAL: User-Override Net Opening Area
 Perimeter as Weir Length
 OPTIONAL: User-Override Weir Length

Top Elevation of Vertical Orifice Opening, Top = _____ ft.

Center Elevation of Vertical Orifice Opening, Cen = _____ ft.

Routing 3: Single Stage - Water flows through WQCV plate and #1 horizontal opening into #1 vertical opening. This flow will be applied to culvert sheet (#2 vertical & horizontal openings is not used).

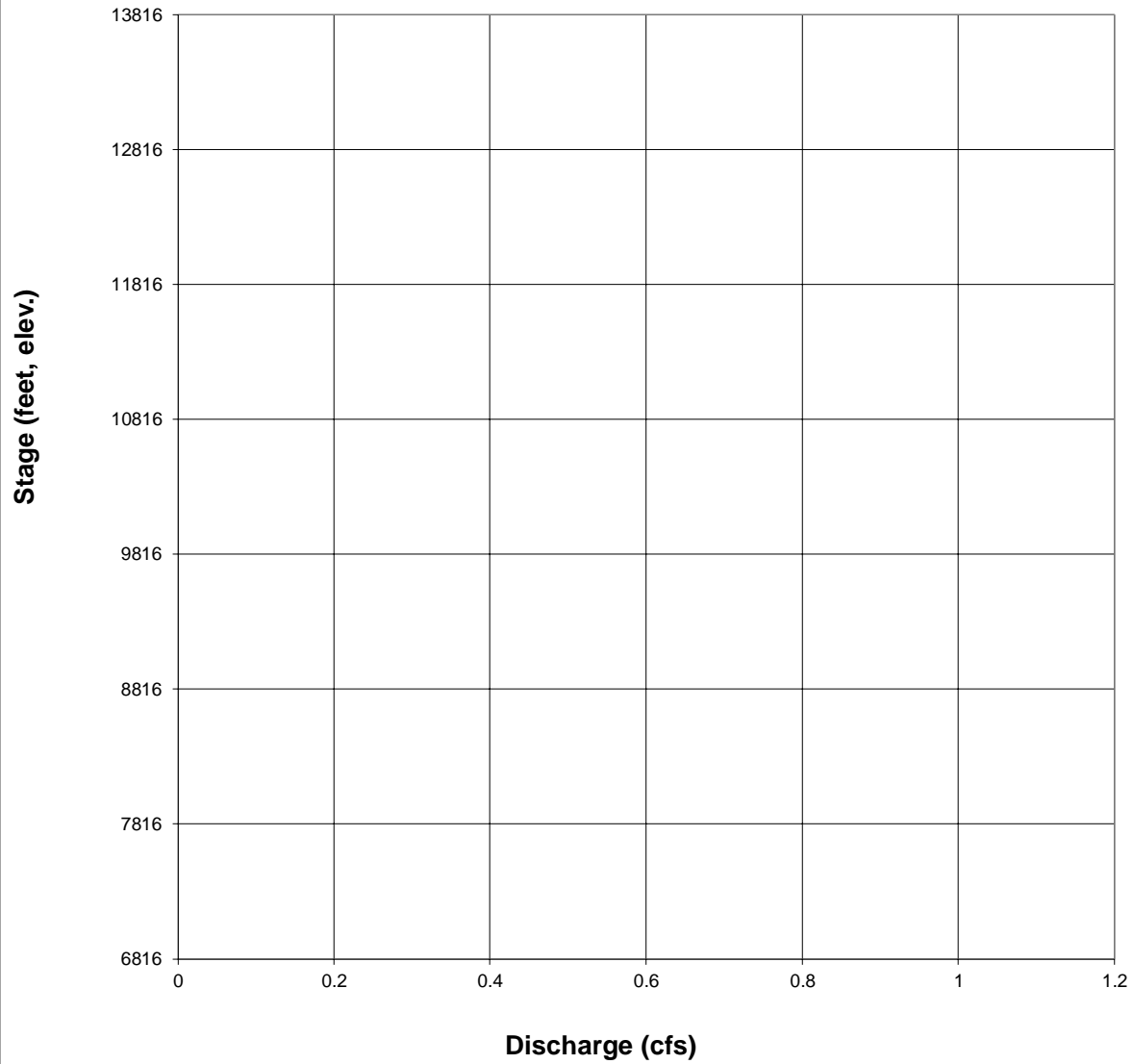
[illegible]

STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)

Project: Falcon Meadows at Bent Grass

Basin ID: School Site Pond - Current Conditions

STAGE-DISCHARGE CURVE FOR THE OUTLET STRUCTURE



STAGE-DISCHARGE SIZING OF THE SPILLWAY

Basin ID: School Site Pond - Current Conditions

75.96
4.00000

Design Information (input):

Bottom Length of Weir
Angle of Side Slope Weir
Elev. for Weir Crest
Coef. for Rectangular Weir
Coef. for Trapezoidal Weir

L =	30.00	feet
Angle =	75.96	degrees
EL. Crest =	3.00	feet
C _w =	0.50	
C _t =	0.60	

Calculation of Spillway Capacity (output):

[illegible]

STAGE-DISCHARGE SIZING OF THE SPILLWAY

Project: Falcon Meadows at Bent Grass

Basin ID: School Site Pond - Current Conditions

DETENTION VOLUME BY THE FULL SPECTRUM METHOD

Project: _____
Basin ID: _____

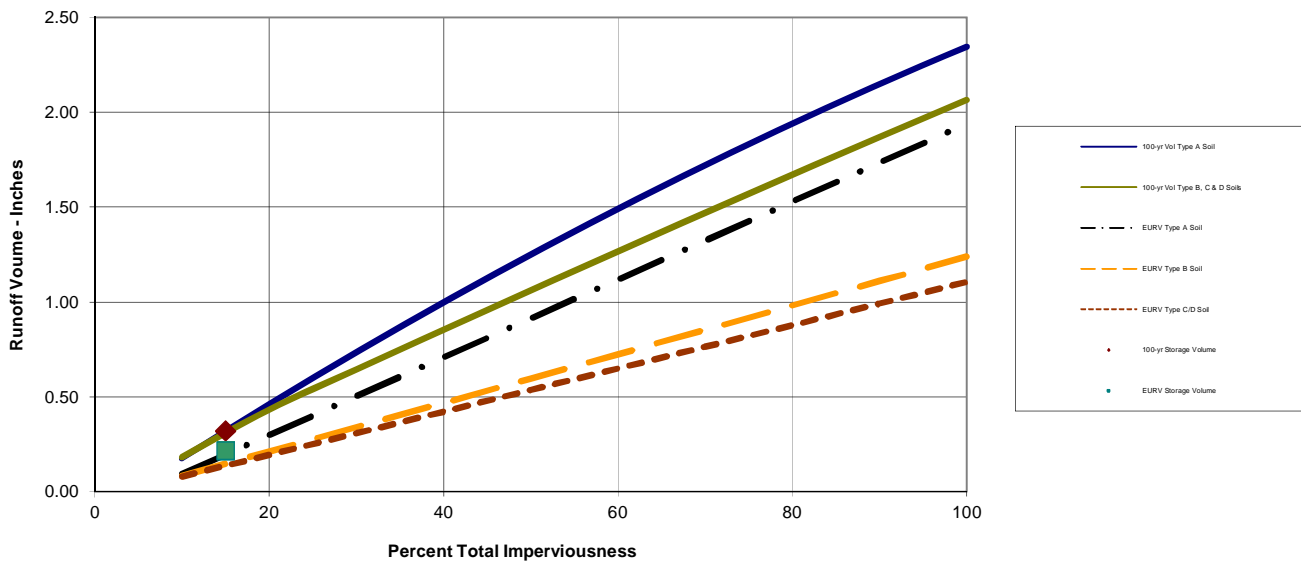
* User input data
shown in blue.

Area of Watershed (acres)	740.00	
Subwatershed Imperviousness	15.0%	
Level of Minimizing Directly Connected Impervious Area (MDCIA)	0	<div><div>0</div><div></div></div>
Effective Imperviousness ¹	15.0%	
Hydrologic Soil Type	Percentage of Area	Area (acres)
Type A	100.0%	740.0
Type B		0.0
Type C or D		0.0

Recommended Horton's Equation Parameters for CUHP		
Infiltration (inches per hour)		Decay Coefficient-- α
Initial-- f_i	Final-- f_o	
5	1.0	0.0007
Detention Volumes ^{2,5}		Maximum Allowable Release Rate, cfs ³
(watershed inches)	(acre-feet)	
0.22	13.30	Design Outlet to Empty EURV in 72 Hours
0.32	19.72	370.00

Excess Urban Runoff Volume⁴

100-year Detention Volume Including WQCV⁵



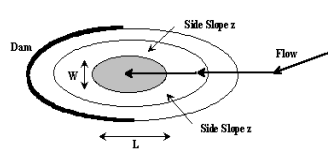
Notes:

- 1) Effective imperviousness is based on Figure ND-1 of the Urban Storm Drainage Criteria Manual (USDCM).
- 2) Results shown reflect runoff reduction from Level 1 or 2 MDCIA and are plotted at the watershed's total imperviousness value; the impact of MDCIA is reflected by the results being below the curves.
- 3) Maximum allowable release rates for 100-year event are based on Table SO-1. Outlet for the Excess Urban Runoff Volume (EURV) to be designed to empty out the EURV in 72 hours. Outlet design is similar to one for the WQCV outlet of an extended detention basin (i.e., perforated plate with a micro-pool) and extends to top of EURV water surface elevation.
- 4) EURV approximates the difference between developed and pre-developed runoff volume.
- 5) 100-yr detention volume includes EURV. No need to add more volume for WQCV or EURV

<p style="text-align: center;">STAGE-STORAGE SIZING FOR DETENTION BASINS</p>

Project: FALCON MARKETPLACE

Basin ID: NORTH POND #1



Design Information (Input):

Width of Basin Bottom, W	=	<input type="text"/>	ft
Length of Basin Bottom, L	=	<input type="text"/>	ft
Dam Side-slope (H:V), Z_d	=	<input type="text"/>	ft/ft

Right Triangle		OR...
Isosceles Triangle		OR...
Rectangle		OR...
Circle / Ellipse		OR...
Irregular		(Use Override values in cells G32:G52)

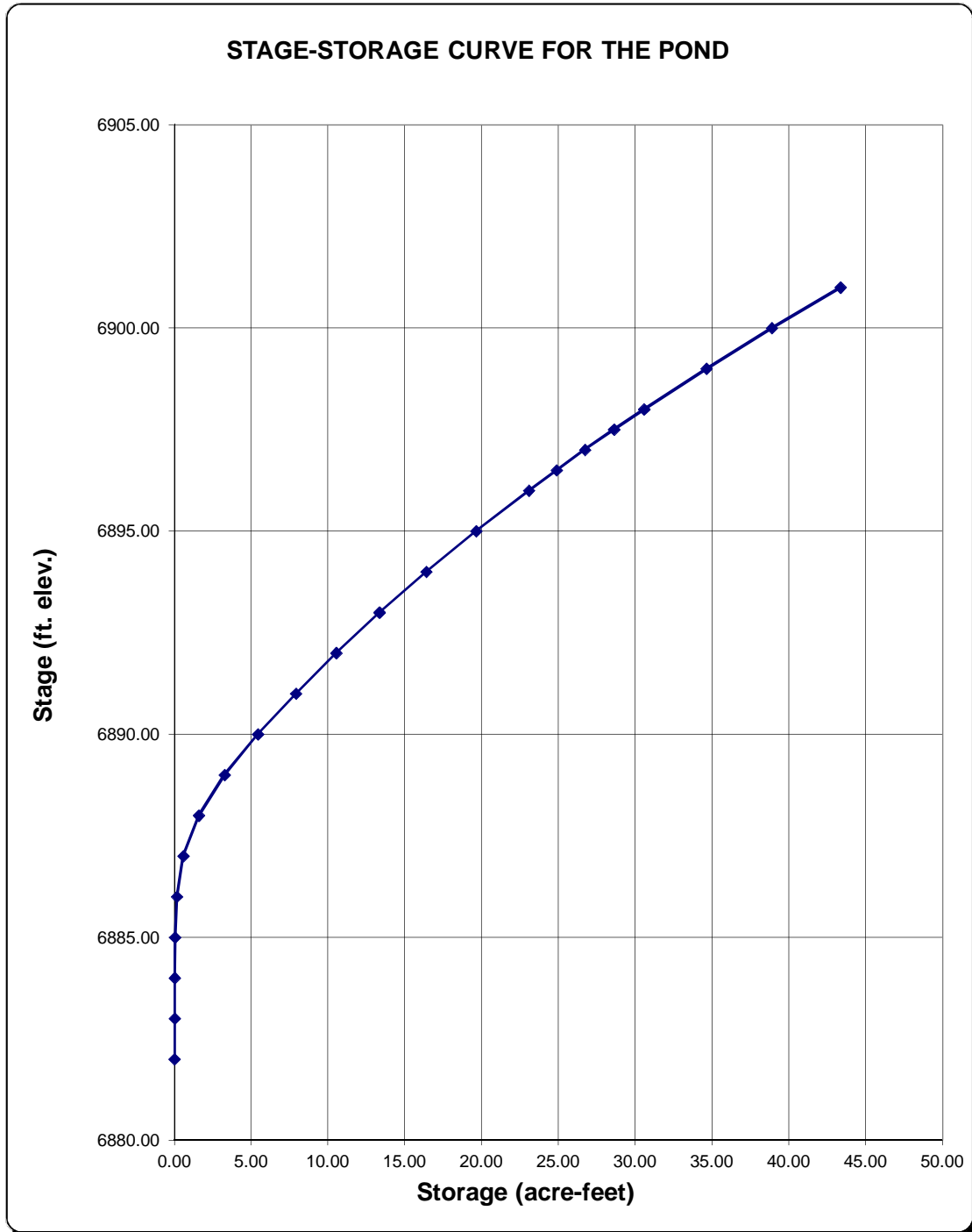
Storage Requirement from Sheet 'Modified FAA':
Storage Requirement from Sheet 'Hydrograph':
Storage Requirement from Sheet 'Full-Spectrum':

MINOR	MAJOR	
		acre-ft.
		acre-ft.
13.30	19.72	acre-ft.

[illegible]

STAGE-STORAGE SIZING FOR DETENTION BASINS

Project: _____
Basin ID: _____



Project: FALCON MARKETPLACE
Basin ID: NORTH POND #1

Catchment Imperviousness, I_p =	15.0	percent
Catchment Area, A_c =	740.00	acres
Depth at MOCV outlet above lowest perforation, H =	8	feet
Vertical distance between rows, h =	30.00	inches
Number of rows, N_r =	3.00	
Office discharge coefficient, C_o =	0.50	
Slope of Basin Tickle Channel, S =	0.005	ft / ft
Time to Drain the Pond =	40	hours

Percent Soil Type A =	100
Percent Soil Type B =	
Percent Soil Type C/D =	

Excess Urban Runoff Volume (From 'Full-Spectrum Sheet')	0.216 watershed inches
Excess Urban Runoff Volume (From 'Full-Spectrum Sheet')	N/A
Excess Urban Runoff Volume (From 'Full-Spectrum Sheet')	13,300 acre-feet
Total opening area at each row based on user-input above. Ao =	69.21 square inches
Total opening area at each row based on user-input above. Ao =	19.63 square inches
Total opening area at each row based on user-input above. Ao =	0.136 square feet

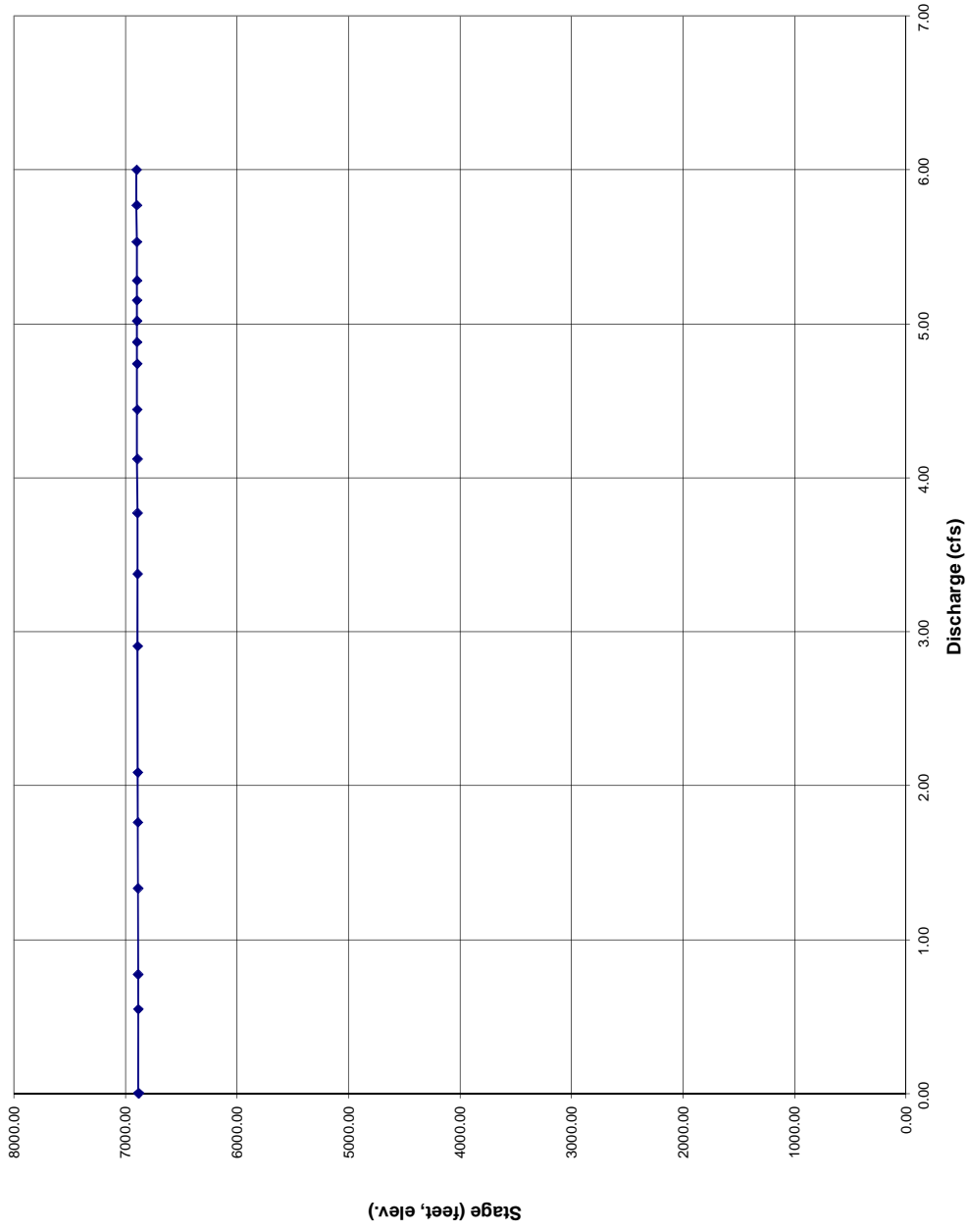
FM Pond #1 rev (w6897.0) -KV.xls, WQCV

STAGE-DISCHARGE SIZING OF THE WATER QUALITY CAPTURE VOLUME (WQCV) OUTLET

Worksheet Protected

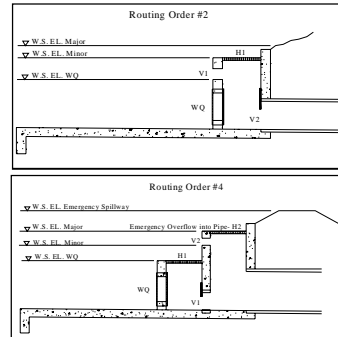
Project: FALCON MARKETPLACE
Basin ID: NORTH POND #1

STAGE-DISCHARGE CURVE FOR THE WQCV OUTLET STRUCTURE



STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)
--

Project: Falcon Marketplace #1
Basin ID: NORTH POND #1



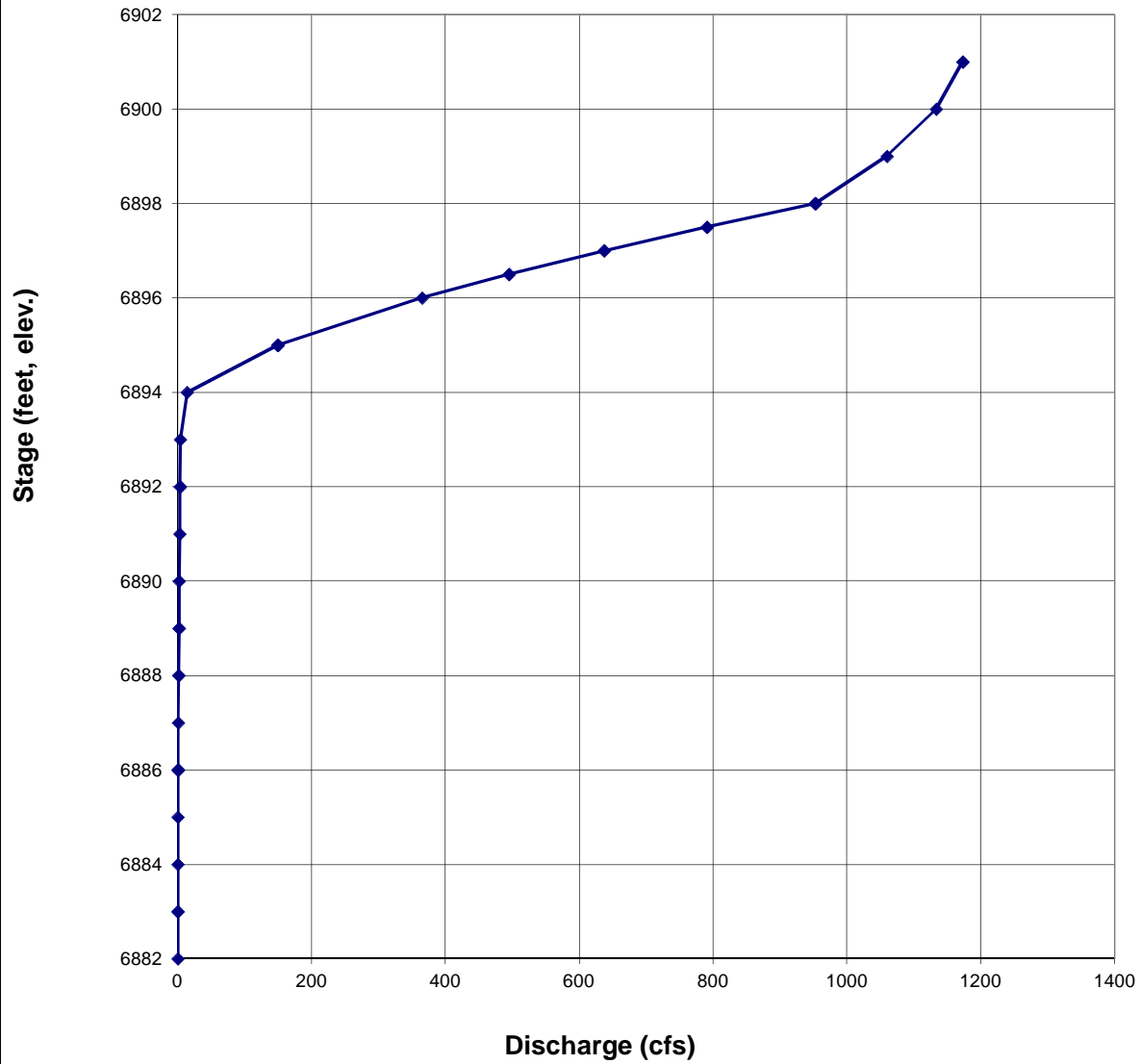
Routing 3: Single Stage - Water flows through WQCV plate and #1 horizontal opening into #1 vertical opening. This flow will be applied to culvert sheet (#2 vertical & horizontal openings is not used).

[illegible]

STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)

Project: Falcon Marketplace #1
Basin ID: NORTH POND #1

STAGE-DISCHARGE CURVE FOR THE OUTLET STRUCTURE

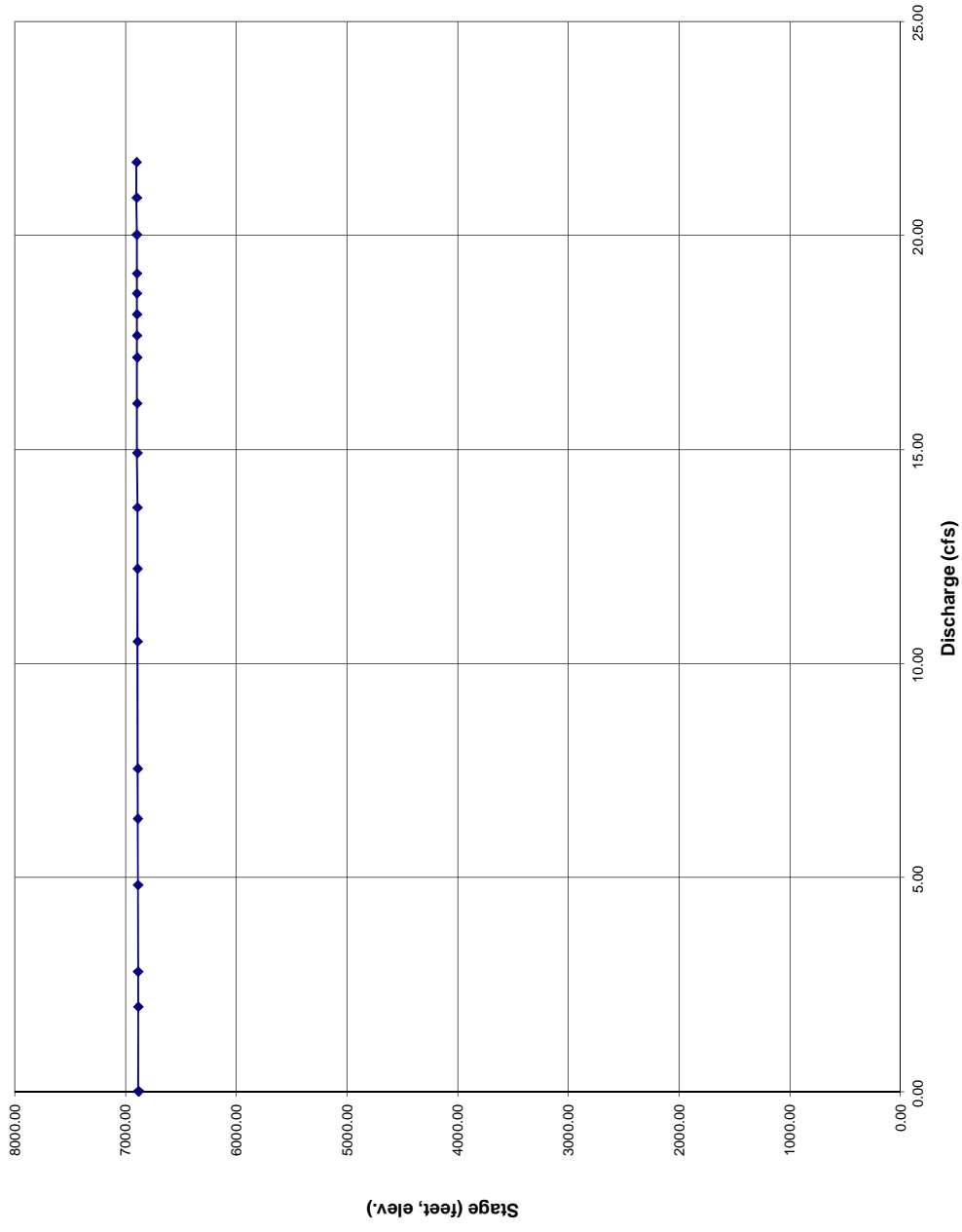


STAGE-DISCHARGE SIZING OF THE WATER QUALITY CAPTURE VOLUME (WQCV) OUTLET

Worksheet Protected

Project: FALCON MARKETPLACE
Basin ID: NORTH POND #1

STAGE-DISCHARGE CURVE FOR THE WQCV OUTLET STRUCTURE



Project: **FALCON MARKETPLACE**
Basin ID: **NORTH POND #1**

D = 96 in
Grooved End with Headwall

Height (Rise) =
Width (Span) =
Square Edge w/ 90-15 deg. Flared Wingwall

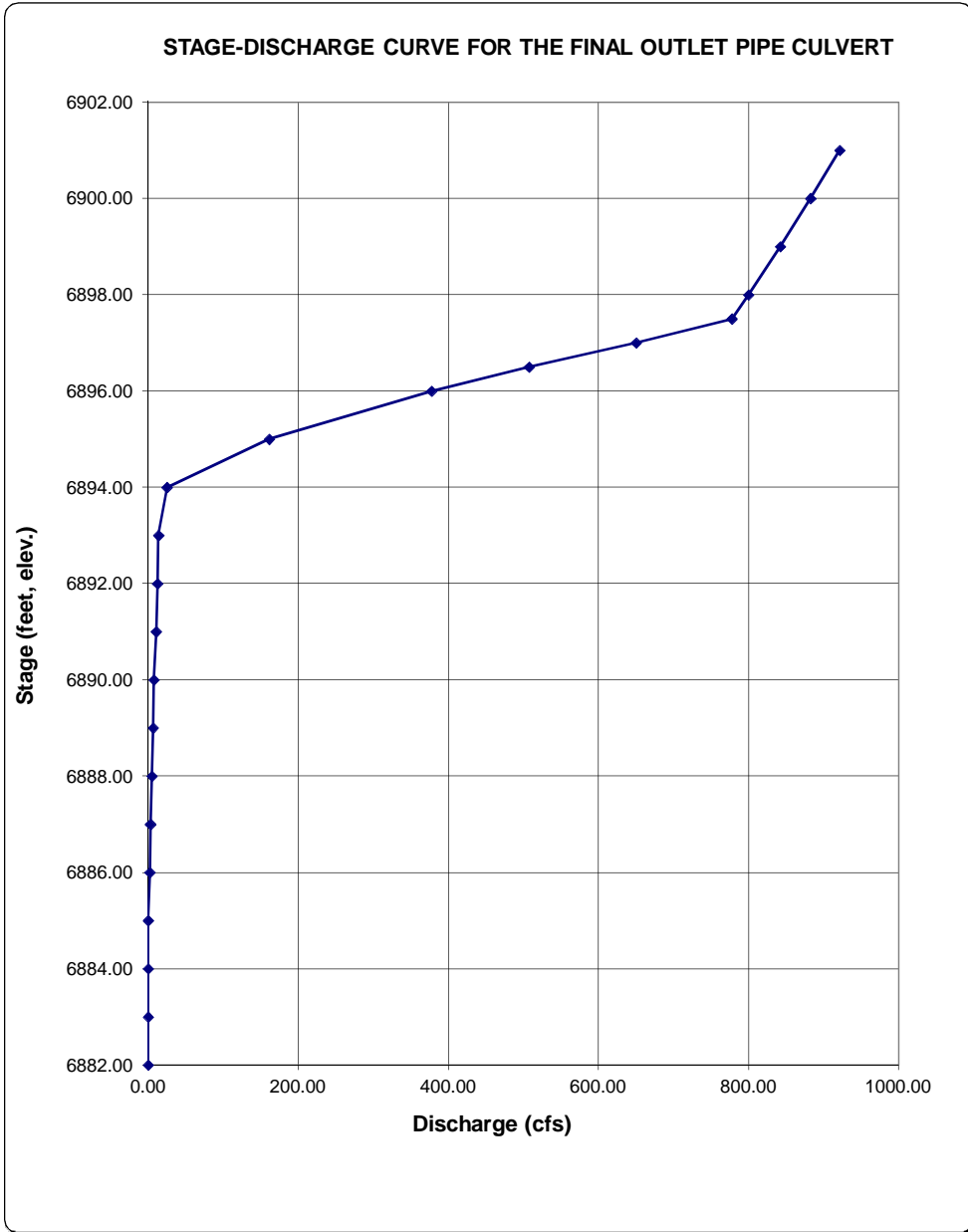
No =	1	
I_{elev} =	6881.97	ft. elev.
O_{elev} =	6880.85	ft. elev.
L =	78.0	ft.
n =	0.0120	
K_b =	0.00	
K_v =	1.00	

$K_e =$	0.20
$K_f =$	0.13
$K_s =$	1.33
$C_d =$	0.99
$KE_{low} =$	-0.04

[illegible]

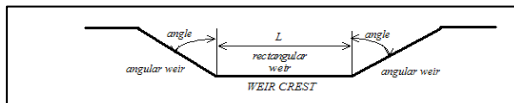
STAGE-DISCHARGE SIZING OF THE OUTLET CULVERT (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

Project: FALCON MARKETPLACE
Basin ID: NORTH POND #1



<p align="center">STAGE-DISCHARGE SIZING OF THE SPILLWAY</p>

Basin ID: NORTH POND #1



Design Information (input):

L =	160.00	feet
Angle =	75.96	degrees
EL. Crest =	6,898.00	feet
C _w =		
C _t =	3.50	

Calculation of Spillway Capacity (output):

[illegible]

PROJECT INFORMATION

PROJECT: Falcon Marketplace
PROJECT NO: 20988-00CSCV
DESIGN BY: KGV
REV. BY: TDM
AGENCY: El Paso County
REPORT TYPE: Preliminary
DATE: 6/19/2017



Drexel, Barrell & Co.

SPILLWAY CALCULATIONS

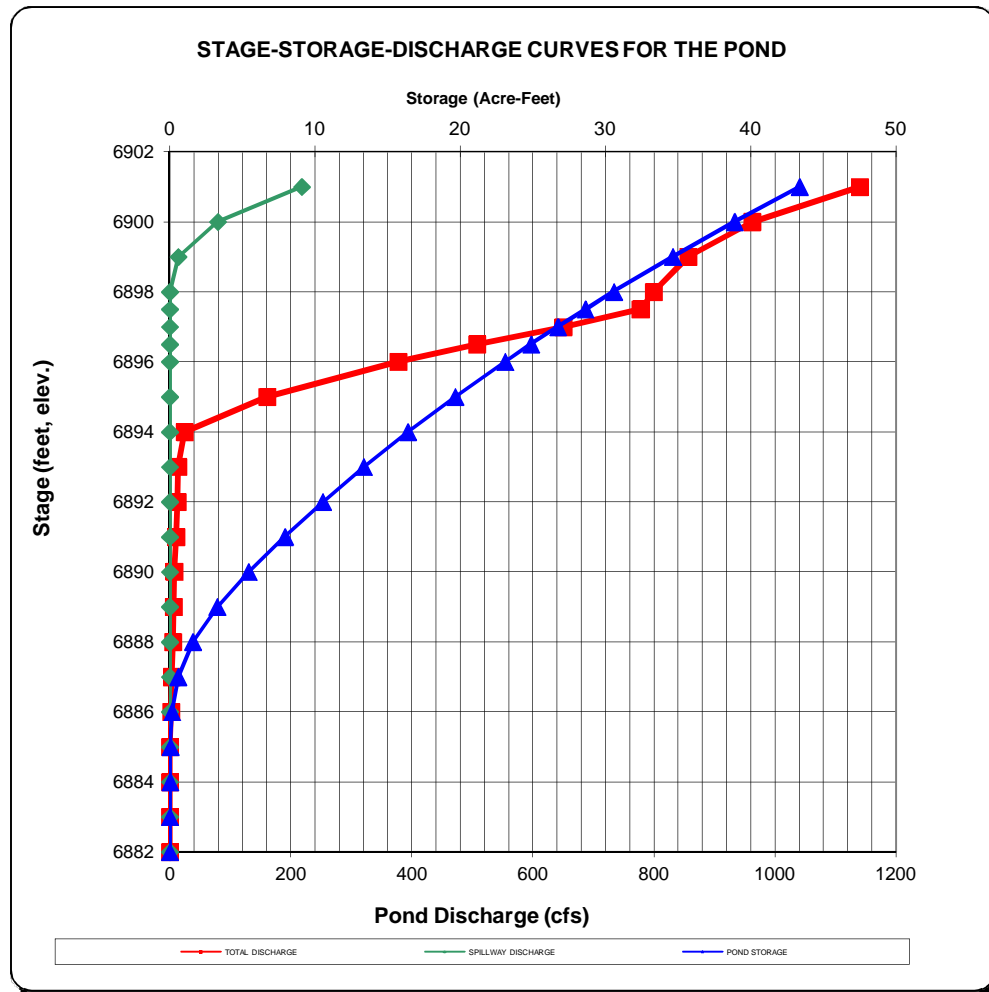
$$Q = CL(H^{2/3})$$

Weir coefficient C: 3.5
Depth H, ft: 1.5
Flowrate Q. cfs: 1016

Required L, ft: 158.01

STAGE-DISCHARGE SIZING OF THE SPILLWAY

Project: FALCON MARKETPLACE
Basin ID: NORTH POND #1



Aluminum Bar Grating

TRASH RACK GRATE
AT FRONT OF BOX

RECTANGULAR BAR SWAGE-LOCKED 1-3/16" C/C Bearing Bars

PRESS-LOCKED 1-3/16" C/C Bearing Bars

19-SR-4

19-SR-2

19-AP-4

19-AP-2



Cross Rods 4" C/C



Cross Rods 2" C/C



Cross Bars 4" C/C



Cross Bars 2" C/C

NON-SERRATED & SERRATED

LOAD & DEFLECTION TABLE

Bar Size	Symbol	Approx. Weight per sq ft	Sec. Mod. Per Ft. Of Width	SPAN (Direction of Bearing Bar)				
				24"	30"	36"	42"	
3/4" x 1/8"	19-SR-4	1.4	0.118	U	237	152	105	77
	19-SR-2	1.6		D	0.192	0.300	0.432	0.588
	19-AP-4	1.5		C	237	189	158	135
	19-AP-2	1.8		D	0.154	0.240	0.348	0.470
3/4" x 3/16"	19-SR-4	1.9	0.178	U	355	227	158	116
	19-SR-2	2.1		D	0.192	0.300	0.432	0.588
	19-AP-4	2.2		C	355	284	237	203
	19-AP-2	2.7		D	0.154	0.240	0.346	0.470
1" x 1/8"	19-SR-4	1.7	0.211	U	421	269	187	137
	19-SR-2	1.9		D	0.144	0.225	0.324	0.441
	19-AP-4	1.8		C	421	337	281	241
	19-AP-2	2.2		D	0.115	0.180	0.259	0.353
1" x 3/16"	19-SR-4	2.5	0.316	U	632	404	281	206
	19-SR-2	2.7		D	0.144	0.225	0.324	0.441
	19-AP-4	2.8		C	632	505	421	361
	19-AP-2	3.3		D	0.115	0.180	0.259	0.353
1-1/4" x 1/8"	19-SR-4	2.1	0.329	U	658	421	292	215
	19-SR-2	2.3		D	0.115	0.180	0.259	0.353
	19-AP-4	2.4		C	658	526	439	376
	19-AP-2	2.8		D	0.092	0.144	0.207	0.282
1-1/4" x 3/16"	19-SR-4	3.1	0.493	U	987	632	439	322
	19-SR-2	3.3		D	0.115	0.180	0.259	0.353
	19-AP-4	3.5		C	987	789	658	564
	19-AP-2	4.2		D	0.092	0.144	0.207	0.282
1-1/2" x 1/8"	19-SR-4	2.5	0.474	U	947	606	421	309
	19-SR-2	2.7		D	0.096	0.150	0.216	0.294
	19-AP-4	2.8		C	947	758	632	541
	19-AP-2	3.2		D	0.077	0.120	0.173	0.235
1-1/2" x 3/16"	19-SR-4	3.7	0.711	U	1421	909	632	464
	19-SR-2	3.9		D	0.096	0.150	0.216	0.294
	19-AP-4	4.1		C	1421	1137	947	812
	19-AP-2	4.8		D	0.077	0.120	0.173	0.235
1-3/4" x 3/16"	19-SR-4	4.2	0.967	U	1934	1238	860	632
	19-SR-2	4.4		D	0.082	0.129	0.185	0.252
	19-AP-4	4.7		C	1934	1547	1289	1105
	19-AP-2	5.3		D	0.066	0.103	0.148	0.202
2" x 3/16"	19-SR-4	4.8	1.263	U	2526	1617	1123	825
	19-SR-2	5.0		D	0.072	0.113	0.162	0.221
	19-AP-4	5.3		C	2526	2021	1684	1444
	19-AP-2	5.9		D	0.058	0.090	0.130	0.176
2-1/4" x 3/16"	19-SR-4	5.4	1.599	U	3197	2046	1421	1044
	19-SR-2	5.6		D	0.064	0.100	0.144	0.196
	19-AP-4	5.8		C	3197	2558	2132	1827
	19-AP-2	6.5		D	0.051	0.080	0.115	0.157
2-1/2" x 3/16"	19-SR-4	5.9	1.974	U	3947	2526	1754	1289
	19-SR-2	6.1		D	0.058	0.090	0.130	0.176
	19-AP-4	6.4		C	3947	3158	2632	2256
	19-AP-2	7.1		D	0.046	0.072	0.104	0.141

U = safe uniform load, psf (page 93)
C = safe concentrated load, psf (page 93)
D = deflection, inches
E = modulus of elasticity, 10,000,000 psi
F = fiber stress, 12,000 psi

Material: ASTM B-221, 6063 or 6061

Deflection: Spans and loads to the right of the bold line exceed 1/4" deflection for uniform load of 100 psf which provides safe pedestrian comfort. These can be exceeded for other types of loads with engineer's approval.

Serrated Bars: For serrated grating, the depth of grating required for a specified load is 1/4" deeper than that shown in the table.

General: Loads and deflections are theoretical and based on static loading.

Finish: Mill finish unless otherwise specified.

FALCON MARKETPLACE
15-FT Head x 62-4 = 936 psf

SR/AP-19 PANEL WIDTH (inches)

Note: Includes 1/4" (1/8" each side) for extended cross rods on swage-locked (SR) and extended cross bars on press-locked (AP).

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1/8" Bar	1 1/16	2 1/4	3 1/2	5 1/8	6 3/16	7 1/2	8 11/16	9 7/8	11 1/16	12 1/4	13 3/16	14 5/8	15 13/16	17	18 3/16
3/16" Bar	1 5/8	2 13/16	4	5 3/16	6 3/8	7 9/16	8 3/4	9 9/16	11 1/8	12 5/16	13 1/2	14 11/16	15 7/8	17 1/16	18 1/4
No. of Bars	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1/8" Bar	19 3/8	20 9/16	21 3/4	22 15/16	24 1/8	25 3/16	26 1/2	27 11/16	28 7/8	30 1/16	31 1/4	32 3/16	33 5/8	34 13/16	36
3/16" Bar	19 7/16	20 5/8	21 13/16	23	24 3/16	25 3/8	26 9/16	27 3/4	28 15/16	30 1/8	31 1/16	32 1/2	33 11/16	34 7/8	36 1/16

Flow depths entering Pond SR4

CLOMR

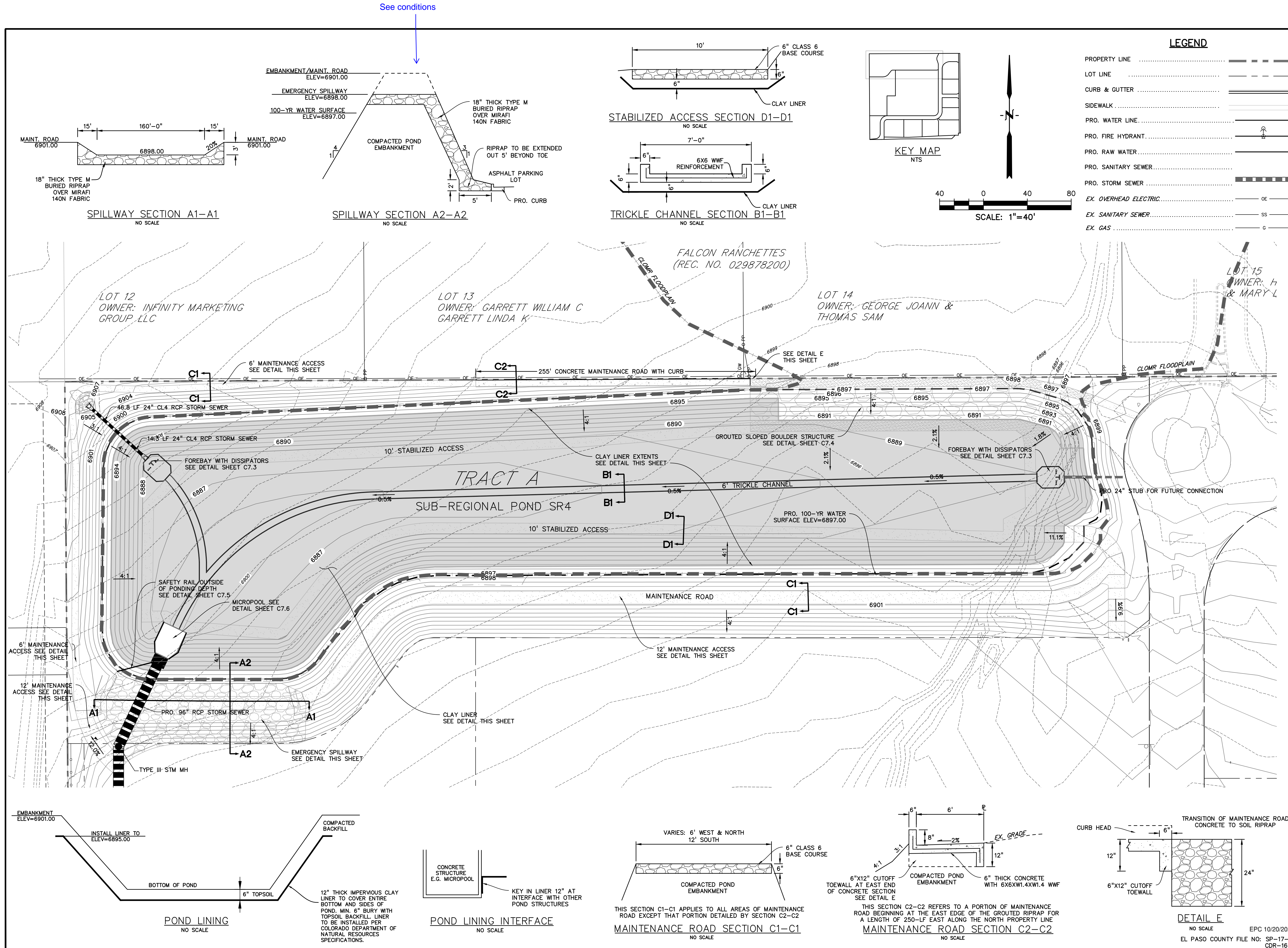
Min Ch El	6895.98
WS Elev	6898.75
Max flow depth (north)	2.8 ft

NORTHWEST SWALE

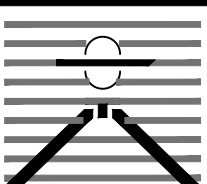
Assuming trapezoidal channelized flow at riprap entry

Q100	30.2 cfs
Width	8 ft
Side Slopes	5 :1
Slope	1.6 %
n	0.020

Calculated flow depth	0.5 ft
-----------------------	---------------



PREPARED BY:


DREXEL, BARRELL & CO.
Engineers • Surveyors
3 SOUTH 7TH STREET
COLORADO SPGS, COLORADO 80905
CONTACT: TIM D. McCONNELL, P.E.
(719)260-0887
BOULDER • COLORADO SPRINGS


CLIENT:

HUMMEL INVESTMENTS, LLC
8117 PRESTON ROAD, SUITE 120
DALLAS, TEXAS 75225
(214) 416-9820

OVERLOT GRADING, POND SR4 & UTILITY
CONSTRUCTION DRAWINGS FOR

**FALCON
MARKETPLACE**
FALCON, COLORADO

ISSUE	DATE
1ST SUBMITTAL	6-20-17
RESUBMITTAL	9-6-18
REVISED	7-24-20
DESIGNED BY:	TDM
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	



PREPARED UNDER MY DIRECT
SUPERVISION FOR AND ON BEHALF
OF DREXEL, BARRELL & CO.

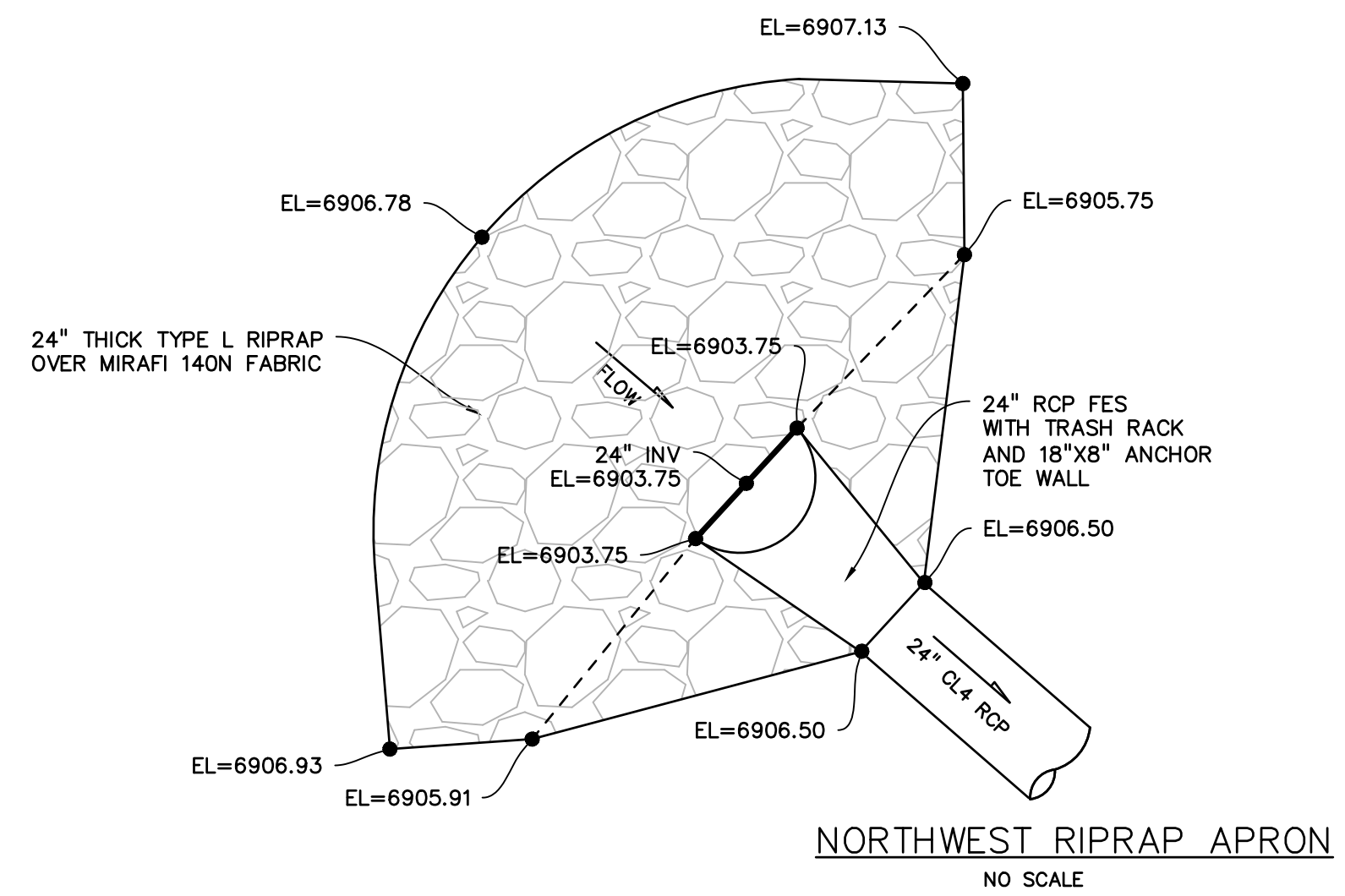
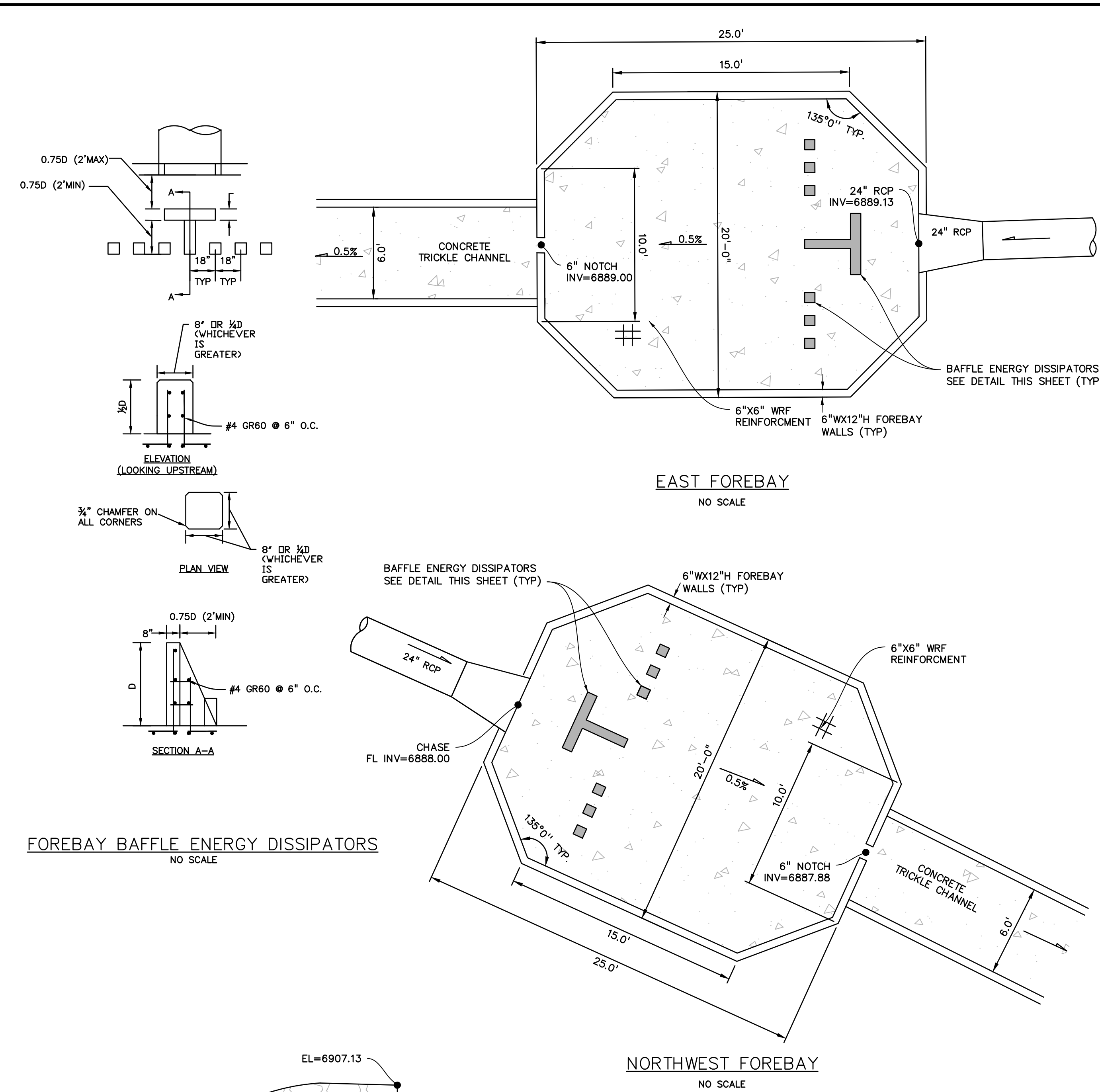
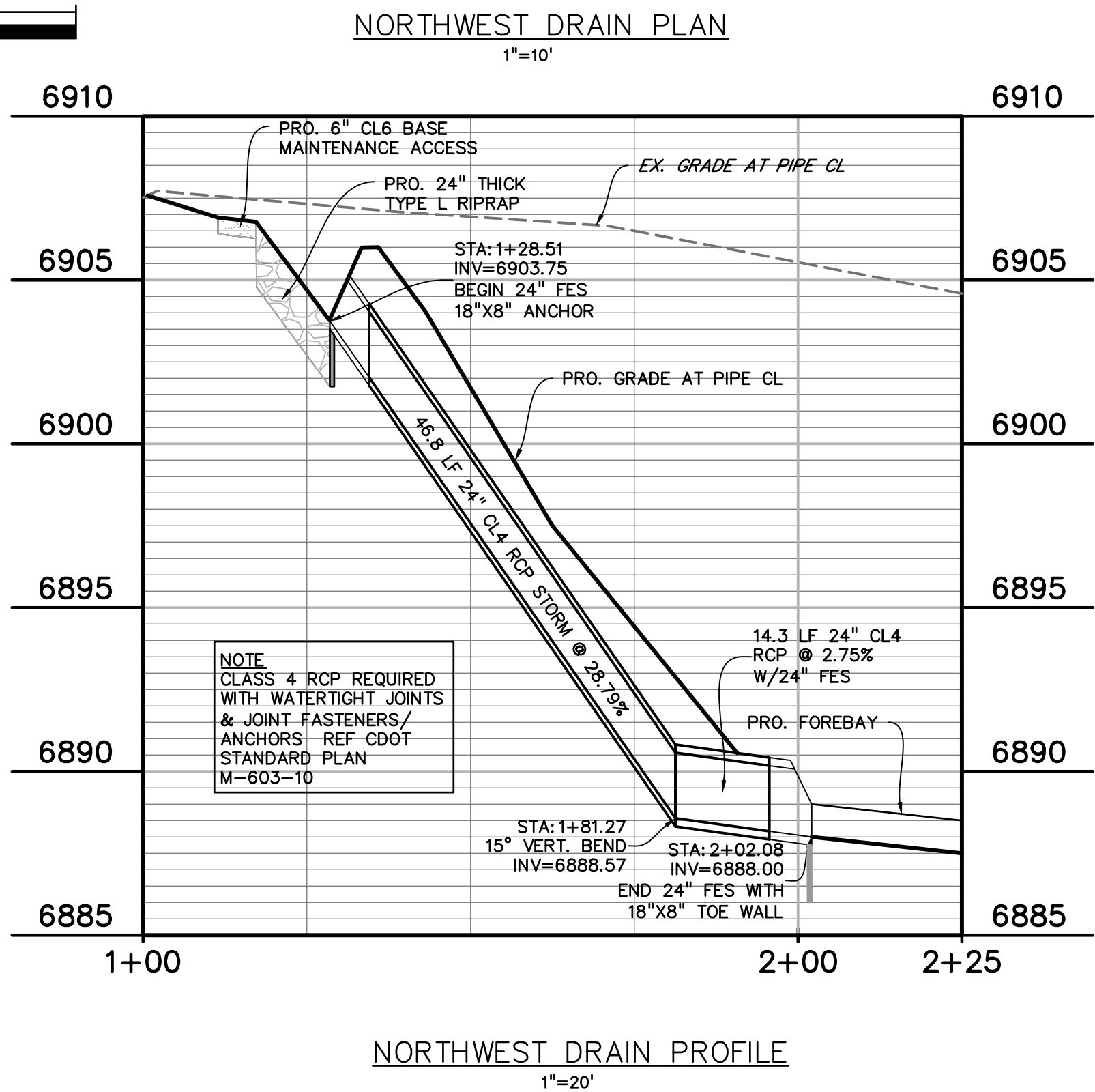
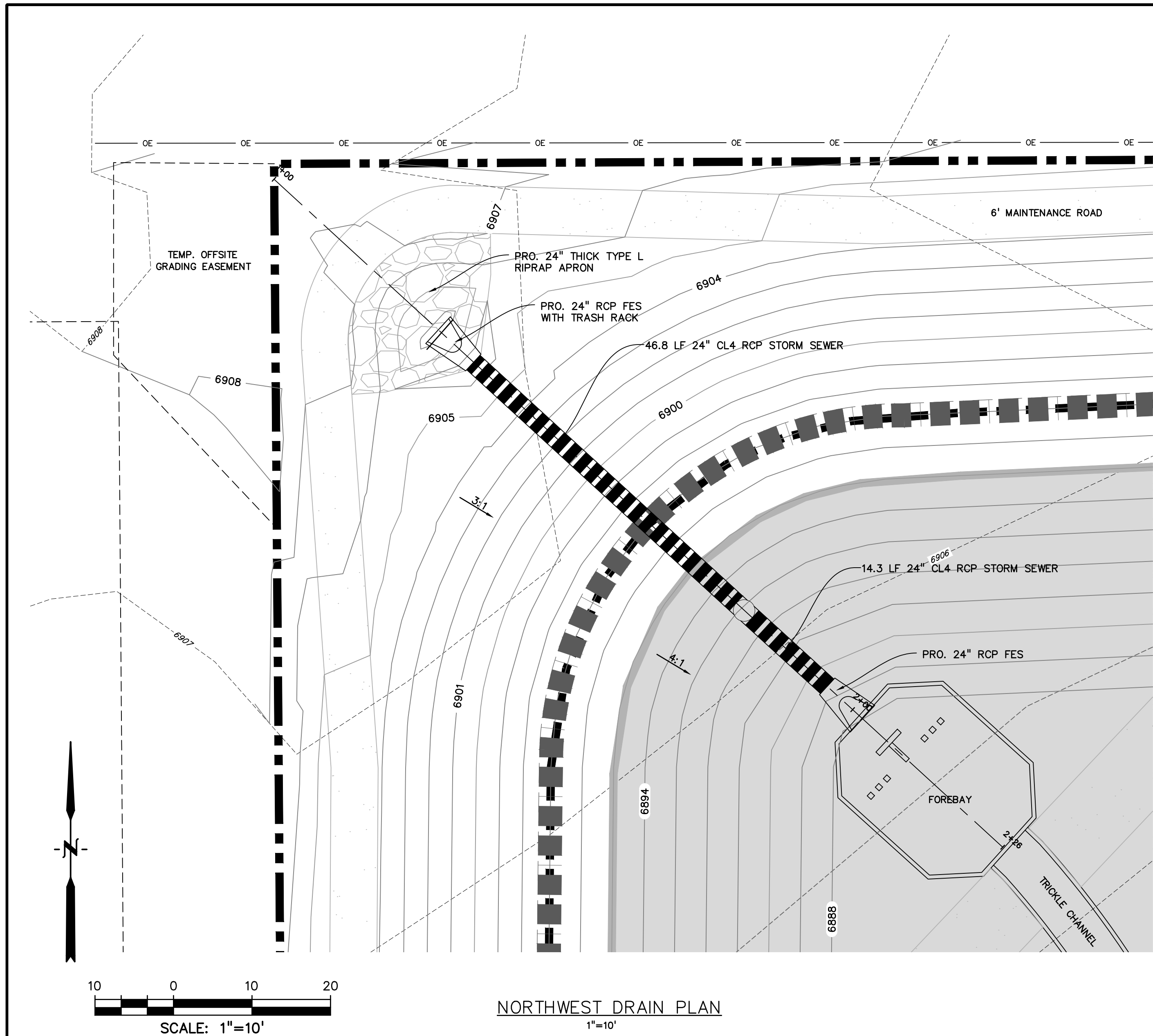
DRAWING SCALE:
HORIZONTAL: 1"=40'
VERTICAL: N/A

**SUB-REGIONAL
POND #1 (SR4)**

PROJECT NO. 20988-00CSV
DRAWING NO.

C7.2

SHEET: 9 OF 12



PREPARED BY:

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CONSTRUCTION DRAWINGS FOR

**FALCON
MARKETPLACE**
FALCON, COLORADO

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RESUBMITTAL	9-6-18
REVISED	7-24-20
DESIGNED BY:	TDM
DRAWN BY:	KGW
CHECKED BY:	TDM
FILE NAME:	

PROFESIONAL ENGINEER
33797
8-28-20

PREPARED UNDER MY DIRECT
SUPERVISION FOR AND ON BEHALF
OF DREXEL, BARRELL & CO.

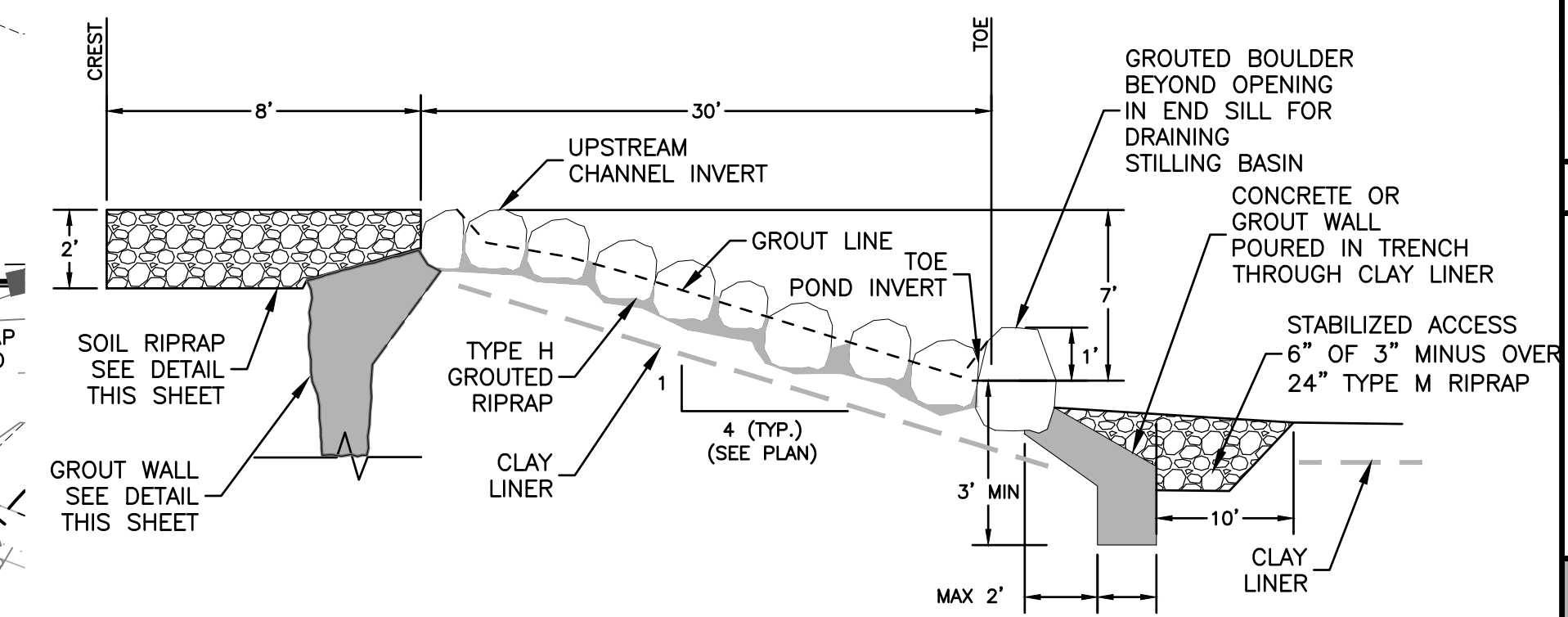
DRAWING SCALE:
HORIZONTAL: N/A
VERTICAL: N/A

**POND #1 (SR4)
DETAILS**

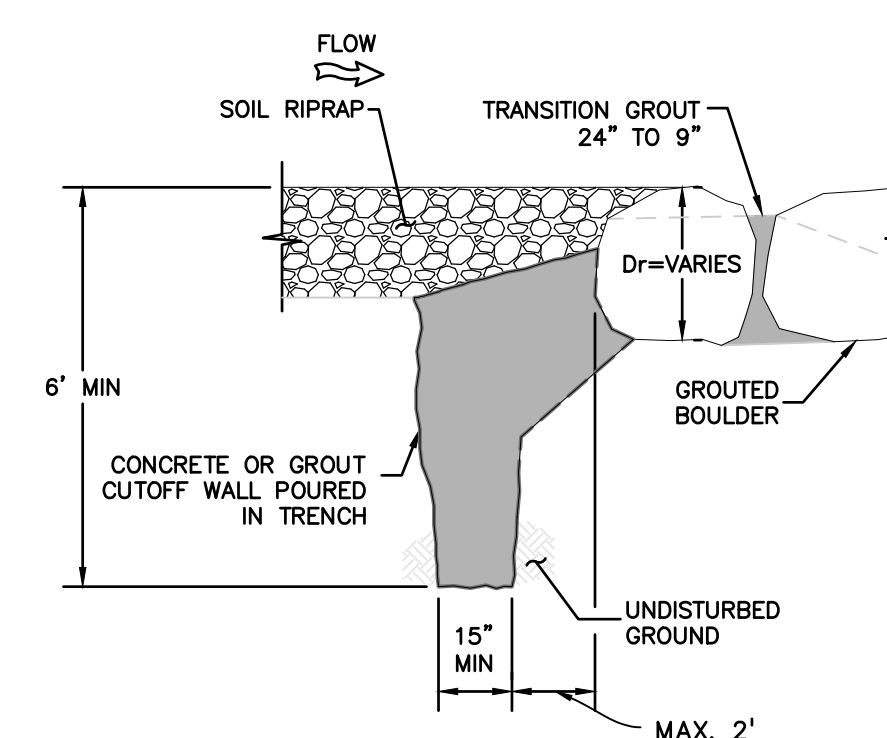
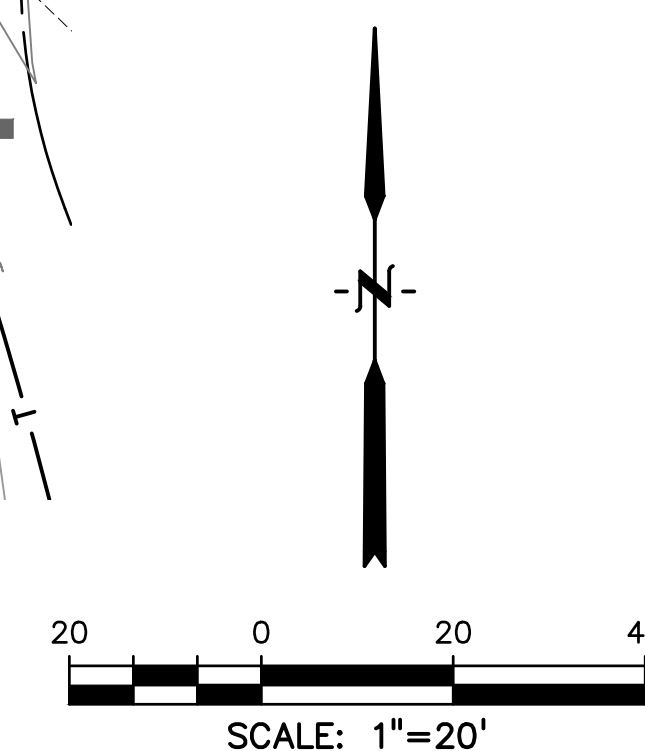
PROJECT NO. 20988-00CSCV
DRAWING NO.

C7.3

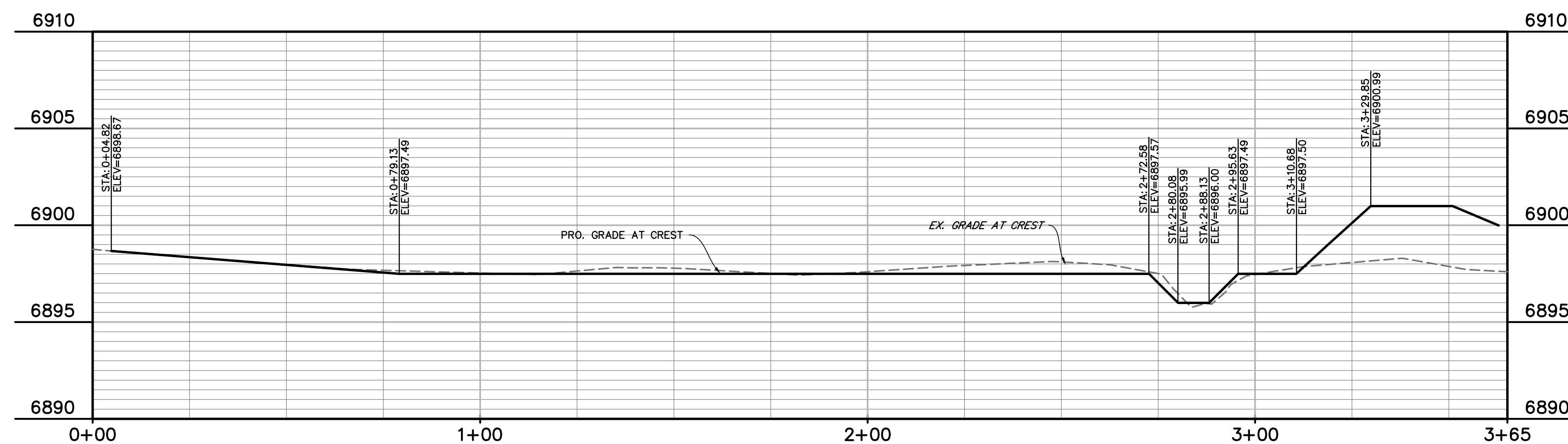
SHEET: 10 OF 12



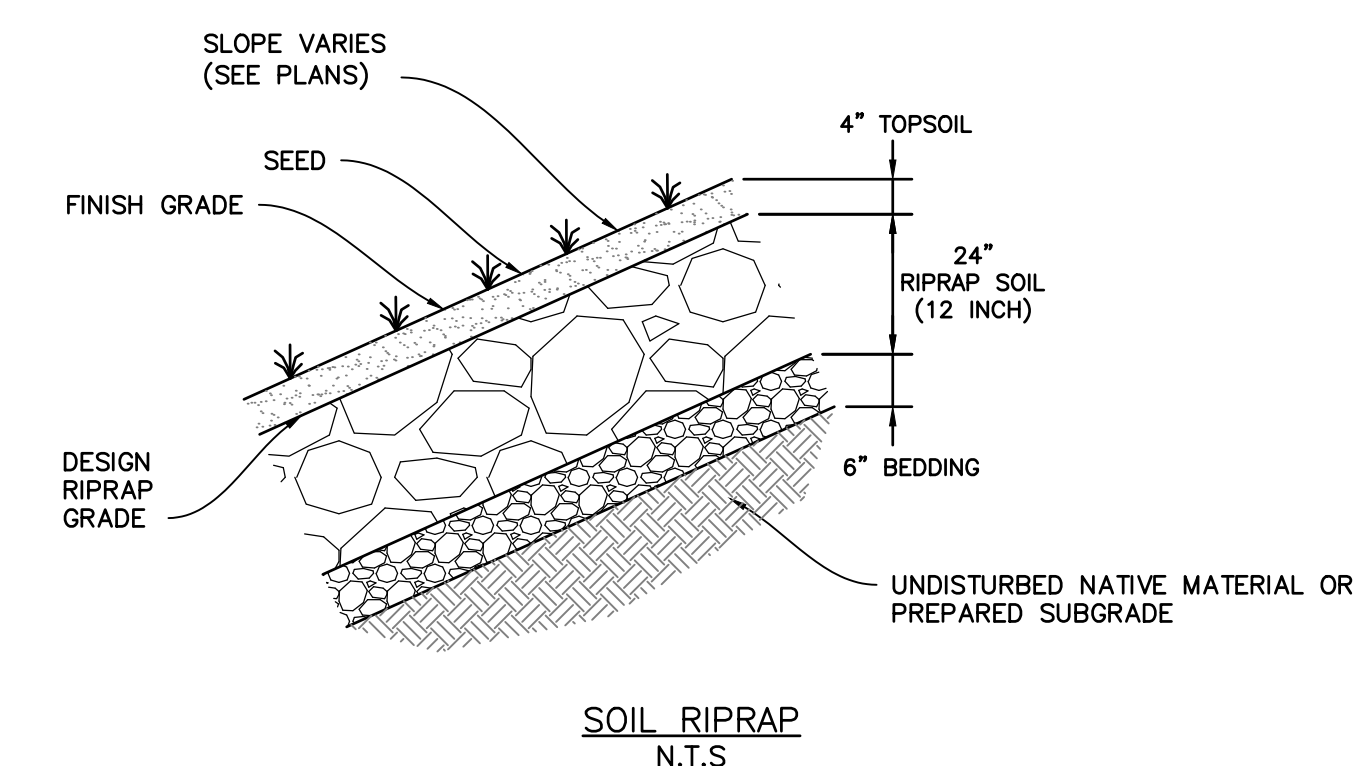
GROUTED SLOPED BOULDER STRUCTURE
NO SCALE



GROUT WALL CONNECTION
TRENCHED VERTICAL WALL
UPSTREAM OF DROP



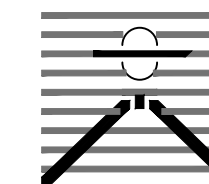
CREST PROFILE



NOTE

REFERENCE UDFCD SPECIFICATION SECTIONS 31 37 00 AND 31 37 19 FOR GROUT, BOULDER AND RIPRAP SPECIFICATIONS, REINFORCEMENT AND INSTALLATION GUIDELINES.

PREPARED BY:



DREXEL, BARRELL & CO.
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CLIENT:

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OVERLOT GRADING, POND SR4 & UTILITY
CONSTRUCTION DRAWINGS FOR

FALCON
MARKETPLACE

FALCON, COLORADO

ISSUE	DATE
1ST SUBMITTAL	6-20-17
RESUBMITTAL	9-6-18
REVISED	7-24-20

DESIGNED BY:	TDM
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	



PREPARED UNDER MY DIRECT
SUPERVISION FOR AND ON BEHALF
OF DREXEL, BARRELL & CO.

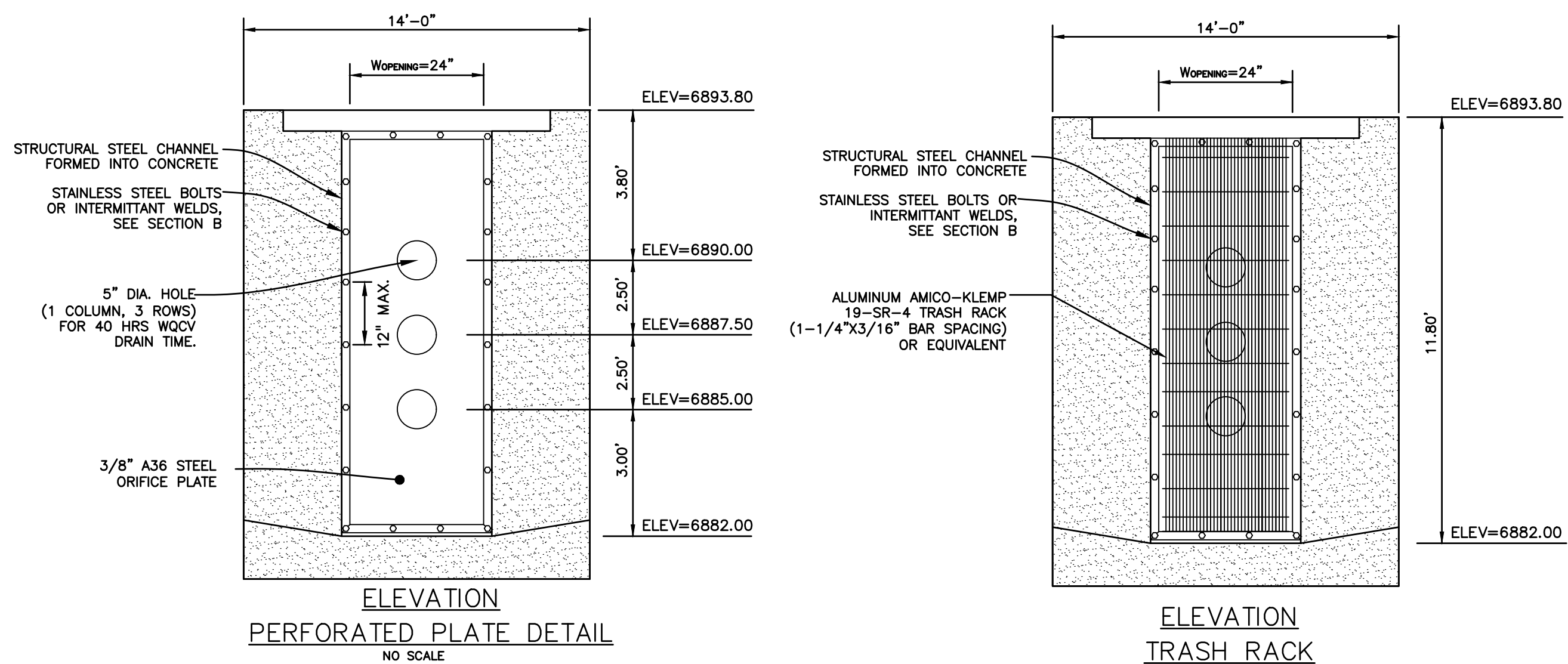
DRAWING SCALE:
HORIZONTAL: 1"=20'
VERTICAL: N/A

POND #1 (SR4)
GROUTED DROP
DETAILS

PROJECT NO. 20988-00CSCV
DRAWING NO.

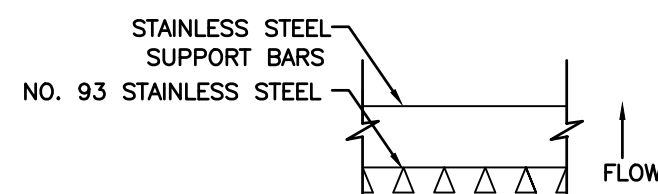
C7.4

SHEET: 11 OF 12

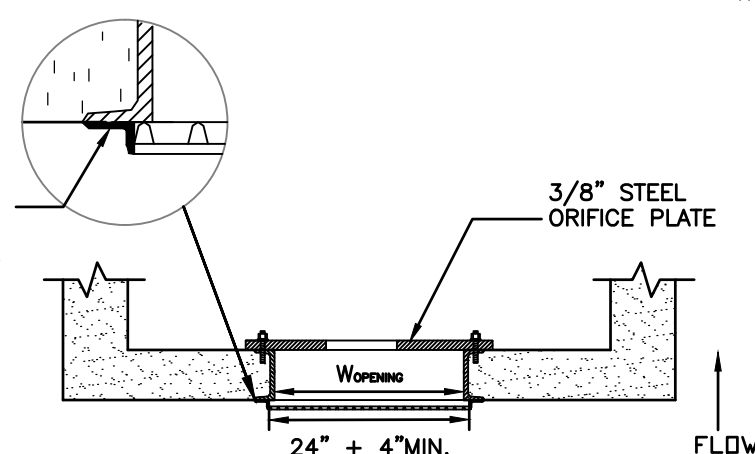


PERFORATED PLATE NOTES:

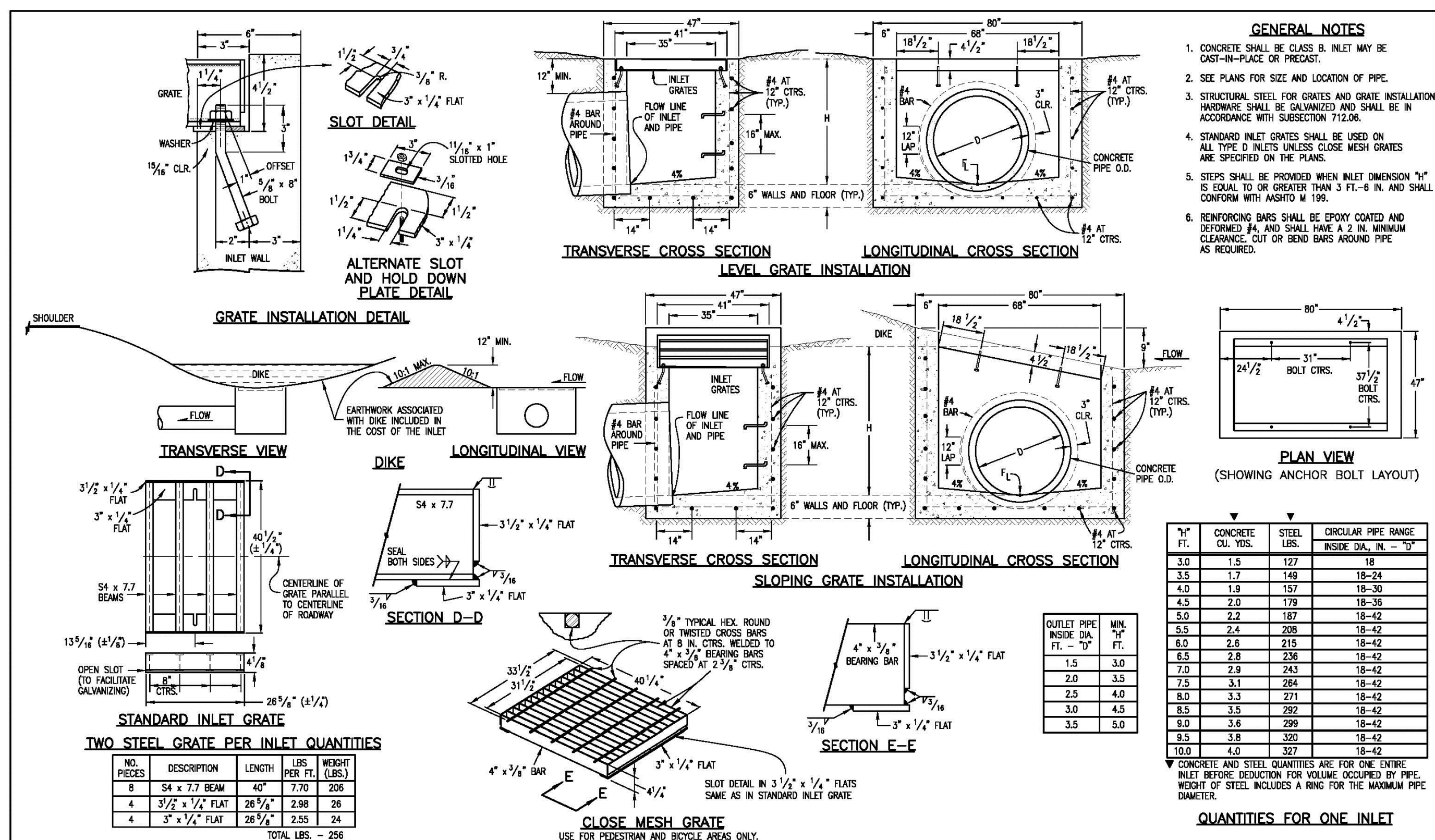
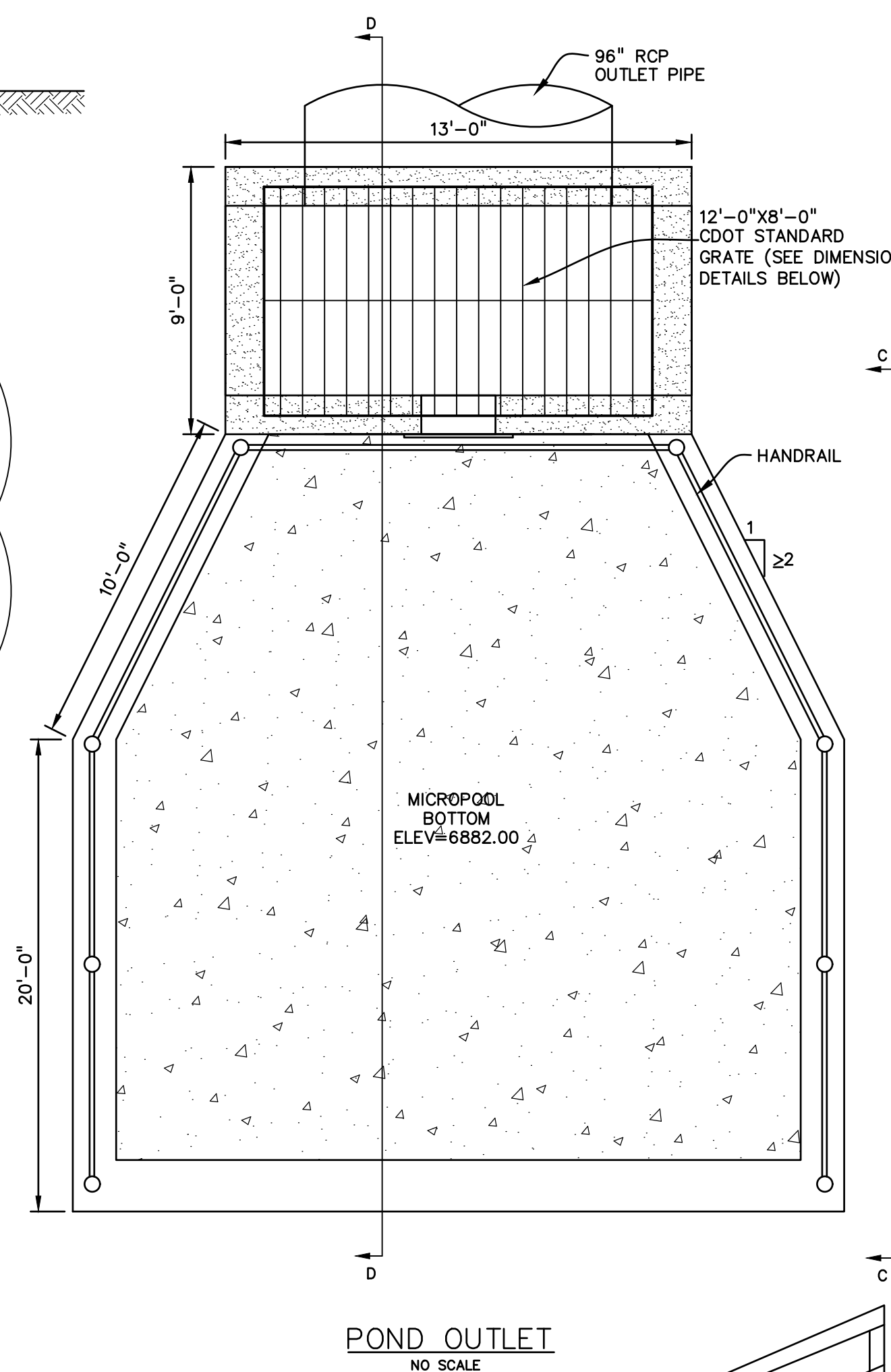
1. PROVIDE NEOPRENE GASKET MATERIAL OR GROUT BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE @ 12" MAX. ON CENTER. ORIFICE PLATE IS TO BE REMOVABLE.
3. ALL NON STAINLESS STEEL SURFACES ARE TO BE COATED WITH ZRC COLD GALVANIZING COMPOUND.



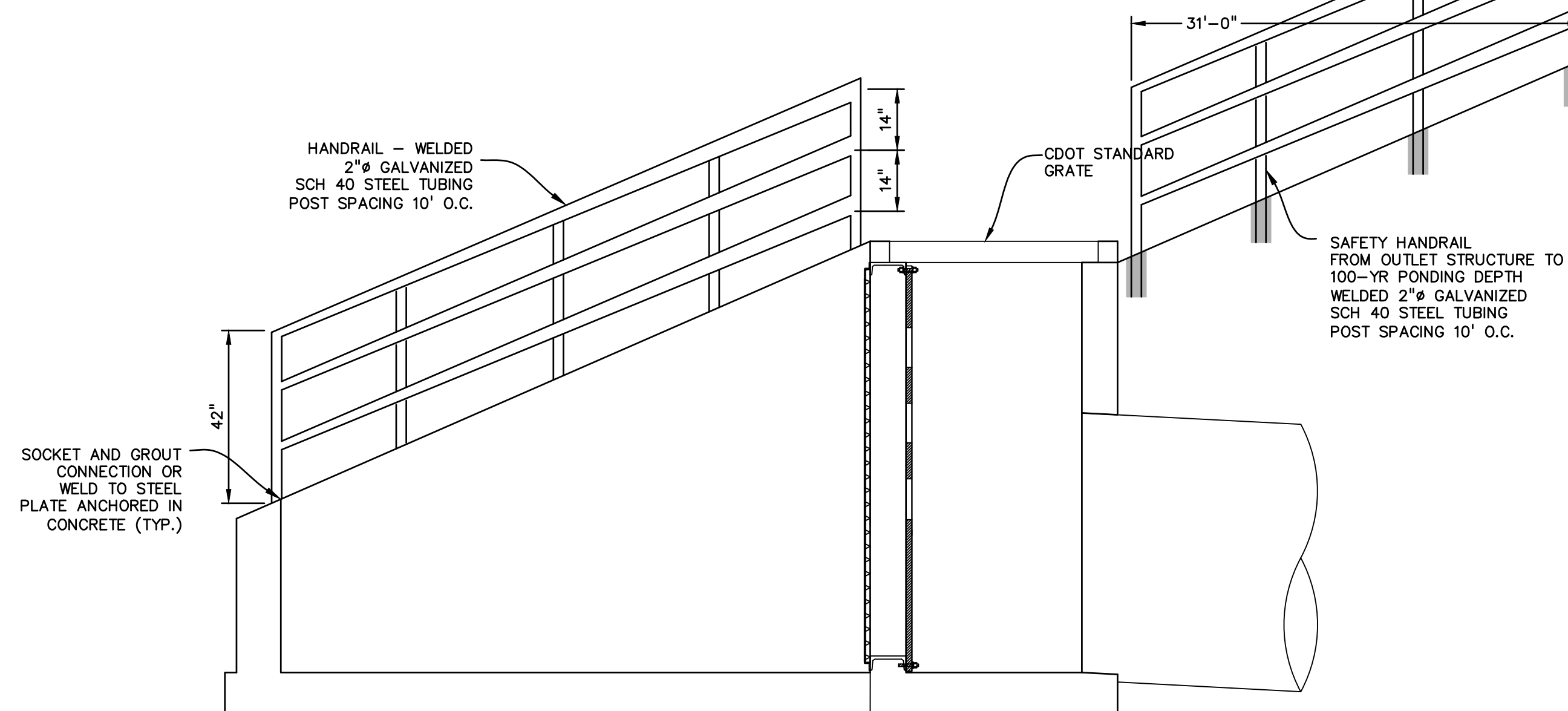
WELL-SCREEN FRAME ATTACHED TO CHANNEL BY INTERMITTENT WELDS



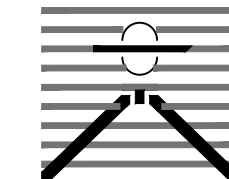
POND OUTLET PROFILE SECTION D-D
NO SCALE



SECTION C-C
NO SCALE



PREPARED BY:



DREXEL, BARRELL & CO.
Engineers & Surveyors
3 SOUTH 7TH STREET
COLORADO SPGS, COLORADO 80905
CONTACT: TIM D. McCONNELL, P.E.
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CLIENT:

HUMMEL INVESTMENTS, LLC

8117 PRESTON ROAD, SUITE 120
DALLAS, TEXAS 75225

(214) 416-9820

OVERLOT GRADING, POND SR4 & UTILITY
CONSTRUCTION DRAWINGS FOR

**FALCON
MARKETPLACE**
FALCON, COLORADO

ISSUE	DATE
1ST SUBMITTAL	6-20-17
RESUBMITTAL	9-6-18
REVISED	7-24-20

DESIGNED BY: TDM
DRAWN BY: KGV
CHECKED BY: TDM
FILE NAME:



PREPARED UNDER MY DIRECT
SUPERVISION FOR AND ON BEHALF
OF DREXEL, BARRELL & CO.

DRAWING SCALE:
HORIZONTAL: N/A
VERTICAL: N/A

**POND #1 (SR4)
DETAILS**

PROJECT NO. 20988-00CSCV
DRAWING NO.

C7.5

SHEET: 12 OF 12

Computer File Information		Sheet Revisions	
Creation Date: 07/04/06	Initials: SJR	Date:	Comments:
Last Modification Date: 07/04/06	Initials: LTA		
Full Path: www.dot.state.co.us/DesignSupport/			
Drawing File Name: 6040110101.dwg			
CAD Ver: MicroStation V8	Scale: Not to Scale	Units: English	

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-0820

INLET, TYPE D

Project Development Branch SRJ/LTA Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO.
M-604-11
Sheet No. 1 of 1

STAGE - STORAGE - DISCHARGE TABLE (POND WU - OUTLET REVISIONS)

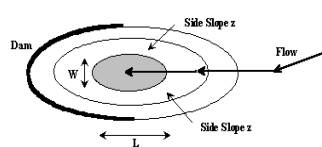
per UDFCD UD-Detention Spreadsheet

Elevation	Stage	Orifice Plate	Horiz Weir	Total Collection Capacity (WQCV & Weir)	Controlling Flowrate Culvert #1 (48")	Controlling Flowrate Culvert #2 (60")	Controlling Flowrate Culvert #3 (60")	Controlling Flowrate Culvert #4 (60")	Total Controlling Flowrate - Outlet Culverts	Spill Way	Total Outflow*
[ft]	[ft]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]
6816.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6818.20	1.90	1.34	0.00	1.34	1.34	1.34	1.34	1.34	5.36	0.00	1.34
6819.00	2.70	2.18	0.00	2.18	2.18	2.18	2.18	2.18	8.72	0.00	2.18
6820.00	3.70	3.28	0.00	3.28	3.28	3.28	3.28	3.28	13.12	0.00	3.28
6821.00	4.70	4.53	0.00	4.53	4.53	4.53	4.53	4.53	18.12	0.00	4.53
6822.00	5.70	5.90	78.71	84.61	84.61	84.61	84.61	84.61	338.44	0.00	84.61
6823.00	6.70	6.91	544.70	551.61	116.75	134.68	153.58	150.75	555.76	0.00	551.61
6824.00	7.70	7.76	1233.69	1241.44	135.78	174.76	189.73	187.47	687.74	0.00	687.74
6825.00	8.70	8.51	2087.92	2096.43	152.52	207.28	220.03	218.07	797.90	0.00	797.90
6826.00	9.70	9.19	3080.00	3089.19	167.63	235.34	246.62	244.87	894.46	0.00	894.46
6827.00	10.70	9.83	4192.88	4202.71	181.43	260.37	270.62	269.03	981.45	0.00	981.45
6828.00	11.70	10.42	5414.65	5425.07	194.30	283.23	292.66	291.20	1061.39	0.00	1061.39
6829.00	12.70	10.98	6249.18	6260.16	206.36	304.32	313.16	311.78	1135.62	16.43	1152.05
6830.00	13.70	11.52	6659.12	6509.89	217.74	324.10	332.39	331.10	1205.33	148.29	1353.62
6830.20	13.90	11.62	6738.12	6509.99	219.95	327.91	336.10	334.82	1218.78	183.81	1402.59

* - Based on Spillway flow plus lesser flow of Total Collection Capacity (WQCV & Weir) or Total Controlling Flowrate - Outlet Culverts

STAGE-STORAGE SIZING FOR DETENTION BASINS

Basin ID: Pond WU



Check Basin Shape

Right Triangle		OR...
Isosceles Triangle		OR...
Rectangle		OR...
Circle / Ellipse		OR...
Irregular		(Use Override values in cells G32:G52)

Storage Requirement from Sheet 'Modified FAA':
Storage Requirement from Sheet 'Hydrograph':
Storage Requirement from Sheet 'Full-Spectrum':

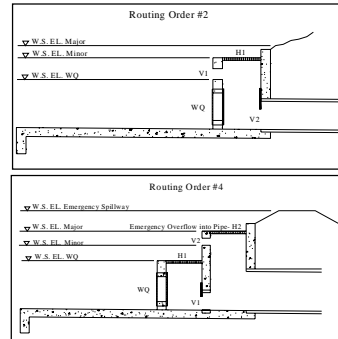
MINOR	MAJOR	
		acre-ft.
		acre-ft.
8.25	18.89	acre-ft.

[illegible]

STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)
--

Basin ID: Pond WU

7080.5 Routing Order #1 (Standard) Routing Order #2



Current Routing Order is #3

<u>Design Information (Input):</u>	#1 Horiz.	#2 Horiz.	#1 Vert.	#2 Vert.
---	------------------	------------------	-----------------	-----------------

	#1 Horiz.	#2 Horiz.	#1 Vert.	#2 Vert.	
Dia. =			60.00		inches

W =

45.50			
-------	--	--	--

 ft.

L or H =	10.50				ft.
----------	-------	--	--	--	-----

% open =

100		100	
-----	--	-----	--

 %

$C_o =$	0.60	0.50	
---------	------	------	--

$C_w =$	3.00		
---------	------	--	--

$E_o =$	6821.62				ft.
---------	---------	--	--	--	-----

Calculation of Collection Capacity:

$A_0 =$ 477.75 19.63 sq. ft.

$A_0 =$

--	--	--	--

 sq. ft.

$$L_w = 112.00 \text{ ft.}$$

$L_w =$ ft.

Center Elevation of Vertical Orifice Opening, Cen = 2.50 ft.

#1 horizontal opening into #1 vertical opening. This flow will be

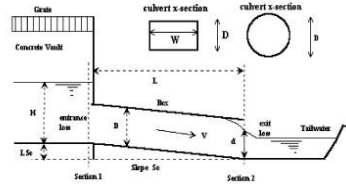
Routing 3: Single Stage - Water flows through WQCV plate and #1 horizontal opening into #1 vertical opening. This flow will be applied to culvert sheet (#2 vertical & horizontal openings is not used).

[illegible]

STAGE-DISCHARGE SIZING OF THE OUTLET CULVERT (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

Basin ID: Pond WU - Exist 48" Outlet Pipe

Status: Culvert Data is valid!



Design Information (Input):

Circular Culvert: Inlet Edge Type (choose from pull-down list)

Circular Culvert: Inlet Edge Type (choose from pull-down list)

OR:

Box Culvert: Barrel Width (Span) in Feet

Inlet Elevation at C

Inlet Elevation at Culvert Invert

Outlet Elevation at Culvert Invert

Manning's Roughness

Bend Loss Coefficient

Exit Loss Coefficient

Grooved End with Headwall

Span) = ft.

$$l_{\text{elev}} = \boxed{6816.40} \text{ ft.}$$

$I_{elev} = 6816.40$ ft. elev.

$O_{elev} =$

6816.19

 ft. elev.

n = 0.0130

$K_b =$	0.00
---------	------

$$K_x = 0.50$$

Design Information (calculated):

Friction Loss Coefficient

Friction Loss Coefficient

Orifice Inlet Condition Coeff

Orifice Inlet Condition Coefficient

Minimum Energy Condition Coeff

 $K_f =$ $K_f =$
$$C_d =$$
$$KE_{low} =$$

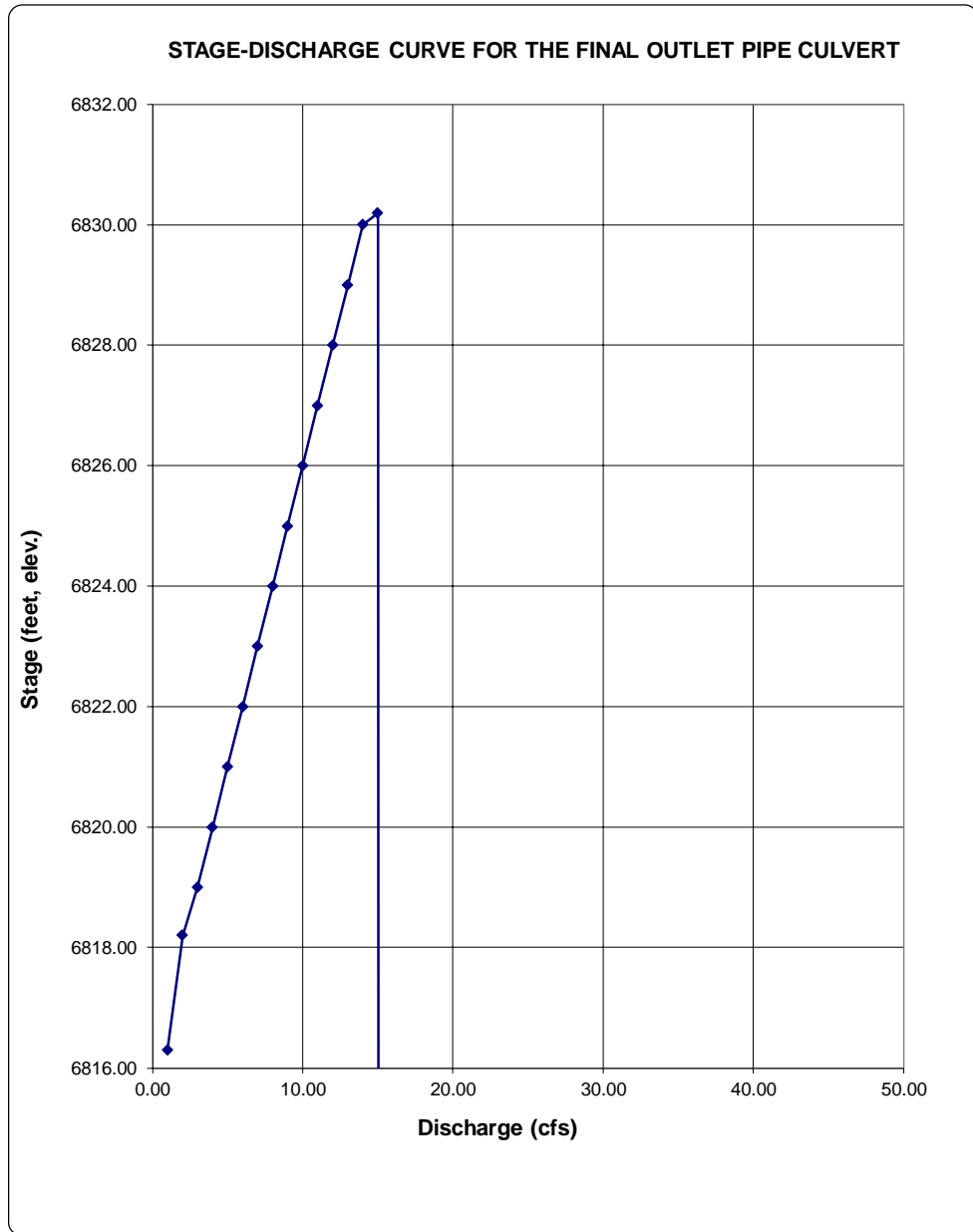
Calculations of Culvert Capacity (output):

[illegible]

STAGE-DISCHARGE SIZING OF THE OUTLET CULVERT (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

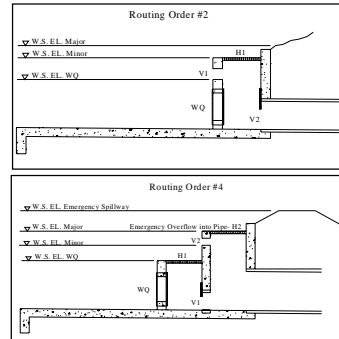
Project: Bent Grass

Basin ID: Pond WU - Exist 48" Outlet Pipe



STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)
--

Basin ID: Pond WU - Existing 60" Outle Pipe - Culvert 1



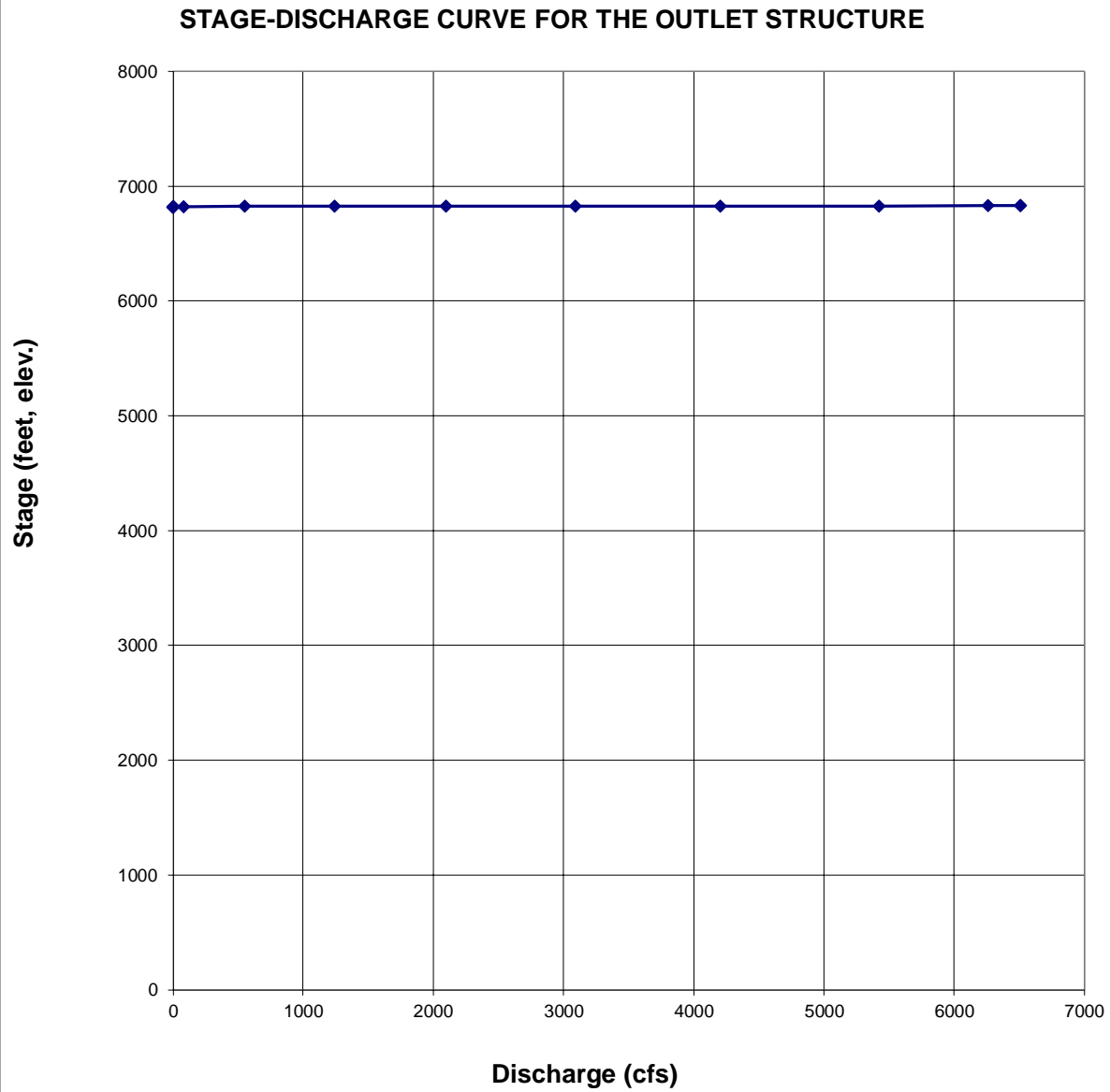
Routing 3: Single Stage - Water flows through WQCV plate and #1 horizontal opening into #1 vertical opening. This flow will be applied to culvert sheet (#2 vertical & horizontal openings is not used).

[illegible]

STAGE-DISCHARGE SIZING OF THE WEIRS AND ORIFICES (INLET CONTROL)

Project: Falcon Meadows at Bent Grass

Basin ID: Pond WU - Existing 60" Outlet Pipe - Culvert 1

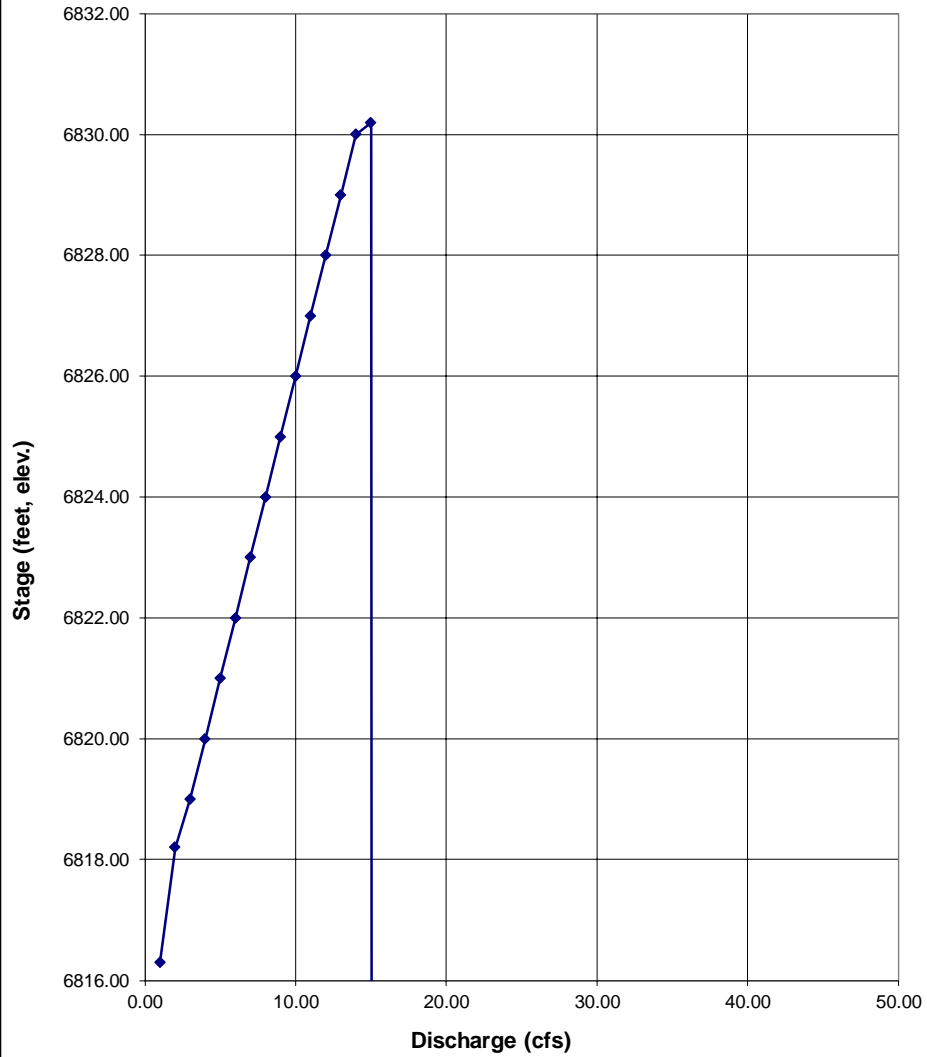


STAGE-DISCHARGE SIZING OF THE OUTLET CULVERT (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

Project: Bent Grass

Basin ID: Pond WU - Exist 60" Outlet Pipe - Culvert 2

STAGE-DISCHARGE CURVE FOR THE FINAL OUTLET PIPE CULVERT



Project: **Bent Grass**
Basin ID: **Pond WU - Exist 60" Outlet Pipe - Culvert 3**

[illegible]

D = 60 in
Grooved End with Headwall

Height (Rise) = ft
Width (Span) = ft
Square Edge w/ 90-15 deg. Flared Wingwall

No =	1	
I_{elev} =	6816.27	ft. elev.
O_{elev} =	6816.17	ft. elev.
L =	82.5	ft.
n =	0.0130	
K_b =	0.00	
K_x =	0.50	

$K_e =$	0.20
$K_f =$	0.30
$K_s =$	1.00
$C_d =$	0.99
$KE_{low} =$	0.01

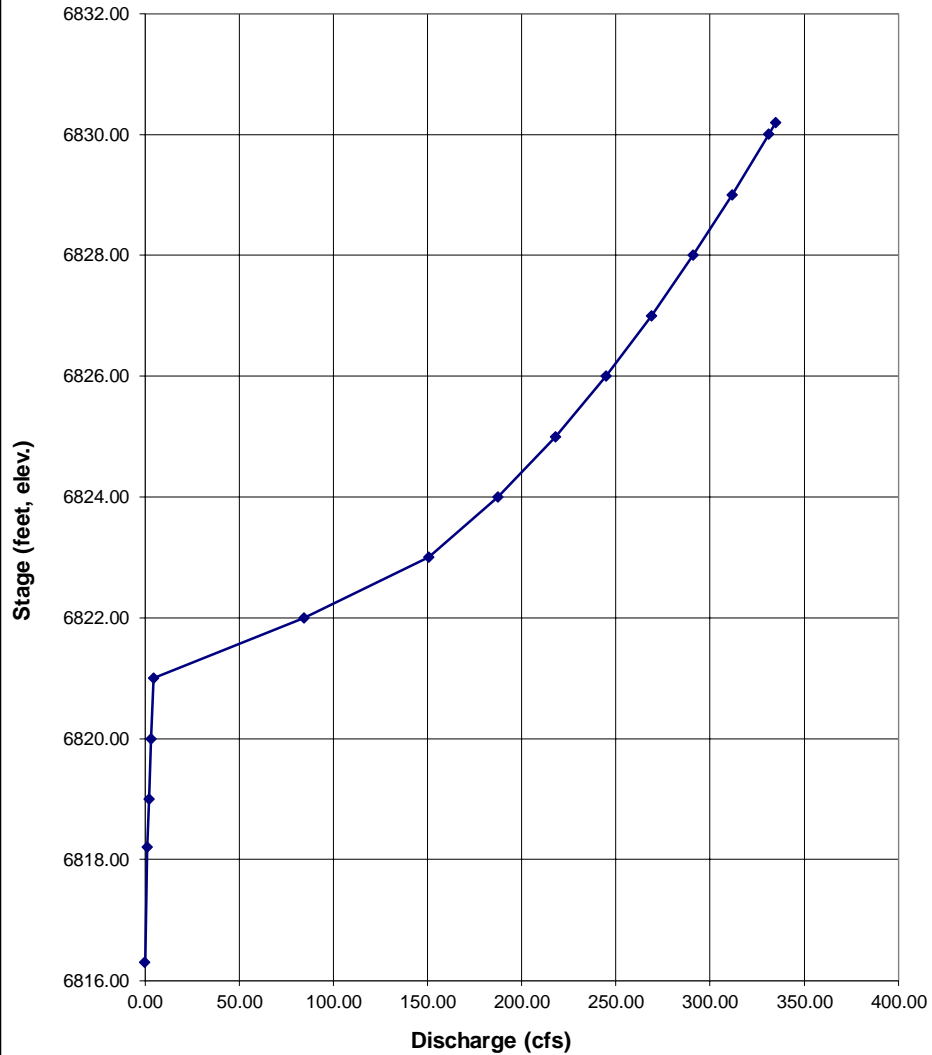
[illegible]

STAGE-DISCHARGE SIZING OF THE OUTLET CULVERT (INLET vs. OUTLET CONTROL WITH TAILWATER EFFECTS)

Project: Bent Grass

Basin ID: Pond WU - Exist 60" Outlet Pipe - Culvert 3

STAGE-DISCHARGE CURVE FOR THE FINAL OUTLET PIPE CULVERT



STAGE-DISCHARGE SIZING OF THE SPILLWAY

Basin ID: Pond WU

Design Information (input):

L =	200.00	feet
Angle =	3.33	degrees
EL. Crest =	6,828.70	feet
C _w =	0.50	
C _t =	0.60	

Calculation of Spillway Capacity (output):

[illegible]

STAGE-DISCHARGE SIZING OF THE SPILLWAY

Project: Bent Grass

Basin ID: Pond WU

Design Values

Angular D_{50} dia. = 11.7 in.
 Rock_{chute} thickness = 23.5 in.
 Inlet apron length = 10 ft.
 Outlet apron length = 15 ft.
 Radius = 33 ft.

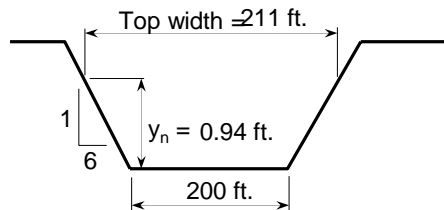
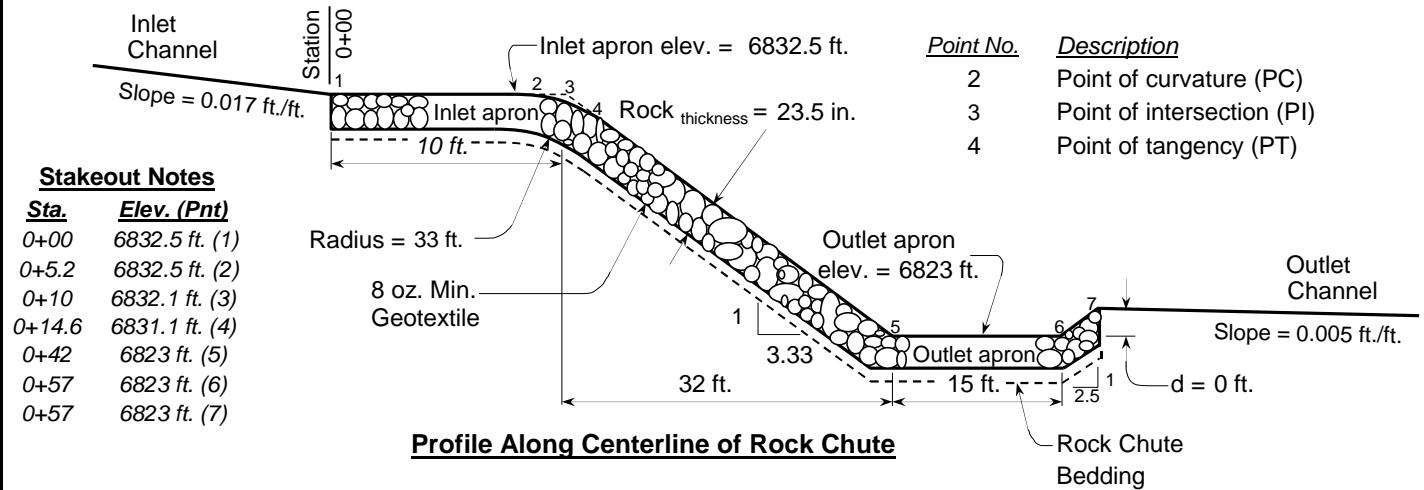
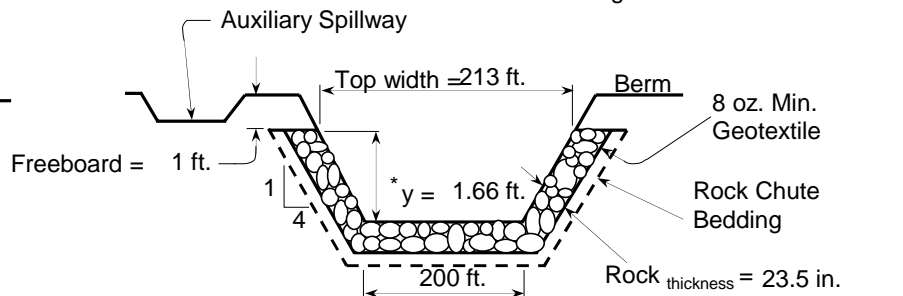
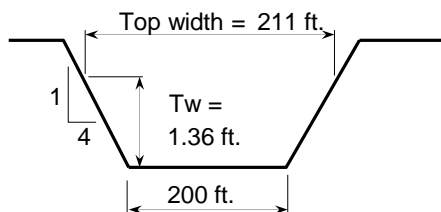
Will bedding be used? Yes

Rock Gradation Envelope

% Passing	Diameter, in. (weight, lbs.)
D_{100} -----	18 - 23 (394 - 934)
D_{85} -----	15 - 21 (256 - 681)
D_{50} -----	12 - 18 (117 - 394)
D_{10} -----	9 - 15 (60 - 256)

Coefficient of Uniformity, $(D_{60})/(D_{10}) \leq 2.0$ **Quantities^a**

Angular Rock = 935 yd³
 Geotextile (8 oz.)^b = 1486 yd²
 Bedding (6 in.) = 250 yd³
 Excavation = 0 yd³
 Earthfill = 0 yd³
 Seeding = 0.0 acres

Notes: ^a Rock, bedding, and geotextile quantities are determined from x-section below (neglect radius).^b Geotextile shall be overlapped (18-in. minimum) and anchored (18-in. minimum along sides and 24-in. minimum on the ends) --- quantity not included.**Inlet Channel Cross Section****Rock Chute Cross Section*** Use H_p throughout chute but not less than z_2 .**Outlet Channel Cross Section****Profile, Cross Sections, and Quantities**

Project: Pond WU - Riprap Weir (Inflow)
 Location: County

U.S. Department of Agriculture
Natural Resources Conservation Service

Designed: Aaron Johnston

Approved by: _____

Drawn: NRCS Standard Dwg.

Title: _____

Traced: _____

Sheet

Drawing No.

Checked: _____

No.

of

Future HMS Model

FUTURE HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT020	0.0671383	41.9	01Jan2011, 06:21	4.8
JWT020	0.0671383	41.9	01Jan2011, 06:21	4.8
RWT030	0.0671383	41.9	01Jan2011, 06:29	4.8
WT030	0.0764732	75.3	01Jan2011, 06:07	5.5
JWT030	0.1436115	85.4	01Jan2011, 06:09	10.3
RWT042	0.1436115	85.3	01Jan2011, 06:15	10.3
WT010	0.13533	88.9	01Jan2011, 06:17	9.3
JWT010	0.13533	88.9	01Jan2011, 06:17	9.3
RWT044	0.13533	88.8	01Jan2011, 06:24	9.3
JWT042	0.2789415	167	01Jan2011, 06:21	19.6
RWT046	0.2789415	166.7	01Jan2011, 06:28	19.6
WT040	0.18506	92.7	01Jan2011, 06:28	12.8
JWT044	0.4640015	259.4	01Jan2011, 06:28	32.4
RWT054	0.4640015	258.8	01Jan2011, 06:35	32.3
WT060	0.19563	116.8	01Jan2011, 06:26	15.1
WT050	0.18993	139.4	01Jan2011, 06:19	15.3
JWT050	0.8495615	475.4	01Jan2011, 06:31	62.7
RWT092	0.8495615	475.2	01Jan2011, 06:32	62.7
WT070	0.1711	133.9	01Jan2011, 06:12	11.8
JWT070	0.1711	133.9	01Jan2011, 06:12	11.8
RWT080	0.1711	133.4	01Jan2011, 06:22	11.8
WT080	0.0691596	67.3	01Jan2011, 06:10	5.6
Sub Regional Pond SR1	1.0898211	513.2	01Jan2011, 06:40	78.4
JWT080	1.0898211	513.2	01Jan2011, 06:40	78.4
RWT094	1.0898211	512.4	01Jan2011, 06:45	78.3
WT100-REV	0.12927	203	01Jan2011, 06:04	12.9
W26-REV	0.072	103.6	01Jan2011, 06:03	6.4
WS3-1	0.072	102.8	01Jan2011, 06:10	6.4
Paint Brush Hills Pond C	0.20127	64.4	01Jan2011, 06:26	19.2
WT090	0.15333	162.4	01Jan2011, 06:09	12.8
JWT090	1.4444211	595.9	01Jan2011, 06:44	110.2
RWT122	1.4444211	595.5	01Jan2011, 06:45	110.2
WT110	0.19428	169.9	01Jan2011, 06:14	16.2
JWT110	1.6387011	651	01Jan2011, 06:43	126.4
RWT124	1.6387011	650.8	01Jan2011, 06:47	126.3
WT130-REV	0.101625	130	01Jan2011, 06:11	10.9
Paint Brush Hills Pond A	0.101625	53.8	01Jan2011, 06:32	10.9
WT120-REV	0.04303	51.1	01Jan2011, 06:08	3.8
JWT120	1.7833561	703.6	01Jan2011, 06:46	140.9
RWT172	1.7833561	702.5	01Jan2011, 06:58	140.5
WT140-REV	0.14453	194.2	01Jan2011, 06:12	16.8
JWT140	0.14453	194.2	01Jan2011, 06:12	16.8

FUTURE HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT150	0.14453	193.3	01Jan2011, 06:22	16.8
WT150-REV	0.13081	202.5	01Jan2011, 06:08	15
Paint Brush Hills Pond B1	0.27534	235.6	01Jan2011, 06:29	31.8
W34B2-REV	0.09359	141.8	01Jan2011, 06:07	10.2
Paint Brush Hills Pond B2	0.36893	234.3	01Jan2011, 06:43	38.9
JWT150	0.36893	234.3	01Jan2011, 06:43	38.9
RWT160	0.36893	234.2	01Jan2011, 06:49	38.8
WT160-REV	0.07348	109.9	01Jan2011, 06:06	7.5
JWT160	0.44241	244.8	01Jan2011, 06:48	46.3
RWT174	0.44241	244.7	01Jan2011, 06:56	46.2
WT170-REV	0.106015	85.2	01Jan2011, 06:19	9.2
W34-CY-REV	0.0465469	38.1	01Jan2011, 06:16	3.8
JWT172	2.378328	981.9	01Jan2011, 06:56	199.7
RWT176	2.378328	981.6	01Jan2011, 06:57	199.7
Sub Regional Pond SR2	2.378328	972.9	01Jan2011, 07:01	194.8
JWT174	2.378328	972.9	01Jan2011, 07:01	194.8
RWT180	2.378328	972.1	01Jan2011, 07:10	194.2
WT180-REV	0.04094	29.3	01Jan2011, 06:19	3.2
JWT180	2.419268	978	01Jan2011, 07:10	197.4
RWT202	2.419268	977.7	01Jan2011, 07:16	197.1
WT200-N	0.191	121	01Jan2011, 06:29	16.5
WT200-W	0.068	64.4	01Jan2011, 06:13	5.9
WT190	0.0574561	74.7	01Jan2011, 06:05	5
The Meadows Pond #1	0.0574561	2.1	01Jan2011, 08:29	2.8
JWT190	0.0574561	2.1	01Jan2011, 08:29	2.8
RWT204	0.0574561	2.1	01Jan2011, 08:46	2.7
→ 40	2.7357241	1029.1	01Jan2011, 07:15	222.1
RWT206	2.7357241	1027.9	01Jan2011, 07:17	221.9
→ BG	0.184	255.6	01Jan2011, 06:17	24.7
WT210-N	0.074	77.5	01Jan2011, 06:17	7.8
→ CC	2.9937241	1075.3	01Jan2011, 07:16	254.4
→ RWT210	2.9937241	1074.9	01Jan2011, 07:20	254.1
WT210-S	0.117	116.2	01Jan2011, 06:19	12.4
JWT210	3.1107241	1093.7	01Jan2011, 07:20	266.5
RWT232	3.1107241	1093.3	01Jan2011, 07:23	266.1
WT220-S	0.118	178.8	01Jan2011, 06:08	13.3
JWT220	0.118	178.8	01Jan2011, 06:08	13.3
RWT234	0.118	177.6	01Jan2011, 06:18	13.3
JWT232	3.2287241	1107.7	01Jan2011, 07:23	279.4
RWT236	3.2287241	1107.7	01Jan2011, 07:23	279.4
WT230	0.19818	346.7	01Jan2011, 06:05	23.1
JWT234	3.4269041	1125.3	01Jan2011, 07:23	302.4

FUTURE HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT240	3.4269041	1124.7	01Jan2011, 07:26	302.2
WT240	0.0761461	160.3	01Jan2011, 06:01	9.1
Regional Pond WU North	3.5030502	1130.7	01Jan2011, 07:27	310.1
Regional Pond WU Diversion	3.5030502	1092	01Jan2011, 07:27	266.8
Old Meridian	0.03359	85	01Jan2011, 06:07	6.1
RWT-OM	0.03359	84.2	01Jan2011, 06:12	6.1
→ Regional Pond WU South	3.5366402	921.2	01Jan2011, 07:48	265.7
RWT240_Diversion Reach	0	38.7	01Jan2011, 07:32	43.1
JWT240	3.5366402	959.8	01Jan2011, 07:48	308.8
RWT250	3.5366402	959.5	01Jan2011, 07:49	308.7
WT250	0.14695	291.4	01Jan2011, 06:02	17.1
JWT250	3.6835902	971.8	01Jan2011, 07:49	325.8
RWT260	3.6835902	971.4	01Jan2011, 07:59	324.8
WT260	0.1388002	77.5	01Jan2011, 06:34	11.5
JWT260	3.8223904	985.5	01Jan2011, 07:58	336.4
RWT291	3.8223904	985.4	01Jan2011, 08:01	336.1
WT270	0.0324738	57.1	01Jan2011, 06:04	3.6
JWT270	0.0324738	57.1	01Jan2011, 06:04	3.6
RWT292	0.0324738	56.9	01Jan2011, 06:08	3.5
JWT292	3.8548642	988	01Jan2011, 08:01	339.7
RWT295	3.8548642	987.9	01Jan2011, 08:02	339.6
WT280	0.26695	251.8	01Jan2011, 06:12	22.3
JWT280	0.26695	251.8	01Jan2011, 06:12	22.3
RWT294	0.26695	251.2	01Jan2011, 06:15	22.2
JWT294	4.1218142	1005.7	01Jan2011, 08:02	361.8
RWT296	4.1218142	1005.3	01Jan2011, 08:07	361.1
MT040	0.30842	455.2	01Jan2011, 06:11	38.1
MT030	0.15663	228.6	01Jan2011, 06:05	15.1
MT020	0.0902033	143.1	01Jan2011, 06:04	9
JMT020	0.0902033	143.1	01Jan2011, 06:04	9
RMT030	0.0902033	141.8	01Jan2011, 06:17	8.9
JMT030	0.2468333	294.4	01Jan2011, 06:07	24
RMT040	0.2468333	293	01Jan2011, 06:11	24
Woodmen Hills Pond H	0.5552533	751.7	01Jan2011, 06:11	61.7
JMT040	0.5552533	751.7	01Jan2011, 06:11	61.7
RMT050	0.5552533	745.8	01Jan2011, 06:14	61.7
MT050	0.11861	109.7	01Jan2011, 06:18	11.4
JMT050	0.6738633	851.9	01Jan2011, 06:14	73.1
→ RMT062	0.6738633	849.2	01Jan2011, 06:16	73
MT010	0.28989	139.9	01Jan2011, 06:24	17.7
The Meadows Pond #2	0.28989	63.5	01Jan2011, 06:55	14.1
JMT010	0.28989	63.5	01Jan2011, 06:55	14.1

FUTURE HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
MT060a	0.0311	28.3	01Jan2011, 06:17	2.9
School Site	0.32099	16.5	01Jan2011, 08:54	12.2
RMT060a	0.32099	16.5	01Jan2011, 09:01	12.2
MT060-N	0.062	59.6	01Jan2011, 06:15	5.7
JMT060a	1.0568533	908.9	01Jan2011, 06:16	91
RMT064	1.0568533	905.9	01Jan2011, 06:20	90.9
MT060-S	0.111	125.7	01Jan2011, 06:10	10.3
MT070-N	0.084	74.5	01Jan2011, 06:20	8.3
Sub Regional Pond SR4	1.2518533	700.3	01Jan2011, 06:36	94.7
JMT060	1.2518533	700.3	01Jan2011, 06:36	94.7
RMT070	1.2518533	697.8	01Jan2011, 06:42	94.4
MT070-S	0.058	64.3	01Jan2011, 06:13	5.7
JMT070	1.3098533	717.5	01Jan2011, 06:41	100.1
RMT080	1.3098533	717.1	01Jan2011, 06:43	100.1
MT080	0.0638371	191.9	01Jan2011, 06:00	11
Regional Pond MN	1.3736904	691.7	01Jan2011, 06:48	108.6
JMT080	1.3736904	691.7	01Jan2011, 06:48	108.6
RMT102	1.3736904	688.9	01Jan2011, 06:56	108.3
MT090	0.0435103	127.4	01Jan2011, 06:00	7.1
Woodmen Hills Pond #5	0.0435103	18.6	01Jan2011, 06:07	5.9
JMT090	0.0435103	18.6	01Jan2011, 06:07	5.9
RMT090	0.0435103	18.6	01Jan2011, 06:08	5.9
JMT104	0.0435103	18.6	01Jan2011, 06:08	5.9
RMT104	0.0435103	18.6	01Jan2011, 06:12	5.9
JMT102	1.4172007	703.9	01Jan2011, 06:56	114.2
RMT106	1.4172007	698.3	01Jan2011, 06:57	114.1
MT100	0.0557682	88.2	01Jan2011, 06:05	5.9
JMT106	1.4729689	705.1	01Jan2011, 06:57	120
RMT112	1.4729689	701.6	01Jan2011, 07:10	119.3
MT110	0.11639	117.4	01Jan2011, 06:16	11.5
JMT110	1.5893589	720.7	01Jan2011, 07:10	130.8
RMT114	1.5893589	719.4	01Jan2011, 07:15	130.6
WT290	0.10378	110.3	01Jan2011, 06:09	8.7
Regional Pond R1	5.8149531	1427.6	01Jan2011, 07:25	492.7
JWT296	5.8149531	1427.6	01Jan2011, 07:25	492.7
RWT314	5.8149531	1427.1	01Jan2011, 07:30	491.9
WT300	0.0970199	91.6	01Jan2011, 06:12	8.1
JWT300	0.0970199	91.6	01Jan2011, 06:12	8.1
RWT312	0.0970199	91.1	01Jan2011, 06:29	8.1
WT310	0.27742	246.7	01Jan2011, 06:13	22.3
JWT310	6.189393	1459.7	01Jan2011, 07:30	522.4
RWT320	6.189393	1458.3	01Jan2011, 07:36	521.3

FUTURE HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT320	0.20614	200.6	01Jan2011, 06:11	17.2
JWT320	6.395533	1472.8	01Jan2011, 07:36	538.5
RWT352	6.395533	1471	01Jan2011, 07:46	537.3
ET020	0.21317	360.5	01Jan2011, 06:06	24.8
ET010	0.14513	198.3	01Jan2011, 06:11	16.4
Paint Brush Hills Pond #4	0.14513	150.9	01Jan2011, 06:20	16.3
JET010	0.14513	150.9	01Jan2011, 06:20	16.3
RET020	0.14513	150	01Jan2011, 06:37	16.3
Sub Regional Pond SR6	0.3583	195.4	01Jan2011, 06:41	37.9
JET020	0.3583	195.4	01Jan2011, 06:41	37.9
RET030	0.3583	194.9	01Jan2011, 07:02	37.5
ET030	0.20428	242	01Jan2011, 06:15	23
JET030	0.56258	266	01Jan2011, 06:43	60.5
RET040	0.56258	265.2	01Jan2011, 06:50	60.3
Woodmen Hills Pond #1 North	0.71172	263.5	01Jan2011, 07:09	75.5
ET040	0.14914	165.7	01Jan2011, 06:14	15.3
Woodmen Hills Pond #1 South	0.71172	261.1	01Jan2011, 07:18	69.5
JET040	0.71172	261.1	01Jan2011, 07:18	69.5
RET050	0.71172	261.1	01Jan2011, 07:23	69.4
ET050	0.11719	197.1	01Jan2011, 06:03	11.6
Woodmen Hills Pond #2	0.82891	250.3	01Jan2011, 07:46	79.3
JET050	0.82891	250.3	01Jan2011, 07:46	79.3
RET060	0.82891	250.3	01Jan2011, 07:53	79.1
ET060	0.28543	529.3	01Jan2011, 06:01	29.3
Woodmen Hills Pond #3	1.11434	360.9	01Jan2011, 06:06	105.9
JET060	1.11434	360.9	01Jan2011, 06:06	105.9
RET070	1.11434	356.7	01Jan2011, 06:16	105.6
ET070	0.24975	461	01Jan2011, 06:02	27.3
JET070	1.36409	636.4	01Jan2011, 06:04	132.9
RET080	1.36409	517.5	01Jan2011, 06:23	131.3
ET080	0.29164	517.9	01Jan2011, 06:07	37.1
Woodmen Hills Pond #4	1.65573	288	01Jan2011, 07:00	139.2
JET080	1.65573	288	01Jan2011, 07:00	139.2
RET090	1.65573	287.3	01Jan2011, 07:03	139
ET090	0.12424	133	01Jan2011, 06:22	14.9
JET090	1.77997	330.8	01Jan2011, 06:59	153.9
RET100	1.77997	330.7	01Jan2011, 07:01	153.8
ET100	0.0480615	72	01Jan2011, 06:02	4
JET100	1.8280315	335.4	01Jan2011, 07:01	157.8
RET110	1.8280315	335.2	01Jan2011, 07:05	157.6
ET110	0.22603	198.8	01Jan2011, 06:12	17.5
JET110	2.0540615	362.1	01Jan2011, 07:03	175.1

FUTURE HMS MODEL - 100 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RET120	2.0540615	361.3	01Jan2011, 07:09	174.7
ET120	0.10913	89.4	01Jan2011, 06:14	8.5
JET120	2.1631915	403.2	01Jan2011, 06:17	183.2
RET152	2.1631915	402.2	01Jan2011, 06:24	182.9
ET130	0.13481	85.4	01Jan2011, 06:27	11.2
JET130	0.13481	85.4	01Jan2011, 06:27	11.2
RET140	0.13481	84.7	01Jan2011, 06:54	11.1
ET140	0.26759	122.8	01Jan2011, 06:46	22.2
JET140	0.4024	204.8	01Jan2011, 06:51	33.3
RET154	0.4024	204.4	01Jan2011, 07:05	33.2
JET152	2.5655915	572.3	01Jan2011, 07:10	216.1
RET156	2.5655915	572	01Jan2011, 07:14	215.8
ET150	0.17773	136.2	01Jan2011, 06:18	14.3
JET154	2.7433215	595.8	01Jan2011, 07:12	230.1
RET162	2.7433215	595.1	01Jan2011, 07:25	228.9
ET160	0.18892	137.2	01Jan2011, 06:23	16.3
JET160	2.9322415	633.6	01Jan2011, 06:38	245.2
RET164	2.9322415	629	01Jan2011, 06:47	244.7
WT350	0.30377	276.7	01Jan2011, 06:14	26.3
JWT352	9.6315445	2087.3	01Jan2011, 07:42	808.4
RWT354	9.6315445	2087.2	01Jan2011, 07:42	808.3
WT330	0.32668	249.3	01Jan2011, 06:19	27.2
JWT330	0.32668	249.3	01Jan2011, 06:19	27.2
RWT344	0.32668	248.4	01Jan2011, 06:25	27.2
WT340	0.278	147.3	01Jan2011, 06:37	23.1
JWT354	10.2362245	2160.6	01Jan2011, 07:41	858.6
RWT372	10.2362245	2158.3	01Jan2011, 07:47	857.5
WT360	0.065683	54.8	01Jan2011, 06:15	5.3
JWT360	0.065683	54.8	01Jan2011, 06:15	5.3
RWT374	0.065683	54.6	01Jan2011, 06:24	5.3
Regional Pond R2	10.3019075	2161.3	01Jan2011, 07:48	859.4
JWT372	10.3019075	2161.3	01Jan2011, 07:48	859.4
RWT376	10.3019075	2156.4	01Jan2011, 07:58	857.2
WT370	0.21476	123.3	01Jan2011, 06:12	11.5
JWT374_OUTLET	10.5166675	2166.6	01Jan2011, 07:58	868.7
FS010	0.122	74.9	01Jan2011, 06:16	7.7
JFS010_OUTLET	0.122	74.9	01Jan2011, 06:16	7.7

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	15Jun2021, 13:16:38	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	71.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:51
Peak Outflow :	16.5 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:54
Total Inflow :	17.0 (AC-FT)	Peak Storage :	8.0 (AC-FT)
Total Outflow :	12.2 (AC-FT)	Peak Elevation :	6957.1 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	15Jun2021, 13:16:38	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	1072.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:20
Peak Outflow :	700.3 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:36
Total Inflow :	109.4 (AC-FT)	Peak Storage :	27.5 (AC-FT)
Total Outflow :	94.7 (AC-FT)	Peak Elevation :	6897.2 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	15Jun2021, 13:16:38	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	727.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:43
Peak Outflow :	691.7 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:48
Total Inflow :	111.1 (AC-FT)	Peak Storage :	6.7 (AC-FT)
Total Outflow :	108.6 (AC-FT)	Peak Elevation :	6853.6 (FT)

FUTURE HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT020	0.0671383	10.3	01Jan2011, 06:23	1.4
JWT020	0.0671383	10.3	01Jan2011, 06:23	1.4
RWT030	0.0671383	10.3	01Jan2011, 06:34	1.4
WT030	0.0764732	19.5	01Jan2011, 06:08	1.6
JWT030	0.1436115	20	01Jan2011, 06:09	3
RWT042	0.1436115	19.9	01Jan2011, 06:18	3
WT010	0.13533	21.2	01Jan2011, 06:19	2.6
JWT010	0.13533	21.2	01Jan2011, 06:19	2.6
RWT044	0.13533	21.2	01Jan2011, 06:29	2.6
JWT042	0.2789415	37.2	01Jan2011, 06:24	5.6
RWT046	0.2789415	37.2	01Jan2011, 06:35	5.6
WT040	0.18506	21.9	01Jan2011, 06:31	3.6
JWT044	0.4640015	58.9	01Jan2011, 06:34	9.2
RWT054	0.4640015	58.7	01Jan2011, 06:43	9.2
WT060	0.19563	30.1	01Jan2011, 06:29	4.5
WT050	0.18993	37.3	01Jan2011, 06:21	4.7
JWT050	0.8495615	108.6	01Jan2011, 06:38	18.4
RWT092	0.8495615	108.5	01Jan2011, 06:39	18.4
WT070	0.1711	32.6	01Jan2011, 06:13	3.4
JWT070	0.1711	32.6	01Jan2011, 06:13	3.4
RWT080	0.1711	32.5	01Jan2011, 06:28	3.3
WT080	0.0691596	18.5	01Jan2011, 06:12	1.7
Sub Regional Pond SR1	1.0898211	113.8	01Jan2011, 06:50	21.9
JWT080	1.0898211	113.8	01Jan2011, 06:50	21.9
RWT094	1.0898211	113.7	01Jan2011, 06:58	21.8
WT100-REV	0.12927	67.7	01Jan2011, 06:05	4.5
W26-REV	0.072	33.7	01Jan2011, 06:04	2.1
WS3-1	0.072	33.4	01Jan2011, 06:13	2.1
Paint Brush Hills Pond C	0.20127	14	01Jan2011, 06:38	6.5
WT090	0.15333	46	01Jan2011, 06:10	4
JWT090	1.4444211	133.8	01Jan2011, 06:57	32.3
RWT122	1.4444211	133.7	01Jan2011, 07:01	32.3
WT110	0.19428	47	01Jan2011, 06:16	5.1
JWT110	1.6387011	144	01Jan2011, 07:00	37.4
RWT124	1.6387011	144	01Jan2011, 07:08	37.3
WT130-REV	0.101625	43.5	01Jan2011, 06:12	3.9
Paint Brush Hills Pond A	0.101625	9.3	01Jan2011, 06:49	3.9
WT120-REV	0.04303	14.8	01Jan2011, 06:09	1.2
JWT120	1.7833561	154.4	01Jan2011, 07:08	42.4
RWT172	1.7833561	154.2	01Jan2011, 07:18	42.2
WT140-REV	0.14453	65.2	01Jan2011, 06:14	6.1
JWT140	0.14453	65.2	01Jan2011, 06:14	6.1

FUTURE HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT150	0.14453	64.9	01Jan2011, 06:24	6.1
WT150-REV	0.13081	71.3	01Jan2011, 06:08	5.5
Paint Brush Hills Pond B1	0.27534	110.4	01Jan2011, 06:15	11.6
W34B2-REV	0.09359	49.1	01Jan2011, 06:08	3.7
Paint Brush Hills Pond B2	0.36893	20.1	01Jan2011, 07:15	13.8
JWT150	0.36893	20.1	01Jan2011, 07:15	13.8
RWT160	0.36893	20	01Jan2011, 07:24	13.8
WT160-REV	0.07348	36.3	01Jan2011, 06:07	2.6
JWT160	0.44241	37.3	01Jan2011, 06:07	16.4
RWT174	0.44241	36.9	01Jan2011, 06:20	16.3
WT170-REV	0.106015	24	01Jan2011, 06:21	2.9
W34-CY-REV	0.0465469	10.7	01Jan2011, 06:18	1.2
JWT172	2.378328	181.3	01Jan2011, 07:17	62.6
RWT176	2.378328	181.2	01Jan2011, 07:18	62.6
Sub Regional Pond SR2	2.378328	171.7	01Jan2011, 07:30	59.3
JWT174	2.378328	171.7	01Jan2011, 07:30	59.3
RWT180	2.378328	171.6	01Jan2011, 07:45	59
WT180-REV	0.04094	7.6	01Jan2011, 06:21	1
JWT180	2.419268	172.6	01Jan2011, 07:45	59.9
RWT202	2.419268	172.6	01Jan2011, 07:55	59.7
WT200-N	0.191	33.8	01Jan2011, 06:32	5.3
WT200-W	0.068	18.4	01Jan2011, 06:15	1.9
WT190	0.0574561	22.5	01Jan2011, 06:06	1.6
The Meadows Pond #1	0.0574561	0.6	01Jan2011, 10:18	0.9
JWT190	0.0574561	0.6	01Jan2011, 10:18	0.9
RWT204	0.0574561	0.6	01Jan2011, 10:42	0.8
→ 40	2.7357241	181.4	01Jan2011, 07:54	67.6
RWT206	2.7357241	181.2	01Jan2011, 07:58	67.5
→ BG	0.184	89.9	01Jan2011, 06:18	9.5
WT210-N	0.074	24.9	01Jan2011, 06:19	2.8
→ CC	2.9937241	191.9	01Jan2011, 07:58	79.7
→ RWT210	2.9937241	191.8	01Jan2011, 08:04	79.6
WT210-S	0.117	37.2	01Jan2011, 06:21	4.4
JWT210	3.1107241	195.7	01Jan2011, 08:04	83.9
RWT232	3.1107241	195.7	01Jan2011, 08:11	83.6
WT220-S	0.118	61.6	01Jan2011, 06:09	4.8
JWT220	0.118	61.6	01Jan2011, 06:09	4.8
RWT234	0.118	61.2	01Jan2011, 06:21	4.8
JWT232	3.2287241	230.1	01Jan2011, 06:31	88.5
RWT236	3.2287241	230.1	01Jan2011, 06:31	88.5
WT230	0.19818	124	01Jan2011, 06:06	8.5
JWT234	3.4269041	253.8	01Jan2011, 06:30	97

FUTURE HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RWT240	3.4269041	252.7	01Jan2011, 06:35	96.8
WT240	0.0761461	61	01Jan2011, 06:02	3.4
Regional Pond WU North	3.5030502	258.2	01Jan2011, 06:36	99.1
Regional Pond WU Diversion	3.5030502	221	01Jan2011, 06:36	67.5
Old Meridian	0.03359	38.2	01Jan2011, 06:09	2.8
RWT-OM	0.03359	37.8	01Jan2011, 06:14	2.8
→ Regional Pond WU South	3.5366402	166.5	01Jan2011, 08:26	63.9
RWT240_Diversion Reach	0	37.2	01Jan2011, 06:41	31.5
JWT240	3.5366402	203.6	01Jan2011, 08:26	95.4
RWT250	3.5366402	203.5	01Jan2011, 08:27	95.4
WT250	0.14695	107.5	01Jan2011, 06:03	6.3
JWT250	3.6835902	208.5	01Jan2011, 06:55	101.7
RWT260	3.6835902	207.5	01Jan2011, 07:10	101.2
WT260	0.1388002	21	01Jan2011, 06:36	3.6
JWT260	3.8223904	219	01Jan2011, 07:10	104.8
RWT291	3.8223904	218.7	01Jan2011, 07:14	104.6
WT270	0.0324738	20	01Jan2011, 06:04	1.3
JWT270	0.0324738	20	01Jan2011, 06:04	1.3
RWT292	0.0324738	19.9	01Jan2011, 06:10	1.3
JWT292	3.8548642	220.2	01Jan2011, 07:14	105.9
RWT295	3.8548642	220	01Jan2011, 07:15	105.8
WT280	0.26695	70.1	01Jan2011, 06:14	6.9
JWT280	0.26695	70.1	01Jan2011, 06:14	6.9
RWT294	0.26695	70	01Jan2011, 06:17	6.9
JWT294	4.1218142	230.3	01Jan2011, 07:15	112.8
RWT296	4.1218142	229.1	01Jan2011, 07:23	112.4
MT040	0.30842	163.5	01Jan2011, 06:12	14.5
MT030	0.15663	73.4	01Jan2011, 06:06	5.1
MT020	0.0902033	47.3	01Jan2011, 06:05	3.1
JMT020	0.0902033	47.3	01Jan2011, 06:05	3.1
RMT030	0.0902033	46.8	01Jan2011, 06:21	3.1
JMT030	0.2468333	93.6	01Jan2011, 06:07	8.1
RMT040	0.2468333	92.8	01Jan2011, 06:12	8.1
Woodmen Hills Pond H	0.5552533	242.5	01Jan2011, 06:16	22.5
JMT040	0.5552533	242.5	01Jan2011, 06:16	22.5
RMT050	0.5552533	242.2	01Jan2011, 06:19	22.5
MT050	0.11861	33.2	01Jan2011, 06:20	3.8
JMT050	0.6738633	275.4	01Jan2011, 06:19	26.3
→ RMT062	0.6738633	274.9	01Jan2011, 06:20	26.3
MT010	0.28989	36.7	01Jan2011, 06:26	5.2
The Meadows Pond #2	0.28989	2.1	01Jan2011, 10:49	1.8
JMT010	0.28989	2.1	01Jan2011, 10:49	1.8

FUTURE HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
MT060a	0.0311	8.3	01Jan2011, 06:19	0.9
School Site	0.32099	1.1	01Jan2011, 21:23	1.1
RMT060a	0.32099	1.1	01Jan2011, 21:36	1.1
MT060-N	0.062	17.6	01Jan2011, 06:17	1.9
JMT060a	1.0568533	292.1	01Jan2011, 06:20	29.3
RMT064	1.0568533	290.1	01Jan2011, 06:27	29.2
MT060-S	0.111	37.8	01Jan2011, 06:11	3.4
MT070-N	0.084	22.6	01Jan2011, 06:22	2.8
Sub Regional Pond SR4	1.2518533	43.7	01Jan2011, 07:53	25.4
JMT060	1.2518533	43.7	01Jan2011, 07:53	25.4
RMT070	1.2518533	43.6	01Jan2011, 08:00	25.2
MT070-S	0.058	19.8	01Jan2011, 06:14	1.9
JMT070	1.3098533	45.3	01Jan2011, 08:00	27.1
RMT080	1.3098533	45.3	01Jan2011, 08:03	27.1
MT080	0.0638371	91.5	01Jan2011, 06:00	5
Regional Pond MN	1.3736904	47.8	01Jan2011, 08:05	29.6
JMT080	1.3736904	47.8	01Jan2011, 08:05	29.6
RMT102	1.3736904	47.7	01Jan2011, 08:15	29.4
MT090	0.0435103	59.3	01Jan2011, 06:00	3.2
Woodmen Hills Pond #5	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT104	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT104	0.0435103	2.2	01Jan2011, 08:07	2.3
JMT102	1.4172007	49.9	01Jan2011, 08:15	31.7
RMT106	1.4172007	49.7	01Jan2011, 08:17	31.6
MT100	0.0557682	29.8	01Jan2011, 06:06	2.1
JMT106	1.4729689	52	01Jan2011, 06:20	33.7
RMT112	1.4729689	47.2	01Jan2011, 09:22	32.6
MT110	0.11639	36.3	01Jan2011, 06:18	3.9
JMT110	1.5893589	55.7	01Jan2011, 06:57	36.6
RMT114	1.5893589	55.4	01Jan2011, 07:06	36.3
WT290	0.10378	31.2	01Jan2011, 06:10	2.7
Regional Pond R1	5.8149531	254.2	01Jan2011, 09:07	144.3
JWT296	5.8149531	254.2	01Jan2011, 09:07	144.3
RWT314	5.8149531	254.1	01Jan2011, 09:14	143.6
WT300	0.0970199	25.5	01Jan2011, 06:14	2.5
JWT300	0.0970199	25.5	01Jan2011, 06:14	2.5
RWT312	0.0970199	25.4	01Jan2011, 06:34	2.5
WT310	0.27742	67.1	01Jan2011, 06:14	6.9
JWT310	6.189393	262	01Jan2011, 07:39	153
RWT320	6.189393	261.3	01Jan2011, 07:46	152.3

FUTURE HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT320	0.20614	56.1	01Jan2011, 06:13	5.4
JWT320	6.395533	266.3	01Jan2011, 07:46	157.7
RWT352	6.395533	265.7	01Jan2011, 07:55	156.8
ET020	0.21317	128.1	01Jan2011, 06:07	9.2
ET010	0.14513	67.4	01Jan2011, 06:12	5.9
Paint Brush Hills Pond #4	0.14513	48.8	01Jan2011, 06:22	5.9
JET010	0.14513	48.8	01Jan2011, 06:22	5.9
RET020	0.14513	48.7	01Jan2011, 06:37	5.9
Sub Regional Pond SR6	0.3583	19.9	01Jan2011, 07:26	13.5
JET020	0.3583	19.9	01Jan2011, 07:26	13.5
RET030	0.3583	19.7	01Jan2011, 08:14	13.1
ET030	0.20428	81.2	01Jan2011, 06:17	8.4
JET030	0.56258	81.2	01Jan2011, 06:17	21.5
RET040	0.56258	80.9	01Jan2011, 06:28	21.4
Woodmen Hills Pond #1 North	0.71172	103.5	01Jan2011, 06:35	26.6
ET040	0.14914	52.6	01Jan2011, 06:15	5.3
Woodmen Hills Pond #1 South	0.71172	32.8	01Jan2011, 07:14	21.7
JET040	0.71172	32.8	01Jan2011, 07:14	21.7
RET050	0.71172	32.8	01Jan2011, 07:22	21.6
ET050	0.11719	66.6	01Jan2011, 06:03	4
Woodmen Hills Pond #2	0.82891	29.6	01Jan2011, 08:07	23.9
JET050	0.82891	29.6	01Jan2011, 08:07	23.9
RET060	0.82891	29.6	01Jan2011, 08:19	23.7
ET060	0.28543	185.5	01Jan2011, 06:02	10.2
Woodmen Hills Pond #3	1.11434	82.1	01Jan2011, 06:08	31.5
JET060	1.11434	82.1	01Jan2011, 06:08	31.5
RET070	1.11434	81	01Jan2011, 06:18	31.2
ET070	0.24975	164.1	01Jan2011, 06:03	9.8
JET070	1.36409	164.5	01Jan2011, 06:03	41
RET080	1.36409	123.5	01Jan2011, 06:29	40.2
ET080	0.29164	192.2	01Jan2011, 06:08	14.3
Woodmen Hills Pond #4	1.65573	26.7	01Jan2011, 14:58	26.8
JET080	1.65573	26.7	01Jan2011, 14:58	26.8
RET090	1.65573	26.7	01Jan2011, 15:03	26.6
ET090	0.12424	46	01Jan2011, 06:23	5.6
JET090	1.77997	50.6	01Jan2011, 06:24	32.2
RET100	1.77997	50.6	01Jan2011, 06:28	32.1
ET100	0.0480615	22.3	01Jan2011, 06:02	1.3
JET100	1.8280315	53.2	01Jan2011, 06:28	33.3
RET110	1.8280315	53.1	01Jan2011, 06:35	33.1
ET110	0.22603	52.7	01Jan2011, 06:13	5.3
JET110	2.0540615	86	01Jan2011, 06:13	38.4

FUTURE HMS MODEL - 5 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RET120	2.0540615	85.1	01Jan2011, 06:19	38.1
ET120	0.10913	23.5	01Jan2011, 06:16	2.5
JET120	2.1631915	107.9	01Jan2011, 06:19	40.7
RET152	2.1631915	107.7	01Jan2011, 06:25	40.4
ET130	0.13481	23.2	01Jan2011, 06:30	3.5
JET130	0.13481	23.2	01Jan2011, 06:30	3.5
RET140	0.13481	23.1	01Jan2011, 07:00	3.5
ET140	0.26759	33.4	01Jan2011, 06:49	6.9
JET140	0.4024	55.3	01Jan2011, 06:56	10.4
RET154	0.4024	55.2	01Jan2011, 07:19	10.3
JET152	2.5655915	108.6	01Jan2011, 06:26	50.8
RET156	2.5655915	108.3	01Jan2011, 06:30	50.6
ET150	0.17773	36.6	01Jan2011, 06:20	4.4
JET154	2.7433215	138.8	01Jan2011, 06:29	55
RET162	2.7433215	135.5	01Jan2011, 06:54	54.2
ET160	0.18892	38.5	01Jan2011, 06:25	5.2
JET160	2.9322415	154.7	01Jan2011, 06:53	59.4
RET164	2.9322415	154.3	01Jan2011, 06:58	59.2
WT350	0.30377	78.7	01Jan2011, 06:16	8.4
JWT352	9.6315445	384.9	01Jan2011, 07:53	224.4
RWT354	9.6315445	384.8	01Jan2011, 07:53	224.3
WT330	0.32668	68.2	01Jan2011, 06:21	8.5
JWT330	0.32668	68.2	01Jan2011, 06:21	8.5
RWT344	0.32668	67.9	01Jan2011, 06:30	8.5
WT340	0.278	40	01Jan2011, 06:39	7.2
JWT354	10.2362245	406.1	01Jan2011, 07:52	240
RWT372	10.2362245	405.7	01Jan2011, 07:56	239.4
WT360	0.065683	14.8	01Jan2011, 06:17	1.6
JWT360	0.065683	14.8	01Jan2011, 06:17	1.6
RWT374	0.065683	14.7	01Jan2011, 06:32	1.6
Regional Pond R2	10.3019075	406.6	01Jan2011, 07:58	237.8
JWT372	10.3019075	406.6	01Jan2011, 07:58	237.8
RWT376	10.3019075	405.6	01Jan2011, 08:07	236.6
WT370	0.21476	23.4	01Jan2011, 06:15	2.8
JWT374_OUTLET	10.5166675	408.5	01Jan2011, 08:07	239.4
FS010	0.122	16.6	01Jan2011, 06:18	2.1
JFS010_OUTLET	0.122	16.6	01Jan2011, 06:18	2.1

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	15Jun2021, 13:26:14	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	8.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:19
Peak Outflow :	1.1 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 21:23
Total Inflow :	2.7 (AC-FT)	Peak Storage :	1.6 (AC-FT)
Total Outflow :	1.1 (AC-FT)	Peak Elevation :	6955.0 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	15Jun2021, 13:26:14	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	331.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:27
Peak Outflow :	43.7 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 07:53
Total Inflow :	35.4 (AC-FT)	Peak Storage :	16.8 (AC-FT)
Total Outflow :	25.4 (AC-FT)	Peak Elevation :	6894.1 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	15Jun2021, 13:26:14	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	97.2 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:01
Peak Outflow :	47.8 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:05
Total Inflow :	32.1 (AC-FT)	Peak Storage :	2.7 (AC-FT)
Total Outflow :	29.6 (AC-FT)	Peak Elevation :	6851.5 (FT)

FUTURE HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT020	0.0671383	4.4	01Jan2011, 06:25	0.7
JWT020	0.0671383	4.4	01Jan2011, 06:25	0.7
RWT030	0.0671383	4.4	01Jan2011, 06:39	0.7
WT030	0.0764732	8.6	01Jan2011, 06:09	0.8
JWT030	0.1436115	8.7	01Jan2011, 06:09	1.5
RWT042	0.1436115	8.7	01Jan2011, 06:20	1.5
WT010	0.13533	8.8	01Jan2011, 06:21	1.3
JWT010	0.13533	8.8	01Jan2011, 06:21	1.3
RWT044	0.13533	8.8	01Jan2011, 06:33	1.3
JWT042	0.2789415	15.1	01Jan2011, 06:26	2.8
RWT046	0.2789415	15.1	01Jan2011, 06:40	2.8
WT040	0.18506	9.1	01Jan2011, 06:34	1.8
JWT044	0.4640015	23.9	01Jan2011, 06:39	4.5
RWT054	0.4640015	23.8	01Jan2011, 06:50	4.5
WT060	0.19563	13.6	01Jan2011, 06:30	2.3
WT050	0.18993	17.3	01Jan2011, 06:23	2.4
JWT050	0.8495615	42.8	01Jan2011, 06:47	9.3
RWT092	0.8495615	42.7	01Jan2011, 06:49	9.3
WT070	0.1711	13.6	01Jan2011, 06:15	1.6
JWT070	0.1711	13.6	01Jan2011, 06:15	1.6
RWT080	0.1711	13.6	01Jan2011, 06:34	1.6
WT080	0.0691596	8.7	01Jan2011, 06:13	0.9
Sub Regional Pond SR1	1.0898211	41.9	01Jan2011, 07:03	10.4
JWT080	1.0898211	41.9	01Jan2011, 07:03	10.4
RWT094	1.0898211	41.9	01Jan2011, 07:14	10.3
WT100-REV	0.12927	37	01Jan2011, 06:05	2.5
W26-REV	0.072	18.4	01Jan2011, 06:04	1.2
WS3-1	0.072	18.1	01Jan2011, 06:15	1.2
Paint Brush Hills Pond C	0.20127	10.4	01Jan2011, 06:34	3.7
WT090	0.15333	22.1	01Jan2011, 06:11	2.1
JWT090	1.4444211	54.5	01Jan2011, 07:12	16.1
RWT122	1.4444211	54.5	01Jan2011, 07:17	16.1
WT110	0.19428	22.3	01Jan2011, 06:17	2.7
JWT110	1.6387011	58.6	01Jan2011, 07:16	18.7
RWT124	1.6387011	58.6	01Jan2011, 07:26	18.7
WT130-REV	0.101625	24	01Jan2011, 06:13	2.3
Paint Brush Hills Pond A	0.101625	4.8	01Jan2011, 06:53	2.3
WT120-REV	0.04303	7.2	01Jan2011, 06:09	0.6
JWT120	1.7833561	63.9	01Jan2011, 07:26	21.6
RWT172	1.7833561	63.8	01Jan2011, 07:38	21.5
WT140-REV	0.14453	35.7	01Jan2011, 06:14	3.6
JWT140	0.14453	35.7	01Jan2011, 06:14	3.6

FUTURE HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
RWT150	0.14453	35.5	01Jan2011, 06:25	3.6
WT150-REV	0.13081	40.8	01Jan2011, 06:09	3.3
Paint Brush Hills Pond B1	0.27534	58.7	01Jan2011, 06:19	6.8
W34B2-REV	0.09359	27.9	01Jan2011, 06:08	2.2
Paint Brush Hills Pond B2	0.36893	9.8	01Jan2011, 07:30	8
JWT150	0.36893	9.8	01Jan2011, 07:30	8
RWT160	0.36893	9.8	01Jan2011, 07:40	8
WT160-REV	0.07348	19.7	01Jan2011, 06:07	1.5
JWT160	0.44241	20.1	01Jan2011, 06:07	9.5
RWT174	0.44241	19.8	01Jan2011, 06:23	9.4
WT170-REV	0.106015	11.6	01Jan2011, 06:22	1.6
W34-CY-REV	0.0465469	5.2	01Jan2011, 06:19	0.6
JWT172	2.378328	81.2	01Jan2011, 06:39	33.1
RWT176	2.378328	81.1	01Jan2011, 06:40	33.1
Sub Regional Pond SR2	2.378328	66.8	01Jan2011, 08:06	30
JWT174	2.378328	66.8	01Jan2011, 08:06	30
RWT180	2.378328	66.8	01Jan2011, 08:25	29.7
WT180-REV	0.04094	3.4	01Jan2011, 06:22	0.5
JWT180	2.419268	67.2	01Jan2011, 08:25	30.2
RWT202	2.419268	67.2	01Jan2011, 08:39	30.1
WT200-N	0.191	16.4	01Jan2011, 06:33	2.8
WT200-W	0.068	9	01Jan2011, 06:16	1
WT190	0.0574561	11.3	01Jan2011, 06:07	0.9
The Meadows Pond #1	0.0574561	0.3	01Jan2011, 13:19	0.4
JWT190	0.0574561	0.3	01Jan2011, 13:19	0.4
RWT204	0.0574561	0.3	01Jan2011, 13:56	0.4
40	2.7357241	70.4	01Jan2011, 08:38	34.3
RWT206	2.7357241	70.3	01Jan2011, 08:43	34.2
BG	0.184	50.1	01Jan2011, 06:19	5.7
WT210-N	0.074	13.4	01Jan2011, 06:20	1.6
CC	2.9937241	81	01Jan2011, 06:23	41.4
RWT210	2.9937241	80.9	01Jan2011, 06:30	41.3
WT210-S	0.117	19.9	01Jan2011, 06:22	2.5
JWT210	3.1107241	99	01Jan2011, 06:29	43.8
RWT232	3.1107241	98.9	01Jan2011, 06:38	43.6
WT220-S	0.118	34.5	01Jan2011, 06:09	2.8
JWT220	0.118	34.5	01Jan2011, 06:09	2.8
RWT234	0.118	34.3	01Jan2011, 06:23	2.8
JWT232	3.2287241	118.2	01Jan2011, 06:35	46.4
RWT236	3.2287241	118.2	01Jan2011, 06:35	46.4
WT230	0.19818	71.3	01Jan2011, 06:06	5
JWT234	3.4269041	130.6	01Jan2011, 06:34	51.4

FUTURE HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RWT240	3.4269041	130.1	01Jan2011, 06:39	51.4
WT240	0.0761461	36.4	01Jan2011, 06:02	2.1
Regional Pond WU North	3.5030502	132.3	01Jan2011, 06:41	52.3
Regional Pond WU Diversion	3.5030502	100.9	01Jan2011, 06:41	29.1
Old Meridian	0.03359	24.6	01Jan2011, 06:09	1.9
RWT-OM	0.03359	24.3	01Jan2011, 06:16	1.8
→ Regional Pond WU South	3.5366402	45.9	01Jan2011, 09:41	24.7
RWT240_Diversion Reach	0	31.4	01Jan2011, 06:47	23.1
JWT240	3.5366402	69.8	01Jan2011, 09:34	47.8
RWT250	3.5366402	69.8	01Jan2011, 09:35	47.7
WT250	0.14695	63	01Jan2011, 06:03	3.7
JWT250	3.6835902	71.5	01Jan2011, 09:35	51.5
RWT260	3.6835902	71.5	01Jan2011, 09:55	51.1
WT260	0.1388002	9.9	01Jan2011, 06:38	1.9
JWT260	3.8223904	72.5	01Jan2011, 09:55	53
RWT291	3.8223904	72.5	01Jan2011, 10:00	52.9
WT270	0.0324738	11.3	01Jan2011, 06:05	0.7
JWT270	0.0324738	11.3	01Jan2011, 06:05	0.7
RWT292	0.0324738	11.2	01Jan2011, 06:11	0.7
JWT292	3.8548642	72.8	01Jan2011, 10:00	53.6
RWT295	3.8548642	72.8	01Jan2011, 10:02	53.6
WT280	0.26695	33.4	01Jan2011, 06:15	3.7
JWT280	0.26695	33.4	01Jan2011, 06:15	3.7
RWT294	0.26695	33.4	01Jan2011, 06:18	3.7
JWT294	4.1218142	94	01Jan2011, 06:30	57.2
RWT296	4.1218142	91.9	01Jan2011, 06:40	56.9
MT040	0.30842	94.6	01Jan2011, 06:13	8.8
MT030	0.15663	39	01Jan2011, 06:06	2.8
MT020	0.0902033	25.8	01Jan2011, 06:05	1.7
JMT020	0.0902033	25.8	01Jan2011, 06:05	1.7
RMT030	0.0902033	25.4	01Jan2011, 06:20	1.7
JMT030	0.2468333	50.1	01Jan2011, 06:10	4.5
RMT040	0.2468333	49.3	01Jan2011, 06:16	4.5
Woodmen Hills Pond H	0.5552533	107.8	01Jan2011, 06:25	13.2
JMT040	0.5552533	107.8	01Jan2011, 06:25	13.2
RMT050	0.5552533	107.4	01Jan2011, 06:28	13.2
MT050	0.11861	17	01Jan2011, 06:21	2.1
JMT050	0.6738633	123.1	01Jan2011, 06:27	15.3
→ RMT062	0.6738633	122.8	01Jan2011, 06:29	15.3
MT010	0.28989	17.3	01Jan2011, 06:28	2.7
The Meadows Pond #2	0.28989	0	01Jan2011, 00:00	0
JMT010	0.28989	0	01Jan2011, 00:00	0

FUTURE HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
MT060a	0.0311	4.2	01Jan2011, 06:20	0.5
School Site	0.32099	0.2	01Jan2011, 13:18	0.3
RMT060a	0.32099	0.2	01Jan2011, 13:43	0.3
MT060-N	0.062	8.9	01Jan2011, 06:18	1
JMT060a	1.0568533	129.7	01Jan2011, 06:29	16.6
RMT064	1.0568533	128.1	01Jan2011, 06:38	16.6
MT060-S	0.111	19.2	01Jan2011, 06:12	1.9
MT070-N	0.084	11.6	01Jan2011, 06:23	1.6
Sub Regional Pond SR4	1.2518533	11.8	01Jan2011, 09:38	14.8
JMT060	1.2518533	11.8	01Jan2011, 09:38	14.8
RMT070	1.2518533	11.8	01Jan2011, 09:49	14.6
MT070-S	0.058	10.3	01Jan2011, 06:15	1.1
JMT070	1.3098533	12.4	01Jan2011, 09:53	15.7
RMT080	1.3098533	12.4	01Jan2011, 09:57	15.7
MT080	0.0638371	62.4	01Jan2011, 06:00	3.4
Regional Pond MN	1.3736904	14.4	01Jan2011, 08:02	16.5
JMT080	1.3736904	14.4	01Jan2011, 08:02	16.5
RMT102	1.3736904	14.4	01Jan2011, 08:13	16.4
MT090	0.0435103	39.9	01Jan2011, 06:00	2.1
Woodmen Hills Pond #5	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT104	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT104	0.0435103	1.4	01Jan2011, 08:09	1.5
JMT102	1.4172007	15.8	01Jan2011, 08:13	17.9
RMT106	1.4172007	15.8	01Jan2011, 08:15	17.9
MT100	0.0557682	16.5	01Jan2011, 06:06	1.2
JMT106	1.4729689	17.7	01Jan2011, 06:07	19.1
RMT112	1.4729689	16.7	01Jan2011, 06:52	18.3
MT110	0.11639	18.9	01Jan2011, 06:19	2.2
JMT110	1.5893589	23.4	01Jan2011, 06:51	20.6
RMT114	1.5893589	23	01Jan2011, 07:03	20.4
WT290	0.10378	15	01Jan2011, 06:11	1.4
Regional Pond R1	5.8149531	91.3	01Jan2011, 10:22	71.8
JWT296	5.8149531	91.3	01Jan2011, 10:22	71.8
RWT314	5.8149531	91.3	01Jan2011, 10:33	71.3
WT300	0.0970199	12.2	01Jan2011, 06:15	1.3
JWT300	0.0970199	12.2	01Jan2011, 06:15	1.3
RWT312	0.0970199	12.1	01Jan2011, 06:39	1.3
WT310	0.27742	31.3	01Jan2011, 06:16	3.6
JWT310	6.189393	93.6	01Jan2011, 10:32	76.2
RWT320	6.189393	93.5	01Jan2011, 10:41	75.6

FUTURE HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI ²)	(CFS)		(AC-FT)
WT320	0.20614	26.8	01Jan2011, 06:14	2.8
JWT320	6.395533	94.7	01Jan2011, 10:41	78.5
RWT352	6.395533	94.7	01Jan2011, 10:52	77.8
ET020	0.21317	73.4	01Jan2011, 06:07	5.4
ET010	0.14513	37.5	01Jan2011, 06:12	3.5
Paint Brush Hills Pond #4	0.14513	29.4	01Jan2011, 06:21	3.5
JET010	0.14513	29.4	01Jan2011, 06:21	3.5
RET020	0.14513	29.3	01Jan2011, 06:37	3.5
Sub Regional Pond SR6	0.3583	9.3	01Jan2011, 07:43	7.9
JET020	0.3583	9.3	01Jan2011, 07:43	7.9
RET030	0.3583	9.3	01Jan2011, 08:37	7.6
ET030	0.20428	44.9	01Jan2011, 06:17	4.9
JET030	0.56258	44.9	01Jan2011, 06:17	12.5
RET040	0.56258	44.6	01Jan2011, 06:30	12.4
Woodmen Hills Pond #1 North	0.71172	60.8	01Jan2011, 06:33	15.4
ET040	0.14914	27.9	01Jan2011, 06:16	3
Woodmen Hills Pond #1 South	0.71172	9.6	01Jan2011, 12:57	12
JET040	0.71172	9.6	01Jan2011, 12:57	12
RET050	0.71172	9.6	01Jan2011, 13:08	11.8
ET050	0.11719	36.5	01Jan2011, 06:03	2.2
Woodmen Hills Pond #2	0.82891	10.4	01Jan2011, 13:06	12.5
JET050	0.82891	10.4	01Jan2011, 13:06	12.5
RET060	0.82891	10.4	01Jan2011, 13:21	12.3
ET060	0.28543	105	01Jan2011, 06:02	5.8
Woodmen Hills Pond #3	1.11434	12.6	01Jan2011, 13:03	15.7
JET060	1.11434	12.6	01Jan2011, 13:03	15.7
RET070	1.11434	12.6	01Jan2011, 13:18	15.5
ET070	0.24975	93.5	01Jan2011, 06:03	5.7
JET070	1.36409	93.6	01Jan2011, 06:03	21.2
RET080	1.36409	64.9	01Jan2011, 06:31	20.7
ET080	0.29164	113.3	01Jan2011, 06:08	8.7
Woodmen Hills Pond #4	1.65573	9.8	02Jan2011, 00:00	12
JET080	1.65573	9.8	02Jan2011, 00:00	12
RET090	1.65573	9.8	02Jan2011, 00:00	11.9
ET090	0.12424	26	01Jan2011, 06:24	3.3
JET090	1.77997	29.2	01Jan2011, 06:25	15.3
RET100	1.77997	29.1	01Jan2011, 06:30	15.2
ET100	0.0480615	11.4	01Jan2011, 06:02	0.7
JET100	1.8280315	30.6	01Jan2011, 06:30	15.8
RET110	1.8280315	30.6	01Jan2011, 06:38	15.7
ET110	0.22603	24	01Jan2011, 06:15	2.7
JET110	2.0540615	41.4	01Jan2011, 06:32	18.4

FUTURE HMS MODEL - 2 YEAR STORM

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	(MI2)	(CFS)		(AC-FT)
RET120	2.0540615	41.4	01Jan2011, 06:39	18.2
ET120	0.10913	10.7	01Jan2011, 06:17	1.3
JET120	2.1631915	49.7	01Jan2011, 06:21	19.5
RET152	2.1631915	49.5	01Jan2011, 06:29	19.4
ET130	0.13481	10.9	01Jan2011, 06:31	1.8
JET130	0.13481	10.9	01Jan2011, 06:31	1.8
RET140	0.13481	10.9	01Jan2011, 07:06	1.8
ET140	0.26759	15.9	01Jan2011, 06:51	3.6
JET140	0.4024	25.8	01Jan2011, 07:01	5.5
RET154	0.4024	25.7	01Jan2011, 07:27	5.4
JET152	2.5655915	53.7	01Jan2011, 07:01	24.8
RET156	2.5655915	53.5	01Jan2011, 07:06	24.7
ET150	0.17773	17	01Jan2011, 06:21	2.3
JET154	2.7433215	62.3	01Jan2011, 06:34	27
RET162	2.7433215	59.6	01Jan2011, 07:07	26.4
ET160	0.18892	18.6	01Jan2011, 06:26	2.8
JET160	2.9322415	66.8	01Jan2011, 07:06	29.2
RET164	2.9322415	66.5	01Jan2011, 07:12	29.1
WT350	0.30377	38.3	01Jan2011, 06:17	4.5
JWT352	9.6315445	128.6	01Jan2011, 08:09	111.4
RWT354	9.6315445	128.6	01Jan2011, 08:09	111.3
WT330	0.32668	32.2	01Jan2011, 06:23	4.5
JWT330	0.32668	32.2	01Jan2011, 06:23	4.5
RWT344	0.32668	32	01Jan2011, 06:34	4.5
WT340	0.278	18.9	01Jan2011, 06:42	3.8
JWT354	10.2362245	138.3	01Jan2011, 08:08	119.6
RWT372	10.2362245	138.2	01Jan2011, 08:14	119.1
WT360	0.065683	6.9	01Jan2011, 06:18	0.8
JWT360	0.065683	6.9	01Jan2011, 06:18	0.8
RWT374	0.065683	6.9	01Jan2011, 06:36	0.8
Regional Pond R2	10.3019075	139.8	01Jan2011, 06:45	116.8
JWT372	10.3019075	139.8	01Jan2011, 06:45	116.8
RWT376	10.3019075	138.6	01Jan2011, 08:26	116
WT370	0.21476	7.2	01Jan2011, 06:17	1.2
JWT374_OUTLET	10.5166675	140.5	01Jan2011, 06:55	117.2
FS010	0.122	6.3	01Jan2011, 06:20	1
JFS010_OUTLET	0.122	6.3	01Jan2011, 06:20	1

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	15Jun2021, 13:19:14	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	4.2 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:20
Peak Outflow :	0.2 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 13:18
Total Inflow :	0.5 (AC-FT)	Peak Storage :	0.3 (AC-FT)
Total Outflow :	0.3 (AC-FT)	Peak Elevation :	6954.2 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	15Jun2021, 13:19:14	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	143.2 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:38
Peak Outflow :	11.8 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 09:38
Total Inflow :	20.0 (AC-FT)	Peak Storage :	10.0 (AC-FT)
Total Outflow :	14.8 (AC-FT)	Peak Elevation :	6891.8 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	15Jun2021, 13:19:14	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	63.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:01
Peak Outflow :	14.4 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:02
Total Inflow :	19.0 (AC-FT)	Peak Storage :	2.5 (AC-FT)
Total Outflow :	16.5 (AC-FT)	Peak Elevation :	6851.4 (FT)

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT020	0.0671383	41.9	01Jan2011, 06:21	4.8
JWT020	0.0671383	41.9	01Jan2011, 06:21	4.8
RWT030	0.0671383	41.9	01Jan2011, 06:29	4.8
WT030	0.0764732	75.3	01Jan2011, 06:07	5.5
JWT030	0.1436115	85.4	01Jan2011, 06:09	10.3
RWT042	0.1436115	85.3	01Jan2011, 06:15	10.3
WT010	0.1353300	88.9	01Jan2011, 06:17	9.3
JWT010	0.1353300	88.9	01Jan2011, 06:17	9.3
RWT044	0.1353300	88.8	01Jan2011, 06:24	9.3
JWT042	0.2789415	167.0	01Jan2011, 06:21	19.6
RWT046	0.2789415	166.7	01Jan2011, 06:28	19.6
WT040	0.1850600	92.7	01Jan2011, 06:28	12.8
JWT044	0.4640015	259.4	01Jan2011, 06:28	32.4
RWT054	0.4640015	258.8	01Jan2011, 06:35	32.3
WT060	0.1956300	116.8	01Jan2011, 06:26	15.1
WT050	0.1899300	139.4	01Jan2011, 06:19	15.3
JWT050	0.8495615	475.4	01Jan2011, 06:31	62.7
RWT092	0.8495615	475.2	01Jan2011, 06:32	62.7
WT070	0.1711000	133.9	01Jan2011, 06:12	11.8
JWT070	0.1711000	133.9	01Jan2011, 06:12	11.8
RWT080	0.1711000	133.4	01Jan2011, 06:22	11.8
WT080	0.0691596	67.3	01Jan2011, 06:10	5.6
Sub Regional Pond SR1	1.0898211	513.2	01Jan2011, 06:40	78.4
JWT080	1.0898211	513.2	01Jan2011, 06:40	78.4
RWT094	1.0898211	512.4	01Jan2011, 06:45	78.3
WT100-REV	0.1292700	203.0	01Jan2011, 06:04	12.9
W26-REV	0.0720000	103.6	01Jan2011, 06:03	6.4
WS3-1	0.0720000	102.8	01Jan2011, 06:10	6.4
Paint Brush Hills Pond C	0.2012700	64.4	01Jan2011, 06:26	19.2
WT090	0.1533300	162.4	01Jan2011, 06:09	12.8
JWT090	1.4444211	595.9	01Jan2011, 06:44	110.2
RWT122	1.4444211	595.5	01Jan2011, 06:45	110.2
WT110	0.1942800	169.9	01Jan2011, 06:14	16.2
JWT110	1.6387011	651.0	01Jan2011, 06:43	126.4
RWT124	1.6387011	650.8	01Jan2011, 06:47	126.3
WT130-REV	0.1016250	130.0	01Jan2011, 06:11	10.9
Paint Brush Hills Pond A	0.1016250	53.8	01Jan2011, 06:32	10.9
WT120-REV	0.0430300	51.1	01Jan2011, 06:08	3.8

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT120	1.7833561	703.6	01Jan2011, 06:46	140.9
RWT172	1.7833561	702.5	01Jan2011, 06:58	140.5
WT140-REV	0.1445300	194.2	01Jan2011, 06:12	16.8
JWT140	0.1445300	194.2	01Jan2011, 06:12	16.8
RWT150	0.1445300	193.3	01Jan2011, 06:22	16.8
WT150-REV	0.1308100	202.5	01Jan2011, 06:08	15.0
Paint Brush Hills Pond...	0.2753400	235.6	01Jan2011, 06:29	31.8
W34B2-REV	0.0935900	141.8	01Jan2011, 06:07	10.2
Paint Brush Hills Pond...	0.3689300	234.3	01Jan2011, 06:43	38.9
JWT150	0.3689300	234.3	01Jan2011, 06:43	38.9
RWT160	0.3689300	234.2	01Jan2011, 06:49	38.8
WT160-REV	0.0734800	109.9	01Jan2011, 06:06	7.5
JWT160	0.4424100	244.8	01Jan2011, 06:48	46.3
RWT174	0.4424100	244.7	01Jan2011, 06:56	46.2
WT170-REV	0.1060150	85.2	01Jan2011, 06:19	9.2
W34-CY-REV	0.0465469	38.1	01Jan2011, 06:16	3.8
JWT172	2.3783280	981.9	01Jan2011, 06:56	199.7
RWT176	2.3783280	981.6	01Jan2011, 06:57	199.7
Sub Regional Pond SR2	2.3783280	972.9	01Jan2011, 07:01	194.8
JWT174	2.3783280	972.9	01Jan2011, 07:01	194.8
RWT180	2.3783280	972.1	01Jan2011, 07:10	194.2
WT180-REV	0.0409400	29.3	01Jan2011, 06:19	3.2
JWT180	2.4192680	978.0	01Jan2011, 07:10	197.4
RWT202	2.4192680	977.3	01Jan2011, 07:21	196.8
WT200	0.3017100	186.8	01Jan2011, 06:30	26.0
WT190	0.0574561	74.7	01Jan2011, 06:05	5.0
The Meadows Pond #1	0.0574561	2.1	01Jan2011, 08:29	2.8
JWT190	0.0574561	2.1	01Jan2011, 08:29	2.8
RWT204	0.0574561	2.1	01Jan2011, 08:55	2.7
JWT200	2.7784341	1041.0	01Jan2011, 07:19	225.5
RWT210	2.7784341	1040.5	01Jan2011, 07:24	225.1
WT210	0.2654600	187.9	01Jan2011, 06:35	28.0
JWT210	3.0438941	1113.0	01Jan2011, 07:23	253.1
RWT232	3.0438941	1112.6	01Jan2011, 07:27	252.7
WT220	0.1895300	250.4	01Jan2011, 06:12	21.3
JWT220	0.1895300	250.4	01Jan2011, 06:12	21.3
RWT234	0.1895300	249.6	01Jan2011, 06:20	21.3
JWT232	3.2334241	1138.4	01Jan2011, 07:26	274.0

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RWT236	3.2334241	1138.3	01Jan2011, 07:26	274.0
WT230	0.1981800	346.7	01Jan2011, 06:05	23.1
JWT234	3.4316041	1155.6	01Jan2011, 07:26	297.0
RWT240	3.4316041	1155.0	01Jan2011, 07:29	296.8
WT240	0.0761461	160.3	01Jan2011, 06:01	9.1
Regional Pond WU No...	3.5077502	1160.9	01Jan2011, 07:30	304.7
Regional Pond WU Di...	3.5077502	1122.2	01Jan2011, 07:30	261.4
Old Meridian	0.0335900	85.0	01Jan2011, 06:07	6.1
RWT-OM	0.0335900	84.2	01Jan2011, 06:12	6.1
Regional Pond WU So...	3.5413402	925.0	01Jan2011, 07:53	260.3
RWT240_Diversion R...	0.0000000	38.8	01Jan2011, 07:35	43.1
JWT240	3.5413402	963.5	01Jan2011, 07:53	303.4
RWT250	3.5413402	963.3	01Jan2011, 07:53	303.3
WT250	0.1469500	291.4	01Jan2011, 06:02	17.1
JWT250	3.6882902	975.6	01Jan2011, 07:53	320.5
RWT260	3.6882902	975.1	01Jan2011, 08:04	319.5
WT260	0.1388002	77.5	01Jan2011, 06:34	11.5
JWT260	3.8270904	988.4	01Jan2011, 08:03	331.0
RWT291	3.8270904	988.3	01Jan2011, 08:05	330.8
WT270	0.0324738	57.1	01Jan2011, 06:04	3.6
JWT270	0.0324738	57.1	01Jan2011, 06:04	3.6
RWT292	0.0324738	56.9	01Jan2011, 06:08	3.5
JWT292	3.8595642	990.9	01Jan2011, 08:05	334.3
RWT295	3.8595642	990.8	01Jan2011, 08:07	334.2
WT280	0.2669500	251.8	01Jan2011, 06:12	22.3
JWT280	0.2669500	251.8	01Jan2011, 06:12	22.3
RWT294	0.2669500	251.2	01Jan2011, 06:15	22.2
JWT294	4.1265142	1008.6	01Jan2011, 08:06	356.4
RWT296	4.1265142	1008.1	01Jan2011, 08:12	355.7
MT040	0.3084200	455.2	01Jan2011, 06:11	38.1
MT030	0.1566300	228.6	01Jan2011, 06:05	15.1
MT020	0.0902033	143.1	01Jan2011, 06:04	9.0
JMT020	0.0902033	143.1	01Jan2011, 06:04	9.0
RMT030	0.0902033	141.8	01Jan2011, 06:17	8.9
JMT030	0.2468333	294.4	01Jan2011, 06:07	24.0
RMT040	0.2468333	293.0	01Jan2011, 06:11	24.0
Woodmen Hills Pond H	0.5552533	751.7	01Jan2011, 06:11	61.7
JMT040	0.5552533	751.7	01Jan2011, 06:11	61.7

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RMT050	0.5552533	745.8	01Jan2011, 06:14	61.7
MT010	0.2898900	139.9	01Jan2011, 06:24	17.7
The Meadows Pond #2	0.2898900	63.5	01Jan2011, 06:55	14.1
JMT010	0.2898900	63.5	01Jan2011, 06:55	14.1
RMT062	0.2898900	63.4	01Jan2011, 07:07	14.1
MT060a	0.0311000	48.5	01Jan2011, 06:03	2.9
School Site	0.3209900	16.4	01Jan2011, 09:09	12.2
JMT060a	0.3209900	16.4	01Jan2011, 09:09	12.2
RMT060a	0.3209900	16.4	01Jan2011, 09:16	12.1
MT050	0.1186100	109.7	01Jan2011, 06:18	11.4
JMT050	0.9948533	852.6	01Jan2011, 06:14	85.2
RMT064	0.9948533	847.9	01Jan2011, 06:21	85.1
MT060	0.1588000	196.8	01Jan2011, 06:08	14.7
Sub Regional Pond SR4	1.1536533	607.7	01Jan2011, 06:38	85.3
JMT060	1.1536533	607.7	01Jan2011, 06:38	85.3
RMT070	1.1536533	604.8	01Jan2011, 06:44	85.1
MT070	0.1994800	170.2	01Jan2011, 06:22	19.6
JMT070	1.3531333	710.9	01Jan2011, 06:42	104.7
RMT080	1.3531333	709.9	01Jan2011, 06:44	104.7
MT080	0.0638371	191.9	01Jan2011, 06:00	11.0
Regional Pond MN	1.4169704	686.6	01Jan2011, 06:49	113.2
JMT080	1.4169704	686.6	01Jan2011, 06:49	113.2
RMT102	1.4169704	683.7	01Jan2011, 06:56	112.9
MT090	0.0435103	127.4	01Jan2011, 06:00	7.1
Woodmen Hills Pond #5	0.0435103	18.6	01Jan2011, 06:07	5.9
JMT090	0.0435103	18.6	01Jan2011, 06:07	5.9
RMT090	0.0435103	18.6	01Jan2011, 06:08	5.9
JMT104	0.0435103	18.6	01Jan2011, 06:08	5.9
RMT104	0.0435103	18.6	01Jan2011, 06:12	5.9
JMT102	1.4604807	698.8	01Jan2011, 06:56	118.8
RMT106	1.4604807	693.3	01Jan2011, 06:58	118.7
MT100	0.0557682	88.2	01Jan2011, 06:05	5.9
JMT106	1.5162489	700.0	01Jan2011, 06:58	124.6
RMT112	1.5162489	696.5	01Jan2011, 07:10	123.9
MT110	0.1163900	117.4	01Jan2011, 06:16	11.5
JMT110	1.6326389	715.5	01Jan2011, 07:10	135.4
RMT114	1.6326389	714.4	01Jan2011, 07:15	135.1
WT290	0.1037800	110.3	01Jan2011, 06:09	8.7

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Regional Pond R1	5.8629331	1335.0	01Jan2011, 07:21	492.0
JWT296	5.8629331	1335.0	01Jan2011, 07:21	492.0
RWT314	5.8629331	1334.1	01Jan2011, 07:27	491.1
WT300	0.0970199	91.6	01Jan2011, 06:12	8.1
JWT300	0.0970199	91.6	01Jan2011, 06:12	8.1
RWT312	0.0970199	91.1	01Jan2011, 06:29	8.1
WT310	0.2774200	246.7	01Jan2011, 06:13	22.3
JWT310	6.2373730	1368.5	01Jan2011, 07:27	521.5
RWT320	6.2373730	1366.0	01Jan2011, 07:33	520.5
WT320	0.2061400	200.6	01Jan2011, 06:11	17.2
JWT320	6.4435130	1380.9	01Jan2011, 07:33	537.7
RWT352	6.4435130	1378.0	01Jan2011, 07:43	536.5
ET020	0.2131700	360.5	01Jan2011, 06:06	24.8
ET010	0.1451300	198.3	01Jan2011, 06:11	16.4
Paint Brush Hills Pond...	0.1451300	150.9	01Jan2011, 06:20	16.3
JET010	0.1451300	150.9	01Jan2011, 06:20	16.3
RET020	0.1451300	150.0	01Jan2011, 06:37	16.3
Sub Regional Pond SR6	0.3583000	195.4	01Jan2011, 06:41	37.9
JET020	0.3583000	195.4	01Jan2011, 06:41	37.9
RET030	0.3583000	194.9	01Jan2011, 07:02	37.5
ET030	0.2042800	242.0	01Jan2011, 06:15	23.0
JET030	0.5625800	266.0	01Jan2011, 06:43	60.5
RET040	0.5625800	265.2	01Jan2011, 06:50	60.3
Woodmen Hills Pond ...	0.7117200	263.5	01Jan2011, 07:09	75.5
ET040	0.1491400	165.7	01Jan2011, 06:14	15.3
Woodmen Hills Pond ...	0.7117200	261.1	01Jan2011, 07:18	69.5
JET040	0.7117200	261.1	01Jan2011, 07:18	69.5
RET050	0.7117200	261.1	01Jan2011, 07:23	69.4
ET050	0.1171900	197.1	01Jan2011, 06:03	11.6
Woodmen Hills Pond #2	0.8289100	250.3	01Jan2011, 07:46	79.3
JET050	0.8289100	250.3	01Jan2011, 07:46	79.3
RET060	0.8289100	250.3	01Jan2011, 07:53	79.1
ET060	0.2854300	529.3	01Jan2011, 06:01	29.3
Woodmen Hills Pond #3	1.1143400	360.9	01Jan2011, 06:06	105.9
JET060	1.1143400	360.9	01Jan2011, 06:06	105.9
RET070	1.1143400	356.7	01Jan2011, 06:16	105.6
ET070	0.2497500	461.0	01Jan2011, 06:02	27.3
JET070	1.3640900	636.4	01Jan2011, 06:04	132.9

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RET080	1.3640900	517.5	01Jan2011, 06:23	131.3
ET080	0.2916400	517.9	01Jan2011, 06:07	37.1
Woodmen Hills Pond #4	1.6557300	288.0	01Jan2011, 07:00	139.2
JET080	1.6557300	288.0	01Jan2011, 07:00	139.2
RET090	1.6557300	287.3	01Jan2011, 07:03	139.0
ET090	0.1242400	133.0	01Jan2011, 06:22	14.9
JET090	1.7799700	330.8	01Jan2011, 06:59	153.9
RET100	1.7799700	330.7	01Jan2011, 07:01	153.8
ET100	0.0480615	72.0	01Jan2011, 06:02	4.0
JET100	1.8280315	335.4	01Jan2011, 07:01	157.8
RET110	1.8280315	335.2	01Jan2011, 07:05	157.6
ET110	0.2260300	198.8	01Jan2011, 06:12	17.5
JET110	2.0540615	362.1	01Jan2011, 07:03	175.1
RET120	2.0540615	361.3	01Jan2011, 07:09	174.7
ET120	0.1091300	89.4	01Jan2011, 06:14	8.5
JET120	2.1631915	403.2	01Jan2011, 06:17	183.2
RET152	2.1631915	402.2	01Jan2011, 06:24	182.9
ET130	0.1348100	85.4	01Jan2011, 06:27	11.2
JET130	0.1348100	85.4	01Jan2011, 06:27	11.2
RET140	0.1348100	84.7	01Jan2011, 06:54	11.1
ET140	0.2675900	122.8	01Jan2011, 06:46	22.2
JET140	0.4024000	204.8	01Jan2011, 06:51	33.3
RET154	0.4024000	204.4	01Jan2011, 07:05	33.2
JET152	2.5655915	572.3	01Jan2011, 07:10	216.1
RET156	2.5655915	572.0	01Jan2011, 07:14	215.8
ET150	0.1777300	136.2	01Jan2011, 06:18	14.3
JET154	2.7433215	595.8	01Jan2011, 07:12	230.1
RET162	2.7433215	595.1	01Jan2011, 07:25	228.9
ET160	0.1889200	137.2	01Jan2011, 06:23	16.3
JET160	2.9322415	633.6	01Jan2011, 06:38	245.2
RET164	2.9322415	629.0	01Jan2011, 06:47	244.7
WT350	0.3037700	276.7	01Jan2011, 06:14	26.3
JWT352	9.6795245	2004.4	01Jan2011, 07:40	807.5
RWT354	9.6795245	2004.3	01Jan2011, 07:40	807.5
WT330	0.3266800	249.3	01Jan2011, 06:19	27.2
JWT330	0.3266800	249.3	01Jan2011, 06:19	27.2
RWT344	0.3266800	248.4	01Jan2011, 06:25	27.2
WT340	0.2780000	147.3	01Jan2011, 06:37	23.1

FUTURE 100-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT354	10.2842045	2080.2	01Jan2011, 07:39	857.8
RWT372	10.2842045	2077.7	01Jan2011, 07:45	856.7
WT360	0.0656830	54.8	01Jan2011, 06:15	5.3
JWT360	0.0656830	54.8	01Jan2011, 06:15	5.3
RWT374	0.0656830	54.6	01Jan2011, 06:24	5.3
Regional Pond R2	10.3498875	2080.9	01Jan2011, 07:47	858.6
JWT372	10.3498875	2080.9	01Jan2011, 07:47	858.6
RWT376	10.3498875	2075.5	01Jan2011, 07:57	856.1
WT370	0.2147600	123.3	01Jan2011, 06:12	11.5
JWT374_OUTLET	10.5646475	2085.6	01Jan2011, 07:57	867.6
FS010	0.1220000	74.9	01Jan2011, 06:16	7.7
JFS010_OUTLET	0.1220000	74.9	01Jan2011, 06:16	7.7

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	29Apr2021, 19:59:08	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	66.4 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 07:05
Peak Outflow :	16.4 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 09:09
Total Inflow :	17.0 (AC-FT)	Peak Storage :	7.9 (AC-FT)
Total Outflow :	12.2 (AC-FT)	Peak Elevation :	6957.0 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	29Apr2021, 19:59:08	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	952.1 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:20
Peak Outflow :	607.7 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:38
Total Inflow :	99.8 (AC-FT)	Peak Storage :	26.2 (AC-FT)
Total Outflow :	85.3 (AC-FT)	Peak Elevation :	6896.9 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 100-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	29Apr2021, 19:59:08	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	720.0 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:44
Peak Outflow :	686.6 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:49
Total Inflow :	115.7 (AC-FT)	Peak Storage :	6.7 (AC-FT)
Total Outflow :	113.2 (AC-FT)	Peak Elevation :	6853.6 (FT)

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT020	0.0671383	10.3	01Jan2011, 06:23	1.4
JWT020	0.0671383	10.3	01Jan2011, 06:23	1.4
RWT030	0.0671383	10.3	01Jan2011, 06:34	1.4
WT030	0.0764732	19.5	01Jan2011, 06:08	1.6
JWT030	0.1436115	20.0	01Jan2011, 06:09	3.0
RWT042	0.1436115	19.9	01Jan2011, 06:18	3.0
WT010	0.1353300	21.2	01Jan2011, 06:19	2.6
JWT010	0.1353300	21.2	01Jan2011, 06:19	2.6
RWT044	0.1353300	21.2	01Jan2011, 06:29	2.6
JWT042	0.2789415	37.2	01Jan2011, 06:24	5.6
RWT046	0.2789415	37.2	01Jan2011, 06:35	5.6
WT040	0.1850600	21.9	01Jan2011, 06:31	3.6
JWT044	0.4640015	58.9	01Jan2011, 06:34	9.2
RWT054	0.4640015	58.7	01Jan2011, 06:43	9.2
WT060	0.1956300	30.1	01Jan2011, 06:29	4.5
WT050	0.1899300	37.3	01Jan2011, 06:21	4.7
JWT050	0.8495615	108.6	01Jan2011, 06:38	18.4
RWT092	0.8495615	108.5	01Jan2011, 06:39	18.4
WT070	0.1711000	32.6	01Jan2011, 06:13	3.4
JWT070	0.1711000	32.6	01Jan2011, 06:13	3.4
RWT080	0.1711000	32.5	01Jan2011, 06:28	3.3
WT080	0.0691596	18.5	01Jan2011, 06:12	1.7
Sub Regional Pond SR1	1.0898211	113.8	01Jan2011, 06:50	21.9
JWT080	1.0898211	113.8	01Jan2011, 06:50	21.9
RWT094	1.0898211	113.7	01Jan2011, 06:58	21.8
WT100-REV	0.1292700	67.7	01Jan2011, 06:05	4.5
W26-REV	0.0720000	33.7	01Jan2011, 06:04	2.1
WS3-1	0.0720000	33.4	01Jan2011, 06:13	2.1
Paint Brush Hills Pond C	0.2012700	14.0	01Jan2011, 06:38	6.5
WT090	0.1533300	46.0	01Jan2011, 06:10	4.0
JWT090	1.4444211	133.8	01Jan2011, 06:57	32.3
RWT122	1.4444211	133.7	01Jan2011, 07:01	32.3
WT110	0.1942800	47.0	01Jan2011, 06:16	5.1
JWT110	1.6387011	144.0	01Jan2011, 07:00	37.4
RWT124	1.6387011	144.0	01Jan2011, 07:08	37.3
WT130-REV	0.1016250	43.5	01Jan2011, 06:12	3.9
Paint Brush Hills Pond A	0.1016250	9.3	01Jan2011, 06:49	3.9
WT120-REV	0.0430300	14.8	01Jan2011, 06:09	1.2

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT120	1.7833561	154.4	01Jan2011, 07:08	42.4
RWT172	1.7833561	154.2	01Jan2011, 07:18	42.2
WT140-REV	0.1445300	65.2	01Jan2011, 06:14	6.1
JWT140	0.1445300	65.2	01Jan2011, 06:14	6.1
RWT150	0.1445300	64.9	01Jan2011, 06:24	6.1
WT150-REV	0.1308100	71.3	01Jan2011, 06:08	5.5
Paint Brush Hills Pond...	0.2753400	110.4	01Jan2011, 06:15	11.6
W34B2-REV	0.0935900	49.1	01Jan2011, 06:08	3.7
Paint Brush Hills Pond...	0.3689300	20.1	01Jan2011, 07:15	13.8
JWT150	0.3689300	20.1	01Jan2011, 07:15	13.8
RWT160	0.3689300	20.0	01Jan2011, 07:24	13.8
WT160-REV	0.0734800	36.3	01Jan2011, 06:07	2.6
JWT160	0.4424100	37.3	01Jan2011, 06:07	16.4
RWT174	0.4424100	36.9	01Jan2011, 06:20	16.3
WT170-REV	0.1060150	24.0	01Jan2011, 06:21	2.9
W34-CY-REV	0.0465469	10.7	01Jan2011, 06:18	1.2
JWT172	2.3783280	181.3	01Jan2011, 07:17	62.6
RWT176	2.3783280	181.2	01Jan2011, 07:18	62.6
Sub Regional Pond SR2	2.3783280	171.7	01Jan2011, 07:30	59.3
JWT174	2.3783280	171.7	01Jan2011, 07:30	59.3
RWT180	2.3783280	171.6	01Jan2011, 07:45	59.0
WT180-REV	0.0409400	7.6	01Jan2011, 06:21	1.0
JWT180	2.4192680	172.6	01Jan2011, 07:45	59.9
RWT202	2.4192680	172.6	01Jan2011, 08:03	59.5
WT200	0.3017100	52.2	01Jan2011, 06:33	8.3
WT190	0.0574561	22.5	01Jan2011, 06:06	1.6
The Meadows Pond #1	0.0574561	0.6	01Jan2011, 10:18	0.9
JWT190	0.0574561	0.6	01Jan2011, 10:18	0.9
RWT204	0.0574561	0.6	01Jan2011, 10:56	0.8
JWT200	2.7784341	182.8	01Jan2011, 08:02	68.6
RWT210	2.7784341	182.7	01Jan2011, 08:10	68.3
WT210	0.2654600	59.7	01Jan2011, 06:38	9.8
JWT210	3.0438941	194.3	01Jan2011, 08:09	78.2
RWT232	3.0438941	194.3	01Jan2011, 08:16	77.9
WT220	0.1895300	84.8	01Jan2011, 06:13	7.8
JWT220	0.1895300	84.8	01Jan2011, 06:13	7.8
RWT234	0.1895300	84.4	01Jan2011, 06:25	7.7
JWT232	3.2334241	200.7	01Jan2011, 08:16	85.7

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RWT236	3.2334241	200.7	01Jan2011, 08:16	85.7
WT230	0.1981800	124.0	01Jan2011, 06:06	8.5
JWT234	3.4316041	205.6	01Jan2011, 08:15	94.2
RWT240	3.4316041	205.4	01Jan2011, 08:21	94.0
WT240	0.0761461	61.0	01Jan2011, 06:02	3.4
Regional Pond WU No...	3.5077502	206.4	01Jan2011, 08:23	96.3
Regional Pond WU Di...	3.5077502	169.3	01Jan2011, 08:23	64.8
Old Meridian	0.0335900	38.2	01Jan2011, 06:09	2.8
RWT-OM	0.0335900	37.8	01Jan2011, 06:14	2.8
Regional Pond WU So...	3.5413402	165.5	01Jan2011, 08:33	61.2
RWT240_Diversion R...	0.0000000	37.1	01Jan2011, 08:29	31.4
JWT240	3.5413402	202.6	01Jan2011, 08:33	92.6
RWT250	3.5413402	202.5	01Jan2011, 08:34	92.6
WT250	0.1469500	107.5	01Jan2011, 06:03	6.3
JWT250	3.6882902	205.1	01Jan2011, 08:34	98.9
RWT260	3.6882902	204.9	01Jan2011, 08:49	98.4
WT260	0.1388002	21.0	01Jan2011, 06:36	3.6
JWT260	3.8270904	207.6	01Jan2011, 08:49	102.0
RWT291	3.8270904	207.5	01Jan2011, 08:53	101.8
WT270	0.0324738	20.0	01Jan2011, 06:04	1.3
JWT270	0.0324738	20.0	01Jan2011, 06:04	1.3
RWT292	0.0324738	19.9	01Jan2011, 06:10	1.3
JWT292	3.8595642	208.0	01Jan2011, 08:53	103.1
RWT295	3.8595642	208.0	01Jan2011, 08:54	103.0
WT280	0.2669500	70.1	01Jan2011, 06:14	6.9
JWT280	0.2669500	70.1	01Jan2011, 06:14	6.9
RWT294	0.2669500	70.0	01Jan2011, 06:17	6.9
JWT294	4.1265142	211.4	01Jan2011, 08:54	110.0
RWT296	4.1265142	211.2	01Jan2011, 09:02	109.5
MT040	0.3084200	163.5	01Jan2011, 06:12	14.5
MT030	0.1566300	73.4	01Jan2011, 06:06	5.1
MT020	0.0902033	47.3	01Jan2011, 06:05	3.1
JMT020	0.0902033	47.3	01Jan2011, 06:05	3.1
RMT030	0.0902033	46.8	01Jan2011, 06:21	3.1
JMT030	0.2468333	93.6	01Jan2011, 06:07	8.1
RMT040	0.2468333	92.8	01Jan2011, 06:12	8.1
Woodmen Hills Pond H	0.5552533	242.5	01Jan2011, 06:16	22.5
JMT040	0.5552533	242.5	01Jan2011, 06:16	22.5

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RMT050	0.5552533	242.2	01Jan2011, 06:19	22.5
MT010	0.2898900	36.7	01Jan2011, 06:26	5.2
The Meadows Pond #2	0.2898900	2.1	01Jan2011, 10:49	1.8
JMT010	0.2898900	2.1	01Jan2011, 10:49	1.8
RMT062	0.2898900	2.1	01Jan2011, 11:26	1.7
MT060a	0.0311000	15.6	01Jan2011, 06:03	1.0
School Site	0.3209900	1.1	01Jan2011, 22:03	1.1
JMT060a	0.3209900	1.1	01Jan2011, 22:03	1.1
RMT060a	0.3209900	1.1	01Jan2011, 22:16	1.1
MT050	0.1186100	33.2	01Jan2011, 06:20	3.8
JMT050	0.9948533	275.5	01Jan2011, 06:19	27.4
RMT064	0.9948533	273.3	01Jan2011, 06:29	27.3
MT060	0.1588000	60.1	01Jan2011, 06:09	4.8
Sub Regional Pond SR4	1.1536533	24.2	01Jan2011, 08:43	22.7
JMT060	1.1536533	24.2	01Jan2011, 08:43	22.7
RMT070	1.1536533	24.2	01Jan2011, 08:52	22.5
MT070	0.1994800	51.6	01Jan2011, 06:24	6.6
JMT070	1.3531333	55.6	01Jan2011, 06:25	29.1
RMT080	1.3531333	55.6	01Jan2011, 06:28	29.1
MT080	0.0638371	91.5	01Jan2011, 06:00	5.0
Regional Pond MN	1.4169704	62.4	01Jan2011, 06:32	31.6
JMT080	1.4169704	62.4	01Jan2011, 06:32	31.6
RMT102	1.4169704	62.2	01Jan2011, 06:41	31.4
MT090	0.0435103	59.3	01Jan2011, 06:00	3.2
Woodmen Hills Pond #5	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT104	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT104	0.0435103	2.2	01Jan2011, 08:07	2.3
JMT102	1.4604807	64.3	01Jan2011, 06:41	33.7
RMT106	1.4604807	64.0	01Jan2011, 06:43	33.6
MT100	0.0557682	29.8	01Jan2011, 06:06	2.1
JMT106	1.5162489	67.8	01Jan2011, 06:42	35.7
RMT112	1.5162489	66.0	01Jan2011, 07:16	34.8
MT110	0.1163900	36.3	01Jan2011, 06:18	3.9
JMT110	1.6326389	72.0	01Jan2011, 07:16	38.8
RMT114	1.6326389	71.2	01Jan2011, 07:25	38.5
WT290	0.1037800	31.2	01Jan2011, 06:10	2.7

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Regional Pond R1	5.8629331	241.7	01Jan2011, 09:13	143.7
JWT296	5.8629331	241.7	01Jan2011, 09:13	143.7
RWT314	5.8629331	241.7	01Jan2011, 09:20	143.0
WT300	0.0970199	25.5	01Jan2011, 06:14	2.5
JWT300	0.0970199	25.5	01Jan2011, 06:14	2.5
RWT312	0.0970199	25.4	01Jan2011, 06:34	2.5
WT310	0.2774200	67.1	01Jan2011, 06:14	6.9
JWT310	6.2373730	246.2	01Jan2011, 09:20	152.4
RWT320	6.2373730	246.0	01Jan2011, 09:28	151.6
WT320	0.2061400	56.1	01Jan2011, 06:13	5.4
JWT320	6.4435130	248.5	01Jan2011, 09:28	157.0
RWT352	6.4435130	248.3	01Jan2011, 09:37	156.2
ET020	0.2131700	128.1	01Jan2011, 06:07	9.2
ET010	0.1451300	67.4	01Jan2011, 06:12	5.9
Paint Brush Hills Pond...	0.1451300	48.8	01Jan2011, 06:22	5.9
JET010	0.1451300	48.8	01Jan2011, 06:22	5.9
RET020	0.1451300	48.7	01Jan2011, 06:37	5.9
Sub Regional Pond SR6	0.3583000	19.9	01Jan2011, 07:26	13.5
JET020	0.3583000	19.9	01Jan2011, 07:26	13.5
RET030	0.3583000	19.7	01Jan2011, 08:14	13.1
ET030	0.2042800	81.2	01Jan2011, 06:17	8.4
JET030	0.5625800	81.2	01Jan2011, 06:17	21.5
RET040	0.5625800	80.9	01Jan2011, 06:28	21.4
Woodmen Hills Pond ...	0.7117200	103.5	01Jan2011, 06:35	26.6
ET040	0.1491400	52.6	01Jan2011, 06:15	5.3
Woodmen Hills Pond ...	0.7117200	32.8	01Jan2011, 07:14	21.7
JET040	0.7117200	32.8	01Jan2011, 07:14	21.7
RET050	0.7117200	32.8	01Jan2011, 07:22	21.6
ET050	0.1171900	66.6	01Jan2011, 06:03	4.0
Woodmen Hills Pond #2	0.8289100	29.6	01Jan2011, 08:07	23.9
JET050	0.8289100	29.6	01Jan2011, 08:07	23.9
RET060	0.8289100	29.6	01Jan2011, 08:19	23.7
ET060	0.2854300	185.5	01Jan2011, 06:02	10.2
Woodmen Hills Pond #3	1.1143400	82.1	01Jan2011, 06:08	31.5
JET060	1.1143400	82.1	01Jan2011, 06:08	31.5
RET070	1.1143400	81.0	01Jan2011, 06:18	31.2
ET070	0.2497500	164.1	01Jan2011, 06:03	9.8
JET070	1.3640900	164.5	01Jan2011, 06:03	41.0

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RET080	1.3640900	123.5	01Jan2011, 06:29	40.2
ET080	0.2916400	192.2	01Jan2011, 06:08	14.3
Woodmen Hills Pond #4	1.6557300	26.7	01Jan2011, 14:58	26.8
JET080	1.6557300	26.7	01Jan2011, 14:58	26.8
RET090	1.6557300	26.7	01Jan2011, 15:03	26.6
ET090	0.1242400	46.0	01Jan2011, 06:23	5.6
JET090	1.7799700	50.6	01Jan2011, 06:24	32.2
RET100	1.7799700	50.6	01Jan2011, 06:28	32.1
ET100	0.0480615	22.3	01Jan2011, 06:02	1.3
JET100	1.8280315	53.2	01Jan2011, 06:28	33.3
RET110	1.8280315	53.1	01Jan2011, 06:35	33.1
ET110	0.2260300	52.7	01Jan2011, 06:13	5.3
JET110	2.0540615	86.0	01Jan2011, 06:13	38.4
RET120	2.0540615	85.1	01Jan2011, 06:19	38.1
ET120	0.1091300	23.5	01Jan2011, 06:16	2.5
JET120	2.1631915	107.9	01Jan2011, 06:19	40.7
RET152	2.1631915	107.7	01Jan2011, 06:25	40.4
ET130	0.1348100	23.2	01Jan2011, 06:30	3.5
JET130	0.1348100	23.2	01Jan2011, 06:30	3.5
RET140	0.1348100	23.1	01Jan2011, 07:00	3.5
ET140	0.2675900	33.4	01Jan2011, 06:49	6.9
JET140	0.4024000	55.3	01Jan2011, 06:56	10.4
RET154	0.4024000	55.2	01Jan2011, 07:19	10.3
JET152	2.5655915	108.6	01Jan2011, 06:26	50.8
RET156	2.5655915	108.3	01Jan2011, 06:30	50.6
ET150	0.1777300	36.6	01Jan2011, 06:20	4.4
JET154	2.7433215	138.8	01Jan2011, 06:29	55.0
RET162	2.7433215	135.5	01Jan2011, 06:54	54.2
ET160	0.1889200	38.5	01Jan2011, 06:25	5.2
JET160	2.9322415	154.7	01Jan2011, 06:53	59.4
RET164	2.9322415	154.3	01Jan2011, 06:58	59.2
WT350	0.3037700	78.7	01Jan2011, 06:16	8.4
JWT352	9.6795245	342.0	01Jan2011, 08:07	223.7
RWT354	9.6795245	341.9	01Jan2011, 08:07	223.7
WT330	0.3266800	68.2	01Jan2011, 06:21	8.5
JWT330	0.3266800	68.2	01Jan2011, 06:21	8.5
RWT344	0.3266800	67.9	01Jan2011, 06:30	8.5
WT340	0.2780000	40.0	01Jan2011, 06:39	7.2

FUTURE 5-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT354	10.2842045	359.4	01Jan2011, 08:07	239.3
RWT372	10.2842045	359.2	01Jan2011, 08:11	238.7
WT360	0.0656830	14.8	01Jan2011, 06:17	1.6
JWT360	0.0656830	14.8	01Jan2011, 06:17	1.6
RWT374	0.0656830	14.7	01Jan2011, 06:32	1.6
Regional Pond R2	10.3498875	360.4	01Jan2011, 08:12	237.1
JWT372	10.3498875	360.4	01Jan2011, 08:12	237.1
RWT376	10.3498875	359.9	01Jan2011, 08:21	235.9
WT370	0.2147600	23.4	01Jan2011, 06:15	2.8
JWT374_OUTLET	10.5646475	362.2	01Jan2011, 08:21	238.7
FS010	0.1220000	16.6	01Jan2011, 06:18	2.1
JFS010_OUTLET	0.1220000	16.6	01Jan2011, 06:18	2.1

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	29Apr2021, 20:04:22	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	15.6 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:03
Peak Outflow :	1.1 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 22:03
Total Inflow :	2.7 (AC-FT)	Peak Storage :	1.6 (AC-FT)
Total Outflow :	1.1 (AC-FT)	Peak Elevation :	6955.0 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	29Apr2021, 20:04:22	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	293.0 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:29
Peak Outflow :	24.2 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:43
Total Inflow :	32.1 (AC-FT)	Peak Storage :	16.2 (AC-FT)
Total Outflow :	22.7 (AC-FT)	Peak Elevation :	6893.9 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 5-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	29Apr2021, 20:04:22	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	99.9 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:01
Peak Outflow :	62.4 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:32
Total Inflow :	34.1 (AC-FT)	Peak Storage :	2.8 (AC-FT)
Total Outflow :	31.6 (AC-FT)	Peak Elevation :	6851.6 (FT)

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT020	0.0671383	4.4	01Jan2011, 06:25	0.7
JWT020	0.0671383	4.4	01Jan2011, 06:25	0.7
RWT030	0.0671383	4.4	01Jan2011, 06:39	0.7
WT030	0.0764732	8.6	01Jan2011, 06:09	0.8
JWT030	0.1436115	8.7	01Jan2011, 06:09	1.5
RWT042	0.1436115	8.7	01Jan2011, 06:20	1.5
WT010	0.1353300	8.8	01Jan2011, 06:21	1.3
JWT010	0.1353300	8.8	01Jan2011, 06:21	1.3
RWT044	0.1353300	8.8	01Jan2011, 06:33	1.3
JWT042	0.2789415	15.1	01Jan2011, 06:26	2.8
RWT046	0.2789415	15.1	01Jan2011, 06:40	2.8
WT040	0.1850600	9.1	01Jan2011, 06:34	1.8
JWT044	0.4640015	23.9	01Jan2011, 06:39	4.5
RWT054	0.4640015	23.8	01Jan2011, 06:50	4.5
WT060	0.1956300	13.6	01Jan2011, 06:30	2.3
WT050	0.1899300	17.3	01Jan2011, 06:23	2.4
JWT050	0.8495615	42.8	01Jan2011, 06:47	9.3
RWT092	0.8495615	42.7	01Jan2011, 06:49	9.3
WT070	0.1711000	13.6	01Jan2011, 06:15	1.6
JWT070	0.1711000	13.6	01Jan2011, 06:15	1.6
RWT080	0.1711000	13.6	01Jan2011, 06:34	1.6
WT080	0.0691596	8.7	01Jan2011, 06:13	0.9
Sub Regional Pond SR1	1.0898211	41.9	01Jan2011, 07:03	10.4
JWT080	1.0898211	41.9	01Jan2011, 07:03	10.4
RWT094	1.0898211	41.9	01Jan2011, 07:14	10.3
WT100-REV	0.1292700	37.0	01Jan2011, 06:05	2.5
W26-REV	0.0720000	18.4	01Jan2011, 06:04	1.2
WS3-1	0.0720000	18.1	01Jan2011, 06:15	1.2
Paint Brush Hills Pond C	0.2012700	10.4	01Jan2011, 06:34	3.7
WT090	0.1533300	22.1	01Jan2011, 06:11	2.1
JWT090	1.4444211	54.5	01Jan2011, 07:12	16.1
RWT122	1.4444211	54.5	01Jan2011, 07:17	16.1
WT110	0.1942800	22.3	01Jan2011, 06:17	2.7
JWT110	1.6387011	58.6	01Jan2011, 07:16	18.7
RWT124	1.6387011	58.6	01Jan2011, 07:26	18.7
WT130-REV	0.1016250	24.0	01Jan2011, 06:13	2.3
Paint Brush Hills Pond A	0.1016250	4.8	01Jan2011, 06:53	2.3
WT120-REV	0.0430300	7.2	01Jan2011, 06:09	0.6

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT120	1.7833561	63.9	01Jan2011, 07:26	21.6
RWT172	1.7833561	63.8	01Jan2011, 07:38	21.5
WT140-REV	0.1445300	35.7	01Jan2011, 06:14	3.6
JWT140	0.1445300	35.7	01Jan2011, 06:14	3.6
RWT150	0.1445300	35.5	01Jan2011, 06:25	3.6
WT150-REV	0.1308100	40.8	01Jan2011, 06:09	3.3
Paint Brush Hills Pond...	0.2753400	58.7	01Jan2011, 06:19	6.8
W34B2-REV	0.0935900	27.9	01Jan2011, 06:08	2.2
Paint Brush Hills Pond...	0.3689300	9.8	01Jan2011, 07:30	8.0
JWT150	0.3689300	9.8	01Jan2011, 07:30	8.0
RWT160	0.3689300	9.8	01Jan2011, 07:40	8.0
WT160-REV	0.0734800	19.7	01Jan2011, 06:07	1.5
JWT160	0.4424100	20.1	01Jan2011, 06:07	9.5
RWT174	0.4424100	19.8	01Jan2011, 06:23	9.4
WT170-REV	0.1060150	11.6	01Jan2011, 06:22	1.6
W34-CY-REV	0.0465469	5.2	01Jan2011, 06:19	0.6
JWT172	2.3783280	81.2	01Jan2011, 06:39	33.1
RWT176	2.3783280	81.1	01Jan2011, 06:40	33.1
Sub Regional Pond SR2	2.3783280	66.8	01Jan2011, 08:06	30.0
JWT174	2.3783280	66.8	01Jan2011, 08:06	30.0
RWT180	2.3783280	66.8	01Jan2011, 08:25	29.7
WT180-REV	0.0409400	3.4	01Jan2011, 06:22	0.5
JWT180	2.4192680	67.2	01Jan2011, 08:25	30.2
RWT202	2.4192680	67.1	01Jan2011, 08:51	29.9
WT200	0.3017100	25.3	01Jan2011, 06:34	4.4
WT190	0.0574561	11.3	01Jan2011, 06:07	0.9
The Meadows Pond #1	0.0574561	0.3	01Jan2011, 13:19	0.4
JWT190	0.0574561	0.3	01Jan2011, 13:19	0.4
RWT204	0.0574561	0.3	01Jan2011, 14:16	0.4
JWT200	2.7784341	70.6	01Jan2011, 08:50	34.8
RWT210	2.7784341	70.6	01Jan2011, 09:00	34.6
WT210	0.2654600	31.9	01Jan2011, 06:39	5.6
JWT210	3.0438941	74.5	01Jan2011, 08:59	40.2
RWT232	3.0438941	74.5	01Jan2011, 09:08	40.0
WT220	0.1895300	47.1	01Jan2011, 06:14	4.5
JWT220	0.1895300	47.1	01Jan2011, 06:14	4.5
RWT234	0.1895300	46.9	01Jan2011, 06:26	4.5
JWT232	3.2334241	76.6	01Jan2011, 09:08	44.5

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RWT236	3.2334241	76.6	01Jan2011, 09:09	44.5
WT230	0.1981800	71.3	01Jan2011, 06:06	5.0
JWT234	3.4316041	84.5	01Jan2011, 06:43	49.5
RWT240	3.4316041	84.0	01Jan2011, 06:48	49.4
WT240	0.0761461	36.4	01Jan2011, 06:02	2.1
Regional Pond WU No...	3.5077502	89.8	01Jan2011, 06:10	50.3
Regional Pond WU Di...	3.5077502	62.4	01Jan2011, 06:10	27.5
Old Meridian	0.0335900	24.6	01Jan2011, 06:09	1.9
RWT-OM	0.0335900	24.3	01Jan2011, 06:16	1.8
Regional Pond WU So...	3.5413402	45.0	01Jan2011, 09:51	23.1
RWT240_Diversion R...	0.0000000	27.1	01Jan2011, 06:16	22.8
JWT240	3.5413402	68.8	01Jan2011, 09:44	45.9
RWT250	3.5413402	68.8	01Jan2011, 09:46	45.8
WT250	0.1469500	63.0	01Jan2011, 06:03	3.7
JWT250	3.6882902	70.5	01Jan2011, 09:46	49.5
RWT260	3.6882902	70.5	01Jan2011, 10:06	49.2
WT260	0.1388002	9.9	01Jan2011, 06:38	1.9
JWT260	3.8270904	71.5	01Jan2011, 10:06	51.1
RWT291	3.8270904	71.5	01Jan2011, 10:10	51.0
WT270	0.0324738	11.3	01Jan2011, 06:05	0.7
JWT270	0.0324738	11.3	01Jan2011, 06:05	0.7
RWT292	0.0324738	11.2	01Jan2011, 06:11	0.7
JWT292	3.8595642	71.9	01Jan2011, 06:29	51.7
RWT295	3.8595642	71.8	01Jan2011, 10:12	51.7
WT280	0.2669500	33.4	01Jan2011, 06:15	3.7
JWT280	0.2669500	33.4	01Jan2011, 06:15	3.7
RWT294	0.2669500	33.4	01Jan2011, 06:18	3.7
JWT294	4.1265142	94.0	01Jan2011, 06:30	55.3
RWT296	4.1265142	91.9	01Jan2011, 06:40	55.0
MT040	0.3084200	94.6	01Jan2011, 06:13	8.8
MT030	0.1566300	39.0	01Jan2011, 06:06	2.8
MT020	0.0902033	25.8	01Jan2011, 06:05	1.7
JMT020	0.0902033	25.8	01Jan2011, 06:05	1.7
RMT030	0.0902033	25.4	01Jan2011, 06:20	1.7
JMT030	0.2468333	50.1	01Jan2011, 06:10	4.5
RMT040	0.2468333	49.3	01Jan2011, 06:16	4.5
Woodmen Hills Pond H	0.5552533	107.8	01Jan2011, 06:25	13.2
JMT040	0.5552533	107.8	01Jan2011, 06:25	13.2

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RMT050	0.5552533	107.4	01Jan2011, 06:28	13.2
MT010	0.2898900	17.3	01Jan2011, 06:28	2.7
The Meadows Pond #2	0.2898900	0.0	01Jan2011, 00:00	0.0
JMT010	0.2898900	0.0	01Jan2011, 00:00	0.0
RMT062	0.2898900	0.0	01Jan2011, 00:00	0.0
MT060a	0.0311000	8.3	01Jan2011, 06:04	0.5
School Site	0.3209900	0.2	01Jan2011, 13:06	0.3
JMT060a	0.3209900	0.2	01Jan2011, 13:06	0.3
RMT060a	0.3209900	0.2	01Jan2011, 13:30	0.3
MT050	0.1186100	17.0	01Jan2011, 06:21	2.1
JMT050	0.9948533	123.2	01Jan2011, 06:27	15.6
RMT064	0.9948533	121.3	01Jan2011, 06:40	15.5
MT060	0.1588000	30.7	01Jan2011, 06:10	2.7
Sub Regional Pond SR4	1.1536533	11.2	01Jan2011, 09:37	13.7
JMT060	1.1536533	11.2	01Jan2011, 09:37	13.7
RMT070	1.1536533	11.2	01Jan2011, 09:48	13.5
MT070	0.1994800	26.4	01Jan2011, 06:25	3.7
JMT070	1.3531333	29.0	01Jan2011, 06:26	17.2
RMT080	1.3531333	29.0	01Jan2011, 06:29	17.2
MT080	0.0638371	62.4	01Jan2011, 06:00	3.4
Regional Pond MN	1.4169704	30.9	01Jan2011, 06:37	18.0
JMT080	1.4169704	30.9	01Jan2011, 06:37	18.0
RMT102	1.4169704	30.8	01Jan2011, 06:48	17.9
MT090	0.0435103	39.9	01Jan2011, 06:00	2.1
Woodmen Hills Pond #5	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT104	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT104	0.0435103	1.4	01Jan2011, 08:09	1.5
JMT102	1.4604807	32.1	01Jan2011, 06:48	19.4
RMT106	1.4604807	31.8	01Jan2011, 06:51	19.4
MT100	0.0557682	16.5	01Jan2011, 06:06	1.2
JMT106	1.5162489	33.6	01Jan2011, 06:51	20.6
RMT112	1.5162489	33.0	01Jan2011, 07:29	19.9
MT110	0.1163900	18.9	01Jan2011, 06:19	2.2
JMT110	1.6326389	35.8	01Jan2011, 07:29	22.1
RMT114	1.6326389	35.7	01Jan2011, 07:40	21.9
WT290	0.1037800	15.0	01Jan2011, 06:11	1.4

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Regional Pond R1	5.8629331	91.0	01Jan2011, 10:31	71.5
JWT296	5.8629331	91.0	01Jan2011, 10:31	71.5
RWT314	5.8629331	91.0	01Jan2011, 10:41	70.9
WT300	0.0970199	12.2	01Jan2011, 06:15	1.3
JWT300	0.0970199	12.2	01Jan2011, 06:15	1.3
RWT312	0.0970199	12.1	01Jan2011, 06:39	1.3
WT310	0.2774200	31.3	01Jan2011, 06:16	3.6
JWT310	6.2373730	93.2	01Jan2011, 10:41	75.8
RWT320	6.2373730	93.2	01Jan2011, 10:50	75.3
WT320	0.2061400	26.8	01Jan2011, 06:14	2.8
JWT320	6.4435130	94.3	01Jan2011, 10:50	78.1
RWT352	6.4435130	94.3	01Jan2011, 11:02	77.4
ET020	0.2131700	73.4	01Jan2011, 06:07	5.4
ET010	0.1451300	37.5	01Jan2011, 06:12	3.5
Paint Brush Hills Pond...	0.1451300	29.4	01Jan2011, 06:21	3.5
JET010	0.1451300	29.4	01Jan2011, 06:21	3.5
RET020	0.1451300	29.3	01Jan2011, 06:37	3.5
Sub Regional Pond SR6	0.3583000	9.3	01Jan2011, 07:43	7.9
JET020	0.3583000	9.3	01Jan2011, 07:43	7.9
RET030	0.3583000	9.3	01Jan2011, 08:37	7.6
ET030	0.2042800	44.9	01Jan2011, 06:17	4.9
JET030	0.5625800	44.9	01Jan2011, 06:17	12.5
RET040	0.5625800	44.6	01Jan2011, 06:30	12.4
Woodmen Hills Pond ...	0.7117200	60.8	01Jan2011, 06:33	15.4
ET040	0.1491400	27.9	01Jan2011, 06:16	3.0
Woodmen Hills Pond ...	0.7117200	9.6	01Jan2011, 12:57	12.0
JET040	0.7117200	9.6	01Jan2011, 12:57	12.0
RET050	0.7117200	9.6	01Jan2011, 13:08	11.8
ET050	0.1171900	36.5	01Jan2011, 06:03	2.2
Woodmen Hills Pond #2	0.8289100	10.4	01Jan2011, 13:06	12.5
JET050	0.8289100	10.4	01Jan2011, 13:06	12.5
RET060	0.8289100	10.4	01Jan2011, 13:21	12.3
ET060	0.2854300	105.0	01Jan2011, 06:02	5.8
Woodmen Hills Pond #3	1.1143400	12.6	01Jan2011, 13:03	15.7
JET060	1.1143400	12.6	01Jan2011, 13:03	15.7
RET070	1.1143400	12.6	01Jan2011, 13:18	15.5
ET070	0.2497500	93.5	01Jan2011, 06:03	5.7
JET070	1.3640900	93.6	01Jan2011, 06:03	21.2

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
RET080	1.3640900	64.9	01Jan2011, 06:31	20.7
ET080	0.2916400	113.3	01Jan2011, 06:08	8.7
Woodmen Hills Pond #4	1.6557300	9.8	02Jan2011, 00:00	12.0
JET080	1.6557300	9.8	02Jan2011, 00:00	12.0
RET090	1.6557300	9.8	02Jan2011, 00:00	11.9
ET090	0.1242400	26.0	01Jan2011, 06:24	3.3
JET090	1.7799700	29.2	01Jan2011, 06:25	15.3
RET100	1.7799700	29.1	01Jan2011, 06:30	15.2
ET100	0.0480615	11.4	01Jan2011, 06:02	0.7
JET100	1.8280315	30.6	01Jan2011, 06:30	15.8
RET110	1.8280315	30.6	01Jan2011, 06:38	15.7
ET110	0.2260300	24.0	01Jan2011, 06:15	2.7
JET110	2.0540615	41.4	01Jan2011, 06:32	18.4
RET120	2.0540615	41.4	01Jan2011, 06:39	18.2
ET120	0.1091300	10.7	01Jan2011, 06:17	1.3
JET120	2.1631915	49.7	01Jan2011, 06:21	19.5
RET152	2.1631915	49.5	01Jan2011, 06:29	19.4
ET130	0.1348100	10.9	01Jan2011, 06:31	1.8
JET130	0.1348100	10.9	01Jan2011, 06:31	1.8
RET140	0.1348100	10.9	01Jan2011, 07:06	1.8
ET140	0.2675900	15.9	01Jan2011, 06:51	3.6
JET140	0.4024000	25.8	01Jan2011, 07:01	5.5
RET154	0.4024000	25.7	01Jan2011, 07:27	5.4
JET152	2.5655915	53.7	01Jan2011, 07:01	24.8
RET156	2.5655915	53.5	01Jan2011, 07:06	24.7
ET150	0.1777300	17.0	01Jan2011, 06:21	2.3
JET154	2.7433215	62.3	01Jan2011, 06:34	27.0
RET162	2.7433215	59.6	01Jan2011, 07:07	26.4
ET160	0.1889200	18.6	01Jan2011, 06:26	2.8
JET160	2.9322415	66.8	01Jan2011, 07:06	29.2
RET164	2.9322415	66.5	01Jan2011, 07:12	29.1
WT350	0.3037700	38.3	01Jan2011, 06:17	4.5
JWT352	9.6795245	134.9	01Jan2011, 08:21	111.0
RWT354	9.6795245	134.9	01Jan2011, 08:21	111.0
WT330	0.3266800	32.2	01Jan2011, 06:23	4.5
JWT330	0.3266800	32.2	01Jan2011, 06:23	4.5
RWT344	0.3266800	32.0	01Jan2011, 06:34	4.5
WT340	0.2780000	18.9	01Jan2011, 06:42	3.8

FUTURE 2-YEAR STORM

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT354	10.2842045	143.7	01Jan2011, 08:20	119.3
RWT372	10.2842045	143.6	01Jan2011, 08:26	118.8
WT360	0.0656830	6.9	01Jan2011, 06:18	0.8
JWT360	0.0656830	6.9	01Jan2011, 06:18	0.8
RWT374	0.0656830	6.9	01Jan2011, 06:36	0.8
Regional Pond R2	10.3498875	144.3	01Jan2011, 08:27	116.5
JWT372	10.3498875	144.3	01Jan2011, 08:27	116.5
RWT376	10.3498875	144.0	01Jan2011, 08:37	115.7
WT370	0.2147600	7.2	01Jan2011, 06:17	1.2
JWT374_OUTLET	10.5646475	144.8	01Jan2011, 08:37	116.9
FS010	0.1220000	6.3	01Jan2011, 06:20	1.0
JFS010_OUTLET	0.1220000	6.3	01Jan2011, 06:20	1.0

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: School Site

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	29Apr2021, 20:01:55	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	8.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:04
Peak Outflow :	0.2 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 13:06
Total Inflow :	0.5 (AC-FT)	Peak Storage :	0.3 (AC-FT)
Total Outflow :	0.3 (AC-FT)	Peak Elevation :	6954.2 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: Sub Regional Pond SR4

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	29Apr2021, 20:01:55	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	128.3 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:40
Peak Outflow :	11.2 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 09:37
Total Inflow :	18.2 (AC-FT)	Peak Storage :	9.0 (AC-FT)
Total Outflow :	13.7 (AC-FT)	Peak Elevation :	6891.4 (FT)

Project: Aug15_Working_Falcon_DBPS_S
Simulation Run: FU 2-yr Reservoir: Regional Pond MN

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	29Apr2021, 20:01:55	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	64.9 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:01
Peak Outflow :	30.9 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 06:37
Total Inflow :	20.5 (AC-FT)	Peak Storage :	2.6 (AC-FT)
Total Outflow :	18.0 (AC-FT)	Peak Elevation :	6851.5 (FT)

Historic Rational Calculations

COMPOSITE % IMPERVIOUS CALCULATIONS (EXISTING/HISTORIC CONDITIONS)

Subdivision: Bent Grass

Location: CO, Colorado Springs

Bent Grass

CLH017.20

TJE

CMD

12/2/20

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Basins Total
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	Weighted % Imp.
OFFSITE BASINS											
WT200	192.00										10.0
OS-25	14.13	100	0.17	1.2	2	13.71	1.9	90	0.22	1.4	4.5
OS-26	5.81	100	0.00	0.0	2	5.81	2.0	90	0.00	0.0	2.0
H5	11.30	100	0.00	0.0	2	5.81	1.0	90	0.00	0.0	1.0
OS-22	4.42	100	0.00	0.0	2	4.42	2.0	90	0.00	0.0	2.0
OS-23	10.24	100	0.00	0.0	2	10.24	2.0	90	0.00	0.0	2.0
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS											
C1	2.07										80.0
C2	2.15										95.0
D1	5.22										95.0
D2	1.40										75.0
H1	3.00										30.0
H2	1.22										30.0
F	1.37										40.0
G	1.70										40.0
H3	1.54										75.0
H4	0.42										75.0
I1	3.00										75.0
I2	1.70										75.0
J	1.64										55.0
K	1.00										55.0
L	5.90										90.0
M1	1.56										95.0
M2	0.44										95.0
N	1.32										95.0
D	0.41										90.0
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS											
A-1	5.42	100	0.16	3.0	2	5.26	1.9	90	0.00	0.0	4.9

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A-2	18.00	100	0.00	0.0	2	18.00	2.0	90	0.00	0.0	2.0
A-3	19.59	100	0.00	0.0	2	19.59	2.0	90	0.00	0.0	2.0
A-4	23.81	100	0.57	2.4	2	23.12	1.9	90	0.12	0.5	4.8
B-1	32.53	100	0.00	0.0	2	32.53	2.0	90	0.00	0.0	2.0
B-2	4.51	100	0.00	0.0	2	4.51	2.0	90	0.00	0.0	2.0
B-3	16.18	100	1.00	6.2	2	15.18	1.9	90	0.00	0.0	8.1
OS-1	13.06	100	0.84	6.4	2	11.65	1.8	90	0.57	3.9	12.1
OS-2	17.81	100	2.00	11.2	2	15.18	1.7	90	0.63	3.2	16.1
OS-4	30.69	100	1.42	4.6	2	28.41	1.9	90	0.86	2.5	9.0
MERIDIAN ROAD BASIN											
P-1	2.03	100	1.29	63.5	2	0.74	0.7	90	0.00	0.0	64.2

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS (EXISTING/HISTORIC CONDITIONS)

Subdivision: Bent Grass
Location: CO, Colorado Springs

Bent Grass
CLH017.20
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Basin ID	Total Area (ac)	Hydrologic Soils Group	Paved Roads			Lawns			Roofs			Composite C ₅	Composite C ₁₀₀
			C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)		
OFFSITE BASINS													
WT200	192.00											0.20	0.44
OS-25	14.13	A	0.90	0.96	0.17	0.09	0.36	13.71	0.73	0.81	0.22	0.11	0.37
OS-26	5.81	A	0.90	0.96	0.00	0.09	0.36	5.81	0.73	0.81	0.00	0.09	0.36
H5	11.30	A	0.90	0.96	0.00	0.09	0.36	5.81	0.73	0.81	0.00	0.05	0.19
OS-22	4.42	A	0.90	0.96	0.00	0.09	0.36	4.42	0.73	0.81	0.00	0.09	0.36
OS-23	10.24	A	0.90	0.96	0.00	0.09	0.36	10.24	0.73	0.81	0.00	0.09	0.36
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS*													
C1	2.07	A										0.75	0.81
C2	2.15	A										0.76	0.82
D1	5.22	A										0.55	0.65
D2	1.40	A										0.55	0.65
H1	3.00	A										0.25	0.27
H2	1.22	A										0.25	0.27
F	1.37	A										0.40	0.55
G	1.70	A										0.40	0.50
H3	1.54	A										0.55	0.65
H4	0.42	A										0.55	0.65
I1	3.00	A										0.55	0.65
I2	1.70	A										0.55	0.65
J	1.64	A										0.40	0.55
K	1.00	A										0.40	0.55
L	5.90	A										0.78	0.83
M1	1.56	A										0.85	0.90
M2	0.44	A										0.85	0.90
N	1.32	A										0.85	0.90
D	0.41	A										0.82	0.83
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS													
A-1	5.42	A	0.90	0.96	0.16	0.09	0.36	5.26	0.73	0.81	0.00	0.11	0.38
A-2	18.00	A	0.90	0.96	0.00	0.09	0.36	18.00	0.73	0.81	0.00	0.09	0.36
A-3	19.59	A	0.90	0.96	0.00	0.09	0.36	19.59	0.73	0.81	0.00	0.09	0.36
A-4	23.81	A	0.90	0.96	0.57	0.09	0.36	23.12	0.73	0.81	0.12	0.11	0.38
B-1	32.53	A	0.90	0.96	0.00	0.09	0.36	32.53	0.73	0.81	0.00	0.09	0.36
B-2	4.51	A	0.90	0.96	0.00	0.09	0.36	4.51	0.73	0.81	0.00	0.09	0.36

Basin ID	Total Area (ac)	Hydrologic Soils Group	Paved Roads			Lawns			Roofs			Composite C ₅	Composite C ₁₀₀
			C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)		
B-3	16.18	A	0.90	0.96	1.00	0.09	0.36	15.18	0.73	0.81	0.00	0.14	0.40
OS-1	13.06	A	0.90	0.96	0.84	0.09	0.36	11.65	0.73	0.81	0.57	0.17	0.42
OS-2	17.81	A	0.90	0.96	2.00	0.09	0.36	15.18	0.73	0.81	0.63	0.20	0.44
OS-4	30.69	A	0.90	0.96	1.42	0.09	0.36	28.41	0.73	0.81	0.86	0.15	0.40
MERIDIAN ROAD BASIN													
P-1	2.03	A	0.90	0.96	1.29	0.09	0.36	0.00	0.73	0.81	0.00	0.57	0.61

*FROM FDR BG RES FILING 1 & BG EAST COMMERCIAL FILING NO. 1

STANDARD FORM SF-2 **TIME OF CONCENTRATION** **EXISTING/HISTORIC CONDITIONS**

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

SUB-BASIN DATA						INITIAL/OVERLAND (T _i)			TRAVEL TIME (T _i)					T _c CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C5	C ₁₀₀	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _i (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)	T _c (MIN)
OFFSITE BASINS																	
WT200	192.00	A	10.00	0.20	0.44	300	2.0	22.7	2060	2.0	15.0	2.1	16.2	38.8	2360.0	23.1	23.1
OS-25	14.13	A	4.50	0.11	0.37	300	2.5	23.1	1400	3.0	15.0	2.6	9.0	32.1	1700.0	19.4	19.4
OS-26	5.81	A	2.00	0.09	0.36	300	2.0	25.4	400	2.0	15.0	2.1	3.1	28.6	700.0	13.9	13.9
H5	11.30	A	1.00	0.05	0.19	100	6.0	10.6	1460	2.0	15.0	2.1	11.5	22.1	1560.0	18.7	18.7
OS-22	4.42	A	2.00	0.09	0.36	100	1.0	18.5	650	1.0	10.0	1.0	10.8	29.3	750.0	14.2	14.2
OS-23	10.24	A	2.00	0.09	0.36	100	1.0	18.5	600	1.0	10.0	1.0	10.0	28.5	700.0	13.9	13.9
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS*																	
C1	2.07	A	80.00	0.75	0.81	5	2.0	1.1	400	1.0	20.0	2.0	3.3	4.5	405.0	12.3	5.0
C2	2.15	A	95.00	0.76	0.82	10	2.0	1.6	310	2.0	20.0	2.8	1.8	3.4	320.0	11.8	5.0
D1	5.22	A	95.00	0.55	0.65	50	2.0	5.7	310	2.0	20.0	2.8	1.8	7.5	360.0	12.0	7.5
D2	1.40	A	75.00	0.55	0.65	5	2.0	1.8	400	1.0	20.0	2.0	3.3	5.1	405.0	12.3	5.1
H1	3.00	A	30.00	0.25	0.27	10	2.0	3.9	310	2.0	20.0	2.8	1.8	5.7	320.0	11.8	5.7
H2	1.22	A	30.00	0.25	0.27	50	2.0	8.7	310	2.0	20.0	2.8	1.8	10.6	360.0	12.0	10.6
F	1.37	A	40.00	0.40	0.55	80	4.5	6.9						6.9	80.0	10.4	6.9
G	1.70	A	40.00	0.40	0.50	240	1.5	17.3						17.3	240.0	11.3	11.3
H3	1.54	A	75.00	0.55	0.65	100	0.5	12.6	350	2.0		4.9	1.2	13.8	450.0	12.5	12.5
H4	0.42	A	75.00	0.55	0.65	50	0.5	8.9	150	2.0		4.9	0.5	9.4	200.0	11.1	9.4
I1	3.00	A	75.00	0.55	0.65	50	0.5	8.9	550	2.0		4.9	1.9	10.7	600.0	13.3	10.7
I2	1.70	A	75.00	0.55	0.65	50	0.5	8.9	300	2.0		4.9	1.0	9.9	350.0	11.9	9.9
J	1.64	A	55.00	0.40	0.55	75	2.8	7.9						7.9	75.0	10.4	7.9
K	1.00	A	55.00	0.40	0.55	65	2.4	7.7						7.7	65.0	10.4	7.7
L	5.90	A	90.00	0.78	0.83	50	0.2	6.9	800	1.0		3.5	3.8	10.7	850.0	14.7	10.7
M1	1.56	A	95.00	0.85	0.90	50	0.1	6.9	300	1.0		3.5	1.4	8.3	350.0	11.9	8.3
M2	0.44	A	95.00	0.85	0.90									0.0	0.0	10.0	5.0
N	1.32	A	95.00	0.85	0.90	40	0.1	5.7	330	2.0		4.9	1.1	6.8	370.0	12.1	6.8
D	0.41	A	90.00	0.82	0.83	50	2.0	2.9						2.9	50.0	10.3	5.0
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS																	
A-1	5.42	A	4.90	0.11	0.38	300	2.5	23.0	466	2.5	15.0	2.4	3.3	26.3	766.0	14.3	14.3
A-2	18.00	A	2.00	0.09	0.36	300	2.4	23.9	1130	2.0	15.0	2.1	8.9	32.8	1430.0	17.9	17.9
A-3	19.59	A	2.00	0.09	0.36	300	2.7	23.0	760	2.7	15.0	2.5	5.1	28.1	1060.0	15.9	15.9
A-4	23.81	A	4.80	0.11	0.38	300	2.0	24.9	1500	2.0	15.0	2.1	11.8	36.7	1800.0	20.0	20.0
B-1	32.53	A	2.00	0.09	0.36	300	2.6	23.3	1100	2.6	15.0	2.4	7.6	30.9	1400.0	17.8	17.8
B-2	4.51	A	2.00	0.09	0.36	300	3.0	22.2	323	5.0	15.0	3.4	1.6	23.8	623.0	13.5	13.5
B-3	16.18	A	8.10	0.14	0.40	300	2.9	21.4	780	2.9	15.0	2.6	5.1	26.4	1080.0	16.0	16.0
OS-1	13.06	A	12.10	0.17	0.42	300	2.5	21.7	1420	2.5	15.0	2.4	10.0	31.7	1720.0	19.6	19.6
OS-2	17.81	A	16.10	0.20	0.44	300	2.3	21.6	1370	2.3	15.0	2.3	10.0	31.7	1670.0	19.3	19.3
OS-4	30.69	A	9.00	0.15	0.40	300	2.3	22.8	2600	2.3	15.0	2.3	19.0	41.9	2900.0	26.1	26.1

**STANDARD FORM SF-2
TIME OF CONCENTRATION
EXISTING/HISTORIC CONDITIONS**

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN	D.A.	Hydrologic	Impervious	C5	C ₁₀₀	L	S	T _i	L	S	C _v	VEL.	T _t	COMP. T _c	TOTAL	Urbanized T _c	
PROPOSED:																	
P-1	2.03	A	64.20	0.57	0.61	100	6.0	5.3	1230	1.7	15.0	2.0	10.5	15.8	1330.0	17.4	15.8

*FROM FDR BG RES FILING 1 & BG EAST COMMERCIAL FILING NO. 1

NOTES:

$T_i = (0.395 * (1.1 - C_s) * (L)^{0.5}) / ((S)^{0.33})$, S in ft/ft

$T_t = L / 60V$

Velocity $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

Type of Land Surface	Cv
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

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN (EXISTING/HISTORIC CONDITIONS)
(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coef.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		RWT202	1574.40						46.6	7.69	1.82	14.0								From Falcon DBPS by Matrix (Existing Flows)
		RWT204	38.40						11.4	1.78	3.94	7.0								From Falcon DBPS by Matrix (Existing Flows)
		WT200	192.00						37.8	11.74	2.13	25.0								From Falcon DBPS by Matrix (Existing Flows)
		OS-25	14.13	0.11	19.4	1.55	3.13	4.9												
		OS-26	5.81	0.09	13.9	0.52	3.64	1.9												
		H5	11.30	0.05	18.7	0.57	3.19	1.8												
		OS-22	4.42	0.09	14.2	0.40	3.61	1.4												
		OS-23	10.24	0.09	13.9	0.92	3.64	3.3												
		C1	2.07	0.75	5.0	1.55	5.17	8.0												
		C2	2.15	0.76	5.0	1.63	5.17	8.4												
		D1	5.22	0.55	7.5	2.87	4.56	13.1												
		D2	1.40	0.55	5.1	0.77	5.13	4.0												
		H1	3.00	0.25	5.7	0.75	4.96	3.7												
		H2	1.22	0.25	10.6	0.31	4.05	1.3												
		F	1.37	0.40	6.9	0.55	4.68	2.6												
		G	1.70	0.40	11.3	0.68	3.94	2.7												
		H3	1.54	0.55	12.5	0.85	3.79	3.2												
		H4	0.42	0.55	9.4	0.23	4.23	1.0												
		I1	3.00	0.55	10.7	1.65	4.02	6.6												
		I2	1.70	0.55	9.9	0.94	4.15	3.9												
		J	1.64	0.40	7.9	0.66	4.48	3.0												
		K	1.00	0.40	7.7	0.40	4.52	1.8												
		L	5.90	0.78	10.7	4.60	4.03	18.5												
		M1	1.56	0.85	8.3	1.33	4.41	5.9												

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN (EXISTING/HISTORIC CONDITIONS)
(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		M2	0.44	0.85	5.0	0.37	5.17	1.9													
		N	1.32	0.85	6.8	1.12	4.70	5.3													
		D	0.41	0.82	5.0	0.34	5.17	1.8													
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS																					
		A-1	5.42	0.11	14.3	0.60	3.60	2.2													
		A-2	18.00	0.09	17.9	1.62	3.25	5.3													
		A-3	19.59	0.09	15.9	1.76	3.43	6.0													
		A-4	23.81	0.11	20.0	2.62	3.09	8.1													
		B-1	32.53	0.09	17.8	2.93	3.27	9.6													
		B-2	4.51	0.09	13.5	0.41	3.68	1.5													
		B-3	16.18	0.14	16.0	2.27	3.42	7.8													
		OS-1	13.06	0.17	19.6	2.22	3.12	6.9													
		OS-2	17.81	0.20	19.3	3.56	3.14	11.2													
		OS-4	30.69	0.15	26.1	4.60	2.69	12.4													
MERIDIAN ROAD BASIN																					
		P-1	2.03	0.61	15.8	1.24	3.44	4.3													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coef.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		RWT202	1574.40						46.6	252.46	3.05	770.0									From Falcon DBPS by Matrix (Existing Flows)
		RWT204	38.40						11.4	6.51	6.61	43.0									From Falcon DBPS by Matrix (Existing Flows)
		WT200	192.00						37.8	30.73	3.58	110.0									From Falcon DBPS by Matrix (Existing Flows)
		OS-25	14.13	0.37	19.4	5.23	5.26	27.5													
		OS-26	5.81	0.36	13.9	2.09	6.10	12.7													
		H5	11.30	0.19	18.7	2.15	5.36	11.5													
		OS-22	4.42	0.36	14.2	1.59	6.05	9.6													
		OS-23	10.24	0.36	13.9	3.69	6.10	22.5													
		C1	2.07	0.81	5.0	1.68	8.68	14.6													
		C2	2.15	0.82	5.0	1.76	8.68	15.3													
		D1	5.22	0.65	7.5	3.39	7.66	26.0													
		D2	1.40	0.65	5.1	0.91	8.62	7.8													
		H1	3.00	0.27	5.7	0.81	8.33	6.7													
		H2	1.22	0.27	10.6	0.33	6.79	2.2													
		F	1.37	0.55	6.9	0.75	7.85	5.9													
		G	1.70	0.50	11.3	0.85	6.62	5.6													
		H3	1.54	0.65	12.5	1.00	6.37	6.4													
		H4	0.42	0.65	9.4	0.27	7.10	1.9													
		I1	3.00	0.65	10.7	1.95	6.76	13.2													
		I2	1.70	0.65	9.9	1.11	6.96	7.7													
		J	1.64	0.55	7.9	0.90	7.52	6.8													
		K	1.00	0.55	7.7	0.55	7.59	4.2													
		L	5.90	0.83	10.7	4.90	6.77	33.2													
		M1	1.56	0.90	8.3	1.40	7.41	10.4													
		M2	0.44	0.90	5.0	0.40	8.68	3.5													
		N	1.32	0.90	6.8	1.19	7.89	9.4													
		D	0.41	0.83	5.0	0.34	8.68	3.0													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS																					
		A-1	5.42	0.38	14.3	2.06	6.04	12.4													
		A-2	18.00	0.36	17.9	6.48	5.46	35.4													
		A-3	19.59	0.36	15.9	7.05	5.77	40.7													
		A-4	23.81	0.38	20.0	9.05	5.19	47.0													
		B-1	32.53	0.36	17.8	11.71	5.48	64.2													
		B-2	4.51	0.36	13.5	1.62	6.18	10.0													
		B-3	16.18	0.40	16.0	6.47	5.75	37.2													
		OS-1	13.06	0.42	19.6	5.49	5.24	28.8													
		OS-2	17.81	0.44	19.3	7.84	5.28	41.4													
		OS-4	30.69	0.40	26.1	12.28	4.51	55.4													
MERIDIAN ROAD BASIN																					
		P-1	2.03	0.61	15.8	1.24	5.78	7.2													

BENT GRASS/MERIDIAN ROAD - MDDP SURFACE ROUTING - EXISTING/HISTORIC CONDITIONS

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
30	Release rate from Meadows Pond 2	0.30	27.16	15.0	3.4	5.9	1.0	160.0	Flows from Meadows Filing No. 3 Pond 2 (Approved DBPS by Matrix)		
		TRAVEL TIME									
		0.30	27.16	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
1	OS-1 A-1	2.22	5.49	19.6	2.9	5.2	8.3	38.9			
		0.60	2.06	TRAVEL TIME							
		2.82	7.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
31	OS-25 DP 30	1.55	5.23	33.3	2.2	3.8	4.0	123.3			
		0.30	27.16	TRAVEL TIME							
		1.85	32.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
32	OS-26 DP 1 DP 31	0.52	2.09	37.7	2.0	3.5	10.5	148.0			
		2.82	7.55	TRAVEL TIME							
		1.85	32.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
14	C1 H5 OS-22 OS-23 DP 32	1.55	1.68	43.9	1.8	3.2	15.8	163.6			
		0.57	2.15	TRAVEL TIME							
		0.40	1.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG1	D1	2.87	3.39	7.5	4.5	7.9	13.0	26.9	Existing Sump Inlet		
		2.87	3.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	7.5				
BG2	D2	0.77	0.91	5.1	5.2	9.0	4.0	8.2	Existing Sump Inlet		
		0.77	0.91	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG4	H1	0.75	0.81	5.7	5.0	8.7	3.7	7.0	Existing Sump Inlet		
		0.75	0.81	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG5	H2	0.31	0.33	10.6	4.0	6.9	1.2	2.3	Existing Sump Inlet		
		0.31	0.33	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG POND	G DP BG1 DP BG2 DP BG4 DP BG5	0.68	0.85	10.6	4.0	6.9	21.3	43.5	Flows into existing Pond at Bent Grass Filing No. 1		
		2.87	3.39	TRAVEL TIME							
		0.77	0.91	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG POND 1	BG Pond 1 Release Flows	0.06	0.32	5.0	5.2	9.1	0.3	2.9	Release flows from Bent Grass Res 1 Pond 1		
		0.06	0.32	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						2.8	0.0	5.0			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
50		111.34	193.50	26.1	2.5	4.4	280.0	850.0	Flow from Falcon DBPS at Meridian Rd & BGMD Intersection		
		TRAVEL TIME									
		111.34	193.50	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.8	0.0	26.1				
20	DP 50 DP 14	111.34	193.50	45.2	1.8	3.1	200.6	608.4			
		0.31	0.33	TRAVEL TIME							
		111.65	193.83	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
			Culverts	125	11.2	0.2	45.4				
15	C2 DP 20	1.63	1.76	45.4	1.8	3.1	203.0	612.3			
		111.65	193.83	TRAVEL TIME							
		113.28	195.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	45.4				
BG32	F	0.55	0.75	6.9	4.7	8.1	2.6	6.1			
		TRAVEL TIME									
		0.55	0.75	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	6.9				
BG33	J	0.66	0.90	7.9	4.4	7.8	2.9	7.0			
		TRAVEL TIME									
		0.66	0.90	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	7.9				
BG 7	H3	0.85	1.00	12.5	3.7	6.4	3.1	6.4	Ex 4' Sump Inlet		
		TRAVEL TIME									
		0.85	1.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	12.5				
BG 8	H4	0.23	0.27	9.4	4.2	7.3	1.0	2.0	Ex 4' Sump Inlet		
		TRAVEL TIME									
		0.23	0.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	9.4				
BG 9	I1	1.65	1.95	10.7	3.9	6.9	6.5	13.4	Ex 6' Sump Inlet		
		TRAVEL TIME									
		1.65	1.95	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	10.7				
BG 10	I2	0.94	1.11	9.9	4.1	7.1	3.8	7.9	Ex 4' Sump Inlet		
		TRAVEL TIME									
		0.94	1.11	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	9.9				
BG 11	DP BG 7 DP BG 8 DP BG 9 DP BG 10	0.85	1.00	12.5	3.7	6.4	13.5	27.8	Inflow to BG Pond 2 West storm sewer		
		0.23	0.27								
		1.65	1.95								
		0.94	1.11	TRAVEL TIME							
BG 12	M1	3.67	4.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	Ex 6' Sump Inlet		
					2.0	0.0	12.5				
		1.33	1.40	8.3	4.4	7.6	5.8	10.7			
		TRAVEL TIME									
BG 13	M2 N	1.33	1.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	Ex 6' Sump Inlet		
					2.5	0.0	8.3				
		1.49	1.59	6.8	4.7	8.2	7.0	13.0			
		TRAVEL TIME									
BG 14	BG DP 12 BG DP 13	1.49	1.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	Ex 6' Sump Inlet		
					2.5	0.0	8.3				
		2.82	2.99	1.33	1.40	8.3	4.4	7.6		12.3	22.8
		TRAVEL TIME									

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
BG 15	K L DP BG 11 DP BG 14	0.40	0.55	12.5	3.7	6.4	42.2	82.0	Total info to BG Pond 2
		4.60	4.90						
		3.67	4.33						
		2.82	2.99	T R A V E L T I M E					
		11.49	12.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.0	0.0	12.5		
BG POND 2	BG Pond 2 Release Flows	0.08	1.10	5.0	5.2	9.1	0.4	10.0	Release flows from Bent Grass Res 1 Pond 2
				T R A V E L T I M E					
		0.08	1.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.8	0.0	5.0		
BG 30	PLD RELEASE RATE	0.58	0.55	5.0	5.2	9.1	3.0	5.0	Released flows from existing PLD on 7-11 site
				T R A V E L T I M E					
		0.58	0.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.8	0.0	5.0		
BG31	D	0.34	0.34	5.0	5.2	9.1	1.8	3.1	Future lot for development in Bent Grass East Commercial Filing No. 1
				T R A V E L T I M E					
		0.34	0.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.5	0.0	5.0		
25	P-1 DP 15 BG 30 BG 31 BG POND2	1.24	1.24	45.4	1.8	3.1	205.2	616.2	
		113.28	195.59						
		2.82	2.99						
		0.34	0.34	T R A V E L T I M E					
		0.08	1.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		114.52	196.83			2.5	0.0	45.4	
9	RWT202	7.94	250.07	46.6	1.8	3.1	14.0	770.0	DBPS Flows - Existing Model
				T R A V E L T I M E					
		7.94	250.07	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			CHANNEL	1560	5.0	5.2	51.8		
	RWT204	1.83	6.43	11.4	3.8	6.7	7.0	43.0	DBPS Flows - Existing Model
				T R A V E L T I M E					
		1.83	6.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	11.4		
	WT200	12.41	31.26	37.8	2.0	3.5	25.0	110.0	DBPS Flows - Existing Model
				T R A V E L T I M E					
		12.41	31.26	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.1	0.0	37.8		
8	RWT204 WT200	1.83	6.43	37.8	2.0	3.5	28.7	132.6	
		12.41	31.26	T R A V E L T I M E					
		14.24	37.69	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			CHANNEL	850	4.0	3.5	41.3		
1	A-1	0.60	2.06	14.3	3.5	6.0	2.1	12.4	
				T R A V E L T I M E					
		0.60	2.06	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	14.3		
2	A-2	1.62	6.48	17.9	3.1	5.4	5.0	34.9	
				T R A V E L T I M E					
		1.62	6.48	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	17.9		
3	A-3 DP 2 DP 8 DP 9	1.76	7.05	51.8	1.6	2.9	42.0	865.5	
		1.62	6.48						
		14.24	37.69	T R A V E L T I M E					
		7.94	250.07	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		25.56	301.30	CHANNEL	900	5.0	3.0	54.8	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
4	OS-4 A-4	4.60	12.28	26.1	2.5	4.4	18.2	93.7	Flows offsite to Latigo Business Center Filing No. 1
		2.62	9.05	T R A V E L T I M E					
		7.22	21.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	26.1		
5	B-1	2.93	11.71	17.8	3.1	5.4	9.1	63.4	Flows offsite at south property line
				T R A V E L T I M E					
		2.93	11.71	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	17.8		
6	B-2 DP 3	0.41	1.62	54.8	1.6	2.8	41.1	838.2	
				T R A V E L T I M E					
		25.56	301.30	T R A V E L T I M E					
		25.97	302.92	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			365	5.0	1.2	56.0			
7	B-3 DP 6	2.27	6.47	56.0	1.6	2.7	44.1	843.6	Flows exiting site at channel
		25.97	302.92						
				T R A V E L T I M E					
		28.24	309.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	56.0		

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS (EXISTING/HISTORIC CONDITIONS)

Subdivision: Bent Grass
Location: CO, Colorado Springs

Bent Grass
CLH017.20
TJE
CMD
12/2/20

Basin ID	Total Area (ac)	Hydrologic Soils Group	Paved Roads			Lawns			Roofs			Composite C ₅	Composite C ₁₀₀
			C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)		
OFFSITE BASINS													
WT200	192.00											0.20	0.44
OS-25	14.13	A	0.90	0.96	0.17	0.09	0.36	13.71	0.73	0.81	0.22	0.11	0.37
OS-26	5.81	A	0.90	0.96	0.00	0.09	0.36	5.81	0.73	0.81	0.00	0.09	0.36
H5	11.30	A	0.90	0.96	0.00	0.09	0.36	5.81	0.73	0.81	0.00	0.05	0.19
OS-22	4.42	A	0.90	0.96	0.00	0.09	0.36	4.42	0.73	0.81	0.00	0.09	0.36
OS-23	10.24	A	0.90	0.96	0.00	0.09	0.36	10.24	0.73	0.81	0.00	0.09	0.36
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS*													
C1	2.07	A										0.75	0.81
C2	2.15	A										0.76	0.82
D1	5.22	A										0.55	0.65
D2	1.40	A										0.55	0.65
H1	3.00	A										0.25	0.27
H2	1.22	A										0.25	0.27
F	1.37	A										0.40	0.55
G	1.70	A										0.40	0.50
H3	1.54	A										0.55	0.65
H4	0.42	A										0.55	0.65
I1	3.00	A										0.55	0.65
I2	1.70	A										0.55	0.65
J	1.64	A										0.40	0.55
K	1.00	A										0.40	0.55
L	5.90	A										0.78	0.83
M1	1.56	A										0.85	0.90
M2	0.44	A										0.85	0.90
N	1.32	A										0.85	0.90
D	0.41	A										0.82	0.83
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS													
A-1	5.42	A	0.90	0.96	0.16	0.09	0.36	5.26	0.73	0.81	0.00	0.11	0.38
A-2	18.00	A	0.90	0.96	0.00	0.09	0.36	18.00	0.73	0.81	0.00	0.09	0.36
A-3	19.59	A	0.90	0.96	0.00	0.09	0.36	19.59	0.73	0.81	0.00	0.09	0.36
A-4	23.81	A	0.90	0.96	0.57	0.09	0.36	23.12	0.73	0.81	0.12	0.11	0.38
B-1	32.53	A	0.90	0.96	0.00	0.09	0.36	32.53	0.73	0.81	0.00	0.09	0.36
B-2	4.51	A	0.90	0.96	0.00	0.09	0.36	4.51	0.73	0.81	0.00	0.09	0.36

Basin ID	Total Area (ac)	Hydrologic Soils Group	Paved Roads			Lawns			Roofs			Composite C ₅	Composite C ₁₀₀
			C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)		
B-3	16.18	A	0.90	0.96	1.00	0.09	0.36	15.18	0.73	0.81	0.00	0.14	0.40
OS-1	13.06	A	0.90	0.96	0.84	0.09	0.36	11.65	0.73	0.81	0.57	0.17	0.42
OS-2	17.81	A	0.90	0.96	2.00	0.09	0.36	15.18	0.73	0.81	0.63	0.20	0.44
OS-4	30.69	A	0.90	0.96	1.42	0.09	0.36	28.41	0.73	0.81	0.86	0.15	0.40
MERIDIAN ROAD BASIN													
P-1	2.03	A	0.90	0.96	1.29	0.09	0.36	0.00	0.73	0.81	0.00	0.57	0.61

*FROM FDR BG RES FILING 1 & BG EAST COMMERCIAL FILING NO. 1

COMPOSITE % IMPERVIOUS CALCULATIONS (EXISTING/HISTORIC CONDITIONS)

Subdivision: Bent Grass

Location: CO, Colorado Springs

Bent Grass

CLH017.20

TJE

CMD

12/2/20

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Basins Total
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	Weighted Total Imp.
OFFSITE BASINS											
WT200	192.00										10.0
OS-25	14.13	100	0.17	1.2	2	13.71	1.9	90	0.22	1.4	4.5
OS-26	5.81	100	0.00	0.0	2	5.81	2.0	90	0.00	0.0	2.0
H5	11.30	100	0.00	0.0	2	5.81	1.0	90	0.00	0.0	1.0
OS-22	4.42	100	0.00	0.0	2	4.42	2.0	90	0.00	0.0	2.0
OS-23	10.24	100	0.00	0.0	2	10.24	2.0	90	0.00	0.0	2.0
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS											
C1	2.07										80.0
C2	2.15										95.0
D1	5.22										95.0
D2	1.40										75.0
H1	3.00										30.0
H2	1.22										30.0
F	1.37										40.0
G	1.70										40.0
H3	1.54										75.0
H4	0.42										75.0
I1	3.00										75.0
I2	1.70										75.0
J	1.64										55.0
K	1.00										55.0
L	5.90										90.0
M1	1.56										95.0
M2	0.44										95.0
N	1.32										95.0
D	0.41										90.0
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS											
A-1	5.42	100	0.16	3.0	2	5.26	1.9	90	0.00	0.0	4.9

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A-2	18.00	100	0.00	0.0	2	18.00	2.0	90	0.00	0.0	2.0
A-3	19.59	100	0.00	0.0	2	19.59	2.0	90	0.00	0.0	2.0
A-4	23.81	100	0.57	2.4	2	23.12	1.9	90	0.12	0.5	4.8
B-1	32.53	100	0.00	0.0	2	32.53	2.0	90	0.00	0.0	2.0
B-2	4.51	100	0.00	0.0	2	4.51	2.0	90	0.00	0.0	2.0
B-3	16.18	100	1.00	6.2	2	15.18	1.9	90	0.00	0.0	8.1
OS-1	13.06	100	0.84	6.4	2	11.65	1.8	90	0.57	3.9	12.1
OS-2	17.81	100	2.00	11.2	2	15.18	1.7	90	0.63	3.2	16.1
OS-4	30.69	100	1.42	4.6	2	28.41	1.9	90	0.86	2.5	9.0
MERIDIAN ROAD BASIN											
P-1	2.03	100	1.29	63.5	2	0.74	0.7	90	0.00	0.0	64.2

STANDARD FORM SF-2 TIME OF CONCENTRATION EXISTING/HISTORIC CONDITIONS

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL	
DATA						(T _i)			(T _t)					(URBANIZED BASINS)				
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C5	C ₁₀₀	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _t (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)		T _c (MIN)
OFFSITE BASINS																		
WT200	192.00	A	10.00	0.20	0.44	300	2.0	22.7	2060	2.0	15.0	2.1	16.2	38.8	2360.0	23.1	23.1	
OS-25	14.13	A	4.50	0.11	0.37	300	2.5	23.1	1400	3.0	15.0	2.6	9.0	32.1	1700.0	19.4	19.4	
OS-26	5.81	A	2.00	0.09	0.36	300	2.0	25.4	400	2.0	15.0	2.1	3.1	28.6	700.0	13.9	13.9	
H5	11.30	A	1.00	0.05	0.19	100	6.0	10.6	1460	2.0	15.0	2.1	11.5	22.1	1560.0	18.7	18.7	
OS-22	4.42	A	2.00	0.09	0.36	100	1.0	18.5	650	1.0	10.0	1.0	10.8	29.3	750.0	14.2	14.2	
OS-23	10.24	A	2.00	0.09	0.36	100	1.0	18.5	600	1.0	10.0	1.0	10.0	28.5	700.0	13.9	13.9	
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS*																		
C1	2.07	A	80.00	0.75	0.81	5	2.0	1.1	400	1.0	20.0	2.0	3.3	4.5	405.0	12.3	5.0	
C2	2.15	A	95.00	0.76	0.82	10	2.0	1.6	310	2.0	20.0	2.8	1.8	3.4	320.0	11.8	5.0	
D1	5.22	A	95.00	0.55	0.65	50	2.0	5.7	310	2.0	20.0	2.8	1.8	7.5	360.0	12.0	7.5	
D2	1.40	A	75.00	0.55	0.65	5	2.0	1.8	400	1.0	20.0	2.0	3.3	5.1	405.0	12.3	5.1	
H1	3.00	A	30.00	0.25	0.27	10	2.0	3.9	310	2.0	20.0	2.8	1.8	5.7	320.0	11.8	5.7	
H2	1.22	A	30.00	0.25	0.27	50	2.0	8.7	310	2.0	20.0	2.8	1.8	10.6	360.0	12.0	10.6	
F	1.37	A	40.00	0.40	0.55	80	4.5	6.9						6.9	80.0	10.4	6.9	
G	1.70	A	40.00	0.40	0.50	240	1.5	17.3						17.3	240.0	11.3	11.3	
H3	1.54	A	75.00	0.55	0.65	100	0.5	12.6	350	2.0		4.9	1.2	13.8	450.0	12.5	12.5	
H4	0.42	A	75.00	0.55	0.65	50	0.5	8.9	150	2.0		4.9	0.5	9.4	200.0	11.1	9.4	
I1	3.00	A	75.00	0.55	0.65	50	0.5	8.9	550	2.0		4.9	1.9	10.7	600.0	13.3	10.7	
I2	1.70	A	75.00	0.55	0.65	50	0.5	8.9	300	2.0		4.9	1.0	9.9	350.0	11.9	9.9	
J	1.64	A	55.00	0.40	0.55	75	2.8	7.9						7.9	75.0	10.4	7.9	
K	1.00	A	55.00	0.40	0.55	65	2.4	7.7						7.7	65.0	10.4	7.7	
L	5.90	A	90.00	0.78	0.83	50	0.2	6.9	800	1.0		3.5	3.8	10.7	850.0	14.7	10.7	
M1	1.56	A	95.00	0.85	0.90	50	0.1	6.9	300	1.0		3.5	1.4	8.3	350.0	11.9	8.3	
M2	0.44	A	95.00	0.85	0.90									0.0	0.0	10.0	5.0	
N	1.32	A	95.00	0.85	0.90	40	0.1	5.7	330	2.0		4.9	1.1	6.8	370.0	12.1	6.8	
D	0.41	A	90.00	0.82	0.83	50	2.0	2.9						2.9	50.0	10.3	5.0	
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS																		
A-1	5.42	A	4.90	0.11	0.38	300	2.5	23.0	466	2.5	15.0	2.4	3.3	26.3	766.0	14.3	14.3	
A-2	18.00	A	2.00	0.09	0.36	300	2.4	23.9	1130	2.0	15.0	2.1	8.9	32.8	1430.0	17.9	17.9	
A-3	19.59	A	2.00	0.09	0.36	300	2.7	23.0	760	2.7	15.0	2.5	5.1	28.1	1060.0	15.9	15.9	
A-4	23.81	A	4.80	0.11	0.38	300	2.0	24.9	1500	2.0	15.0	2.1	11.8	36.7	1800.0	20.0	20.0	
B-1	32.53	A	2.00	0.09	0.36	300	2.6	23.3	1100	2.6	15.0	2.4	7.6	30.9	1400.0	17.8	17.8	
B-2	4.51	A	2.00	0.09	0.36	300	3.0	22.2	323	5.0	15.0	3.4	1.6	23.8	623.0	13.5	13.5	
B-3	16.18	A	8.10	0.14	0.40	300	2.9	21.4	780	2.9	15.0	2.6	5.1	26.4	1080.0	16.0	16.0	
OS-1	13.06	A	12.10	0.17	0.42	300	2.5	21.7	1420	2.5	15.0	2.4	10.0	31.7	1720.0	19.6	19.6	
OS-2	17.81	A	16.10	0.20	0.44	300	2.3	21.6	1370	2.3	15.0	2.3	10.0	31.7	1670.0	19.3	19.3	
OS-4	30.69	A	9.00	0.15	0.40	300	2.3	22.8	2600	2.3	15.0	2.3	19.0	41.9	2900.0	26.1	26.1	

STANDARD FORM SF-2 TIME OF CONCENTRATION EXISTING/HISTORIC CONDITIONS

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN	D.A.	Hydrologic	Impervious	C5	C ₁₀₀	L	S	T _i	L	S	C _v	VEL.	T _t	COMP. T _c	TOTAL	Urbanized T _c	
PROPOSED:																	
P-1	2.03	A	64.20	0.57	0.61	100	6.0	5.3	1230	1.7	15.0	2.0	10.5	15.8	1330.0	17.4	15.8

*FROM FDR BG RES FILING 1 & BG EAST COMMERCIAL FILING NO. 1

NOTES:

$$T_i = (0.395 * (1.1 - C_s) * (L)^{0.5}) / ((S)^{0.33}), \text{ S in ft/ft}$$

$$T_i = L / 60V$$

$$\text{Velocity } V = C_v * S^{0.5}, \text{ S in ft/ft}$$

$$T_c \text{ Check} = 10 + L / 180$$

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

Type of Land Surface	C _v
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

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN (EXISTING/HISTORIC CONDITIONS)
(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coef.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		RWT202	1574.40						46.6	120.88	1.82	220.0								From Falcon DBPS by Matrix
		RWT204	38.40						11.4	1.78	3.94	7.0								From Falcon DBPS by Matrix
		WT200	192.00						37.8	24.41	2.13	52.0								From Falcon DBPS by Matrix
		OS-25	14.13	0.11	19.4	1.55	3.13	4.9												
		OS-26	5.81	0.09	13.9	0.52	3.64	1.9												
		H5	11.30	0.05	18.7	0.57	3.19	1.8												
		OS-22	4.42	0.09	14.2	0.40	3.61	1.4												
		OS-23	10.24	0.09	13.9	0.92	3.64	3.3												
		C1	2.07	0.75	5.0	1.55	5.17	8.0												
		C2	2.15	0.76	5.0	1.63	5.17	8.4												
		D1	5.22	0.55	7.5	2.87	4.56	13.1												
		D2	1.40	0.55	5.1	0.77	5.13	4.0												
		H1	3.00	0.25	5.7	0.75	4.96	3.7												
		H2	1.22	0.25	10.6	0.31	4.05	1.3												
		F	1.37	0.40	6.9	0.55	4.68	2.6												
		G	1.70	0.40	11.3	0.68	3.94	2.7												
		H3	1.54	0.55	12.5	0.85	3.79	3.2												
		H4	0.42	0.55	9.4	0.23	4.23	1.0												
		I1	3.00	0.55	10.7	1.65	4.02	6.6												
		I2	1.70	0.55	9.9	0.94	4.15	3.9												
		J	1.64	0.40	7.9	0.66	4.48	3.0												
		K	1.00	0.40	7.7	0.40	4.52	1.8												
		L	5.90	0.78	10.7	4.60	4.03	18.5												
		M1	1.56	0.85	8.3	1.33	4.41	5.9												

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN (EXISTING/HISTORIC CONDITIONS)
(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		M2	0.44	0.85	5.0	0.37	5.17	1.9													
		N	1.32	0.85	6.8	1.12	4.70	5.3													
		D	0.41	0.82	5.0	0.34	5.17	1.8													
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS																					
		A-1	5.42	0.11	14.3	0.60	3.60	2.2													
		A-2	18.00	0.09	17.9	1.62	3.25	5.3													
		A-3	19.59	0.09	15.9	1.76	3.43	6.0													
		A-4	23.81	0.11	20.0	2.62	3.09	8.1													
		B-1	32.53	0.09	17.8	2.93	3.27	9.6													
		B-2	4.51	0.09	13.5	0.41	3.68	1.5													
		B-3	16.18	0.14	16.0	2.27	3.42	7.8													
		OS-1	13.06	0.17	19.6	2.22	3.12	6.9													
		OS-2	17.81	0.20	19.3	3.56	3.14	11.2													
		OS-4	30.69	0.15	26.1	4.60	2.69	12.4													
MERIDIAN ROAD BASIN																					
		P-1	2.03	0.61	15.8	1.24	3.44	4.3													

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN (EXISTING/HISTORIC CONDITIONS)
(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		RWT202	1574.40						46.6	327.87	3.05	1000.0									From Falcon DBPS by Matrix
		RWT204	38.40						11.4	6.51	6.61	43.0									From Falcon DBPS by Matrix
		WT200	192.00						37.8	53.07	3.58	190.0									From Falcon DBPS by Matrix
		OS-25	14.13	0.37	19.4	5.23	5.26	27.5													
		OS-26	5.81	0.36	13.9	2.09	6.10	12.7													
		H5	11.30	0.19	18.7	2.15	5.36	11.5													
		OS-22	4.42	0.36	14.2	1.59	6.05	9.6													
		OS-23	10.24	0.36	13.9	3.69	6.10	22.5													
		C1	2.07	0.81	5.0	1.68	8.68	14.6													
		C2	2.15	0.82	5.0	1.76	8.68	15.3													
		D1	5.22	0.65	7.5	3.39	7.66	26.0													
		D2	1.40	0.65	5.1	0.91	8.62	7.8													
		H1	3.00	0.27	5.7	0.81	8.33	6.7													
		H2	1.22	0.27	10.6	0.33	6.79	2.2													
		F	1.37	0.55	6.9	0.75	7.85	5.9													
		G	1.70	0.50	11.3	0.85	6.62	5.6													
		H3	1.54	0.65	12.5	1.00	6.37	6.4													
		H4	0.42	0.65	9.4	0.27	7.10	1.9													
		I1	3.00	0.65	10.7	1.95	6.76	13.2													
		I2	1.70	0.65	9.9	1.11	6.96	7.7													
		J	1.64	0.55	7.9	0.90	7.52	6.8													
		K	1.00	0.55	7.7	0.55	7.59	4.2													
		L	5.90	0.83	10.7	4.90	6.77	33.2													
		M1	1.56	0.90	8.3	1.40	7.41	10.4													
		M2	0.44	0.90	5.0	0.40	8.68	3.5													
		N	1.32	0.90	6.8	1.19	7.89	9.4													
		D	0.41	0.83	5.0	0.34	8.68	3.0													

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN (EXISTING/HISTORIC CONDITIONS)
(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 12/2/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
BENT GRASS FILING NO. 2 & BENT GRASS WEST BASINS																					
		A-1	5.42	0.38	14.3	2.06	6.04	12.4													
		A-2	18.00	0.36	17.9	6.48	5.46	35.4													
		A-3	19.59	0.36	15.9	7.05	5.77	40.7													
		A-4	23.81	0.38	20.0	9.05	5.19	47.0													
		B-1	32.53	0.36	17.8	11.71	5.48	64.2													
		B-2	4.51	0.36	13.5	1.62	6.18	10.0													
		B-3	16.18	0.40	16.0	6.47	5.75	37.2													
		OS-1	13.06	0.42	19.6	5.49	5.24	28.8													
		OS-2	17.81	0.44	19.3	7.84	5.28	41.4													
		OS-4	30.69	0.40	26.1	12.28	4.51	55.4													
MERIDIAN ROAD BASIN																					
		P-1	2.03	0.61	15.8	1.24	5.78	7.2													

BENT GRASS/MERIDIAN ROAD - MDDP SURFACE ROUTING - EXISTING/HISTORIC CONDITIONS

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
30	Release rate from Meadows Pond 2	0.30	27.16	15.0	3.4	5.9	1.0	160.0	Flows from Meadows Filing No. 3 Pond 2 (Approved DBPS by Matrix)		
		TRAVEL TIME									
		0.30	27.16	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
1	OS-1 A-1	2.22	5.49	19.6	2.9	5.2	8.3	38.9			
		0.60	2.06	TRAVEL TIME							
		2.82	7.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
31	OS-25 DP 30	1.55	5.23	33.3	2.2	3.8	4.0	123.3			
		0.30	27.16	TRAVEL TIME							
		1.85	32.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
32	OS-26 DP 1 DP 31	0.52	2.09	37.7	2.0	3.5	10.5	148.0			
		2.82	7.55	TRAVEL TIME							
		1.85	32.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
14	C1 H5 OS-22 OS-23 DP 32	1.55	1.68	43.9	1.8	3.2	15.8	163.6			
		0.57	2.15	TRAVEL TIME							
		0.40	1.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG1	D1	2.87	3.39	7.5	4.5	7.9	13.0	26.9	Existing Sump Inlet		
		2.87	3.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.5	0.0	7.5				
BG2	D2	0.77	0.91	5.1	5.2	9.0	4.0	8.2	Existing Sump Inlet		
		0.77	0.91	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG4	H1	0.75	0.81	5.7	5.0	8.7	3.7	7.0	Existing Sump Inlet		
		0.75	0.81	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG5	H2	0.31	0.33	10.6	4.0	6.9	1.2	2.3	Existing Sump Inlet		
		0.31	0.33	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG POND	G DP BG1 DP BG2 DP BG4 DP BG5	0.68	0.85	10.6	4.0	6.9	21.3	43.5	Flows into existing Pond at Bent Grass Filing No. 1		
		2.87	3.39	TRAVEL TIME							
		0.77	0.91	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG POND 1	BG Pond 1 Release Flows	0.06	0.32	5.0	5.2	9.1	0.3	2.9	Release flows from Bent Grass Res 1 Pond 1		
		0.06	0.32	TRAVEL TIME							
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES	
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)		
50		111.34	193.50	26.1	2.5	4.4	280.0	850.0	Flow from Falcon DBPS at Meridian Rd & BGMD Intersection	
		TRAVEL TIME								
		111.34	193.50	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
20	DP 50 DP 14	111.34	193.50	45.2	1.8	3.1	200.6	608.4		
		0.31	0.33	TRAVEL TIME						
		111.65	193.83	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
			Culverts	125	11.2	0.2	45.4			
15	C2 DP 20	1.63	1.76	45.4	1.8	3.1	203.0	612.3		
		111.65	193.83	TRAVEL TIME						
		113.28	195.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG32	F	0.55	0.75	6.9	4.7	8.1	2.6	6.1		
		TRAVEL TIME								
		0.55	0.75	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG33	J	0.66	0.90	7.9	4.4	7.8	2.9	7.0		
		TRAVEL TIME								
		0.66	0.90	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 7	H3	0.85	1.00	12.5	3.7	6.4	3.1	6.4	Ex 4' Sump Inlet	
		TRAVEL TIME								
		0.85	1.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 8	H4	0.23	0.27	9.4	4.2	7.3	1.0	2.0	Ex 4' Sump Inlet	
		TRAVEL TIME								
		0.23	0.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 9	I1	1.65	1.95	10.7	3.9	6.9	6.5	13.4	Ex 6' Sump Inlet	
		TRAVEL TIME								
		1.65	1.95	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 10	I2	0.94	1.11	9.9	4.1	7.1	3.8	7.9	Ex 4' Sump Inlet	
		TRAVEL TIME								
		0.94	1.11	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 11	DP BG 7 DP BG 8 DP BG 9 DP BG 10	0.85	1.00	12.5	3.7	6.4	13.5	27.8	Inflow to BG Pond 2 West storm sewer	
		0.23	0.27							
		1.65	1.95							
		0.94	1.11	TRAVEL TIME						
BG 12	M1	1.33	1.40	8.3	4.4	7.6	5.8	10.7	Ex 6' Sump Inlet	
		TRAVEL TIME								
		1.33	1.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 13	M2 N	0.37	0.40	6.8	4.7	8.2	7.0	13.0	Ex 6' Sump Inlet	
		1.12	1.19	TRAVEL TIME						
		1.49	1.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
BG 14	BG DP 12 BG DP 13	1.33	1.40	8.3	4.4	7.6	12.3	22.8	Ex 6' Sump Inlet	
		1.49	1.59	TRAVEL TIME						
		2.82	2.99	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
						2.5	0.0	8.3		

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
BG 15	K L DP BG 11 DP BG 14	0.40	0.55	12.5	3.7	6.4	42.2	82.0	Total inflo to BG Pond 2
		4.60	4.90						
		3.67	4.33						
		2.82	2.99	T R A V E L T I M E					
		11.49	12.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.0	0.0	12.5		
BG POND 2	BG Pond 2 Release Flows	0.08	1.10	5.0	5.2	9.1	0.4	10.0	Release flows from Bent Grass Res 1 Pond 2
				T R A V E L T I M E					
		0.08	1.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.8	0.0	5.0		
BG 30	PLD RELEASE RATE	0.58	0.55	5.0	5.2	9.1	3.0	5.0	Released flows from existing PLD on 7-11 site
				T R A V E L T I M E					
		0.58	0.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.8	0.0	5.0		
BG31	D	0.34	0.34	5.0	5.2	9.1	1.8	3.1	Future lot for development in Bent Grass East Commercial Filing No. 1
				T R A V E L T I M E					
		0.34	0.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.5	0.0	5.0		
25	P-1 DP 15 BG 30 BG 31 BG POND2	1.24	1.24	45.4	1.8	3.1	205.2	616.2	
		113.28	195.59						
		2.82	2.99						
		0.34	0.34						
		0.08	1.10	T R A V E L T I M E					
		114.52	196.83	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.5	0.0	45.4		
9	RWT202	124.80	324.77	46.6	1.8	3.1	220.0	1000.0	
				T R A V E L T I M E					
		124.80	324.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			CHANNEL	1560	5.0	5.2	51.8		
	RWT204	1.83	6.43	11.4	3.8	6.7	7.0	43.0	
				T R A V E L T I M E					
		1.83	6.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	11.4		
	WT200	25.81	54.00	37.8	2.0	3.5	52.0	190.0	
				T R A V E L T I M E					
		25.81	54.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.1	0.0	37.8		
8	RWT204 WT200	1.83	6.43	37.8	2.0	3.5	55.7	212.6	
		25.81	54.00						
				T R A V E L T I M E					
		27.64	60.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
1	A-1			CHANNEL	850	4.0	3.5	41.3	
		0.60	2.06	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	14.3	
2	A-2	1.62	6.48	17.9	3.1	5.4	5.0	34.9	
				T R A V E L T I M E					
		1.62	6.48	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	17.9		
3	A-3 DP 2 DP 8 DP 9	1.76	7.05	51.8	1.6	2.9	256.3	1145.4	
		1.62	6.48						
		27.64	60.43						
		124.80	324.77	T R A V E L T I M E					
		155.82	398.73	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				CHANNEL	900	5.0	3.0	54.8	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
4	OS-4 A-4	4.60	12.28	26.1	2.5	4.4	18.2	93.7	Flows offsite to Latigo Business Center Filing No. 1
		2.62	9.05	T R A V E L T I M E					
		7.22	21.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	26.1		
5	B-1	2.93	11.71	17.8	3.1	5.4	9.1	63.4	Flows offsite at south property line
				T R A V E L T I M E					
		2.93	11.71	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	17.8		
6	B-2 DP 3	0.41	1.62	54.8	1.6	2.8	247.5	1107.8	
				T R A V E L T I M E					
		155.82	398.73	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		156.23	400.35	CHANNEL	365	5.0	1.2	56.0	
7	B-3 DP 6	2.27	6.47	56.0	1.6	2.7	247.4	1109.3	Flows exiting site at channel
		156.23	400.35						
				T R A V E L T I M E					
		158.50	406.82	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	56.0		

Current Rational Calculations

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Residential - 1/8 Acre			Residential - 1/4 Acre			Residential - 1/3 Acre			Residential - 1/2 Acre			Residential - 1 Acre			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
C-5	7.86	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	6.53	54.0	40	1.33	6.8	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	60.8
C-6	5.54	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	3.14	36.8	40	1.60	11.6	30	0.80	4.3	25	0.00	0.0	20	0.00	0.0	52.7
C-7	0.89	100	0.00	0.0	2	0.89	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
C-8	0.42	100	0.00	0.0	2	0.42	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
E-1	1.71	100	0.78	45.6	2	0.23	0.3	90	0.00	0.0	65	0.00	0.0	40	0.70	16.4	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	62.3
E-2	0.68	100	0.56	82.4	2	0.12	0.4	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	82.8
E-3	0.78	100	0.69	88.5	2	0.09	0.2	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	88.7
E-4	0.91	100	0.73	80.2	2	0.18	0.4	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	80.6
E-5	0.89	100	0.79	88.8	2	0.10	0.2	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	89.0
F-1	0.44	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	0.00	0.0	40	0.41	37.3	30	0.00	0.0	25	0.00	0.0	20	0.03	1.4	38.7
F-2	0.55	100	0.21	38.2	2	0.11	0.4	90	0.00	0.0	65	0.23	27.2	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.8
G-1	1.47	100	0.00	0.0	2	0.64	0.9	90	0.00	0.0	65	0.25	11.1	40	0.08	2.2	30	0.20	4.1	25	0.30	5.1	20	0.00	0.0	23.4
H-1	0.52	100	0.00	0.0	2	0.52	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
I-1	0.31	100	0.22	71.0	2	0.09	0.6	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	71.6
BENT GRASS WEST BASINS																										
EX-1	1.19	100	0.00	0.0	2	1.19	2.0	2	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-2	1.56	100	0.00	0.0	2	1.56	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-3	0.62	100	0.00	0.0	2	0.62	2.0	1	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-4	12.49	100	0.00	0.0	2	12.49	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-5	5.15	100	0.00	0.0	2	5.15	2.0	10	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-6	9.53	100	0.00	0.0	2	9.53	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-7	9.16	100	0.00	0.0	2	9.16	2.0	18	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
EX-8	21.30	100	0.00	0.0	2	21.30	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
MERIDIAN ROAD BASIN																										
P-1	2.03	100	1.29	63.6	2	0.74	0.7	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	64.3

Basin ID	Total Area (ac)	Paved/Gravel Roads			Lawns/Undeveloped			Roofs			Residential - 1/8 Acre			Residential - 1/4 Acre			Residential - 1/3 Acre			Residential - 1/2 Acre			Residential - 1 Acre			Composite C ₅	Composite C ₁₀₀
		C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)		
E-5	0.89	0.90	0.96	0.79	0.09	0.36	0.10	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.81	0.89
F-1	0.44	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.41	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.03	0.29	0.50
F-2	0.55	0.90	0.96	0.21	0.09	0.36	0.11	0.73	0.81	0.00	0.45	0.59	0.23	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.55	0.69
G-1	1.47	0.90	0.96	0.00	0.09	0.36	0.64	0.73	0.81	0.00	0.45	0.59	0.25	0.30	0.50	0.08	0.25	0.47	0.20	0.22	0.46	0.30	0.20	0.44	0.00	0.21	0.44
H-1	0.52	0.90	0.96	0.00	0.09	0.36	0.52	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
I-1	0.31	0.90	0.96	0.22	0.09	0.36	0.09	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.66	0.79
BENT GRASS WEST BASINS:																											
EX-1	1.19	0.90	0.96	0.00	0.09	0.36	1.19	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-2	1.56	0.90	0.96	0.00	0.09	0.36	1.56	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-3	0.62	0.90	0.96	0.00	0.09	0.36	0.62	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-4	12.49	0.90	0.96	0.00	0.09	0.36	12.49	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-5	5.15	0.90	0.96	0.00	0.09	0.36	5.15	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-6	9.53	0.90	0.96	0.00	0.09	0.36	9.53	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-7	9.16	0.90	0.96	0.00	0.09	0.36	9.16	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
EX-8	21.30	0.90	0.96	0.00	0.09	0.36	21.30	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
PROPOSED:																											
P-1	2.03	0.90	0.96	1.29	0.09	0.36	0.74	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.60	0.74

Lot Type Identification:	
Lot Size (SF)	Lot Size (Acre)
0 - 8,167	<= 1/8 Acre
8,168 - 12,704	1/4 Acre
12,705 - 18,149	1/3 Acre
18,150 - 32,670	1/2 Acre
32,671 - 43,560	1 Acre

NOTES:
C values are taken directly from Table 6-6 in the Colorado Springs DCM Vol. 1. CH. 6 (Referencing UDFCD 2001)
Coefficients use HSG A&B soils - Refer to "Appendix A: Exhibits and Figures" for soil map

STANDARD FORM SF-2 TIME OF CONCENTRATION CURRENT CONDITIONS

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					Tc CHECK			FINAL	
DATA						(Ti)			(Ti)					(URBANIZED BASINS)				
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₅	C100	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	Cv	VEL. (FPS)	T _i (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)		T _c (MIN)
OFFSITE BASINS																		
WT200	192.00	A	10.0	0.20	0.44	300	2.0	22.7	2060	2.0	15	2.1	16.2	38.8	2360.0	23.1	23.1	
OS-2	20.08	A	8.0	0.14	0.40	100	2.3	13.3	1400	2.3	15	2.3	10.3	23.6	1500.0	18.3	18.3	
OS-3	10.62	A	8.0	0.14	0.40	100	2.0	14.0	1500	2.0	15	2.1	11.8	25.7	1600.0	18.9	18.9	
OS-24	2.64	A	2.0	0.09	0.36	100	6.0	10.2	1460	2.0	15	2.1	11.5	21.7	1560.0	18.7	18.7	
OS-25	14.13	A	4.5	0.11	0.37	100	6.0	10.0	1230	1.7	15	2.0	10.5	20.5	1330.0	17.4	17.4	
OS-26	5.81	A	2.0	0.09	0.36	100	1.0	18.5	650	1.0	10	1.0	10.8	29.3	750.0	14.2	14.2	
H5	11.30	A	1.0	0.05	0.19	100	1.0	19.2	600	1.0	10	1.0	10.0	29.2	700.0	13.9	13.9	
OS-22	4.42	A	2.0	0.09	0.36	100	1.0	18.5	600	1.0	10	1.0	10.0	28.5	700.0	13.9	13.9	
OS-23	10.24	A	2.0	0.09	0.36	100	1.0	18.5	600	1.0	10	1.0	10.0	28.5	700.0	13.9	13.9	
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS																		
C1a	0.48	A	75.5	0.70	0.81	5	2.0	1.3	400	1.0	20	2.0	3.3	4.6	405.0	12.3	5.0	
C1b	0.88	A	77.7	0.72	0.82	10	2.0	1.7	310	2.0	20	2.8	1.8	3.6	320.0	11.8	5.0	
C1c	1.09	A	81.1	0.74	0.84	50	2.0	3.7	310	2.0	20	2.8	1.8	5.5	360.0	12.0	5.5	
D1a	0.56	A	59.8	0.57	0.71	5	2.0	1.7	400	1.0	20	2.0	3.3	5.1	405.0	12.3	5.1	
D1b	0.68	A	65.3	0.57	0.71	10	2.0	2.4	310	2.0	20	2.8	1.8	4.3	320.0	11.8	5.0	
D1c	1.20	A	66.7	0.58	0.71	50	2.0	5.3	310	2.0	20	2.8	1.8	7.2	360.0	12.0	7.2	
D1d	2.79	A	67.8	0.59	0.71	100	2.0	7.4	485	2.0	20	2.8	2.9	10.3	585.0	13.3	10.3	
C2a	1.26	A	59.6	0.57	0.71	12	2.0	2.7	965	1.0	20	2.0	8.0	10.7	977.0	15.4	10.7	
C2b	0.99	A	93.1	0.84	0.92	12	2.0	1.3	1190	1.0	20	2.0	9.9	11.2	1202.0	16.7	11.2	
D2a	1.00	A	34.7	0.35	0.55	5	2.0	2.4	310	2.0	20	2.8	1.8	4.3	315.0	11.8	5.0	
D2b	0.41	A	49.8	0.46	0.63	5	2.0	2.1	225	2.0	20	2.8	1.3	3.4	230.0	11.3	5.0	
H1a	0.40	A	50.0	0.48	0.65	10	2.0	2.8	310	2.0	20	2.8	1.8	4.7	320.0	11.8	5.0	
H1b	2.52	A	47.6	0.44	0.60	50	2.0	6.8	575	1.0	20	2.0	4.8	11.6	625.0	13.5	11.6	
H1c	0.16	A	43.6	0.42	0.60	5	2.0	2.2	100	1.0	20	2.0	0.8	3.0	105.0	10.6	5.0	
H2a	1.09	A	41.9	0.41	0.59	50	2.0	7.1	575	1.0	20	2.0	4.8	11.9	625.0	13.5	11.9	
H2b	0.15	A	34.7	0.36	0.56	5	2.0	2.4	100	1.0	20	2.0	0.8	3.2	105.0	10.6	5.0	
F	1.37	A	40.0	0.40	0.55	80	4.5	6.9						6.9	80.0	10.4	6.9	
G	1.70	A	40.0	0.40	0.50	240	1.5	17.3						17.3	240.0	11.3	11.3	
H3	1.54	A	75.0	0.55	0.65	100	0.5	12.6	350	2.0		4.9	1.2	13.8	450.0	12.5	12.5	
H4	0.42	A	75.0	0.55	0.65	50	0.5	8.9	150	2.0		4.9	0.5	9.4	200.0	11.1	9.4	
I1	3.00	A	75.0	0.55	0.65	50	0.5	8.9	550	2.0		4.9	1.9	10.7	600.0	13.3	10.7	
I2	1.70	A	75.0	0.55	0.65	50	0.5	8.9	300	2.0		4.9	1.0	9.9	350.0	11.9	9.9	
J	1.64	A	55.0	0.40	0.55	75	2.8	7.9						7.9	75.0	10.4	7.9	
K	1.00	A	55.0	0.40	0.55	65	2.4	7.7						7.7	65.0	10.4	7.7	
L	5.90	A	90.0	0.78	0.83	50	0.2	6.9	800	1.0		3.5	3.8	10.7	850.0	14.7	10.7	

STANDARD FORM SF-2 TIME OF CONCENTRATION CURRENT CONDITIONS

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Falcon Meadows at Bent Grass

Project No.: CLH017.20

Calculated By: TJE

Checked By: CMD

Date: 3/23/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					Tc CHECK			FINAL
DATA						(Ti)			(Ti)					(URBANIZED BASINS)			
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₅	C100	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	Cv	VEL. (FPS)	T _i (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)	
M1	1.56	A	95.0	0.85	0.90	50	0.1	6.9	300	1.0		3.5	1.4	8.3	350.0	11.9	8.3
M2	0.44	A	95.0	0.85	0.90									0.0	0.0	10.0	5.0
N	1.32	A	95.0	0.85	0.90	40	0.1	5.7	330	2.0		4.9	1.1	6.8	370.0	12.1	6.8
D	0.41	A	90.0	0.82	0.83	50	2.0	2.9						2.9	50.0	10.3	5.0
BENT GRASS FILING NO. 2 BASINS																	
OS-1	32.28	A	11.0	0.16	0.41	100	2.4	12.9	2100	2.2	15	2.2	15.7	28.6	2200.0	22.2	22.2
OS-4	4.46	A	49.5	0.36	0.54	100	2.0	10.8	910	1.2	20	2.2	6.9	17.7	1010.0	15.6	15.6
OS-5	0.46	A	65.0	0.45	0.59	15	2.0	3.7	190	1.0	20	2.0	1.6	5.2	205.0	11.1	5.2
OS-6	1.17	A	65.0	0.45	0.59	85	0.2	18.7	430	0.9	20	1.9	3.8	22.5	515.0	12.9	12.9
A-1	2.70	A	44.7	0.33	0.52	100	1.3	12.9	550	1.3	20	2.3	4.0	16.9	650.0	13.6	13.6
A-2	1.19	A	43.4	0.32	0.51	100	4.3	8.8	310	2.3	20	3.0	1.7	10.5	410.0	12.3	10.5
A-3	1.57	A	49.4	0.36	0.53	70	1.0	11.3	680	1.2	20	2.2	5.2	16.5	750.0	14.2	14.2
A-4	2.24	A	46.5	0.34	0.53	100	4.2	8.6	650	1.7	20	2.6	4.2	12.8	750.0	14.2	12.8
C-1	1.35	A	58.2	0.42	0.57	35	2.4	5.5	400	2.4	20	3.1	2.2	7.7	435.0	12.4	7.7
C-2	6.80	A	46.8	0.34	0.53	100	2.0	11.0	1770	1.5	20	2.4	12.0	23.1	1870.0	20.4	20.4
C-3	2.38	A	56.9	0.40	0.56	100	1.6	11.0	810	1.0	20	2.0	6.8	17.7	910.0	15.1	15.1
C-4	3.61	A	59.8	0.42	0.57	100	2.0	9.9	973	2.0	20	2.8	5.7	15.6	1073.0	16.0	15.6
C-5	7.86	A	60.8	0.42	0.57	100	2.0	9.9	1200	1.3	20	2.3	8.8	18.7	1300.0	17.2	17.2
C-6	5.54	A	52.7	0.38	0.55	100	3.0	9.1	1230	1.5	20	2.4	8.4	17.5	1330.0	17.4	17.4
C-7	0.89	A	2.0	0.09	0.36	80	2.5	12.2	150	2.0	15	2.1	1.2	13.4	230.0	11.3	11.3
C-8	0.42	A	2.0	0.09	0.36	100	2.5	13.6	170	2.5	15	2.4	1.2	14.8	270.0	11.5	11.5
E-1	1.71	A	62.3	0.55	0.69	25	2.0	4.0	940	1.0	20	2.0	7.8	11.8	965.0	15.4	11.8
E-2	0.68	A	82.8	0.76	0.85	25	2.0	2.5	665	1.6	20	2.5	4.4	6.9	690.0	13.8	6.9
E-3	0.78	A	88.7	0.81	0.89	25	2.0	2.1	632	1.0	20	2.0	5.3	7.4	657.0	13.7	7.4
E-4	0.91	A	80.6	0.74	0.84	25	2.0	2.6	913	2.0	20	2.8	5.4	8.0	938.0	15.2	8.0
E-5	0.89	A	89.0	0.81	0.89	25	2.0	2.1	903	2.1	20	2.9	5.2	7.3	928.0	15.2	7.3
F-1	0.44	A	38.7	0.29	0.50	66	2.5	8.9	1	1.0	15	1.5	0.0	8.9	67.0	10.4	8.9
F-2	0.55	A	65.8	0.55	0.69	25	2.0	4.0	464	4.0	20	4.0	1.9	5.9	489.0	12.7	5.9
G-1	1.47	A	23.4	0.21	0.44	20	2.0	5.8	700	3.5	15	2.8	4.2	9.9	720.0	14.0	9.9
H-1	0.52	A	2.0	0.09	0.36	25	2.0	7.3	135	2.0	20	2.8	0.8	8.1	160.0	10.9	8.1
I-1	0.31	A	71.6	0.66	0.79	25	2.0	3.2	135	2.0	20	2.8	0.8	4.0	160.0	10.9	5.0
BENT GRASS WEST BASINS																	
EX-1	1.19	A	2.0	0.09	0.36	300	2.7	23.0	690	2.7	15	2.5	4.7	27.7	990.0	15.5	15.5
EX-2	1.56	A	2.0	0.09	0.36	200	2.7	18.8	100	2.7	15	2.5	0.7	19.5	300.0	11.7	11.7
EX-3	0.62	A	2.0	0.09	0.36	100	5.0	10.8	30	2.7	15	2.5	0.2	11.0	130.0	10.7	10.7
EX-4	12.49	A	2.0	0.09	0.36	100	2.7	13.3	1180	2.7	15	2.5	8.0	21.3	1280.0	17.1	17.1

STANDARD FORM SF-2 TIME OF CONCENTRATION CURRENT CONDITIONS

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL
DATA						(T _i)			(T _i)					(URBANIZED BASINS)			
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₅	C100	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _t (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)	
EX-5	5.15	A	2.0	0.09	0.36	100	2.7	13.3	1000	2.7	15	2.5	6.8	20.0	1100.0	16.1	16.1
EX-6	9.53	A	2.0	0.09	0.36	100	2.7	13.3	1700	2.7	15	2.5	11.5	24.8	1800.0	20.0	20.0
EX-7	9.16	A	2.0	0.09	0.36	90	2.7	12.6	1020	2.7	15	2.5	6.9	19.5	1110.0	16.2	16.2
EX-8	21.30	A	2.0	0.09	0.36	100	2.7	13.3	996	2.7	15	2.5	6.7	20.0	1096.0	16.1	16.1
PROPOSED:																	
P-1	2.03	A	64.3	0.60	0.74	100	6.0	5.0	1230	1.7	15	2.0	10.5	15.5	1330.0	17.4	15.5

NOTES:

$T_i = (0.395 * (1.1 - C_5) * (L)^{0.5}) / ((S)^{0.33})$, S in ft/ft

$T_i = L / 60V$

Velocity $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

Type of Land Surface	C _v
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

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
OFFSITE BASINS																					
		RWT202	1574.40						46.6	120.88	1.82	220.0								From Falcon DBPS by Matrix	
		RWT204	38.40						11.4	1.78	3.94	7.0								From Falcon DBPS by Matrix	
		WT200	192.00						37.8	24.41	2.13	52.0								From Falcon DBPS by Matrix	
		OS-2	20.08	0.14	18.3	2.81	3.22	9.0													
		OS-3	10.62	0.14	18.9	1.49	3.18	4.7													
		OS-24	2.64	0.09	18.7	0.24	3.19	0.8													
		OS-25	14.13	0.11	17.4	1.55	3.30	5.1													
		OS-26	5.81	0.09	14.2	0.52	3.61	1.9													
		H5	11.30	0.05	13.9	0.57	3.64	2.1													
		OS-22	4.42	0.09	13.9	0.40	3.64	1.5													
		OS-23	10.24	0.09	13.9	0.92	3.64	3.3													
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS																					
		C1a	0.48	0.70	5.0	0.34	5.17	1.8													
		D1a	0.56	0.57	5.1	0.32	5.15	1.6													
		H1a	0.40	0.48	5.0	0.19	5.17	1.0													
		D1b	0.68	0.57	5.0	0.39	5.17	2.0													
		D1c	1.20	0.58	7.2	0.70	4.63	3.2													
		D1d	2.79	0.59	10.3	1.65	4.09	6.7													
		D2a	1.00	0.35	5.0	0.35	5.17	1.8													
		D2b	0.41	0.46	5.0	0.19	5.17	1.0													
		H1b	2.52	0.44	11.6	1.11	3.91	4.3													
		H1c	0.16	0.42	5.0	0.07	5.17	0.4													
		H2a	1.09	0.41	11.9	0.45	3.87	1.7													
		H2b	0.15	0.36	5.0	0.05	5.17	0.3													
		C1b	0.88	0.72	5.0	0.63	5.17	3.3													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		C1c	1.09	0.74	5.5	0.81	5.02	4.1													
		C2a	1.26	0.57	10.7	0.72	4.03	2.9													
		C2b	0.99	0.84	11.2	0.83	3.96	3.3													
		F	1.37	0.40	6.9	0.55	4.68	2.6													
		G	1.70	0.40	11.3	0.68	3.94	2.7													
		H3	1.54	0.55	12.5	0.85	3.79	3.2													
		H4	0.42	0.55	9.4	0.23	4.23	1.0													
		I1	3.00	0.55	10.7	1.65	4.02	6.6													
		I2	1.70	0.55	9.9	0.94	4.15	3.9													
		J	1.64	0.40	7.9	0.66	4.48	3.0													
		K	1.00	0.40	7.7	0.40	4.52	1.8													
		L	5.90	0.78	10.7	4.60	4.03	18.5													
		M1	1.56	0.85	8.3	1.33	4.41	5.9													
		M2	0.44	0.85	5.0	0.37	5.17	1.9													
		N	1.32	0.85	6.8	1.12	4.70	5.3													
		D	0.41	0.82	5.0	0.34	5.17	1.8													
BENT GRASS FILING NO. 2 BASINS																					
		OS-1	32.28	0.16	22.2	5.16	2.93	15.1													
		OS-4	4.46	0.36	15.6	1.61	3.46	5.6													
		OS-5	0.46	0.45	5.2	0.21	5.10	1.1													
		OS-6	1.17	0.45	12.9	0.53	3.75	2.0													
		A-1	2.70	0.33	13.6	0.89	3.67	3.3													
		A-2	1.19	0.32	10.5	0.38	4.06	1.5													
		A-3	1.57	0.36	14.2	0.57	3.61	2.1													
		A-4	2.24	0.34	12.8	0.76	3.76	2.9													
		C-1	1.35	0.42	7.7	0.57	4.53	2.6													
		C-2	6.80	0.34	20.4	2.31	3.06	7.1													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		C-3	2.38	0.40	15.1	0.95	3.52	3.3													
		C-4	3.61	0.42	15.6	1.52	3.46	5.3													
		C-5	7.86	0.42	17.2	3.30	3.31	10.9													
		C-6	5.54	0.38	17.4	2.11	3.30	7.0													
		C-7	0.89	0.09	11.3	0.08	3.95	0.3													
		C-8	0.42	0.09	11.5	0.04	3.92	0.2													
		E-1	1.71	0.55	11.8	0.94	3.88	3.6													
		E-2	0.68	0.76	6.9	0.52	4.70	2.4													
		E-3	0.78	0.81	7.4	0.63	4.59	2.9													
		E-4	0.91	0.74	8.0	0.67	4.46	3.0													
		E-5	0.89	0.81	7.3	0.72	4.60	3.3													
		F-1	0.44	0.29	8.9	0.13	4.31	0.6													
		F-2	0.55	0.55	5.9	0.30	4.91	1.5													
		G-1	1.47	0.21	9.9	0.31	4.14	1.3													
		H-1	0.52	0.09	8.1	0.05	4.44	0.2													
		I-1	0.31	0.66	5.0	0.20	5.17	1.0													
BENT GRASS WEST BASINS																					
		EX-1	1.19	0.09	15.5	0.11	3.47	0.4													
		EX-2	1.56	0.09	11.7	0.14	3.90	0.5													
		EX-3	0.62	0.09	10.7	0.06	4.02	0.2													
		EX-4	12.49	0.09	17.1	1.12	3.32	3.7													
		EX-5	5.15	0.09	16.1	0.46	3.41	1.6													
		EX-6	9.53	0.09	20.0	0.86	3.09	2.7													
		EX-7	9.16	0.09	16.2	0.82	3.41	2.8													
		EX-8	21.30	0.09	16.1	1.92	3.42	6.6													
MERIDIAN ROAD BASINS																					
		P-1	2.03	0.60	15.5	1.22	3.47	4.2													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
OFFSITE BASINS																					
		RWT202	1574.40						46.6	327.87	3.05	1000.0									From Falcon DBPS by Matrix
		RWT204	38.40						11.4	6.51	6.61	43.0									From Falcon DBPS by Matrix
		WT200	192.00						37.8	53.07	3.58	190.0									From Falcon DBPS by Matrix
		OS-2	20.08	0.40	18.3	8.03	5.41	43.4													
		OS-3	10.62	0.40	18.9	4.25	5.33	22.7													
		OS-24	2.64	0.36	18.7	0.95	5.36	5.1													
		OS-25	14.13	0.37	17.4	5.23	5.54	29.0													
		OS-26	5.81	0.36	14.2	2.09	6.05	12.6													
		H5	11.30	0.19	13.9	2.15	6.10	13.1													
		OS-22	4.42	0.36	13.9	1.59	6.10	9.7													
		OS-23	10.24	0.36	13.9	3.69	6.10	22.5													
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS																					
		C1a	0.48	0.81	5.0	0.39	8.68	3.4													
		D1a	0.56	0.71	5.1	0.40	8.65	3.5													
		H1a	0.40	0.65	5.0	0.26	8.68	2.3													
		D1b	0.68	0.71	5.0	0.48	8.68	4.2													
		D1c	1.20	0.71	7.2	0.85	7.77	6.6													
		D1d	2.79	0.71	10.3	1.98	6.87	13.6													
		D2a	1.00	0.55	5.0	0.55	8.68	4.8													
		D2b	0.41	0.63	5.0	0.26	8.68	2.3													
		H1b	2.52	0.60	11.6	1.51	6.56	9.9													
		H1c	0.16	0.60	5.0	0.10	8.68	0.9													
		H2a	1.09	0.59	11.9	0.64	6.50	4.2													
		H2b	0.15	0.56	5.0	0.08	8.68	0.7													
		C1b	0.88	0.82	5.0	0.72	8.68	6.2													
		C1c	1.09	0.84	5.5	0.92	8.43	7.8													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		C2a	1.26	0.71	10.7	0.89	6.76	6.0												
		C2b	0.99	0.92	11.2	0.91	6.64	6.0												
		F	1.37	0.55	6.9	0.75	7.85	5.9												
		G	1.70	0.50	11.3	0.85	6.62	5.6												
		H3	1.54	0.65	12.5	1.00	6.37	6.4												
		H4	0.42	0.65	9.4	0.27	7.10	1.9												
		I1	3.00	0.65	10.7	1.95	6.76	13.2												
		I2	1.70	0.65	9.9	1.11	6.96	7.7												
		J	1.64	0.55	7.9	0.90	7.52	6.8												
		K	1.00	0.55	7.7	0.55	7.59	4.2												
		L	5.90	0.83	10.7	4.90	6.77	33.2												
		M1	1.56	0.90	8.3	1.40	7.41	10.4												
		M2	0.44	0.90	5.0	0.40	8.68	3.5												
		N	1.32	0.90	6.8	1.19	7.89	9.4												
		D	0.41	0.83	5.0	0.34	8.68	3.0												
BENT GRASS FILING NO. 2 BASINS																				
		OS-1	32.28	0.41	22.2	13.23	4.92	65.1												
		OS-4	4.46	0.54	15.6	2.41	5.81	14.0												
		OS-5	0.46	0.59	5.2	0.27	8.56	2.3												
		OS-6	1.17	0.59	12.9	0.69	6.30	4.3												
		A-1	2.70	0.52	13.6	1.40	6.16	8.6												
		A-2	1.19	0.51	10.5	0.61	6.81	4.2												
		A-3	1.57	0.53	14.2	0.83	6.05	5.0												
		A-4	2.24	0.53	12.8	1.19	6.31	7.5												
		C-1	1.35	0.57	7.7	0.77	7.61	5.9												
		C-2	6.80	0.53	20.4	3.60	5.14	18.5												
		C-3	2.38	0.56	15.1	1.33	5.90	7.8												

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		C-4	3.61	0.57	15.6	2.06	5.81	12.0												
		C-5	7.86	0.57	17.2	4.48	5.56	24.9												
		C-6	5.54	0.55	17.4	3.05	5.54	16.9												
		C-7	0.89	0.36	11.3	0.32	6.63	2.1												
		C-8	0.42	0.36	11.5	0.15	6.58	1.0												
		E-1	1.71	0.69	11.8	1.18	6.51	7.7												
		E-2	0.68	0.85	6.9	0.58	7.89	4.6												
		E-3	0.78	0.89	7.4	0.69	7.70	5.3												
		E-4	0.91	0.84	8.0	0.76	7.50	5.7												
		E-5	0.89	0.89	7.3	0.79	7.73	6.1												
		F-1	0.44	0.50	8.9	0.22	7.23	1.6												
		F-2	0.55	0.69	5.9	0.38	8.25	3.1												
		G-1	1.47	0.44	9.9	0.65	6.95	4.5												
		H-1	0.52	0.36	8.1	0.19	7.45	1.4												
		I-1	0.31	0.79	5.0	0.24	8.68	2.1												
BENT GRASS WEST BASINS																				
		EX-1	1.19	0.36	15.5	0.43	5.83	2.5												
		EX-2	1.56	0.36	11.7	0.56	6.54	3.7												
		EX-3	0.62	0.36	10.7	0.22	6.76	1.5												
		EX-4	12.49	0.36	17.1	4.50	5.58	25.1												
		EX-5	5.15	0.36	16.1	1.85	5.73	10.6												
		EX-6	9.53	0.36	20.0	3.43	5.19	17.8												
		EX-7	9.16	0.36	16.2	3.30	5.72	18.9												
		EX-8	21.30	0.36	16.1	7.67	5.73	43.9												
MERIDIAN ROAD BASIN																				
		P-1	2.03	0.74	15.5	1.50	5.82	8.7												

BENT GRASS/MERIDIAN ROAD - MDDP SURFACE ROUTING - CURRENT CONDITIONS

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
FILING NO. 2:									
	RWT202	124.80	324.77	46.6	1.8	3.1	220.0	1000.0	
		TRAVEL TIME							
		124.80	324.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	46.6		
	RWT204	1.83	6.43	11.4	3.8	6.7	7.0	43.0	
		TRAVEL TIME							
		1.83	6.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	11.4		
	WT200	25.81	54.00	37.8	2.0	3.5	52.0	190.0	
		TRAVEL TIME							
		25.81	54.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	37.8		
40	OS-1 RWT202 RWT204 WT200	5.16	13.23	46.6	1.8	3.1	277.8	1226.8	
		124.80	324.77						
		1.83	6.43						
		25.81	54.00						
		157.60	398.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			CHANNEL	850	4.0	3.5	50.1		
1	A-1	0.89	1.40	13.6	3.5	6.2	3.1	8.6	
		TRAVEL TIME							
		0.89	1.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	140	2.0	1.2	14.8		
2	A-2 DP 1	0.38	0.61	14.8	3.4	5.9	4.3	11.9	
		0.89	1.40						
		1.27	2.01	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	275	2.4	1.9	16.7		
3	A-3 DP 2	0.57	0.83	16.7	3.2	5.6	5.9	15.9	
		1.27	2.01						
		1.84	2.84	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	40	2.4	0.3	17.0		
4	A-4 DP 3	0.76	1.19	17.0	3.2	5.5	8.3	22.3	
		1.84	2.84						
		2.60	4.03	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	780	2.0	6.5	23.5		
5	EX-5	0.46	1.85	16.1	3.3	5.7	1.5	10.5	@ GRADE INLET
		TRAVEL TIME							
		0.46	1.85	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	80	2.0	0.7	16.8		
6	EX-4 FB DP 5	1.12	4.50	17.1	3.2	5.5	3.5	34.4	@ GRADE INLET
		0.00	1.74						
		1.12	6.24	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	460	2.0	3.8	20.9		
7	E-3	0.63	0.69	7.4	4.6	8.0	2.9	5.5	SUMP INLET
		TRAVEL TIME							
		0.63	0.69	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.6	0.0	7.4		
8	E-1 E-2 DP 4 FB DP 6	0.94	1.18	23.5	2.7	4.7	11.2	32.7	SUMP INLET
		0.52	0.58						
		2.60	4.03						
		0.15	1.22						
		4.21	7.01	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.6	0.0	23.5		

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
9	OS-5	0.21	0.27	16.1	3.3	5.7	0.7	1.5			
		TRAVEL TIME									
		0.21	0.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		SWALE	125	3.2	0.7	16.7					
10	EX-1 DP 9	0.11	0.43	16.7	3.2	5.6	1.0	3.9			
		0.21	0.27	TRAVEL TIME							
		0.32	0.70	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		SWALE	295	6.2	0.8	17.5					
11	OS-4	1.61	2.41	15.6	3.3	5.8	5.3	13.9			
		TRAVEL TIME									
		1.61	2.41	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				2.6	0.0	15.6					
12	OS-6	0.53	0.69	12.9	3.6	6.3	1.9	4.4			
		TRAVEL TIME									
		0.53	0.69	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				2.6	0.0	12.9					
13	DP 11 DP 12	1.61	2.41	15.6	3.3	5.8	7.1	17.9			
		0.53	0.69	TRAVEL TIME							
		2.14	3.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		SWALE	160	6.1	0.4	16.0					
14	EX-2 DP 10 DP 13	0.14	0.56	17.5	3.1	5.5	8.1	23.8			
		0.32	0.70	TRAVEL TIME							
		2.14	3.10	TRAVEL TIME							
		2.60	4.36	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
15	EX-3 DP 8 DP 14	0.06	0.22	23.5	2.7	4.7	18.3	54.1			
		4.21	7.01	TRAVEL TIME							
		2.60	4.36	TRAVEL TIME							
		6.87	11.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
15A	NORTH POND RELEASE	2.35	4.08	5.0	5.2	9.1	12.2	37.0			
		TRAVEL TIME									
		2.35	4.08	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				2.6	0.0	5.0					
AA	DP 40 DP 15A			50.1	1.7	2.9	268.8	1181.4			
		TRAVEL TIME									
		157.60	398.43	TRAVEL TIME							
		2.35	4.08	TRAVEL TIME							
BB	DP AA DP 7	159.95	402.51	Culverts	135	5.0	0.5	50.6			
		0.63	0.69	50.6	1.7	2.9	268.3	1176.5			
		160.58	403.20	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		CHANNEL	800	5.0	2.7	53.3					
16	C-5	3.30	4.48	11.2	3.9	6.7	12.7	30.2	@ GRADE INLET		
		TRAVEL TIME									
		3.30	4.48	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		STREET	115	2.0	1.0	12.2					
17	C-6	2.11	3.05	11.2	3.9	6.7	8.1	20.5	@ GRADE INLET		
		TRAVEL TIME									
		2.11	3.05	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		STREET	115	2.0	1.0	12.2					
18	C-3 C-4 FB DP 16	0.95	1.33	11.2	3.9	6.7	10.6	32.2	SUMP INLET		
		1.52	2.06	TRAVEL TIME							
		0.29	1.40	TRAVEL TIME							
		2.76	4.79	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						2.6	0.0	11.2			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
19	C-1 C-2 FB DP 17	0.57	0.77	20.4	2.9	5.0	9.5	29.7	SUMP INLET
		2.31	3.60						
		0.42	1.53	TRAVEL TIME					
		3.30	5.90	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	20.4	
20	G-1	0.31	0.65	9.9	4.1	7.1	1.3	4.6	
				TRAVEL TIME					
		0.31	0.65	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	9.9	
20A	C-7 DP 18 DP 19 DP 20	0.08	0.32	20.4	2.9	5.0	18.6	58.7	
		2.76	4.79						
		3.30	5.90						
		0.31	0.65	TRAVEL TIME					
		6.44	11.65	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				2.6	0.0	20.4			
20B	SOUTH POND RELEASE	4.11	7.28	5.0	5.2	9.1	21.3	66.0	
				TRAVEL TIME					
		4.11	7.28	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
28	OS-2	2.81	8.03	18.3	3.1	5.3	8.6	42.8	
				TRAVEL TIME					
		2.81	8.03	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			SWALE	640	4.0	2.7	21.0		
29	OS-3 DP 28	1.49	4.25	21.0	2.8	5.0	12.2	60.9	
		2.81	8.03	TRAVEL TIME					
		4.30	12.28	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			SWALE	475	3.5	2.3	23.3		
21	EX-7	0.82	3.30	16.2	3.3	5.7	2.7	18.7	@ GRADE INLET
				TRAVEL TIME					
		0.82	3.30	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	60	2.0	0.5	16.7		
22	EX-6 FB DP 21	0.86	3.43	20.0	2.9	5.1	2.5	29.6	@ GRADE INLET
		0.00	2.38	TRAVEL TIME					
		0.86	5.81	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			STREET	515	2.0	4.3	24.3		
23	DP 29			23.3	2.7	4.7	11.5	57.6	TYPE C INLET
		4.30	12.28	TRAVEL TIME					
		4.30	12.28	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			SWALE	190	3.5	0.9	24.2		
24	E-4 OS-24 FB DP 22	0.67	0.76	18.7	3.0	5.3	2.9	21.1	@ GRADE INLET
		0.24	0.95						
		0.07	2.29	TRAVEL TIME					
		0.98	4.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	18.7	
25	E-5 FB DP 24	0.72	0.79	7.3	4.6	8.0	3.3	10.7	@ GRADE INLET
		0.00	0.55	TRAVEL TIME					
		0.72	1.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	7.3	
26	DP 23 DP 24 DP 25	4.30	12.28	24.2	2.6	4.6	15.8	80.9	
		0.98	4.00						
		0.72	1.34	TRAVEL TIME					
		6.00	17.62	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				SWALE	900	5.4	2.8	26.9	
27A	EX-8	1.92	7.67	16.1	3.3	5.7	6.3	43.7	
				TRAVEL TIME					
		1.92	7.67	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	16.1	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
27B	C-8	0.04	0.15	11.2	3.9	6.7	0.2	1.0	
		T R A V E L T I M E							
		0.04	0.15	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.6	0.0	11.2		
CC	DP 27A	1.92	7.67	53.3	1.6	2.8	278.8	1229.4	EXITS SITE
	DP 27B	0.04	0.15						
	DP 20B	4.11	7.28						
	DP 26	6.00	17.62						
	BB	160.58	403.20	T R A V E L T I M E					
		172.64	435.93	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	53.3	
EAST OF FILING NO. 2:									
30	Release rate from Meadows Pond 2	0.80	10.76	15.0	3.4	5.9	2.7	63.4	Flows from Meadows Filing No. 3 Pond 2 - Updated HEC HMS model
		T R A V E L T I M E							
		0.80	10.76	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			Sheet	2300	2.1	18.3	33.3		
31	OS-25 DP 30	1.55	5.23	33.3	2.2	3.8	5.1	60.9	
		0.80	10.76	T R A V E L T I M E					
		2.35	15.99	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			Sheet	700	2.6	4.5	37.7		
32	OS-26 C1a DP 31	0.52	2.09	37.7	2.0	3.5	6.5	65.0	
		0.34	0.39						
		2.35	15.99	T R A V E L T I M E					
		3.21	18.47	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.0	0.0	37.7		
32-N	DP-32	3.21	9.44	37.7	2.0	3.5	6.5	33.2	Flows remaining in north half of BGMD & continuing east (Max gutter flow allowed 5 Yr=9.4, 100 Yr=33.2)
		T R A V E L T I M E							
		3.21	9.44	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			Street	905	2.0	7.5	45.3		
32-S	DP BG 1a OT from DP 32-N	0.32	0.40	37.7	2.0	3.5	0.6	33.2	Flows remaining in south half of BGMD & continuing east (Max gutter flow allowed 5 Yr=9.4 & 100 Yr=33.2)
		0.00	9.04						
		0.32	9.44	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.5	0.0	37.7		
BG 1a-Os		0.00	-0.01	37.7	2.0	3.5	0.0	0.0	Overtopping Flows from DP 32 which will head south through Bent Grass Filing No. 1 in Sea Oats Drive (Sea Oats Dr can carry 2.2 & 11.6 cfs per side)
		T R A V E L T I M E							
		0.00	-0.01	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG 1a-Ose		0.00	0.00	37.7	2.0	3.5	0.0	0.0	Overtopping Flows from DP 1a-Os which will flow in east half of Sea Oats Drive
		T R A V E L T I M E							
		0.00	0.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG 1a-Osw		0.00	0.00	37.7	2.0	3.5	0.0	0.0	Overtopping Flows from DP 1a-Os which will flow in west half of Sea Oats Drive
		T R A V E L T I M E							
		0.00	0.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG 4a	H1a DP BG 1a-Ose	0.19	0.26	37.7	2.0	3.5	0.4	0.9	Flows to west side of Inlet 4
		0.00	0.00	T R A V E L T I M E					
		0.19	0.26	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG .1b	D1b DP BG 1a-Osw			Street	600	2.0	5.0	42.7	
		0.39	0.48	37.7	2.0	3.5	0.8	1.7	
		0.00	0.00	T R A V E L T I M E					
		0.39	0.48	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG 1c	D1c DP BG 1b			Street	575	2.8	3.4	41.2	Flows in Aveno Rd to east side of Inlet 1 (Max gutter allowed 1.6 & 8.6 cfs per side)
		0.70	0.85	41.2	1.9	3.3	2.1	4.4	
		0.39	0.48	T R A V E L T I M E					
		1.09	1.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.5	0.0	41.2	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
BG 1	D1d DP 1c	1.65	1.98	41.2	1.9	3.3	5.2	11.0	Existing 10' Sump Inlet - Total flow to Inlet 1
		1.09	1.33	T R A V E L T I M E					
		2.74	3.31	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SUMP		5.0	0.0	41.2			
BG 2e	D2a	0.35	0.55	5.0	5.2	9.1	1.8	5.0	Flows in Aveno Rd to east side of Inlet 2 (Max gutter allowed 1.6 & 8.6 cfs per side)
				T R A V E L T I M E					
		0.35	0.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	5.0			
BG 2w	D2b	0.19	0.26	5.0	5.2	9.1	1.0	2.4	Flows in Aveno Rd to west side of Inlet 2 (Max gutter allowed 2.2 & 11.4 cfs per side)
				T R A V E L T I M E					
		0.19	0.26	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	5.0			
BG 2	DP BG 2e DP BG 2w	0.35	0.55	5.0	5.2	9.1	2.8	7.3	Existing 4' Sump Inlet - Total flow to Inlet 2
		0.19	0.26	T R A V E L T I M E					
		0.54	0.81	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SUMP		5.0	0.0	5.0			
BG 4e	H1c	0.07	0.10	5.0	5.2	9.1	0.4	0.9	Flows in Aveno Rd to east side of Inlet 4 (Max gutter allowed 1.8 & 9.8 cfs per side)
				T R A V E L T I M E					
		0.07	0.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	5.0			
BG 4w	H1b DP BG 4a	1.11	1.51	42.7	1.9	3.3	2.4	5.7	Flows in Aveno Rd to west side of Inlet 4 (Max gutter allowed 2.1 & 11.3 cfs per side)
		0.19	0.26	T R A V E L T I M E					
		1.30	1.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	42.7			
BG 4	DP BG 4e DP BG 4w	0.07	0.10	42.7	1.9	3.3	2.6	6.1	Existing 4' Sump Inlet
		1.30	1.77	T R A V E L T I M E					
		1.37	1.87	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SUMP		5.0	0.0	42.7			
BG 5e	H2b	0.05	0.08	5.0	5.2	9.1	0.3	0.7	Flows in Aveno Rd to east side of Inlet 5 (Max gutter allowed 1.8 & 9.8 cfs per side)
				T R A V E L T I M E					
		0.05	0.08	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	5.0			
BG 5w	H2a	0.45	0.64	11.9	3.8	6.6	1.7	4.2	Flows in Aveno Rd to west side of Inlet 5 (Max gutter allowed 2.1 & 11.3 cfs per side)
				T R A V E L T I M E					
		0.45	0.64	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	11.9			
BG 5	DP BG 5e DP BG 5w	0.05	0.08	11.9	3.8	6.6	1.9	4.7	Existing 4' Sump Inlet
		0.45	0.64	T R A V E L T I M E					
		0.50	0.72	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SUMP		5.0	0.0	11.9			
BG 3	G DP BG 1 DP BG 2	0.68	0.85	41.2	1.9	3.3	7.6	16.6	Flows into BG Pond 1 from West side
		2.74	3.31	T R A V E L T I M E					
		0.54	0.81	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		3.96	4.97			2.8	0.0	41.2	
BG 6	DP BG 4 DP BG 5	1.37	1.87	42.7	1.9	3.3	3.5	8.4	Flows into BG Pond 1 from East Side
		0.50	0.72	T R A V E L T I M E					
		1.87	2.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				5.0	0.0	42.7			
	DP BG 3 DP BG 6	3.96	4.97	42.7	1.9	3.3	10.9	24.6	Total flows into BG Pond 1
		1.87	2.59	T R A V E L T I M E					
		5.83	7.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SUMP		5.0	0.0	42.7			
BG POND1	BG POND 1 RELEASE	0.10	2.43	5.0	5.2	9.1	0.5	22.0	
				T R A V E L T I M E					
		0.10	2.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				2.6	0.0	5.0			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
BG 14n	OS-2 H5 C1b DP 32-N	2.81	8.03	45.3	1.8	3.1	13.0	63.8	Flow continuing in North half of BGMD		
		0.57	2.15								
		0.63	0.72								
		3.21	9.44	T R A V E L T I M E							
		7.22	20.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
		Street	300	2.8	1.8	47.1					
BG 15n	OS-3 D1c DP BG 14n	1.49	4.25	47.1	1.8	3.1	12.6	62.2	Flow continuing in North half of BGMD		
		0.70	0.85								
		7.22	20.34	T R A V E L T I M E							
		9.41	25.44	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	47.1			
BG 50		111.34	193.50	26.1	2.5	4.4	280.0	850.0	Flow from Falcon DBPS at Meridian Rd & BGMD Intersection		
		T R A V E L T I M E									
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	26.1			
BG 20	DP BG 15n DP BG 50	9.41	25.44	26.1	2.5	4.4	303.7	961.8	Combined flow at Culvert Crossing - North side of BGMD		
		111.34	193.50	T R A V E L T I M E							
		120.75	218.94	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
			Culverts	125	11.2	0.2	26.3				
BG 14s	C2a DP 32-S	0.72	0.89	37.7	2.0	3.5	1.5	36.4	Flow continuing in South half of BGMD		
			9.44	T R A V E L T I M E							
		0.72	10.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				Street	300	2.8	1.8	39.5			
BG 15s	C2b DP BG 14s	0.83	0.91	39.5	2.0	3.4	3.0	38.5	Flow continuing in South half of BGMD		
		0.72	10.33	T R A V E L T I M E							
		1.55	11.24	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	39.5			
BG 21	DP 20 DP BG 15s	120.75	218.94	26.3	2.5	4.4	306.3	1007.0	Combined flow at Culvert Crossing - South side of BGMD		
		1.55	11.24	T R A V E L T I M E							
		122.30	230.18	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
			Channel	1250	2.0	10.4	36.7				
BG 32	F	0.55	0.75	6.9	4.7	8.1	2.6	6.1			
		T R A V E L T I M E									
		0.55	0.75	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	6.9			
BG 33	J	0.66	0.90	7.9	4.4	7.8	2.9	7.0			
		T R A V E L T I M E									
		0.66	0.90	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	7.9			
BG 7	H3	0.85	1.00	12.5	3.7	6.4	3.1	6.4	Ex 4' Sump Inlet		
		T R A V E L T I M E									
		0.85	1.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	12.5			
BG 8	H4	0.23	0.27	9.4	4.2	7.3	1.0	2.0	Ex 4' Sump Inlet		
		T R A V E L T I M E									
		0.23	0.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	9.4			
BG 9	I1	1.65	1.95	10.7	3.9	6.9	6.5	13.4	Ex 6' Sump Inlet		
		T R A V E L T I M E									
		1.65	1.95	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	10.7			
BG 10	I2	0.94	1.11	9.9	4.1	7.1	3.8	7.9	Ex 4' Sump Inlet		
		T R A V E L T I M E									
		0.94	1.11	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	9.9			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
BG 11	DP BG 7	0.85	1.00	12.5	3.7	6.4	13.5	27.8	Inflow to BG Pond 2 West Storm Sewer
	DP BG 8	0.23	0.27						
	DP BG 9	1.65	1.95						
	DP BG 10	0.94	1.11	T R A V E L T I M E					
		3.67	4.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG 12	M1	1.33	1.40	8.3	4.4	7.6	5.8	10.7	Ex 6' Sump Inlet
				T R A V E L T I M E					
		1.33	1.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	8.3	
BG 13	M2 N	0.37	0.40	6.8	4.7	8.2	7.0	13.0	Ex 6' Sump Inlet
		1.12	1.19	T R A V E L T I M E					
		1.49	1.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	6.8	
BG 14	DP BG 12 DP BG 13	1.33	1.40	8.3	4.4	7.6	12.3	22.8	Inflow to BG Pond 2 East Storm Sewer
		1.49	1.59	T R A V E L T I M E					
		2.82	2.99	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	8.3	
BG 15	K L DP BG 11 DP BG 14	0.40	0.55	12.5	3.7	6.4	42.2	82.0	Total Inflow to BG Pond 2
		4.60	4.90						
		3.67	4.33						
		2.82	2.99	T R A V E L T I M E					
		11.49	12.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
BG POND2	BG POND 2 RELEASE	0.08	1.10	5.0	5.2	9.1	0.4	10.0	
				T R A V E L T I M E					
		0.08	1.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
BG 30	PLD RELEASE RATE	0.58	0.55	5.0	5.2	9.1	3.0	5.0	Released flows from existing PLD on 7-11 site
				T R A V E L T I M E					
		0.58	0.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
BG 31	D	0.34	0.34	5.0	5.2	9.1	1.8	3.1	Future lot for development in Bent Grass East Commercial Filing No. 1
				T R A V E L T I M E					
		0.34	0.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	5.0	
BG 25	P-1 DP BG 21 BG 30 BG 31 BG POND 2	1.22	1.50	36.7	2.1	3.6	255.5	837.4	Flow @ Existing Culvert, north side of Owl Place
		122.30	230.18						
		0.58	0.55						
		0.34	0.34	T R A V E L T I M E					
	0.08	1.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)		
		124.51	233.68			5.0	0.0	36.7	

Future Rational Calculations

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Residential - 1/8 Acre			Residential - 1/4 Acre			Residential - 1/3 Acre			Residential - 1/2 Acre			Residential - 1 Acre			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
F-1	0.44	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65	0.00	0.0	40	0.41	37.3	30	0.00	0.0	25	0.00	0.0	20	0.03	1.4	38.7
F-2	0.55	100	0.21	38.2	2	0.11	0.4	90	0.00	0.0	65	0.23	27.2	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.8
G-1	1.47	100	0.00	0.0	2	0.64	0.9	90	0.00	0.0	65	0.25	11.1	40	0.08	2.2	30	0.20	4.1	25	0.30	5.1	20	0.00	0.0	23.4
H-1	0.52	100	0.00	0.0	2	0.52	2.0	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
I-1	0.31	100	0.22	71.0	2	0.09	0.6	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	71.6
BENT GRASS WEST BASINS																										
AA-1	2.57	100	0.52	20.2	2	0.20	0.2	90	0.00	0.0	65.0	0.79	20.0	40	0.00	0.0	30	0.31	3.6	25	0.00	0.0	20	0.75	5.8	49.8
AA-2	2.28	100	0.40	17.5	2	0.46	0.4	90	0.00	0.0	65.0	1.43	40.8	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	58.7
B-1	5.25	100	0.00	0.0	2	4.55	1.7	90	0.00	0.0	65.0	0.88	10.9	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	12.6
B-2	4.16	100	0.00	0.0	2	4.41	2.1	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.1
CC-1	9.07	100	2.14	23.6	2	0.33	0.1	90	0.00	0.0	65.0	4.56	32.7	40	1.70	7.5	30	0.34	1.1	25	0.00	0.0	20	0.00	0.0	65.0
CC-2	1.53	100	0.44	28.8	2	0.19	0.2	90	0.00	0.0	65.0	0.90	38.2	40	0.00	0.0	30	0.25	4.9	25	0.00	0.0	20	0.00	0.0	72.1
CC-3	1.88	100	1.12	59.6	2	0.00	0.0	90	0.00	0.0	65.0	0.76	26.3	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	85.9
CC-4	3.64	100	0.00	0.0	2	1.15	0.6	90	0.00	0.0	65.0	2.49	44.5	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	45.1
CC-5	0.45	100	0.00	0.0	2	0.45	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
D-1	9.07	100	1.52	16.8	2	0.69	0.2	90	0.00	0.0	65.0	2.35	16.8	40	1.86	8.2	30	1.53	5.1	25	1.12	3.1	20	0.00	0.0	50.2
D-2	7.42	100	2.31	31.1	2	0.76	0.2	90	0.00	0.0	65.0	4.35	38.1	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	69.4
D-3	2.03	100	0.00	0.0	2	0.28	0.3	90	0.00	0.0	65.0	0.36	11.5	40	0.17	3.3	30	0.12	1.8	25	0.00	0.0	20	0.00	0.0	16.9
D-4	4.38	100	1.21	27.6	2	0.63	0.3	90	0.00	0.0	65.0	2.53	37.5	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.4
D-5	1.08	100	0.22	20.4	2	0.11	0.2	90	0.00	0.0	65.0	0.75	45.1	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.7
D-6	4.01	100	0.91	22.7	2	0.09	0.0	90	0.00	0.0	65.0	3.01	48.8	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	71.5
D-7	6.39	100	0.00	0.0	2	5.59	1.7	90	0.00	0.0	65.0	0.80	8.1	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	9.8
D-8	1.69	100	0.00	0.0	2	1.13	1.3	90	0.00	0.0	65.0	0.56	21.5	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	22.8
MERIDIAN ROAD BASIN																										
P-1	2.03	100	1.29	63.6	2	0.74	0.7	90	0.00	0.0	65	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	64.3

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Residential - 1/8 Acre			Residential - 1/4 Acre			Residential - 1/3 Acre			Residential - 1/2 Acre			Residential - 1 Acre			Composite C ₅	Composite C ₁₀₀	
		C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)	C ₅	C ₁₀₀	Area (ac)			
E-4	0.91	0.90	0.96	0.73	0.09	0.36	0.18	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.74	0.84	
E-5	0.89	0.90	0.96	0.79	0.09	0.36	0.10	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.81	0.89	
F-1	0.44	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.41	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.03	0.29	0.50	
F-2	0.55	0.90	0.96	0.21	0.09	0.36	0.11	0.73	0.81	0.00	0.45	0.59	0.23	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.55	0.69	
G-1	1.47	0.90	0.96	0.00	0.09	0.36	0.64	0.73	0.81	0.00	0.45	0.59	0.25	0.30	0.50	0.08	0.25	0.47	0.20	0.22	0.46	0.30	0.20	0.44	0.00	0.21	0.44	
H-1	0.52	0.90	0.96	0.00	0.09	0.36	0.52	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36	
I-1	0.31	0.90	0.96	0.22	0.09	0.36	0.09	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.66	0.79	
BENT GRASS WEST BASINS:																												
AA-1	2.57	0.90	0.96	0.52	0.09	0.36	0.20	0.73	0.81	0.00	0.45	0.59	0.79	0.30	0.50	0.00	0.25	0.47	0.31	0.22	0.46	0.00	0.20	0.44	0.75	0.42	0.59	
AA-2	2.28	0.90	0.96	0.40	0.09	0.36	0.46	0.73	0.81	0.00	0.45	0.59	1.43	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.46	0.61	
B-1	5.25	0.90	0.96	0.00	0.09	0.36	4.55	0.73	0.81	0.00	0.45	0.59	0.88	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.15	0.41	
B-2	4.16	0.90	0.96	0.00	0.09	0.36	4.41	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.10	0.38	
CC-1	9.07	0.90	0.96	2.14	0.09	0.36	0.33	0.73	0.81	0.00	0.45	0.59	4.56	0.30	0.50	1.70	0.25	0.47	0.34	0.22	0.46	0.00	0.20	0.44	0.00	0.51	0.65	
CC-2	1.53	0.90	0.96	0.44	0.09	0.36	0.19	0.73	0.81	0.00	0.45	0.59	0.90	0.30	0.50	0.00	0.25	0.47	0.25	0.22	0.46	0.00	0.20	0.44	0.00	0.58	0.74	
CC-3	1.88	0.90	0.96	1.12	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.76	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.72	0.81	
CC-4	3.64	0.90	0.96	0.00	0.09	0.36	1.15	0.73	0.81	0.00	0.45	0.59	2.49	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.34	0.52	
CC-5	0.45	0.90	0.96	0.00	0.09	0.36	0.45	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36	
D-1	9.07	0.90	0.96	1.52	0.09	0.36	0.69	0.73	0.81	0.00	0.45	0.59	2.35	0.30	0.50	1.86	0.25	0.47	1.53	0.22	0.46	1.12	0.20	0.44	0.00	0.41	0.58	
D-2	7.42	0.90	0.96	2.31	0.09	0.36	0.76	0.73	0.81	0.00	0.45	0.59	4.35	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.55	0.68	
D-3	2.03	0.90	0.96	0.00	0.09	0.36	0.28	0.73	0.81	0.00	0.45	0.59	0.36	0.30	0.50	0.17	0.25	0.47	0.12	0.22	0.46	0.00	0.20	0.44	0.00	0.13	0.22	
D-4	4.38	0.90	0.96	1.21	0.09	0.36	0.63	0.73	0.81	0.00	0.45	0.59	2.53	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.52	0.66	
D-5	1.08	0.90	0.96	0.22	0.09	0.36	0.11	0.73	0.81	0.00	0.45	0.59	0.75	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.51	0.64	
D-6	4.01	0.90	0.96	0.91	0.09	0.36	0.09	0.73	0.81	0.00	0.45	0.59	3.01	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.54	0.67	
D-7	6.39	0.90	0.96	0.00	0.09	0.36	5.59	0.73	0.81	0.00	0.45	0.59	0.80	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.14	0.39	
D-8	1.69	0.90	0.96	0.00	0.09	0.36	1.13	0.73	0.81	0.00	0.45	0.59	0.56	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.21	0.44	
PROPOSED:																												
P-1	2.03	0.90	0.96	1.29	0.09	0.36	0.74	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.60	0.74	

STANDARD FORM SF-2 TIME OF CONCENTRATION (FUTURE CONDITIONS)

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL	
DATA						(T _i)			(T _t)					(URBANIZED BASINS)				
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C ₅	C100	L (FT)	S (%)	T _i (MIN)	L (FT)	S (%)	C _v	VEL. (FPS)	T _t (MIN)	COMP. T _c (MIN)	TOTAL LENGTH (FT)	Urbanized T _c (MIN)		T _c (MIN)
OFFSITE BASINS																		
WT200	192.00	A	0.0	0.20	0.44	300	2.0	22.7	2060	2.0	15	2.1	16.2	38.8	2360.0	23.1	23.1	
OS-2	20.08	A	8.0	0.14	0.40	100	2.3	13.3	1400	2.3	15	2.3	10.3	23.6	1500.0	18.3	18.3	
OS-3	10.62	A	8.0	0.14	0.40	100	2.0	14.0	1500	2.0	15	2.1	11.8	25.7	1600.0	18.9	18.9	
OS-25	18.74	A	4.6	0.11	0.37	100	1.7	15.2	1730	1.7	15	2.0	14.7	29.9	1830.0	20.2	20.2	
OS-26	5.81	A	2.0	0.09	0.36	100	1.0	18.5	650	1.0	10	1.0	10.8	29.3	750.0	14.2	14.2	
H5	6.37	A	10.2	0.14	0.39	100	1.0	17.6	600	7.0	10	2.6	3.8	21.4	700.0	13.9	13.9	
OS-22	4.42	A	2.0	0.09	0.36	100	1.0	18.5	600	1.0	10	1.0	10.0	28.5	700.0	13.9	13.9	
OS-23	10.24	A	2.0	0.09	0.36	100	1.0	18.5	600	1.0	10	1.0	10.0	28.5	700.0	13.9	13.9	
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS																		
C1a	0.48	A	75.5	0.70	0.81	5	2.0	1.3	400	1.0	20	2.0	3.3	4.6	405.0	12.3	5.0	
C1b	0.88	A	77.7	0.72	0.82	10	2.0	1.7	310	2.0	20	2.8	1.8	3.6	320.0	11.8	5.0	
C1c	1.09	A	81.1	0.74	0.84	50	2.0	3.7	310	2.0	20	2.8	1.8	5.5	360.0	12.0	5.5	
D1a	0.56	A	59.8	0.57	0.71	5	2.0	1.7	400	1.0	20	2.0	3.3	5.1	405.0	12.3	5.1	
D1b	0.68	A	65.3	0.57	0.71	10	2.0	2.4	310	2.0	20	2.8	1.8	4.3	320.0	11.8	5.0	
D1c	1.20	A	66.7	0.58	0.71	50	2.0	5.3	310	2.0	20	2.8	1.8	7.2	360.0	12.0	7.2	
D1d	2.79	A	67.8	0.59	0.71	100	2.0	7.4	485	2.0	20	2.8	2.9	10.3	585.0	13.3	10.3	
C2a	1.26	A	59.6	0.57	0.71	12	2.0	2.7	965	1.0	20	2.0	8.0	10.7	977.0	15.4	10.7	
C2b	0.99	A	93.1	0.84	0.92	12	2.0	1.3	1190	1.0	20	2.0	9.9	11.2	1202.0	16.7	11.2	
D2a	1.00	A	34.7	0.35	0.55	5	2.0	2.4	310	2.0	20	2.8	1.8	4.3	315.0	11.8	5.0	
D2b	0.41	A	49.8	0.46	0.63	5	2.0	2.1	225	2.0	20	2.8	1.3	3.4	230.0	11.3	5.0	
H1a	0.40	A	50.0	0.48	0.65	10	2.0	2.8	310	2.0	20	2.8	1.8	4.7	320.0	11.8	5.0	
H1b	2.52	A	47.6	0.44	0.60	50	2.0	6.8	575	1.0	20	2.0	4.8	11.6	625.0	13.5	11.6	
H1c	0.16	A	43.6	0.42	0.60	5	2.0	2.2	100	1.0	20	2.0	0.8	3.0	105.0	10.6	5.0	
H2a	1.09	A	41.9	0.41	0.59	50	2.0	7.1	575	1.0	20	2.0	4.8	11.9	625.0	13.5	11.9	
H2b	0.15	A	34.7	0.36	0.56	5	2.0	2.4	100	1.0	20	2.0	0.8	3.2	105.0	10.6	5.0	
F	1.37	A	40.0	0.40	0.55	80	4.5	6.9						6.9	80.0	10.4	6.9	
G	1.70	A	40.0	0.40	0.50	240	1.5	17.3						17.3	240.0	11.3	11.3	
H3	1.54	A	75.0	0.55	0.65	100	0.5	12.6	350	2.0		4.9	1.2	13.8	450.0	12.5	12.5	
H4	0.42	A	75.0	0.55	0.65	50	0.5	8.9	150	2.0		4.9	0.5	9.4	200.0	11.1	9.4	
I1	3.00	A	75.0	0.55	0.65	50	0.5	8.9	550	2.0		4.9	1.9	10.7	600.0	13.3	10.7	
I2	1.70	A	75.0	0.55	0.65	50	0.5	8.9	300	2.0		4.9	1.0	9.9	350.0	11.9	9.9	
J	1.64	A	55.0	0.40	0.55	75	2.8	7.9						7.9	75.0	10.4	7.9	
K	1.00	A	55.0	0.40	0.55	65	2.4	7.7						7.7	65.0	10.4	7.7	
L	5.90	A	90.0	0.78	0.83	50	0.2	6.9	800	1.0		3.5	3.8	10.7	850.0	14.7	10.7	
M1	1.56	A	95.0	0.85	0.90	50	0.1	6.9	300	1.0		3.5	1.4	8.3	350.0	11.9	8.3	
M2	0.44	A	95.0	0.85	0.90									0.0	0.0	10.0	5.0	
N	1.32	A	95.0	0.85	0.90	40	0.1	5.7	330	2.0		4.9	1.1	6.8	370.0	12.1	6.8	

STANDARD FORM SF-2 TIME OF CONCENTRATION (FUTURE CONDITIONS)

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					Tc CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN	D.A.	Hydrologic	Impervious	C ₅	C100	L	S	T _i	L	S	Cv	VEL.	T _t	COMP. T _c	TOTAL	Urbanized T _c	
D	0.41	A	90.0	0.82	0.83	50	2.0	2.9						2.9	50.0	10.3	5.0
BENT GRASS FILING NO. 2 BASINS																	
OS-1	33.07	A	10.9	0.16	0.41	100	2.4	12.9	2100	2.2	15	2.2	15.7	28.6	2200.0	22.2	22.2
OS-4	4.46	A	49.5	0.36	0.54	100	2.0	10.8	910	1.2	20	2.2	6.9	17.7	1010.0	15.6	15.6
OS-5	0.46	A	65.0	0.45	0.59	15	2.0	3.7	190	1.0	20	2.0	1.6	5.2	205.0	11.1	5.2
OS-6	1.17	A	65.0	0.45	0.59	85	0.2	18.7	430	0.9	20	1.9	3.8	22.5	515.0	12.9	12.9
A-1	2.70	A	44.7	0.33	0.52	100	1.3	12.9	550	1.3	20	2.3	4.0	16.9	650.0	13.6	13.6
A-2	1.19	A	43.4	0.32	0.51	100	4.3	8.8	310	2.3	20	3.0	1.7	10.5	410.0	12.3	10.5
A-3	1.57	A	49.4	0.36	0.53	70	1.0	11.3	680	1.2	20	2.2	5.2	16.5	750.0	14.2	14.2
A-4	2.24	A	46.5	0.34	0.53	100	4.2	8.6	650	1.7	20	2.6	4.2	12.8	750.0	14.2	12.8
C-1	1.35	A	58.2	0.42	0.57	35	2.4	5.5	400	2.4	20	3.1	2.2	7.7	435.0	12.4	7.7
C-2	6.80	A	46.8	0.34	0.53	100	2.0	11.0	1770	1.5	20	2.4	12.0	23.1	1870.0	20.4	20.4
C-3	2.38	A	56.9	0.40	0.56	100	1.6	11.0	810	1.0	20	2.0	6.8	17.7	910.0	15.1	15.1
C-4	3.61	A	59.8	0.42	0.57	100	2.0	9.9	973	2.0	20	2.8	5.7	15.6	1073.0	16.0	15.6
C-5	7.86	A	60.8	0.42	0.57	100	2.0	9.9	1200	1.3	20	2.3	8.8	18.7	1300.0	17.2	17.2
C-6	5.54	A	52.7	0.38	0.55	100	3.0	9.1	1230	1.5	20	2.4	8.4	17.5	1330.0	17.4	17.4
C-7	0.89	A	2.0	0.09	0.36	80	2.5	12.2	150	2.0	15	2.1	1.2	13.4	230.0	11.3	11.3
E-1	1.71	A	62.3	0.55	0.69	25	2.0	4.0	940	1.0	20	2.0	7.8	11.8	965.0	15.4	11.8
E-2	0.68	A	82.8	0.76	0.85	25	2.0	2.5	665	1.6	20	2.5	4.4	6.9	690.0	13.8	6.9
E-3	0.78	A	88.7	0.81	0.89	25	2.0	2.1	632	1.0	20	2.0	5.3	7.4	657.0	13.7	7.4
E-4	0.91	A	80.6	0.74	0.84	25	2.0	2.6	913	2.0	20	2.8	5.4	8.0	938.0	15.2	8.0
E-5	0.89	A	89.0	0.81	0.89	25	2.0	2.1	903	2.1	20	2.9	5.2	7.3	928.0	15.2	7.3
F-1	0.44	A	38.7	0.29	0.50	66	2.5	8.9	1	1.0	15	1.5	0.0	8.9	67.0	10.4	8.9
F-2	0.55	A	65.8	0.55	0.69	25	2.0	4.0	464	4.0	20	4.0	1.9	5.9	489.0	12.7	5.9
G-1	1.47	A	23.4	0.21	0.44	20	2.0	5.8	700	3.5	15	2.8	4.2	9.9	720.0	14.0	9.9
H-1	0.52	A	2.0	0.09	0.36	25	2.0	7.3	135	2.0	20	2.8	0.8	8.1	160.0	10.9	8.1
I-1	0.31	A	71.6	0.66	0.79	25	2.0	3.2	135	2.0	20	2.8	0.8	4.0	160.0	10.9	5.0
BENT GRASS WEST BASINS																	
AA-1	2.57	A	49.8	0.42	0.59	100	4.0	7.8	765	2.5	20	3.2	4.0	11.9	865.0	14.8	11.9
AA-2	2.28	A	58.7	0.46	0.61	60	2.0	7.2	735	2.5	20	3.2	3.9	11.1	795.0	14.4	11.1
B-1	5.25	A	12.6	0.15	0.41	90	6.4	8.9	2000	1.7	15	2.0	17.0	25.9	2090.0	21.6	21.6
B-2	4.16	A	2.1	0.10	0.38	160	11.0	10.4	920	1.6	15	1.9	8.1	18.5	1080.0	16.0	16.0
CC-1	9.07	A	65.0	0.51	0.65	75	2.0	7.4	1160	2.3	20	3.0	6.4	13.9	1235.0	16.9	13.9
CC-2	1.53	A	72.1	0.58	0.74	10	2.0	2.4	380	4.0	20	4.0	1.6	4.0	390.0	12.2	5.0
CC-3	1.88	A	85.9	0.72	0.81	10	2.0	1.7	945	2.5	20	3.2	5.0	6.7	955.0	15.3	6.7
CC-4	3.64	A	45.1	0.34	0.52	5	2.0	2.5	575	2.5	20	3.2	3.0	5.5	580.0	13.2	5.5
CC-5	0.45	A	2.0	0.09	0.36	5	2.0	3.3		1.0	15	1.5	0.0	3.3	5.0	10.0	5.0
D-1	9.07	A	50.2	0.41	0.58	100	2.6	9.2	1900	1.3	20	2.3	13.9	23.1	2000.0	21.1	21.1
D-2	7.42	A	69.4	0.55	0.68	10	2.0	2.5	1355	1.3	20	2.3	9.9	12.4	1365.0	17.6	12.4

STANDARD FORM SF-2 TIME OF CONCENTRATION (FUTURE CONDITIONS)

Subdivision: Bent Grass
Location: CO, Colorado Springs

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

SUB-BASIN						INITIAL/OVERLAND			TRAVEL TIME					T _c CHECK			FINAL
DATA						(T _i)			(T _t)					(URBANIZED BASINS)			
BASIN	D.A.	Hydrologic	Impervious	C ₅	C100	L	S	T _i	L	S	C _v	VEL.	T _t	COMP. T _c	TOTAL	Urbanized T _c	
D-3	2.03	A	16.9	0.13	0.22	25	8.0	4.4	1960	1.0	15	1.5	21.8	26.2	1985.0	21.0	21.0
D-4	4.38	A	65.4	0.52	0.66	100	2.3	8.0	980	1.0	20	2.0	8.2	16.2	1080.0	16.0	16.0
D-5	1.08	A	65.7	0.51	0.64	100	2.0	8.6	300	1.1	20	2.1	2.4	11.0	400.0	12.2	11.0
D-6	4.01	A	71.5	0.54	0.67	45	2.0	5.5	835	1.0	20	2.0	7.0	12.4	880.0	14.9	12.4
D-7	6.39	A	9.8	0.14	0.39	200	7.5	12.7	665	1.0	15	1.5	7.4	20.1	865.0	14.8	14.8
D-8	1.69	A	22.8	0.21	0.44	125	3.7	11.8	600	1.0	15	1.5	6.7	18.4	725.0	14.0	14.0
PROPOSED:																	
P-1	2.03	A	64.3	0.60	0.74	100	6.0	5.0	1230	1.7	15	2.0	10.5	15.5	1330.0	17.4	15.5

NOTES:

$T_i = (0.395 * (1.1 - C_s) * (L)^{0.5}) / ((S)^{0.33})$, S in ft/ft

$T_t = L / 60V$

Velocity $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

Type of Land Surface	C _v
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

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
OFFSITE BASINS																				
		RWT202	1574.40						46.6	120.88	1.82	220.0								From Falcon DBPS by Matrix
		RWT204	38.40						11.4	1.78	3.93	7.0								From Falcon DBPS by Matrix
		WT200	192.00						37.8	24.41	2.13	52.0								From Falcon DBPS by Matrix
		OS-2	20.08	0.14	18.3	2.81	3.22	9.0												
		OS-3	10.62	0.14	18.9	1.49	3.18	4.7												
		OS-25	18.74	0.11	20.2	2.06	3.08	6.3												
		OS-26	5.81	0.09	14.2	0.52	3.61	1.9												
		H5	6.37	0.14	13.9	0.89	3.64	3.2												
		OS-22	4.42	0.09	13.9	0.40	3.64	1.5												
		OS-23	10.24	0.09	13.9	0.92	3.64	3.3												
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS																				
		C1a	0.48	0.70	5.0	0.34	5.17	1.8												
		D1a	0.56	0.57	5.1	0.32	5.15	1.6												
		H1a	0.40	0.48	5.0	0.19	5.17	1.0												
		D1b	0.68	0.57	5.0	0.39	5.17	2.0												
		D1c	1.20	0.58	7.2	0.70	4.63	3.2												
		D1d	2.79	0.59	10.3	1.65	4.09	6.7												
		D2a	1.00	0.35	5.0	0.35	5.17	1.8												
		D2b	0.41	0.46	5.0	0.19	5.17	1.0												
		H1b	2.52	0.44	11.6	1.11	3.91	4.3												
		H1c	0.16	0.42	5.0	0.07	5.17	0.4												
		H2a	1.09	0.41	11.9	0.45	3.87	1.7												
		H2b	0.15	0.36	5.0	0.05	5.17	0.3												

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		C1b	0.88	0.72	5.0	0.63	5.17	3.3												
		C1c	1.09	0.74	5.5	0.81	5.02	4.1												
		C2a	1.26	0.57	10.7	0.72	4.03	2.9												
		C2b	0.99	0.84	11.2	0.83	3.96	3.3												
		F	1.37	0.40	6.9	0.55	4.68	2.6												
		G	1.70	0.40	11.3	0.68	3.94	2.7												
		H3	1.54	0.55	12.5	0.85	3.79	3.2												
		H4	0.42	0.55	9.4	0.23	4.23	1.0												
		I1	3.00	0.55	10.7	1.65	4.02	6.6												
		I2	1.70	0.55	9.9	0.94	4.15	3.9												
		J	1.64	0.40	7.9	0.66	4.48	3.0												
		K	1.00	0.40	7.7	0.40	4.52	1.8												
		L	5.90	0.78	10.7	4.60	4.03	18.5												
		M1	1.56	0.85	8.3	1.33	4.41	5.9												
		M2	0.44	0.85	5.0	0.37	5.17	1.9												
		N	1.32	0.85	6.8	1.12	4.70	5.3												
		D	0.41	0.82	5.0	0.34	5.17	1.8												
BENT GRASS FILING NO. 2 BASINS																				
		OS-1	33.07	0.16	22.2	5.29	2.93	15.5												
		OS-4	4.46	0.36	15.6	1.61	3.46	5.6												
		OS-5	0.46	0.45	5.2	0.21	5.10	1.1												
		OS-6	1.17	0.45	12.9	0.53	3.75	2.0												
		A-1	2.70	0.33	13.6	0.89	3.67	3.3												
		A-2	1.19	0.32	10.5	0.38	4.06	1.5												
		A-3	1.57	0.36	14.2	0.57	3.61	2.1												

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		A-4	2.24	0.34	12.8	0.76	3.76	2.9												
		C-1	1.35	0.42	7.7	0.57	4.53	2.6												
		C-2	6.80	0.34	20.4	2.31	3.06	7.1												
		C-3	2.38	0.40	15.1	0.95	3.52	3.3												
		C-4	3.61	0.42	15.6	1.52	3.46	5.3												
		C-5	7.86	0.42	17.2	3.30	3.31	10.9												
		C-6	5.54	0.38	17.4	2.11	3.30	7.0												
		C-7	0.89	0.09	11.3	0.08	3.95	0.3												
		E-1	1.71	0.55	11.8	0.94	3.88	3.6												
		E-2	0.68	0.76	6.9	0.52	4.70	2.4												
		E-3	0.78	0.81	7.4	0.63	4.59	2.9												
		E-4	0.91	0.74	8.0	0.67	4.46	3.0												
		E-5	0.89	0.81	7.3	0.72	4.60	3.3												
		F-1	0.44	0.29	8.9	0.13	4.31	0.6												
		F-2	0.55	0.55	5.9	0.30	4.91	1.5												
		G-1	1.47	0.21	9.9	0.31	4.14	1.3												
		H-1	0.52	0.09	8.1	0.05	4.44	0.2												
		I-1	0.31	0.66	5.0	0.20	5.17	1.0												
BENT GRASS WEST BASINS																				
		AA-1	2.57	0.42	11.9	1.08	3.87	4.2												
		AA-2	2.28	0.46	11.1	1.05	3.98	4.2												
		B-1	5.25	0.15	21.6	0.79	2.97	2.3												
		B-2	4.16	0.10	16.0	0.42	3.42	1.4												
		CC-1	9.07	0.51	13.9	4.63	3.64	16.9												
		CC-2	1.53	0.58	5.0	0.89	5.17	4.6												

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		CC-3	1.88	0.72	6.7	1.35	4.72	6.4													
		CC-4	3.64	0.34	5.5	1.24	5.03	6.2													
		CC-5	0.45	0.09	5.0	0.04	5.17	0.2													
		D-1	9.07	0.41	21.1	3.72	3.01	11.2													
		D-2	7.42	0.55	12.4	4.08	3.80	15.5													
		D-3	2.03	0.13	21.0	0.26	3.01	0.8													
		D-4	4.38	0.52	16.0	2.28	3.42	7.8													
		D-5	1.08	0.51	11.0	0.55	3.99	2.2													
		D-6	4.01	0.54	12.4	2.17	3.80	8.2													
		D-7	6.39	0.14	14.8	0.89	3.54	3.2													
		D-8	1.69	0.21	14.0	0.35	3.62	1.3													
MERIDIAN ROAD BASINS																					
		P-1	2.03	0.60	15.5	1.22	3.47	4.2													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
OFFSITE BASINS																					
		RWT202	1574.40						46.6	327.87	3.05	1000.0									From Falcon DBPS by Matrix
		RWT204	38.40						11.4	6.52	6.60	43.0									From Falcon DBPS by Matrix
		WT200	192.00						37.8	53.07	3.58	190.0									From Falcon DBPS by Matrix
		OS-2	20.08	0.40	18.3	8.03	5.41	43.4													
		OS-3	10.62	0.40	18.9	4.25	5.33	22.7													
		OS-25	18.74	0.37	20.2	6.93	5.16	35.8													
		OS-26	5.81	0.36	14.2	2.09	6.05	12.6													
		H5	6.37	0.39	13.9	2.48	6.10	15.1													
		OS-22	4.42	0.36	13.9	1.59	6.10	9.7													
		OS-23	10.24	0.36	13.9	3.69	6.10	22.5													
BENT GRASS EAST COMMERCIAL & FILING NO. 1 BASINS																					
		C1a	0.48	0.81	5.0	0.39	8.68	3.4													
		D1a	0.56	0.71	5.1	0.40	8.65	3.5													
		H1a	0.40	0.65	5.0	0.26	8.68	2.3													
		D1b	0.68	0.71	5.0	0.48	8.68	4.2													
		D1c	1.20	0.71	7.2	0.85	7.77	6.6													
		D1d	2.79	0.71	10.3	1.98	6.87	13.6													
		D2a	1.00	0.55	5.0	0.55	8.68	4.8													
		D2b	0.41	0.63	5.0	0.26	8.68	2.3													
		H1b	2.52	0.60	11.6	1.51	6.56	9.9													
		H1c	0.16	0.60	5.0	0.10	8.68	0.9													
		H2a	1.09	0.59	11.9	0.64	6.50	4.2													
		H2b	0.15	0.56	5.0	0.08	8.68	0.7													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
		H3	1.54	0.65	12.5	1.00	6.37	6.4													
		C1b	0.88	0.82	5.0	0.72	8.68	6.2													
		C1c	1.09	0.84	5.5	0.92	8.43	7.8													
		C2a	1.26	0.71	10.7	0.89	6.76	6.0													
		C2b	0.99	0.92	11.2	0.91	6.64	6.0													
		F	1.37	0.55	6.9	0.75	7.85	5.9													
		G	1.70	0.50	11.3	0.85	6.62	5.6													
		H3	1.54	0.65	12.5	1.00	6.37	6.4													
		H4	0.42	0.65	9.4	0.27	7.10	1.9													
		I1	3.00	0.65	10.7	1.95	6.76	13.2													
		I2	1.70	0.65	9.9	1.11	6.96	7.7													
		J	1.64	0.55	7.9	0.90	7.52	6.8													
		K	1.00	0.55	7.7	0.55	7.59	4.2													
		L	5.90	0.83	10.7	4.90	6.77	33.2													
		M1	1.56	0.90	8.3	1.40	7.41	10.4													
		M2	0.44	0.90	5.0	0.40	8.68	3.5													
		N	1.32	0.90	6.8	1.19	7.89	9.4													
		D	0.41	0.83	5.0	0.34	8.68	3.0													
BENT GRASS FILING NO. 2 BASINS																					
		OS-1	33.07	0.41	22.2	13.56	4.92	66.7													
		OS-4	4.46	0.54	15.6	2.41	5.81	14.0													

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	
		OS-5	0.46	0.59	5.2	0.27	8.56	2.3												
		OS-6	1.17	0.59	12.9	0.69	6.30	4.3												
		A-1	2.70	0.52	13.6	1.40	6.16	8.6												
		A-2	1.19	0.51	10.5	0.61	6.81	4.2												
		A-3	1.57	0.53	14.2	0.83	6.05	5.0												
		A-4	2.24	0.53	12.8	1.19	6.31	7.5												
		C-1	1.35	0.57	7.7	0.77	7.61	5.9												
		C-2	6.80	0.53	20.4	3.60	5.14	18.5												
		C-3	2.38	0.56	15.1	1.33	5.90	7.8												
		C-4	3.61	0.57	15.6	2.06	5.81	12.0												
		C-5	7.86	0.57	17.2	4.48	5.56	24.9												
		C-6	5.54	0.55	17.4	3.05	5.54	16.9												
		C-7	0.89	0.36	11.3	0.32	6.63	2.1												
		E-1	1.71	0.69	11.8	1.18	6.51	7.7												
		E-2	0.68	0.85	6.9	0.58	7.89	4.6												
		E-3	0.78	0.89	7.4	0.69	7.70	5.3												
		E-4	0.91	0.84	8.0	0.76	7.50	5.7												
		E-5	0.89	0.89	7.3	0.79	7.73	6.1												
		F-1	0.44	0.50	8.9	0.22	7.23	1.6												
		F-2	0.55	0.69	5.9	0.38	8.25	3.1												
		G-1	1.47	0.44	9.9	0.65	6.95	4.5												
		H-1	0.52	0.36	8.1	0.19	7.45	1.4												
		I-1	0.31	0.79	5.0	0.24	8.68	2.1												

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

Subdivision: Bent Grass
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Falcon Meadows at Bent Grass
Project No.: CLH017.20
Calculated By: TJE
Checked By: CMD
Date: 3/23/20

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE		TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		Tt (min)
BENT GRASS WEST BASINS																					
		AA-1	2.57	0.59	11.9	1.52	6.50	9.9													
		AA-2	2.28	0.61	11.1	1.39	6.67	9.3													
		B-1	5.25	0.41	21.6	2.15	4.99	10.7													
		B-2	4.16	0.38	16.0	1.58	5.75	9.1													
		CC-1	9.07	0.65	13.9	5.90	6.11	36.0													
		CC-2	1.53	0.74	5.0	1.13	8.68	9.8													
		CC-3	1.88	0.81	6.7	1.52	7.93	12.1													
		CC-4	3.64	0.52	5.5	1.89	8.44	16.0													
		CC-5	0.45	0.36	5.0	0.16	8.68	1.4													
		D-1	9.07	0.58	21.1	5.26	5.05	26.6													
		D-2	7.42	0.68	12.4	5.05	6.38	32.2													
		D-3	2.03	0.22	21.0	0.45	5.06	2.3													
		D-4	4.38	0.66	16.0	2.89	5.75	16.6													
		D-5	1.08	0.64	11.0	0.69	6.70	4.6													
		D-6	4.01	0.67	12.4	2.69	6.39	17.2													
		D-7	6.39	0.39	14.8	2.49	5.94	14.8													
		D-8	1.69	0.44	14.0	0.74	6.08	4.5													
MERIDIAN ROAD BASINS																					
		P-1	2.03	0.74	15.5	1.50	5.82	8.7													

BENT GRASS/MERIDIAN ROAD - MDDP SURFACE ROUTING - FUTURE CONDITIONS

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
FILING NO. 2:									
	RWT202	124.80	324.77	46.6	1.8	3.1	220.0	1000.0	
		T R A V E L T I M E							
		124.80	324.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	46.6		
	RWT204	1.83	6.43	11.4	3.8	6.7	7.0	43.0	
		T R A V E L T I M E							
		1.83	6.43	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	11.4		
	WT200	25.81	54.00	37.8	2.0	3.5	52.0	190.0	
		T R A V E L T I M E							
		25.81	54.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	37.8		
40	OS-1 RWT202 RWT204 WT200	5.29	13.56	46.6	1.8	3.1	278.1	1227.8	
		124.80	324.77						
		1.83	6.43						
		25.81	54.00						
		157.73	398.76	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				CHANNEL	850	4.0	3.5	50.1	
1	A-1	0.89	1.40	13.6	3.5	6.2	3.1	8.6	
		T R A V E L T I M E							
		0.89	1.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	140	2.0	1.2	14.8	
2	A-2 DP 1	0.38	0.61	14.8	3.4	5.9	4.3	11.9	
		0.89	1.40						
		1.27	2.01	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	275	2.4	1.9	16.7	
3	A-3 DP 2	0.57	0.83	16.7	3.2	5.6	5.9	15.9	
		1.27	2.01						
		1.84	2.84	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	40	2.4	0.3	17.0	
4	A-4 DP 3	0.76	1.19	17.0	3.2	5.5	8.3	22.3	
		1.84	2.84						
		2.60	4.03	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	780	2.0	6.5	23.5	
9	OS-5	0.21	0.27	5.2	5.1	8.9	1.1	2.4	
		T R A V E L T I M E							
		0.21	0.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	315	3.2	1.6	6.9	
11	OS-4 DP 9	1.61	2.41	15.6	3.3	5.8	6.0	15.5	
		0.21	0.27						
		1.82	2.68	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	150	3.2	0.8	16.4	
13	OS-6 DP 11	0.53	0.69	16.4	3.2	5.6	7.6	19.0	
		1.82	2.68						
		2.35	3.37	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	120	3.2	0.6	17.0	
5	AA-1 DP 12	1.08	1.52	17.0	3.2	5.5	10.9	27.1	
		2.35	3.37						
		3.43	4.89	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.4	0.0	17.0		
6	AA-2	1.05	1.39	11.1	3.9	6.8	4.1	9.4	
		T R A V E L T I M E							
		1.05	1.39	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.4	0.0	11.1		

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
7	E-3	0.63	0.69	7.4	4.6	8.0	2.9	5.5	
				TRAVEL TIME					
		0.63	0.69	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.4	0.0	7.4	
8	E-1 E-2 CC-4 DP 4	0.94	1.18	11.8	3.8	6.6	20.0	50.5	
		0.52	0.58						
		1.24	1.89						
		2.60	4.03	TRAVEL TIME					
		5.30	7.68	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.4	0.0	11.8	
12	CC-2	0.89	1.13	5.0	5.2	9.1	4.6	10.2	
				TRAVEL TIME					
		0.89	1.13	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	60	3.2	0.3	5.3	
15	CC-1 CC-3	4.63	5.90	13.9	3.5	6.1	20.9	45.4	
		1.35	1.52	TRAVEL TIME					
		5.98	7.42	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	60	3.2	0.3	14.2	
10	CC-5 DP 12 DP 15	0.04	0.16	14.2	3.5	6.1	23.9	52.7	TOTAL FLOWS INTO NORTH POND BENT GRASS WEST
		0.89	1.13						
		5.98	7.42	TRAVEL TIME					
		6.91	8.71	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.4	0.0	14.2	
10A	BG NORTH POND RELEASE	1.16	2.42	5.0	5.2	9.1	6.0	21.9	
				TRAVEL TIME					
		1.16	2.42	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
14	DP 5 DP 6 DP 7 DP 8	3.43	4.89	17.0	3.2	5.5	33.0	81.1	TOTAL FLOWS INTO NORTH POND FILING NO. 2
		1.05	1.39						
		0.63	0.69	TRAVEL TIME					
		5.30	7.68	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		10.41	14.65			2.4	0.0	17.0	
14A	F2 NORTH POND RELEASE	2.35	4.08	5.0	5.2	9.1	12.2	37.0	
				TRAVEL TIME					
		2.35	4.08	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
AA	B-1 DP 40 DP 15A	0.79	2.15	50.1	1.7	2.9	270.3	1188.7	
				157.73	398.76				
		2.35	4.08	TRAVEL TIME					
		160.87	404.99	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				CULVERTS	135	5.1	0.4	50.6	
BB	B-2 DP AA	0.42	1.58	50.6	1.7	2.9	269.5	1186.4	
		160.87	404.99	TRAVEL TIME					
		161.29	406.57	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				CHANNEL	900	5.0	3.0	53.6	
16	C-5	3.30	4.48	5.5	5.0	8.8	16.6	39.4	@ GRADE INLET
				TRAVEL TIME					
		3.30	4.48	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	115	2.0	1.0	6.5	
17	C-6	2.11	3.05	5.5	5.0	8.8	10.6	26.8	@ GRADE INLET
				TRAVEL TIME					
		2.11	3.05	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				STREET	115	2.0	1.0	6.5	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
18	C-3 C-4 FB DP 16	0.95	1.33	5.5	5.0	8.8	13.5	39.2	SUMP INLET
		1.52	2.06						
		0.22	1.07	T R A V E L T I M E					
		2.69	4.46	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.5	
19	C-1 C-2 FB DP 17	0.57	0.77	20.4	2.9	5.0	9.5	29.7	SUMP INLET
		2.31	3.60						
		0.42	1.53	T R A V E L T I M E					
		3.30	5.90	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	20.4	
20	G-1	0.31	0.65	9.9	4.1	7.1	1.3	4.6	
		T R A V E L T I M E							
		0.31	0.65	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	9.9	
20A	C-7 DP 18 DP 19 DP 20	0.08	0.32	20.4	2.9	5.0	18.4	57.1	TOTAL FLOW INTO FILING NO. 2 SOUTH POND
		2.69	4.46						
		3.30	5.90						
		0.31	0.65	T R A V E L T I M E					
		6.37	11.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				2.6	0.0	20.4			
20B	F2 SOUTH POND RELEASE	4.11	7.28	5.0	5.2	9.1	21.3	66.0	
		T R A V E L T I M E							
		4.11	7.28	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
28	OS-2	2.81	8.03	18.3	3.1	5.3	8.6	42.8	
		T R A V E L T I M E							
		2.81	8.03	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SWALE	640	4.0	2.7	21.0			
29	OS-3 DP 28	1.49	4.25	21.0	2.8	5.0	12.2	60.9	
		2.81	8.03	T R A V E L T I M E					
		4.30	12.28	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		SWALE	475	3.5	2.3	23.3			
21	D-2	4.08	5.05	12.4	3.7	6.4	15.0	32.5	@ GRADE INLET
		T R A V E L T I M E							
		4.08	5.05	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						4.0	0.0	12.4	
22	D-1	3.72	5.26	21.1	2.8	4.9	10.5	26.0	@ GRADE INLET
		T R A V E L T I M E							
		3.72	5.26	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						3.5	0.0	21.1	
23	D-3 DP 29	0.26	0.45	23.3	2.7	4.7	12.2	59.7	TYPE C INLET
		4.30	12.28	T R A V E L T I M E					
		4.56	12.73	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						4.0	0.0	23.3	
24	E-4 FB DP 22	0.67	0.76	21.1	2.8	4.9	2.1	15.9	@ GRADE INLET
		0.07	2.45	T R A V E L T I M E					
		0.74	3.21	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						3.5	0.0	21.1	
25	E-5 FB DP 24	0.72	0.79	7.3	4.6	8.0	3.3	10.7	@ GRADE INLET
		0.00	0.55	T R A V E L T I M E					
		0.72	1.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						3.5	0.0	7.3	
26	D-7 DP 24 DP 25	0.89	2.49	14.8	3.4	5.9	8.0	41.7	
		0.74	3.21						
		0.72	1.34	T R A V E L T I M E					
		2.35	7.04	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						3.5	0.0	14.8	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
42	D-4	2.28	2.89	16.0	3.3	5.7	7.5	16.5	SUMP INLET		
		T R A V E L T I M E									
		2.28	2.89	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.0	0.0	16.0				
43	D-5 D-6	0.55	0.69	12.4	3.7	6.4	10.0	21.8	SUMP INLET		
		2.17	2.69	T R A V E L T I M E							
		2.72	3.38	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.0	0.0	12.4				
44	D-8	0.35	0.74	14.0	3.5	6.1	1.2	4.5			
		T R A V E L T I M E									
		0.35	0.74	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.0	0.0	14.0				
45	DP 21 DP 22 DP 23 DP 26 DP 42 DP 43 DP 44	4.08	5.05	23.3	2.7	4.7	53.8	173.9	TOTAL FLOW INTO BENT GRASS WEST SOUTH POND		
		3.72	5.26								
		4.56	12.73								
		2.35	7.04								
		2.28	2.89								
		2.72	3.38								
		0.35	0.74	T R A V E L T I M E							
		20.06	37.09	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				2.6	0.0	23.3					
45A	BG SOUTH POND RELEASE	0.21	5.05	5.0	5.2	9.1	1.1	45.8			
		T R A V E L T I M E									
		0.21	5.05	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.6	0.0	5.0				
CC	DP BB DP 10A DP 20B DP 45A	161.29	406.57	53.6	1.6	2.8	268.2	1183.4	EXITS SITE		
		1.16	2.42								
		4.11	7.28								
		0.21	5.05	T R A V E L T I M E							
		166.77	421.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						3.5	0.0	53.6			
EAST OF FILING NO. 2:											
30	Release rate from Meadows Pond 2	0.62	10.78	15.0	3.4	5.9	2.1	63.5	Flows from Meadows Filing No. 3 Pond 2 - Updated HEC HMS model		
		T R A V E L T I M E									
		0.62	10.78	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				Sheet	2300	2.1	18.3	33.3			
31	OS-25 DP 30	2.06	6.93	33.3	2.2	3.8	5.8	67.4			
		0.62	10.78								
		2.68	17.71	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				Sheet	700	2.6	4.5	37.7			
32	OS-6 DP 31	0.53	0.69	37.7	2.0	3.5	6.5	64.8	Flow into revised pond on "School Site"		
		2.68	17.71								
		3.21	18.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				Sheet	700	2.6	4.5	42.2			
32A	Fut Pond Release C1a	1.11	5.46	15.0	3.4	5.9	4.9	34.5	Designed release rates from Future Pond are 3.8 & 32.2 cfs		
		0.34	0.39								
		T R A V E L T I M E									
		1.45	5.85	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
					2.0	0.0	15.0				
32A-N	DP-32	1.45	5.64	15.0	3.4	5.9	4.9	33.2	Flows remaining in north half of BGMD & continuing east (Max gutter flow allowed 5 Yr=9.4, 100 Yr=33.2)		
		T R A V E L T I M E									
		1.45	5.64	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
				Street	905	2.0	7.5	22.5			
32A-S	D1a OT from DP 32A-N	3.72	0.40	15.0	3.4	5.9	12.5	3.6	Flows remaining in south half of BGMD & continuing east (Max gutter flow allowed 5 Yr=9.4 & 100 Yr=33.2)		
		0.00	0.21								
		3.72	0.61	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						2.5	0.0	15.0			
BG 1a-Os		0.00	0.00	15.0	3.4	5.9	0.0	0.0	Overtopping Flows from DP 32A which will head south through Bent Grass Filing No. 1 in Sea Oats Drive (Sea Oats Dr can carry 2.2 & 11.6 cfs per side)		
		T R A V E L T I M E									
		0.00	0.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						2.5	0.0	15.0			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES		
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)			
BG 1a-Ose		0.00	0.00	15.0	3.4	5.9	0.0	0.0	Overtopping Flows from DP 1a-Os which will flow in east half of Sea Oats Drive		
		T R A V E L T I M E									
		0.00	0.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 1a-Osw		0.00	0.00	15.0	3.4	5.9	0.0	0.0	Overtopping Flows from DP 1a-Os which will flow in west half of Sea Oats Drive		
		T R A V E L T I M E									
		0.00	0.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 4a	H1a DP BG 1a-Ose	0.19	0.26	15.0	3.4	5.9	0.6	1.5	Flows to west side of Inlet 4		
		0.00	0.00	T R A V E L T I M E							
		0.19	0.26	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 1b	D1b DP BG 1a-Osw	0.39	0.48	15.0	3.4	5.9	1.3	2.8			
		0.00	0.00	T R A V E L T I M E							
		0.39	0.48	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 1c	D1c DP BG 1b	0.70	0.85	18.4	3.0	5.3	3.3	7.1	Flows in Aveno Rd to east side of Inlet 1 (Max gutter allowed 1.6 & 8.6 cfs per side)		
		0.39	0.48	T R A V E L T I M E							
		1.09	1.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 1	D1d DP BG 1c	1.65	1.98	18.4	3.0	5.3	8.3	17.6	Existing 10' Sump Inlet - Total flow to Inlet 1		
		1.09	1.33	T R A V E L T I M E							
		2.74	3.31	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 2e	D2a	0.35	0.55						Flows in Aveno Rd to east side of Inlet 2 (Max gutter allowed 1.6 & 8.6 cfs per side)		
				T R A V E L T I M E							
		0.35	0.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 2w	D2b	0.19	0.26	5.0	5.2	9.1	1.0	2.4	Flows in Aveno Rd to west side of Inlet 2 (Max gutter allowed 2.2 & 11.4 cfs per side)		
		T R A V E L T I M E									
		0.19	0.26	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 2	DP BG 2e DP BG 2w	0.35	0.55	5.0	5.2	9.1	2.8	7.3	Existing 4' Sump Inlet - Total flow to		
		0.19	0.26	T R A V E L T I M E							
		0.54	0.81	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 4e	H1c	0.07	0.10	5.0	5.2	9.1	0.4	0.9	Flows in Aveno Rd to west side of Inlet 4 (Max gutter allowed 1.8 & 9.8 cfs per side)		
		T R A V E L T I M E									
		0.07	0.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 4w	H1b DP BG 4a	1.11	1.51	20.0	2.9	5.1	3.8	9.0	Flows in Aveno Rd to east side of Inlet 4 (Max gutter allowed 2.1 & 11.3 cfs per side)		
		0.19	0.26	T R A V E L T I M E							
		1.30	1.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 4	DP BG 4e DP BG 4w	0.07	0.10	20.0	2.9	5.1	4.0	9.5	Existing 4' Sump Inlet		
		1.30	1.77	T R A V E L T I M E							
		1.37	1.87	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 5e	H2b	0.05	0.08	5.0	5.2	9.1	0.3	0.7	Flows in Aveno Rd to west side of Inlet 5 (Max gutter allowed 1.8 & 9.8 cfs per side)		
		T R A V E L T I M E									
		0.05	0.08	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
BG 5w	H2a	0.45	0.64	11.9	3.8	6.6	1.7	4.2	Flows in Aveno Rd to east side of Inlet 5 (Max gutter allowed 2.1 & 11.3 cfs per side)		
		T R A V E L T I M E									
		0.45	0.64	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)			
						5.0	0.0	11.9			

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
BG 5	DP BG 5e DP BG 5w	0.05	0.08	11.9	3.8	6.6	1.9	4.7	Existing 4' Sump Inlet
		0.45	0.64	T R A V E L T I M E					
		0.50	0.72	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			SUMP		5.0	0.0	11.9		
BG 3	G DP BG 1 DP BG 2	2.06	6.93	18.4	3.0	5.3	16.2	58.7	Flows into BG Pond 1 from West side
		2.74	3.31	T R A V E L T I M E					
		0.54	0.81	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		5.34	11.05			2.8	0.0	18.4	
BG 6	DP BG 4 DP BG 5	1.37	1.87	20.0	2.9	5.1	5.4	13.2	Flows into BG Pond 1 from East side
		0.50	0.72	T R A V E L T I M E					
		1.87	2.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	20.0		
	DP BG 3 DP BG 6	5.34	11.05	20.0	2.9	5.1	21.0	69.4	Total flows into BG Pond 1
		1.87	2.59	T R A V E L T I M E					
		7.21	13.64	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					5.0	0.0	20.0		
BG POND1	BG POND 1 RELEASE	0.06	0.32	5.0	5.2	9.1	0.3	2.9	
				T R A V E L T I M E					
		0.06	0.32	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
					2.6	0.0	5.0		
BG 14n	OS-22 H5 C1b DP BG 32A-N	0.40	1.59	22.5	2.7	4.8	9.2	42.7	Flow continuing in North half of BGMD
		0.89	1.00	T R A V E L T I M E					
		0.63	0.72	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		1.45	5.64	Street	300	2.8	1.8	24.3	
BG 15n	OS-23 D1c DP BG 14n	0.92	3.69	24.3	2.6	4.6	8.8	40.9	Flow continuing in North half of BGMD
		0.70	0.85	T R A V E L T I M E					
		3.37	8.95	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
		4.99	13.49			5.0	0.0	24.3	
BG 50		111.34	193.50	26.1	2.5	4.4	280.0	850.0	Flow from Falcon DBPS at Meridian Rd & BGMD Intersection
				T R A V E L T I M E					
				Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	26.1	
BG 20	DP BG 15n DP BG 50	4.99	13.49	26.1	2.5	4.4	292.5	909.3	Combined flow at Culvert Crossing - North side of BGMD
		111.34	193.50	T R A V E L T I M E					
		116.33	206.99	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			Culverts	125	11.2	0.2	26.3		
BG 14s	C2a DP BG 12-S	0.72	0.71	15.0	3.4	5.9	15.0	7.8	Flow continuing in South half of BGMD
		3.72	0.61	T R A V E L T I M E					
		4.44	1.32	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			Street	300	2.8	1.8	16.8		
BG 15s	C2b DP BG 14s	0.83	0.91	16.8	3.2	5.6	16.8	12.4	Flow continuing in South half of BGMD
		4.44	1.32	T R A V E L T I M E					
		5.27	2.23	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	16.8	
BG 21	DP BG 20 DP BG 15s	116.33	206.99	26.3	2.5	4.4	304.6	915.3	Combined flow at Culvert Crossing - South side of BGMD
		5.27	2.23	T R A V E L T I M E					
		121.60	209.22	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
			Channel	1250	2.0	10.4	36.7		
BG 32	F	0.55	0.75	6.9	4.7	8.1	2.6	6.1	
				T R A V E L T I M E					
		0.55	0.75	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	6.9	
BG 33	J	0.66	0.90	7.9	4.4	7.8	2.9	7.0	
				T R A V E L T I M E					
		0.66	0.90	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	7.9	

DESIGN POINT	CONTRIBUTING BASINS	CA (equivalent)		Tc (min.)	INTENSITY		TOTAL FLOWS		NOTES
		CA(5)	CA(100)		I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)	
BG 7	H3	0.85	1.00	12.5	3.7	6.4	3.1	6.4	Ex 4' Sump Inlet
				T R A V E L T I M E					
		0.85	1.00	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	12.5	
BG 8	H4	0.23	0.27	9.4	4.2	7.3	1.0	2.0	Ex 4' Sump Inlet
				T R A V E L T I M E					
		0.23	0.27	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	9.4	
BG 9	I1	1.65	1.95	10.7	3.9	6.9	6.5	13.4	Ex 6' Sump Inlet
				T R A V E L T I M E					
		1.65	1.95	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	10.7	
BG 10	I2	0.94	1.11	9.9	4.1	7.1	3.8	7.9	Ex 4' Sump Inlet
				T R A V E L T I M E					
		0.94	1.11	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	9.9	
BG 11	DP BG 7 DP BG 8 DP BG 9 DP BG 10	0.85	1.00	12.5	3.7	6.4	13.5	27.8	Inflow to BG Pond 2 West storm sewer
		0.23	0.27						
		1.65	1.95						
		0.94	1.11	T R A V E L T I M E					
		3.67	4.33	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.8	0.0	12.5	
BG 12	M1	1.33	1.40	8.3	4.4	7.6	5.8	10.7	Ex 6' Sump Inlet
				T R A V E L T I M E					
		1.33	1.40	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	8.3	
BG 13	M2 N	0.37	0.40	6.8	4.7	8.2	7.0	13.0	Ex 6' Sump Inlet
		1.12	1.19	T R A V E L T I M E					
		1.49	1.59	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	6.8	
BG 14	DP BG 12 DP BG 13	1.33	1.40	8.3	4.4	7.6	12.3	22.8	Inflow to BG Pond 2 East Storm sewer
		1.49	1.59	T R A V E L T I M E					
		2.82	2.99	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	8.3	
BG 15	K L DP BG 11 DP BG 14	0.40	0.55	12.5	3.7	6.4	42.2	82.0	Total inflow to BG Pond 2
		4.60	4.90						
		3.67	4.33						
		2.82	2.99	T R A V E L T I M E					
		11.49	12.77	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
				Street	300	2.8	1.8	14.3	
BG POND2	BG POND 2 RELEASE	0.08	1.10	5.0	5.2	9.1	0.4	10.0	
				T R A V E L T I M E					
		0.08	1.10	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
BG 30	PLD RELEASE RATE	0.58	0.55	5.0	5.2	9.1	3.0	5.0	Released flows from existing PLD on 7-11 site
				T R A V E L T I M E					
		0.58	0.55	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						2.6	0.0	5.0	
BG 31	D	0.34	0.34	5.0	5.2	9.1	1.8	3.1	Future lot for development in Bent Grass East Commercial Filing No. 1
				T R A V E L T I M E					
		0.34	0.34	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	5.0	
BG 25	P-1 DP BG 21 BG 30 BG 31 BG POND 2	1.22	0.45	36.7	2.1	3.6	252.0	751.4	Flow @ Existing Culvert, north side of Owl Place
		121.60	209.22						
		0.58	0.55						
		0.34	0.34						
		0.08	1.10	T R A V E L T I M E					
		122.82	209.67	Type/flow	Length (ft)	Velocity (fps)	d. Time (min)	T. Time (min)	
						5.0	0.0	36.7	

APPENDIX C
Hydraulic Computations

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

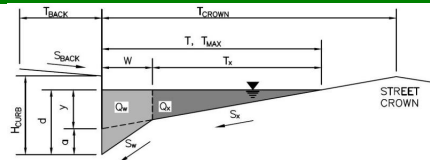
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Bent Grass Residential Filing No. 2

Inlet ID:

Street Capacity - 1/2 Street Section of Bent Grass Meadows Drive

**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb
 Side Slope Behind Curb (leave blank for no conveyance credit behind curb)
 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

$T_{BACK} = 14.0$ ft
 $S_{BACK} = 0.020$ ft/ft
 $n_{BACK} = 0.013$

Height of Curb at Gutter Flow Line
 Distance from Curb Face to Street Crown
 Gutter Width
 Street Transverse Slope
 Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)
 Street Longitudinal Slope - Enter 0 for sump condition
 Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$H_{CURB} = 6.00$ inches
 $T_{CROWN} = 26.0$ ft
 $W = 2.00$ ft
 $S_x = 0.020$ ft/ft
 $S_w = 0.083$ ft/ft
 $S_o = 0.010$ ft/ft
 $n_{STREET} = 0.016$

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$	16.0	26.0	ft
$d_{MAX} =$	6.0	8.3	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

Maximum Capacity for 1/2 Street based On Allowable Spread

Water Depth without Gutter Depression (Eq. ST-2)
 Vertical Depth between Gutter Lip and Gutter Flowline (usually 2")
 Gutter Depression ($d_c - (W \cdot S_x \cdot 12)$)
 Water Depth at Gutter Flowline
 Allowable Spread for Discharge outside the Gutter Section W (T - W)
 Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)
 Discharge outside the Gutter Section W, carried in Section T_x
 Discharge within the Gutter Section W ($Q_t - Q_x$)
 Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)

	Minor Storm	Major Storm	
$y =$	3.84	6.24	inches
$d_c =$	2.0	2.0	inches
$a =$	1.51	1.51	inches
$d =$	5.35	7.75	inches
$T_x =$	14.0	24.0	ft
$E_o =$	0.372	0.225	
$Q_x =$	5.9	24.7	cfs
$Q_w =$	3.5	7.2	cfs
$Q_{BACK} =$	0.0	1.3	cfs
$Q_t =$	9.4	33.2	cfs
$V =$	4.8	6.4	fps
$V \cdot d =$	2.1	4.1	

Maximum Flow Based On Allowable Spread

Flow Velocity within the Gutter Section
 $V \cdot d$ Product: Flow Velocity times Gutter Flowline Depth

Maximum Capacity for 1/2 Street based on Allowable Depth

Theoretical Water Spread
 Theoretical Spread for Discharge outside the Gutter Section W (T - W)
 Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)
 Theoretical Discharge outside the Gutter Section W, carried in Section T_{xTH}
 Actual Discharge outside the Gutter Section W, (limited by distance T_{CROWN})
 Discharge within the Gutter Section W ($Q_t - Q_x$)
 Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)
 Total Discharge for Major & Minor Storm (Pre-Safety Factor)
 Average Flow Velocity Within the Gutter Section
 $V \cdot d$ Product: Flow Velocity Times Gutter Flowline Depth
 Slope-Based Depth Safety Reduction Factor for Major & Minor ($d \geq 6"$) Storm
Max Flow Based on Allowable Depth (Safety Factor Applied)
 Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)
 Resultant Flow Depth at Street Crown (Safety Factor Applied)

	Minor Storm	Major Storm	
$T_{TH} =$	18.7	28.3	ft
$T_{xTH} =$	16.7	26.3	ft
$E_o =$	0.318	0.206	
$Q_{xTH} =$	9.4	31.5	cfs
$Q_x =$	9.4	31.5	cfs
$Q_w =$	4.4	8.2	cfs
$Q_{BACK} =$	0.0	2.6	cfs
$Q =$	13.8	42.3	cfs
$V =$	5.2	6.7	fps
$V \cdot d =$	2.6	4.7	
$R =$	1.00	1.00	
$Q_d =$	13.8	42.3	cfs
$d =$	6.00	8.30	inches
$d_{CROWN} =$	0.00	0.55	inches

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

	Minor Storm	Major Storm	
$Q_{allow} =$	9.4	33.2	cfs

WARNING: MINOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'**WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'**

Current Pond Calculations

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

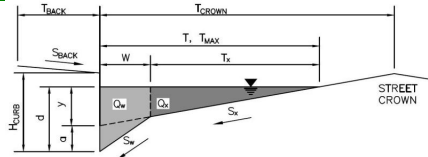
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Bent Grass Residential Filing No. 2

Inlet ID:

Street Capacity - 1/2 Street Section of Bent Grass Meadows Drive

**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb

T_{BACK} = 14.0 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} = 0.013

Height of Curb at Gutter Flow Line

H_{CURB} = 6.00 inches

Distance from Curb Face to Street Crown

T_{CROWN} = 26.0 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 = 0.010 ft/ft

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

n_{STREET} = 0.016

Max. Allowable Spread for Minor & Major Storm

	Minor Storm	Major Storm	
T _{MAX}	16.0	26.0	ft
d _{MAX}	6.0	8.3	inches

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (leave blank for no)

☐ ☐ check = yes
Maximum Capacity for 1/2 Street based On Allowable Spread

Water Depth without Gutter Depression (Eq. ST-2)

	Minor Storm	Major Storm	
y	3.84	6.24	inches
d _c	2.0	2.0	inches
a	1.51	1.51	inches
d	5.35	7.75	inches
T _x	14.0	24.0	ft
E _o	0.372	0.225	
Q _x	5.9	24.7	cfs
Q _w	3.5	7.2	cfs
Q _{BACK}	0.0	1.3	cfs
Q _T	9.4	33.2	cfs
V	4.8	6.4	fps
V*d	2.1	4.1	

Vertical Depth between Gutter Lip and Gutter Flowline (usually 2")

Gutter Depression (d_c - (W * S_x * 12))

Water Depth at Gutter Flowline

Allowable Spread for Discharge outside the Gutter Section W (T - W)

Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)

Discharge outside the Gutter Section W, carried in Section T_xDischarge within the Gutter Section W (Q_T - Q_x)

Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)

Maximum Flow Based On Allowable Spread

Flow Velocity within the Gutter Section

V*d Product: Flow Velocity times Gutter Flowline Depth

Maximum Capacity for 1/2 Street based on Allowable Depth

Theoretical Water Spread

Theoretical Spread for Discharge outside the Gutter Section W (T - W)

Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)

Theoretical Discharge outside the Gutter Section W, carried in Section T_x THActual Discharge outside the Gutter Section W, (limited by distance T_{CROWN})Discharge within the Gutter Section W (Q_T - Q_x)

Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)

Total Discharge for Major & Minor Storm (Pre-Safety Factor)

Average Flow Velocity Within the Gutter Section

V*d Product: Flow Velocity Times Gutter Flowline Depth

Slope-Based Depth Safety Reduction Factor for Major & Minor (d ≥ 6") Storm

Max Flow Based on Allowable Depth (Safety Factor Applied)

Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)

Resultant Flow Depth at Street Crown (Safety Factor Applied)

	Minor Storm	Major Storm	
T _{TH}	18.7	28.3	ft
T _x TH	16.7	26.3	ft
E _o	0.318	0.206	
Q _x TH	9.4	31.5	cfs
Q _x	9.4	31.5	cfs
Q _w	4.4	8.2	cfs
Q _{BACK}	0.0	2.6	cfs
Q	13.8	42.3	cfs
V	5.2	6.7	fps
V*d	2.6	4.7	
R	1.00	1.00	
Q _d	13.8	42.3	cfs
d	6.00	8.30	inches
d _{CROWN}	0.00	0.55	inches

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

	Minor Storm	Major Storm	
Q _{allow}	9.4	33.2	cfs

WARNING: MINOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

MHFD-Detention, Version 4.02 (February 2020)

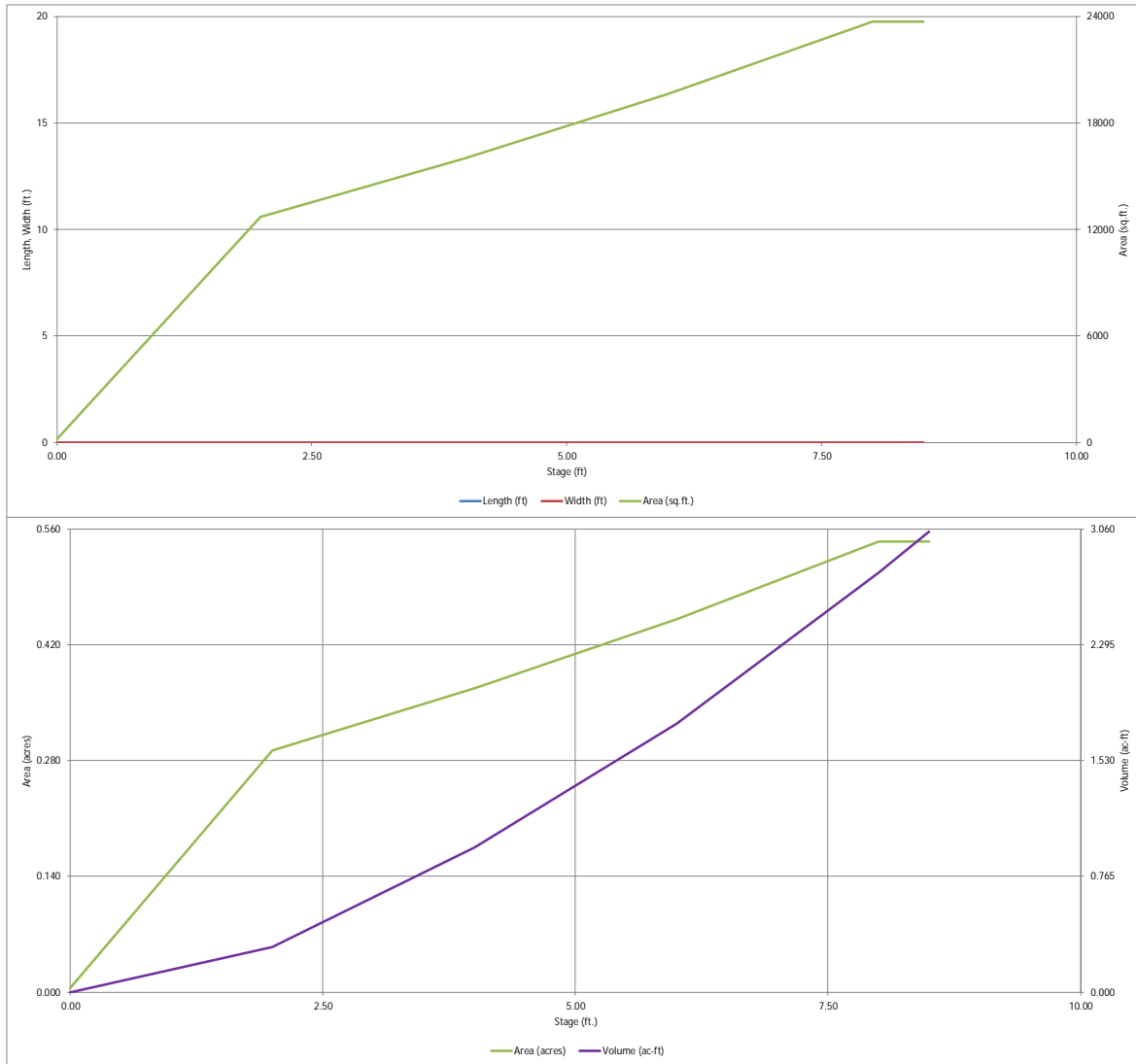
Basin ID: BG Filling No. 1 - Ex. Pond 1 - Current Conditions



1/25/2021, 1:42 PM

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD- Detention, Version 4.02 (February 2020)



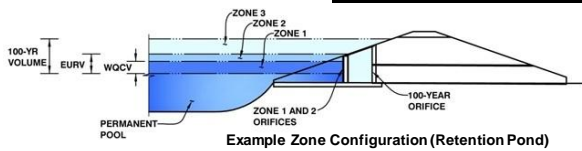
**NOTE: FOR INFORMATION
ONLY-NO IMPROVEMENTS ARE
PROPOSED FOR THIS FACILITY**

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD- Detention, Version 4.02 (February 2020)

Project: Meridian Road - Falcon MDDP

Basin ID: BG Filing No. 1 - Ex. Pond 1 - Current Conditions



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.38	0.408	Orifice Plate
Zone 2 (EURV)	5.18	1.008	Not Utilized
Zone 3 (100-year)	6.94	0.801	Weir&Pipe (Restrict)
Total (all zones)		2.217	

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

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain	
Underdrain Orifice Area =	N/A ft ²
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)

Invert of Lowest Orifice =	1.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	4.90	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	0.99	sq. inches (diameter = 1-1/8 inches)

Calculated Parameters for Plate	
WO Orifice Area per Row =	6.875E-03 ft ²
Elliptical Half-Width =	N/A feet
Elliptical Slot Centroid =	N/A feet
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)	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33
Orifice Area (sq. inches)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99

	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)	3.67	4.00	4.33	4.67				
Orifice Area (sq. inches)	0.99	0.99	0.99	0.99				

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice	
Vertical Orifice Area =	Not Selected ft ²
Vertical Orifice Centroid =	Not Selected feet

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	
Overflow Weir Front Edge Height, Ho =	5.00	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	2.55	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir	
Height of Grate Upper Edge, H ₁ =	5.00 ft
Overflow Weir Slope Length =	2.55 feet
Grate Open Area / 100-yr Orifice Area =	2.27
Overflow Grate Open Area w/o Debris =	7.14 ft ²
Overflow Grate Open Area w/ Debris =	3.57 ft ²

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	24.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate	
Outlet Orifice Area =	3.14 ft ²
Outlet Orifice Centroid =	1.00 feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	7.61	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	24.00	feet
Spillway End Slopes =	3.00	H:V
Freeboard above Max Water Surface =	0.35	feet

Calculated Parameters for Spillway	
Spillway Design Flow Depth =	0.54 feet
Stage at Top of Freeboard =	8.50 feet
Basin Area at Top of Freeboard =	0.54 acres
Basin Volume at Top of Freeboard =	3.04 acre-ft

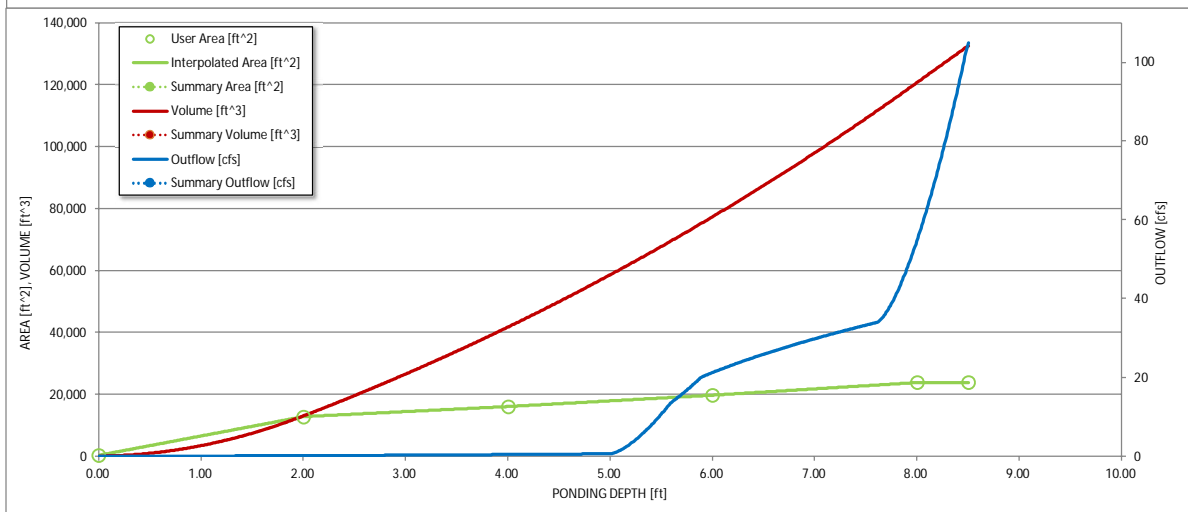
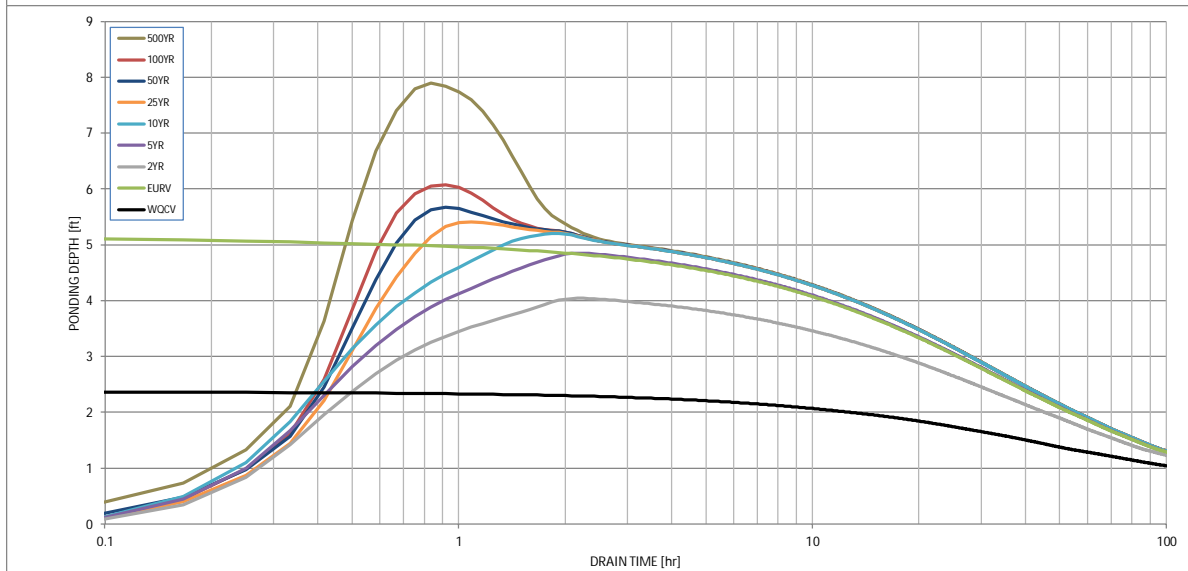
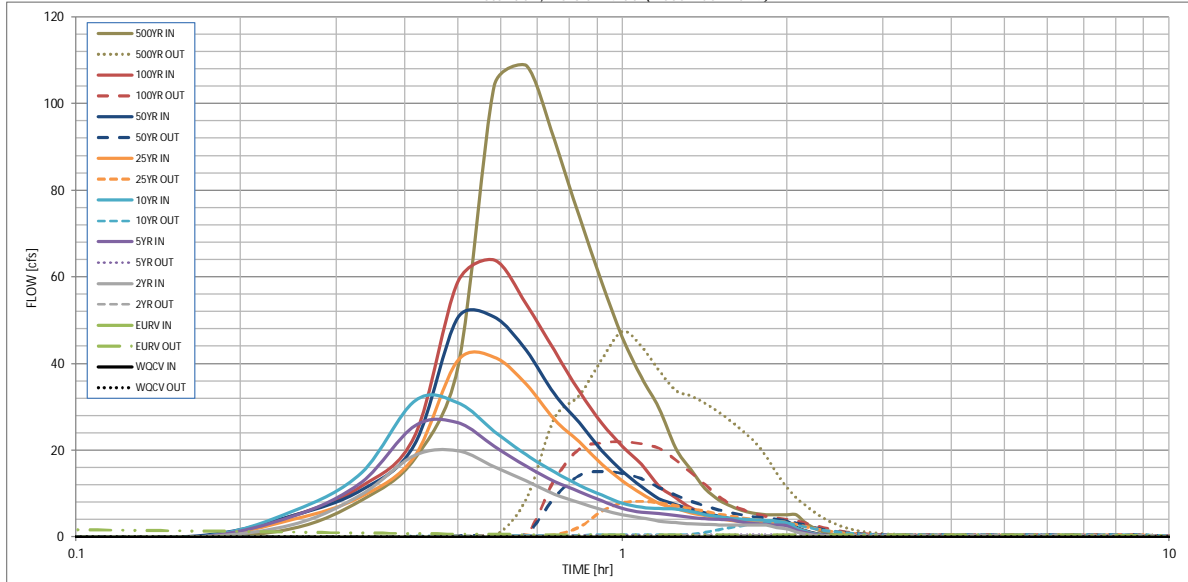
Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.68
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.68
CUHP Runoff Volume (acre-ft)	0.408	1.416	1.022	1.354	1.619	2.020	2.412	2.906	4.962
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.022	1.354	1.619	2.020	2.412	2.906	4.962
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	0.3	0.5	0.7	6.2	12.0	19.6	49.3
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.01	0.02	0.03	0.27	0.53	0.86	2.16
Peak Inflow Q (cfs)	N/A	N/A	19.9	26.3	31.5	41.5	50.8	63.9	108.8
Peak Outflow Q (cfs)	0.1	2.3	0.4	0.5	3.3	8.3	15.1	22.0	47.4
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	1.0	4.7	1.3	1.3	1.1	1.0
Structure Controlling Flow	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Gate 1 (fps)	N/A	0.30	N/A	N/A	0.4	1.1	2.0	3.0	4.9
Max Velocity through Gate 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)	>120	>120	>120	>120	>120	>120	>120	>120	91
Time to Drain 99% of Inflow Volume (hours)	>120	>120	>120	>120	>120	>120	>120	>120	>120
Maximum Ponding Depth (ft)	2.38	5.18	4.05	4.86	5.21	5.42	5.68	6.08	7.90
Area at Maximum Ponding Depth (acres)	0.31	0.42	0.37	0.40	0.42	0.43	0.44	0.45	0.54
Maximum Volume Stored (acre-ft)	0.411	1.418	0.971	1.283	1.431	1.515	1.627	1.810	2.716

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

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.03	2.01
	0:15:00	0.00	0.00	2.97	4.82	5.99	4.04	4.97	4.93	8.52
	0:20:00	0.00	0.00	9.87	12.72	14.91	9.36	10.83	11.73	18.07
	0:25:00	0.00	0.00	18.88	25.69	31.49	18.74	21.53	23.45	39.16
	0:30:00	0.00	0.00	19.88	26.34	31.01	40.79	50.66	58.91	104.32
	0:35:00	0.00	0.00	16.15	20.89	24.38	41.50	50.76	63.94	108.83
	0:40:00	0.00	0.00	13.00	16.36	18.97	35.23	43.14	53.76	91.65
	0:45:00	0.00	0.00	9.93	12.85	15.04	27.21	33.00	43.05	73.95
	0:50:00	0.00	0.00	7.89	10.53	12.00	21.98	26.42	33.66	58.81
	0:55:00	0.00	0.00	6.33	8.35	9.65	16.77	19.95	26.28	46.09
	1:00:00	0.00	0.00	5.14	6.67	7.82	12.96	15.22	20.93	36.87
	1:05:00	0.00	0.00	4.47	5.74	6.88	10.05	11.65	16.76	29.82
	1:10:00	0.00	0.00	3.72	5.39	6.58	7.77	8.90	11.78	20.61
	1:15:00	0.00	0.00	3.31	4.96	6.49	6.67	7.58	9.13	15.61
	1:20:00	0.00	0.00	3.07	4.51	5.94	5.61	6.33	6.78	11.20
	1:25:00	0.00	0.00	2.93	4.22	5.15	4.97	5.60	5.39	8.60
	1:30:00	0.00	0.00	2.84	4.04	4.64	4.27	4.81	4.55	7.03
	1:35:00	0.00	0.00	2.78	3.94	4.31	3.83	4.31	4.00	6.00
	1:40:00	0.00	0.00	2.75	3.43	4.10	3.55	3.99	3.68	5.40
	1:45:00	0.00	0.00	2.74	3.10	3.96	3.39	3.81	3.54	5.18
	1:50:00	0.00	0.00	2.74	2.89	3.87	3.30	3.70	3.49	5.09
	1:55:00	0.00	0.00	2.24	2.76	3.69	3.25	3.65	3.48	5.07
	2:00:00	0.00	0.00	1.92	2.56	3.29	3.22	3.63	3.48	5.07
	2:05:00	0.00	0.00	1.21	1.61	2.08	2.04	2.29	2.20	3.19
	2:10:00	0.00	0.00	0.74	0.99	1.29	1.27	1.43	1.36	1.97
	2:15:00	0.00	0.00	0.44	0.59	0.77	0.77	0.86	0.82	1.17
	2:20:00	0.00	0.00	0.24	0.35	0.44	0.44	0.50	0.47	0.67
	2:25:00	0.00	0.00	0.12	0.19	0.23	0.24	0.27	0.25	0.35
	2:30:00	0.00	0.00	0.05	0.08	0.09	0.10	0.11	0.10	0.14
	2:35:00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02
	2:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
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4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
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5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Basin ID: Pond (North) - WATER QUALITY ONLY



Required Volume Calculation

Selected BMP Type =	EDB
	EDB

Watershed Area =	19.12	acres
Watershed Length =	1,700	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	47.90%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Use Input	
Water Quality Capture Volume (WQCV) =	0.320	acre-feet
Excess Urban Runoff Volume (ELRV) =	1.043	acre-feet
2-yr Runoff Volume (P1 = 1.19%) =	0.711	1.19 inches
5-yr Runoff Volume (P1 = 1.5%) =	0.936	1.50 inches
10-yr Runoff Volume (P1 = 1.54%) =	1.154	1.75 inches
25-yr Runoff Volume (P1 = 2%) =	1.445	2.00 inches
50-yr Runoff Volume (P1 = 2.2%) =	1.817	2.25 inches
100-yr Runoff Volume (P1 = 2.52%) =	2.259	2.52 inches
500-yr Runoff Volume (P1 = 3.68 in.) =	3.846	3.68 inches
Approximate 2-yr Detention Volume =	0.670	acre-feet
Approximate 5-yr Detention Volume =	0.883	acre-feet
Approximate 10-yr Detention Volume =	1.079	acre-feet
Approximate 25-yr Detention Volume =	1.324	acre-feet
Approximate 50-yr Detention Volume =	1.481	acre-feet
Approximate 100-yr Detention Volume =	1.678	acre-feet

Stage-Storage Calculation

Zone 1 Volume (WQCV) = 0.320 acre-feet

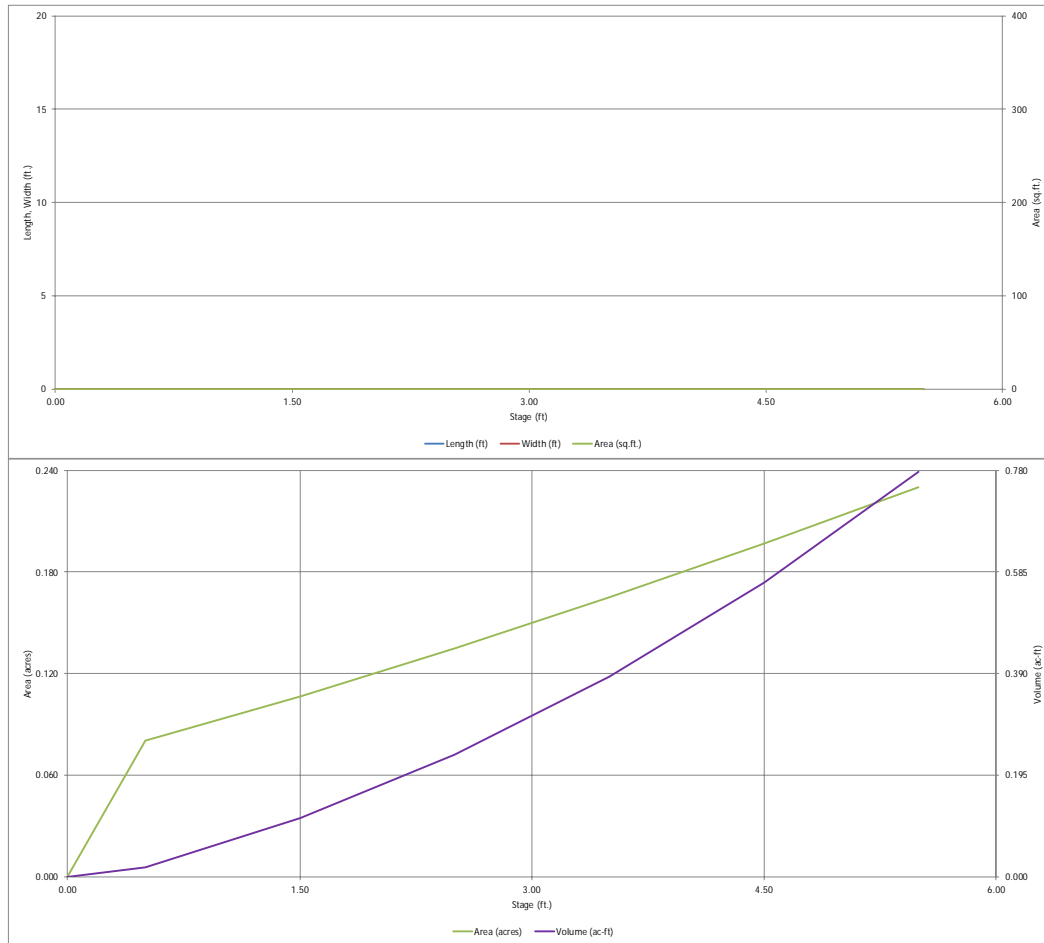
Zone 1 Volume (WQCV) = 0.320 acre-feet

Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.320	acre-feet
Initial Surcharge Volume (ISV) =	USF#	ft ³
Initial Surcharge Depth (ISD) =	USF#	ft
Total Available Detention Depth (H _{DA}) =	USF#	ft
Depth of Trickle Channel (H _{TC}) =	USF#	ft
Slope of Trickle Channel (S _{TC}) =	USF#	ft/ft
Slopes of Main Basin Sides (S _{MB}) =	USF#	H:V
Basin Length-to-Width Ratio (R _{BL}) =	USF#	
Initial Surcharge Area (A _{IS}) =	USF#	ft ²
Surcharge Volume Length (L _{SV}) =	USF#	ft
Surcharge Volume Width (W _{SV}) =	USF#	ft
Depth of Basin Floor (H _{B,Floor}) =	USF#	ft
Length of Basin Floor (L _{B,Floor}) =	USF#	ft
Width of Basin Floor (W _{B,Floor}) =	USF#	ft
Area of Basin Floor (A _{B,Floor}) =	USF#	ft ²
Volume of Basin Floor (V _{B,Floor}) =	USF#	ft ³
Depth of Main Basin (H _{MB}) =	USF#	ft
Length of Main Basin (L _{MB}) =	USF#	ft
Width of Main Basin (W _{MB}) =	USF#	ft
Area of Main Basin (A _{MB}) =	USF#	ft ²
Volume of Main Basin (V _{MB}) =	USF#	ft ³
Calculated Total Basin Volume (V _{Total}) =	USF#	acre-feet

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DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

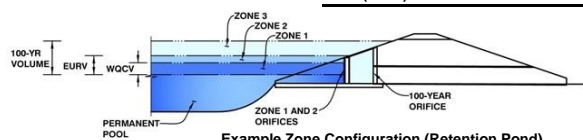


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Bent Grass Residential Filing No. 2

Basin ID: Pond (North) - WATER QUALITY ONLY



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.10	0.320	Orifice Plate
Zone 2			
Zone 3			
		0.320	Total

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

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = 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)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-7/16 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

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	1.00	2.00					
Orifice Area (sq. inches)	1.66	1.66	1.66					

	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)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orifice

Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Slope = H:V (enter zero for flat grate)
Horiz. Length of Weir Sides = feet
Overflow Grate Open Area % = % grate open area/total area
Debris Clogging % = %

Calculated Parameters for Overflow Weir

Height of Grate Upper Edge, H₁ = feet
Over Flow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area = should be ≥ 4
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

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

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

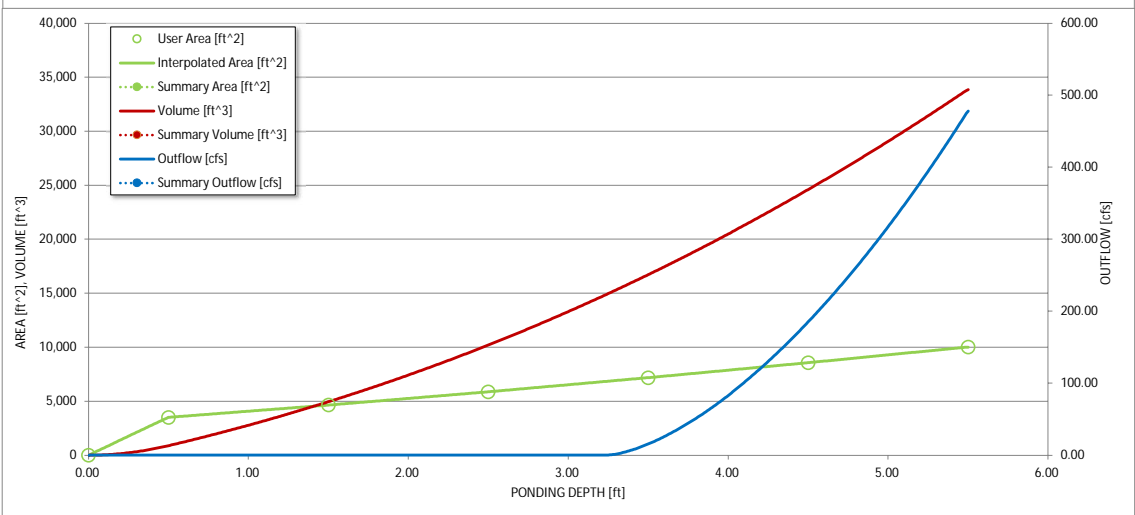
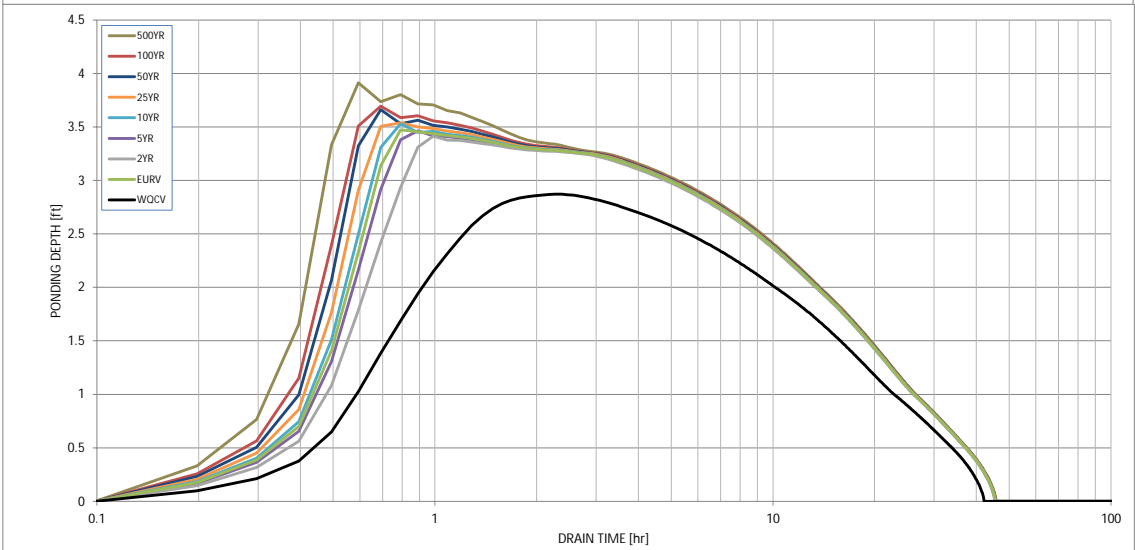
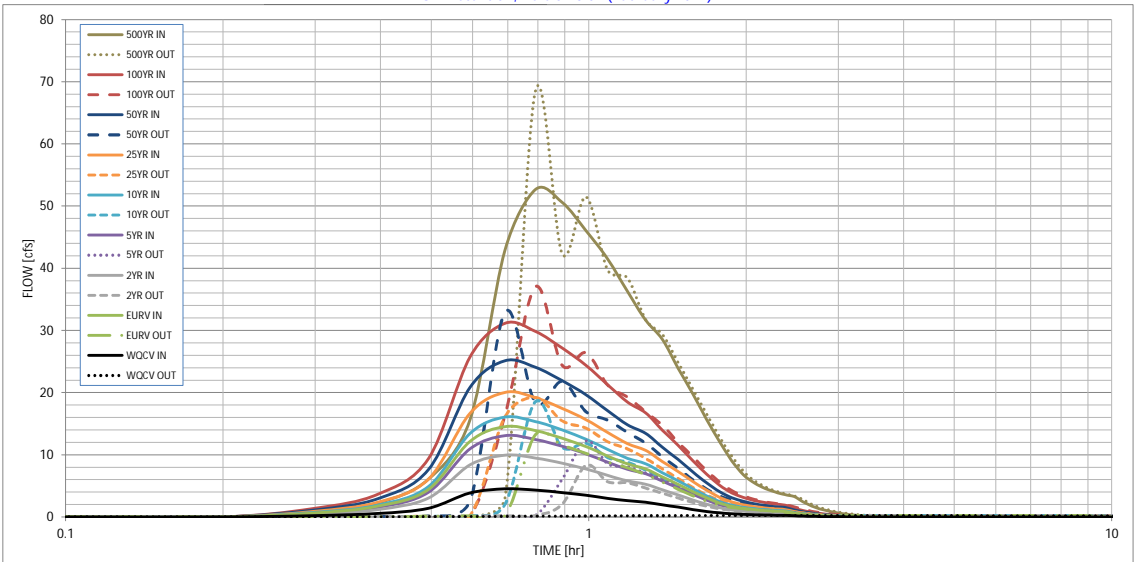
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.68
Calculated Runoff Volume (acre-ft) =	0.320	1.043	0.711	0.936	1.154	1.445	1.817	2.259	3.846
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.320	1.043	0.710	0.936	1.154	1.445	1.817	2.259	3.847
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.02	0.15	0.38	1.02
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.2	0.4	3.0	7.2	19.5
Peak Inflow Q (cfs) =	4.5	14.5	9.9	13.0	16.1	20.0	25.1	31.1	52.6
Peak Outflow Q (cfs) =	0.2	13.2	8.3	12.2	18.5	19.2	32.9	37.0	68.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	159.6	104.1	48.2	11.1	5.1	3.5
Structure Controlling Flow =	Plate	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	34	37	35	33	31	28	26	19
Time to Drain 99% of Inflow Volume (hours) =	40	40	42	41	40	39	38	37	32
Maximum Ponding Depth (ft) =	2.87	3.47	3.41	3.46	3.53	3.54	3.66	3.69	3.91
Area at Maximum Ponding Depth (acres) =	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18
Maximum Volume Stored (acre-ft) =	0.286	0.379	0.369	0.377	0.389	0.389	0.410	0.416	0.454

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



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

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Basin ID: Pond (South) - WATER QUALITY ONLY



Required Volume Calculation

Selected BMP Type = **EDB**

Watershed Area =	29.90	acres
Watershed Length =	1,800	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	53.20%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Use Input	
Water Quality Capture Volume (WQCV) =	0.536	acre-feet
Excess Urban Runoff Volume (EURV) =	1.866	acre-feet
2-y Runoff Volume (P1 = 1.19 i.) =	1.276	acre-feet
5-y Runoff Volume (P1 = 1.5 i.) =	1.674	acre-feet
10-y Runoff Volume (P1 = 2.0 i.) =	2.056	acre-feet
25-y Runoff Volume (P1 = 2.2 i.) =	2.545	acre-feet
50-y Runoff Volume (P1 = 2.25 i.) =	3.141	acre-feet
100-y Runoff Volume (P1 = 2.52 i.) =	3.840	acre-feet
500-y Runoff Volume (P1 = 3.68 i.) =	6.387	acre-feet
Approximate 2-yr Detention Volume =	1.203	acre-feet
Approximate 5-yr Detention Volume =	1.582	acre-feet
Approximate 10-yr Detention Volume =	1.924	acre-feet
Approximate 25-yr Detention Volume =	2.345	acre-feet
Approximate 50-yr Detention Volume =	2.609	acre-feet
Approximate 100-yr Detention Volume =	2.919	acre-feet

Stage-Storage Calculation

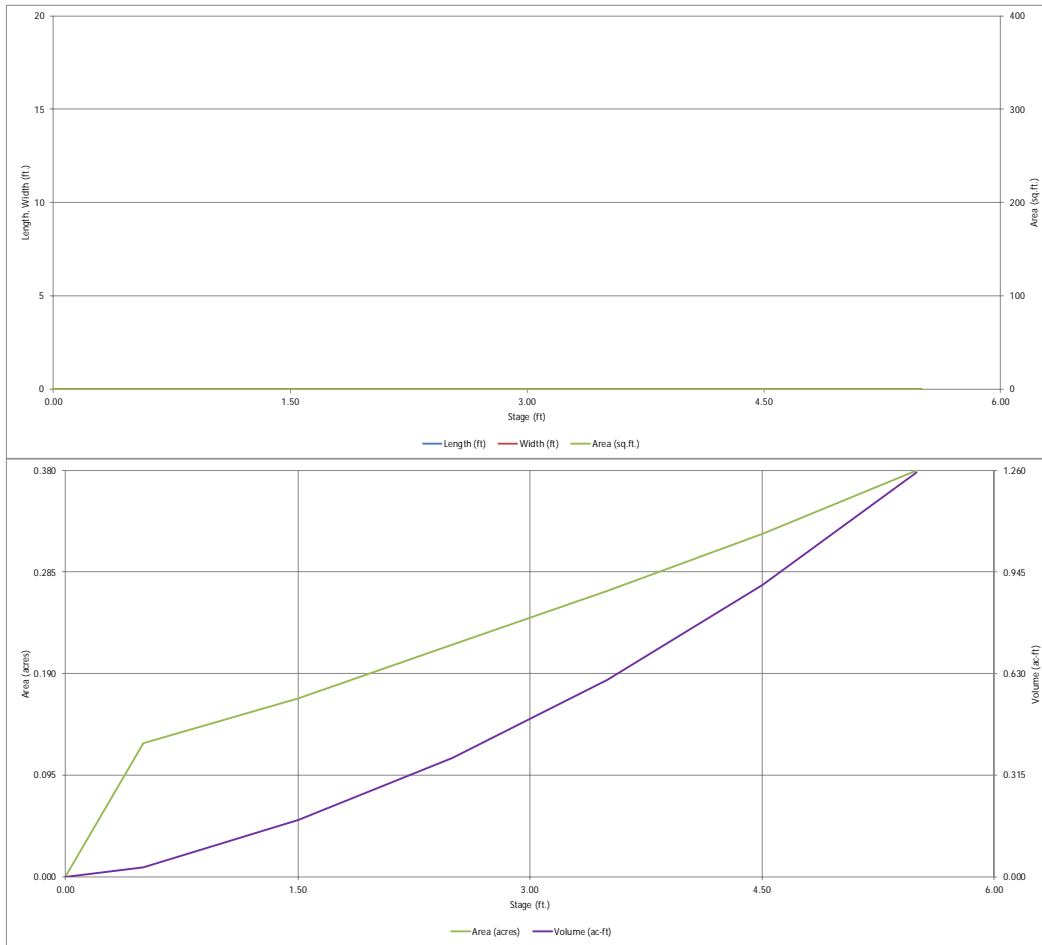
Zone 1 Volume (WQCV) = 0.536 acre-feet

Select Zone 2 Storage Volume (Optional) =		acre-feet	Total detention volume is less than 100-year volume.
Select Zone 3 Storage Volume (Optional) =		acre-feet	
Total Detention Basin Volume =	0.536	acre-feet	
Initial Surcharge Volume (ISV) =	USGf	ft ³	
Initial Surcharge Depth (ISD) =	USGf	ft	
Total Available Detention Depth (H _{DA}) =	USGf	ft	
Depth of Trickle Channel (H _{TC}) =	USGf	ft	
Slope of Trickle Channel (S _{TC}) =	USGf	ft/ft	
Slopes of Main Basin Sides (S _{MB}) =	USGf	ft/V	
Basin Length-to-Width Ratio (R _{BL}) =	USGf		
Initial Surcharge Area (A _{IS}) =	USGf	ft ²	
Surcharge Volume Length (L _{SV}) =	USGf	ft	
Surcharge Volume Width (W _{SV}) =	USGf	ft	
Depth of Basin Floor (H _{1,000}) =	USGf	ft	
Length of Basin Floor (L _{1,000}) =	USGf	ft	
Width of Basin Floor (W _{1,000}) =	USGf	ft	
Area of Basin Floor (A _{1,000}) =	USGf	ft ²	
Volume of Basin Floor (V _{1,000}) =	USGf	ft ³	
Depth of Main Basin (H _{Mb}) =	USGf	ft	
Length of Main Basin (L _{Mb}) =	USGf	ft	
Width of Main Basin (W _{Mb}) =	USGf	ft	
Area of Main Basin (A _{Mb}) =	USGf	ft ²	
Volume of Main Basin (V _{Mb}) =	USGf	ft ³	
Calculated Total Basin Volume (V _{Tb}) =	USGf	acre-feet	

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DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

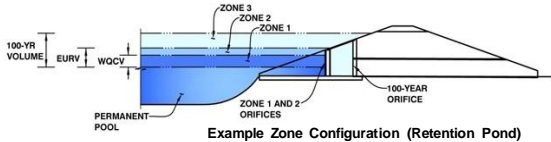


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Bent Grass Residential Filing No. 2

Basin ID: Pond (South) - WATER QUALITY ONLY



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.22	0.536	Orifice Plate
Zone 2			Not Utilized
Zone 3			Not Utilized
		0.536	Total

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

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = 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)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-7/8 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

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	1.10	2.20					
Orifice Area (sq. inches)	2.75	2.75	2.75					

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

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orifice

Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Slope = H:V (enter zero for flat grate)
Horiz. Length of Weir Sides = feet
Overflow Grate Open Area % = %
Debris Clogging % = %

Calculated Parameters for Overflow Weir

Height of Grate Upper Edge, H_u = feet
Over Flow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area = should be ≥ 4
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

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

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

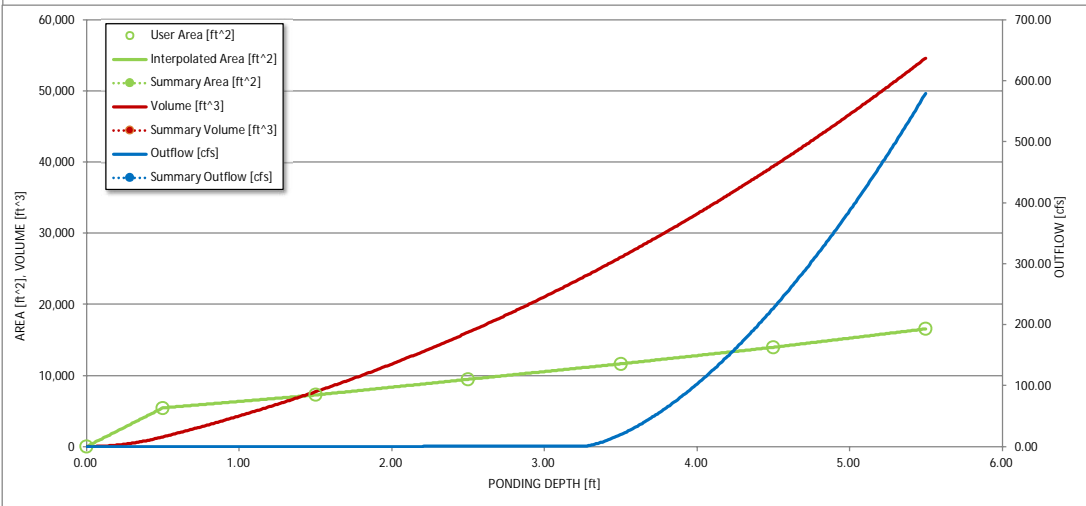
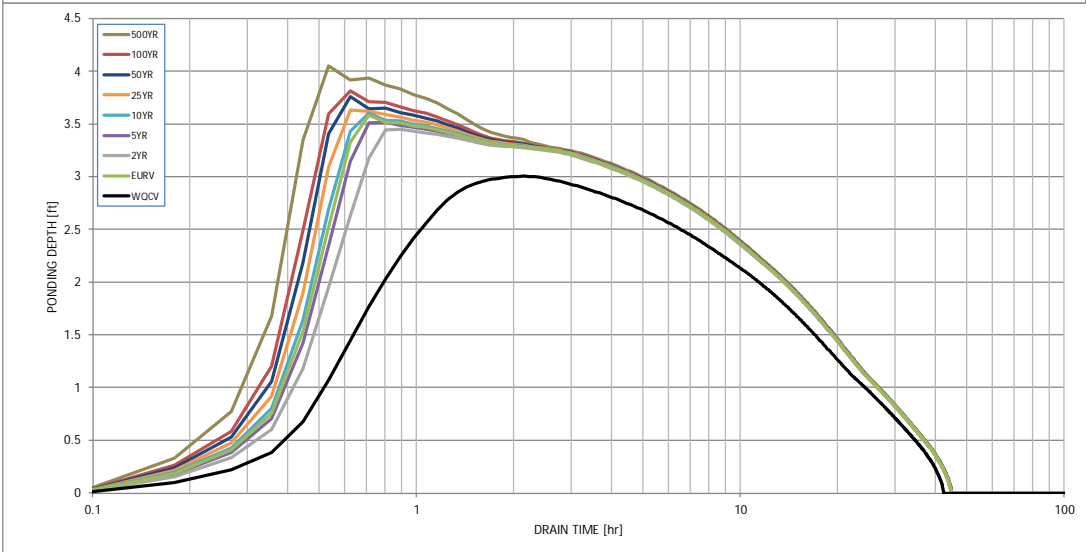
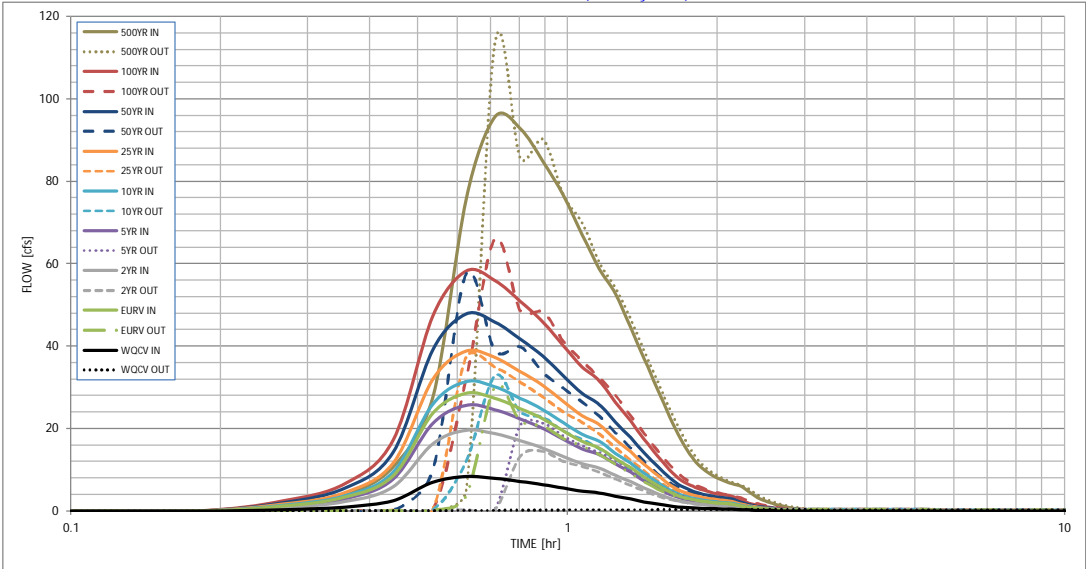
Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.68
One-Hour Rainfall Depth (in) =	0.536	1.866	1.276	1.674	2.056	2.545	3.141	3.840	6.387
Calculated Runoff Volume (acre-ft) =									
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.536	1.866	1.275	1.674	2.055	2.544	3.141	3.840	6.382
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.02	0.18	0.43	1.16
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.3	0.7	5.4	13.0	34.7
Peak Inflow Q (cfs) =	8.3	28.6	19.6	25.7	31.5	38.8	47.8	58.2	95.7
Peak Outflow Q (cfs) =	0.4	30.1	14.5	21.3	32.8	37.3	57.5	66.0	113.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	153.5	101.7	51.7	10.7	5.1	3.3
Structure Controlling Flow =	Plate	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	33	36	34	32	30	27	25	19
Time to Drain 99% of Inflow Volume (hours) =	40	40	41	40	39	38	37	36	32
Maximum Ponding Depth (ft) =	3.01	3.58	3.45	3.52	3.60	3.64	3.76	3.81	4.05
Area at Maximum Ponding Depth (acres) =	0.24	0.27	0.26	0.27	0.27	0.27	0.28	0.28	0.30
Maximum Volume Stored (acre-ft) =	0.483	0.632	0.597	0.613	0.637	0.646	0.682	0.696	0.765

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



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: _____

UD-Detention, Version 3.07 (February 2017)

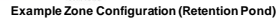
The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

The table can estimate the source flow hydrographs from the Workbook that show Hydrographs developed in a separate program.										
	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.35 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph Constant	0:10:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:16:03	0.37	1.23	0.86	1.11	1.35	1.65	2.02	2.43	3.79
0.935	0:21:24	1.00	3.36	2.32	3.03	3.69	4.54	5.56	6.74	10.77
	0:26:45	2.56	8.64	5.96	7.77	9.48	11.66	14.29	17.30	27.66
	0:32:06	7.04	23.71	16.37	21.33	26.03	31.99	39.19	47.44	75.74
	0:37:27	8.33	28.60	19.63	25.69	31.46	38.83	47.79	58.23	95.72
	0:42:48	7.95	27.38	18.77	24.58	30.13	37.22	45.85	55.97	92.86
	0:48:09	7.23	24.92	17.09	22.38	27.42	33.87	41.73	50.95	84.88
	0:53:30	6.45	22.37	15.31	20.08	24.63	30.45	37.55	45.89	76.53
	0:58:51	5.57	19.44	13.28	17.43	21.42	26.53	32.77	40.12	67.15
	1:04:12	4.85	16.88	11.54	15.14	18.61	23.09	28.57	35.01	58.73
	1:09:33	4.39	15.31	10.47	13.74	16.87	20.91	25.83	31.62	52.84
	1:14:54	3.62	12.76	8.69	11.44	14.07	17.46	21.60	26.49	44.52
	1:20:15	2.95	10.52	7.14	9.42	11.61	14.42	17.87	21.94	36.97
	1:25:36	2.27	8.24	5.56	7.37	9.10	11.35	14.10	17.36	29.49
	1:30:57	1.68	6.27	4.20	5.59	6.94	8.69	10.84	13.39	22.91
	1:36:18	1.22	4.61	3.06	4.10	5.11	6.43	8.05	9.99	17.24
	1:41:39	0.95	3.50	2.34	3.12	3.88	4.86	6.07	7.50	12.84
	1:47:00	0.78	2.85	1.92	2.54	3.15	3.94	4.90	6.04	10.25
	1:52:21	0.66	2.41	1.62	2.15	2.66	3.32	4.13	5.08	8.61
	1:57:42	0.58	2.10	1.42	1.88	2.32	2.90	3.60	4.43	7.47
	2:03:03	0.52	1.89	1.28	1.69	2.08	2.60	3.22	3.96	6.67
	2:08:24	0.48	1.73	1.17	1.55	1.91	2.38	2.95	3.63	6.10
	2:13:45	0.35	1.28	0.86	1.14	1.41	1.76	2.19	2.70	4.60
	2:19:06	0.26	0.93	0.63	0.83	1.03	1.28	1.59	1.95	3.32
	2:24:27	0.19	0.69	0.46	0.61	0.76	0.94	1.17	1.44	2.46
	2:29:48	0.14	0.51	0.34	0.45	0.56	0.70	0.87	1.07	1.83
	2:35:09	0.10	0.37	0.25	0.33	0.41	0.51	0.64	0.79	1.35
	2:40:30	0.07	0.26	0.18	0.23	0.29	0.36	0.46	0.56	0.97
	2:45:51	0.05	0.19	0.13	0.17	0.21	0.26	0.33	0.41	0.70
	2:51:12	0.03	0.13	0.09	0.12	0.14	0.18	0.23	0.29	0.50
	2:56:33	0.02	0.08	0.05	0.07	0.09	0.12	0.15	0.18	0.33
	3:01:54	0.01	0.04	0.03	0.04	0.05	0.06	0.08	0.10	0.19
	3:07:15	0.00	0.02	0.01	0.02	0.02	0.03	0.04	0.05	0.09
	3:12:36	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03
	3:17:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:23:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:28:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:34:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:39:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:44:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:06:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:11:27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:16:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:22:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:27:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:32:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:38:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:43:33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:48:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:54:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:59:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:04:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:21:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:26:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:31:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:37:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:42:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:47:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:53:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:58:27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:03:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:09:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:14:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:19:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:25:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Future Pond Calculations

MHFD-Detention, Version 4.02 (February 2020)

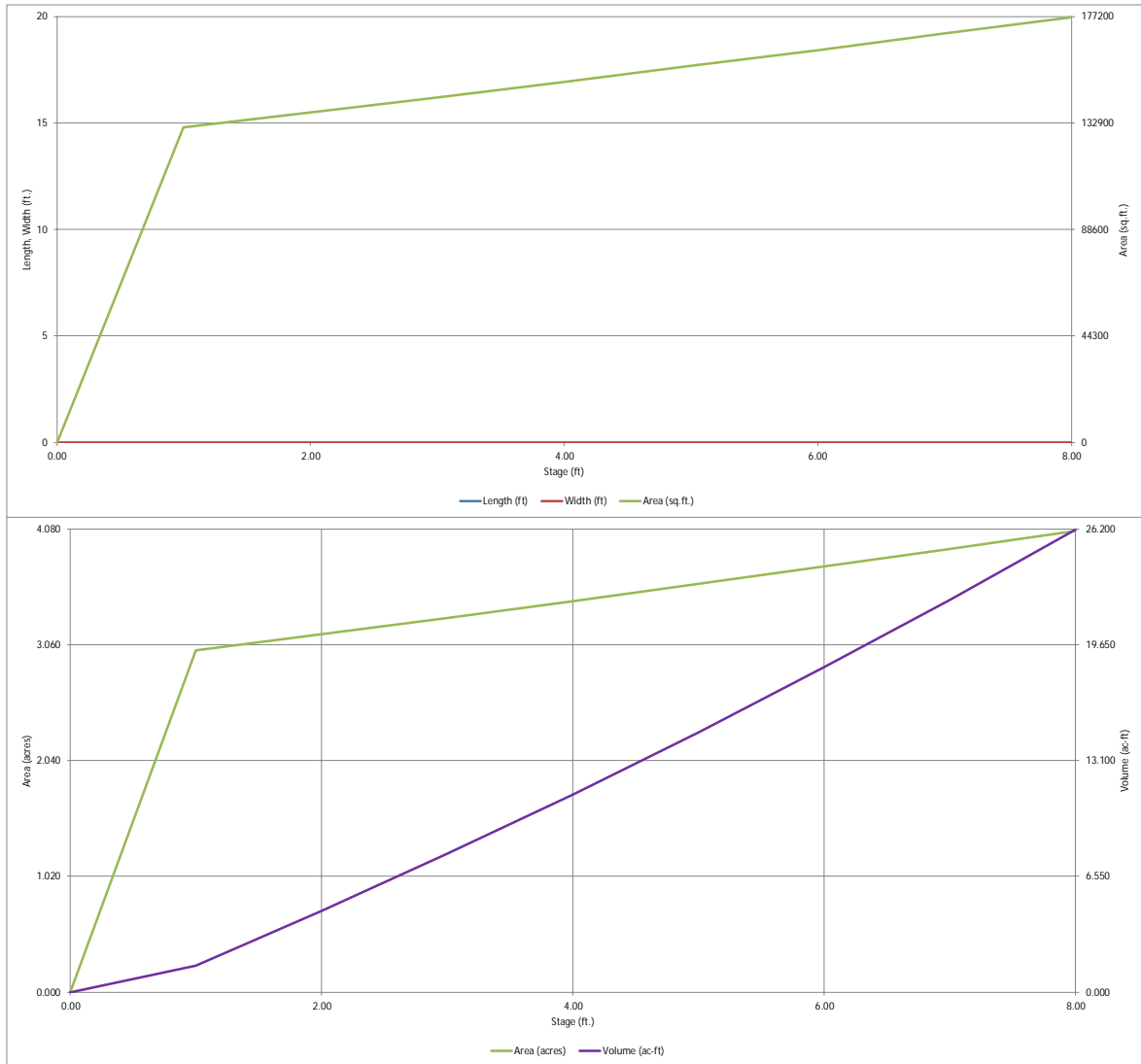
Basin ID: Future Pond for Offsite Flows



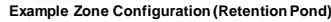
	acre-feet
	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.68	inches

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Defention, Version 4.02 (February 2020)



MHFD-Detention, Version 4.02 (February 2020)

Basin ID: Future Pond for Offsite Flows11.977Underdrain Orifice Centroid = N/A feet

Elliptical Slot Area =

N/A

 ft²

	Zone 2 Circular	Not Selected	
Vertical Orifice Area =	0.79	N/A	ft ²
Vertical Orifice Centroid =	0.50	N/A	feet

	Zone 3 Weir	Not Selected	
f) Height of Grate Upper Edge, H_1 =	2.60	N/A	feet
Overflow Weir Slope Length =	5.82	N/A	feet
Grate Open Area / 100-yr Orifice Area =	4.71	N/A	
Overflow Grate Open Area w/o Debris =	11.90	N/A	ft ²
Overflow Grate Open Area w/ Debris =	5.95	N/A	ft ²

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	2.53	N/A	ft ²
Outlet Orifice Centroid =	0.83	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.09	N/A	radians

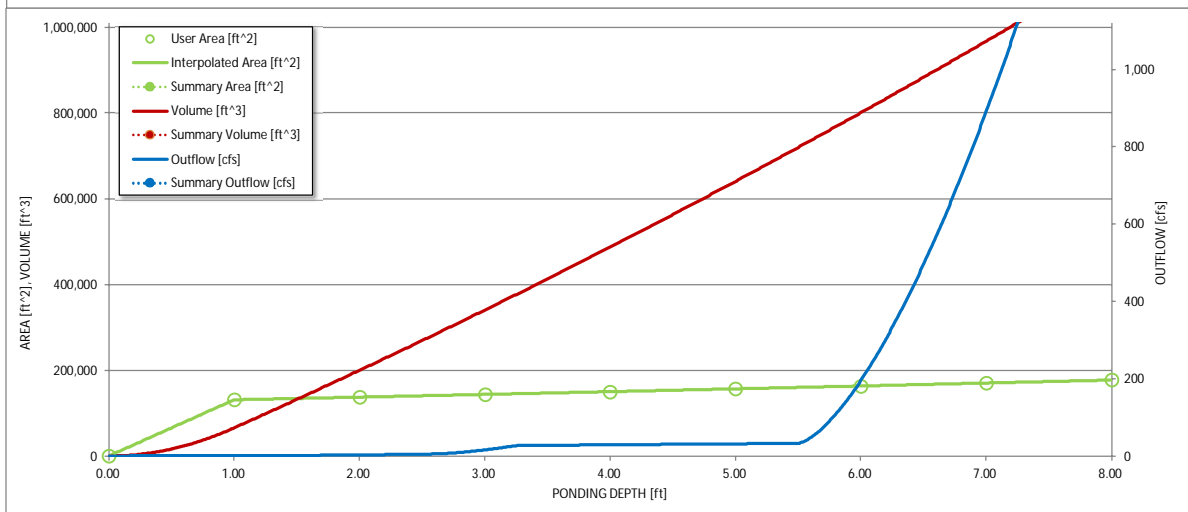
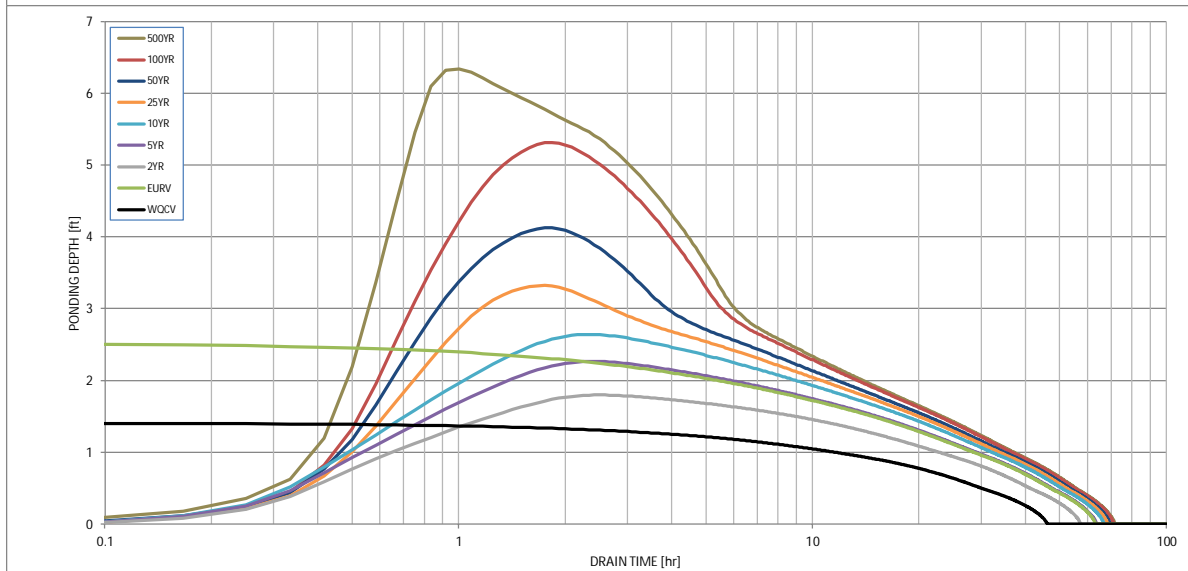
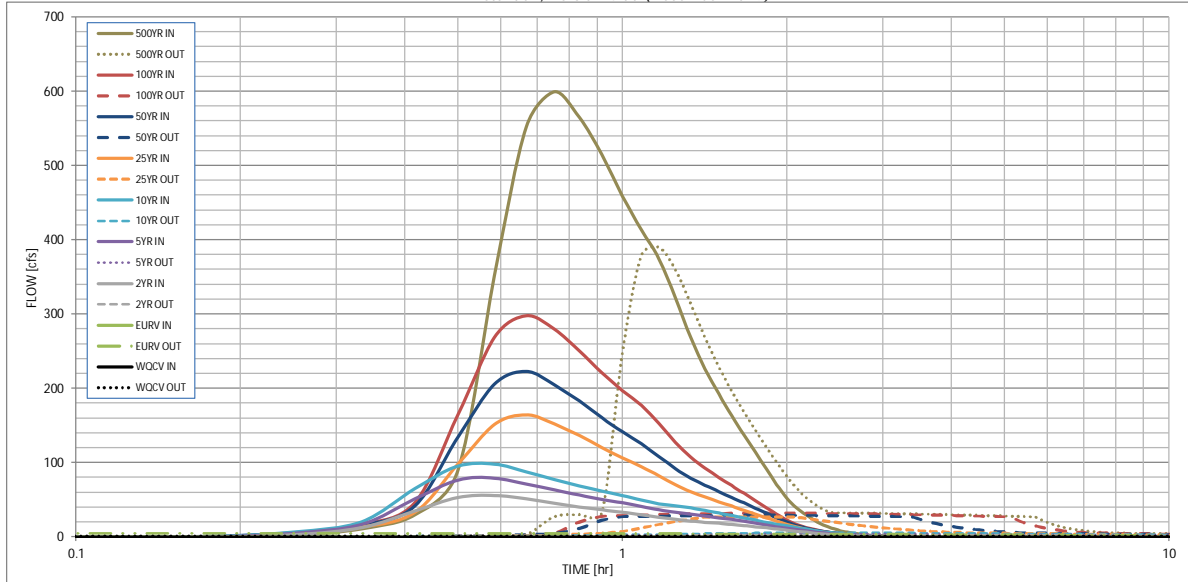
Spillway Design Flow Depth=	0.75	feet
Stage at Top of Freeboard =	7.25	feet
Basin Area at Top of Freeboard =	3.95	acres
Basin Volume at Top of Freeboard =	23.18	acre-ft

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

3.07	3.23	3.12	3.19	3.24	3.34	3.46	3.64	3.80
------	------	------	------	------	------	------	------	------

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

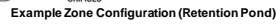
Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WOCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.04	2.25
	0:15:00	0.00	0.00	3.17	5.15	6.42	4.34	5.62	5.36	11.14
	0:20:00	0.00	0.00	12.88	17.39	20.72	13.26	15.74	16.61	29.79
	0:25:00	0.00	0.00	34.95	51.45	65.17	33.08	41.62	46.39	89.31
	0:30:00	0.00	0.00	53.08	76.70	95.51	97.89	134.37	164.02	351.30
	0:35:00	0.00	0.00	56.14	79.47	98.20	151.18	205.50	268.52	552.35
	0:40:00	0.00	0.00	51.58	71.43	87.75	164.65	222.97	297.67	599.52
	0:45:00	0.00	0.00	45.77	63.25	77.65	152.11	204.89	279.90	564.97
	0:50:00	0.00	0.00	40.69	56.43	68.70	137.00	183.18	250.90	514.71
	0:55:00	0.00	0.00	36.68	50.93	61.86	120.70	160.48	221.27	459.44
	1:00:00	0.00	0.00	33.30	45.91	55.72	106.65	141.58	197.21	413.39
	1:05:00	0.00	0.00	30.01	41.04	50.02	94.61	125.16	177.21	374.61
	1:10:00	0.00	0.00	26.52	36.61	44.99	82.34	108.34	152.87	322.41
	1:15:00	0.00	0.00	23.62	33.13	41.93	70.31	91.98	127.64	268.42
	1:20:00	0.00	0.00	21.57	30.47	39.15	60.88	79.39	107.61	226.50
	1:25:00	0.00	0.00	19.92	28.10	35.74	53.81	69.75	92.67	192.72
	1:30:00	0.00	0.00	18.38	25.86	32.20	47.56	61.28	80.20	163.60
	1:35:00	0.00	0.00	16.90	23.71	28.89	41.72	53.39	69.20	137.95
	1:40:00	0.00	0.00	15.42	21.13	25.75	36.26	45.98	58.84	114.11
	1:45:00	0.00	0.00	13.95	18.38	22.71	31.02	38.88	48.91	91.63
	1:50:00	0.00	0.00	12.53	15.78	19.87	26.02	32.09	39.49	70.73
	1:55:00	0.00	0.00	10.79	13.54	17.22	21.35	25.73	30.74	52.19
	2:00:00	0.00	0.00	9.28	11.96	15.27	17.23	20.11	22.90	39.34
	2:05:00	0.00	0.00	7.75	10.16	12.97	13.52	15.66	17.11	29.92
	2:10:00	0.00	0.00	6.32	8.30	10.62	10.53	12.12	12.96	22.27
	2:15:00	0.00	0.00	5.11	6.69	8.59	8.25	9.47	9.82	16.38
	2:20:00	0.00	0.00	4.14	5.40	6.96	6.51	7.44	7.52	12.05
	2:25:00	0.00	0.00	3.33	4.35	5.59	5.15	5.86	5.73	8.74
	2:30:00	0.00	0.00	2.66	3.49	4.45	4.07	4.59	4.33	6.29
	2:35:00	0.00	0.00	2.11	2.76	3.49	3.17	3.55	3.27	4.66
	2:40:00	0.00	0.00	1.67	2.15	2.70	2.46	2.75	2.54	3.55
	2:45:00	0.00	0.00	1.32	1.67	2.08	1.90	2.12	1.97	2.74
	2:50:00	0.00	0.00	1.03	1.30	1.63	1.49	1.66	1.57	2.16
	2:55:00	0.00	0.00	0.79	0.99	1.26	1.16	1.28	1.22	1.65
	3:00:00	0.00	0.00	0.58	0.73	0.94	0.87	0.97	0.91	1.21
	3:05:00	0.00	0.00	0.41	0.52	0.67	0.63	0.69	0.65	0.84
	3:10:00	0.00	0.00	0.26	0.35	0.45	0.43	0.47	0.44	0.53
	3:15:00	0.00	0.00	0.15	0.22	0.27	0.26	0.28	0.26	0.29
	3:20:00	0.00	0.00	0.07	0.12	0.14	0.14	0.14	0.13	0.13
	3:25:00	0.00	0.00	0.03	0.05	0.05	0.05	0.05	0.04	0.03
	3:30:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

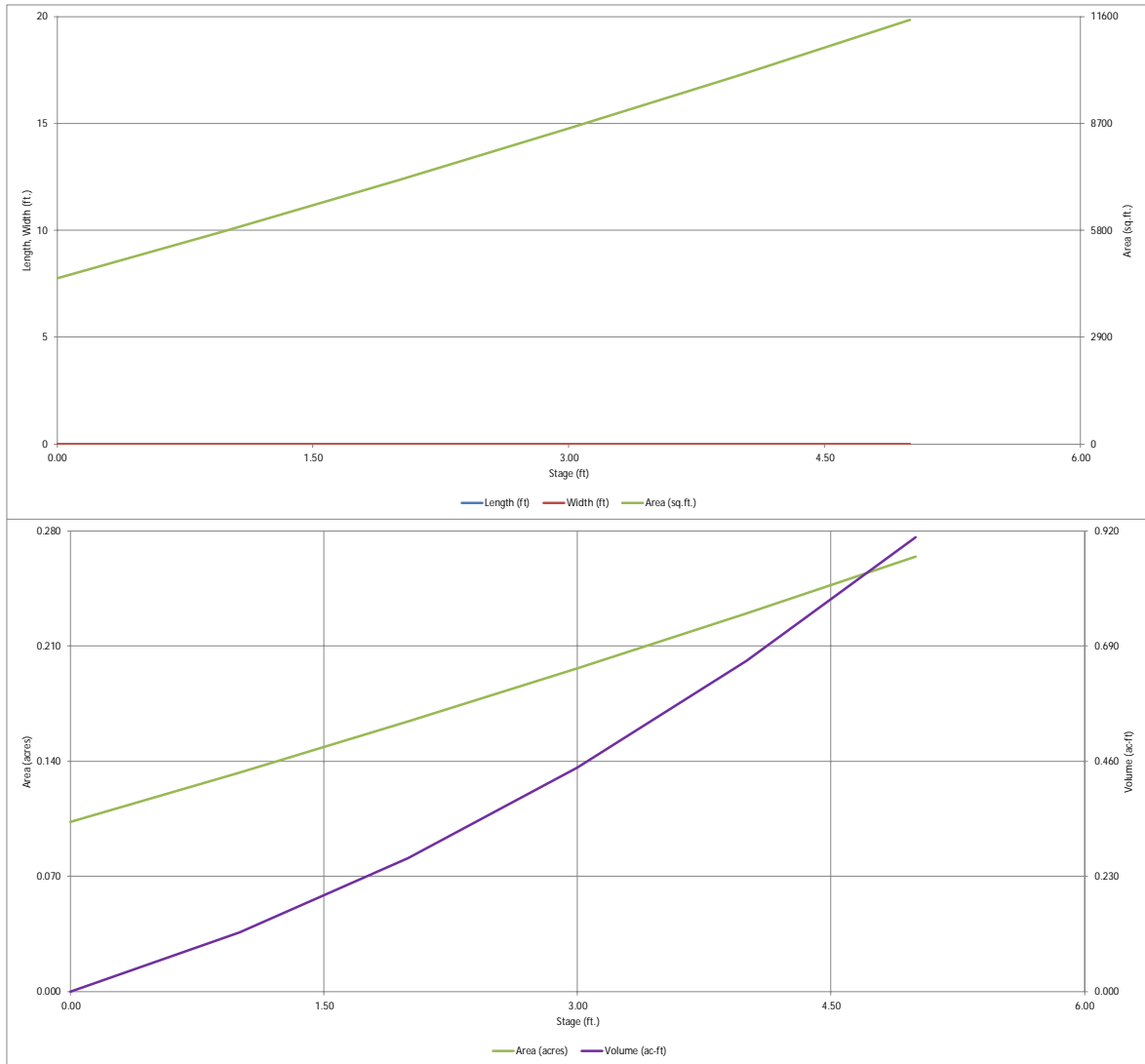
MHFD-Detention, Version 4.03 (May 2020)

Basin ID: WQCV Pond - North

1/25/2021, 3:07 PM

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

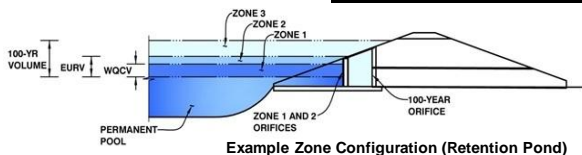


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Falcon Meadows at Bent Grass

Basin ID: WQCV Pond - North



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.74	0.225	Orifice Plate
Zone 2			
Zone 3			
Total (all zones)		0.225	

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

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)
Underdrain Orifice Diameter = N/A inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = N/A ft²
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)
Depth at top of Zone using Orifice Plate = 1.74 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = 9.00 inches
Orifice Plate: Orifice Area per Row = 2.00 sq. inches (diameter = 1-9/16 inches)
WQ Orifice Area per Row = 1.389E-02 ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.80	1.60					
Orifice Area (sq. inches)	2.00	2.00	2.00					

	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)

Calculated Parameters for Vertical Orifice

Invert of Vertical Orifice = Not Selected Not Selected ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = Not Selected Not Selected ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = Not Selected Not Selected inches
Vertical Orifice Area = Not Selected Not Selected ft²
Vertical Orifice Centroid = Not Selected Not Selected feet

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

Calculated Parameters for Overflow Weir

Overflow Weir Front Edge Height, H_o = Not Selected Not Selected ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = Not Selected Not Selected feet
Overflow Weir Grate Slope = Not Selected Not Selected H:V
Horiz. Length of Weir Sides = Not Selected Not Selected feet
Overflow Grate Open Area % = Not Selected Not Selected %, grate open area/total area
Debris Clogging % = Not Selected Not Selected %
Height of Grate Upper Edge, H₁ = Not Selected Not Selected feet
Overflow Weir Slope Length = Not Selected Not Selected feet
Grate Open Area / 100-yr Orifice Area = Not Selected Not Selected ft²
Overflow Grate Open Area w/o Debris = Not Selected Not Selected ft²
Overflow Grate Open Area w/ Debris = Not Selected Not Selected ft²

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Depth to Invert of Outlet Pipe = Not Selected Not Selected ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter = Not Selected Not Selected inches
Outlet Orifice Area = Not Selected Not Selected ft²
Outlet Orifice Centroid = Not Selected Not Selected feet
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 = 2.50 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 10.00 feet
Spillway End Slopes = 4.00 H:V
Freeboard above Max Water Surface = 1.00 feet
Spillway Design Flow Depth = 0.76 feet
Stage at Top of Freeboard = 4.26 feet
Basin Area at Top of Freeboard = 0.24 acres
Basin Volume at Top of Freeboard = 0.72 acre-ft

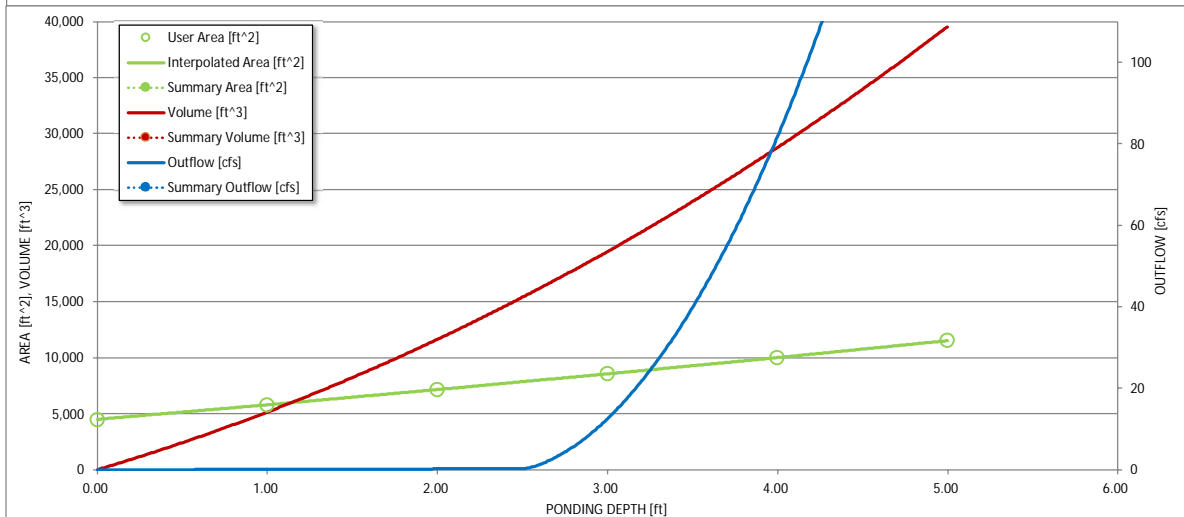
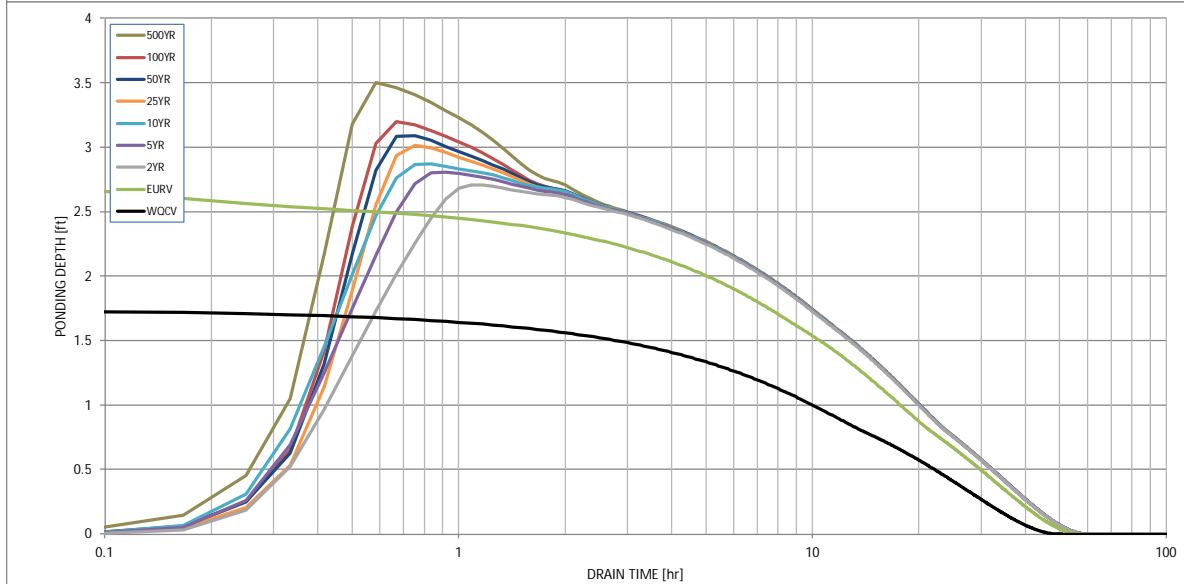
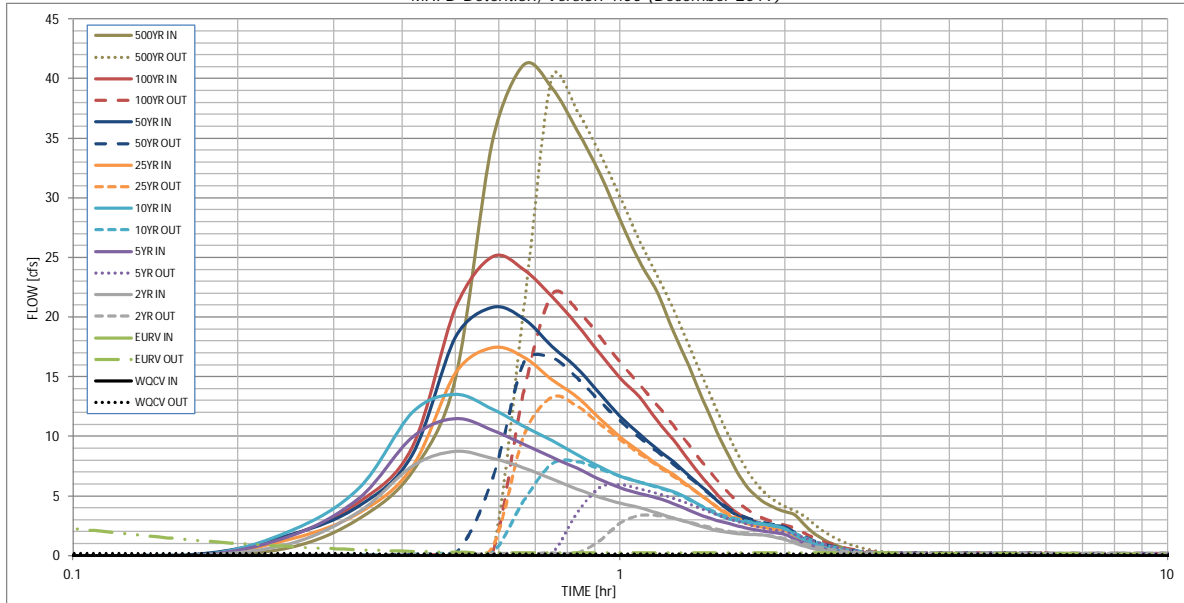
Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.68
One-Hour Rainfall Depth (in) =	N/A	N/A	0.622	0.817	0.973	1.180	1.383	1.631	2.666
CUHP Runoff Volume (acre-ft) =	0.225	0.849	0.622	0.817	0.973	1.180	1.383	1.631	2.666
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.622	0.817	0.973	1.180	1.383	1.631	2.666
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	0.1	0.2	1.6	3.3	5.3	14.0
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.02	0.15	0.30	0.49	1.28
Peak Inflow Q (cfs) =	N/A	N/A	8.8	11.5	13.5	17.4	20.8	25.1	41.2
Peak Outflow Q (cfs) =	0.2	66.0	3.4	6.0	7.9	13.3	16.6	21.9	40.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	47.3	44.7	8.2	5.1	4.1	2.9
Structure Controlling Flow =	Plate	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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) =	40	42	44	42	40	38	36	34	27
Time to Drain 99% of Inflow Volume (hours) =	44	48	51	49	48	47	46	45	41
Maximum Ponding Depth (ft) =	1.74	4.78	2.71	2.81	2.87	3.02	3.09	3.20	3.50
Area at Maximum Ponding Depth (acres) =	0.16	0.26	0.19	0.19	0.19	0.20	0.20	0.20	0.21
Maximum Volume Stored (acre-ft) =	0.225	0.850	0.392	0.409	0.422	0.449	0.465	0.487	0.550

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

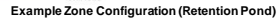
Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.01	0.70
	0:15:00	0.00	0.00	1.04	1.69	2.10	1.41	1.76	1.72	3.13
	0:20:00	0.00	0.00	3.70	4.86	5.71	3.60	4.20	4.50	7.06
	0:25:00	0.00	0.00	7.52	9.95	12.01	7.45	8.51	9.15	14.81
	0:30:00	0.00	0.00	8.78	11.52	13.54	15.28	18.32	20.76	34.73
	0:35:00	0.00	0.00	8.17	10.54	12.30	17.44	20.83	25.10	41.19
	0:40:00	0.00	0.00	7.38	9.34	10.86	16.66	19.87	23.98	39.26
	0:45:00	0.00	0.00	6.43	8.26	9.66	14.77	17.55	21.72	35.71
	0:50:00	0.00	0.00	5.61	7.34	8.47	13.30	15.76	19.38	32.07
	0:55:00	0.00	0.00	4.91	6.42	7.45	11.52	13.58	16.97	28.11
	1:00:00	0.00	0.00	4.39	5.70	6.68	9.95	11.66	14.89	24.68
	1:05:00	0.00	0.00	4.04	5.23	6.19	8.75	10.21	13.31	22.17
	1:10:00	0.00	0.00	3.59	4.86	5.78	7.69	8.95	11.36	18.81
	1:15:00	0.00	0.00	3.17	4.38	5.37	6.81	7.89	9.72	15.94
	1:20:00	0.00	0.00	2.78	3.85	4.78	5.84	6.74	8.02	13.03
	1:25:00	0.00	0.00	2.42	3.36	4.07	4.96	5.70	6.51	10.48
	1:30:00	0.00	0.00	2.12	2.96	3.48	4.08	4.66	5.19	8.25
	1:35:00	0.00	0.00	1.92	2.70	3.09	3.33	3.77	4.09	6.38
	1:40:00	0.00	0.00	1.83	2.41	2.87	2.84	3.20	3.36	5.19
	1:45:00	0.00	0.00	1.78	2.20	2.73	2.55	2.87	2.93	4.49
	1:50:00	0.00	0.00	1.74	2.05	2.62	2.36	2.66	2.66	4.02
	1:55:00	0.00	0.00	1.55	1.93	2.50	2.23	2.51	2.47	3.69
	2:00:00	0.00	0.00	1.37	1.79	2.29	2.15	2.41	2.34	3.45
	2:05:00	0.00	0.00	1.07	1.40	1.78	1.67	1.88	1.79	2.63
	2:10:00	0.00	0.00	0.82	1.06	1.35	1.26	1.42	1.33	1.94
	2:15:00	0.00	0.00	0.62	0.81	1.02	0.95	1.07	1.00	1.46
	2:20:00	0.00	0.00	0.47	0.61	0.77	0.72	0.81	0.76	1.10
	2:25:00	0.00	0.00	0.35	0.45	0.57	0.53	0.60	0.57	0.82
	2:30:00	0.00	0.00	0.26	0.33	0.42	0.39	0.44	0.42	0.60
	2:35:00	0.00	0.00	0.19	0.23	0.30	0.29	0.32	0.31	0.44
	2:40:00	0.00	0.00	0.13	0.17	0.22	0.21	0.23	0.22	0.32
	2:45:00	0.00	0.00	0.09	0.11	0.15	0.14	0.16	0.15	0.22
	2:50:00	0.00	0.00	0.05	0.07	0.09	0.09	0.10	0.10	0.14
	2:55:00	0.00	0.00	0.02	0.04	0.05	0.05	0.05	0.05	0.07
	3:00:00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.03
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	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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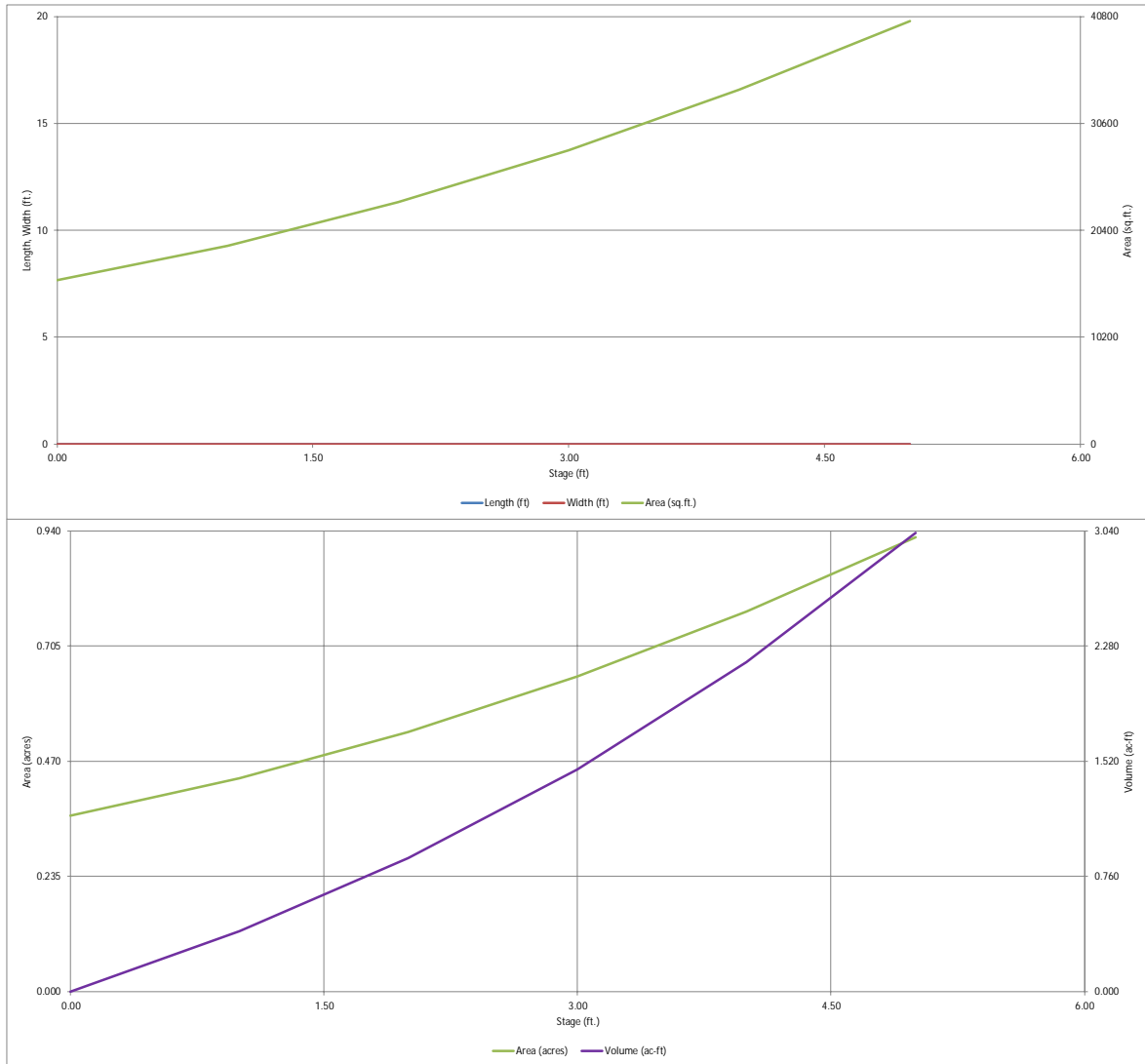
MHFD-Detention, Version 4.03 (May 2020)

Basin ID: WQCV Pond - South

1/25/2021, 3:09 PM

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

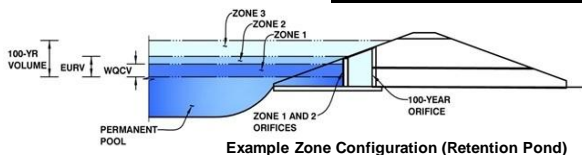


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Falcon Meadows at Bent Grass

Basin ID: WQCV Pond - South



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.90	0.825	Orifice Plate
Zone 2			
Zone 3			
Total (all zones)		0.825	

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

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = 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 = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = inches
Orifice Plate: Orifice Area per Row = sq. inches (use rectangular openings)

WQ Orifice Area per Row = ft²
Elliptical Half-Width = feet
Elliptical Slot Centroid = feet
Elliptical Slot Area = ft²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.80	1.60					
Orifice Area (sq. inches)	7.00	7.00	7.00					

	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)

Calculated Parameters for Vertical Orifice

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter = inches

Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

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

Calculated Parameters for Overflow Weir

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Open Area % = %
Debris Clogging % = %

Height of Grate Upper Edge, H₁ = feet
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area = ft²
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter = inches

Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = feet
Spillway End Slopes = H:V
Freeboard above Max Water Surface = feet

Spillway Design Flow Depth = feet
Stage at Top of Freeboard = feet
Basin Area at Top of Freeboard = acres
Basin Volume at Top of Freeboard = acre-ft

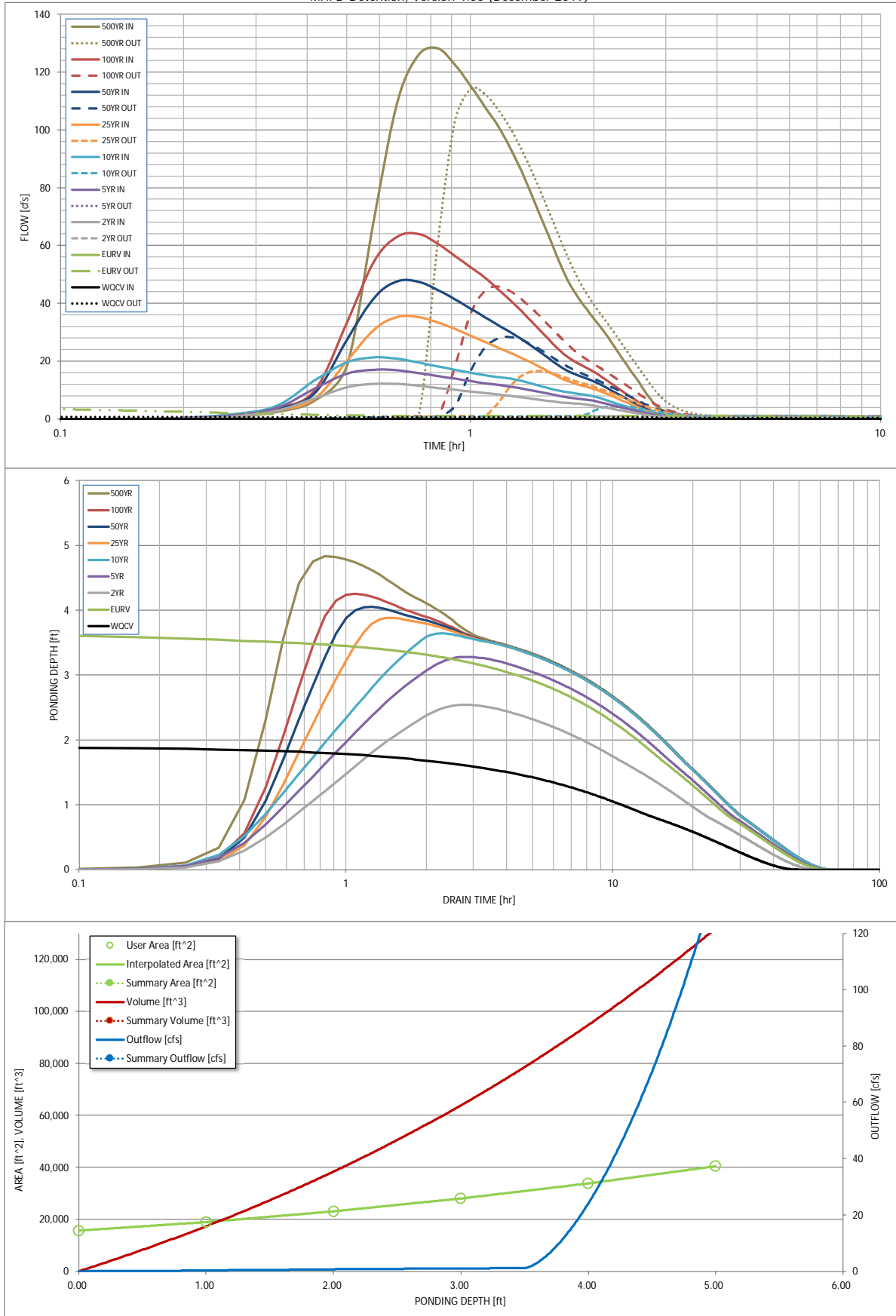
Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.68
One-Hour Rainfall Depth (in) =	N/A	N/A	1.351	1.865	2.297	3.405	4.438	5.824	11.682
CUHP Runoff Volume (acre-ft) =	0.825	1.938	1.351	1.865	2.297	3.405	4.438	5.824	11.682
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.351	1.865	2.297	3.405	4.438	5.824	11.682
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.4	0.8	1.1	9.8	19.6	32.5	84.9
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.02	0.15	0.30	0.49	1.29
Peak Inflow Q (cfs) =	N/A	N/A	12.2	17.1	21.3	35.3	47.8	64.0	128.3
Peak Outflow Q (cfs) =	0.7	5.2	0.9	1.1	4.7	16.5	28.4	45.8	114.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.5	4.4	1.7	1.5	1.4	1.3
Structure Controlling Flow =	Plate	Spillway	Plate	Plate	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Gate 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) =	40	48	46	49	50	46	43	40	29
Time to Drain 99% of Inflow Volume (hours) =	44	54	51	55	56	54	53	51	45
Maximum Ponding Depth (ft) =	1.90	3.69	2.55	3.28	3.65	3.89	4.06	4.26	4.84
Area at Maximum Ponding Depth (acres) =	0.52	0.73	0.59	0.68	0.73	0.76	0.78	0.81	0.90
Maximum Volume Stored (acre-ft) =	0.827	1.941	1.182	1.651	1.904	2.083	2.214	2.374	2.871

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.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.01	0.49
	0:15:00	0.00	0.00	0.66	1.08	1.36	0.93	1.22	1.17	2.41
	0:20:00	0.00	0.00	2.70	3.64	4.39	2.84	3.40	3.61	6.34
	0:25:00	0.00	0.00	7.15	10.47	13.36	6.99	8.83	9.86	18.69
	0:30:00	0.00	0.00	10.96	15.74	19.72	20.21	27.61	33.65	70.54
	0:35:00	0.00	0.00	12.17	17.12	21.31	31.15	42.17	54.90	110.97
	0:40:00	0.00	0.00	12.12	16.81	20.82	35.35	47.78	63.29	126.34
	0:45:00	0.00	0.00	11.48	15.83	19.47	35.23	47.41	64.02	128.28
	0:50:00	0.00	0.00	10.74	14.86	18.20	33.47	44.65	60.56	122.65
	0:55:00	0.00	0.00	10.11	13.98	17.07	31.17	41.45	56.41	115.35
	1:00:00	0.00	0.00	9.53	13.13	16.01	28.88	38.24	52.55	108.08
	1:05:00	0.00	0.00	9.04	12.39	15.14	26.77	35.31	48.95	101.49
	1:10:00	0.00	0.00	8.55	11.82	14.52	24.72	32.52	44.98	93.68
	1:15:00	0.00	0.00	8.06	11.23	13.97	22.92	30.05	41.12	85.46
	1:20:00	0.00	0.00	7.56	10.57	13.22	21.12	27.56	37.24	76.82
	1:25:00	0.00	0.00	7.07	9.87	12.27	19.31	25.05	33.41	68.26
	1:30:00	0.00	0.00	6.57	9.18	11.27	17.49	22.55	29.79	60.21
	1:35:00	0.00	0.00	6.11	8.53	10.34	15.71	20.09	26.30	52.60
	1:40:00	0.00	0.00	5.73	7.89	9.62	14.06	17.84	23.16	46.40
	1:45:00	0.00	0.00	5.47	7.41	9.13	12.82	16.26	20.93	41.86
	1:50:00	0.00	0.00	5.29	7.02	8.72	11.90	15.07	19.23	38.07
	1:55:00	0.00	0.00	5.01	6.65	8.30	11.14	14.04	17.74	34.70
	2:00:00	0.00	0.00	4.69	6.29	7.83	10.43	13.08	16.36	31.58
	2:05:00	0.00	0.00	4.26	5.74	7.12	9.49	11.86	14.75	28.17
	2:10:00	0.00	0.00	3.81	5.13	6.33	8.47	10.54	13.06	24.73
	2:15:00	0.00	0.00	3.37	4.54	5.57	7.47	9.26	11.44	21.45
	2:20:00	0.00	0.00	2.96	3.99	4.85	6.52	8.03	9.91	18.32
	2:25:00	0.00	0.00	2.58	3.47	4.19	5.62	6.86	8.42	15.29
	2:30:00	0.00	0.00	2.22	2.97	3.56	4.75	5.73	6.98	12.33
	2:35:00	0.00	0.00	1.88	2.50	2.96	3.91	4.64	5.57	9.47
	2:40:00	0.00	0.00	1.55	2.05	2.41	3.11	3.61	4.22	6.79
	2:45:00	0.00	0.00	1.24	1.64	1.91	2.37	2.65	2.98	4.70
	2:50:00	0.00	0.00	0.97	1.28	1.53	1.71	1.90	2.09	3.42
	2:55:00	0.00	0.00	0.79	1.05	1.28	1.29	1.45	1.55	2.55
	3:00:00	0.00	0.00	0.67	0.89	1.08	1.03	1.15	1.19	1.91
	3:05:00	0.00	0.00	0.57	0.75	0.91	0.84	0.93	0.93	1.43
	3:10:00	0.00	0.00	0.48	0.63	0.77	0.68	0.75	0.73	1.07
	3:15:00	0.00	0.00	0.41	0.53	0.65	0.57	0.62	0.58	0.80
	3:20:00	0.00	0.00	0.35	0.45	0.55	0.47	0.51	0.46	0.61
	3:25:00	0.00	0.00	0.29	0.38	0.45	0.38	0.41	0.37	0.49
	3:30:00	0.00	0.00	0.24	0.31	0.37	0.31	0.33	0.30	0.39
	3:35:00	0.00	0.00	0.20	0.25	0.29	0.25	0.27	0.24	0.31
	3:40:00	0.00	0.00	0.16	0.20	0.23	0.20	0.21	0.19	0.24
	3:45:00	0.00	0.00	0.12	0.15	0.18	0.15	0.16	0.14	0.18
	3:50:00	0.00	0.00	0.09	0.12	0.14	0.11	0.12	0.10	0.12
	3:55:00	0.00	0.00	0.07	0.09	0.10	0.08	0.08	0.07	0.08
	4:00:00	0.00	0.00	0.05	0.06	0.07	0.05	0.05	0.05	0.05
	4:05:00	0.00	0.00	0.03	0.04	0.04	0.03	0.03	0.02	0.02
	4:10:00	0.00	0.00	0.02	0.02	0.02	0.02	0.01	0.01	0.01
	4:15:00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Current Channel Calculations

MERIDIAN ROAD

Worksheet for Ex Channel - Pr DBPS 100 Yr Flow-MR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035
Channel Slope	1.75 %
Left Side Slope	4.00 ft/ft (H:V)
Right Side Slope	4.00 ft/ft (H:V)
Discharge	850.00 ft³/s

Results

Normal Depth	4.68 ft
Flow Area	87.61 ft²
Wetted Perimeter	38.59 ft
Hydraulic Radius	2.27 ft
Top Width	37.44 ft
Critical Depth	4.89 ft
Critical Slope	0.01379 ft/ft
Velocity	9.70 ft/s
Velocity Head	1.46 ft
Specific Energy	6.14 ft
Froude Number	1.12
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.68 ft
Critical Depth	4.89 ft
Channel Slope	1.75 %
Critical Slope	0.01379 ft/ft

MERIDIAN ROAD

Worksheet for Ex Channel - Pr 100 Yr Flow-MR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035
Channel Slope	1.75 %
Left Side Slope	4.00 ft/ft (H:V)
Right Side Slope	4.00 ft/ft (H:V)
Discharge	925.00 ft³/s

Results

Normal Depth	4.83 ft
Flow Area	93.35 ft²
Wetted Perimeter	39.84 ft
Hydraulic Radius	2.34 ft
Top Width	38.65 ft
Critical Depth	5.06 ft
Critical Slope	0.01364 ft/ft
Velocity	9.91 ft/s
Velocity Head	1.53 ft
Specific Energy	6.36 ft
Froude Number	1.12
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.83 ft
Critical Depth	5.06 ft
Channel Slope	1.75 %
Critical Slope	0.01364 ft/ft

Worksheet for Ex Owl Place

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050	
Channel Slope	1.60	%
Left Side Slope	11.00	ft/ft (H:V)
Right Side Slope	12.00	ft/ft (H:V)
Discharge	850.00	ft ³ /s

Results

Normal Depth	3.64	ft
Flow Area	152.13	ft ²
Wetted Perimeter	83.97	ft
Hydraulic Radius	1.81	ft
Top Width	83.66	ft
Critical Depth	3.21	ft
Critical Slope	0.03128	ft/ft
Velocity	5.59	ft/s
Velocity Head	0.49	ft
Specific Energy	4.12	ft
Froude Number	0.73	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.64	ft
Critical Depth	3.21	ft
Channel Slope	1.60	%
Critical Slope	0.03128	ft/ft

Future Channel Calculations

MERIDIAN ROAD

Worksheet for Fut Channel - Pr 100 Yr Flow-MR

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035
Channel Slope	0.30 %
Left Side Slope	4.00 ft/ft (H:V)
Right Side Slope	4.00 ft/ft (H:V)
Bottom Width	15.00 ft
Discharge	925.00 ft³/s

Results

Normal Depth	5.15 ft
Flow Area	183.50 ft²
Wetted Perimeter	57.49 ft
Hydraulic Radius	3.19 ft
Top Width	56.22 ft
Critical Depth	3.58 ft
Critical Slope	0.01368 ft/ft
Velocity	5.04 ft/s
Velocity Head	0.39 ft
Specific Energy	5.55 ft
Froude Number	0.49
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.15 ft
Critical Depth	3.58 ft
Channel Slope	0.30 %

MERIDIAN ROAD

Worksheet for Fut Channel - Pr 100 Yr Flow-MR

GVF Output Data

Critical Slope 0.01368 ft/ft

HY-8 Culvert Analysis Report

Culvert Alternative for Roadside Ditch alongside Meridian Road

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 248.6 cfs

Design Flow: 850 cfs

Maximum Flow: 925 cfs

Table 1 - Summary of Culvert Flows at Crossing: Meridian Road-Fut Pipe Ditch Alt

Headwater Elevation (ft)	Total Discharge (cfs)	Fut Culvert Option-Parallel Meridian Rd Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6929.05	248.60	248.60	0.00	1
6929.72	316.24	316.24	0.00	1
6930.35	383.88	383.88	0.00	1
6930.97	451.52	451.52	0.00	1
6931.60	519.16	519.16	0.00	1
6932.28	586.80	586.80	0.00	1
6933.02	654.44	654.44	0.00	1
6933.83	722.08	722.08	0.00	1
6934.73	789.72	789.72	0.00	1
6935.28	850.00	828.14	21.64	5
6935.62	925.00	851.12	73.83	5
6935.00	809.07	809.07	0.00	Overtopping

Rating Curve Plot for Crossing: Meridian Road-Fut Pipe Ditch Alt

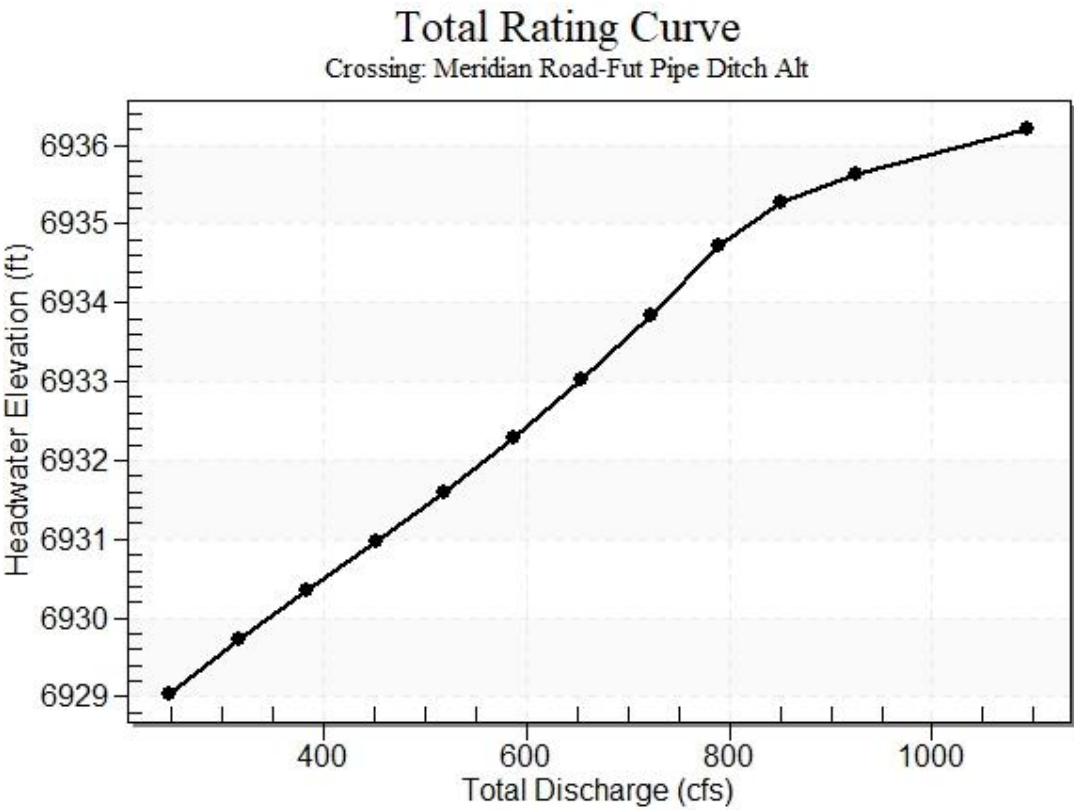


Table 2 - Culvert Summary Table: Fut Culvert Option-Parallel Meridian Rd

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
248.60	248.60	6929.05	4.247	0.0*	1-S2n	2.284	2.941	2.284	0.496	11.945	14.310
316.24	316.24	6929.72	4.923	0.0*	1-S2n	2.600	3.336	2.600	0.574	12.756	15.730
383.88	383.88	6930.35	5.551	0.0*	1-S2n	2.895	3.692	2.895	0.646	13.430	16.969
451.52	451.52	6930.97	6.168	0.0*	1-S2n	3.178	4.019	3.178	0.713	14.000	18.082
519.16	519.16	6931.60	6.802	0.0*	5-S2n	3.453	4.320	3.453	0.777	14.493	19.092
586.80	586.80	6932.28	7.480	0.0*	5-S2n	3.725	4.599	3.725	0.837	14.917	20.026
654.44	654.44	6933.02	8.218	0.0*	5-S2n	3.998	4.856	3.998	0.895	15.282	20.889
722.08	722.08	6933.83	9.030	1.896	5-S2n	4.278	5.091	4.278	0.951	15.590	21.705
789.72	789.72	6934.73	9.927	4.435	5-S2n	4.570	5.305	4.576	1.004	15.818	22.467
850.00	828.14	6935.28	10.476	5.969	5-S2n	4.746	5.417	4.746	1.051	15.953	23.118
925.00	851.12	6935.62	10.819	6.919	5-S2n	4.855	5.480	4.855	1.107	16.010	23.882

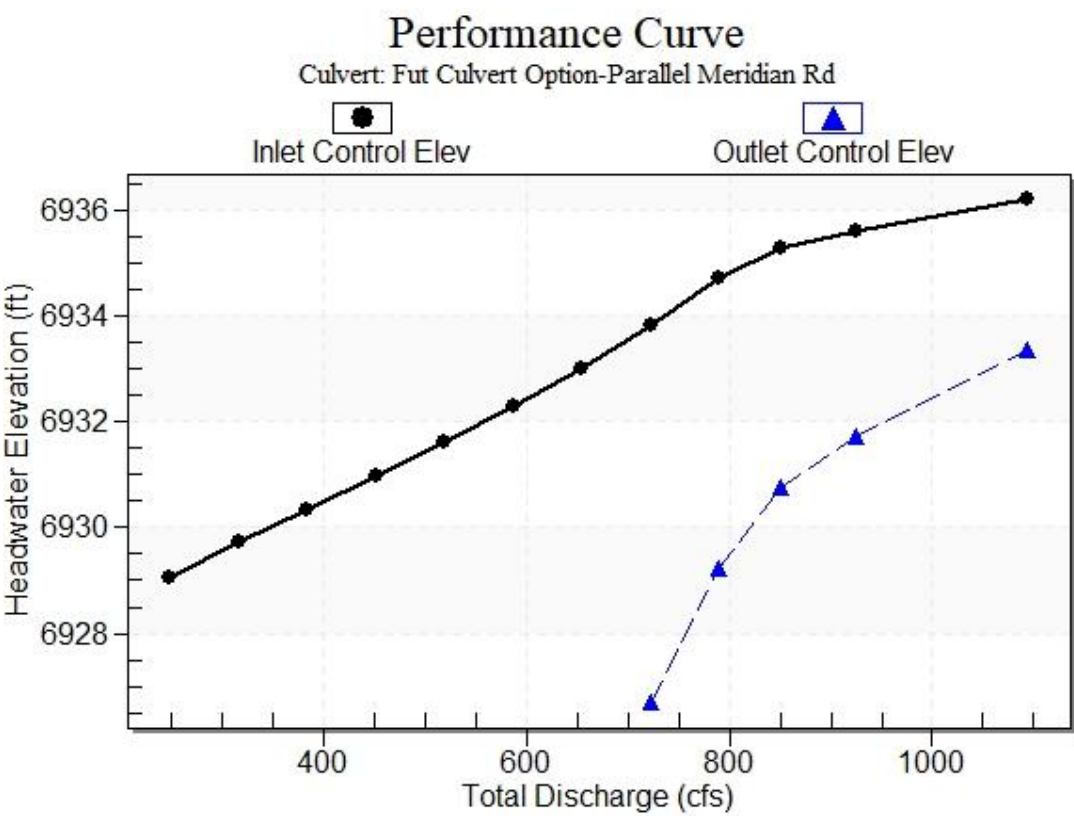
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 6924.80 ft, Outlet Elevation (invert): 6908.50 ft

Culvert Length: 2400.06 ft, Culvert Slope: 0.0068

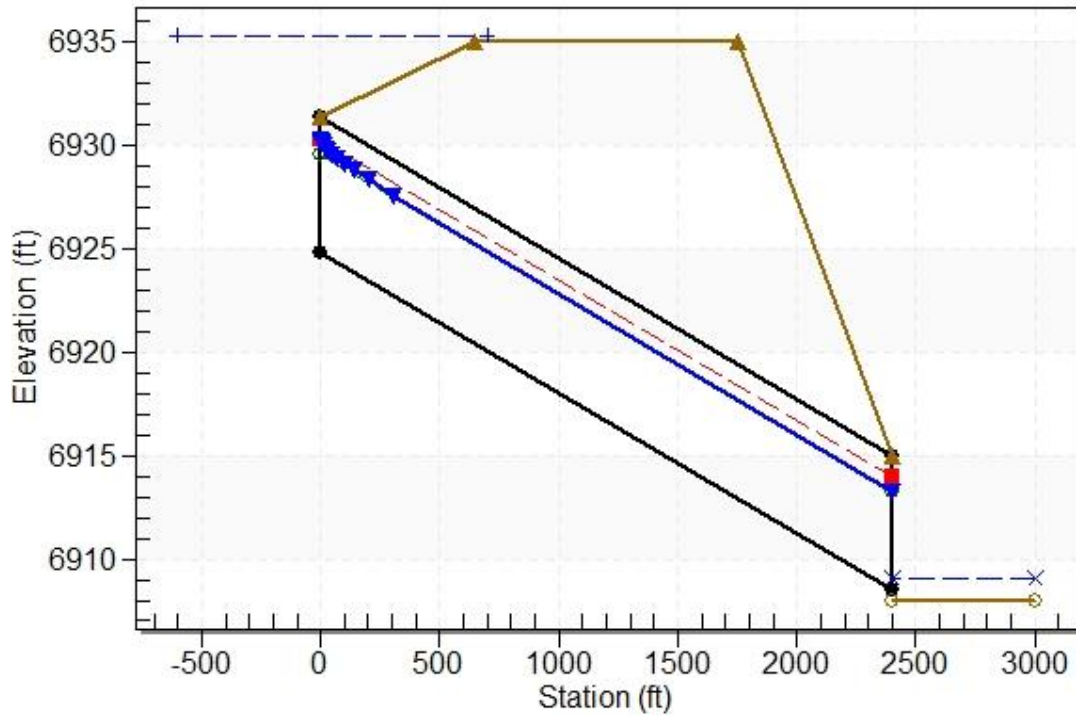
Culvert Performance Curve Plot: Fut Culvert Option-Parallel Meridian Rd



Water Surface Profile Plot for Culvert: Fut Culvert Option-Parallel Meridian Rd

Crossing - Meridian Road-Fut Pipe Ditch Alt, Design Discharge - 850.0 cfs

Culvert - Fut Culvert Option-Parallel Meridian Rd, Culvert Discharge - 828.1 cfs



Site Data - Fut Culvert Option-Parallel Meridian Rd

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6924.80 ft

Outlet Station: 2400.00 ft

Outlet Elevation: 6908.50 ft

Number of Barrels: 2

Culvert Data Summary - Fut Culvert Option-Parallel Meridian Rd

Barrel Shape: Circular

Barrel Diameter: 6.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Meridian Road-Fut Pipe Ditch

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
248.60	6908.50	0.50	14.31	9.29	3.58
316.24	6908.57	0.57	15.73	10.75	3.66
383.88	6908.65	0.65	16.97	12.10	3.72
451.52	6908.71	0.71	18.08	13.36	3.77
519.16	6908.78	0.78	19.09	14.54	3.82
586.80	6908.84	0.84	20.03	15.67	3.86
654.44	6908.90	0.90	20.89	16.76	3.89
722.08	6908.95	0.95	21.70	17.79	3.92
789.72	6909.00	1.00	22.47	18.80	3.95
850.00	6909.05	1.05	23.12	19.67	3.97
925.00	6909.11	1.11	23.88	20.72	4.00

Alt)**Tailwater Channel Data - Meridian Road-Fut Pipe Ditch Alt**

Tailwater Channel Option: Rectangular Channel

Bottom Width: 35.00 ft

Channel Slope: 0.3000

Channel Manning's n: 0.0350

Channel Invert Elevation: 6908.00 ft

Worksheet for Fut Owl Place

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.30	%
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	35.00	ft
Discharge	925.00	ft³/s

Results

Normal Depth	3.86	ft
Flow Area	194.93	ft²
Wetted Perimeter	66.86	ft
Hydraulic Radius	2.92	ft
Top Width	65.91	ft
Critical Depth	2.52	ft
Critical Slope	0.01424	ft/ft
Velocity	4.75	ft/s
Velocity Head	0.35	ft
Specific Energy	4.21	ft
Froude Number	0.49	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.86	ft
Critical Depth	2.52	ft
Channel Slope	0.30	%

Worksheet for Fut Owl Place

GVF Output Data

Critical Slope 0.01424 ft/ft

HY-8 Culvert Analysis Report

Culvert Alternative for Ditch alongside Bent Grass Meadows Drive

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 8 cfs

Design Flow: 40.9 cfs

Maximum Flow: 50 cfs

Table 1 - Summary of Culvert Flows at Crossing: BGMD-Future Pipe Channel Alt

Headwater Elevation (ft)	Total Discharge (cfs)	Fut Culvert Option-Parallel BGMD Discharge (cfs)	Roadway Discharge (cfs)	Iterations
26.16	8.00	8.00	0.00	1
26.45	12.20	12.20	0.00	1
26.70	16.40	16.40	0.00	1
26.96	20.60	20.60	0.00	1
27.20	24.80	24.80	0.00	1
27.42	29.00	29.00	0.00	1
27.63	33.20	33.20	0.00	1
27.83	37.40	37.40	0.00	1
28.00	40.90	40.90	0.00	1
28.22	45.80	45.80	0.00	1
28.42	50.00	50.00	0.00	1
30.00	78.87	78.87	0.00	Overtopping

Rating Curve Plot for Crossing: BGMD-Future Pipe Channel Alt

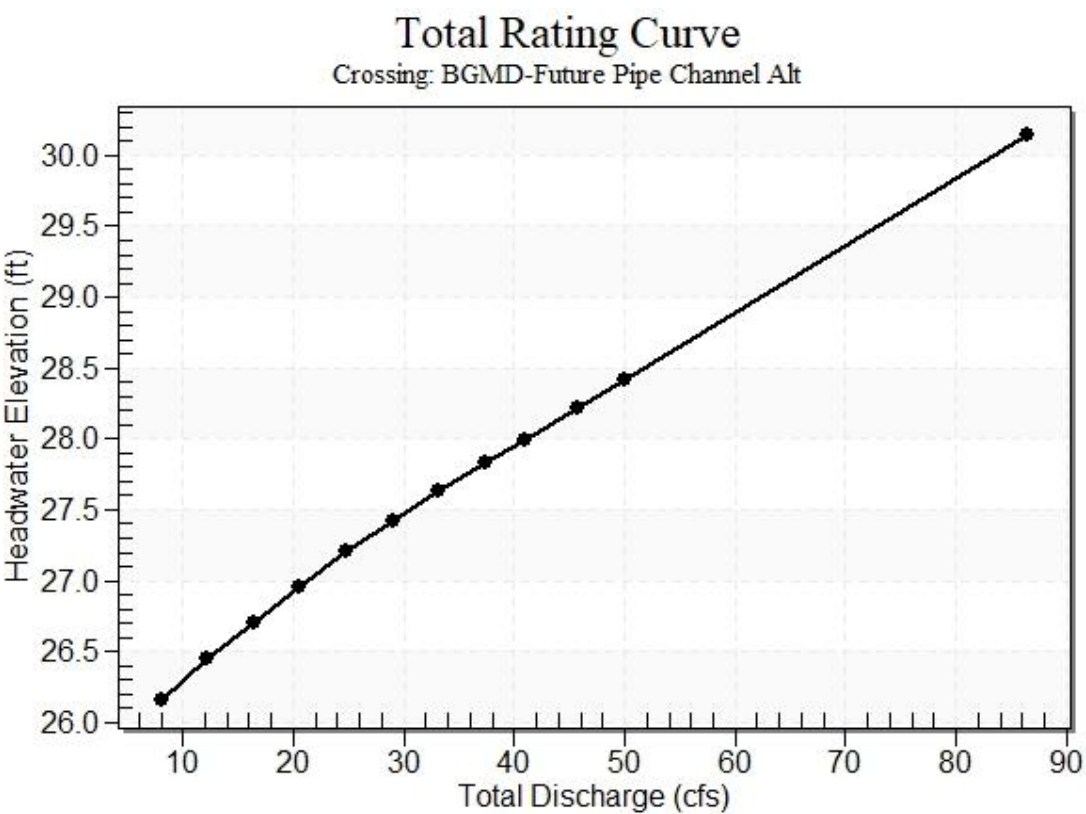


Table 2 - Culvert Summary Table: Fut Culvert Option-Parallel BGMD

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
8.00	8.00	26.16	1.163	0.0*	1-S2n	0.760	0.853	0.760	0.207	5.193	7.721
12.20	12.20	26.45	1.453	0.0*	1-S2n	0.940	1.060	0.940	0.269	5.865	9.058
16.40	16.40	26.70	1.702	0.0*	1-S2n	1.095	1.235	1.095	0.324	6.376	10.116
20.60	20.60	26.96	1.959	0.0*	1-S2n	1.234	1.390	1.234	0.374	6.795	11.007
24.80	24.80	27.20	2.201	0.0*	1-S2n	1.363	1.532	1.363	0.421	7.149	11.778
29.00	29.00	27.42	2.424	0.0*	1-S2n	1.486	1.662	1.486	0.465	7.456	12.463
33.20	33.20	27.63	2.633	0.0*	1-S2n	1.603	1.784	1.603	0.508	7.724	13.080
37.40	37.40	27.83	2.833	0.0*	1-S2n	1.717	1.899	1.717	0.548	7.963	13.649
40.90	40.90	28.00	2.995	0.0*	1-S2n	1.811	1.990	1.811	0.581	8.142	14.085
45.80	45.80	28.22	3.221	0.0*	1-S2n	1.940	2.111	1.940	0.625	8.367	14.651
50.00	50.00	28.42	3.416	0.0*	1-S2n	2.050	2.210	2.050	0.662	8.538	15.103

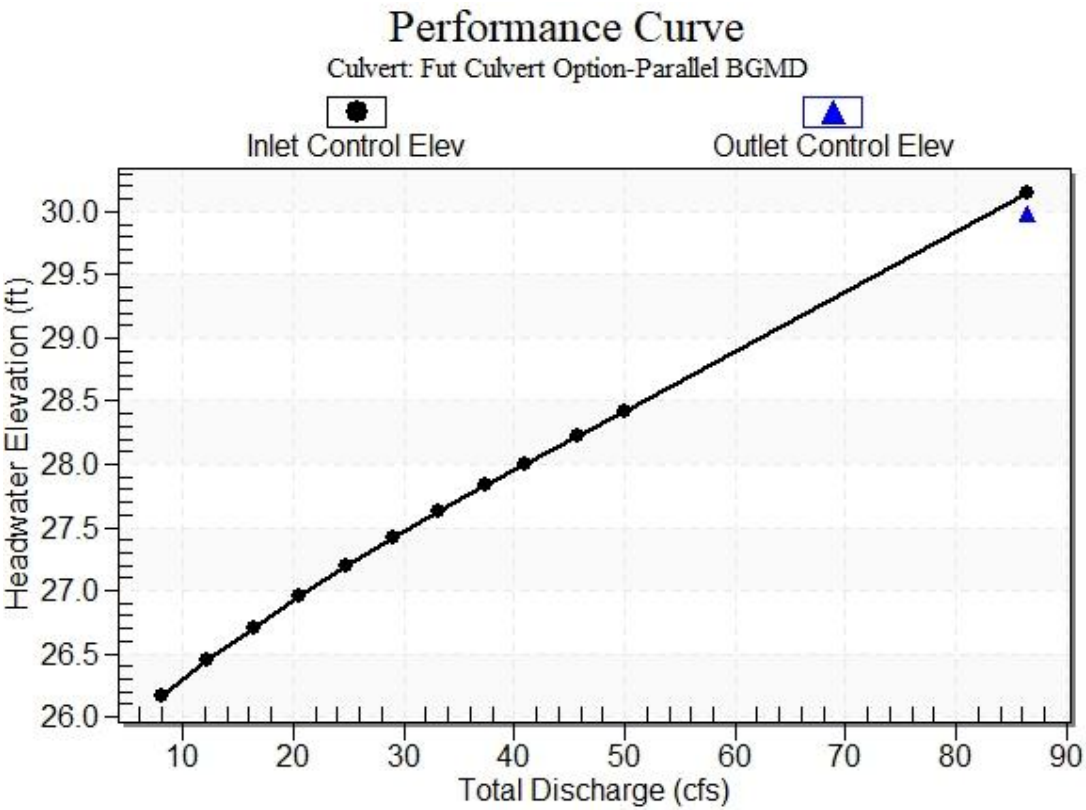
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 25.00 ft, Outlet Elevation (invert): 13.00 ft

Culvert Length: 2400.03 ft, Culvert Slope: 0.0050

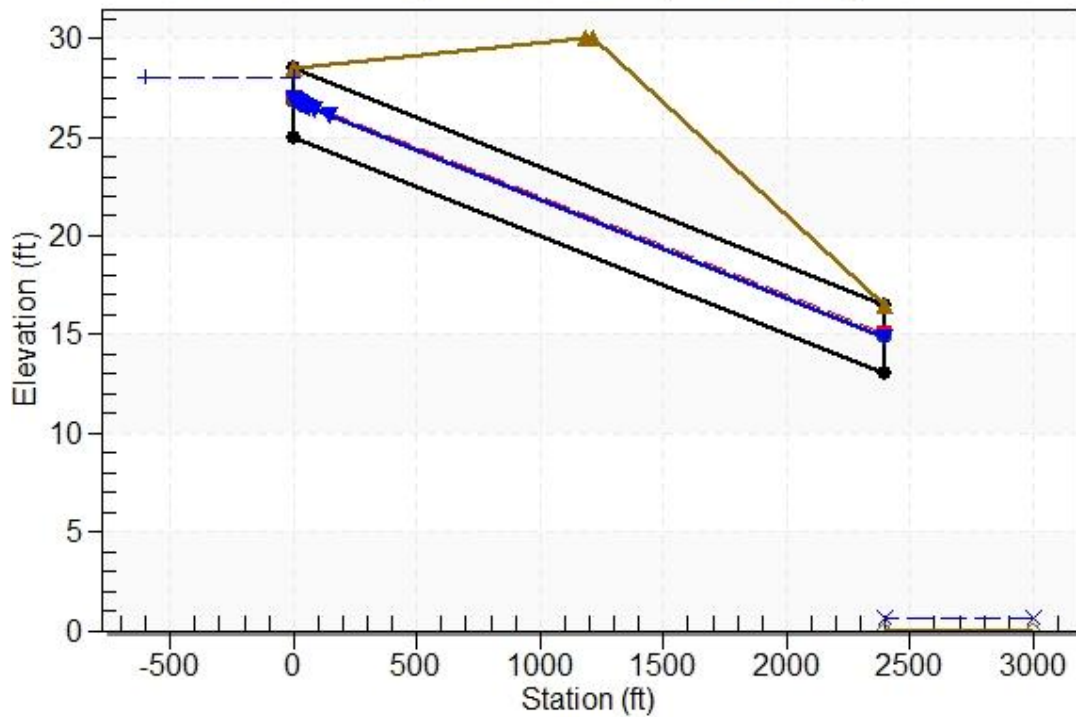
Culvert Performance Curve Plot: Fut Culvert Option-Parallel BGMD



Water Surface Profile Plot for Culvert: Fut Culvert Option-Parallel BGMD

Crossing - BGMD-Future Pipe Channel Alt, Design Discharge - 40.9 cfs

Culvert - Fut Culvert Option-Parallel BGMD, Culvert Discharge - 40.9 cfs



Site Data - Fut Culvert Option-Parallel BGMD

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 25.00 ft

Outlet Station: 2400.00 ft

Outlet Elevation: 13.00 ft

Number of Barrels: 1

Culvert Data Summary - Fut Culvert Option-Parallel BGMD

Barrel Shape: Circular

Barrel Diameter: 3.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: BGMD-Future Pipe Channel

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
8.00	0.21	0.21	7.72	3.88	2.99
12.20	0.27	0.27	9.06	5.04	3.08
16.40	0.32	0.32	10.12	6.07	3.13
20.60	0.37	0.37	11.01	7.01	3.17
24.80	0.42	0.42	11.78	7.88	3.20
29.00	0.47	0.47	12.46	8.71	3.22
33.20	0.51	0.51	13.08	9.50	3.24
37.40	0.55	0.55	13.65	10.26	3.25
40.90	0.58	0.58	14.09	10.87	3.26
45.80	0.63	0.63	14.65	11.70	3.27
50.00	0.66	0.66	15.10	12.39	3.27

Alt)**Tailwater Channel Data - BGMD-Future Pipe Channel Alt**

Tailwater Channel Option: Rectangular Channel

Bottom Width: 5.00 ft

Channel Slope: 0.3000

Channel Manning's n: 0.0350

Channel Invert Elevation: 0.00 ft

Current Culvert Calculations

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 143 cfs

Maximum Flow: 143 cfs

Table 1 - Summary of Culvert Flows at Crossing: Bent Grass & Meridian Existing Ex

Headwater Elevation (ft)	Total Discharge (cfs)	Ex Culverts - Ex Pipe Capacity Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6928.05	0.00	0.00	0.00	1
6929.11	14.30	14.30	0.00	1
6929.47	28.60	28.60	0.00	1
6929.76	42.90	42.90	0.00	1
6930.02	57.20	57.20	0.00	1
6930.29	71.50	71.50	0.00	1
6930.56	85.80	85.80	0.00	1
6930.86	100.10	100.10	0.00	1
6931.18	114.40	114.40	0.00	1
6931.53	128.70	128.70	0.00	1
6931.90	143.00	143.00	0.00	1
6931.90	143.03	143.03	0.00	Overtopping

Pipe Cap Check

Rating Curve Plot for Crossing: Bent Grass & Meridian Existing Ex Pipe Cap Check

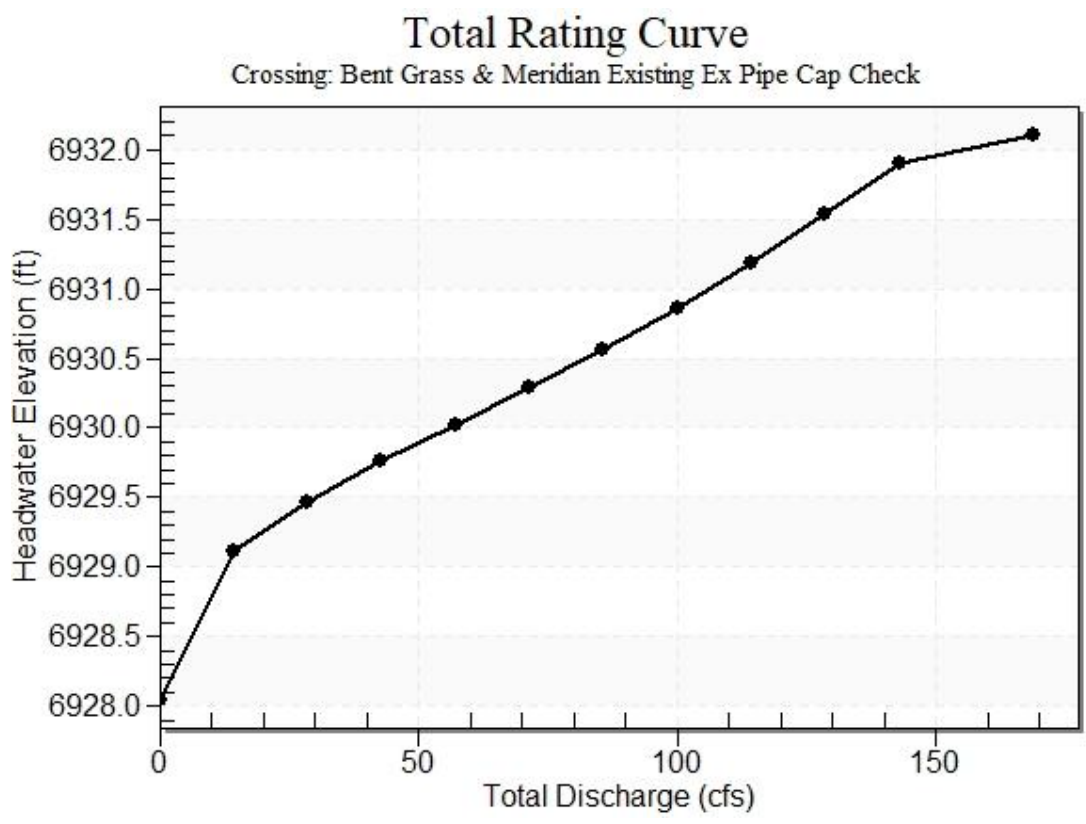


Table 2 - Culvert Summary Table: Ex Culverts - Ex Pipe Capacity

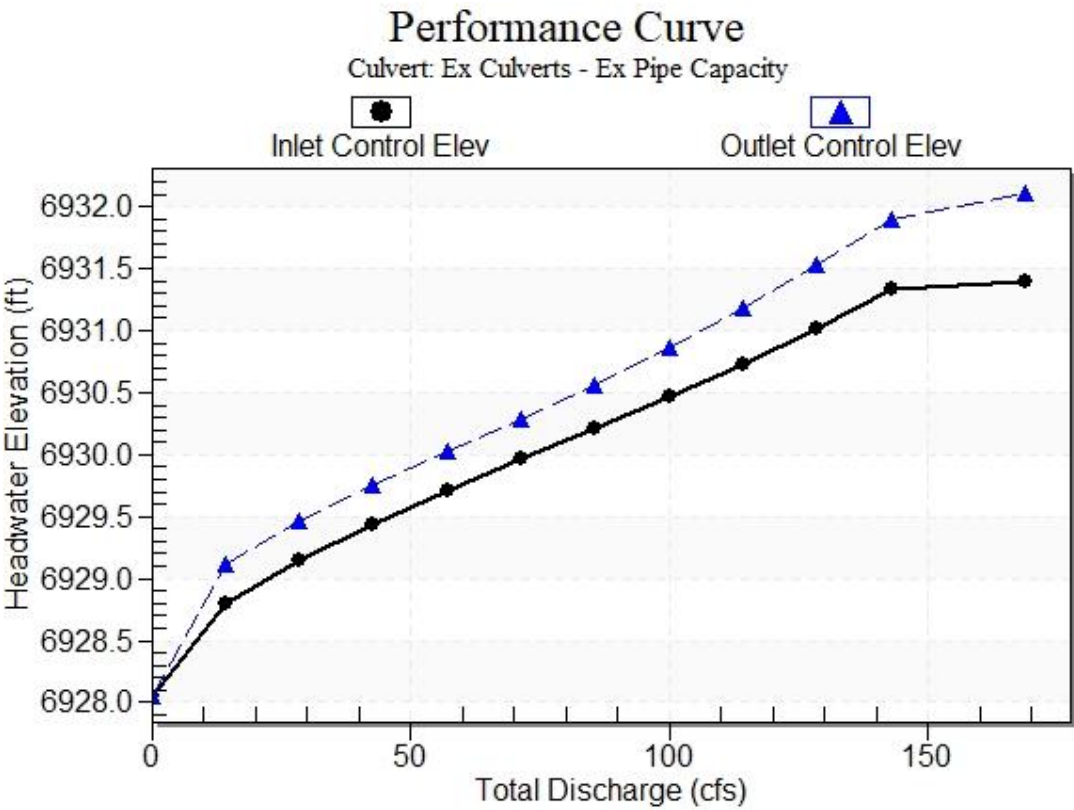
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	6928.05	0.000	0.000	0-NF	0.000	0.000	0.710	0.000	0.000	0.000
14.30	14.30	6929.11	0.753	1.061	1-S1t	0.481	0.558	1.722	1.012	0.851	3.494
28.60	28.60	6929.47	1.094	1.420	1-S1t	0.678	0.802	2.022	1.312	1.446	4.155
42.90	42.90	6929.76	1.388	1.709	1-S1t	0.835	0.995	2.237	1.527	1.997	4.598
57.20	57.20	6930.02	1.659	1.972	1-S1t	0.973	1.161	2.411	1.701	2.570	4.941
71.50	71.50	6930.29	1.913	2.237	1-S1f	1.100	1.303	2.417	1.850	3.213	5.225
85.80	85.80	6930.56	2.161	2.511	1-S1f	1.213	1.438	2.417	1.981	3.855	5.468
100.10	100.10	6930.86	2.415	2.810	1-S1f	1.321	1.562	2.417	2.098	4.498	5.683
114.40	114.40	6931.18	2.681	3.135	4-FFf	1.433	1.677	2.417	2.206	5.140	5.876
128.70	128.70	6931.53	2.968	3.481	4-FFf	1.545	1.783	2.417	2.306	5.783	6.052
143.00	143.00	6931.90	3.280	3.850	4-FFf	1.659	1.882	2.417	2.399	6.425	6.213

Straight Culvert

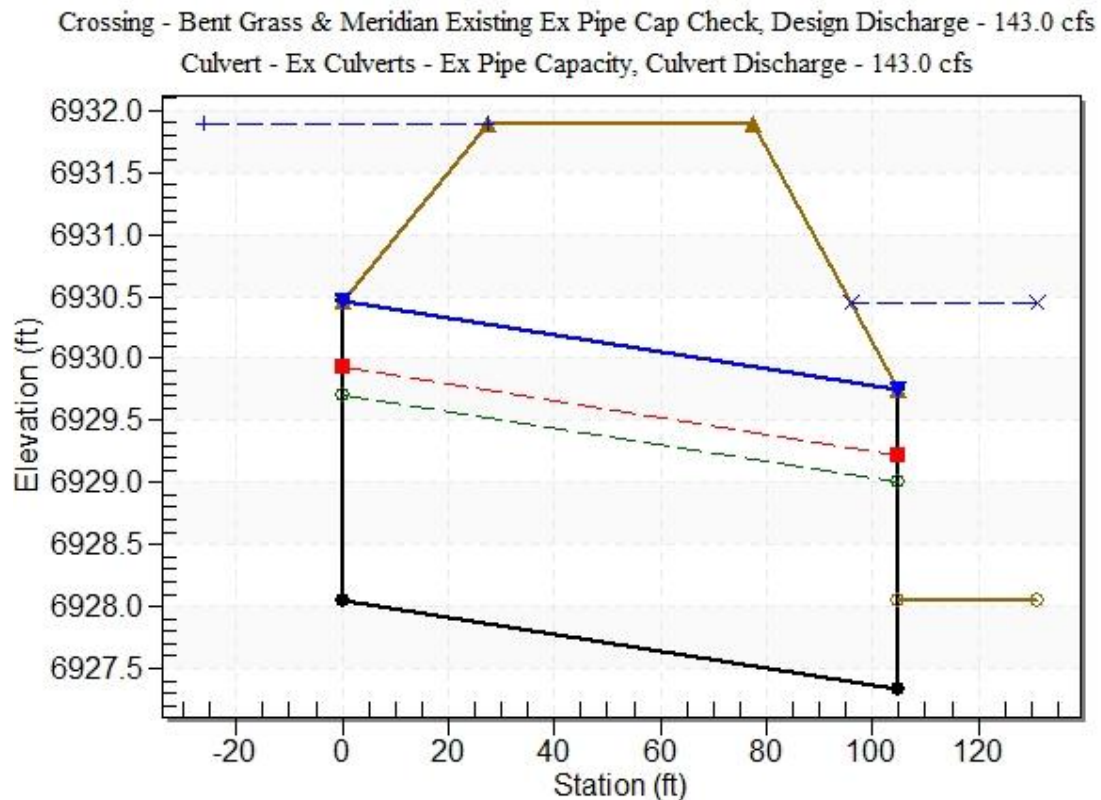
Inlet Elevation (invert): 6928.05 ft, Outlet Elevation (invert): 6927.34 ft

Culvert Length: 105.00 ft, Culvert Slope: 0.0068

Culvert Performance Curve Plot: Ex Culverts - Ex Pipe Capacity



Water Surface Profile Plot for Culvert: Ex Culverts - Ex Pipe Capacity



Site Data - Ex Culverts - Ex Pipe Capacity

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6928.05 ft

Outlet Station: 105.00 ft

Outlet Elevation: 6927.34 ft

Number of Barrels: 3

Culvert Data Summary - Ex Culverts - Ex Pipe Capacity

Barrel Shape: Elliptical

Barrel Span: 45.00 in

Barrel Rise: 29.00 in

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Bent Grass & Meridian

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	6928.05	0.00	0.00	0.00	0.00
14.30	6929.06	1.01	3.49	1.10	0.87
28.60	6929.36	1.31	4.16	1.43	0.90
42.90	6929.58	1.53	4.60	1.67	0.93
57.20	6929.75	1.70	4.94	1.86	0.94
71.50	6929.90	1.85	5.22	2.02	0.96
85.80	6930.03	1.98	5.47	2.16	0.97
100.10	6930.15	2.10	5.68	2.29	0.98
114.40	6930.26	2.21	5.88	2.41	0.99
128.70	6930.36	2.31	6.05	2.52	0.99
143.00	6930.45	2.40	6.21	2.62	1.00

Existing Ex Pipe Cap Check)**Tailwater Channel Data - Bent Grass & Meridian Existing Ex Pipe Cap Check**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 4.00 (1:1)

Channel Slope: 0.0175

Channel Manning's n: 0.0350

Channel Invert Elevation: 6928.05 ft

Roadway Data for Crossing: Bent Grass & Meridian Existing Ex Pipe Cap Check

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 80.00 ft

Crest Elevation: 6931.90 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 270 cfs

Maximum Flow: 850 cfs

Table 1 - Summary of Culvert Flows at Crossing: Bent Grass & Meridian Existing Pr

Headwater Elevation (ft)	Total Discharge (cfs)	Ex Culverts - Pr DBPS Flow Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6928.05	0.00	0.00	0.00	1
6930.55	85.00	85.00	0.00	1
6932.12	170.00	145.81	24.11	8
6932.55	270.00	143.20	126.70	5
6932.78	340.00	140.88	199.06	5
6933.02	425.00	138.39	286.31	4
6933.23	510.00	136.38	373.41	4
6933.43	595.00	134.77	460.09	4
6933.62	680.00	133.49	546.45	4
6933.79	765.00	132.46	632.08	3
6933.96	850.00	131.74	718.07	3
6931.90	143.05	143.05	0.00	Overtopping

DBPS Flows

Rating Curve Plot for Crossing: Bent Grass & Meridian Existing Pr DBPS Flows

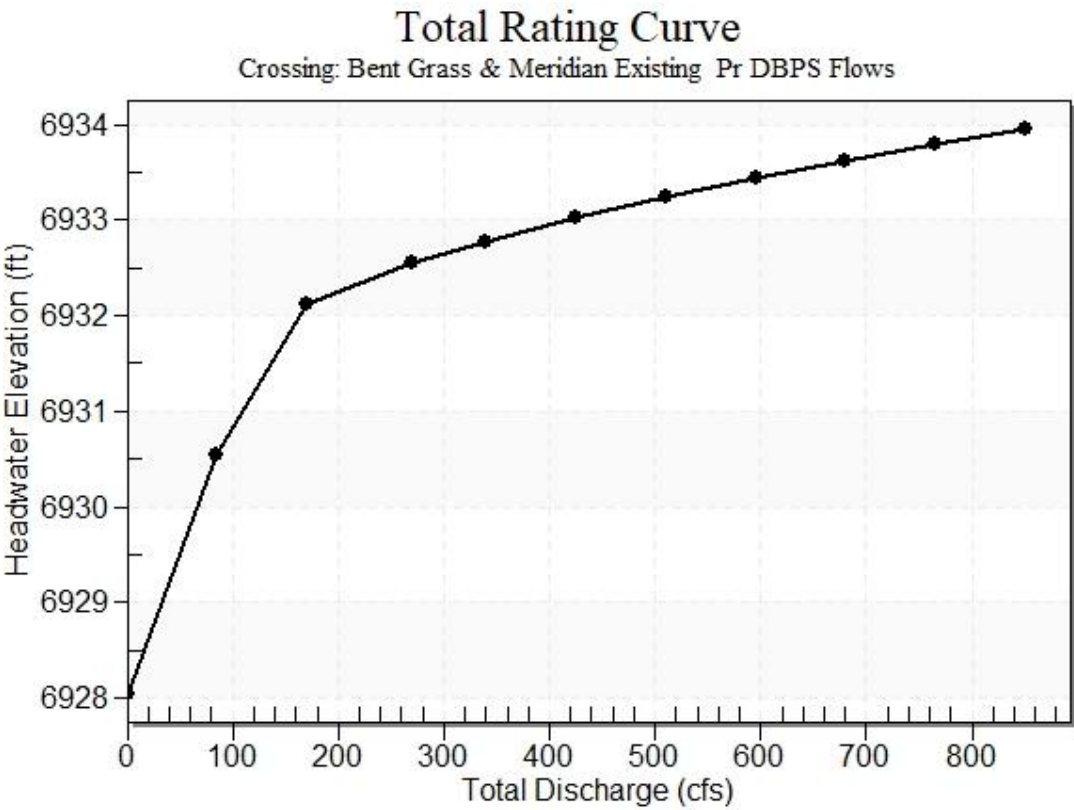


Table 2 - Culvert Summary Table: Ex Culverts - Pr DBPS Flow

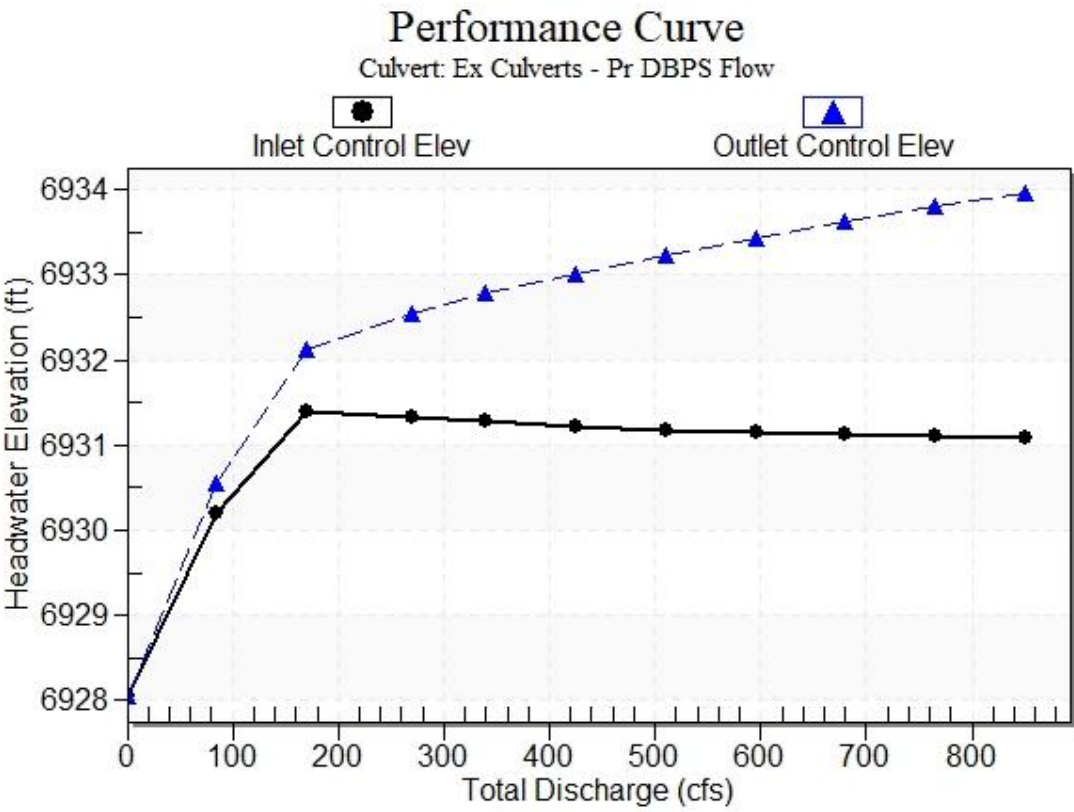
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	6928.05	0.000	0.000	0-NF	0.000	0.000	0.710	0.000	0.000	0.000
85.00	85.00	6930.55	2.148	2.496	1-S1f	1.207	1.431	2.417	1.974	3.819	5.456
170.00	145.81	6932.12	3.345	4.068	4-FFf	1.682	1.900	2.417	2.559	6.551	6.488
270.00	143.20	6932.55	3.285	4.499	4-FFf	1.660	1.883	2.417	3.044	6.434	7.283
340.00	140.88	6932.78	3.232	4.727	4-FFf	1.642	1.868	2.417	3.319	6.330	7.715
425.00	138.39	6933.02	3.176	4.968	4-FFf	1.622	1.851	2.417	3.609	6.218	8.158
510.00	136.38	6933.23	3.132	5.184	4-FFf	1.606	1.837	2.417	3.864	6.128	8.539
595.00	134.77	6933.43	3.097	5.383	4-FFf	1.593	1.826	2.417	4.094	6.055	8.874
680.00	133.49	6933.62	3.069	5.569	4-FFf	1.583	1.817	2.417	4.304	5.998	9.175
765.00	132.46	6933.79	3.047	5.744	4-FFf	1.574	1.810	2.417	4.499	5.951	9.449
850.00	131.74	6933.96	3.032	5.912	4-FFf	1.569	1.805	2.417	4.680	5.919	9.702

Straight Culvert

Inlet Elevation (invert): 6928.05 ft, Outlet Elevation (invert): 6927.34 ft

Culvert Length: 105.00 ft, Culvert Slope: 0.0068

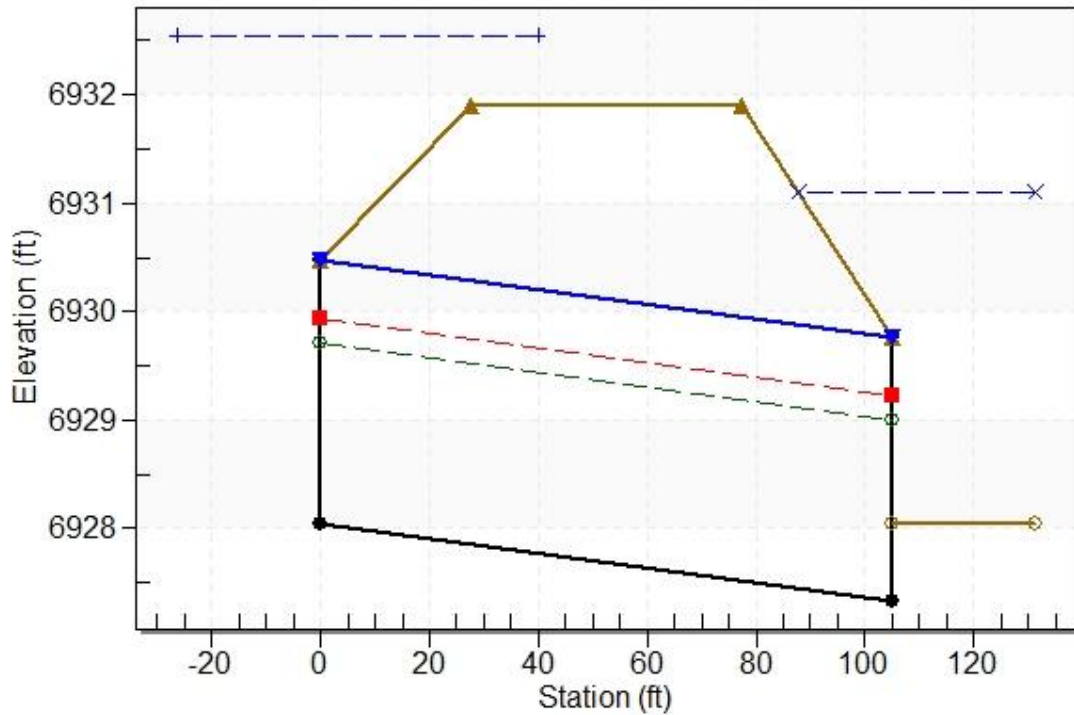
Culvert Performance Curve Plot: Ex Culverts - Pr DBPS Flow



Water Surface Profile Plot for Culvert: Ex Culverts - Pr DBPS Flow

Crossing - Bent Grass & Meridian Existing Pr DBPS Flows, Design Discharge - 270.0 cfs

Culvert - Ex Culverts - Pr DBPS Flow, Culvert Discharge - 143.2 cfs



Site Data - Ex Culverts - Pr DBPS Flow

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6928.05 ft

Outlet Station: 105.00 ft

Outlet Elevation: 6927.34 ft

Number of Barrels: 3

Culvert Data Summary - Ex Culverts - Pr DBPS Flow

Barrel Shape: Elliptical

Barrel Span: 45.00 in

Barrel Rise: 29.00 in

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Bent Grass & Meridian

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	6928.05	0.00	0.00	0.00	0.00
85.00	6930.02	1.97	5.46	2.16	0.97
170.00	6930.61	2.56	6.49	2.79	1.01
270.00	6931.09	3.04	7.28	3.32	1.04
340.00	6931.37	3.32	7.72	3.62	1.06
425.00	6931.66	3.61	8.16	3.94	1.07
510.00	6931.91	3.86	8.54	4.22	1.08
595.00	6932.14	4.09	8.87	4.47	1.09
680.00	6932.35	4.30	9.18	4.70	1.10
765.00	6932.55	4.50	9.45	4.91	1.11
850.00	6932.73	4.68	9.70	5.11	1.12

Existing Pr DBPS Flows)**Tailwater Channel Data - Bent Grass & Meridian Existing Pr DBPS Flows**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0175

Channel Manning's n: 0.0350

Channel Invert Elevation: 6928.05 ft

Roadway Data for Crossing: Bent Grass & Meridian Existing Pr DBPS Flows

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 80.00 ft

Crest Elevation: 6931.90 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 25.8 cfs

Design Flow: 255 cfs

Maximum Flow: 275 cfs

Table 1 - Summary of Culvert Flows at Crossing: Add't Culverts for Add't Offsite Flow

Headwater Elevation (ft)	Total Discharge (cfs)	New Ellp Culverts for Offsite Flow Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6929.35	25.80	25.80	0.00	1
6930.04	50.72	50.72	0.00	1
6930.71	75.64	75.64	0.00	1
6931.51	100.56	100.56	0.00	1
6932.03	125.48	114.03	11.26	9
6932.17	150.40	117.27	32.97	6
6932.28	175.32	119.82	55.38	5
6932.38	200.24	120.43	79.53	4
6932.47	225.16	119.77	105.23	4
6932.58	255.00	118.96	135.95	4
6932.65	275.00	118.48	156.17	3
6931.90	110.74	110.74	0.00	Overtopping

Rating Curve Plot for Crossing: Add't Culverts for Add't Offsite Flow

Total Rating Curve

Crossing: Add't Culverts for Add't Offsite Flow

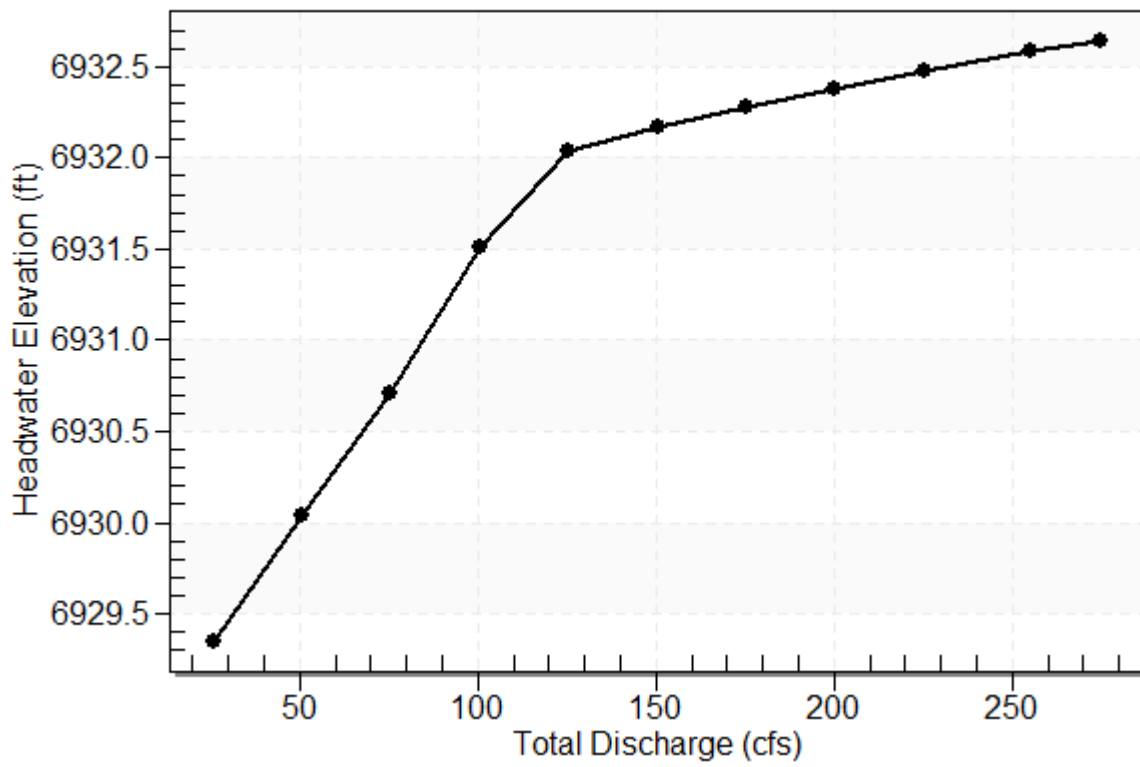


Table 2 - Culvert Summary Table: New Ellp Culverts for Offsite Flow

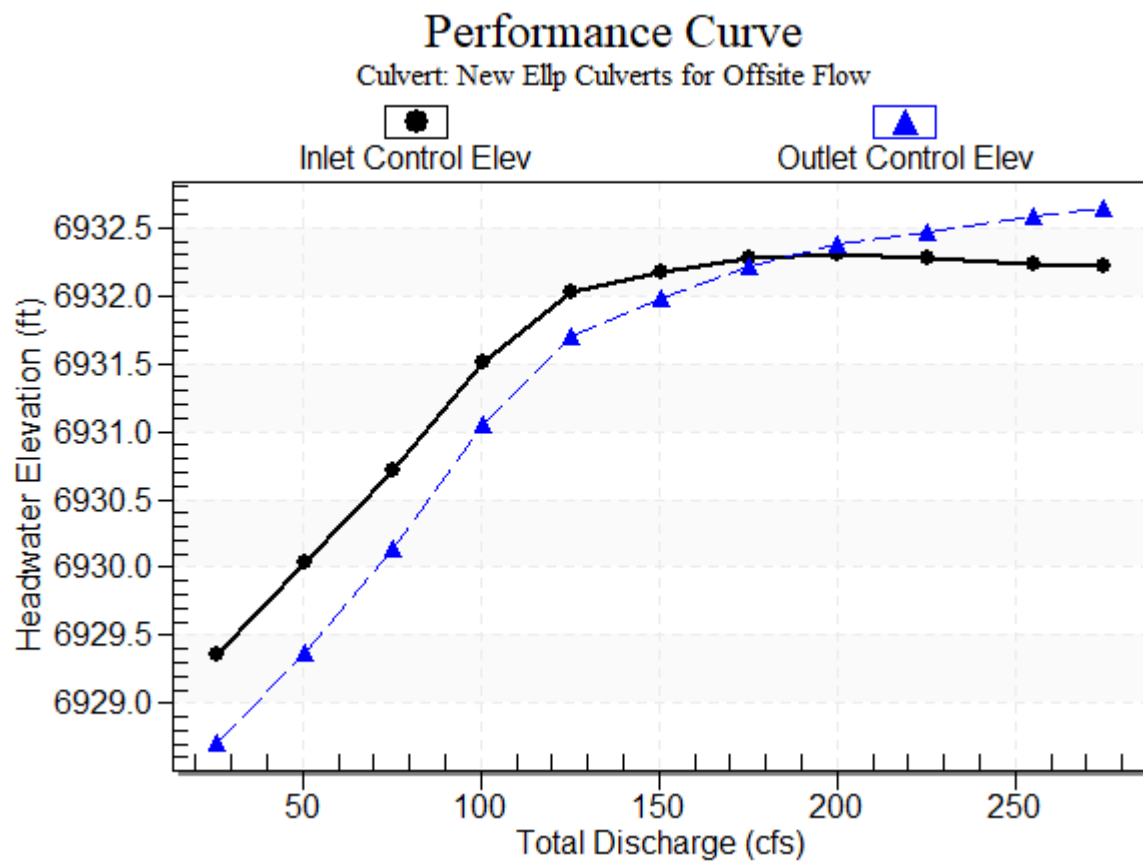
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
25.80	25.80	6929.35	1.303	0.658	1-JS1t	0.792	0.941	1.262	1.262	3.305	4.049
50.72	50.72	6930.04	1.993	1.327	1-S2n	1.139	1.348	1.150	1.626	7.371	4.795
75.64	75.64	6930.71	2.663	2.093	5-S2n	1.426	1.670	1.441	1.889	8.261	5.299
100.56	100.56	6931.51	3.464	3.007	5-S2n	1.723	1.932	1.737	2.102	8.884	5.690
125.48	114.03	6932.03	3.982	3.650	5-JS1t	1.905	2.046	2.284	2.284	7.861	6.014
150.40	117.27	6932.17	4.116	3.930	4-FFf	1.955	2.070	2.417	2.445	7.904	6.292
175.32	119.82	6932.28	4.225	4.171	4-FFf	1.998	2.088	2.417	2.589	8.075	6.538
200.24	120.43	6932.38	4.252	4.327	4-FFf	2.009	2.093	2.417	2.721	8.117	6.759
225.16	119.77	6932.47	4.223	4.424	4-FFf	1.997	2.088	2.417	2.844	8.072	6.960
255.00	118.96	6932.58	4.188	4.529	4-FFf	1.982	2.082	2.417	2.980	8.018	7.180
275.00	118.48	6932.65	4.168	4.596	4-FFf	1.974	2.079	2.417	3.065	7.985	7.317

Straight Culvert

Inlet Elevation (invert): 6928.05 ft, Outlet Elevation (invert): 6927.34 ft

Culvert Length: 105.00 ft, Culvert Slope: 0.0068

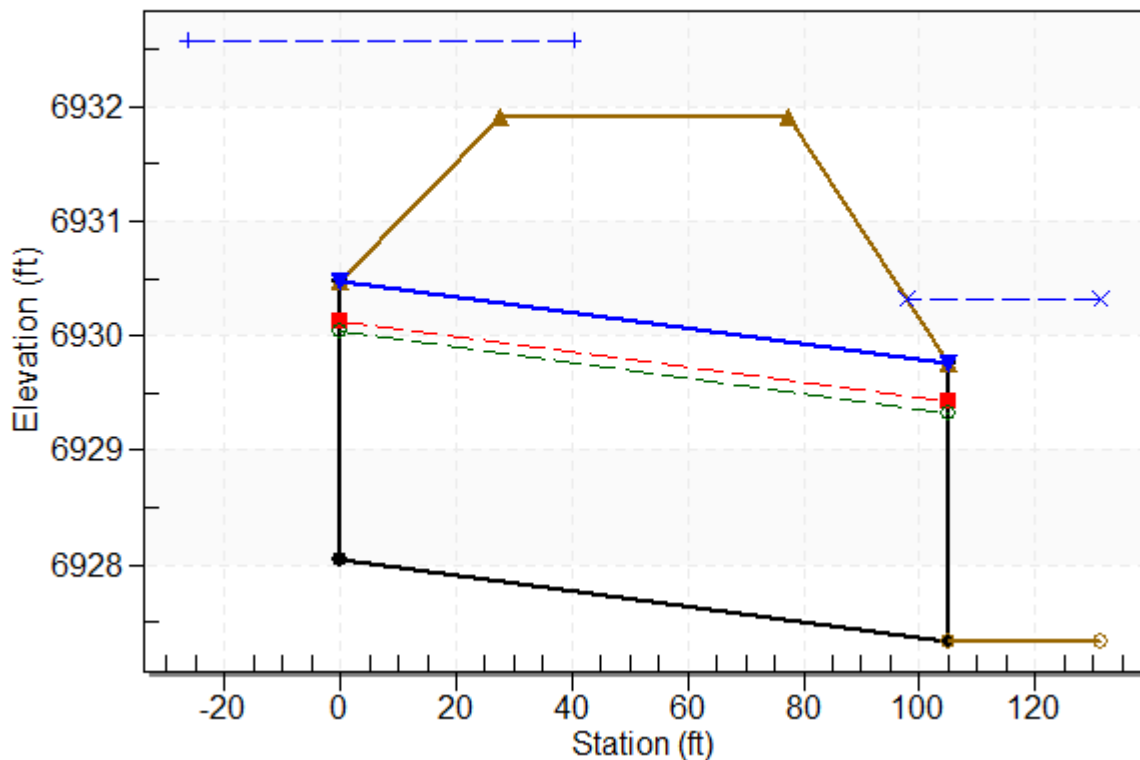
Culvert Performance Curve Plot: New Ellp Culverts for Offsite Flow



Water Surface Profile Plot for Culvert: New Ellp Culverts for Offsite Flow

Crossing - Add't Culverts for Add't Offsite Flow, Design Discharge - 255.0 cfs

Culvert - New Ellp Culverts for Offsite Flow, Culvert Discharge - 119.0 cfs



Site Data - New Ellp Culverts for Offsite Flow

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6928.05 ft

Outlet Station: 105.00 ft

Outlet Elevation: 6927.34 ft

Number of Barrels: 2

Culvert Data Summary - New Ellp Culverts for Offsite Flow

Barrel Shape: Elliptical

Barrel Span: 45.00 in

Barrel Rise: 29.00 in

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Add't Culverts for Add't

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
25.80	6928.60	1.26	4.05	1.38	0.90
50.72	6928.97	1.63	4.79	1.78	0.94
75.64	6929.23	1.89	5.30	2.06	0.96
100.56	6929.44	2.10	5.69	2.30	0.98
125.48	6929.62	2.28	6.01	2.49	0.99
150.40	6929.78	2.44	6.29	2.67	1.00
175.32	6929.93	2.59	6.54	2.83	1.01
200.24	6930.06	2.72	6.76	2.97	1.02
225.16	6930.18	2.84	6.96	3.11	1.03
255.00	6930.32	2.98	7.18	3.25	1.04
275.00	6930.41	3.07	7.32	3.35	1.04

Tailwater Channel Data - Add't Culverts for Add't Offsite Flow

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 4.00 (4:1)

Channel Slope: 0.0175

Channel Manning's n: 0.0350

Channel Invert Elevation: 6927.34 ft

Roadway Data for Crossing: Add't Culverts for Add't Offsite Flow

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 80.00 ft

Crest Elevation: 6931.90 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

HY-8 Culvert Analysis Report

Existing Culverts @ Owl Place

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 248.6 cfs

Design Flow: 850 cfs

Maximum Flow: 925 cfs

Table 1 - Summary of Culvert Flows at Crossing: Owl Place - Ex Culvert Fut DBPS

Headwater Elevation (ft)	Total Discharge (cfs)	Ex Twin 36-IN CMPs Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6913.60	248.60	109.05	139.42	7
6913.77	316.24	111.86	204.26	5
6913.92	383.88	114.62	268.95	4
6914.07	451.52	116.94	334.34	4
6914.20	519.16	118.93	400.05	4
6914.33	586.80	121.04	465.66	4
6914.45	654.44	122.77	531.61	4
6914.57	722.08	123.99	597.68	3
6914.69	789.72	124.68	664.77	3
6914.79	850.00	125.03	724.82	3
6914.91	925.00	125.07	799.85	3
6913.00	97.95	97.95	0.00	Overtopping

Flow (850 cfs)

Rating Curve Plot for Crossing: Owl Place - Ex Culvert Fut DBPS Flow (850 cfs)

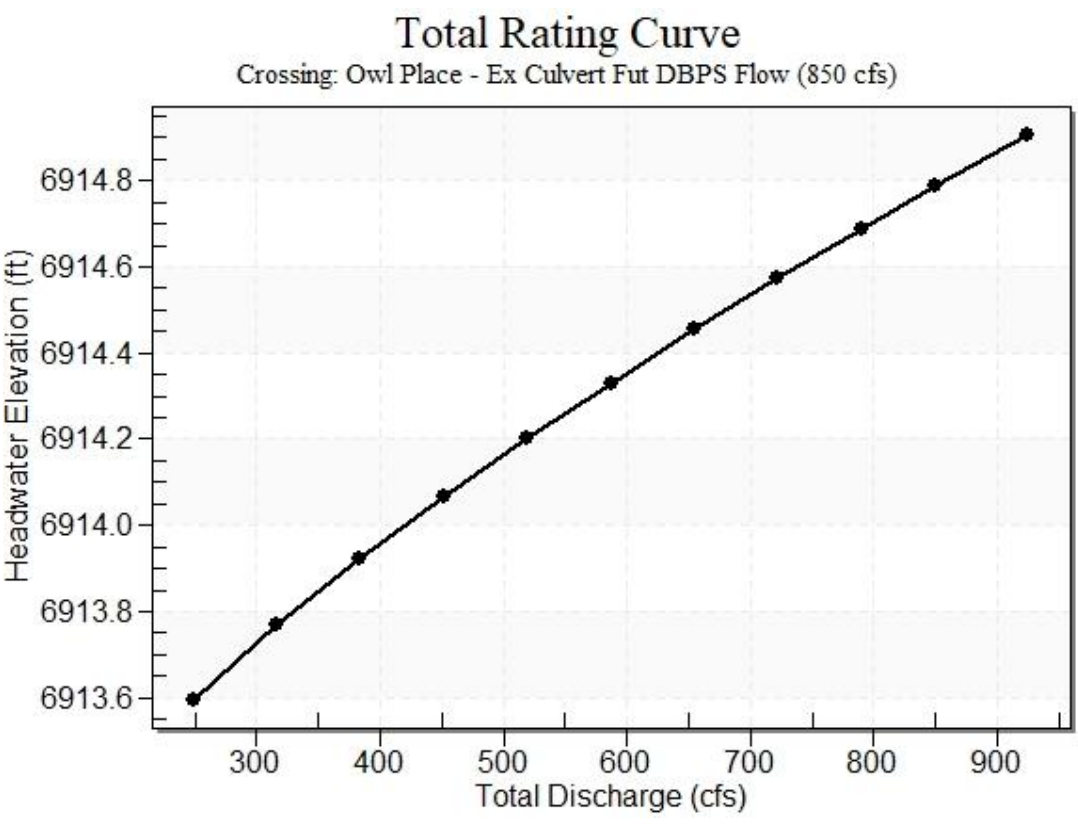


Table 2 - Culvert Summary Table: Ex Twin 36-IN CMPs

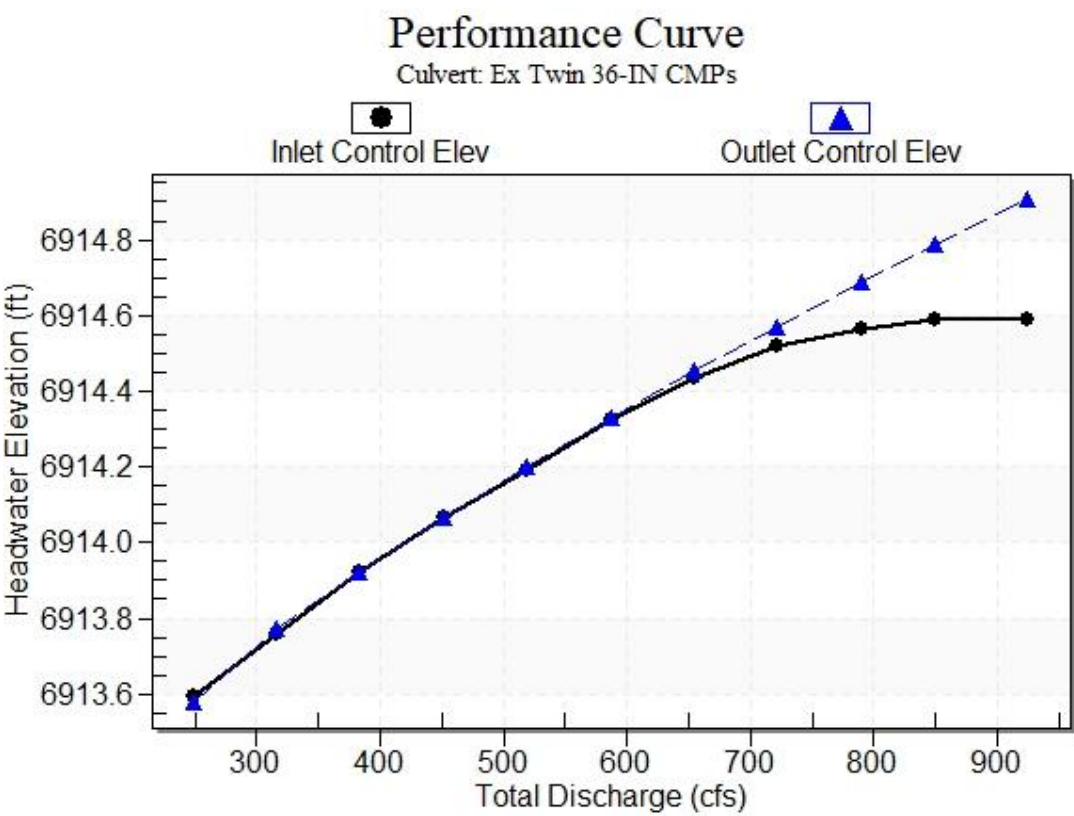
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
248.60	109.05	6913.60	5.096	5.078	7-M2c	3.000	2.397	2.397	2.361	9.005	4.055
316.24	111.86	6913.77	5.258	5.271	7-M2c	3.000	2.425	2.425	2.584	9.136	4.306
383.88	114.62	6913.92	5.423	5.421	7-M2c	3.000	2.452	2.452	2.779	9.267	4.520
451.52	116.94	6914.07	5.565	5.567	7-M2c	3.000	2.474	2.474	2.953	9.379	4.707
519.16	118.93	6914.20	5.689	5.702	7-M2c	3.000	2.492	2.492	3.112	9.476	4.874
586.80	121.04	6914.33	5.824	5.831	7-M2c	3.000	2.511	2.511	3.258	9.579	5.026
654.44	122.77	6914.45	5.937	5.954	7-M2t	3.000	2.526	2.624	3.394	9.362	5.165
722.08	123.99	6914.57	6.017	6.071	7-M2t	3.000	2.536	2.752	3.522	9.130	5.293
789.72	124.68	6914.69	6.063	6.187	7-M2t	3.000	2.542	2.872	3.642	8.951	5.413
850.00	125.03	6914.79	6.087	6.287	7-M2t	3.000	2.545	2.974	3.744	8.856	5.513
925.00	125.07	6914.91	6.090	6.408	4-FFf	3.000	2.545	3.000	3.864	8.847	5.631

Straight Culvert

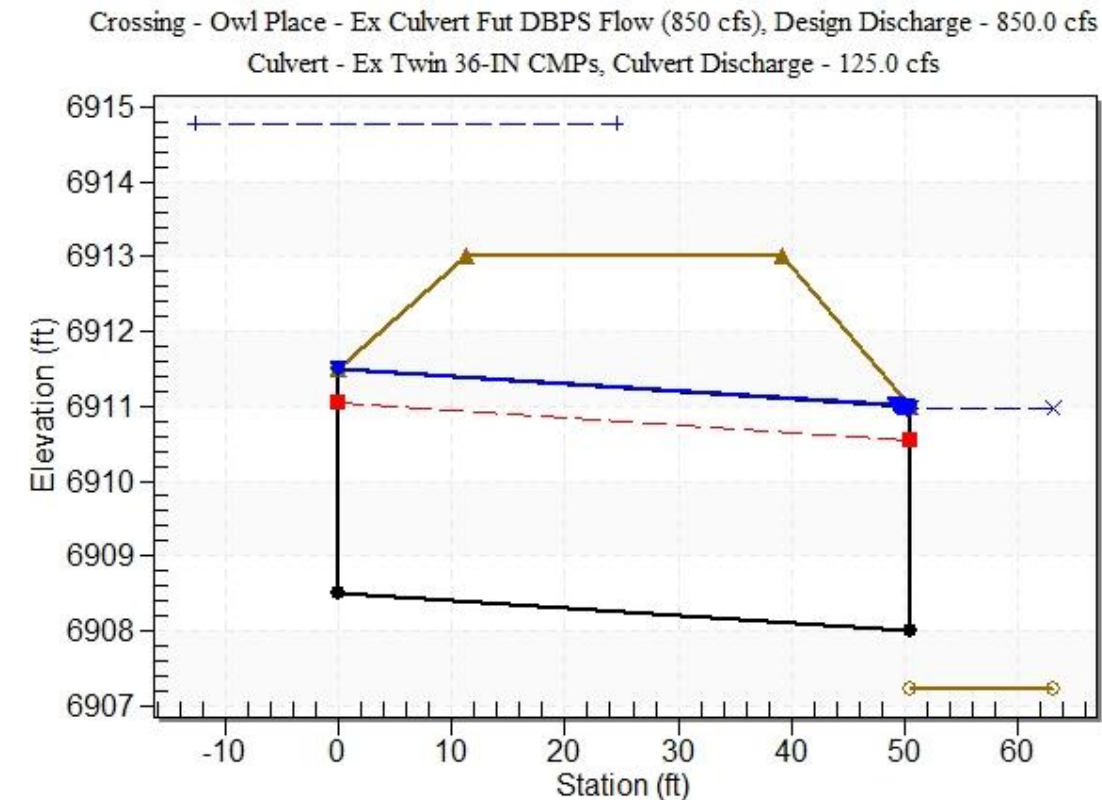
Inlet Elevation (invert): 6908.50 ft, Outlet Elevation (invert): 6908.00 ft

Culvert Length: 50.50 ft, Culvert Slope: 0.0099

Culvert Performance Curve Plot: Ex Twin 36-IN CMPs



Water Surface Profile Plot for Culvert: Ex Twin 36-IN CMPs



Site Data - Ex Twin 36-IN CMPs

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6908.50 ft

Outlet Station: 50.50 ft

Outlet Elevation: 6908.00 ft

Number of Barrels: 2

Culvert Data Summary - Ex Twin 36-IN CMPs

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Owl Place - Ex Culvert Fut

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
248.60	6909.59	2.36	4.05	2.21	0.66
316.24	6909.81	2.58	4.31	2.42	0.67
383.88	6910.01	2.78	4.52	2.60	0.68
451.52	6910.18	2.95	4.71	2.76	0.68
519.16	6910.34	3.11	4.87	2.91	0.69
586.80	6910.49	3.26	5.03	3.05	0.69
654.44	6910.62	3.39	5.16	3.18	0.70
722.08	6910.75	3.52	5.29	3.30	0.70
789.72	6910.87	3.64	5.41	3.41	0.71
850.00	6910.97	3.74	5.51	3.50	0.71
925.00	6911.09	3.86	5.63	3.62	0.71

DBPS Flow (850 cfs))**Tailwater Channel Data - Owl Place - Ex Culvert Fut DBPS Flow (850 cfs)**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 11.00 (1:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0500

Channel Invert Elevation: 6907.23 ft

Roadway Data for Crossing: Owl Place - Ex Culvert Fut DBPS Flow (850 cfs)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 6913.00 ft

Roadway Surface: Paved

Roadway Top Width: 28.00 ft

Future Culvert Calculations

HY-8 Culvert Analysis Report

**Future Culvert @ Bent Grass
Meadows Drive/Meridian Road**

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 298 cfs

Design Flow: 850 cfs

Maximum Flow: 925 cfs

Table 1 - Summary of Culvert Flows at Crossing: Bent Grass & Meridian Future - Fut

Headwater Elevation (ft)	Total Discharge (cfs)	Future Culvert - Fut Flow Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6927.25	298.00	298.00	0.00	1
6927.54	360.70	360.70	0.00	1
6927.82	423.40	423.40	0.00	1
6928.08	486.10	486.10	0.00	1
6928.34	548.80	548.80	0.00	1
6928.58	611.50	611.50	0.00	1
6928.83	674.20	674.20	0.00	1
6929.08	736.90	736.90	0.00	1
6929.33	799.60	799.60	0.00	1
6929.53	850.00	850.00	0.00	1
6929.85	925.00	925.00	0.00	1
6931.50	1258.18	1258.18	0.00	Overtopping

DBPS Flow (850 cfs)

Rating Curve Plot for Crossing: Bent Grass & Meridian Future - Fut DBPS Flow (850 cfs)

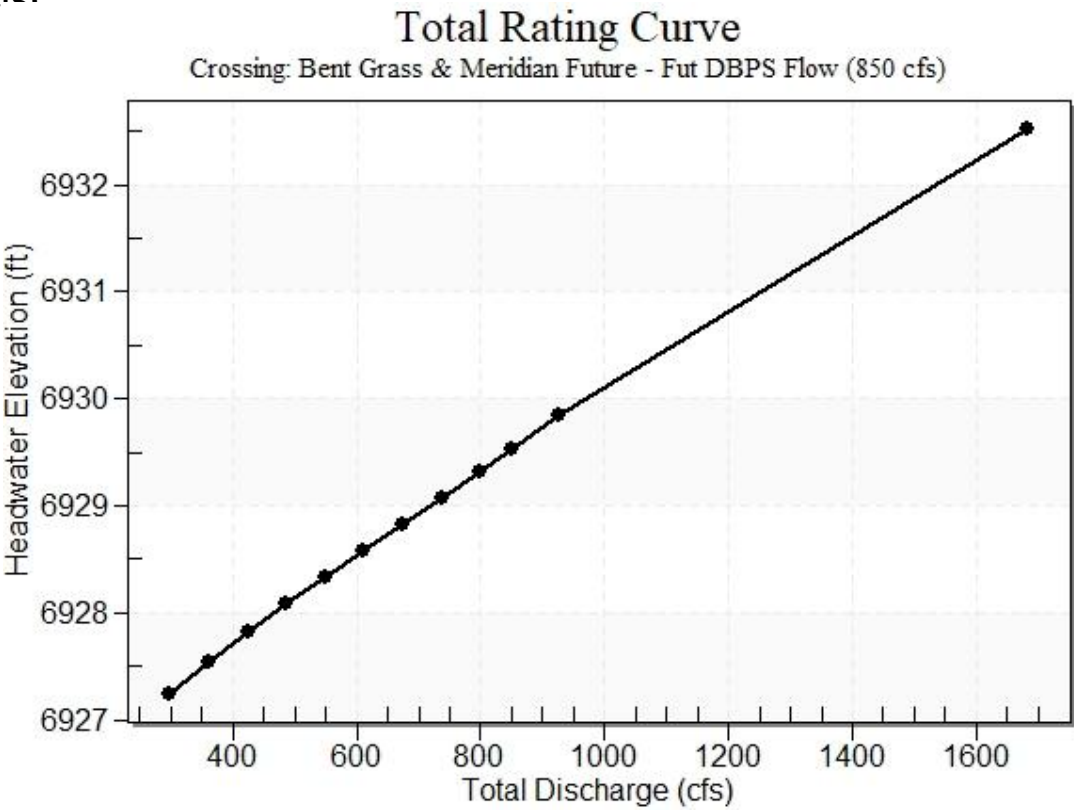


Table 2 - Culvert Summary Table: Future Culvert - Fut Flow

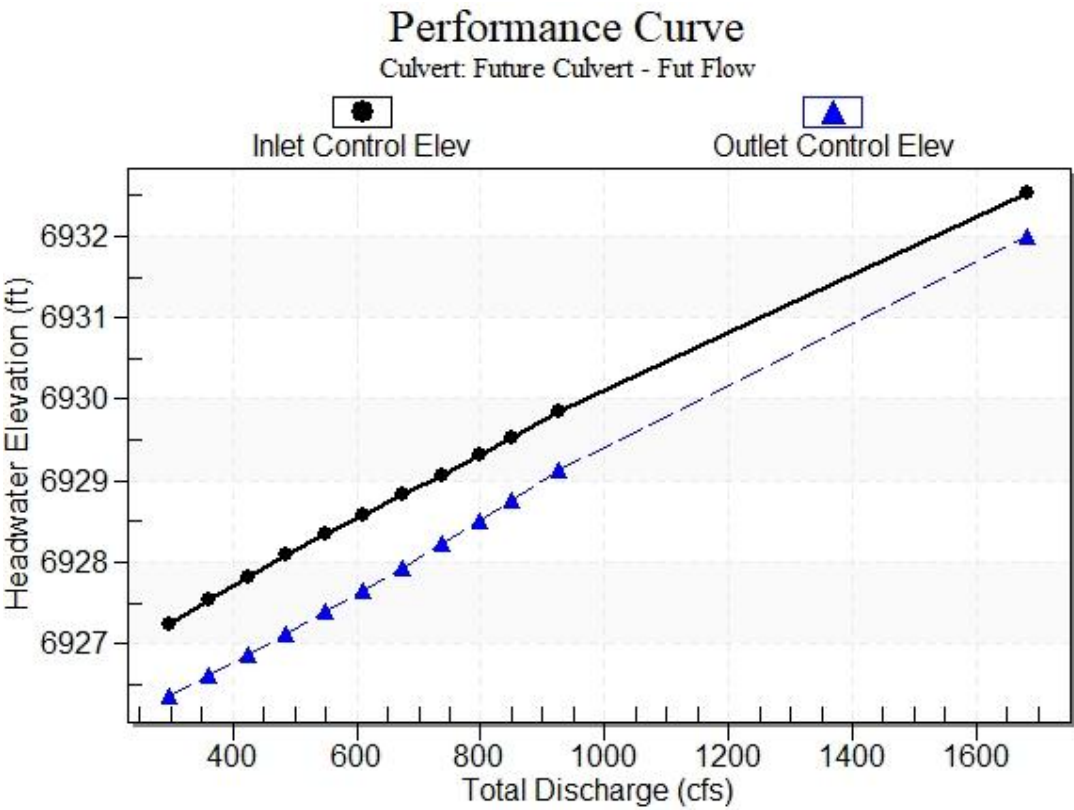
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
298.00	298.00	6927.25	2.138	1.250	1-S2n	1.356	1.391	1.356	0.729	6.866	7.728
360.70	360.70	6927.54	2.435	1.504	1-S2n	1.533	1.580	1.535	0.816	7.343	8.298
423.40	423.40	6927.82	2.712	1.759	1-S2n	1.699	1.758	1.702	0.897	7.773	8.808
486.10	486.10	6928.08	2.975	2.017	1-S2n	1.858	1.928	1.861	0.973	8.161	9.267
548.80	548.80	6928.34	3.228	2.281	1-S2n	2.010	2.090	2.015	1.045	8.513	9.688
611.50	611.50	6928.58	3.475	2.551	1-S2n	2.158	2.247	2.163	1.114	8.835	10.078
674.20	674.20	6928.83	3.719	2.828	1-S2n	2.301	2.398	2.307	1.180	9.133	10.441
736.90	736.90	6929.08	3.965	3.113	1-S2n	2.440	2.544	2.447	1.243	9.412	10.781
799.60	799.60	6929.33	4.216	3.406	5-S2n	2.576	2.687	2.583	1.304	9.673	11.102
850.00	850.00	6929.53	4.422	3.647	5-S2n	2.683	2.798	2.691	1.352	9.872	11.347
925.00	925.00	6929.85	4.740	4.018	5-S2n	2.839	2.961	2.848	1.420	10.151	11.695

Straight Culvert

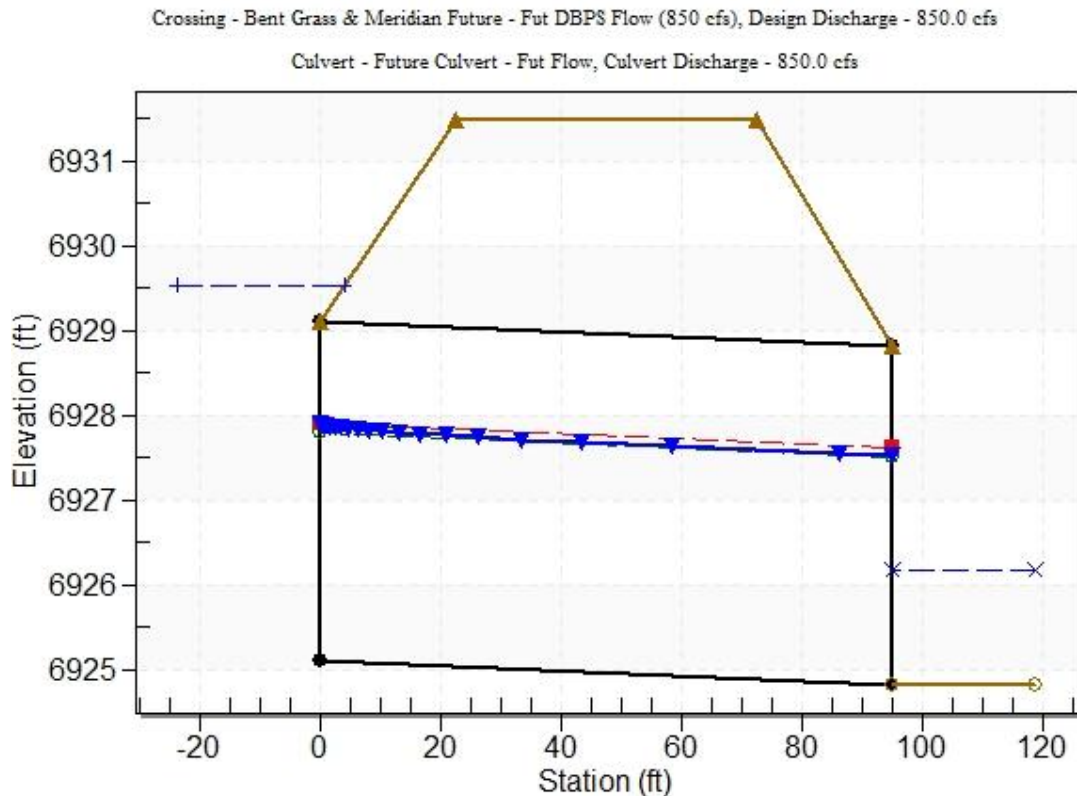
Inlet Elevation (invert): 6925.11 ft, Outlet Elevation (invert): 6924.83 ft

Culvert Length: 95.00 ft, Culvert Slope: 0.0029

Culvert Performance Curve Plot: Future Culvert - Fut Flow



Water Surface Profile Plot for Culvert: Future Culvert - Fut Flow



Site Data - Future Culvert - Fut Flow

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6925.11 ft

Outlet Station: 95.00 ft

Outlet Elevation: 6924.83 ft

Number of Barrels: 2

Culvert Data Summary - Future Culvert - Fut Flow

Barrel Shape: Concrete Box

Barrel Span: 16.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Bent Grass & Meridian)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
298.00	6925.56	0.73	7.73	2.48	1.64
360.70	6925.65	0.82	8.30	2.78	1.67
423.40	6925.73	0.90	8.81	3.05	1.69
486.10	6925.80	0.97	9.27	3.31	1.71
548.80	6925.88	1.05	9.69	3.56	1.73
611.50	6925.94	1.11	10.08	3.79	1.75
674.20	6926.01	1.18	10.44	4.01	1.77
736.90	6926.07	1.24	10.78	4.23	1.78
799.60	6926.13	1.30	11.10	4.44	1.79
850.00	6926.18	1.35	11.35	4.60	1.80
925.00	6926.25	1.42	11.70	4.83	1.82

Future - Fut DBPS Flow (850 cfs))**Tailwater Channel Data - Bent Grass & Meridian Future - Fut DBPS Flow (850 cfs)**

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 50.00 ft

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0545

Channel Manning's n: 0.0350

Channel Invert Elevation: 6924.83 ft

Roadway Data for Crossing: Bent Grass & Meridian Future - Fut DBPS Flow (850 cfs)

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 80.00 ft

Crest Elevation: 6931.50 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

HY-8 Culvert Analysis Report

Future Culvert @ Owl Place

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 248.6 cfs

Design Flow: 850 cfs

Maximum Flow: 925 cfs

Table 1 - Summary of Culvert Flows at Crossing: Owl Place - Fut RCBC FutDBPS

Headwater Elevation (ft)	Total Discharge (cfs)	Fut 20 X 4 RCBC Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6911.34	248.60	248.60	0.00	1
6911.83	316.24	316.24	0.00	1
6912.30	383.88	383.88	0.00	1
6912.76	451.52	451.52	0.00	1
6913.24	519.16	519.16	0.00	1
6913.75	586.80	586.80	0.00	1
6914.29	654.44	654.44	0.00	1
6914.88	722.08	722.08	0.00	1
6915.52	789.72	789.72	0.00	1
6916.14	850.00	850.00	0.00	1
6916.99	925.00	925.00	0.00	1
6917.00	926.05	926.05	0.00	Overtopping

Flow (850 cfs)

Rating Curve Plot for Crossing: Owl Place - Fut RCBC FutDBPS Flow (850 cfs)

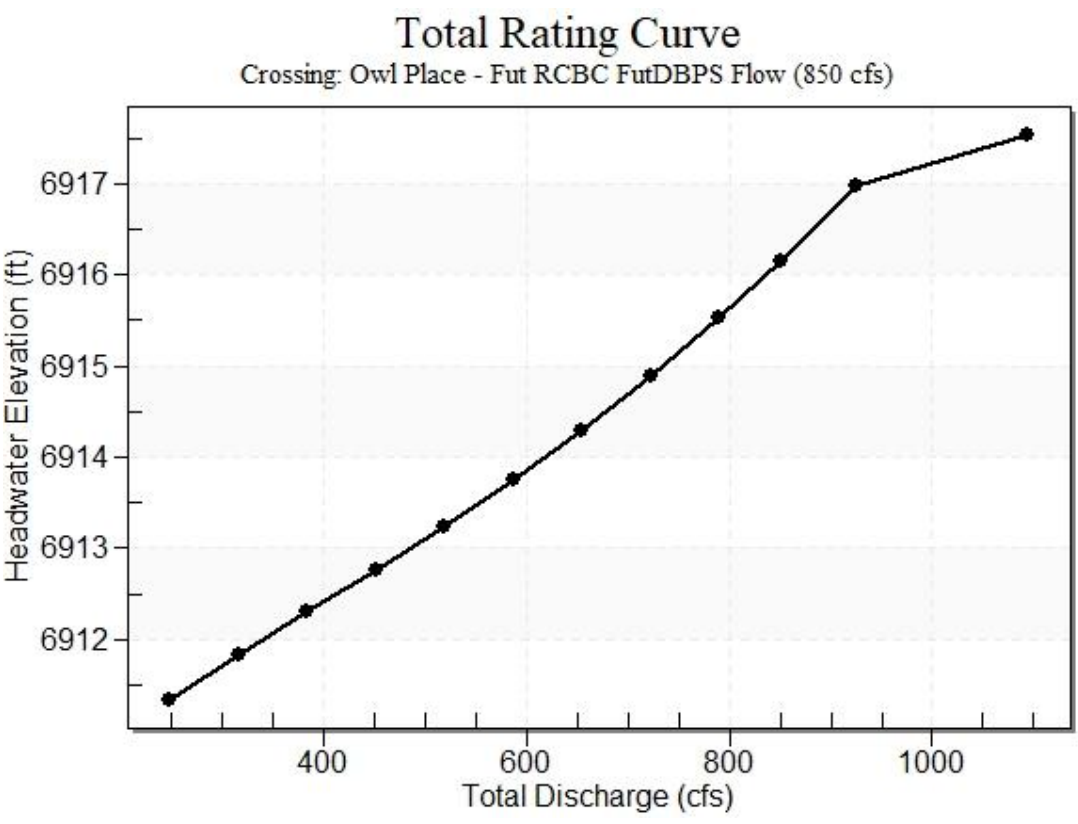


Table 2 - Culvert Summary Table: Fut 20 X 4 RCBC

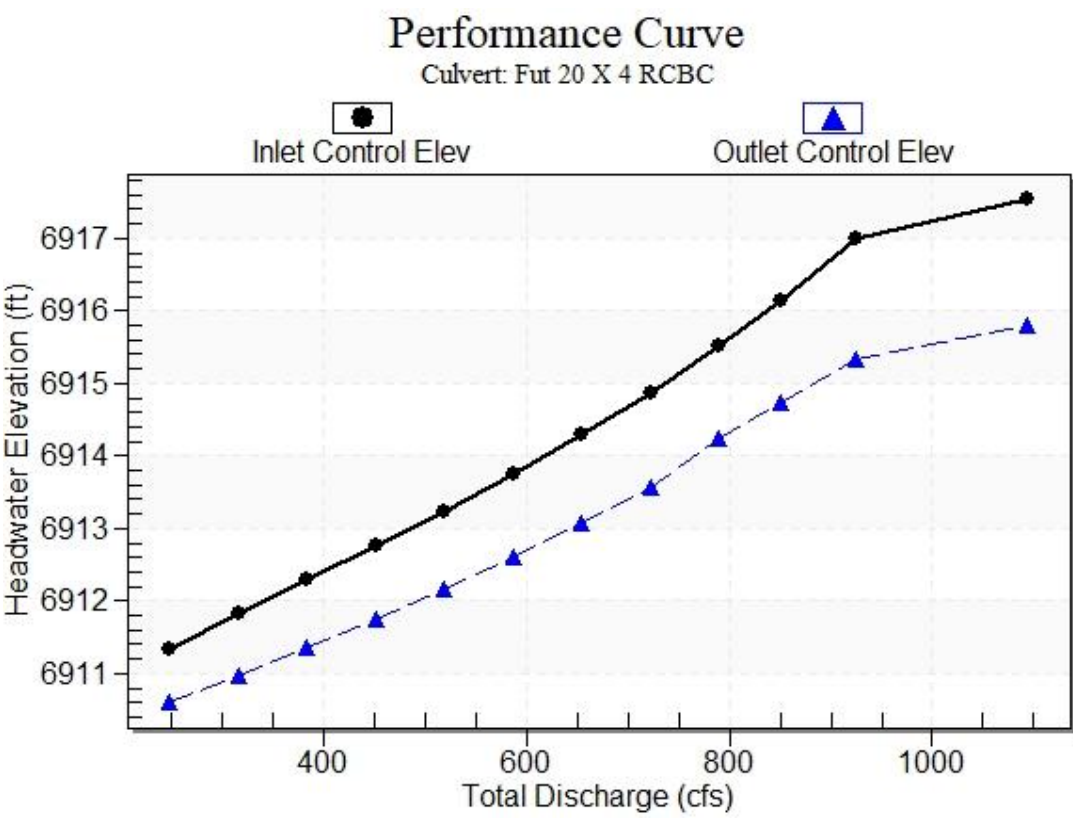
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
248.60	248.60	6911.34	2.843	2.102	1-JS1t	1.044	1.687	2.361	2.361	5.265	4.055
316.24	316.24	6911.83	3.331	2.474	1-S2n	1.214	1.980	1.476	2.584	10.714	4.306
383.88	383.88	6912.30	3.797	2.853	1-S2n	1.371	2.253	1.700	2.779	11.287	4.520
451.52	451.52	6912.76	4.262	3.248	5-S2n	1.520	2.511	1.915	2.953	11.788	4.707
519.16	519.16	6913.24	4.740	3.662	5-S2n	1.661	2.756	2.122	3.112	12.232	4.874
586.80	586.80	6913.75	5.245	4.100	5-S2n	1.795	2.990	2.321	3.258	12.639	5.026
654.44	654.44	6914.29	5.789	4.564	5-S2n	1.925	3.216	2.514	3.394	13.018	5.165
722.08	722.08	6914.88	6.379	5.054	5-S2n	2.051	3.434	2.702	3.522	13.362	5.293
789.72	789.72	6915.52	7.022	5.754	5-S2n	2.173	3.645	2.885	3.642	13.688	5.413
850.00	850.00	6916.14	7.644	6.231	5-S2n	2.279	3.828	3.044	3.744	13.961	5.513
925.00	925.00	6916.99	8.487	6.835	5-S2n	2.407	4.000	3.238	3.864	14.285	5.631

Straight Culvert

Inlet Elevation (invert): 6908.50 ft, Outlet Elevation (invert): 6908.00 ft

Culvert Length: 50.50 ft, Culvert Slope: 0.0099

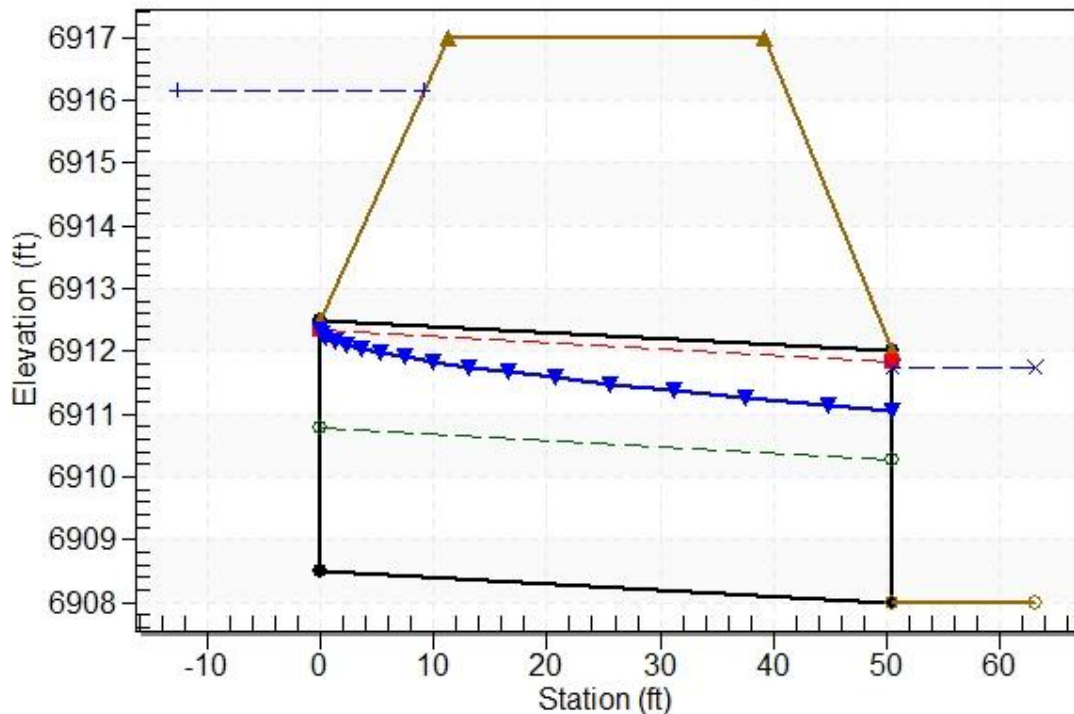
Culvert Performance Curve Plot: Fut 20 X 4 RCBC



Water Surface Profile Plot for Culvert: Fut 20 X 4 RCBC

Crossing - Owl Place - Fut RCBC FutDBPS Flow (850 cfs), Design Discharge - 850.0 cfs

Culvert - Fut 20 X 4 RCBC, Culvert Discharge - 850.0 cfs



Site Data - Fut 20 X 4 RCBC

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6908.50 ft

Outlet Station: 50.50 ft

Outlet Elevation: 6908.00 ft

Number of Barrels: 1

Culvert Data Summary - Fut 20 X 4 RCBC

Barrel Shape: Concrete Box

Barrel Span: 20.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90 & 15° flare) Wingwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Owl Place - Fut RCBC

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
248.60	6910.36	2.36	4.05	2.21	0.66
316.24	6910.58	2.58	4.31	2.42	0.67
383.88	6910.78	2.78	4.52	2.60	0.68
451.52	6910.95	2.95	4.71	2.76	0.68
519.16	6911.11	3.11	4.87	2.91	0.69
586.80	6911.26	3.26	5.03	3.05	0.69
654.44	6911.39	3.39	5.16	3.18	0.70
722.08	6911.52	3.52	5.29	3.30	0.70
789.72	6911.64	3.64	5.41	3.41	0.71
850.00	6911.74	3.74	5.51	3.50	0.71
925.00	6911.86	3.86	5.63	3.62	0.71

FutDBPS Flow (850 cfs))**Tailwater Channel Data - Owl Place - Fut RCBC FutDBPS Flow (850 cfs)**

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 11.00 (1:1)

Channel Slope: 0.0150

Channel Manning's n: 0.0500

Channel Invert Elevation: 6908.00 ft

Roadway Data for Crossing: Owl Place - Fut RCBC FutDBPS Flow (850 cfs)

Roadway Profile Shape: Constant Roadway Elevation

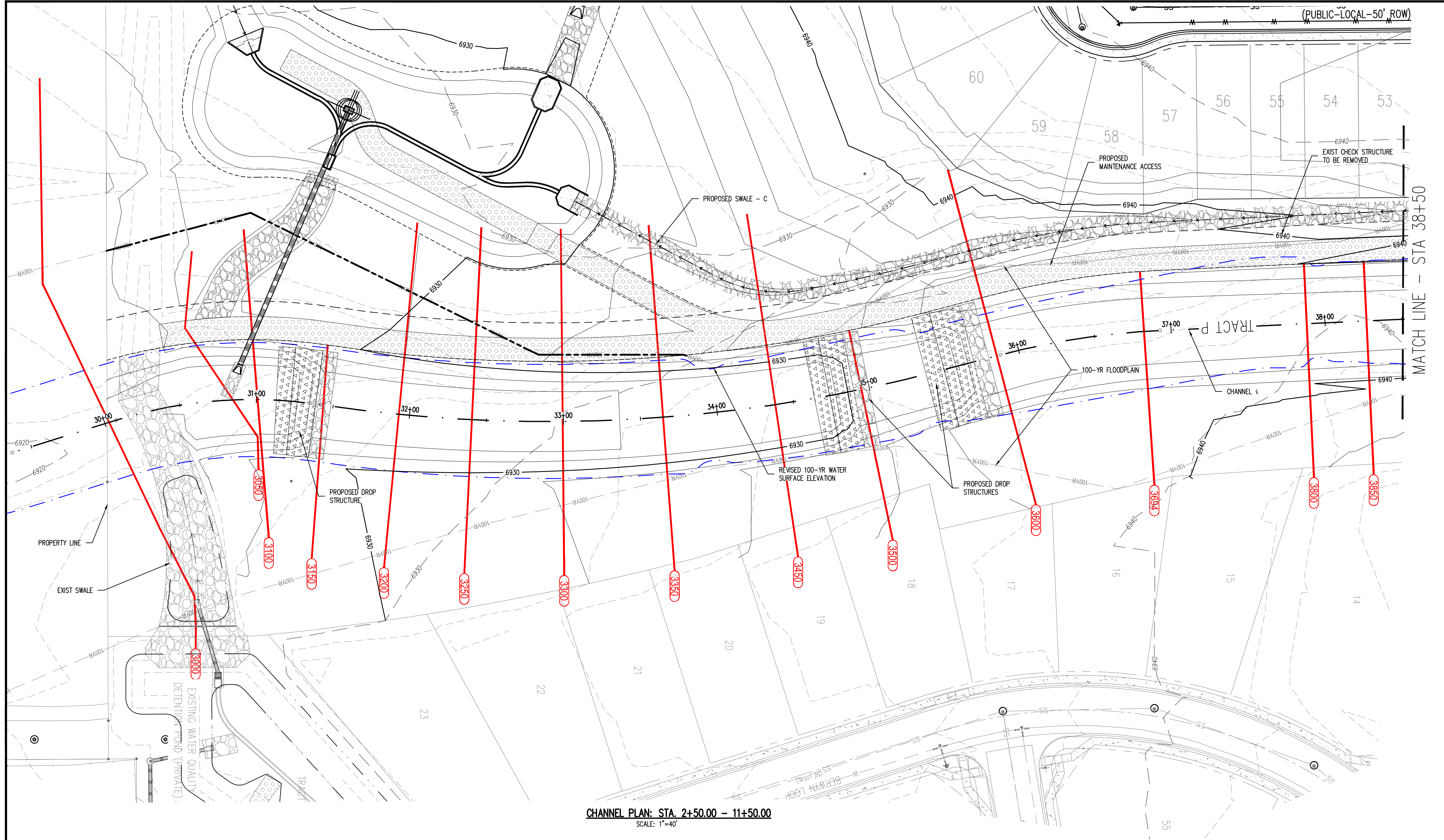
Crest Length: 100.00 ft

Crest Elevation: 6917.00 ft

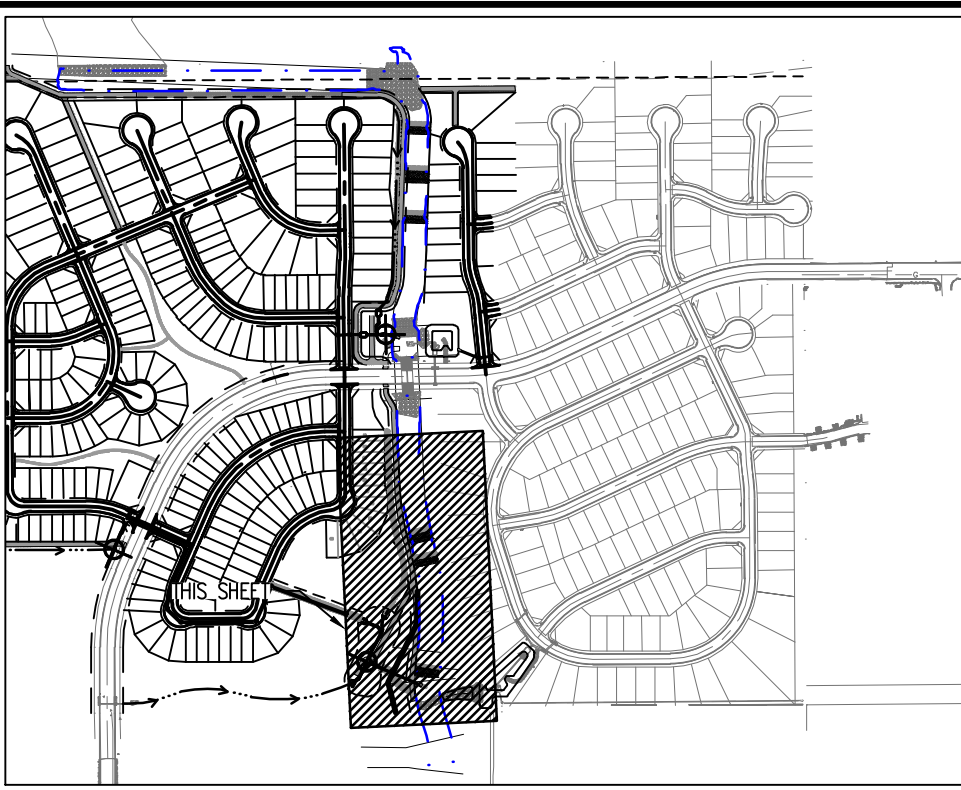
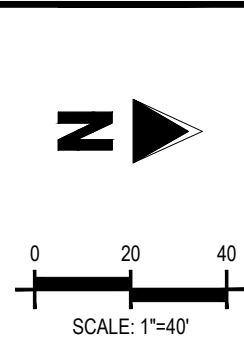
Roadway Surface: Paved

Roadway Top Width: 28.00 ft

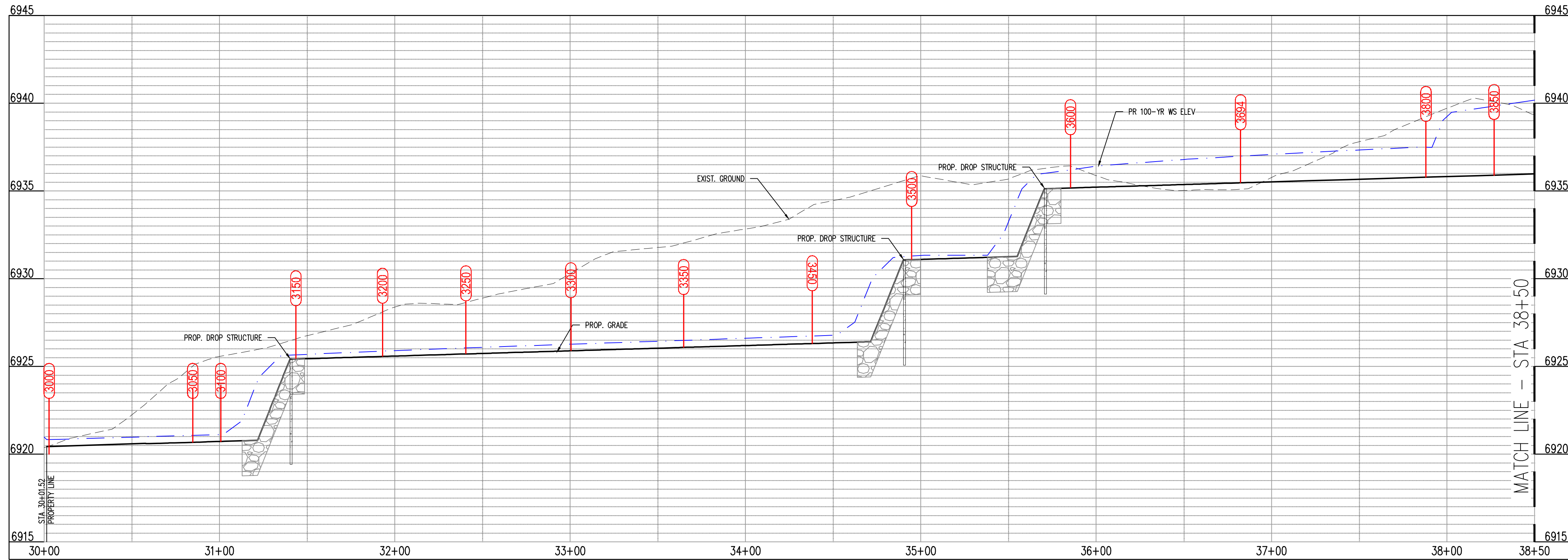
Conceptual
Channel P & P's and Details



CHANNEL PLAN: STA. 2+50.00 - 11+50.00
SCALE: 1"=40'



- LEGEND**
- 6931 --- EXISTING MINOR CONTOUR
 - 6930 --- EXISTING MAJOR CONTOUR
 - 6941 --- PROPOSED MINOR CONTOUR
 - 6940 --- PROPOSED MAJOR CONTOUR
 - --- PROPERTY BOUNDARY
 - 100YR --- 100 - YR FLOODPLAIN LINE
 - --- PROPOSED 100-YR WATER SURFACES
 - (3900) --- HEC-RAS SECTIONS
 - --- EXISTING STORM SEWER
 - --- PROPOSED STORM SEWER
 - --- PROPOSED RIPRAP
 - --- EXISTING RIPRAP



Galloway

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Colorado Springs, CO 80920
719.900.7220
gallowayus.com

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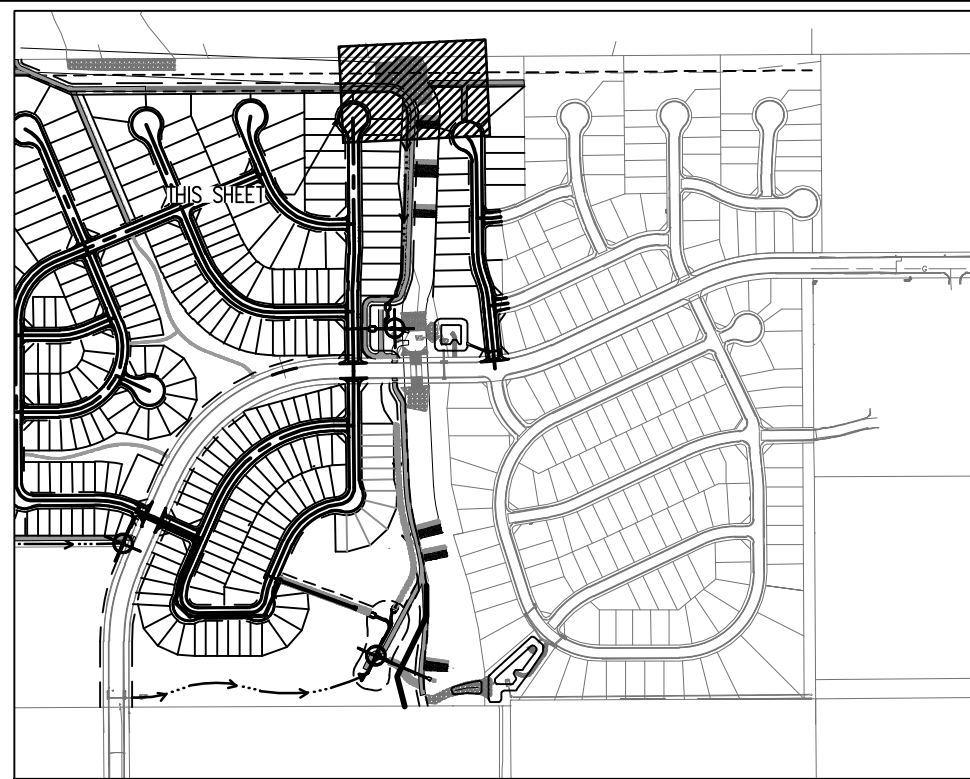
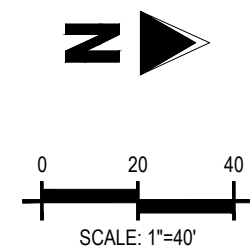
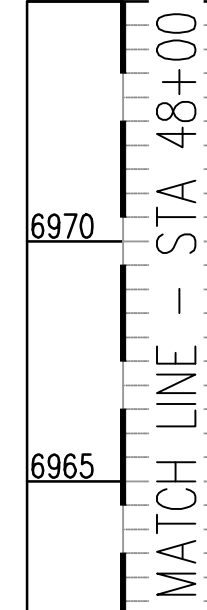
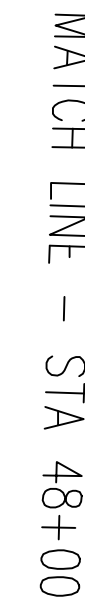
CHALLENGER HOMES

MASTER DRAINAGE DEVELOPMENT PLAN
FALCON MEADOWS AT BENT GRASS
FOR
CHALLENGER COMMUNITIES, LLC
BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD
FALCON, CO 80831 - EL PASO COUNTY

#	Date	Issue / Description	Init.













Project No: _____
Drawn By: _____
Checked By: _____
Date: _____

CHANNEL PLAN & PROFILE



SITE MAP
SCALE: 1"=600'

LEGEND

	EXISTING MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPERTY BOUNDARY
	100 - YR FLOODPLAIN LINE
	PROPOSED 100-YR WATER SURFACES
	HEC-RAS SECTIONS
	EXISTING STORM SEWER
	PROPOSED STORM SEWER
	PROPOSED RIPRAP
	EXISTING RIPRAP

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CHALLENGER HOMES

MASTER DRAINAGE DEVELOPMENT PLAN FALCON MEADOWS AT BENT GRASS FOR CHALLENGER COMMUNITIES, LLC

BENT GRASS MEADOWS DRIVE & MERDIAN ROAD
FALCON, CO 80831 - EL PASO COUNTY

[illegible]

Project No: _____

Drawn By: _____

Checked By: _____

Date: _____

CHANNEL PLAN & PROFILE

DR2.3

~~Sheet 2 of 3~~

Sheet 6-10
Falcon DBPS
Conceptual Plan
West Tributary
El Paso County, CO

- Drainageway Crossing

Stream Centerline

Existing Approximate 100-yr Floodplain*

Floodplain Study Limit

Storm Sewer

Inlet

Manhole

Pipe

Natural Channel Design

Protect In Place

Roadside Ditch Improvement

Small Drop Structures w/ Toe Protection

Existing Detention

Proposed Detention

Proposed Detention Grading

Small Drop Structure

Cross Vane

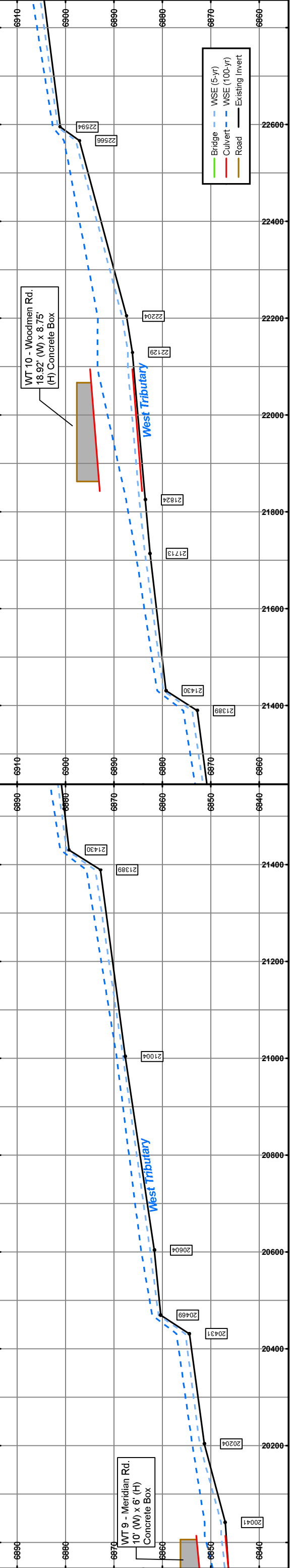
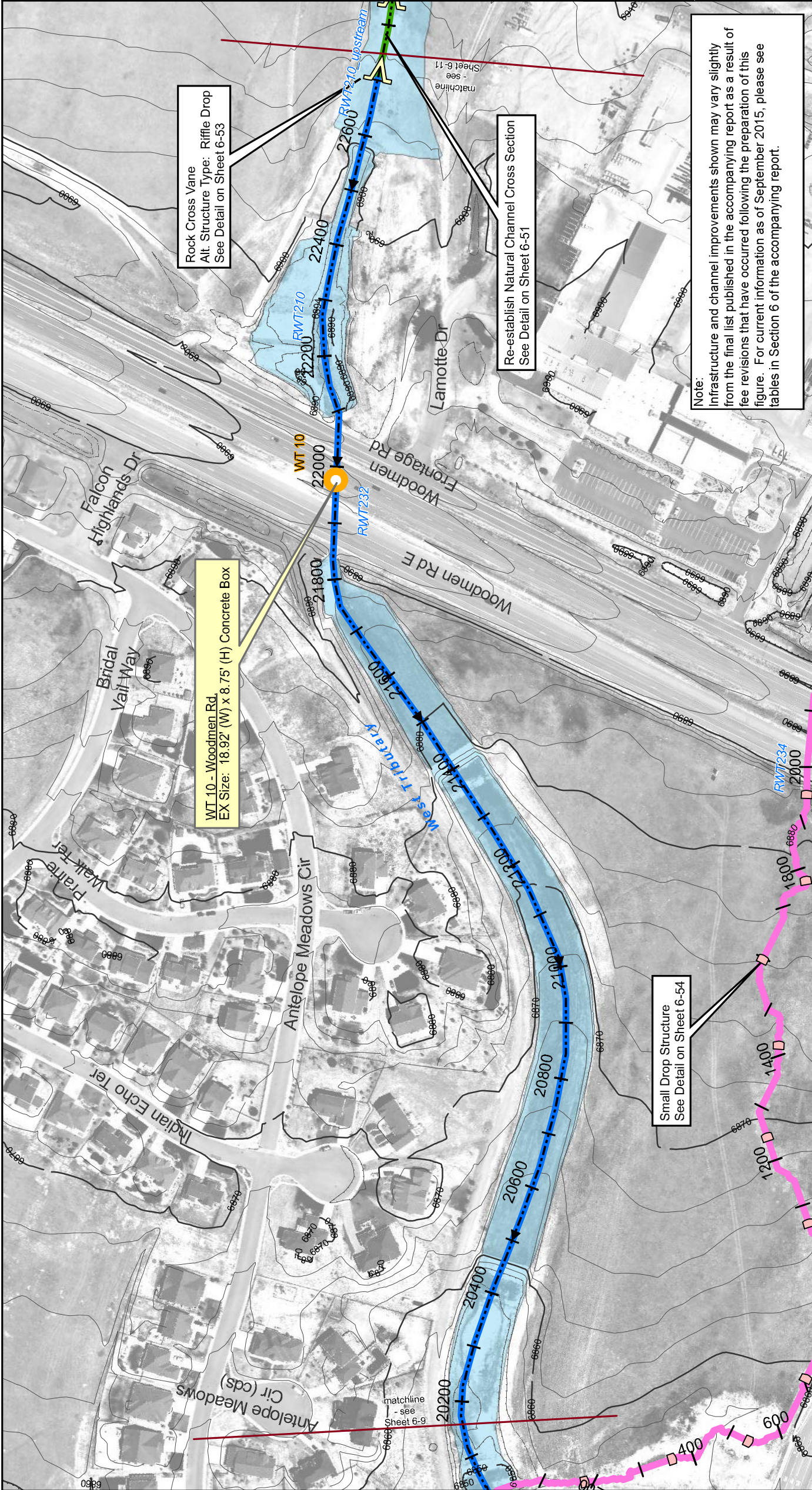
Immediate Action Required to Preserve Existing Condition
- 0

100

200

Feet

* These approximate 100-yr floodplain boundaries are for planning purposes only. This information is not intended to replace the information provided on the FEMA Flood Insurance Rate Maps for this area.
** These are conceptual design drawings and are subject to change. These drawings are not intended for construction purposes.



Sheet 6-11
Falcon DBPS
Conceptual Plan
West Tributary
El Paso County, CO

- Drainageway Crossing

Stream Centerline

Existing Approximate 100-yr Floodplain*

Floodplain Study Limit

Storm Sewer

Inlet

Manhole

Pipe
- Reach Improvements

Natural Channel Design

Protect In Place

Roadside Ditch Improvement

Small Drop Structures w/ Toe Protection

Existing Detention

Proposed Detention

Proposed Detention Grading

Small Drop Structure

Cross Vane

Immediate Action Required to Preserve Existing Condition
- 0

100

200

Feet

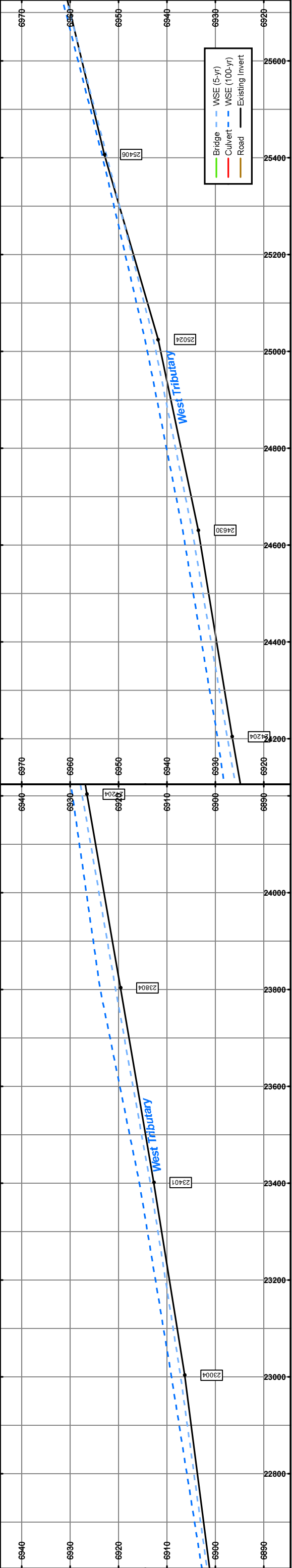
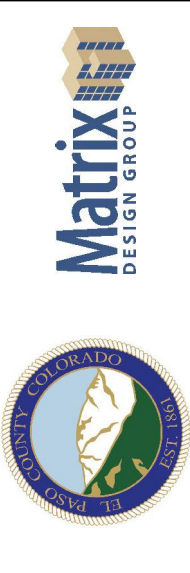
* These approximate 100-yr floodplain boundaries are for planning purposes only. This information is not intended to replace the information provided on the FEMA Flood Insurance Rate Maps for this area.
** These are conceptual design drawings and are subject to change. These drawings are not intended for construction purposes.

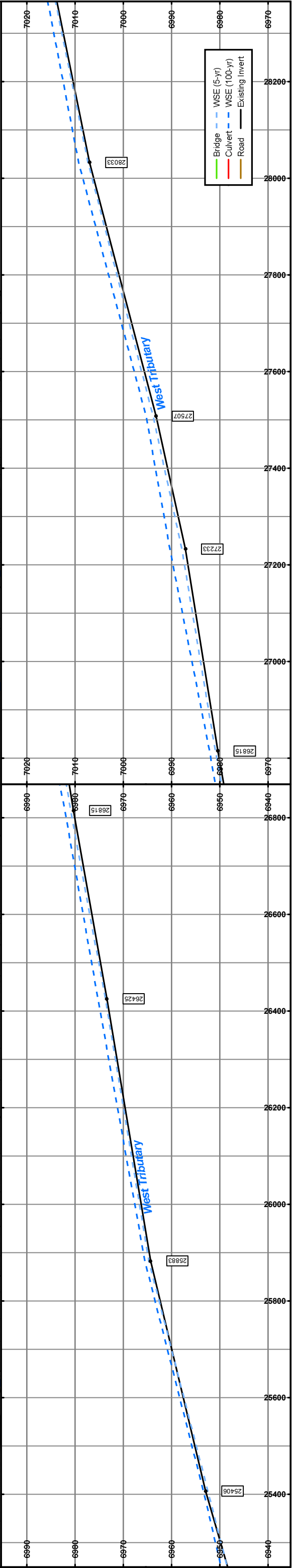
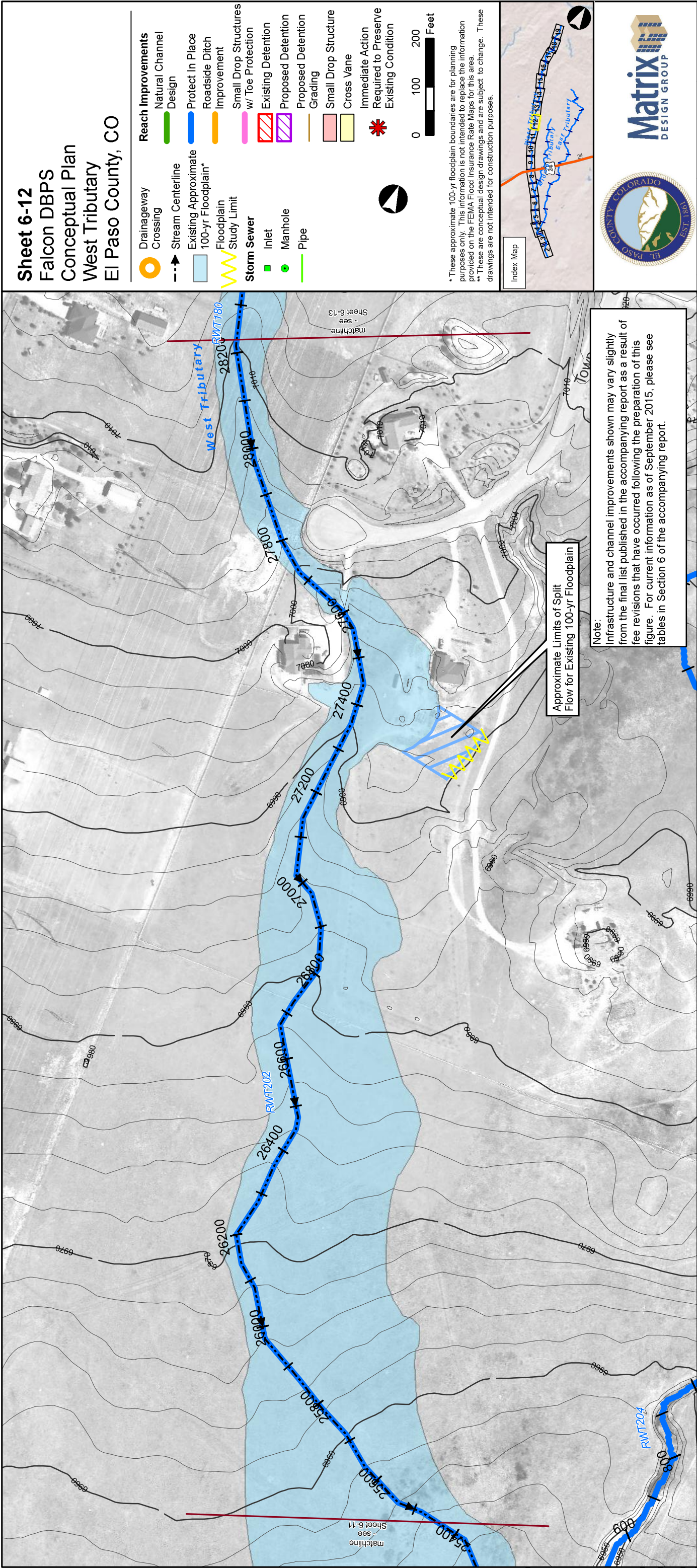
Note:
Infrastructure and channel improvements shown may vary slightly from the final list published in the accompanying report as a result of fee revisions that have occurred following the preparation of this figure. For current information as of September 2015, please see tables in Section 6 of the accompanying report.

Sub Regional Pond SR3
EURV = 1.0 AF
 $Q_{2in} = 72$ cfs
 $Q_{2out} = 72$ cfs
 $Q_{100in} = 910$ cfs
 $Q_{100out} = 910$ cfs

Re-establish Natural Channel Cross Section
See Detail on Sheet 6-51

Rock Cross Vane
Alt. Structure Type: Riffle Drop
See Detail on Sheet 6-53





Sheet 6-13
Falcon DBPS
Conceptual Plan
West Tributary
El Paso County, CO

-  Drainageway Crossing

 Stream Centerline

 Existing Approximate 100-yr Floodplain*

 Floodplain Study Limit


 Storm Sewer Inlet

 Manhole

 Pipe
-  Reach Improvements Natural Channel Design

 Protect In Place Roadside Ditch Improvement

 Small Drop Structures w/ Toe Protection

 Existing Detention

 Proposed Detention

 Proposed Detention Grading

 Small Drop Structure

 Cross Vane

 Immediate Action Required to Preserve Existing Condition

* These approximate 100-yr floodplain boundaries are for planning purposes only. This information is not intended to replace the information provided on the FEMA Flood Insurance Rate Maps for this area.
** These are conceptual design drawings and are subject to change. These drawings are not intended for construction purposes.

Index Map



Matrix
DESIGN GROUP

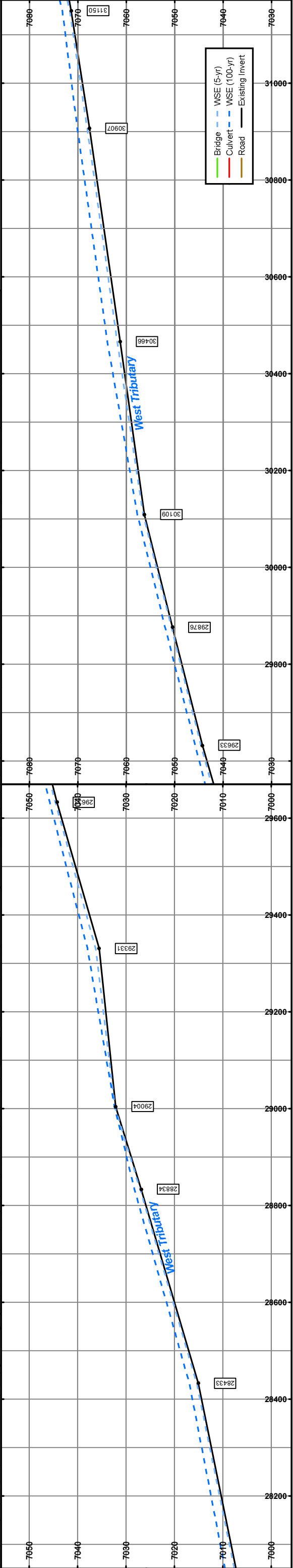
Note:
Infrastructure and channel improvements shown may vary slightly from the final list published in the accompanying report as a result of fee revisions that have occurred following the preparation of this figure. For current information as of September 2015, please see tables in Section 6 of the accompanying report.

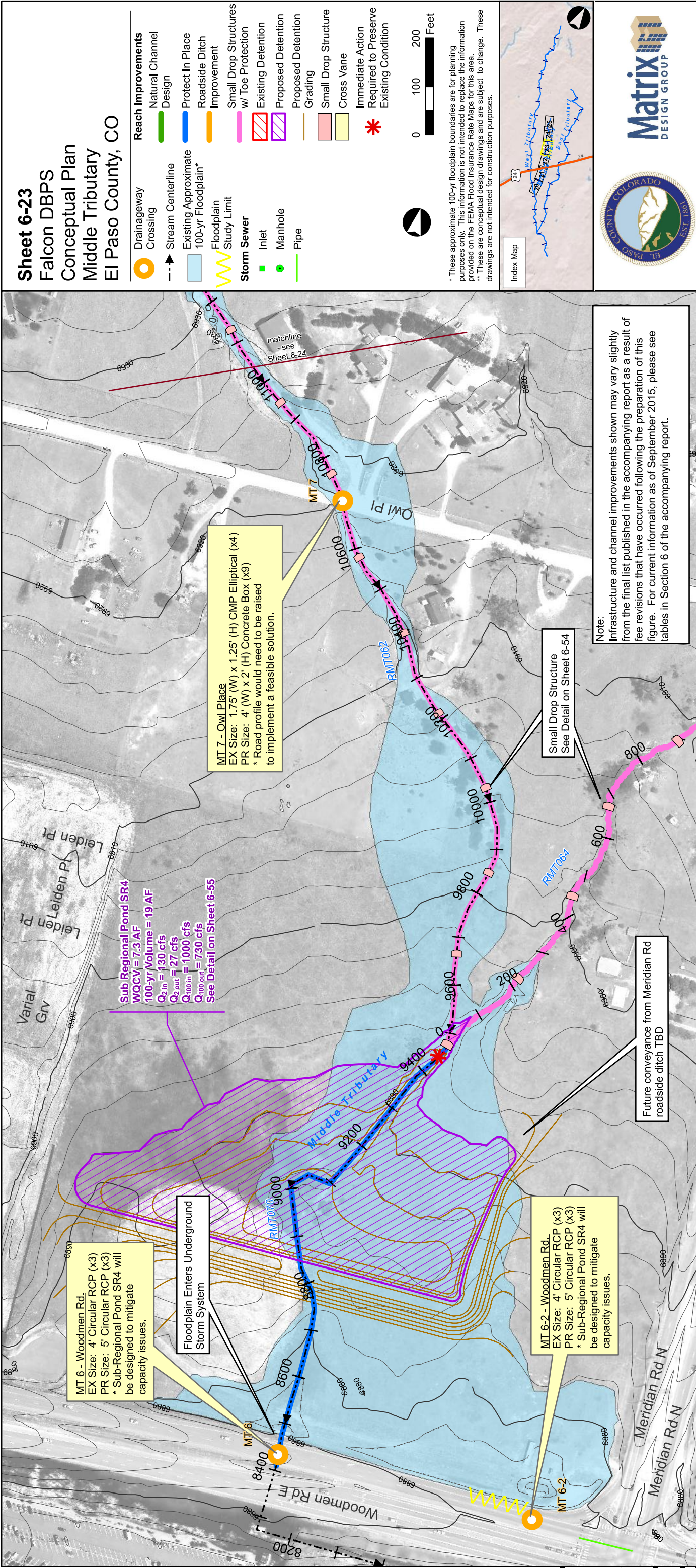
Approximate Limits of Split Flow for Existing 100-yr Floodplain

It is assumed that future development activities will remove this berm.

It is assumed that future development activities will remove this berm.

Approximate Limits of Split Flow for Existing 100-yr Floodplain





Sheet 6-24
Falcon DBPS
Conceptual Plan
Middle Tributary
El Paso County, CO

Drainageway Crossing

Stream Centerline

Existing Approximate 100-yr Floodplain*

Floodplain Study Limit

Storm Sewer Inlet

Manhole

Pipe

Reach Improvements Natural Channel Design

Protect In Place Roadside Ditch Improvement

Small Drop Structures w/ Toe Protection

Existing Detention

Proposed Detention

Proposed Detention Grading

Small Drop Structure

Cross Vane

Immediate Action Required to Preserve Existing Condition

0

100

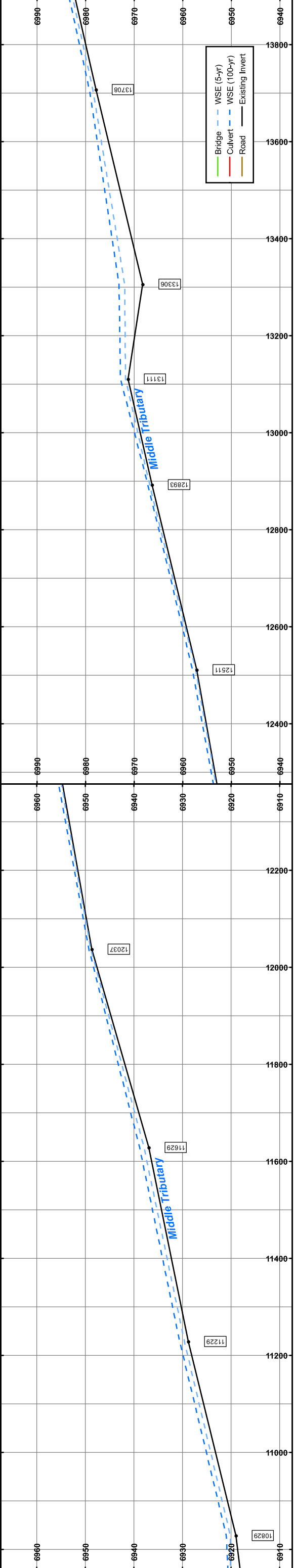
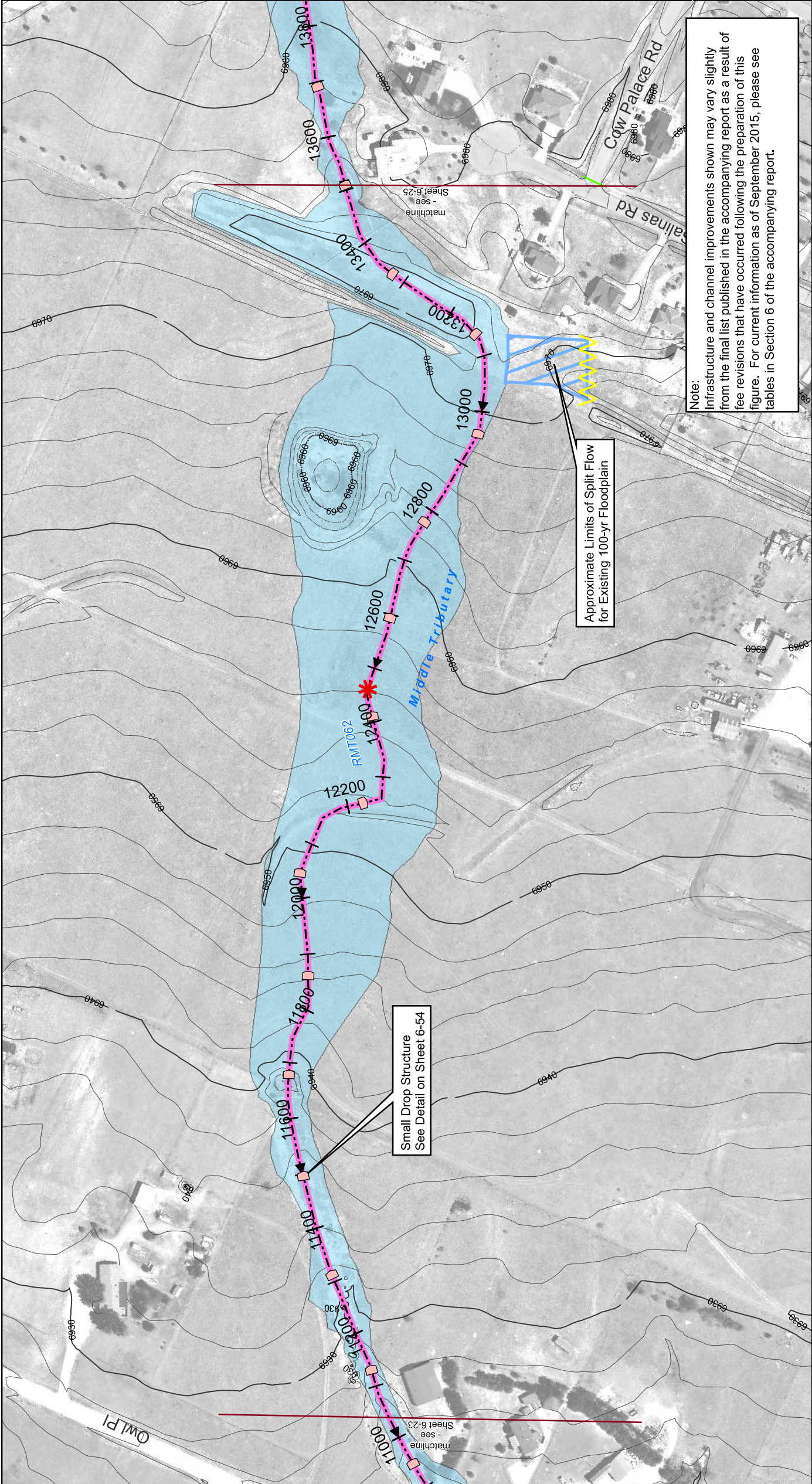
200

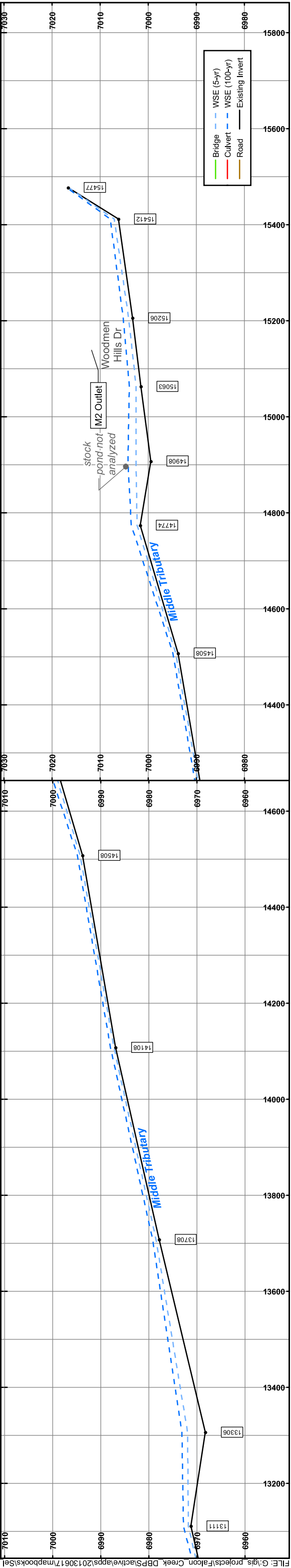
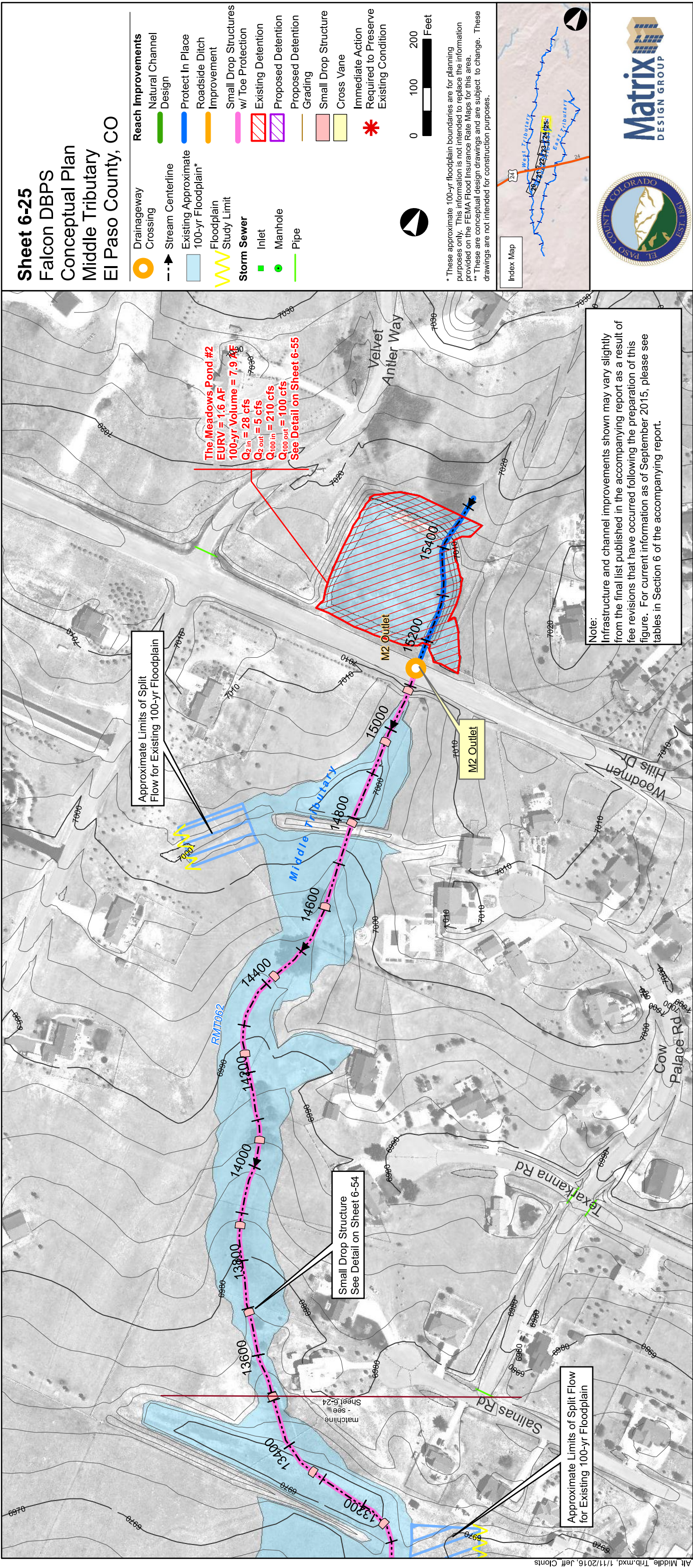
Feet

* These approximate 100-yr floodplain boundaries are for planning purposes only. This information is not intended to replace the information provided on the FEMA Flood Insurance Rate Maps for this area.
** These are conceptual design drawings and are subject to change. These drawings are not intended for construction purposes.



Note:
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Drainage
Crossing

Stream Centerline
Existing Approximate 100-yr Floodplain*

Floodplain Study Limit

Storm Sewer
Inlet
Manhole
Pipe

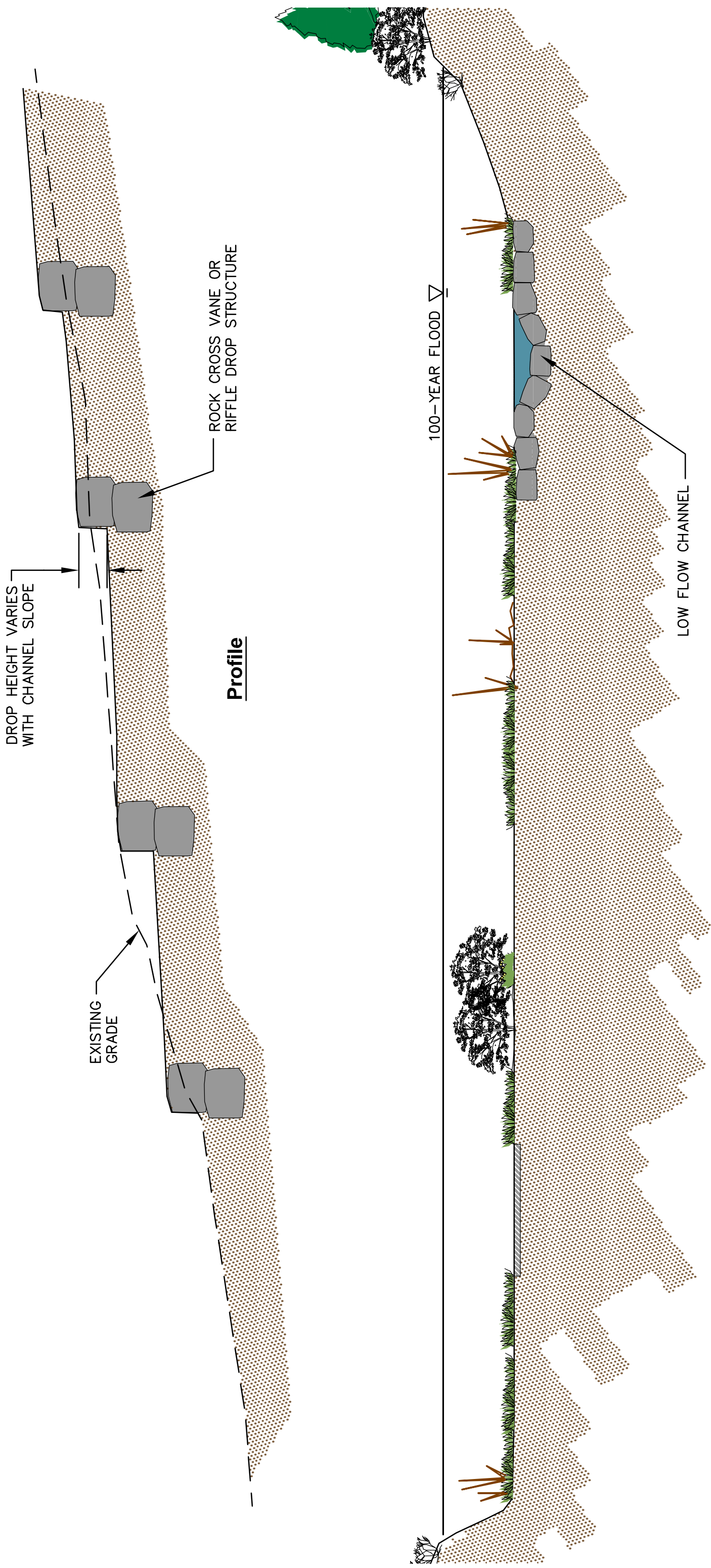
Reach Improvements
Natural Channel Design
Protect in Place
Roadside Ditch Improvement
Small Drop Structures w/ Toe Protection
Existing Detention
Proposed Detention
Proposed Detention Grading
Small Drop Structure
Cross Vane
Immediate Action
Required to Preserve
Existing Condition

0 100 200 Feet



Note: Infrastructure and channel improvements shown may vary slightly from the final list published in the accompanying report as a result of fee revisions that have occurred following the preparation of this figure. For current information as of September 2015, please see tables in Section 6 of the accompanying report.

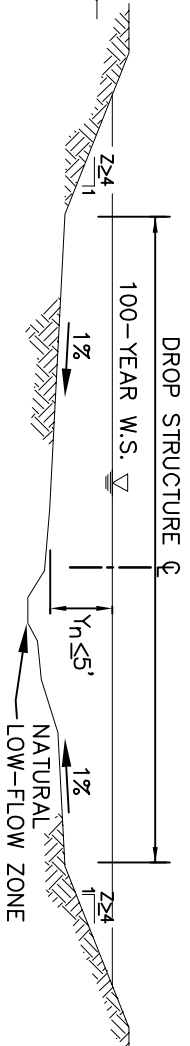
NO PROFILES FOR SMALL TRIBUTARIES



NAME: S:\10.122.003 (Falcon DBPS)\DWG\Channel_sec-pro_exhibit.dwg
PCP: Matrix.cdb
PLOT DATE: Wed Dec 21, 2011 3:03pm

Natural Channel with Grade Control Structures

Figure 5-4

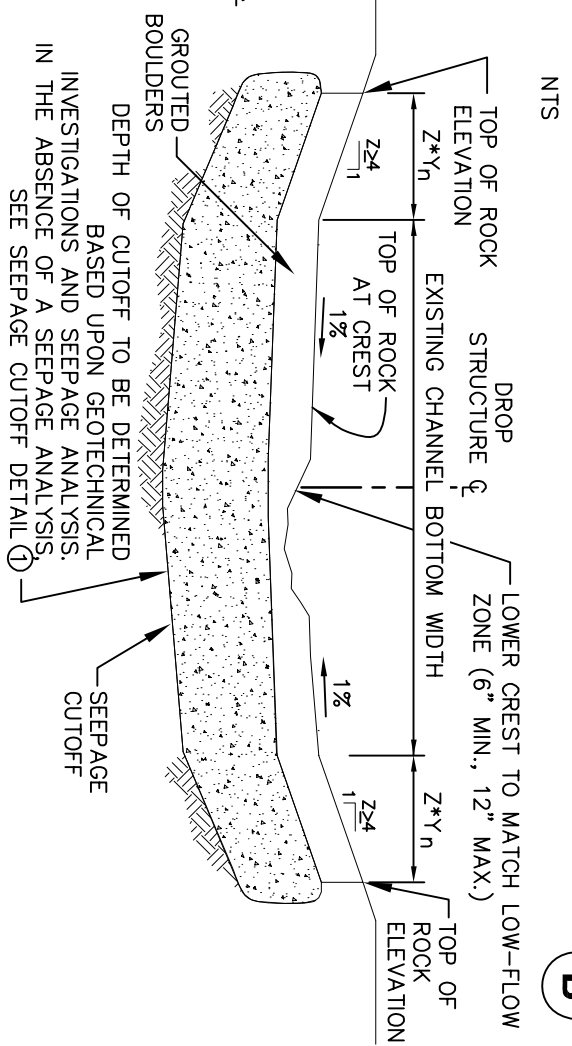


TYPICAL CHANNEL SECTION (UPSTREAM AND DOWNSTREAM OF DROP)

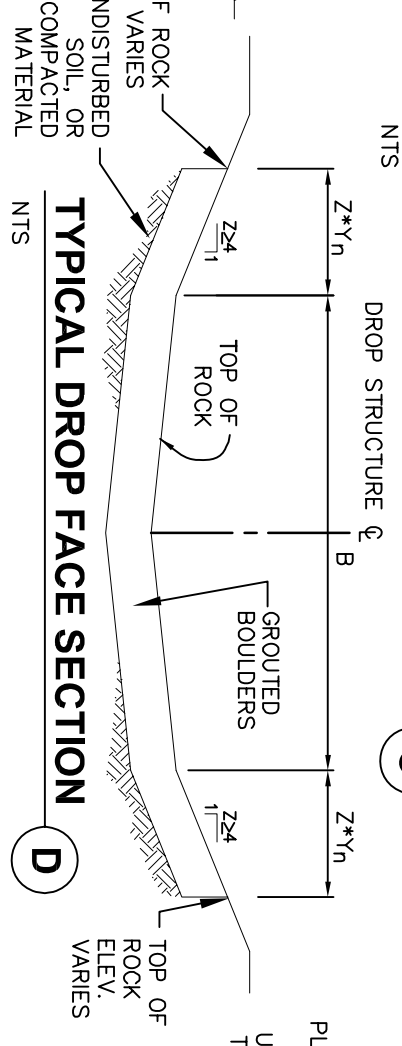
REACH	CREST WIDTH (FT)
RET020	18
RET030	21
RET040	23
RET100	28
RET110	28
RET152	29
RET156	30
RET162	30
RMTO50	23
RMTO62	20
RMTO64	24
RMTO80	27
RMTO92	15
RMTO94	27
RMTO99	27
RMTO102	27
RMTO104	27
RMTO106	27
RMTO110	27
RMTO112	27
RMTO114	27
RMTO122	27
RMTO124	27
RMTO174	22
RMTO234	19
RMTO296	32
RMTO354	38
RMTO372	38



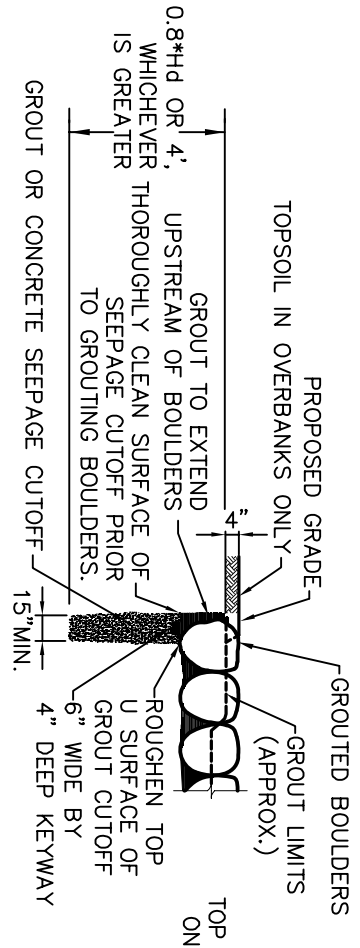
CONSTRUCTED GROUDED SLOPING BOULDER
DROP STRUCTURE



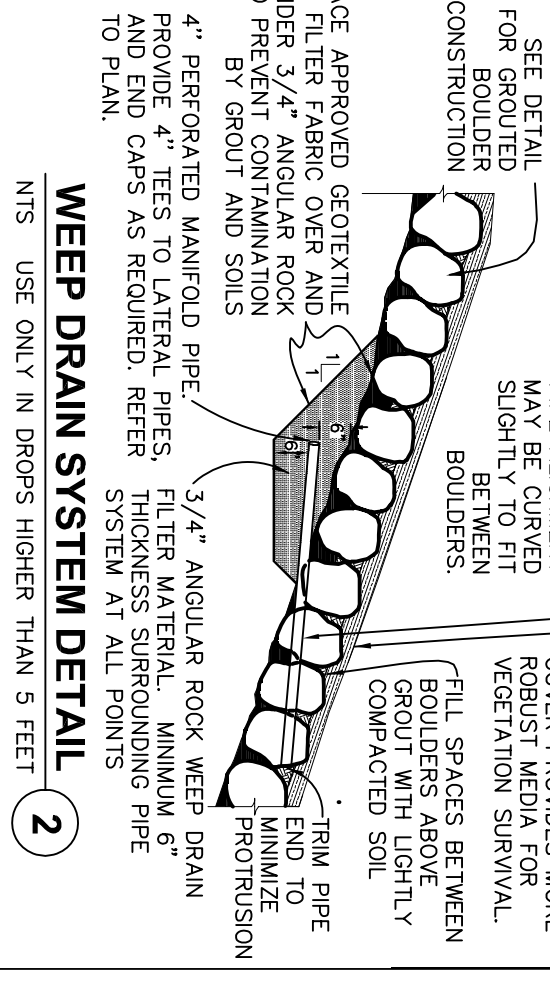
SEEPAGE CUTOFF SECTION



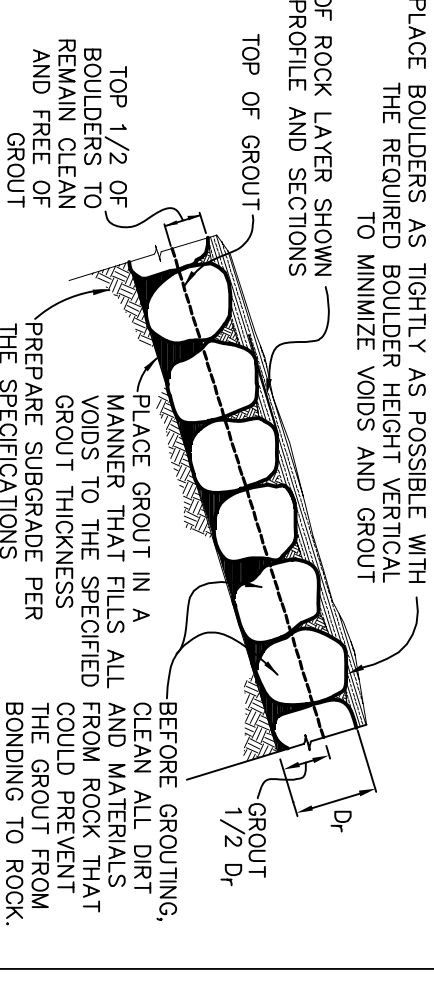
TYPICAL DROP FACE SECTION



SEEPAGE CUTOFF DETAIL



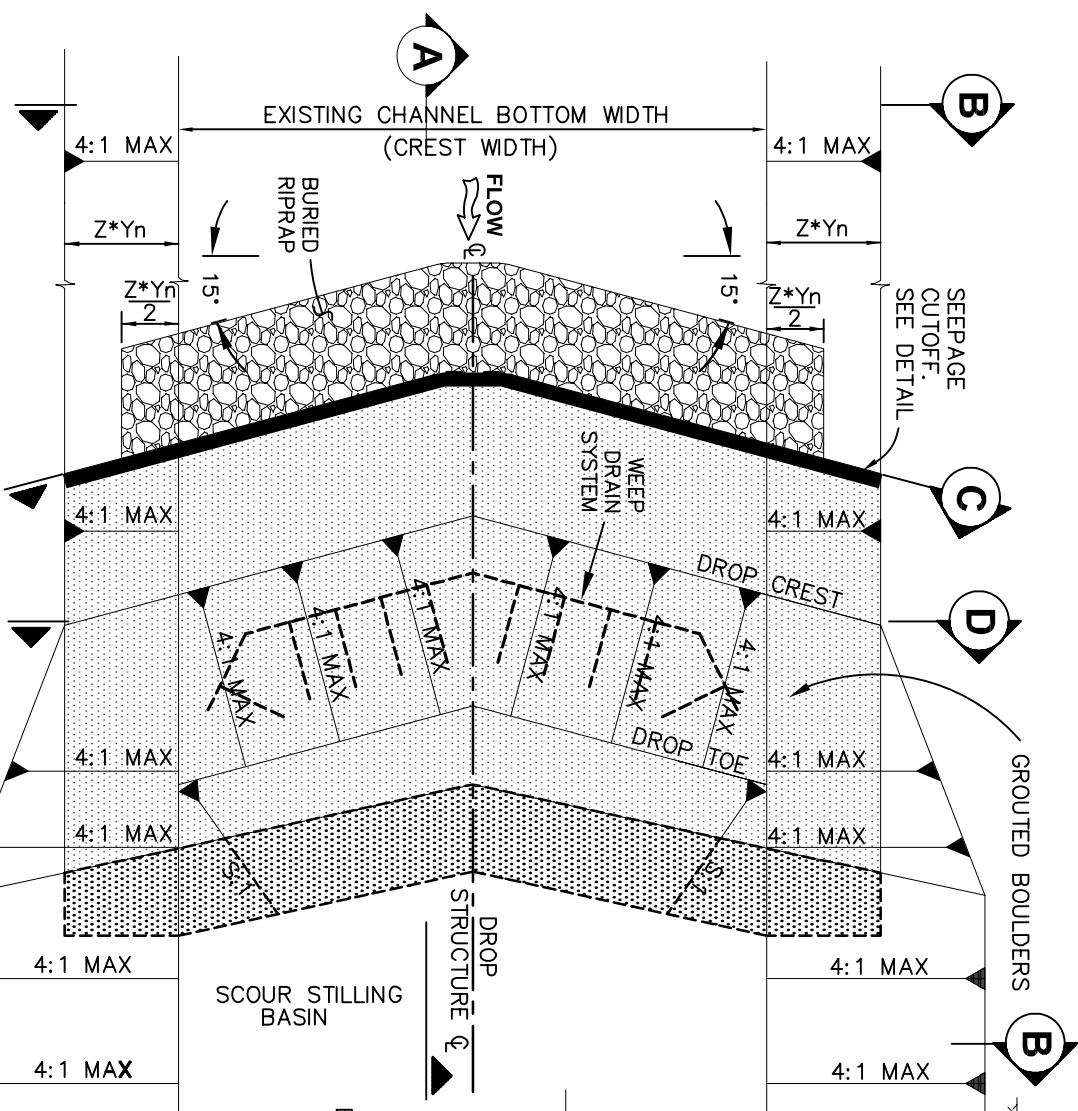
WEEP DRAIN SYSTEM DETAIL



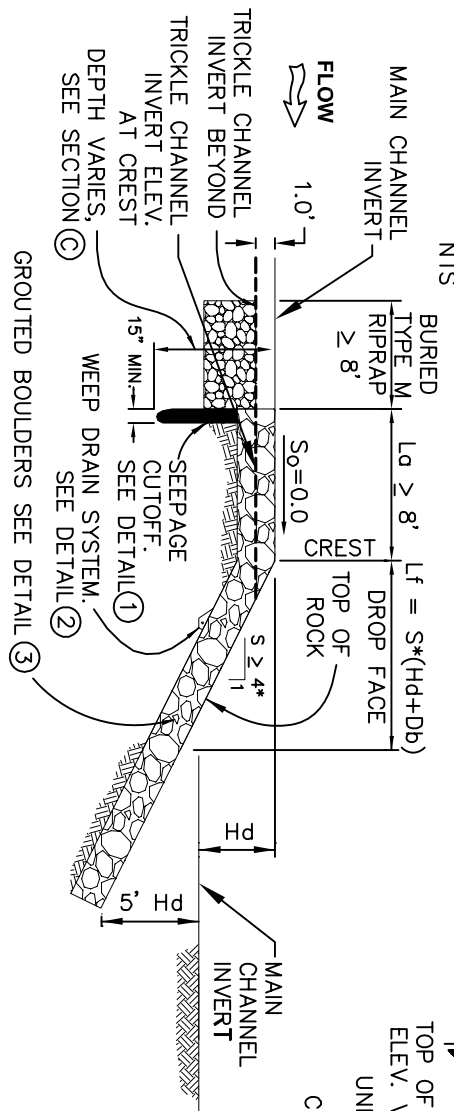
GROUDED BOULDER PLACEMENT DETAIL

TYPICAL GROUDED SLOPING (GSB) BOULDER DROP STRUCTURE

NOT FOR CONSTRUCTION



DROP STRUCTURE PLAN



DROP STRUCTURE PROFILE



2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

NAME: S:\10122003 (Falcon DPRS)\DWG\EURY-GSBD5-AS FLOWsheet.dwg
PLOT DATE: Tue Jun 18, 2013 11:38am

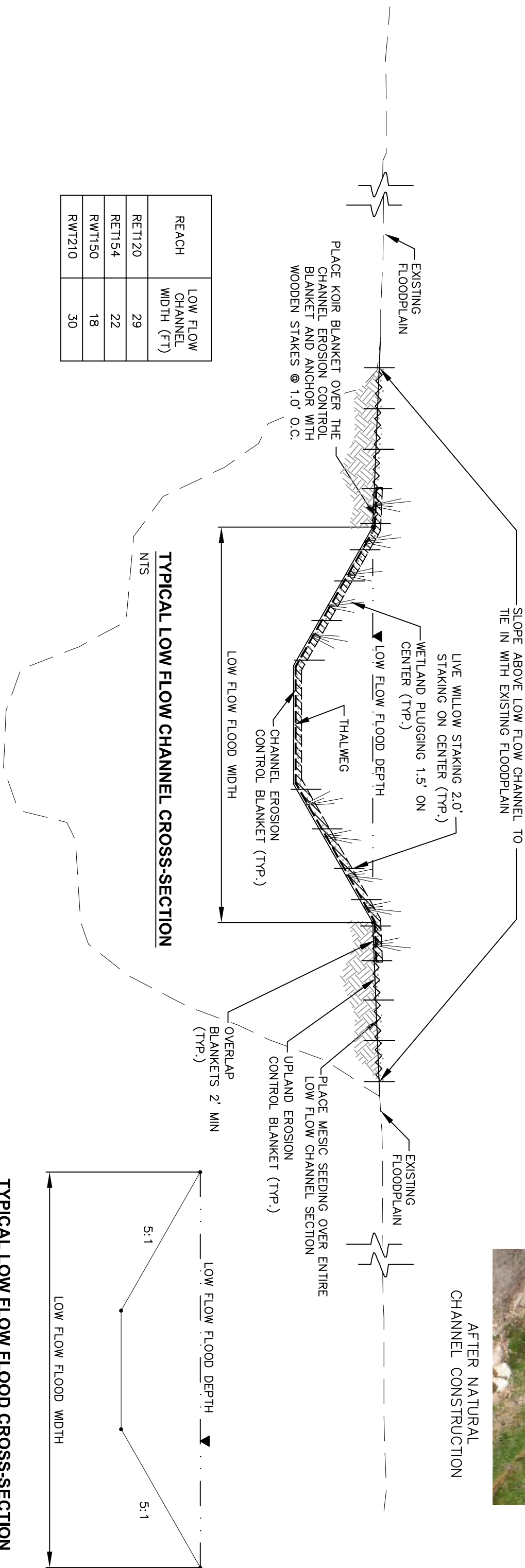
- NOTES:
- 1.) REACHES THAT ARE CURRENTLY DEGRADED MUST BE FILLED TO THE EXISTING FLOODPLAIN ELEVATION. THE LOW FLOW CHANNEL SHALL THEN BE CUT OUT OF THE FILL MATERIAL.
 - 2.) DIMENSIONS SHOWN ARE TYPICAL AND VARY WITH THE LOW FLOW CHANNEL WIDTH.
 - 3.) ALL CHANNEL CROSS-SECTIONS SHALL HAVE A LOW FLOW FLOOD WIDTH TO DEPTH RATIO (W/D) OF 23.
 - 4.) CHANNEL CAPACITY VARIES WITH THE LOW FLOW CHANNEL WIDTH AND SLOPE.
 - 5.) THESE CROSS-SECTIONS SHALL ONLY BE APPLIED TO "NATURAL CHANNEL DESIGN" REACHES.



BEFORE NATURAL
CHANNEL CONSTRUCTION



AFTER NATURAL
CHANNEL CONSTRUCTION



NAME: S:\10122003 (Falcon DBPS)\DWG\XSEC-RCVANE-ROSEmbld.dwg
POP: Morkx.ctb
PLOT DATE: Tue Jun 18, 2013 11:46pm



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Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

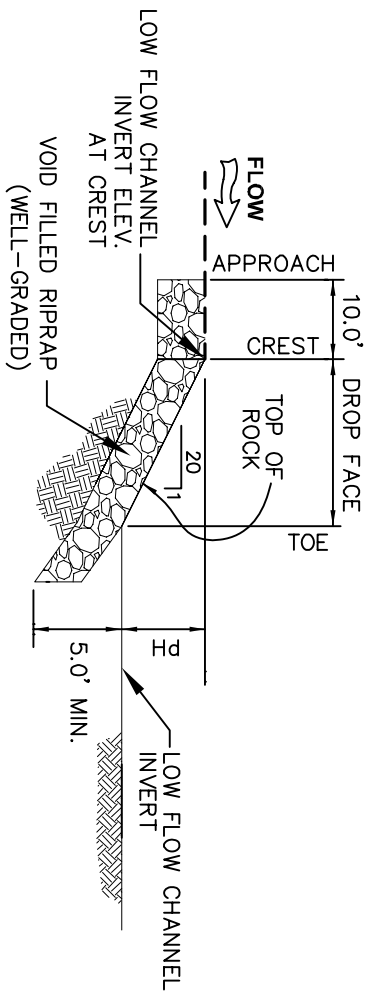
TYPICAL NATURAL CHANNEL CROSS-SECTIONS

FOR USE IN NATURAL CHANNEL DESIGN REACHES

NOT FOR CONSTRUCTION



CONSTRUCTED RIFFLE DROP STRUCTURE

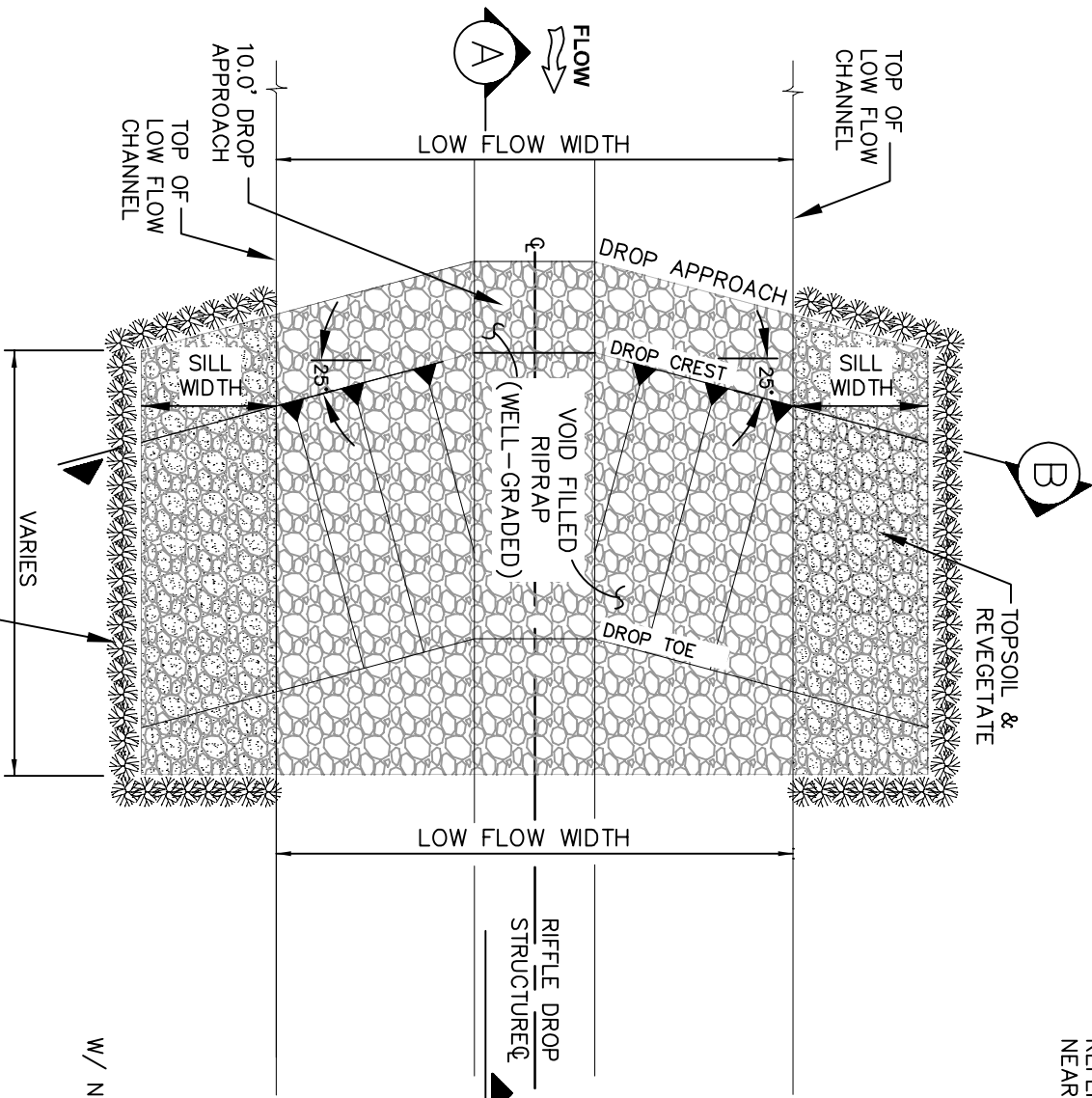


NOTE:
REFER TO EROSION CONTROL BLANKET DETAIL FOR BLANKET INSTALLATION
NEAR STRUCTURES.

RIFFLE DROP STRUCTURE PROFILE

NTS

A



IF ACCESS OR AVAILABILITY PRECLUDES *
LIVE WILLOW TRANSPLANTS, PLACE
CONTINUOUS LAYER OF WILLOW STAKES
VERTICALLY IN SILL TRENCH
PRIOR TO BACKFILL

RIFFLE DROP STRUCTURE PLAN

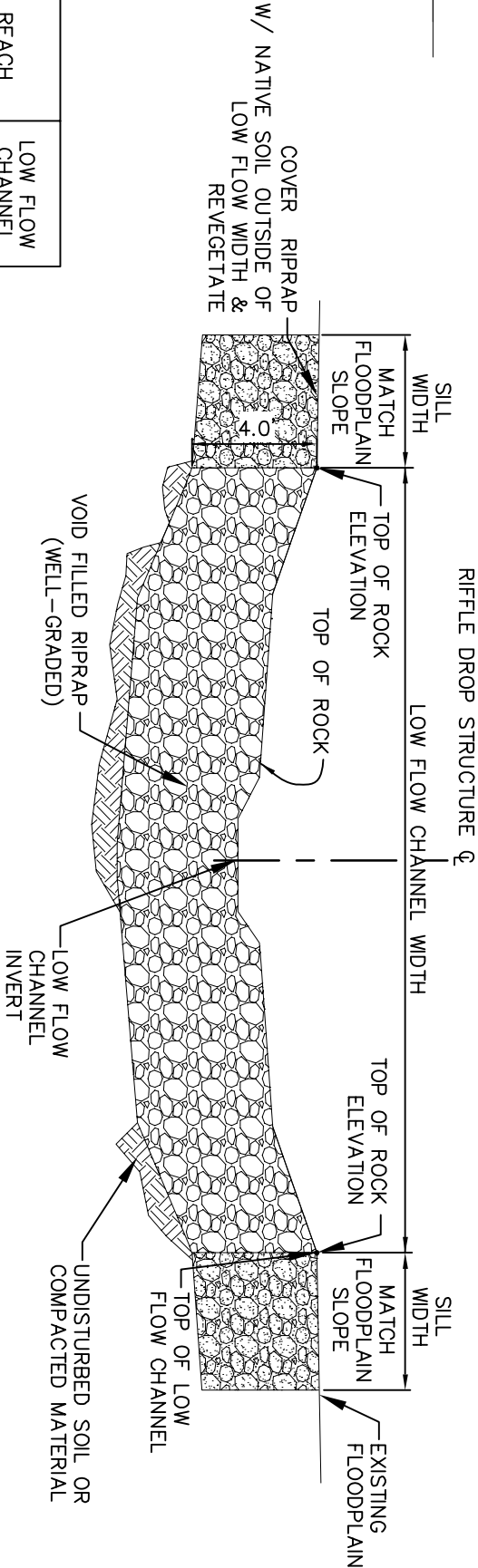
NTS

REACH	LOW FLOW CHANNEL WIDTH (FT)
RET1120	29
RET1154	22
RWT150	18
RWT210	30

RIFFLE DROP STRUCTURE SECTION

NTS

B



2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

NAME: S:\101222003 (Falcon DBPS)\DWG\XSEC-RCVME-R05seabld.dwg
POP: Workx.ctb
PLOT DATE: Tue Jun 18, 2013 1:49pm

TYPICAL RIFFLE DROP STRUCTURE FOR USE IN NATURAL CHANNEL DESIGN REACHES

NOT FOR CONSTRUCTION

★ IF ACCESS PRECLUDES LIVE WILLOW TRANSPLANTS LIVE STAKE AT 1.0' ON CENTER AROUND UPPER VANE ARM AND SILL.

POSITION AT PT AS APPLICABLE ACCORDING TO STRUCTURE LOCATION

GEOTEXTILE BLANKET

USE NATIVE CHANNEL BED MATERIAL FILL LEVEL W/ TOP OF VANE ARM AND SLOPING TO LOW FLOW WIDTH

EXCAVATE SCOUR POOL

POSITION AT PC AS APPLICABLE ACCORDING TO STRUCTURE LOCATION

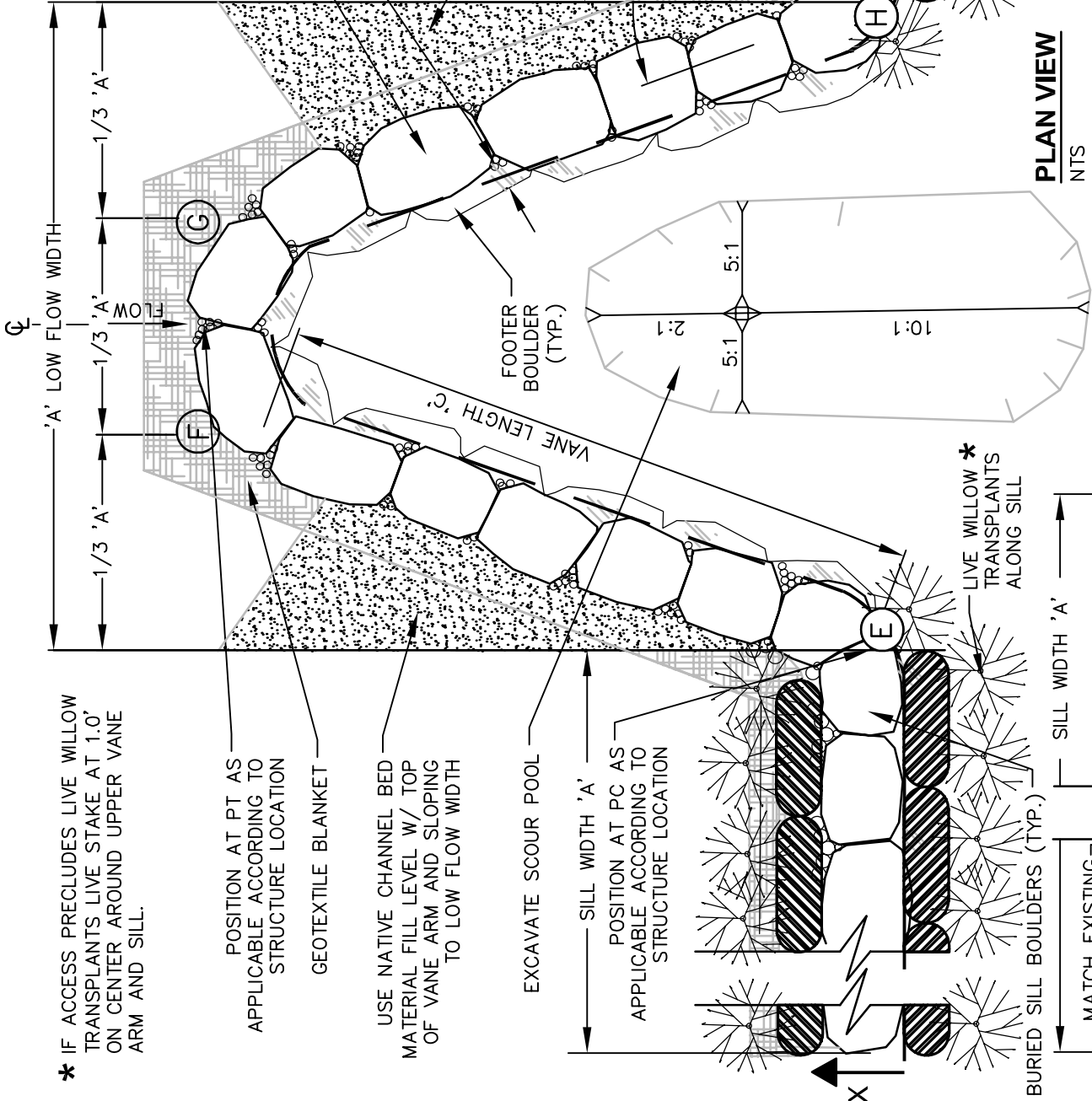
LIVE WILLOW ★ TRANSPLANTS ALONG SILL

BURIED SILL BOULDERS (TYP.)

PLACE SOIL AND SEED FILLED BURLAP SACKS ALONG SILL ARMS.

PLAN VIEW

NTS



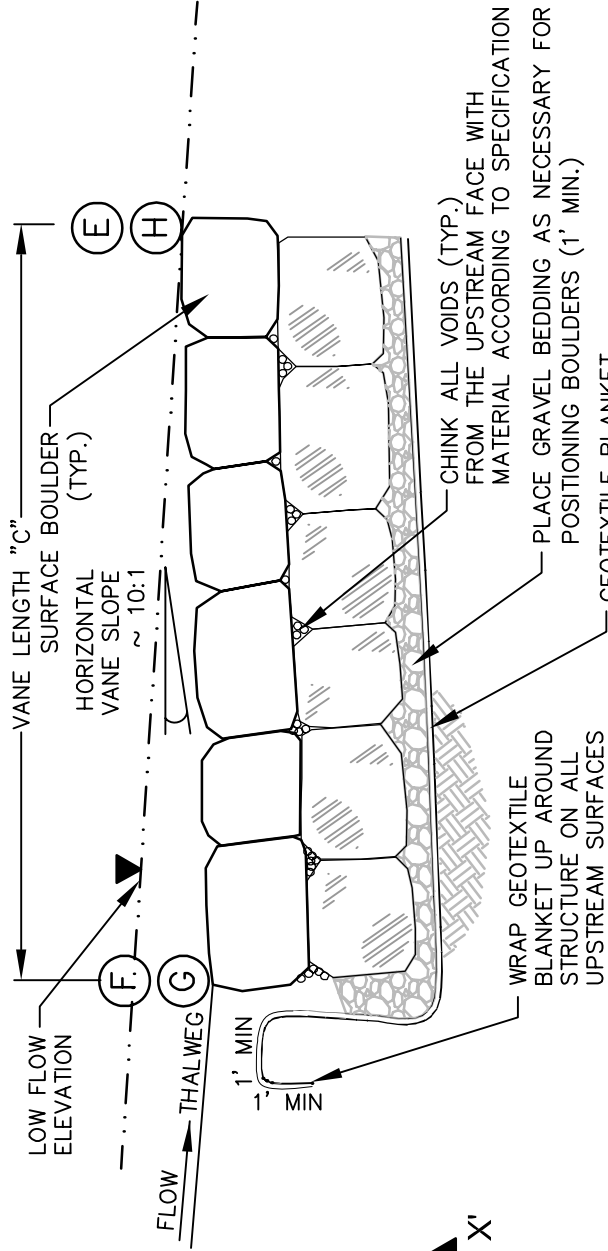
NOTES:

- 1.) REACHES THAT ARE CURRENTLY DEGRADED MUST BE FILLED TO THE EXISTING FLOODPLAIN ELEVATION. THE ROCK CROSS VANE SHALL THEN BE CONSTRUCTED IN COMPACTED FILL MATERIAL.
- 2.) BOULDERS SHALL BE BLOCK SHAPED ACCORDING TO SPECIFICATIONS (NOT ANGULAR).
- 3.) SURFACE BOULDERS SHALL BE IN COMPRESSION W/ FOOTER BOULDERS IN THE DOWNSTREAM DIRECTION.

NOTE:

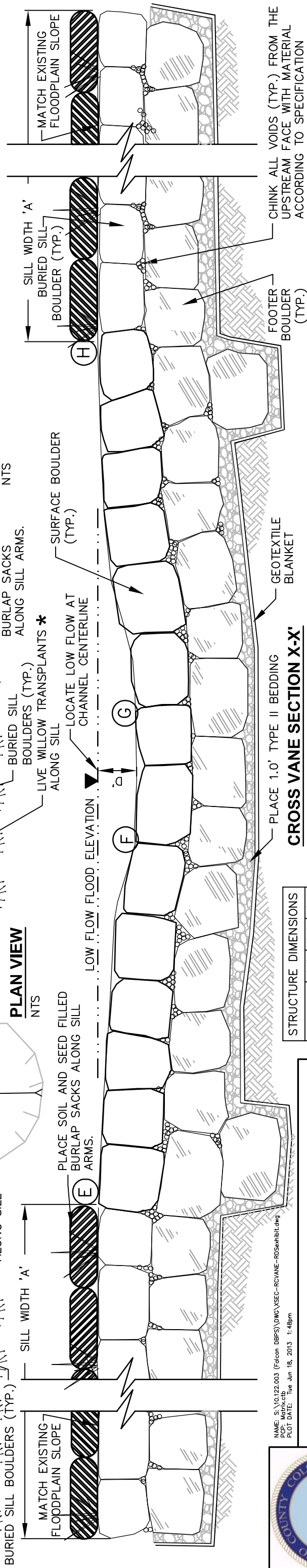
- (E) AND (H) LOW FLOW FLOOD ELEVATION
- (F) AND (G) MARK VANE ELEVATION AT HEAD OF VANE

CONSTRUCTED ROCK CROSS VANE



CROSS VANE LONGITUDINAL PROFILE ALONG VANE

NTS



CROSS VANE SECTION X-X'

NTS

STRUCTURE DIMENSIONS				
REACH	'A'	'C'	'D'	
RET120	29'	26'	1.3'	
RET154	22'	20'	1.0'	
RWT150	18'	16'	0.8'	
RWT210	30'	26'	1.3'	

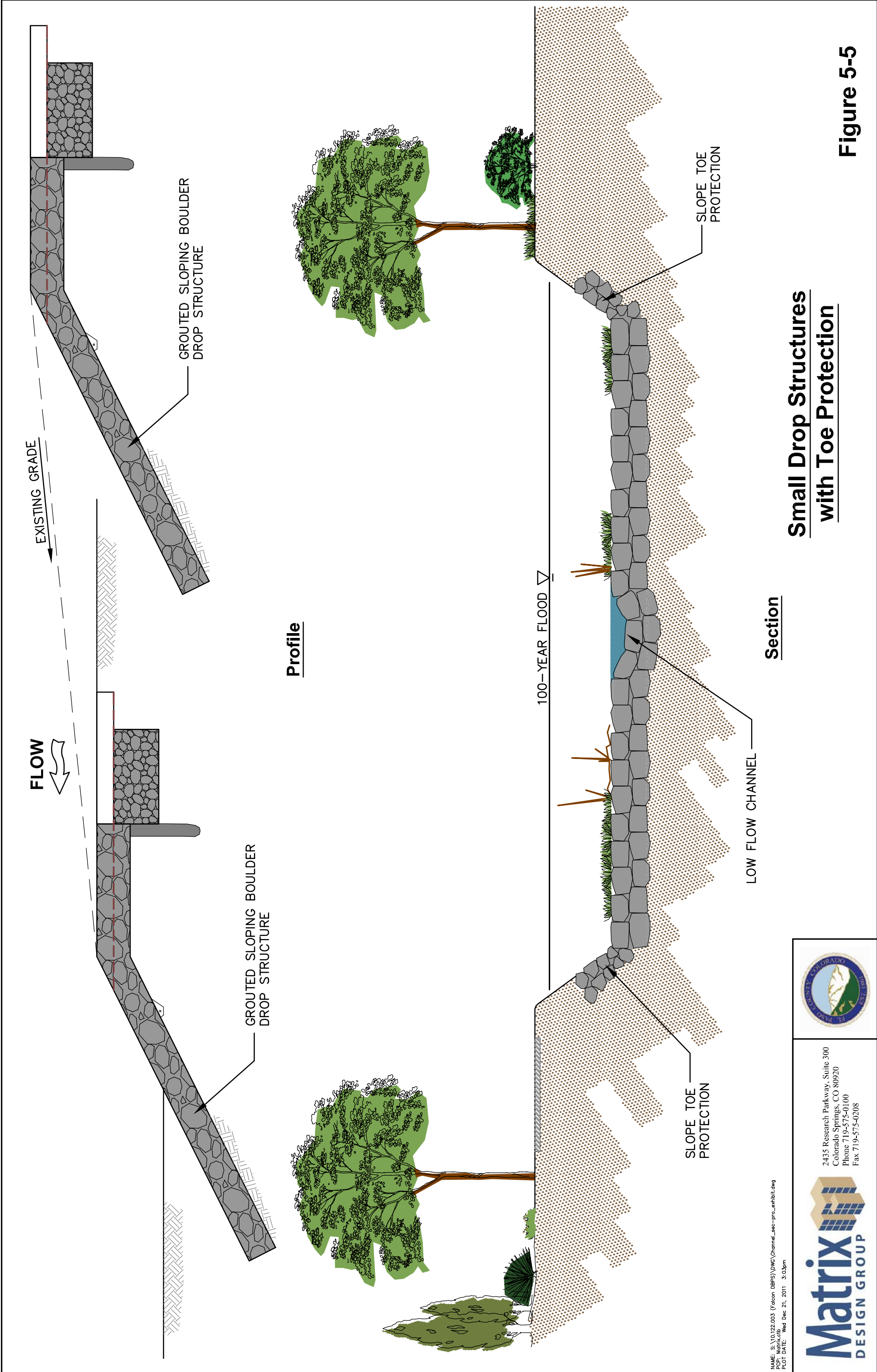
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Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

TYPICAL ROCK CROSS VANE DETAILS
FOR USE IN NATURAL CHANNEL DESIGN REACHES

NOT FOR CONSTRUCTION



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PCP: Matrix.ctb
PLOT DATE: Wed Dec 21, 2011 3:03pm



2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

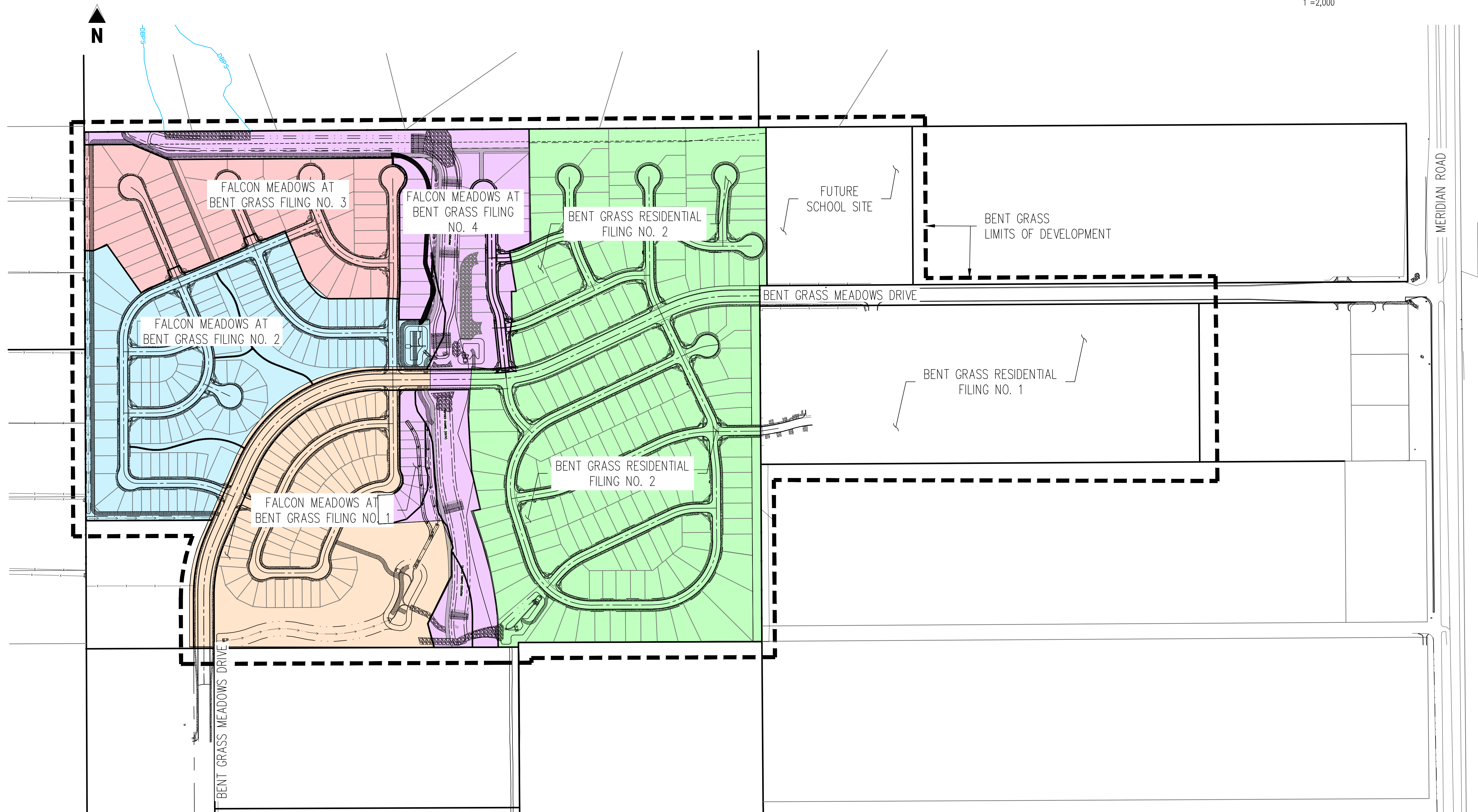


**Small Drop Structures
with Toe Protection**

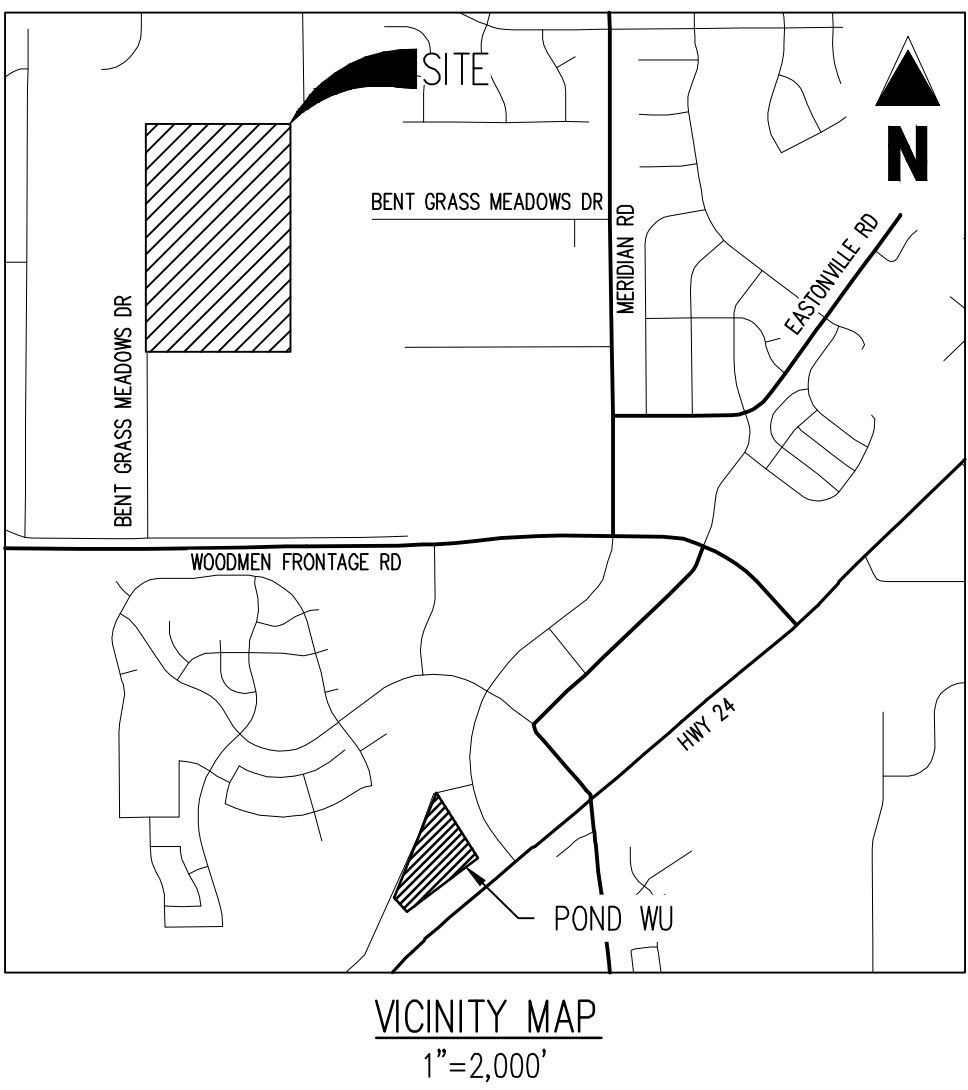
Figure 5-5

APPENDIX D
Drainage Maps

© Challenger Homes, LLC. All Rights Reserved. 06/11/2021. Bent Grass Meadows Drive & Meridian Road. 1"=200'. 06/11/2021.



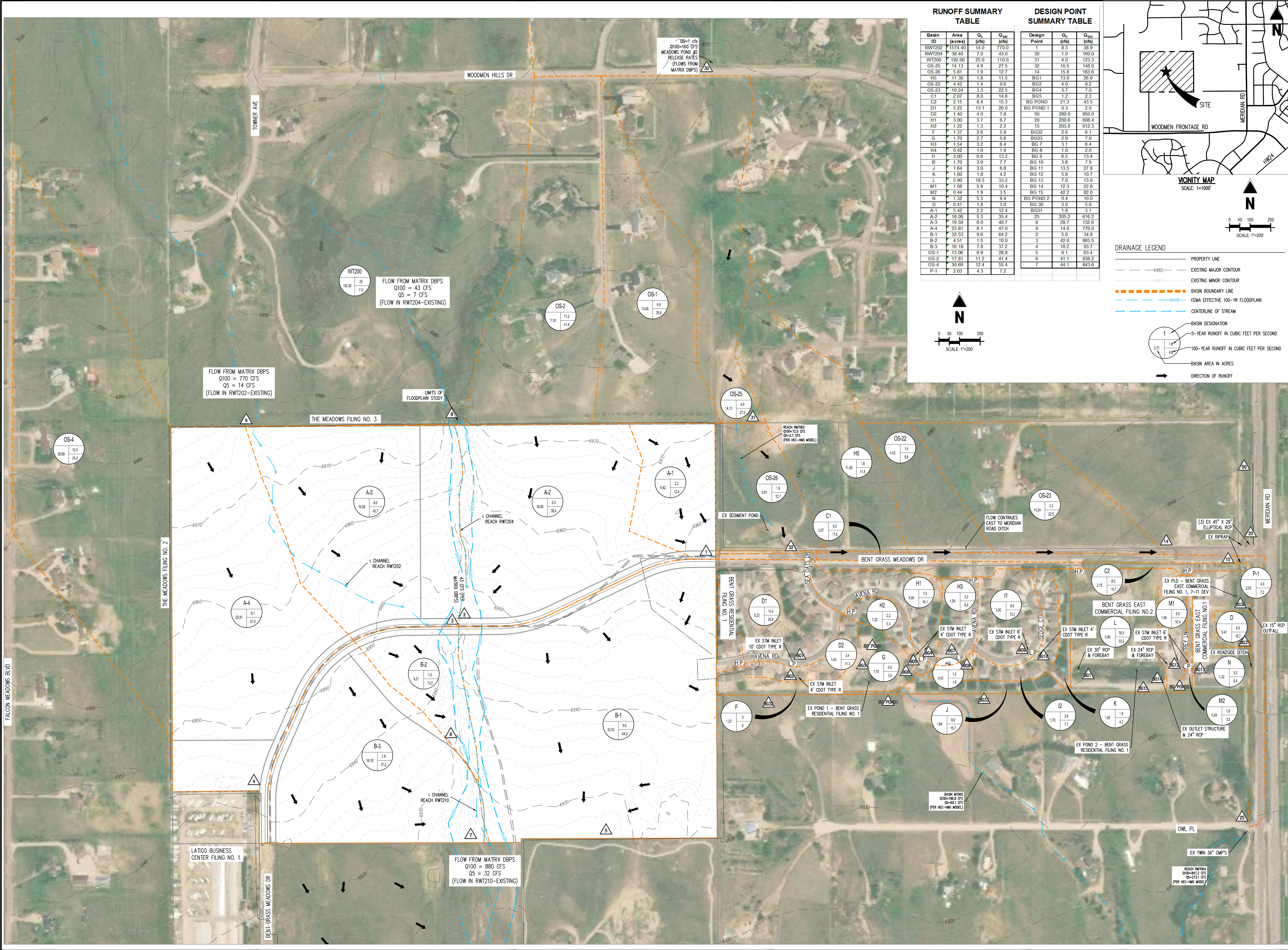
SITE MAP
SCALE: 1"=200'



VICINITY MAP
1"=2,000'

#	Date	Issue / Description	Init.
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Project No:	CLH000017
Drawn By:	CMD
Checked By:	RGD
Date:	06/11/2021



RUNOFF SUMMARY
TABLE

Basin ID	Area (acres)	Q ₂ (cfs)	Q ₁₀₀ (cfs)
RWT204	1574.40	14.0	770.0
RWT204	38.40	7.0	43.0
WT200	192.00	25.0	110.0
OS-25	14.13	4.9	27.5
OS-26	5.81	1.9	12.7
H5	11.30	1.8	11.5
OS-22	4.42	1.4	9.6
OS-23	10.24	3.3	22.5
C1	2.07	8.0	14.6
C2	2.15	8.4	15.3
D1	5.22	13.1	26.0
D2	1.40	4.0	7.8
H1	3.00	3.7	6.7
H2	1.22	1.3	2.2
F	1.37	2.6	5.9
G	1.70	2.7	5.6
H3	1.54	3.2	6.4
H4	0.42	1.0	1.9
I1	3.00	6.6	13.2
I2	1.70	3.9	7.7
J	1.64	3.0	6.8
K	1.00	1.8	4.2
L	5.90	18.5	33.2
M1	1.56	5.9	10.4
M2	0.44	1.9	3.5
N	0.32	5.3	9.4
D	0.41	1.8	3.0
A-1	5.42	2.2	12.4
A-2	18.00	5.3	35.4
A-3	19.59	6.0	40.7
A-4	23.81	8.1	47.0
B-1	32.53	9.6	64.2
B-2	4.51	1.5	10.0
B-3	16.18	7.8	37.2
OS-1	13.06	6.9	28.8
OS-2	17.81	11.2	41.4
OS-4	30.69	12.4	55.4
P-1	2.03	4.3	7.2

DESIGN POINT
SUMMARY TABLE

Design Point	Q ₂ (cfs)	Q ₁₀₀ (cfs)
1	8.3	38.9
30	1.0	160.0
31	4.0	123.3
32	10.5	148.0
14	15.6	163.6
BG1	13.0	26.9
BG2	4.0	8.2
BG4	3.7	7.0
BG5	1.2	2.3
BG POND	21.3	43.5
BG POND 1	0.3	2.9
50	280.0	850.0
20	200.6	608.4
15	203.0	612.3
BG32	2.6	6.1
BG33	2.9	7.0
BG 7	3.1	6.4
BG 8	1.0	2.0
BG 9	6.5	13.4
BG 10	3.8	7.9
BG 11	13.5	27.8
BG 12	5.8	10.7
BG 13	7.0	13.0
BG 14	12.3	22.8
BG 15	42.2	69.0
BG POND 2	0.4	10.0
BG 30	3.0	5.0
BG31	1.8	3.1
25	205.2	616.2
8	28.7	132.6
9	14.0	77.0
2	5.0	34.9
3	42.0	865.5
4	16.2	93.7
5	9.1	63.4
6	41.1	838.2
7	44.1	843.6

VICINITY MAP
SCALE: 1"=1000'

SCALE: 1"=200'

DRAINAGE LEGEND

- PROPERTY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- BASIN BOUNDARY LINE
- FEMA EFFECTIVE 100-YR FLOODPLAIN
- CENTERLINE OF STREAM
- BASIN DESIGNATION
- 5-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- BASIN AREA IN ACRES
- DIRECTION OF RUNOFF

Galloway

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CHALLENGER HOMES

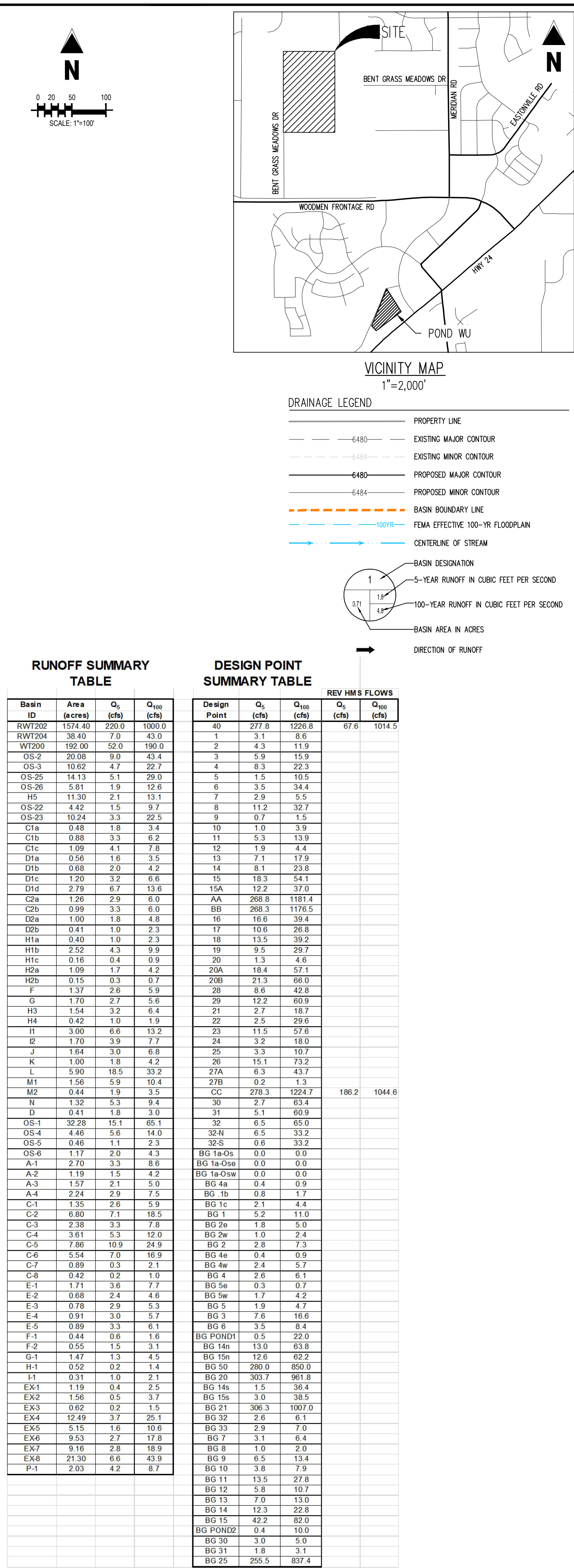
DRAINAGE PLAN
BENT GRASS RESIDENTIAL
FOR
CHALLENGER COMMUNITIES, LLC

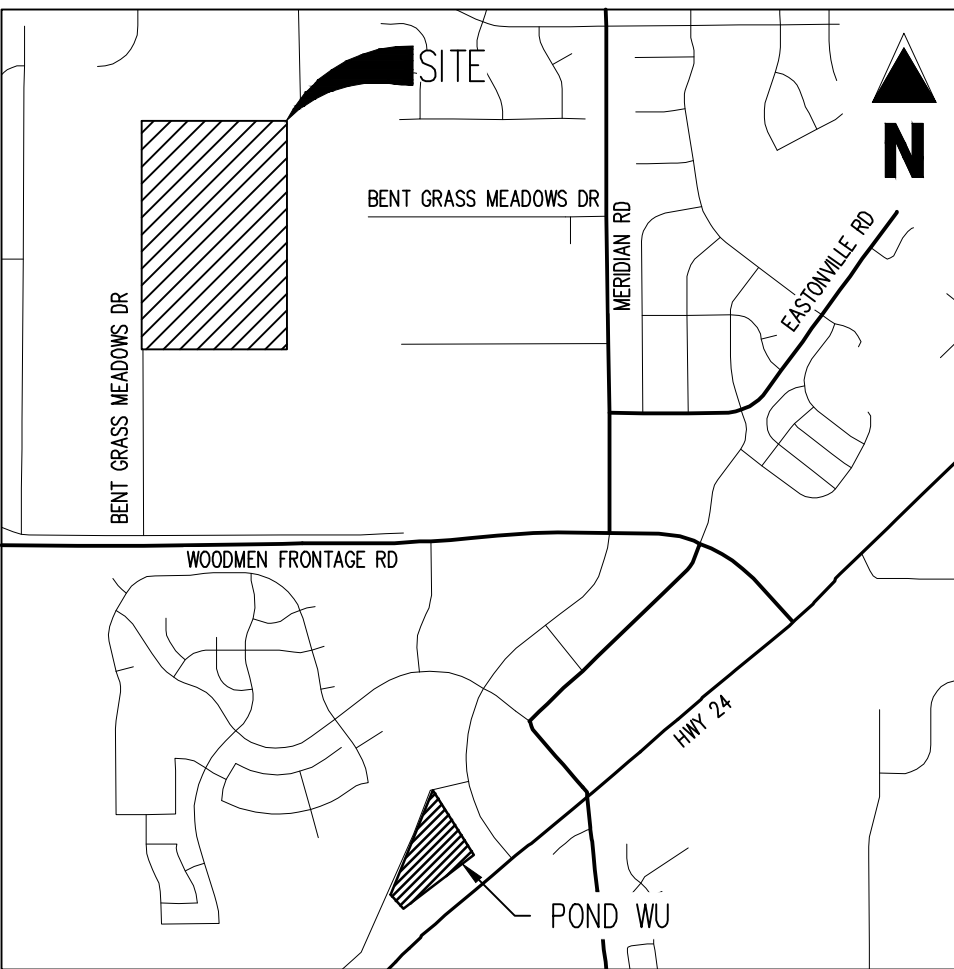
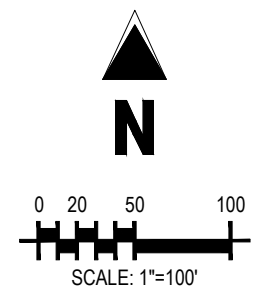
BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD
FALCON, CO - EL PASO COUNTY

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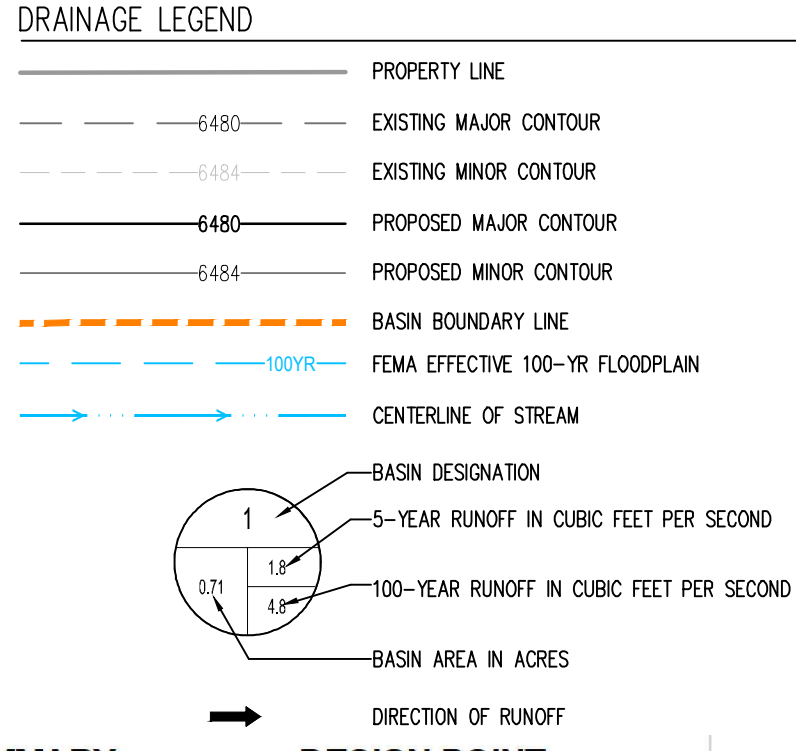
Project No: CLH000014.20
Drawn By: CMWJ
Checked By: SMB
Date: OCTOBER 2019

EXISTING CONDITIONS DRAINAGE MAP





VICINITY MAP
1"=2,000'



RUNOFF SUMMARY
TABLE

Basin ID	Area (acres)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
RWT202	1574.40	220.0	1000.0
RWT204	38.40	7.0	43.0
WT200	192.00	52.0	190.0
OS-2	20.08	9.0	43.4
OS-3	10.62	4.7	22.7
OS-25	14.13	5.1	29.0
OS-26	5.81	1.9	12.6
H5	11.30	2.1	13.1
OS-22	4.42	1.5	9.7
OS-23	10.24	3.3	22.5
C1a	0.48	1.8	3.4
C1b	0.88	3.3	6.2
C1c	1.09	4.1	7.8
D1a	0.56	1.6	3.5
D1b	0.68	2.0	4.2
D1c	1.20	3.2	6.6
D1d	2.79	6.7	13.6
C2a	1.26	2.9	6.0
C2b	0.99	3.3	6.0
D2a	1.00	1.8	4.8
D2b	0.41	1.0	2.3
H1a	0.40	1.0	2.3
H1b	2.52	4.3	9.9
H1c	0.16	0.4	0.9
H2a	1.09	1.7	4.2
H2b	0.15	0.3	0.7
F	1.37	2.6	5.9
G	1.70	2.7	5.6
H3	1.54	3.2	6.4
H4	0.42	1.0	1.9
I1	3.00	6.6	13.2
I2	1.70	3.9	7.7
J	1.64	3.0	6.6
K	1.00	1.8	4.2
L	5.90	18.5	33.2
M1	1.56	5.9	10.4
M2	0.44	1.9	3.5
N	1.32	5.3	9.4
D	0.41	1.8	3.0
OS-1	32.28	15.1	65.1
OS-4	4.46	5.6	14.0
OS-5	0.46	1.1	2.3
OS-6	1.17	2.0	4.3
A-1	2.70	3.3	8.8
A-2	1.19	1.5	4.2
A-3	1.57	2.1	5.0
A-4	2.24	2.9	7.5
C-1	1.35	2.6	5.9
C-2	6.80	7.1	18.5
C-3	2.38	3.3	7.8
C-4	3.61	5.3	12.0
C-5	7.86	10.9	24.3
C-6	5.54	7.0	18.9
C-7	0.89	0.3	2.1
C-8	0.42	0.2	1.0
E-1	1.71	3.6	7.7
E-2	0.68	2.4	4.6
E-3	0.78	2.9	5.3
E-4	0.91	3.0	5.7
E-5	0.89	3.3	6.1
F-1	0.44	0.6	1.6
F-2	0.55	1.5	3.1
G-1	1.47	1.3	4.5
H-1	0.52	0.2	1.4
I-1	0.31	1.0	2.1
EX-1	1.19	0.4	2.5
EX-2	1.56	0.5	3.7
EX-3	0.62	0.2	1.5
EX-4	12.49	3.7	25.1
EX-5	5.15	1.6	10.6
EX-6	9.53	2.7	17.8
EX-7	9.16	2.8	18.9
EX-8	21.30	6.6	43.9
P-1	2.03	4.2	8.7

DESIGN POINT
SUMMARY TABLE

Design Point	Q ₅ (cfs)	Q ₁₀₀ (cfs)	REV HMS FLOWS	Q ₅ (cfs)	Q ₁₀₀ (cfs)
40	277.8	1226.8			
1	3.1	8.6			
2	4.3	11.9			
3	5.9	15.9			
4	8.3	22.3			
5	1.5	10.5			
6	3.5	34.4			
7	2.9	5.5			
8	11.2	32.7			
9	0.7	1.5			
10	1.0	3.9			
11	5.3	13.9			
12	1.9	4.4			
13	7.1	17.9			
14	8.1	23.8			
15	18.3	54.1			
15A	12.2	37.0			
AA	288.8	1141.4			
BB	288.3	1176.5			
16	16.6	39.4			
17	10.6	26.8			
18	13.5	39.2			
19	9.5	29.7			
20	1.3	4.6			
20A	18.4	57.1			
20B	21.3	66.0			
28	8.6	42.8			
29	12.2	60.9			
21	2.7	18.7			
22	2.5	29.6			
23	11.5	57.6			
24	3.2	18.0			
25	3.3	10.7			
26	15.1	73.2			
27A	6.3	43.7			
27B	0.2	1.3			
CC	278.3	1224.7			
30	2.7	63.4			
31	5.1	60.9			
32	6.5	65.0			
32N	6.5	33.2			
32S	0.6	33.2			
BG 1a-0s	0.0	0.0			
BG 1a-0se	0.0	0.0			
BG 1a-0sw	0.0	0.0			
BG 4a	0.4	0.9			
BG 1b	0.8	1.7			
BG 1c	2.1	4.4			
BG 1	5.2	11.0			
BG 2e	1.8	5.0			
BG 2w	1.0	2.4			
BG 2	2.8	7.3			
BG 4e	0.4	0.9			
BG 4w	2.4	5.7			
BG 4	2.6	6.1			
BG 5e	0.3	0.7			
BG 5w	1.7	4.2			
BG 5	1.9	4.7			
BG 3	7.6	16.6			
BG 6	3.5	8.4			
BG POND1	0.5	22.0			
BG 14m	13.0	63.8			
BG 15m	12.6	62.2			
BG 50	280.0	850.0			
BG 20	303.7	961.8			
BG 14s	1.5	36.4			
BG 15s	3.0	38.5			
BG 21	306.3	1007.0			
BG 32	2.6	6.1			
BG 33	2.9	7.0			
BG 7	3.1	6.4			
BG 9	1.0	2.2			
BG 9	6.5	13.4			
BG 10	3.8	7.9			
BG 11	13.5	27.8			
BG 12	5.8	10.7			
BG 13	7.0	13.0			
BG 14	12.3	22.8			
BG 15	42.2	82.0			
BG POND2	0.4	10.0			
BG 30	3.0	5.0			
BG 31	1.9	3.1			
BG 25	255.5	837.4			

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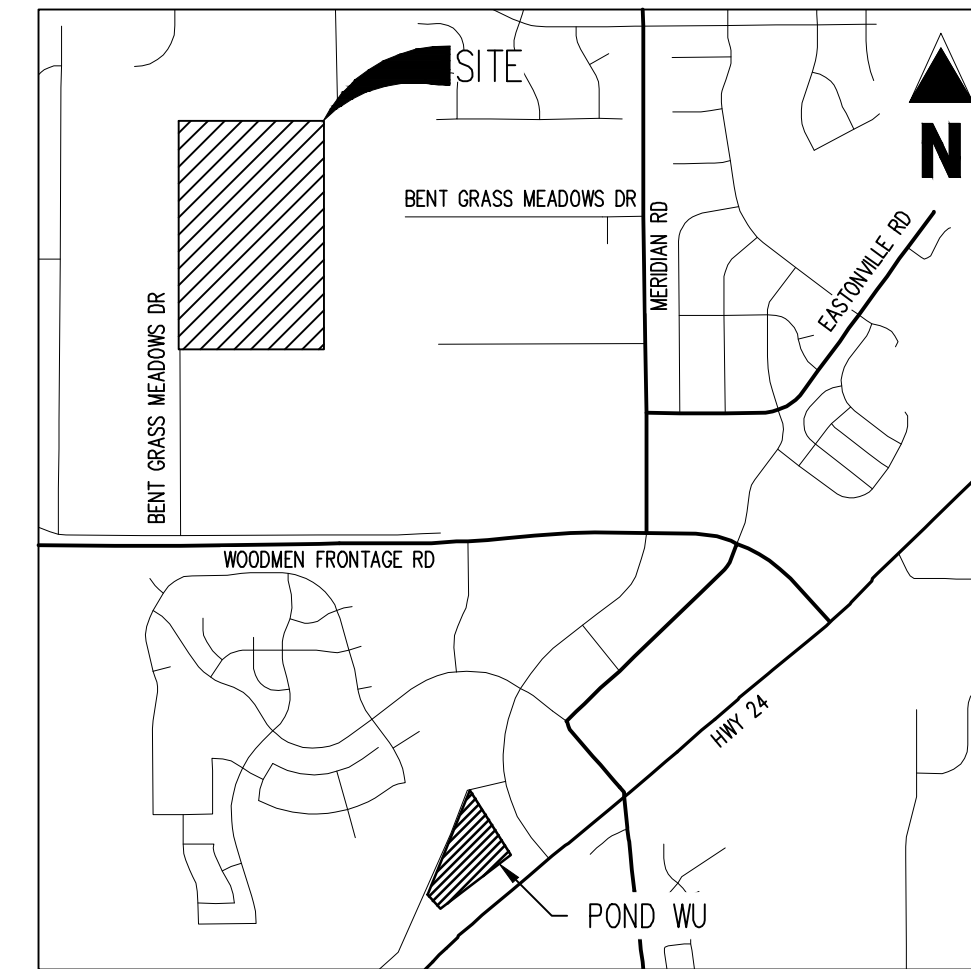
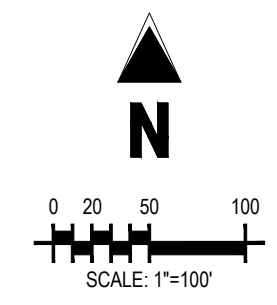
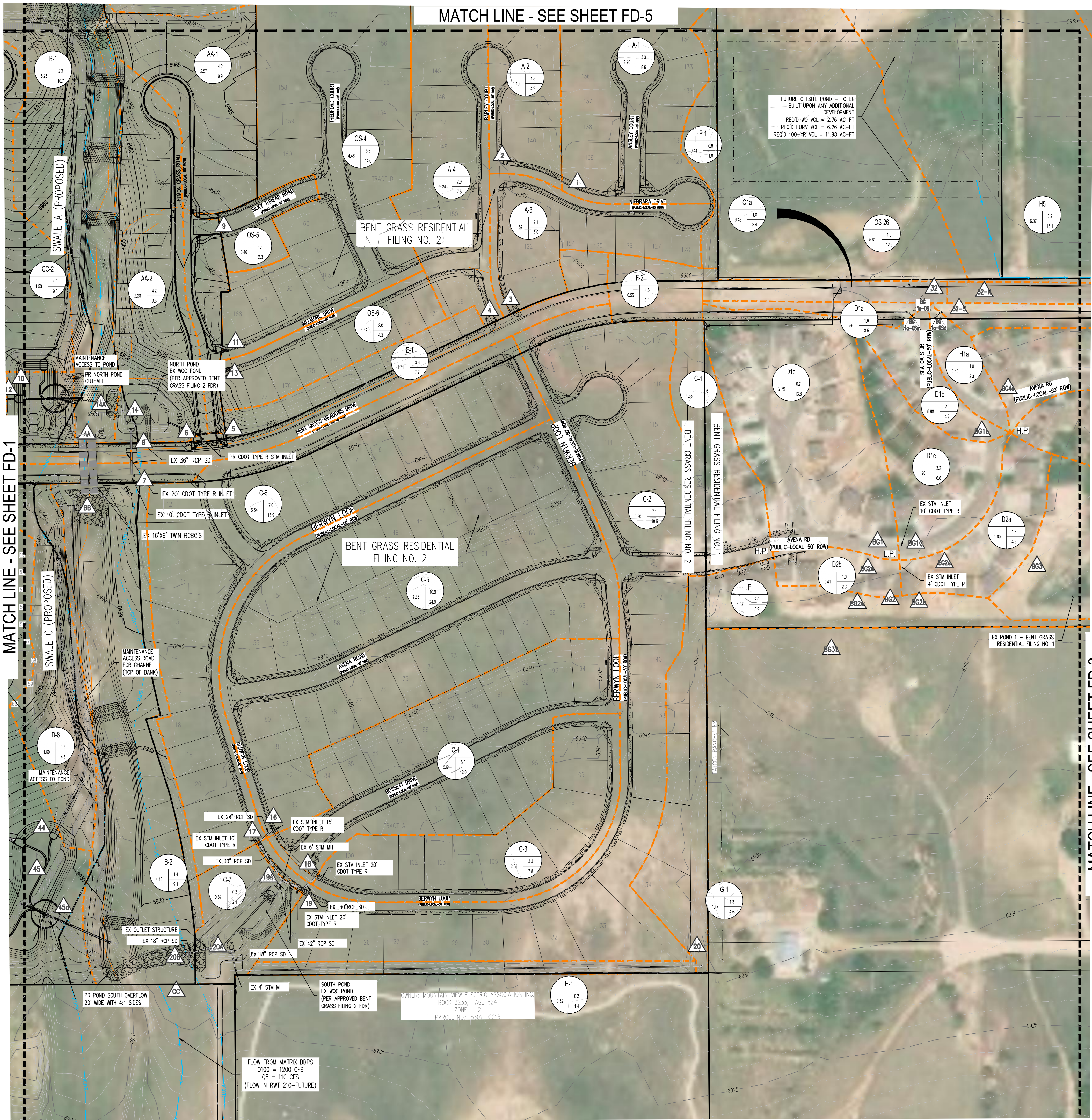
CHALLENGER
HOMES

MASTER DRAINAGE DEVELOPMENT PLAN
FALCON MEADOWS AT BENT GRASS
FOR
CHALLENGER COMMUNITIES, LLC
BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD
FALCON, CO 80831 - EL PASO COUNTY

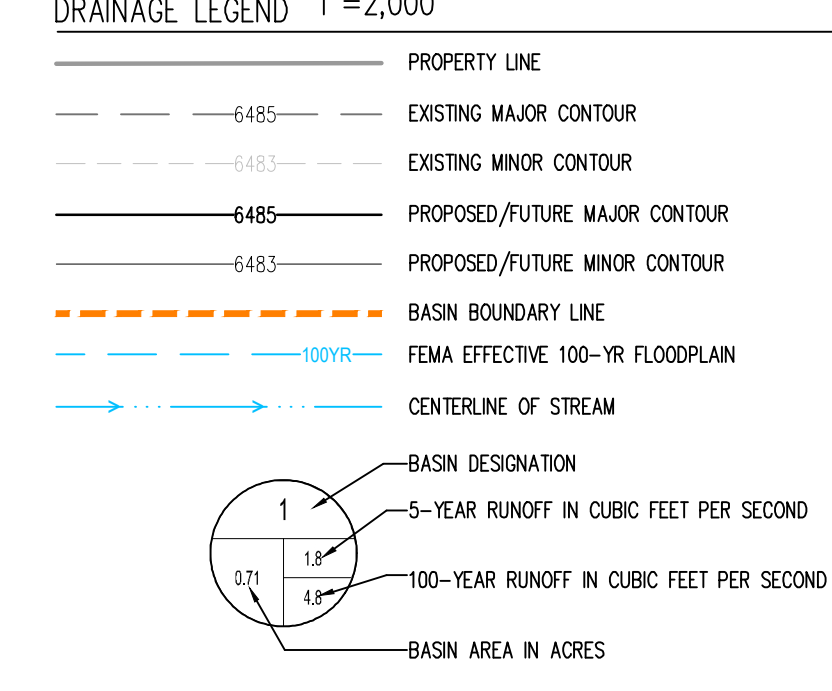
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Project No: CLH000014.20-
Drawn By: CMWJ
Checked By: SMB
Date: OCTOBER 2019

CURRENT CONDITIONS DRAINAGE MAP



VICINITY MAP
DRAINAGE LEGEND 1"=2,000'



RUNOFF SUMMARY
TABLE

Basin ID	Area (acres)	Q ₂ (cfs)	Q ₁₀₀ (cfs)
RWT202	1574.40	220.0	1000.0
RWT204	38.40	7.0	43.0
WT200	192.00	52.0	190.0
OS-2	20.08	9.0	43.4
OS-3	10.62	4.7	22.7
OS-25	18.74	6.3	35.6
OS-26	5.81	1.9	12.6
H5	6.37	3.2	15.1
OS-22	4.42	1.5	9.7
OS-23	10.24	3.3	22.5
C1a	0.48	1.8	3.4
C1b	0.88	3.3	6.2
C1c	1.09	4.1	7.8
D1a	0.56	1.6	3.5
D1b	0.68	2.0	4.2
D1c	1.20	3.2	6.6
D1d	2.79	6.7	13.6
C2a	1.26	2.9	6.0
C2b	0.99	3.3	6.0
D2a	1.00	1.8	4.8
D2b	0.41	1.0	2.3
H1a	0.40	1.0	2.3
H1b	2.52	4.3	9.9
H1c	0.16	0.4	0.9
H2a	1.09	1.7	4.2
H2b	0.15	0.3	0.7
F	1.37	2.6	5.9
G	1.70	2.7	5.6
H3	1.54	3.2	6.4
H4	0.42	1.0	1.9
I1	3.00	6.6	13.2
I2	1.70	3.9	7.7
J	1.64	3.0	6.8
K	1.00	1.8	4.2
L	5.90	18.5	33.2
M1	1.56	5.9	10.4
M2	0.44	1.9	3.5
N	1.32	5.3	9.4
D	0.41	1.8	3.0
OS-1	33.07	15.5	68.7
OS-4	4.46	5.6	14.0
OS-5	0.46	1.1	2.3
OS-6	1.17	2.0	4.3
A-1	2.70	3.3	8.6
A-2	1.19	1.5	4.2
A-3	1.57	2.1	5.0
A-4	2.24	2.9	7.5
C-1	1.35	2.6	5.9
C-2	6.80	7.1	18.5
C-3	2.38	3.3	7.8
C-4	3.61	5.3	12.0
C-5	7.86	10.9	24.9
C-6	5.54	7.0	16.9
C-7	0.89	0.3	2.1
E-1	1.71	3.6	7.7
E-2	0.68	2.4	4.6
E-3	0.78	2.9	5.3
E-4	0.91	3.0	5.7
E-5	0.89	3.3	6.1
F-1	0.44	0.6	1.6
F-2	0.55	1.5	3.1
G-1	1.47	1.3	4.5
H-1	0.52	0.2	1.4
L-1	0.31	1.0	2.1
AA-1	2.57	4.2	9.9
AA-2	2.28	4.2	9.3
B-1	5.25	2.3	10.7
B-2	4.16	1.4	9.1
CC-1	9.07	16.9	38.0
CC-2	1.53	4.6	9.8
CC-3	1.88	6.4	12.1
CC-4	3.64	6.2	16.0
CC-5	0.45	0.2	1.4
D-1	9.07	11.2	28.6
D-2	7.42	15.5	32.2
D-3	2.03	0.8	2.3
D-4	4.38	7.8	16.6
D-5	1.08	2.2	4.6
D-6	4.01	8.2	17.2
D-7	6.39	3.2	14.8
D-8	1.69	1.3	4.5
P-1	2.03	4.2	8.7

DESIGN POINT
SUMMARY TABLE

Design Point	Q ₂ (cfs)	Q ₁₀₀ (cfs)	Q ₂ (cfs)	Q ₁₀₀ (cfs)
40	278.1	1227.8	181.4	1029.1
1	3.1	8.6		
2	4.3	11.9		
3	5.9	15.9		
4	8.3	22.3		
9	1.1	2.4		
11	6.0	15.5		
13	7.6	19.0		
5	10.9	27.1		
6	4.1	9.4		
7	2.9	5.5		
8	20.0	50.5		
12	4.6	10.2		
15	20.9	45.4		
10	23.9	52.7		
10A	6.0	21.9		
14	33.0	81.1		
14A	12.2	37.0		
AA	270.3	1188.7		
BB	269.5	1188.4		
16	16.6	39.4		
17	10.6	26.8		
18	13.5	39.2		
19	9.5	29.7		
20	1.3	4.6		
20A	18.4	57.1		
20B	21.3	66.0		
28	8.6	42.8		
29	12.2	60.9		
21	15.0	32.5		
22	10.5	26.0		
23	12.2	59.7		
24	2.1	15.9		
25	3.3	10.7		
26	8.0	41.7		
42	7.5	16.5		
43	10.0	21.8		
44	1.2	4.5		
45	53.8	173.9		
45A	1.1	45.8		
CC	268.2	1183.4	191.9	1075.3
30	2.1	63.5		
31	5.8	67.4		
32	4.9	34.5		
32A	4.9	33.2		
32A-S	12.5	3.6		
BG 1a-Ob	0.0	0.0		
BG 1a-Ofsw	0.0	0.0		
BG 1a-Ofsw	0.0	0.0		
BG 4a	0.6	1.5		
BG 1b	1.3	2.8		
BG 1c	3.3	7.1		
BG 1	8.3	17.6		
BG 2a	1.8	5.0		
BG 2w	1.0	2.4		
BG 2	2.8	7.3		
BG 4e	0.4	0.9		
BG 4w	3.8	9.0		
BG 4	4.0	9.5		
BG 4e	0.3	0.7		
BG 5w	1.7	4.2		
BG 5	1.9	4.7		
BG 3	16.2	58.7		
BG 16	5.4	13.2		
BG POND1	0.3	2.9		
BG 14n	9.2	42.7		
BG 15n	8.8	40.9		
BG 50	280.0	850.0		
BG 20	292.5	999.3		
BG 14s	15.0	7.8		
BG 15s	16.8	12.4		
BG 21	304.6	915.3		
BG 32	2.6	6.1		
BG 33	2.9	7.0		
BG 7	3.1	6.4		
BG 9	6.5	13.4		
BG 8	1.0	2.0		
BG 13	7.0	13.0		
BG 10	3.8	7.9		
BG 11	13.5	27.8		
BG 12	5.8	10.7		
BG 14	12.3	22.8		
BG 15	42.2	82.0		
BG POND2	0.4	10.0		
BG 30	3.0	5.0		
BG 31	1.6	3.1		
BG 25	252.0	751.4		

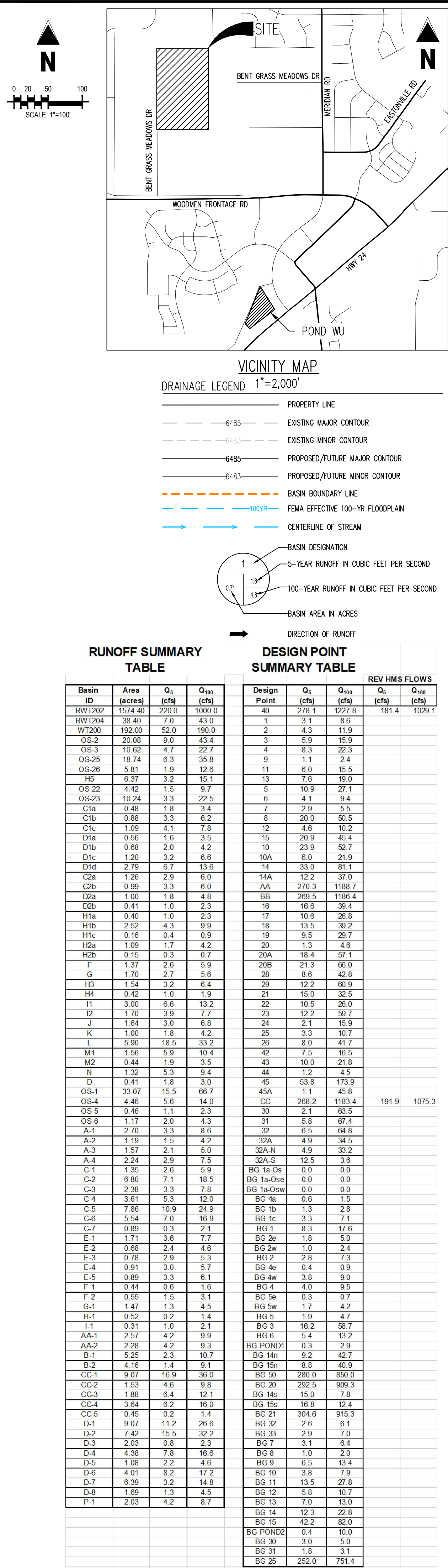
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CHALLENGER
HOMES

MASTER DRAINAGE DEVELOPMENT PLAN
FALCON MEADOWS AT BENT GRASS
FOR
CHALLENGER COMMUNITIES, LLC
BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD
FALCON, CO 80831 - EL PASO COUNTY

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FUTURE CONDITIONS DRAINAGE MAP



Galloway

1155 Kelly Johnson Blvd., Suite 305
Colorado Springs, CO 80920
719.900.7220
GallowayUS.com

CHALLENGER HOMES

MASTER DRAINAGE DEVELOPMENT PLAN
FALCON MEADOWS AT BENT GRASS
FOR
CHALLENGER COMMUNITIES, LLC

BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD
FALCON, CO 80831 - EL PASO COUNTY

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CHALLENGER
HOMES

MASTER DRAINAGE DEVELOPMENT PLAN
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Project No: CLH000014.20-
Drawn By: CMWJL
Checked By: SMB
Date: OCTOBER 2019

SPLIT FLOW EXHIBIT
BENT GRASS RES FILING NO. 1

EXH-1

Sheet 1 of 1

