



INNOVATIVE DESIGN. CLASSIC RESULTS.

**FINAL DRAINAGE REPORT FOR
FOOTHILLS FARM CAMPUS
FILING NO. 2
AMENDMENT TO MASTER DEVELOPMENT DRAINAGE
PLAN FOR MARKETPLACE AT INTERQUEST AND FINAL
DRAINAGE REPORT FOR MARKETPLACE AT
INTERQUEST FILING NO. 1 AND FILING NO. 2**

Prepared for:
ALLISON VALLEY DEVELOPMENT COMPANY, LLC
1755 TELSTAR DRIVE, SUITE 211
COLORADO SPRINGS, CO 80920
(719) 867-2279

Job no. 2399.86



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FINAL DRAINAGE REPORT FOR FOOTHILLS FARM CAMPUS FILING NO. 2

Engineer's Statement

This report and plan for the drainage design of **Foothills Farm Campus Filing No. 2** was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Design and Technical Criteria and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal):


Catherine M. Tessin, Colorado P.E. No. 45004

6/27/19
Date

Developer's Statement

Allison Valley Development Company, LLC hereby certifies that the drainage facilities for **Foothills Farm Campus Filing No. 2** shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of **Foothills Farm Campus Filing No. 2**, guarantee that final drainage design review will absolve **Allison Valley Development Company, LLC**, and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Allison Valley Development Co., LLC a Colorado Limited Liability Company
Name of Developer


Authorized Signature

6/26/19
Date

Steve Rossoll
Printed Name

Director of Development
Title

La Plata Communities, Inc. A Colorado Corporation, Manager
Title

1755 Telstar Drive, Suite 211, Colorado Springs, CO 80920
Address:

Address:

1755 Telstar Drive, Suite 211, Colorado Springs, CO 80920
Address:

Address:

City of Colorado Springs Statement:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.



For City Engineer

Conditions:

07/08/2019

Date



GENERAL DESCRIPTION

Foothills Farm Campus Filing No. 2 is a 42.890-acre site located in Sections 17, 18, 19, and 20, Township 12 South, Range 66 West of the Sixth Principal Meridian in the City of Colorado Springs, County of El Paso, State of Colorado. The site is bound on the south by existing Marketplace at Interquest retail development and Federal Drive, to the west by existing USAFA vacant property and Interstate 25, and to the east Black Squirrel Creek. This site includes a platted lot, public street right of way, and tracts to support the proposed Ent Credit Union headquarters office campus development within the previously approved Marketplace at Interquest PUD plan (see Appendix).

The average soil condition reflects Hydrologic Group "B" (Stapleton Sandy Loam) and Hydrologic Group "A" (Blakeland Loamy Sand) as determined by the "Soil Survey of El Paso County Area," prepared by the Web Soil Survey (NRCS). (See map in Appendix).

This site is not impacted by the City Streamside overlay zone.

EXISTING DRAINAGE CONDITIONS

The site is located within the Black Squirrel Drainage Basin, which stretches from the Black Forest, across Hwy. 83 and into the Air Force Academy property. Currently, an existing box culvert conveys flows under Voyager Parkway. This Basin has been previously studied by the URS Corporation in the approved "Black Squirrel Creek Drainage Basin Planning Study" (1989). The historic flows from The Farm currently drain either directly into Black Squirrel Creek or in a westerly direction into Air Force Academy property. The flows are then directed north and south to the existing I-25 bridge structure.

The overall Farm (including Foothills Farm Campus) property has been previously studied in numerous reports as referenced within the most recent "Allison Valley Master Development Drainage Plan Update," prepared by Kiowa Engineering Corporation, dated December 2011. This MDDP Update was provided to accompany a concurrent Master Plan update at that time.

The Kiowa MDDP update outlines the requirements for The Farm's proposed drainage patterns, outfall locations, and regional detention facility locations as they relate to the existing Black Squirrel Creek and Middle Tributary Basin corridor. Regional Detention and Stormwater Quality Facility outfall locations have been established schematically with the approved MDDP and the USFWS "Biological Assessment and Habitat Mitigation Plan for Allison Valley Project, Colorado Springs, Colorado", prepared by Walsh Environmental Scientists and Engineers, dated May 2007.

The Kiowa MDDP outlines the need to provide Full Spectrum detention pond sizing, which will meet USAFA release rate criteria, will provide for a 72-hour drain time for the public regional stormwater facilities, as well as incorporate Water Quality Capture Volume.

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Historically, this site drains in a northerly direction with slopes ranging from 2% to 33%. The site is currently being overlotted with the previously approved Drainage Memo for Foothills Farm Campus Filing No. 2 – Overlot Grading. This site has also been previously studied as part of the “Master Development Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2,” prepared by Classic Consulting Engineers & Surveyors, approved August 2007.

The subject site was studied as a commercial/retail land use within the previously approved Marketplace at Interquest MDDP, as attached in the Developed Conditions Drainage Map in the Appendix. Please reference this map as the existing conditions map for the subject site. The proposed site development matches the land use, grading configuration, and outfall locations assumed in the Marketplace MDDP, also matching “C” values for developed conditions.

Ultimately, flows from the Marketplace MDDP basins tributary to Black Squirrel Drainage Basin will be conveyed to the proposed BS-3 Full Spectrum Public Regional Facility (Pond G) or to Full Spectrum Public Regional Facility (Pond D). The proposed pond is shown on the approved MDDP developed conditions Drainage Map (see Appendix). In the interim, developed drainage flows tributary to the subject site are being treated in the existing temporary BS-3T pond is still in place as shown on the attached Marketplace interim MDDP Drainage Map.

The Marketplace MDDP Developed Conditions and Interim Conditions drainage map has been included in the Appendix for reference and serves as the “Existing Conditions” map for this site. This map has been marked to show the similar tributary areas for the subject site. While the tributary areas are similar, used commercial “C” land use values, runoff rates and followed very similar outfall routes, this Marketplace MDDP assumed Detention Pond locations in areas slightly different than the proposed condition.

The Marketplace MDDP assumed a BS-2 and a BS-3 Tributary area for each respective Detention Pond. The closely correspond to the proposed subject site in area, land use, and “C” values. See included text in the Appendix of this report for the listing of areas, flows, and basin description of each area tributary to Pond BS-2 and Pond BS-3. These ponds are now being design as Ponds G (in place of BS-3) and Pond D (in place of BS-2). The concept and outfall patterns are similar in intent; however the Ponds will meet current Full Spectrum Detention criteria.

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Pond BS-2: Total acreage of 37.2 acres per the Marketplace MDDP is accumulated from Basins BS-2A, BS-2B, BS-2C, BS-2D, BS-2E for a total inflow developed of $Q_5 = 90.18$ cfs, $Q_{100} = 166.54$ cfs. See Map and text in appendix for acreages and flow rates assumed from each basin. As proposed, this tributary area will now be served by proposed Full Spectrum Detention Facility Pond D, total tributary area of 39.60 acres commercial land use with total inflow of $Q_5 = 110$ cfs, $Q_{100} = 203$ cfs.

Pond BS-3 Total acreage of 74.2 acres per the Marketplace MDDP is accumulated from Basins BS-3A, BS-3B, BS-3C, BS-3D, BS-3E, BS-3F, and BS-3G for a total inflow developed of $Q_5 = 197.70$ cfs, $Q_{100} = 366.68$ cfs. See Map and text in appendix for acreages and flow rates assumed from each basin. As proposed, this tributary area will now be served by proposed Full Spectrum Detention Facility Pond G, total tributary area of 69.64 acres commercial land use with total inflow of $Q_5 = 162$ cfs, $Q_{100} = 306$ cfs.

As shown in the enclosed Developed Conditions Drainage Maps, the tributary acre is nearly the same, and the assumed land uses are similar. The split of flows to the proposed Detention facilities has been updated to match the proposed land use and Development Plan. Final flow calculations for these basins follow, along with an updated description of the current detention requirements for the allowable release rates for the full spectrum detention facilities.

The presence of the Preble's Meadow Jumping Mouse and wetlands within the Black Squirrel Tributary adjacent to the subject site have required coordination with the Environmental Protection Agency, the U.S. Army Corps of Engineers, U.S. Fish and Wildlife and the Colorado Division of Wildlife. In addition, due to the proximity of the Air Force Academy, drainage requirements of the Air Force Academy were taken into account.

PROPOSED DRAINAGE CONDITIONS

Developed runoff from Foothills Farm Campus Filing No. 2 development will be conveyed generally to the north in accordance with the previously approved reports, and approved Marketplace at Interquest MDDP. Stormwater will be routed into public and private RCP storm outfall extensions. Proposed development matches the commercial/retail land use and associated "C" values and time of concentration rates previously assumed in the approved Marketplace at Interquest MDDP, therefore proposed drainage conditions described herein closely match developed flowrates and outfall points in conformance with the approved MDDP. Comparison of total developed stormwater rates closely match those anticipated within the approved MDDP. As a function of the PUD site plan layout and stormwater drainage outfall from the subject site to Black Squirrel Creek, the proposed Full Spectrum



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Pond D (formerly labeled BS-2 on the MDDP map) has been relocated to the north adjacent to Black Squirrel Creek. For purposes of ensuring adequate tributary basin calculations for the proposed Full Spectrum Ponds G and D, all tributary basins are shown in the calculations and on the Developed Conditions Drainage Map. A detailed description of the developed flows is as follows:

Design Point 1 ($Q_5 = 78$ cfs, $Q_{100} = 143$ cfs) is composed of development area from Basin A and B. Basin A (15.98 acres) is the currently proposed Springs at Foothills Farm Filing No. 1 Apartments site. Basin B (7.42 acres) is unimproved and assumed commercial/retail use per the MDDP. Total flows are routed to the intersection of existing Federal Drive and Summit View Parkway. Stormwater is routed ultimately to the proposed Regional Full Spectrum Facility Pond D.

Design Point 2 ($Q_5 = 23$ cfs, $Q_{100} = 43$ cfs) is composed of asphalt parking and landscaping within Basin C. Basin C (7.73 acres) is the tributary area of Federal Drive at Summit View Parkway. Existing Public storm facilities will combine with stormwater from Design Point 1. A proposed 60" public RCP storm pipe (Pipe Run 1) will convey stormwater to proposed Public Full Spectrum Detention (FSD) Pond D.

Design Point 3 ($Q_5 = 18$ cfs, $Q_{100} = 34$ cfs) is composed of Basins D and E. Basin D (3.18 acres) is the currently proposed Foothills Farm Campus Filing No. 1 office site. Basin E (1.18 acres) is unimproved and assumed commercial/retail use per the MDDP. Total flows are routed in Pipe 2 (30" private storm) to the intersection at Summit View Parkway. Pipe Run 3, a proposed 60" public storm conveys stormwater to the proposed Public Regional FSD Pond D.

Design Point 4 ($Q_5 = 8$ cfs, $Q_{100} = 15$ cfs) is an area of future commercial development from Basin Q. Basin Q (1.99 acres) is unimproved and assumed commercial/retail use per the MDDP. Total flows are routed in Pipe 4, a proposed 60" public storm that conveys flow to the proposed Public Regional FSD Pond D.

Design Point 5 ($Q_5 = 10$ cfs, $Q_{100} = 17$ cfs) is an area of future commercial development from Basin K and L. Basin K (1.16 acres) and Basin L (1.12 acres) are unimproved and assumed commercial/retail use per the MDDP. Total flows are routed in Pipe 9, a proposed 24" private storm that conveys flow to the proposed Public Regional FSD Pond G.

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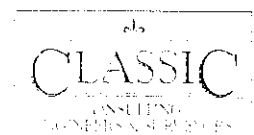
Pipe 9 combines with downstream tributary flows from Basins F, G, H, I and J. These basins are shown on the attached Developed Drainage Map and are part of the approved Marketplace at Interquest commercial /retail area as accounted for in the approved MDDP. The stormwater was assumed in the MDDP as commercial/retail land use, and had adequately assumed "C" values and runoff rates appropriate for the currently developed land use. These basins have been shown for reference to substantiate the sizing and tributary area calculations of the proposed Public Full Spectrum Detention Pond G (listed in the MDDP as Pond BS-3). Total flow from these areas are reflected at Pipe Run 8, $Q_5 = 92$ cfs, $Q_{100} = 168$ cfs at the exit at Existing Great Wolf Lodge. A proposed public 54" storm pipe has been extended at this location and will combine with Pipe 9. Pipe 10, a proposed 60" public storm pipe, conveys stormwater to the north, directing drainage to the proposed Public Regional FSD Pond G.

Design Point 6 ($Q_5 = 12$ cfs, $Q_{100} = 22$ cfs) is an area of future commercial development from Basin M. Basin M (3.07 acres) is unimproved and assumed commercial/retail use per the MDDP. Total flows are routed in Pipe 11, a proposed 30" private storm stub that combines with downstream public storm main. Flows are routed in Pipe 12, a proposed public 60" storm pipe, ultimately directing drainage to the proposed Public Regional FSD Pond G.

Design Point 7 ($Q_5 = 12$ cfs, $Q_{100} = 21$ cfs) consists of developed drainage from Basins N, P3, P4 and half of Basin O. Basin N (1.23 acres) is the proposed private Ent Parkway drive aisle, Basin P3 (0.72 acres) and P4 (0.32 acres) are parking and landscaping areas supporting the Ent office use. Basin O (1.91 acres total) is the public Summit View Parkway right of way. Total flows are routed to Design Point 7, a proposed 8' private D10R inlet. Intercepted flows are conveyed in Pipe 16, a proposed 30" private storm pipe. Flows are ultimately routed to the proposed Public Regional FSD Pond G.

Design Point 8 ($Q_5 = 5$ cfs, $Q_{100} = 9$ cfs) consists of developed drainage from Basins P5 and half of Basin O. Basin P5 (0.39 acres) is the proposed parking and landscaping areas supporting the Ent office use. Basin O (1.91 acres total) is the public Summit View Parkway right of way. Total flows are routed to Design Point 8, a proposed 6' private D10R inlet. Intercepted flows are conveyed in Pipe 17, a proposed 30" private storm pipe. Flows are ultimately routed to the proposed Public Regional FSD Pond G.

Design Point 9 ($Q_5 = 4$ cfs, $Q_{100} = 7$ cfs) consists of developed drainage from Basin P1. Basin P1 (0.88 acres) is the proposed parking and landscaping areas supporting the Ent office use. Flows are routed to Design Point 9, a proposed 4' private D10R inlet. Intercepted flows are conveyed in Pipe 13, a proposed 24" private storm pipe. Flows are ultimately routed to the proposed Public Regional FSD Pond G.



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Design Point 10 ($Q_5 = 3$ cfs, $Q_{100} = 5$ cfs) consists of developed drainage from Basin P2. Basin P2 (0.66 acres) is the proposed parking and landscaping areas supporting the Ent office use. Flows are routed to Design Point 10, a proposed 4' private D10R inlet. Intercepted flows are conveyed in Pipe 14, a proposed 18" private storm pipe. Flows are ultimately routed to the proposed Public Regional FSD Pond G.

Design Point 11 ($Q_5 = 4$ cfs, $Q_{100} = 8$ cfs) consists of developed drainage from Basin P6. Basin P6 (1.03 acres) is the proposed parking and landscaping areas supporting the Ent office use. Flows are routed to Design Point 11, a proposed 4' private D10R inlet. Intercepted flows are conveyed in Pipe 18, a proposed 18" private storm pipe. Pipe 18 along with downstream Pipes 13, 14, 15, 16, and 17 and Basin R (1.31 acres of parking garage Roof Drain) combine in Pipe 19, a proposed 36" private storm pipe. Pipe 19 combines with Pipe 12, in a proposed 66" public storm outfall (Pipe 20) and are ultimately routed to the proposed Public Regional FSD Pond G.

Design Point 12 ($Q_5 = 3$ cfs, $Q_{100} = 5$ cfs) consists of developed drainage from Basin S1. Basin S1 (0.72 acres) is the proposed landscaping areas supporting the Ent office use, as well as a portion of Ent Parkway private drive. Flows are routed to Design Point 12, a proposed 4' private D10R inlet. Intercepted flows are conveyed in Pipe 21, a proposed 18" public storm pipe. Pipe 21 is ultimately routed to the proposed Public Regional FSD Pond G.

Design Point 13 ($Q_5 = 2$ cfs, $Q_{100} = 3$ cfs) consists of developed drainage from Basin S2. Basin S2 (0.47 acres) is the proposed landscaping areas adjunct to and including a portion of Ent Parkway private drive. Flows are routed to Design Point 13, a proposed 4' private D10R inlet. Intercepted flows are conveyed in Pipe 22, a proposed 18" public storm pipe. Pipe 22 combines with Pipe 20, in the proposed 66" public storm outfall (Pipe 23), and is ultimately routed to the proposed Public Regional FSD Pond G.

Design Point 14 ($Q_5 = 2$ cfs, $Q_{100} = 8$ cfs) consists of developed drainage from Basin U1. Basin U1 (3.11 acres) is the proposed landscaping areas supporting the Ent office use. It is assumed the building roof drainage will be included in the pipe outfall (see Pipe Run 24) and half the flows included in Design Point 14 are from surface landscaping. Flows are routed to Design Point 14 along the proposed grass paver fire access roadway that is parallel to the west boundary. This access includes a 6" curb along the west edge to ensure routing of stormwater to a collection location (design Point 14). A proposed 4' private D10R inlet will intercept stormwater at Design Point 14. Intercepted flows are conveyed in Pipe 25, a proposed 24" private storm pipe. Pipe 25 is ultimately routed to the proposed Public Regional FSD Pond G.

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Design Point 15 ($Q_5 = 3$ cfs, $Q_{100} = 7$ cfs) consists of developed drainage from Basin U2. Basin U2 (1.21 acres) is the proposed landscaping areas supporting the Ent office use. Flows are routed to Design Point 15 along the proposed grass paver and asphalt paved fire access roadway. This access includes a 6' curb along the west edge to ensure routing of stormwater to a collection location (design Point 15). A proposed 4' private D10R inlet will intercept stormwater at Design Point 15. It is assumed the building roof drainage from Basin V will be included in the pipe outfall (see Pipe Run 26). Intercepted flows are combined with downstream Pipe 25 in a proposed 30" private storm pipe (Pipe 27). Pipe 27 is ultimately routed to the proposed Public Regional FSD Pond G.

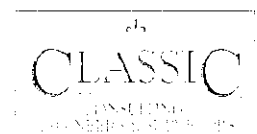
Design Point 16 ($Q_5 = 34$ cfs, $Q_{100} = 62$ cfs) is an area of future commercial development from Basins W (7.04 acres), X (0.91 acres), and Y (1.16 acres). These basins are unimproved and assumed commercial/retail use for the expansion of the Ent office campus building, parking, and landscaping as shown on the Drainage Map. Drainage from this area will be defined in future reports for final routing and facilities. Flows are routed along with downstream Pipe 28 to Pipe 29, a proposed private 36" storm pipe, ultimately directing drainage to the proposed Public Regional FSD Pond G.

Design Point 17 ($Q_5 = 8$ cfs, $Q_{100} = 16$ cfs) is an area of future commercial development from Basin Z, 2.01 acres. This basin is unimproved and assumed commercial/retail use for the expansion of the Ent office campus building, parking, and landscaping as shown on the Drainage Map. Drainage from this area will be defined in future reports for final routing and detention and water quality treatment facilities.

Overflow routing for the private storm system is designed with a maximum ponding depth before overtopping the adjacent high point to the next available downstream inlet. Overflow routing for area inlets adjacent to improvements (including Building foundations or structures) is provided within Detailed Grading Plans to ensure that a limited ponding depth is allowed prior to overtopping to the next inlet and therefor preventing stormwater from impacting proposed improvements. Ponding at these inlets will be provided at a maximum elevation with an additional depth of safety so ensure that the stormwater will be routed to an available inlet prior to stormwater entering the building.

REGIONAL DETENTION AND STORMWATER QUALITY

The City of Colorado Springs Drainage Criteria Manual specifies that this site is required to provide full spectrum detention. The proposed public Pond G and Pond D Full Spectrum Detention facilities will be designed and fully



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constructed with pre-sedimentation forebays, low flow trickle channels, a micropool, and an orifice plate to provide for WQCV, EURV and full spectrum detention requirements.

Full Spectrum Detention Requirement: The UD-Detention spreadsheet has been provided in the Appendix of this report to provide sizing based upon UDFCD requirements for EURV, with a minimum drain time of 72 hours.

Detention Summary:

Proposed Detention Facility D is a 5.5 ac-ft Public Full Spectrum Detention facility. A 42" public storm pipe will outlet the stormwater from the pond and will convey flows to the designated outfall location at Black Squirrel Creek. Total inflow to this facility is $Q_3 = 110$ cfs, $Q_{100} = 203$ cfs. The total acreage tributary to Pond D is combined from Basins A, B, C, D, E, Q, and AA. Total acreage is 39.60 acres with 85% imperviousness, as calculated by the attached IRF form in the Appendix of the report. This pond will store and treat developed stormwater from Foothills Farm and the surrounding tributary properties described in this report. Appropriate energy dissipation measures will be included in the construction drawings at the outlet pipe connection to existing Black Squirrel Creek to provide for permanent erosion protection. The proposed outlet structure is a 6'x4' inlet riser with the UDFCD required 3-hole orifice plate. Reference worksheets in Appendix for details. Overflow weir routing for this facility is shown on the Drainage Map and sized in the attached UD-Detention worksheet. A 165 lf overflow weir with a concrete wall will be installed to route the stormwater flows in an emergency event. Overflow routing is directed to existing Black Squirrel Creek. This facility and outlet structure will be constructed with Foothills Farm Campus Filing No. 2 drainage improvements. Final pond design, outlet structure sizing, trickle channel and forebay details will be included with final construction drawings for review and approval by City Engineering prior to construction approval.

Proposed Detention Facility G is an 8.80 ac-ft Public Full Spectrum Detention facility. A 48" public storm pipe will outlet the stormwater from the pond and will convey flows to the designated outfall location at Black Squirrel Creek. Total inflow to this facility is $Q_3 = 162$ cfs, $Q_{100} = 306$ cfs. The total acreage tributary to Pond G is combined from Basins K, L, M, N, O, P3, P4, P5, P1, P2, P6, S1, S2, U1, U2, W, X, Y, R and BB. Offsite basins from Marketplace at Interquest total and additional 38.34 tributary acres. Total acreage is 69.64 acres with 72% imperviousness, as calculated by the attached IRF form in the Appendix of the report. This pond will store and treat developed stormwater from Foothills Farm and the surrounding tributary properties described in this report. Appropriate energy dissipation measures will be included in the construction drawings at the outlet pipe connection to existing Black Squirrel Creek to provide for permanent erosion protection. The proposed outlet structure is an 8'x4' inlet riser with the UDFCD required 3-hole orifice plate. Reference worksheets in Appendix for details. Overflow weir routing for this facility is shown on the Drainage Map and sized in the attached UD-Detention worksheet. A 200 lf overflow weir with a concrete wall will be

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installed to route the stormwater flows in an emergency event. Overflow routing is directed to existing Black Squirrel Creek. This facility and outlet structure will be constructed with Foothills Farm Campus Filing No. 2 drainage improvements. Final pond design, outlet structure sizing, trickle channel and forebay details will be included with final construction drawings for review and approval by City Engineering prior to construction approval.

Detention Maintenance, Ownership and Access: The proposed FSD Pond G and Pond D will be owned and maintained by the City of Colorado Springs as public facilities. These facilities are located within Tract B per the Foothills Farm Campus Filing No. 2 plat. Access to the pond will be provided per the current City Engineer Criteria and UDFCD criteria as shown on the Drainage Map. A City of Colorado Springs Inspection and Maintenance (IM) plan will be required indicating these facilities to be ultimately owned and maintained by the City of Colorado Springs.

EURV and Stormwater Quality Capture Volume: The standard UD- Detention spreadsheet has been provided in the Appendix of this report to provide sizing based upon UDFCD requirements for EURV, with a minimum drain time of 72 hours. This spreadsheet includes minimum sizing for the required areas of micropool, forebays and the outlet structure orifice sizing.

WATER QUALITY SUMMARY

The City of Colorado Springs has required the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of smaller, frequently occurring storm events, as opposed to larger storms for which drainage and flood control infrastructure are sized. Implementation of these four steps helps to achieve stormwater permit requirements. This site adheres to this Four Step Process as follows:

1. This site is an approved PUD zoned commercial/retail site. In general, most roof drains are intended to drains across landscaping where feasible, and parking areas contain landscaping to minimize directly connected impervious areas. These areas are identified in the IRF spreadsheet in the Appendix of this report.
2. Permanent BMPs for the overall master planned site have been implemented in initial development of the property in the form of Full Spectrum Detention and Stormwater Quality ponds located within the site in accordance with the approved MDDP.

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3. Stormwater drainage from the subject property is being routed through stormwater detention /stormwater quality treatment facilities prior to being released to the historic drainage path as described in the previously approved reports. Developed flows will be required to adhere to release rates established within the previously approved reports and all stormwater discharge to downstream facilities will be required to employ energy dissipation measures to ensure no adverse effect to downstream facilities. As discussed in the report, the developed drainage is being routed to the north to proposed public Full Spectrum Detention Ponds G and D. Upon release stormwater enters Black Squirrel Creek. Per the "Allison Valley Master Development Drainage Plan Update", prepared by Kiowa Engineering Corporation, Dated December 2011, channel improvements along Black Squirrel Creek have been identified. These improvements are scheduled for phased construction and their timing and installation have been identified with development adjacent to the Black Squirrel Creek, as approved by the City of Colorado Springs. See Appendix for timing anticipated for all improvements required, along with a map showing the obligation for improvements tied to land development areas. For the subject site, the channel embankment work downstream of Pond #5 is required to take place with Foothills Farm Campus Filing No. 2 work (or assurances posted prior to CO.)

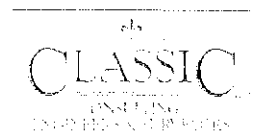
4. A site-specific stormwater quality and erosion control plan and narrative has been submitted and approved by City Engineering prior to any disturbance within the project area. Details such as site specific source control construction BMP's as well as permanent BMP's will be detailed in the Grading and Erosion Control plan and in the Stormwater Management Narrative to protect receiving waters. Upon construction of the proposed development, temporary BMP's will be installed and maintained as required. After final stabilization and site improvement completion, any disturbance to the site will need to be evaluated at that time for temporary and permanent BMP provisions.

EROSION CONTROL PLAN

The City of Colorado Springs Drainage Criteria Manual specifies an Erosion Control Plan and associated cost estimate be submitted with the Final Drainage Report. A Grading and Erosion Control Plan for this site has been approved and assurances have been posted.

DRAINAGE CRITERIA

Hydrologic calculations were performed using the City of Colorado Springs Drainage Criteria Manual, as revised in 2014. The Rational Method was used to estimate stormwater runoff anticipated from design storms for the 2 year, 5 year, 10 year, 25 year, 50 year and 100 year recurrence intervals.



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factor of 2.63) to a new total of **\$870,936.20 for storm pipe and \$236,700.00 for detention pond.** See Cost Index (next page).

Per the Allison Ranch Addition Annexation Agreement recorded 4/5/2006 (Reception No.206049309) Section A. Platting “Owner’s will not be required to pay drainage, pond or bridge fees for land to be dedicated for park, open space or trail purposes.....”

A summary of the area exempt from fees are:

Tract B	13.107 Ac.
Tract B pond area (not included)	6.544 ac
Total	6.563 ac. excluded from fees – net fee acreage 36.327 Ac.

FEE CALCULTIONS:

\$14,302/acre x 36.327 acres (Drainage 2019)	\$519,548.75
\$1,603/acre x 36.327 acres (Bridge 2019)	\$ 58,232.18
<u>\$789/acre x 36.327 acres (Pond Land 2019)</u>	<u>\$ 28,662.00</u>
	\$606,422.94

CREDITS:

A. Pond land credits will be used for Detention Facility D and G located within Tract B using the current \$76,602/acre.

Tract B Pond area only = 6.544 acres @ 76,602.00 acres = \$501,283.49 credit

Note: This amount is in addition to the existing Pond Land Credits remaining (Previously utilized by The Farm Filing No. 1A, 1B, 1C, 2, 3, 4, 4A, and 5).

B. A current credit remaining after the most recent Farm Filing No. 4A plat leaves \$292,710.53 available to offset drainage fees for Black Squirrel Creek.

Total offsets available at the time of Foothills Farm Campus (FFC) Filing No. 2 plat are:

\$292,710.53 Credits available after Farm 4Aplat

Total fees available for offset after FFC Fil. No. 2:

-\$606,422.94 Drainage fees calculated FFC Fil. 2

**\$313,732.41 fees remaining to be offset
with \$1,107636.20 reimbursable facilities.**



FINAL DRAINAGE REPORT FOR FOOTHILLS FARM CAMPUS FILING NO. 2

FINAL FEE CALCULATIONS:

\$14,302/acre x 36.327 acres (Drainage 2019)	<i>FEES OFFSET</i>	\$519,549.75
\$1,603/acre x 36.327 acres (Bridge 2019)		\$ 58,232.18
<u>\$789/acre x 36.327 acres (Pond Land 2019)</u>	<u><i>POND LAND CREDIT</i></u>	<u>\$ -28,662.00</u>
Black Squirrel Fees Foothills Farm Campus Filing No. 2 - due at platting		\$ 58,232.18

NON-REIMBURSABLE CONSTRUCTION COST OPINION

PRIVATE DRAINAGE FACILITIES

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
18" RCP	322	LF	\$ 45.00	\$ 14,490.00
24" RCP	1307	LF	\$ 55.00	\$ 71,885.00
30" RCP	569	LF	\$ 60.00	\$ 34,140.00
36" RCP	1242	LF	\$ 75.00	\$ 93,150.00
STORM INLET D-10-R (4')	6	EA	\$ 4,500.00	\$ 27,000.00
STORM INLET D-10-R (6')	2	EA	\$ 6,500.00	\$ 13,000.00
STORM INLET D-10-R (8')	1	EA	\$ 8,500.00	\$ 8,500.00
STORM MANHOLE	12	EA	\$ 6,200.00	\$ 74,400.00
SUBTOTAL				\$ 336,565.00
15% ENGINEERING & CONTINGENCY				\$ 50,484.75
TOTAL				\$ 387,049.75

PUBLIC DRAINAGE FACILITIES

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
54" RCP	281	LF	\$ 80.00	\$ 22,480.00
60" RCP	1723	LF	\$ 110.00	\$ 189,530.00
66" RCP	980	LF	\$ 130.00	\$ 127,400.00
STORM MANHOLE	11	EA	\$ 7,000.00	\$ 77,000.00
SUBTOTAL				\$ 416,410.00
15% ENGINEERING & CONTINGENCY				\$ 62,461.50
TOTAL				\$ 478,871.50



FINAL DRAINAGE REPORT FOR FOOTHILLS FARM CAMPUS FILING NO. 2

Hydraulic grade line calculations have been provided for the Public storm outfall mains tributary to Public Pond G and Public Pond D along with their stubs. On-site private storm system HGL calculations supporting the Int Development in particular will be supplied for review and approval along with the submittal of the private storm design drawings.

FLOODPLAIN STATEMENT

No portion of this site is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0506G effective date, December 7, 2018 (See Appendix).

DRAINAGE AND BRIDGE FEES

This site has lies within the Black Squirrel Drainage Basin boundaries. The total platted area of Foothills Farm Campus Filing No. 2 is 42.890 acres.

Per the Black Squirrel Creek Drainage Basin Planning Study initial system (urban and rural) conveyance facilities are reimbursable (down to 15" RCP pipe), collection facilities (including inlets) are not. Reference DBPS Table 10, See Appendix.

Public Drainage Facilities (Reimbursable) FOOTHILLS FARM CAMPUS FILING NO. 2– Black Squirrel Creek Basin per DBPS

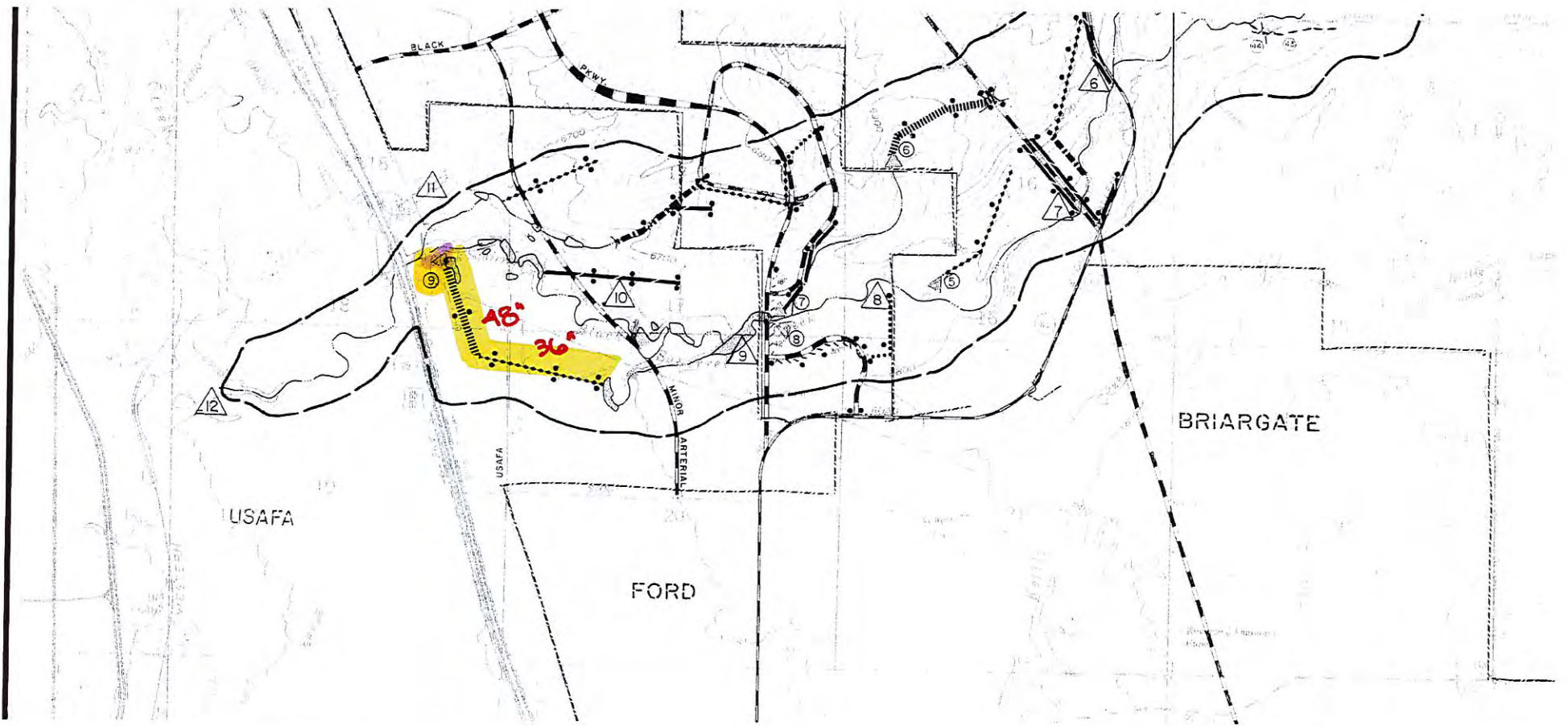
1.	36" Storm RCP	2,000 LF	\$87/LF	\$174,000.00
2.	48" Storm RCP	1500 LF	\$116/LF	\$174,000.00
TOTAL				\$ 348,000.00

Squirrel Creek Basin per DBPS (Pond #9)

3.	Detention Pond	1 EA	\$90,000/EA	\$90,000.00
TOTAL				\$ 90,000.00

Cost of these facilities has been escalated from the original DBPS estimate 1982 to current year based upon the Drainage Basin rate increases. As such, the estimate has been updated at escalated cost (using a





FFC FIL. NO. 2

DBPS · BLACK SQUIRREL
REIMBURSABLE FACILITIES

TABLE 11

**BLACK SQUIRREL CREEK DRAINAGE BASIN
ESTIMATED UNIT CONSTRUCTION COSTS**

ITEM	UNIT	UNIT COST
RIP-RAP	CY	\$25.00
RIP-RAP (GROUTED EMBANKMENT)	SY	30.00
DAM EMBANKMENT	CY	3.00
EXCAVATION & EMBANKMENT	CY	1.50
GRANULAR BEDDING FOR RIP-RAP	CY	12.00
BEND PROTECTION	EA	10,000.00
REVEGETATION (Non-reimbursable when placed over riprap only)	AC	2,500.00
DROP STRUCTURES -		
MAJOR URBAN	EA	60,000.00
MAJOR RURAL	EA	10,000.00
INITIAL RURAL (Q >150 cfs)	EA	3,000.00
INITIAL RURAL (Q <150 cfs)	EA	1,500.00
REINFORCED CONCRETE BOXES -		
CONCRETE	CY	180.00
STEEL	LB	0.50
TRANSITIONS & HEADWALL	EA	12,000.00
REINFORCED CONCRETE PIPE -		
(Including all appurtenances)		
15" Dia	LF	40.00
18" Dia	LF	48.00
24" Dia	LF	61.00
30" Dia	LF	76.00
36" Dia	LF	87.00 *
42" Dia	LF	104.00
48" Dia	LF	116.00 *
54" Dia	LF	124.00
60" Dia	LF	131.00

TABLE 9

BLACK SQUIRREL CREEK DRAINAGE BASIN
ESTIMATED CONCEPTUAL DESIGN IMPROVEMENT COSTS & FEES

DESIGN POINT	REACH	DESIGN FLOW (cfs)	IMPROVEMENT	COMMENT	QTY.	UNIT	UNIT (\$)	ESTIMATED 1988 CONSTRUCTION COSTS		
								DRAINAGE CONSTRUCTION COST (\$)	DRAINAGE & LAND COST (\$)	BRIDGE COST (\$)
RURAL										
-	1-19,21	See Fig. 10	DROPS	-	140	EA	\$9,000	\$1,260,000		
-	1-19,21	See Fig. 8	BRIDGE PROTECTION	-	40	EA	10,000	400,000		
1A	-	563	8' x 8' CBC	S.H. 83	120	LF	290	34,800		
1B	-	848	10' x 10' CBC	S.H. 83	120	LF	410	49,200		
-	3	See Tbl. 7	DETENTION POND #1	34 ac-ft	1	LS	256,800	256,800	\$60,840	
-	-	906	10' x 10' CBC	NORTHGATE ROAD	120	LF	410	49,200		
-	4	364	7' x 7' CBC	S.H. 83	120	LF	240	28,800		
-	6	See Tbl. 7	DETENTION POND #2	34 ac-ft	1	LS	259,200	259,200	63,960	
2	-	740	10' x 9' CBC	NORTHGATE ROAD	120	LF	390	46,800		
-	8	141	6' x 4' CBC	NORTHGATE ROAD	120	LF	165	19,800		
-	8	281	6' x 7' CBC	S.H. 83	120	LF	200	24,000		
-	12	497	8' x 8' CBC	HILAN ROAD	120	LF	290	34,800		
-	13	See Tbl. 7	DETENTION POND #3	44 ac-ft	1	LS	396,000	396,000	82,680	
-	14	574	8' x 8' CBC	HILAN ROAD	120	LF	290	34,800		
-	15	382	7' x 7' CBC	HILAN ROAD	120	LF	240	28,800		
4	-	1641	(10'-10') x 10' CBC	NORTHGATE ROAD	150	LF	795			\$119,250
-	18	See Tbl. 7	DETENTION POND #4	14 ac-ft	1	LS	126,000	126,000	42,120	
-	20	3536	25' x 8' FLC	-	4500	LF	190	855,000		
15 (See Fig. 5)	-	3350	(11'-14'-11') x 10' CBC	FUTURE ARTERIAL	120	LF	1,280			153,600
6	-	3536	(11'-14'-11') x 10' CBC	S.H. 83	210	LF	1,280			268,800
MAJOR SYSTEM SUBTOTAL								\$3,904,800	\$249,600	\$541,650
INITIAL SYSTEM SUBTOTAL (SEE TABLE 10)								1,163,440		
RURAL TOTAL								\$5,067,440	\$249,600	\$541,650
URBAN										
-	22	3577	25' x 8' FLC	-	2250	LF	170	382,500		
7	-	3577	(11' x 14' x 11') x 10' CBC	POWERS BLVD.	210	LF	1,220			256,200
-	23	3597	25' x 8' FLC	-	2250	LF	170	382,500		
-	-	See Tbl. 7	DETENTION POND #5	7 ac-ft	1	LS	63,000	63,000	17,160	
-	24	3779	150'-250' x 4'-5' FLC	-	2900	LF	90	261,000		
-	-	See Tbl. 7	DROPS	-	6	EA	40,000	240,000		
-	-	See Tbl. 7	DETENTION POND #6	12 ac-ft	1	LS	108,000	108,000	26,520	
-	25	358	8' x 3' FLC	-	3000	LF	75	225,000		
-	-	See Tbl. 7	DETENTION POND #7	8 ac-ft	1	LS	72,000	72,000	24,960	
-	-	See Tbl. 7	DETENTION POND #8	8 ac-ft	1	LS	81,000	81,000	18,720	
9	-	3779	(14' x 14') x 10' CBC	VOYAGER PKWY	220	LF	1,345			295,900
-	26	3803	30' x 7' FLC	-	3200	LF	170	544,000		
10	-	3803	(11' x 14' x 11') x 10' CBC	MINOR ARTERIAL	120	LF	1,390			166,800
-	27	3953	30' x 7' FLC	-	1800	LF	170	306,000		
-	28	745	10' x 5' FLC	-	1000	LF	85	85,000		
-	28	745	10' x 9' CBC	MINOR ARTERIAL	120	LF	390	46,800		
-	-	See Tbl. 7	DETENTION POND #9	10 ac-ft	1	LS	90,000	90,000	24,960	
MAJOR SYSTEM SUBTOTAL								\$2,886,800	\$112,320	\$718,900
INITIAL SYSTEM SUBTOTAL (SEE TABLE 10)								2,713,000		
URBAN TOTAL								\$5,599,800	\$112,320	\$718,900
URBAN & RURAL SUBTOTALS								\$10,667,240	\$361,920	\$1,260,550
CONSTRUCTION CONTINGENCY 5%								533,362		63,828
ENGINEERING 10%								1,120,860		132,358
MASTER PLAN COST								115,000		
RURAL TOTAL ASSESSED ACREAGE: 4970/5 = 994										
URBAN TOTAL ASSESSED ACREAGE = 1256										
TOTAL ASSESSED ACREAGE = 2250										
DETENTION LAND AREA COST/ACRE: (* SEE TABLE 7 FOR DETENTION POND ACREAGES)										
COUNTY \$15,600										
CITY \$15,600										
GRAND TOTALS								\$12,435,662	\$361,920	\$1,455,935
PER/ACRE								\$5,527	\$161	\$647

COLORADO SPRINGS ANNUAL CONSTRUCTION INDEX

(Per City Code Section 7.7.108)

2019	6.7%
2018	5.7%
2017	3.5%
2016	4.8%
2015	0%
2014	4.3%
2013	0%
2012	0%
2011	0%
2010	0%
2009	5%
2008	1%
2007	10%
2006	4%
2005	5%
2004	3%
2003	3%
2002	3%
2001	5%
2000	3%
1999	4%
1998	6%
1997	4%

For further information, contact Engineering Development Review
at 385-5056

FINAL DRAINAGE REPORT FOR FOOTHILLS FARM CAMPUS FILING NO. 2

PUBLIC DRAINAGE FACILITIES POND D

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
42" RCP	150	LF	\$ 170.00	\$ 25,500.00
OUTLET BOX W/ MICROPOOL	1	EA	\$ 30,000.00	\$ 30,000.00
60" IMPACT STRUCTURE	1	EA	\$ 105,000.00	\$ 105,000.00
TRICKLE CHANNEL (REINFORCED)	256	LF	\$ 80.00	\$ 20,480.00
RIP RAP SPIILLWAY	214	CY	\$ 40.00	\$ 8,560.00
OVERFLOW WALL -SPILLWAY	184	LF	\$ 170.00	\$ 31,280.00
SUBTOTAL				\$ 220,820.00
15% ENGINEERING & CONTINGENCY				\$ 33,123.00
TOTAL				\$ 253,943.00

PUBLIC DRAINAGE FACILITIES POND G

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
48" RCP	460	LF	\$ 200.00	\$ 92,000.00
OUTLET BOX W/ MICROPOOL	1	EA	\$ 30,000.00	\$ 30,000.00
66" IMPACT STRUCTURE	1	EA	\$ 105,000.00	\$ 105,000.00
TRICKLE CHANNEL (REINFORCED)	1415	LF	\$ 80.00	\$ 113,200.00
RIP RAP SPIILLWAY	380	CY	\$ 40.00	\$ 15,200.00
OVERFLOW WALL -SPILLWAY	220	LF	\$ 170.00	\$ 37,400.00
SUBTOTAL				\$ 392,800.00
15% ENGINEERING & CONTINGENCY				\$ 58,920.00
TOTAL				\$ 451,720.00

SUMMARY

The proposed Foothills Farm Campus Filing No. 2 site is proposed to drain to onsite proposed public and private storm facilities. Since the MDDP anticipated the same land use, “C” runoff coefficients, and time of concentration rates, the total stormwater from this development generally is equal to what was anticipated in the previously approved Marketplace at Interquest MDDP. Full Spectrum Detention is handled in proposed public Pond D and Pond G Facilities as proposed with Foothills Farm Campus Filing No. 2 development. All drainage facilities were sized using the current City of Colorado Springs Drainage Criteria and will safely discharge storm water runoff to adequate outfalls.

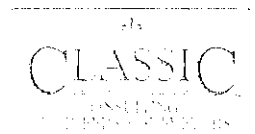


FINAL DRAINAGE REPORT FOR FOOTHILLS FARM CAMPUS FILING NO. 2

PREPARED BY:

Classic Consulting Engineers & Surveyors, LLC

Cathy M. Tessin, P.E.
Project Manager



FINAL DRAINAGE REPORT FOR FOOTHILLS FARM CAMPUS FILING NO. 2

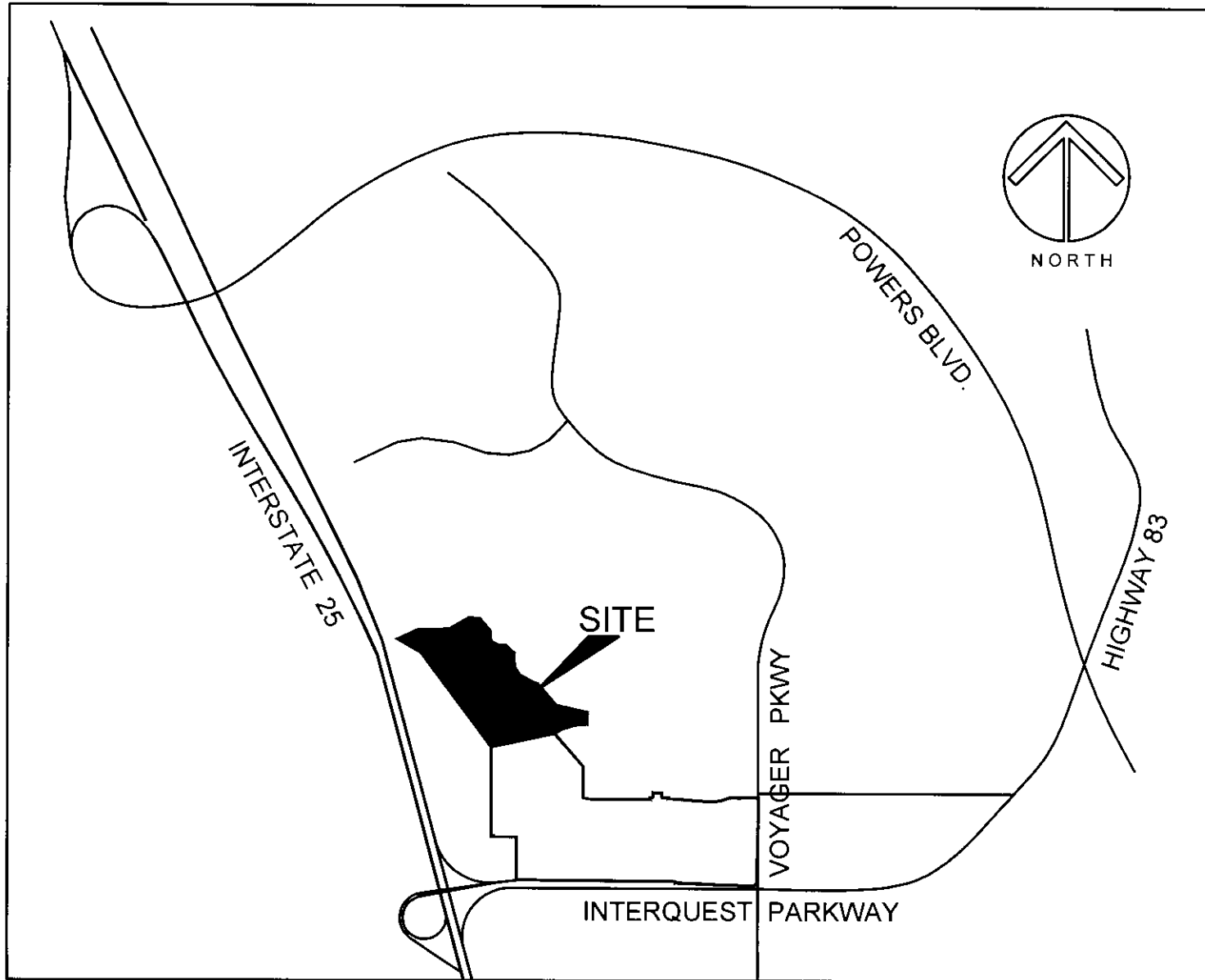
REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual dated October 1991.
2. "Black Squirrel Creek Drainage Basin Planning Study," prepared by URS Corporation, dated January 1989.
3. "Master Development Drainage Plan for Allison Valley," prepared by Classic Consulting Engineers and Surveyors, dated February 2006.
4. "Allison Valley Master Development Drainage Plan Update," prepared by Kiowa Engineering Corporation., dated December 2011.
5. "2007 Addendum to Biological Assessment and Habitat Mitigation Plan for Allison Valley Project, Colorado Springs, Colorado," prepared by Walsh Environmental Scientists and Engineers, dated May 2007.
6. "Master Development Drainage Plan for Trailridge South at Northgate," JR Engineering, dated May 2000, revised September 2000 and January 2001.
7. "Final Drainage Report for Northgate Retail Filing No. 1," prepared by WestWorks Engineering, dated March 2007.
8. "Final Drainage Report for The Farm Filing No. 1A, 1B, and 1C and Preliminary Drainage Report for The Farm Filing No. 2," dated June 2014.
9. "Supplemental Drainage Letter for The Farm – Filings 1A, 1B, and 1C," dated October 2015.
10. "Final Design Report for Allison Valley On-Site Reaches of Black Squirrel Creek and Middle Tributary Creek Channel Improvements," prepared by Classic Consulting Engineers and Surveyors. dated September 2008.
11. "Final Drainage Report for The Farm Filing No. 4," prepared by Classic Consulting Engineers and Surveyors, dated April 2017.
12. "The Farm Filing No. 4 Final Drainage Report Addendum," prepared by Classic Consulting Engineers and Surveyors, dated September 2017.
13. "The Farm Filing No. 4 Final Drainage Report Addendum Middle Tributary Box Culvert Detention/SWQ Ponds," prepared by Classic Consulting Engineers and Surveyors, pending approval.
14. "Master Development Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2," prepared by Classic Consulting Engineers and Surveyors, approved August 2007

APPENDIX

VICINITY MAP

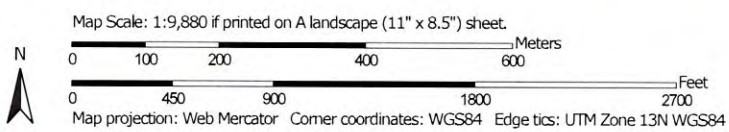
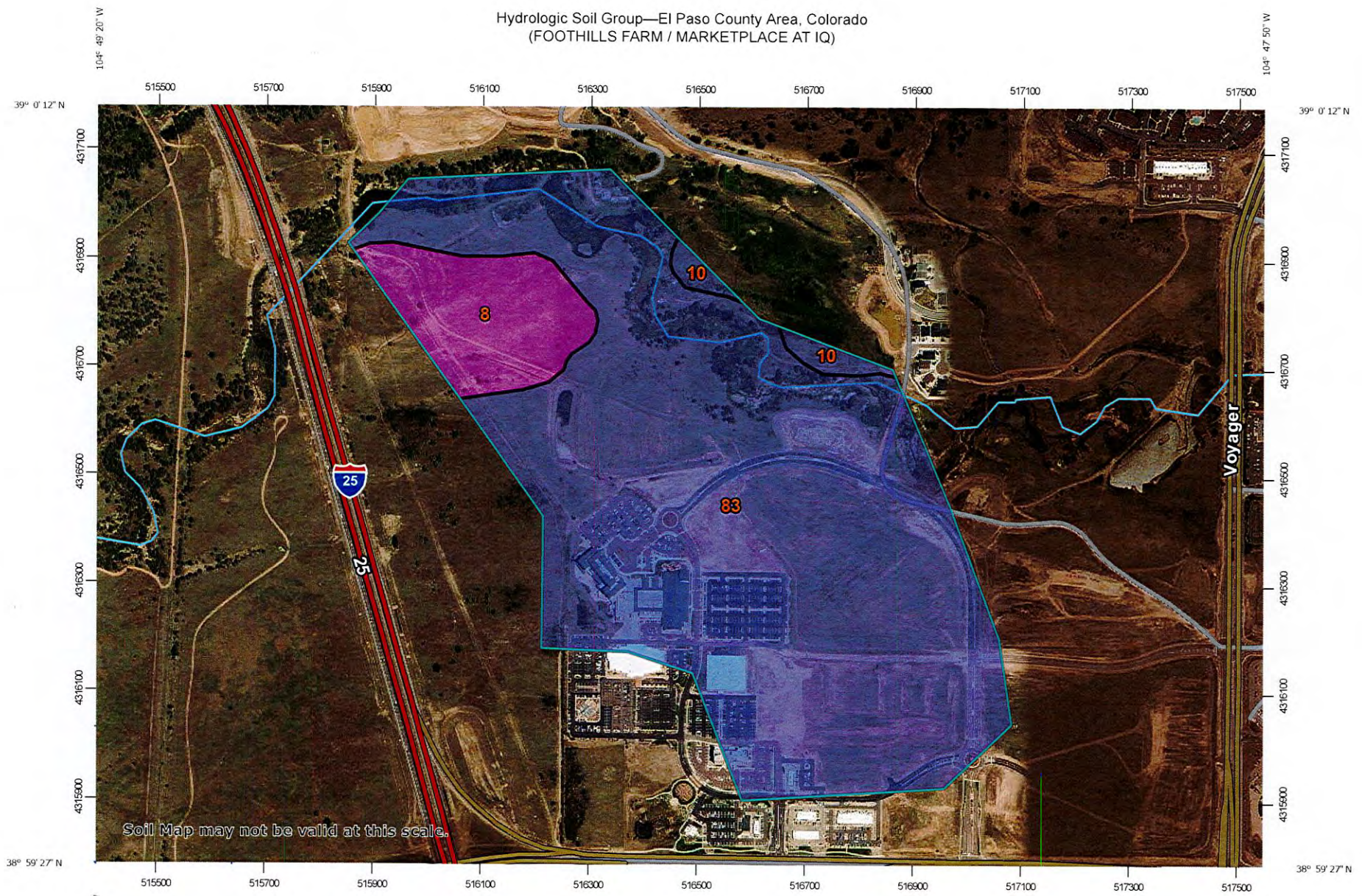
NO. 17880, DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, 100 SOUTH BROAD STREET, 3RD FLOOR, PHILADELPHIA, PA 19107



VICINITY / KEY MAP


SOILS MAP (Web Soil Survey)

Hydrologic Soil Group—El Paso County Area, Colorado
(FOOTHILLS FARM / MARKETPLACE AT IQ)











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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: 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: Jul 4, 2010—Oct 16, 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	20.3	10.5%
10	Blendon sandy loam, 0 to 3 percent slopes	B	3.4	1.8%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	169.9	87.8%
Totals for Area of Interest			193.6	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

F.E.M.A. MAP

National Flood Hazard Layer FIRMette



39°0'11.18"N



Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone I</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
OTHER FEATURES		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
OTHER FEATURES		Hydrographic Feature

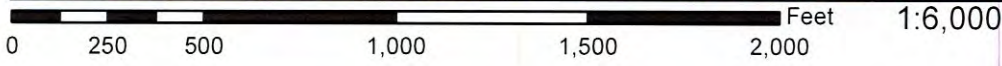
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **4/11/2019 at 7:01:06 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



USGS The National Map: Orthoimagery. Data refreshed October, 2017.

38°59'43.22"N

104°48'24.38"W

HYDROLOGIC/HYDRAULIC CALCULATIONS

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
 JOB NUMBER: 2399.86
 DATE: 06/27/19
 CALCULATED BY CMT

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS				LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED			WEIGHTED CA		
		AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)
A	15.98	14.38	0.89	0.90	0.96	1.60	0.02	0.08	0.35	0.80	0.82	0.90	12.83	13.07	14.37
B	7.42	6.68	0.89	0.90	0.96	0.74	0.02	0.08	0.35	0.80	0.82	0.90	5.96	6.07	6.67
C	7.73	6.57	0.89	0.90	0.96	1.16	0.02	0.08	0.35	0.76	0.78	0.87	5.87	6.01	6.71
D	3.18	2.86	0.89	0.90	0.96	0.32	0.02	0.08	0.35	0.80	0.82	0.90	2.55	2.60	2.86
E	1.18	1.06	0.89	0.90	0.96	0.12	0.02	0.08	0.35	0.80	0.82	0.90	0.95	0.97	1.06
F	12.02	12.02	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	10.70	10.82	11.54
G	2.40	2.40	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	2.14	2.16	2.30
H	7.04	7.04	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	6.27	6.34	6.76
I	4.11	3.49	0.89	0.90	0.96	0.62	0.02	0.08	0.35	0.76	0.78	0.87	3.12	3.19	3.57
J	7.79	7.01	0.89	0.90	0.96	0.78	0.02	0.08	0.35	0.80	0.82	0.90	6.26	6.37	7.00
K	1.16	0.99	0.89	0.90	0.96	0.17	0.02	0.08	0.35	0.76	0.78	0.87	0.88	0.90	1.01
L	1.21	1.03	0.89	0.90	0.96	0.18	0.02	0.08	0.35	0.76	0.78	0.87	0.92	0.94	1.05
M	3.07	2.61	0.89	0.90	0.96	0.46	0.02	0.08	0.35	0.76	0.78	0.87	2.33	2.39	2.67
N	1.23	1.11	0.89	0.90	0.96	0.12	0.02	0.08	0.35	0.80	0.82	0.90	0.99	1.01	1.11
O	1.91	1.91	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	1.70	1.72	1.83
P1	0.88	0.75	0.89	0.90	0.96	0.13	0.02	0.08	0.35	0.76	0.78	0.87	0.67	0.69	0.77
P2	0.66	0.56	0.89	0.90	0.96	0.10	0.02	0.08	0.35	0.76	0.78	0.87	0.50	0.51	0.57
P3	0.72	0.61	0.89	0.90	0.96	0.11	0.02	0.08	0.35	0.76	0.78	0.87	0.55	0.56	0.63
P4	0.32	0.27	0.89	0.90	0.96	0.05	0.02	0.08	0.35	0.76	0.78	0.87	0.24	0.25	0.28
P5	0.39	0.33	0.89	0.90	0.96	0.06	0.02	0.08	0.35	0.76	0.78	0.87	0.29	0.30	0.34
P6	1.03	0.88	0.89	0.90	0.96	0.15	0.02	0.08	0.35	0.76	0.78	0.87	0.78	0.80	0.89
Q	1.99	1.79	0.89	0.90	0.96	0.20	0.02	0.08	0.35	0.80	0.82	0.90	1.60	1.63	1.79
R	1.34	1.34	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	1.19	1.21	1.29
S1	0.72	0.58	0.89	0.90	0.96	0.14	0.02	0.08	0.35	0.72	0.74	0.84	0.52	0.53	0.60
S2	0.47	0.38	0.89	0.90	0.96	0.09	0.02	0.08	0.35	0.72	0.74	0.84	0.34	0.35	0.39
T	3.75	3.00	0.89	0.90	0.96	0.75	0.02	0.08	0.35	0.72	0.74	0.84	2.69	2.76	3.14
U1	3.11	0.47	0.89	0.90	0.96	2.64	0.02	0.08	0.35	0.15	0.20	0.44	0.47	0.63	1.37
U2	1.21	0.60	0.89	0.90	0.96	0.60	0.02	0.08	0.35	0.46	0.49	0.66	0.55	0.59	0.79
V	1.24	1.24	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	1.10	1.12	1.19
W	7.04	5.98	0.89	0.90	0.96	1.06	0.02	0.08	0.35	0.76	0.78	0.87	5.35	5.47	6.11
X	0.91	0.91	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.81	0.82	0.87
Y	1.16	1.16	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	1.03	1.04	1.11
Z	2.01	1.81	0.89	0.90	0.96	0.20	0.02	0.08	0.35	0.80	0.82	0.90	1.61	1.64	1.81
AA	2.12	0.21	0.89	0.90	0.96	1.90	0.02	0.08	0.35	0.11	0.16	0.41	0.23	0.34	0.87
BB	2.75	0.27	0.89	0.90	0.96	2.47	0.02	0.08	0.35	0.11	0.16	0.41	0.29	0.44	1.13

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
 JOB NUMBER: 2399.86
 DATE: 07/26/06
 CALC'D BY: CMT

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)* $t_c = \frac{L}{180} + 10$	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S^{0.33}} \quad V = C_v S_w^{0.5} \quad T_c = L/V$$

*For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc TOTAL (min)	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)		I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	12.83	13.07	14.37	0.08	25	1	5.8	800	2.0%	2.8	4.7	10.5	3.23	4.05	6.80	41	53	98
B	5.96	6.07	6.67	0.08	25	1	5.8	600	2.0%	2.8	3.5	9.4	3.37	4.23	7.10	20	26	47
C	5.87	6.01	6.71	0.08	15	2	3.0	2000	3.0%	3.5	9.6	12.7	3.01	3.78	6.34	18	23	43
D	2.55	2.60	2.86	0.08	12	2	2.5	200	3.0%	3.5	1.0	5.0	4.12	5.17	8.68	11	13	25
E	0.95	0.97	1.06	0.08	10	2	2.2	200	3.0%	3.5	0.0	5.0	4.12	5.17	8.68	4	5	9
F	10.70	10.82	11.54	0.08	15	2	3.0	1200	2.0%	2.8	7.1	10.1	3.28	4.11	6.91	35	44	80
G	2.14	2.16	2.30	0.08	60	1	12.1	600	1.0%	2.0	5.0	17.1	2.66	3.33	5.59	6	7	13
H	6.27	6.34	6.76	0.08	5	1	1.5	200	4.0%	4.0	0.8	5.0	4.12	5.17	8.68	26	33	59
I	3.12	3.19	3.57	0.08	20	1	4.8	300	1.0%	2.0	2.5	7.3	3.66	4.59	7.71	11	15	28
J	6.26	6.37	7.00	0.08	25	4	3.7	600	2.0%	2.8	3.5	7.2	3.68	4.62	7.75	23	29	54
K	0.88	0.90	1.01	0.08	20	1	4.8	150	3.0%	3.5	0.7	5.6	3.99	5.01	8.41	4	5	8
L	0.92	0.94	1.05	0.08	20	1	4.8	150	3.0%	3.5	0.7	5.6	3.99	5.01	8.41	4	5	9
M	2.33	2.39	2.67	0.08	20	1	4.8	300	3.0%	3.5	1.4	6.3	3.85	4.83	8.10	9	12	22
N	0.99	1.01	1.11	0.08	10	0.5	3.4	150	2.0%	2.8	0.9	5.0	4.12	5.17	8.68	4	5	10
O	1.70	1.72	1.83	0.08	15	0.3	5.7	500	2.0%	2.8	2.9	8.6	3.47	4.35	7.31	6	7	13
P1	0.67	0.69	0.77	0.08	10	1	2.7	200	2.0%	2.8	1.2	5.0	4.12	5.17	8.68	3	4	7

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
 JOB NUMBER: 2399.86
 DATE: 07/26/06
 CALC'D BY: CMT

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)* $r_c = \frac{L}{180} + 10$	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$r_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S^{0.33}} \quad V = C_v S_w^{0.5} \quad T_c = L/V$$

*For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc TOTAL (min)	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)		I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
P2	0.50	0.51	0.57	0.08	10	1	2.7	100	2.0%	2.8	0.6	5.0	4.12	5.17	8.68	2	3	5
P3	0.55	0.56	0.63	0.08	20	1	4.8	100	1.5%	2.4	0.7	5.5	4.00	5.02	8.43	2	3	5
P4	0.24	0.25	0.28	0.08	20	1	4.8	100	3.0%	3.5	0.5	5.3	4.05	5.07	8.52	1	1.3	2.4
P5	0.29	0.30	0.34	0.08	10	1	2.7	100	2.0%	2.8	0.6	5.0	4.12	5.17	8.68	1	1.6	2.9
P6	0.78	0.80	0.89	0.08	10	1	2.7	100	3.0%	3.5	0.5	5.0	4.12	5.17	8.68	3	4	8
Q	1.60	1.63	1.79	0.08	20	1	4.8	50	2.0%	2.8	0.3	5.1	4.09	5.13	8.61	7	8	15
R	1.19	1.21	1.29	0.08	0	0	0.0	50	1.0%	2.0	0.4	5.0	4.12	5.17	8.68	5	6	11
S1	0.52	0.53	0.60	0.08	40	6	4.8	220	3.0%	3.5	0.0	5.0	4.12	5.17	8.68	2	3	5
S2	0.34	0.35	0.39	0.08	20	0.5	6.1	220	3.0%	3.5	1.0	7.1	3.70	4.65	7.80	1	2	3
T	2.69	2.76	3.14	0.08	100	1	18.4	500	1.0%	2.0	4.2	22.6	2.33	2.91	4.88	6	8	15
U1	0.47	0.63	1.37	0.08	100	7	9.7	800	1.0%	2.0	6.7	16.4	2.71	3.39	5.69	1	2	8
U2	0.55	0.59	0.79	0.08	15	10	1.8	300	1.0%	2.0	2.5	5.0	4.12	5.17	8.68	2	3	7
V	1.10	1.12	1.19	0.08	0	0	0.0	50	1.0%	2.0	0.4	5.0	4.12	5.17	8.68	5	6	10
W	5.35	5.47	6.11	0.08	20	1	4.8	300	1.0%	2.0	2.5	7.3	3.66	4.59	7.71	20	25	47
X	0.81	0.82	0.87	0.08	20	1	4.8	100	1.0%	2.0	0.8	5.7	3.97	4.98	8.36	3	4	7
Y	1.03	1.04	1.11	0.08	20	1	4.8	100	1.0%	2.0	0.8	5.7	3.97	4.98	8.36	4	5	9

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
 JOB NUMBER: 2399.86
 DATE: 07/26/06
 CALC'D BY: CMT

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)* $t_c = \frac{L}{180} + 10$	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

*For buried riprap, select C_v value based on type of vegetative cover.

$$t_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S^{0.33}} \quad V = C_v S_w^{0.5} \quad T_c = L/V$$

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc TOTAL (min)	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)		I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
Z	1.61	1.64	1.81	0.08	20	1	4.8	50	2.0%	2.8	0.3	5.1	4.09	5.13	8.61	7	8	16
AA	0.23	0.34	0.87	0.08	10	6	1.5	350	1.0%	2.0	2.9	5.0	4.12	5.17	8.68	1	2	8
BB	0.29	0.44	1.13	0.08	12	8	1.6	650	1.0%	2.0	5.4	7.0	3.72	4.66	7.83	1	2	9

JOB NAME: **FOOTHILLS FARM - MARKETPLACE MDDP UPDATE**
 JOB NUMBER: **2399.86**
 DATE: **06/27/19**
 CALCULATED BY: **CMT**

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		COMMENT
					I(5)	I(100)	Q(5)	Q(100)	
1	BASIN A & B	19.14	21.04	10.5	4.05	6.80	78	143	SPRINGS @FF APTS AND FUTURE PARCEL
2	BASIN C	6.01	6.71	12.7	3.78	6.34	23	43	EX. FED DRIVE
3	BASINS D , E	3.57	3.92	5.0	5.17	8.68	18	34	FF CAMPUS FIL .1 AND FUTURE
4	BASIN Q	1.63	1.79	5.1	5.13	8.61	8	15	FUTURE COMMERCIAL
5	BASIN K, L	1.91	2.06	5.6	5.01	8.41	10	17	FUTURE COMMERCIAL
6	BASIN M	2.39	2.67	6.3	4.83	8.10	12	22	FUTURE COMMERCIAL
7	BASIN N, 1/2 BASIN O, P3, P4	2.68	2.93	8.6	4.35	7.31	12	21	PROP. 8' PRIV. INLET
8	BASIN P5, 1/2 BASIN O	1.16	1.25	8.6	4.35	7.31	5	9	PROP. 6' PRIV. INLET
9	BASIN P1	0.69	0.77	5.0	5.17	8.68	4	7	PROP. 4' PRIV. INLET
10	BASIN P2	0.51	0.57	5.0	5.17	8.68	3	5	PROP. 4' PRIV. INLET
11	BASIN P6	0.80	0.89	5.0	5.17	8.68	4	8	PROP. 4' PRIV. INLET
12	BASIN S1	0.53	0.60	5.0	5.17	8.68	3	5	PROP. 4' PRIV. INLET
13	BASIN S2	0.35	0.39	7.1	4.65	7.80	2	3	PROP. 4' PRIV. INLET
14	BASIN U1	0.63	1.37	16.4	3.39	5.69	2	8	PROP. 4' PRIV. INLET
15	BASIN U2	0.59	0.79	5.0	5.17	8.68	3	7	PROP. 4' PRIV. INLET
16	BASIN W, X, Y	7.33	8.10	7.3	4.59	7.71	34	62	FUTURE COMMERCIAL
17	BASIN Z	1.64	1.81	5.1	5.13	8.61	8	16	FUTURE COMMERCIAL

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
 JOB NUMBER: 2399.86
 DATE: 06/27/19
 CALCULATED BY: CMT

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE.
 REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP 1+ DP2	25.15	27.75	14.1	3.62	6.07	91	169	SPRINGS @FF APTS AND FUTURE PARCEL
2	DP 3	3.57	3.92	5.0	5.17	8.68	18	34	FFC Fil. 1and Fut. commercial
3	PIPE 1+2	28.71	31.67	14.1	3.62	6.07	104	192	TOTAL FLOW AT FEDERAL OUTFALL
4	DP 4 + PIPE 3	30.34	33.46	14.1	3.62	6.07	110	203	OUTFALL TO POND D
5	BASINS F, G, H	19.31	20.60	15.8	3.44	5.78	66	119	Marketplace IQ Scheels, Fut. Commercial, and ex. commercial
6	BASIN I	3.19	3.57	7.3	4.59	7.71	15	28	Future GWL expansion commercial parcel /ex. stub
7	BASIN J	6.37	7.00	7.2	4.62	7.75	29	54	Ex. GWL buidling/parking lot
8	PIPES 5, 6, 7	28.88	31.17	18.5	3.21	5.38	93	168	TOTAL FLOW AT GWL OUTFALL
9	DP 5	1.91	2.06	5.6	5.01	8.41	10	17	24" @ 0.5% PRIV.
10	PIPE 8+9	30.79	33.23	18.5	3.21	5.38	99	179	60" @ 0.5% PUBLIC
11	DP 6	2.39	2.67	6.29	4.83	8.10	12	22	30" @ 0.5% PRIV.
12	PIPE 10 + 11 + BASIN AA	33.52	36.77	20.5	3.05	5.12	102	188	66" @ 0.5% PUBLIC
13	DP 9 + BASIN T (1/2)	2.07	2.34	5.00	5.17	8.68	11	20	24" @ 1% PRIV
14	DP 10	0.51	0.57	5.00	5.17	8.68	3	5	18" @ 0.5% PRIV.

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
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 REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
15	PIPE 13 + 14	2.58	2.91	5.0	5.17	8.68	13	25	30" @ 0.5% PRIV.
16	DP 7+ PIPE 15	5.26	5.84	8.6	4.35	7.31	23	43	30" @ 1.0% PRIV.
17	DP 8 + PIPE 16	6.42	7.09	8.6	4.35	7.31	28	52	36" @ 1.0% PRIV.
18	DP 11	0.80	0.89	5.00	5.17	8.68	4	8	18" @ 0.5% PRIV.
19	PIPE 17 + 18 + BASIN R	8.42	9.28	8.6	4.35	7.31	37	68	36" @1.0% PRIV.
20	PIPE 19 + 12	41.94	46.04	23.6	2.84	4.77	119	220	66" @0.5% PUBLIC
21	DP 12	0.53	0.60	5.00	5.17	8.68	3	5	18" @ 1.0% PRIVATE
22	DP 13 + PIPE 21	0.88	1.00	7.1	4.65	7.80	4	8	18" @ 1.0% PRIVATE
23	PIPE 20 + 22 + BASIN BB	43.26	47.49	24.3	2.80	4.69	121	223	TOTAL FLOW TO POND G - 66" OUTFALL
24	BASIN T 1/2	1.38	1.57	22.6	2.91	4.88	4	8	24" @ 0.5% PRIV.
25	DP 14 + PIPE 24	2.01	2.94	22.6	2.91	4.88	6	14	24" @ 1.0% PRIV.
26	BASIN V + DP 15	1.71	1.98	5.0	5.17	8.68	9	17	24" @ 1.0% PRIV.
27	PIPE 25+ 26	3.72	4.93	22.6	2.91	4.88	11	24	30" @ 0.5% PRIV.
28	PIPE 25+ 27	5.73	7.87	22.6	2.91	4.88	17	38	36" @ 0.5% PRIV.

JOB NAME: FOOTHILLS FARM - MARKETPLACE MDDP UPDATE
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* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE.
 REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
29	DP 16 + PIPE 28	13.06	15.97	22.6	2.91	4.88	38	78	TOTAL POND G - 36" @ 1.5% PRIV. OUTFALL
30	PIPE 23 + 29	56.32	63.46	23.1	2.87	4.82	162	306	TOTAL POND G INFLOW

INLET MANAGEMENT

INLET NAME	DP7	DP8	DP9	DP10	DP11	DP12
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump	In Sump	In Sump	In Sump
Inlet Type	Colorado Springs D-10-R	Colorado Springs D-10-R	Colorado Springs D-10-R	Colorado Springs D-10-R	Colorado Springs D-10-R	Colorado Springs D-10-R

USER-DEFINED INPUT

User-Defined Design Flows						
Minor Q_{KINSON} (cfs)	12.0	5.0	4.0	3.0	4.0	3.0
Major Q_{KINSON} (cfs)	21.0	9.0	7.0	5.0	8.0	5.0
Bypass (Carry-Over) Flow from Upstream						
Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0		0.0			
Major Bypass Flow Received, Q_b (cfs)	0.0		0.0			
Watershed Characteristics						
Subcatchment Area (acres)						
Percent Impervious						
NRCS Soil Type						
Watershed Profile						
Overland Slope (ft/ft)						
Overland Length (ft)						
Channel Slope (ft/ft)						
Channel Length (ft)						
Minor Storm Rainfall Input						
Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						
Major Storm Rainfall Input						
Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	12.0	5.0	4.0	3.0	4.0	3.0
Major Total Design Peak Flow, Q (cfs)	21.0	9.0	7.0	5.0	8.0	5.0
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A	N/A	N/A	N/A
Minor Storm (Calculated) Analysis of Flow Time						
C	N/A	N/A	N/A	N/A	N/A	N/A
C_s	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Velocity, V_i	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Velocity, V_i	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Time, T_i	N/A	N/A	N/A	N/A	N/A	N/A
Channel Travel Time, T_i	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A	N/A	N/A
Major Storm (Calculated) Analysis of Flow Time						
C	N/A	N/A	N/A	N/A	N/A	N/A
C_s	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Velocity, V_i	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Velocity, V_i	N/A	N/A	N/A	N/A	N/A	N/A
Overland Flow Time, T_i	N/A	N/A	N/A	N/A	N/A	N/A
Channel Travel Time, T_i	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A	N/A	N/A	N/A

INLET MANAGEMENT

INLET NAME	DP13	DP14	DP15
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	In Sump
Inlet Type	Colorado Springs D-10-R	Colorado Springs D-10-R	Colorado Springs D-10-R

USER-DEFINED INPUT

User-Defined Design Flows			
Minor Q_{down} (cfs)	2.0	6.0	3.0
Major Q_{down} (cfs)	3.0	15.0	7.0
Bypass (Carry-Over) Flow from Upstream			
Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)			
Major Bypass Flow Received, Q_b (cfs)			
Watershed Characteristics			
Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			
Watershed Profile			
Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			
Minor Storm Rainfall Input			
Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			
Major Storm Rainfall Input			
Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

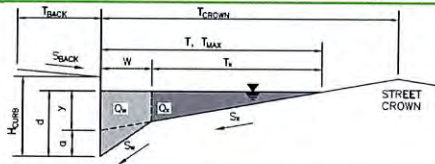
Minor Total Design Peak Flow, Q (cfs)	2.0	6.0	3.0
Major Total Design Peak Flow, Q (cfs)	3.0	15.0	7.0
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	N/A
Minor Storm (Calculated) Analysis of Flow T			
C	N/A	N/A	N/A
C_s	N/A	N/A	N/A
Overland Flow Velocity, V_i	N/A	N/A	N/A
Channel Flow Velocity, V_t	N/A	N/A	N/A
Overland Flow Time, T_i	N/A	N/A	N/A
Channel Travel Time, T_t	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A
Major Storm (Calculated) Analysis of Flow T			
C	N/A	N/A	N/A
C_s	N/A	N/A	N/A
Overland Flow Velocity, V_i	N/A	N/A	N/A
Channel Flow Velocity, V_t	N/A	N/A	N/A
Overland Flow Time, T_i	N/A	N/A	N/A
Channel Travel Time, T_t	N/A	N/A	N/A
Calculated Time of Concentration, T_c	N/A	N/A	N/A
Regional T_c	N/A	N/A	N/A
Recommended T_c	N/A	N/A	N/A
T_c selected by User	N/A	N/A	N/A
Design Rainfall Intensity, I	N/A	N/A	N/A
Calculated Local Peak Flow, Q_p	N/A	N/A	N/A

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

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

Project:
Inlet ID:

FOOTHILLS FARM CAMPUS FIL. 2 ENT
DP7

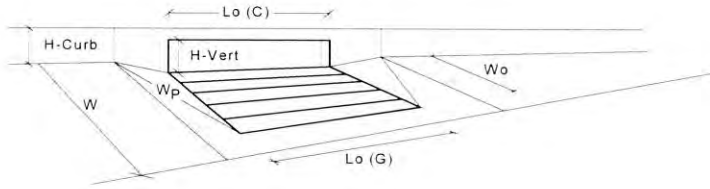


Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 20.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_X = 0.020$ ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_Y = 0.083$ ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_D = 0.000$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.020$						
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Minor Storm</th> <th style="text-align: center;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$T_{MAX} = 20.0$</td> <td style="text-align: center;">$T_{MAX} = 20.0$</td> </tr> <tr> <td style="text-align: center;">$d_{MAX} = 8.0$</td> <td style="text-align: center;">$d_{MAX} = 12.0$</td> </tr> </tbody> </table>	Minor Storm	Major Storm	$T_{MAX} = 20.0$	$T_{MAX} = 20.0$	$d_{MAX} = 8.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm						
$T_{MAX} = 20.0$	$T_{MAX} = 20.0$						
$d_{MAX} = 8.0$	$d_{MAX} = 12.0$						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm							
Check boxes are not applicable in SUMP conditions							
MINOR STORM Allowable Capacity is based on Depth Criterion							
MAJOR STORM Allowable Capacity is based on Depth Criterion							
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Minor Storm</th> <th style="text-align: center;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$Q_{allow} = SUMP$</td> <td style="text-align: center;">$Q_{allow} = SUMP$</td> </tr> </tbody> </table>	Minor Storm	Major Storm	$Q_{allow} = SUMP$	$Q_{allow} = SUMP$		
Minor Storm	Major Storm						
$Q_{allow} = SUMP$	$Q_{allow} = SUMP$						

Warning 02

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017

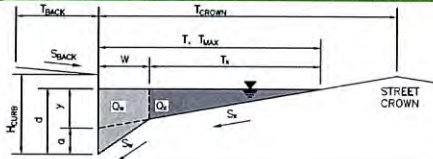


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	8.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	8.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.50	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.81	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	13.9	26.4	cfs
$Q_{PEAK\ REQUIRED}$	12.0	21.0	cfs

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

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

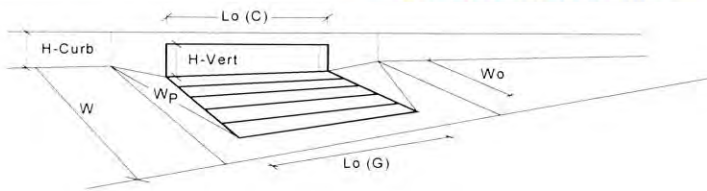
Project: FOOTHILLS FARM CAMPUS FIL. 2 ENT
 Inlet ID: DP8



Gutter Geometry (Enter data in the blue cells)																	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="10.0"/> ft																
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>																
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="6.00"/> inches																
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="20.0"/> ft																
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft																
Street Transverse Slope	$S_X = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_Y = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft																
Street Longitudinal Slope - Enter 0 for sump condition	$S_L = $ <input style="width: 50px;" type="text" value="0.000"/> ft/ft																
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.020"/>																
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td>$T_{MAX} =$</td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="20.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="20.0"/></td> <td style="text-align: right;">ft</td> </tr> <tr> <td>$d_{MAX} =$</td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="8.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="12.0"/></td> <td style="text-align: right;">inches</td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} = $	<input style="width: 40px;" type="text" value="20.0"/>	<input style="width: 40px;" type="text" value="20.0"/>	ft	$d_{MAX} = $	<input style="width: 40px;" type="text" value="8.0"/>	<input style="width: 40px;" type="text" value="12.0"/>	inches		<input type="checkbox"/>	<input type="checkbox"/>	
	Minor Storm	Major Storm															
$T_{MAX} = $	<input style="width: 40px;" type="text" value="20.0"/>	<input style="width: 40px;" type="text" value="20.0"/>	ft														
$d_{MAX} = $	<input style="width: 40px;" type="text" value="8.0"/>	<input style="width: 40px;" type="text" value="12.0"/>	inches														
	<input type="checkbox"/>	<input type="checkbox"/>															
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm																	
Check boxes are not applicable in SUMP conditions																	
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td>$Q_{ALLOW} =$</td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="SUMP"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="SUMP"/></td> <td style="text-align: right;">cfs</td> </tr> </tbody> </table>			Minor Storm	Major Storm		$Q_{ALLOW} = $	<input style="width: 40px;" type="text" value="SUMP"/>	<input style="width: 40px;" type="text" value="SUMP"/>	cfs								
	Minor Storm	Major Storm															
$Q_{ALLOW} = $	<input style="width: 40px;" type="text" value="SUMP"/>	<input style="width: 40px;" type="text" value="SUMP"/>	cfs														
<p>MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion</p>																	

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017

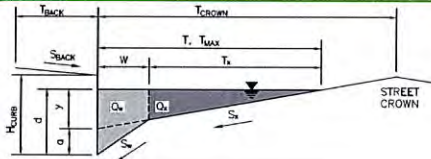


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	8.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	6.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.50	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.94	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	11.2	19.8	cfs
Q _{PEAK REQUIRED}	5.0	9.0	cfs

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

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

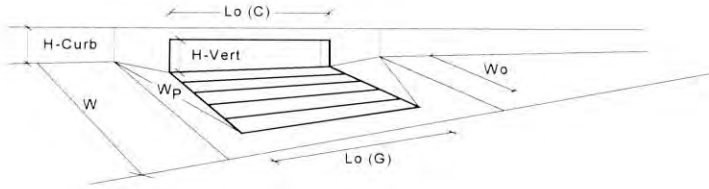
Project: FOOTHILLS FARM CAMPUS FIL. 2 ENT
 Inlet ID: DP9



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 18.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_X = 0.030$ 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	$S_C = 0.000$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.020$						
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> <tr> <td>$T_{MAX} = 18.0$</td> <td>$T_{MAX} = 18.0$</td> <td>ft</td> </tr> </table>	Minor Storm	Major Storm		$T_{MAX} = 18.0$	$T_{MAX} = 18.0$	ft
Minor Storm	Major Storm						
$T_{MAX} = 18.0$	$T_{MAX} = 18.0$	ft					
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> <tr> <td>$d_{MAX} = 6.0$</td> <td>$d_{MAX} = 12.0$</td> <td>inches</td> </tr> </table>	Minor Storm	Major Storm		$d_{MAX} = 6.0$	$d_{MAX} = 12.0$	inches
Minor Storm	Major Storm						
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$	inches					
Check boxes are not applicable in SUMP conditions	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Minor Storm	Major Storm	<input type="checkbox"/>	<input type="checkbox"/>		
Minor Storm	Major Storm						
<input type="checkbox"/>	<input type="checkbox"/>						
MINOR STORM Allowable Capacity is based on Depth Criterion							
MAJOR STORM Allowable Capacity is based on Depth Criterion							
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> <tr> <td>$Q_{SHOW} = SUMP$</td> <td>$Q_{SHOW} = SUMP$</td> <td>cfs</td> </tr> </table>	Minor Storm	Major Storm		$Q_{SHOW} = SUMP$	$Q_{SHOW} = SUMP$	cfs
Minor Storm	Major Storm						
$Q_{SHOW} = SUMP$	$Q_{SHOW} = SUMP$	cfs					

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



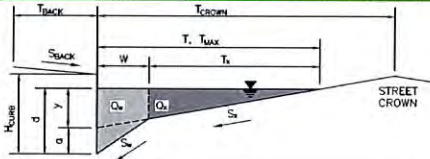
Design Information (Input)	MINOR	MAJOR	
Type of Inlet Colorado Springs D-10-R	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	6.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	4.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	4.6	12.6	cfs
Q PEAK REQUIRED =	4.0	7.0	cfs

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

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

Project:
Inlet ID:

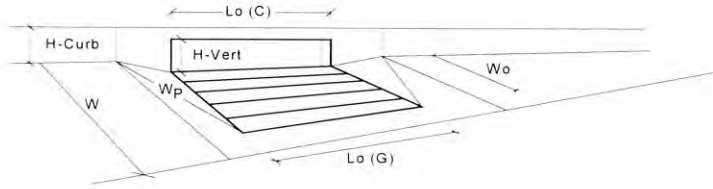
FOOTHILLS FARM CAMPUS FIL. 2 ENT
DP10



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 18.0$ ft				
Gutter Width	$W = 2.00$ ft				
Street Transverse Slope	$S_X = 0.030$ 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	$S_L = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.020$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$T_{MAX} = 18.0$</td> <td>$T_{MAX} = 18.0$</td> </tr> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 18.0$	$T_{MAX} = 18.0$
Minor Storm	Major Storm				
$T_{MAX} = 18.0$	$T_{MAX} = 18.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$d_{MAX} = 6.0$</td> <td>$d_{MAX} = 12.0$</td> </tr> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$				
Check boxes are not applicable in SUMP conditions	<table border="1"> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$Q_{FLOW} = SUMP$</td> <td>$Q_{FLOW} = SUMP$</td> </tr> </table> cfs	Minor Storm	Major Storm	$Q_{FLOW} = SUMP$	$Q_{FLOW} = SUMP$
Minor Storm	Major Storm				
$Q_{FLOW} = SUMP$	$Q_{FLOW} = SUMP$				

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



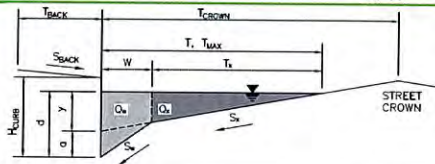
Design Information (Input)	MINOR	MAJOR	
Type of Inlet	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	6.0	7.8	inches
Grate Information	MINOR	MAJOR	Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	4.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.33	0.48	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	4.6	8.0	cfs
Q PEAK REQUIRED	3.0	5.0	cfs

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

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

Project:
Inlet ID:

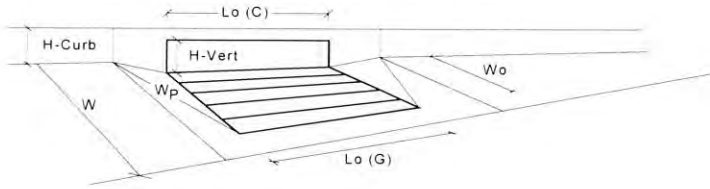
FOOTHLLS FARM CAMPUS FIL. 2 ENT
DP11



Gutter Geometry (Enter data in the blue cells)	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches
Distance from Curb Face to Street Crown	$T_{CROWN} = 18.0$ ft
Gutter Width	$W = 2.00$ ft
Street Transverse Slope	$S_X = 0.030$ 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	$S_L = 0.000$ ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.020$
Max. Allowable Spread for Minor & Major Storm	$T_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 18.0 & 18.0 \end{matrix}$ ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	$d_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 6.0 & 12.0 \end{matrix}$ inches
Check boxes are not applicable in SUMP conditions	<input type="checkbox"/> <input type="checkbox"/>
MINOR STORM Allowable Capacity is based on Depth Criterion	$Q_{FLOW} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ \text{SUMP} & \text{SUMP} \end{matrix}$ cfs
MAJOR STORM Allowable Capacity is based on Depth Criterion	

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017

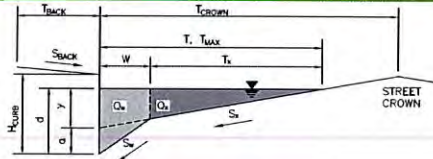


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	$a_{local} = 4.00$		inches
Number of Unit Inlets (Grate or Curb Opening)	$N_o = 1$		
Water Depth at Flowline (outside of local depression)	Ponding Depth = 6.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	$L_o (G) = N/A$		feet
Width of a Unit Grate	$W_o = N/A$		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio} = N/A$		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_l (G) = N/A$	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G) = N/A$		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G) = N/A$		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	$L_o (C) = 4.00$		feet
Height of Vertical Curb Opening in Inches	$H_{vert} = 8.00$		inches
Height of Curb Orifice Throat in Inches	$H_{throat} = 8.00$		inches
Angle of Throat (see USDCM Figure ST-5)	Theta = 81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p = 2.00$		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_l (C) = 0.10$	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C) = 3.60$		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C) = 0.67$		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	$d_{grate} = N/A$	N/A	ft
Depth for Curb Opening Weir Equation	$d_{curb} = 0.33$	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{combination} = 0.85$	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	$RF_{curb} = 1.00$	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	$RF_{grate} = N/A$	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_a = 4.6$	12.6	cfs
$Q_{PEAK REQUIRED} =$	4.0	8.0	cfs

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

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

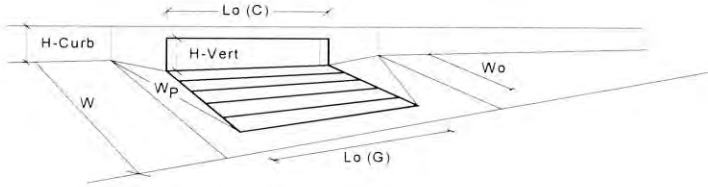
Project: FOOTHILLS FARM CAMPUS FIL. 2 ENT
 Inlet ID: DP12



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 15.0$ ft				
Gutter Width	$W = 3.00$ 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	$S_L = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.020$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$T_{MAX} = 15.0$</td> <td>15.0</td> </tr> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 15.0$	15.0
Minor Storm	Major Storm				
$T_{MAX} = 15.0$	15.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$d_{MAX} = 6.0$</td> <td>12.0</td> </tr> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	12.0
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	12.0				
Check boxes are not applicable in SUMP conditions	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td align="center"><input type="checkbox"/></td> <td align="center"><input type="checkbox"/></td> </tr> </table>	Minor Storm	Major Storm	<input type="checkbox"/>	<input type="checkbox"/>
Minor Storm	Major Storm				
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$Q_{FLOW} = \text{SUMP}$</td> <td>SUMP</td> </tr> </table> cfs	Minor Storm	Major Storm	$Q_{FLOW} = \text{SUMP}$	SUMP
Minor Storm	Major Storm				
$Q_{FLOW} = \text{SUMP}$	SUMP				

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	MINOR	MAJOR	
Type of Inlet Colorado Springs D-10-R	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	6.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	4.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	3.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.25	0.75	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	3.7	12.6	cfs
Q PEAK REQUIRED =	3.0	5.0	cfs

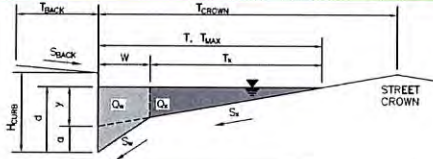
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

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

Project:
Inlet ID:

FOOTHILLS FARM CAMPUS FIL. 2 ENT

DP13



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)
 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)

$T_{BACK} = 10.0$ ft
 $S_{BACK} = 0.020$ ft/ft
 $n_{BACK} = 0.020$
 $H_{CURB} = 6.00$ inches
 $T_{CROWN} = 15.0$ ft
 $W = 2.00$ ft
 $S_s = 0.020$ ft/ft
 $S_W = 0.083$ ft/ft
 $S_L = 0.000$ ft/ft
 $n_{STREET} = 0.020$

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$	15.0	15.0	ft
$d_{MAX} =$	6.0	12.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	

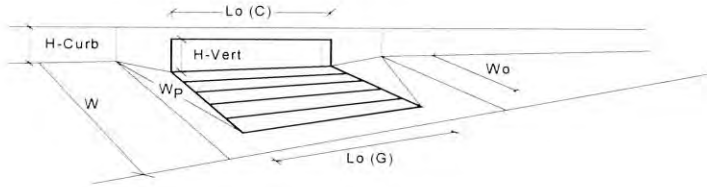
MINOR STORM Allowable Capacity is based on Depth Criterion
 MAJOR STORM Allowable Capacity is based on Depth Criterion

$Q_{ALLOW} =$

Minor Storm	Major Storm	
SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017

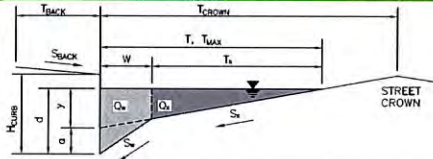


Design Information (Input)	MINOR	MAJOR	
Type of Inlet Colorado Springs D-10-R	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	5.1	5.1	inches
Grate Information	MINOR	MAJOR	Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	4.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.26	0.26	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.72	0.72	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	3.2	3.2	cfs
Q _{PEAK REQUIRED}	2.0	3.0	cfs

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

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

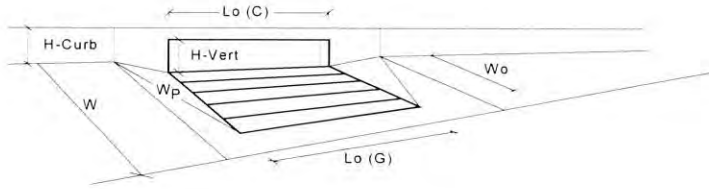
Project: FOOTHILLS FARM CAMPUS FIL. 2 ENT
 Inlet ID: DP14



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.012$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 24.0$ ft				
Gutter Width	$W = 1.00$ ft				
Street Transverse Slope	$S_X = 0.010$ 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	$S_L = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.012$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$T_{MAX} = 24.0$</td> <td>$T_{MAX} = 24.0$</td> </tr> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 24.0$	$T_{MAX} = 24.0$
Minor Storm	Major Storm				
$T_{MAX} = 24.0$	$T_{MAX} = 24.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$d_{MAX} = 6.0$</td> <td>$d_{MAX} = 12.0$</td> </tr> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$				
Check boxes are not applicable in SUMP conditions	<table border="1"> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td>$Q_{ALLOW} = SUMP$</td> <td>$Q_{ALLOW} = SUMP$</td> </tr> </table> cfs	Minor Storm	Major Storm	$Q_{ALLOW} = SUMP$	$Q_{ALLOW} = SUMP$
Minor Storm	Major Storm				
$Q_{ALLOW} = SUMP$	$Q_{ALLOW} = SUMP$				

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



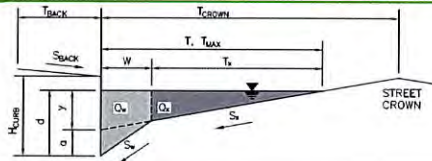
Design Information (Input)	MINOR	MAJOR	
Type of Inlet	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	6.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	6.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	1.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.42	0.92	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.71	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	6.9	19.7	cfs
Q PEAK REQUIRED =	6.0	15.0	cfs

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

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

Project:
Inlet ID:

FOOTHILLS FARM CAMPUS FIL. 2 ENT
DP15



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.012$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 24.0$ ft				
Gutter Width	$W = 2.00$ ft				
Street Transverse Slope	$S_x = 0.010$ ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_y = 0.083$ ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_s = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.020$				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;">$T_{MAX} = 24.0$</td> <td style="text-align: center; padding: 2px;">$T_{MAX} = 24.0$</td> </tr> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 24.0$	$T_{MAX} = 24.0$
Minor Storm	Major Storm				
$T_{MAX} = 24.0$	$T_{MAX} = 24.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;">$d_{MAX} = 6.0$</td> <td style="text-align: center; padding: 2px;">$d_{MAX} = 12.0$</td> </tr> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$				
Check boxes are not applicable in SUMP conditions	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 2px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 2px;"><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;">$Q_{flow} = SUMP$</td> <td style="text-align: center; padding: 2px;">$Q_{flow} = SUMP$</td> </tr> </table> cfs	Minor Storm	Major Storm	$Q_{flow} = SUMP$	$Q_{flow} = SUMP$
Minor Storm	Major Storm				
$Q_{flow} = SUMP$	$Q_{flow} = SUMP$				

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	MINOR	MAJOR	
Type of Inlet	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	4.00		inches
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)	6.0	12.0	inches
Grate Information	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A		feet
Width of a Unit Grate	N/A		feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	4.00		feet
Height of Vertical Curb Opening in Inches	8.00		inches
Height of Curb Orifice Throat in Inches	8.00		inches
Angle of Throat (see USDCM Figure ST-5)	81.00		degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	4.6	12.6	cfs
Q PEAK REQUIRED =	3.0	7.0	cfs

Worksheet for PIPE 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00800	ft/ft
Diameter	5.00	ft
Discharge	169.00	ft ³ /s

Results

Normal Depth	3.16	ft
Flow Area	13.07	ft ²
Wetted Perimeter	9.19	ft
Hydraulic Radius	1.42	ft
Top Width	4.82	ft
Critical Depth	3.73	ft
Percent Full	63.2	%
Critical Slope	0.00514	ft/ft
Velocity	12.93	ft/s
Velocity Head	2.60	ft
Specific Energy	5.76	ft
Froude Number	1.39	
Maximum Discharge	250.57	ft ³ /s
Discharge Full	232.93	ft ³ /s
Slope Full	0.00421	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	63.16	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 1

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.16	ft
Critical Depth	3.73	ft
Channel Slope	0.00800	ft/ft
Critical Slope	0.00514	ft/ft

Worksheet for PIPE 2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	3.00	ft
Discharge	34.00	ft ³ /s

Results

Normal Depth	1.89	ft
Flow Area	4.68	ft ²
Wetted Perimeter	5.49	ft
Hydraulic Radius	0.85	ft
Top Width	2.90	ft
Critical Depth	1.89	ft
Percent Full	62.9	%
Critical Slope	0.00494	ft/ft
Velocity	7.26	ft/s
Velocity Head	0.82	ft
Specific Energy	2.71	ft
Froude Number	1.01	
Maximum Discharge	50.73	ft ³ /s
Discharge Full	47.16	ft ³ /s
Slope Full	0.00260	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	62.88	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 2

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.89	ft
Critical Depth	1.89	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00494	ft/ft

Worksheet for PIPE 3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00800	ft/ft
Diameter	5.00	ft
Discharge	192.00	ft ³ /s

Results

Normal Depth	3.46	ft
Flow Area	14.49	ft ²
Wetted Perimeter	9.82	ft
Hydraulic Radius	1.48	ft
Top Width	4.62	ft
Critical Depth	3.96	ft
Percent Full	69.2	%
Critical Slope	0.00580	ft/ft
Velocity	13.25	ft/s
Velocity Head	2.73	ft
Specific Energy	6.19	ft
Froude Number	1.32	
Maximum Discharge	250.57	ft ³ /s
Discharge Full	232.93	ft ³ /s
Slope Full	0.00544	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	69.18	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 3

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.46	ft
Critical Depth	3.96	ft
Channel Slope	0.00800	ft/ft
Critical Slope	0.00580	ft/ft

Worksheet for PIPE 4

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00800	ft/ft
Diameter	5.00	ft
Discharge	203.00	ft ³ /s

Results

Normal Depth	3.61	ft
Flow Area	15.19	ft ²
Wetted Perimeter	10.16	ft
Hydraulic Radius	1.50	ft
Top Width	4.48	ft
Critical Depth	4.06	ft
Percent Full	72.2	%
Critical Slope	0.00617	ft/ft
Velocity	13.37	ft/s
Velocity Head	2.78	ft
Specific Energy	6.39	ft
Froude Number	1.28	
Maximum Discharge	250.57	ft ³ /s
Discharge Full	232.93	ft ³ /s
Slope Full	0.00608	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	72.23	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 4

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.61	ft
Critical Depth	4.06	ft
Channel Slope	0.00800	ft/ft
Critical Slope	0.00617	ft/ft

Worksheet for PIPE 9

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	2.00	ft
Discharge	17.00	ft ³ /s

Results

Normal Depth	1.79	ft
Flow Area	2.96	ft ²
Wetted Perimeter	4.96	ft
Hydraulic Radius	0.60	ft
Top Width	1.23	ft
Critical Depth	1.49	ft
Percent Full	89.4	%
Critical Slope	0.00694	ft/ft
Velocity	5.74	ft/s
Velocity Head	0.51	ft
Specific Energy	2.30	ft
Froude Number	0.65	
Maximum Discharge	17.21	ft ³ /s
Discharge Full	16.00	ft ³ /s
Slope Full	0.00565	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	89.42	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 9

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.79	ft
Critical Depth	1.49	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00694	ft/ft

Worksheet for PIPE 10

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	5.00	ft
Discharge	179.00	ft ³ /s

Results

Normal Depth	3.98	ft
Flow Area	16.75	ft ²
Wetted Perimeter	11.02	ft
Hydraulic Radius	1.52	ft
Top Width	4.03	ft
Critical Depth	3.83	ft
Percent Full	79.6	%
Critical Slope	0.00541	ft/ft
Velocity	10.69	ft/s
Velocity Head	1.77	ft
Specific Energy	5.75	ft
Froude Number	0.92	
Maximum Discharge	198.09	ft ³ /s
Discharge Full	184.15	ft ³ /s
Slope Full	0.00472	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	79.55	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 10

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.98	ft
Critical Depth	3.83	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00541	ft/ft

Worksheet for PIPE 11

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	2.50	ft
Discharge	22.00	ft ³ /s

Results

Normal Depth	1.63	ft
Flow Area	3.39	ft ²
Wetted Perimeter	4.70	ft
Hydraulic Radius	0.72	ft
Top Width	2.38	ft
Critical Depth	1.60	ft
Percent Full	65.1	%
Critical Slope	0.00530	ft/ft
Velocity	6.50	ft/s
Velocity Head	0.66	ft
Specific Energy	2.28	ft
Froude Number	0.96	
Maximum Discharge	31.20	ft ³ /s
Discharge Full	29.00	ft ³ /s
Slope Full	0.00288	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.14	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 11

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.63	ft
Critical Depth	1.60	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00530	ft/ft

Worksheet for PIPE 12

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient 0.013
Channel Slope 0.00500 ft/ft
Diameter 5.50 ft
Discharge 189.00 ft³/s

Results

Normal Depth 3.71 ft
Flow Area 17.04 ft²
Wetted Perimeter 10.60 ft
Hydraulic Radius 1.61 ft
Top Width 5.16 ft
Critical Depth 3.85 ft
Percent Full 67.4 %
Critical Slope 0.00452 ft/ft
Velocity 11.09 ft/s
Velocity Head 1.91 ft
Specific Energy 5.62 ft
Froude Number 1.08
Maximum Discharge 255.42 ft³/s
Discharge Full 237.44 ft³/s
Slope Full 0.00317 ft/ft
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
Average End Depth Over Rise 0.00 %
Normal Depth Over Rise 67.41 %
Downstream Velocity Infinity ft/s

Worksheet for PIPE 12

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.71	ft
Critical Depth	3.85	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00452	ft/ft

Worksheet for PIPE 13

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	20.00	ft ³ /s

Results

Normal Depth	1.46	ft
Flow Area	2.46	ft ²
Wetted Perimeter	4.10	ft
Hydraulic Radius	0.60	ft
Top Width	1.77	ft
Critical Depth	1.61	ft
Percent Full	73.1	%
Critical Slope	0.00812	ft/ft
Velocity	8.13	ft/s
Velocity Head	1.03	ft
Specific Energy	2.49	ft
Froude Number	1.22	
Maximum Discharge	24.33	ft ³ /s
Discharge Full	22.62	ft ³ /s
Slope Full	0.00782	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	73.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 13

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.46	ft
Critical Depth	1.61	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00812	ft/ft

Worksheet for PIPE 14

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	1.50	ft
Discharge	5.00	ft ³ /s

Results

Normal Depth	0.90	ft
Flow Area	1.11	ft ²
Wetted Perimeter	2.66	ft
Hydraulic Radius	0.42	ft
Top Width	1.47	ft
Critical Depth	0.86	ft
Percent Full	60.1	%
Critical Slope	0.00578	ft/ft
Velocity	4.51	ft/s
Velocity Head	0.32	ft
Specific Energy	1.22	ft
Froude Number	0.91	
Maximum Discharge	7.99	ft ³ /s
Discharge Full	7.43	ft ³ /s
Slope Full	0.00227	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	60.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 14

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.90	ft
Critical Depth	0.86	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00578	ft/ft

Worksheet for PIPE 15

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	2.50	ft
Discharge	25.00	ft ³ /s

Results

Normal Depth	1.79	ft
Flow Area	3.76	ft ²
Wetted Perimeter	5.04	ft
Hydraulic Radius	0.75	ft
Top Width	2.25	ft
Critical Depth	1.70	ft
Percent Full	71.6	%
Critical Slope	0.00569	ft/ft
Velocity	6.65	ft/s
Velocity Head	0.69	ft
Specific Energy	2.48	ft
Froude Number	0.91	
Maximum Discharge	31.20	ft ³ /s
Discharge Full	29.00	ft ³ /s
Slope Full	0.00372	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	71.61	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 15

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.79	ft
Critical Depth	1.70	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00569	ft/ft

Worksheet for PIPE 16

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.50	ft
Discharge	43.00	ft ³ /s

Results

Normal Depth	2.18	ft
Flow Area	4.54	ft ²
Wetted Perimeter	6.02	ft
Hydraulic Radius	0.75	ft
Top Width	1.67	ft
Critical Depth	2.19	ft
Percent Full	87.2	%
Critical Slope	0.00994	ft/ft
Velocity	9.47	ft/s
Velocity Head	1.39	ft
Specific Energy	3.57	ft
Froude Number	1.01	
Maximum Discharge	44.12	ft ³ /s
Discharge Full	41.01	ft ³ /s
Slope Full	0.01099	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	87.19	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 16

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.18	ft
Critical Depth	2.19	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00994	ft/ft

Worksheet for PIPE 17

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00600	ft/ft
Diameter	3.00	ft
Discharge	52.00	ft ³ /s

Results

Normal Depth	2.48	ft
Flow Area	6.24	ft ²
Wetted Perimeter	6.84	ft
Hydraulic Radius	0.91	ft
Top Width	2.28	ft
Critical Depth	2.34	ft
Percent Full	82.6	%
Critical Slope	0.00667	ft/ft
Velocity	8.33	ft/s
Velocity Head	1.08	ft
Specific Energy	3.56	ft
Froude Number	0.89	
Maximum Discharge	55.57	ft ³ /s
Discharge Full	51.66	ft ³ /s
Slope Full	0.00608	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	82.57	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 17

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.48	ft
Critical Depth	2.34	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00667	ft/ft

Worksheet for PIPE 18

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.50	ft
Discharge	8.00	ft ³ /s

Results

Normal Depth	0.98	ft
Flow Area	1.22	ft ²
Wetted Perimeter	2.82	ft
Hydraulic Radius	0.43	ft
Top Width	1.43	ft
Critical Depth	1.10	ft
Percent Full	65.3	%
Critical Slope	0.00743	ft/ft
Velocity	6.54	ft/s
Velocity Head	0.67	ft
Specific Energy	1.64	ft
Froude Number	1.25	
Maximum Discharge	11.30	ft ³ /s
Discharge Full	10.50	ft ³ /s
Slope Full	0.00580	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.32	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 18

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.98	ft
Critical Depth	1.10	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00743	ft/ft

Worksheet for PIPE 19

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	3.00	ft
Discharge	68.00	ft ³ /s

Results

Normal Depth	2.52	ft
Flow Area	6.33	ft ²
Wetted Perimeter	6.94	ft
Hydraulic Radius	0.91	ft
Top Width	2.21	ft
Critical Depth	2.63	ft
Percent Full	83.8	%
Critical Slope	0.00939	ft/ft
Velocity	10.75	ft/s
Velocity Head	1.79	ft
Specific Energy	4.31	ft
Froude Number	1.12	
Maximum Discharge	71.74	ft ³ /s
Discharge Full	66.69	ft ³ /s
Slope Full	0.01040	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	83.85	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 19

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.52	ft
Critical Depth	2.63	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00939	ft/ft

Worksheet for PIPE 19B

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00700	ft/ft
Diameter	3.00	ft
Discharge	57.00	ft ³ /s

Results

Normal Depth	2.52	ft
Flow Area	6.34	ft ²
Wetted Perimeter	6.96	ft
Hydraulic Radius	0.91	ft
Top Width	2.20	ft
Critical Depth	2.45	ft
Percent Full	84.0	%
Critical Slope	0.00737	ft/ft
Velocity	8.99	ft/s
Velocity Head	1.26	ft
Specific Energy	3.78	ft
Froude Number	0.93	
Maximum Discharge	60.03	ft ³ /s
Discharge Full	55.80	ft ³ /s
Slope Full	0.00730	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	84.04	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 19B

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.52	ft
Critical Depth	2.45	ft
Channel Slope	0.00700	ft/ft
Critical Slope	0.00737	ft/ft

Worksheet for PIPE 20

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	5.50	ft
Discharge	216.00	ft ³ /s

Results

Normal Depth	4.12	ft
Flow Area	19.07	ft ²
Wetted Perimeter	11.50	ft
Hydraulic Radius	1.66	ft
Top Width	4.77	ft
Critical Depth	4.11	ft
Percent Full	74.8	%
Critical Slope	0.00501	ft/ft
Velocity	11.32	ft/s
Velocity Head	1.99	ft
Specific Energy	6.11	ft
Froude Number	1.00	
Maximum Discharge	255.42	ft ³ /s
Discharge Full	237.44	ft ³ /s
Slope Full	0.00414	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	74.85	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 20

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.12	ft
Critical Depth	4.11	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00501	ft/ft

Worksheet for PIPE 21

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	1.50	ft
Discharge	5.00	ft ³ /s

Results

Normal Depth	0.90	ft
Flow Area	1.11	ft ²
Wetted Perimeter	2.66	ft
Hydraulic Radius	0.42	ft
Top Width	1.47	ft
Critical Depth	0.86	ft
Percent Full	60.1	%
Critical Slope	0.00578	ft/ft
Velocity	4.51	ft/s
Velocity Head	0.32	ft
Specific Energy	1.22	ft
Froude Number	0.91	
Maximum Discharge	7.99	ft ³ /s
Discharge Full	7.43	ft ³ /s
Slope Full	0.00227	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	60.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 21

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.90	ft
Critical Depth	0.86	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00578	ft/ft

Worksheet for PIPE 22

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.50	ft
Discharge	8.00	ft ³ /s

Results

Normal Depth	0.98	ft
Flow Area	1.22	ft ²
Wetted Perimeter	2.82	ft
Hydraulic Radius	0.43	ft
Top Width	1.43	ft
Critical Depth	1.10	ft
Percent Full	65.3	%
Critical Slope	0.00743	ft/ft
Velocity	6.54	ft/s
Velocity Head	0.67	ft
Specific Energy	1.64	ft
Froude Number	1.25	
Maximum Discharge	11.30	ft ³ /s
Discharge Full	10.50	ft ³ /s
Slope Full	0.00580	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.32	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 22

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.98	ft
Critical Depth	1.10	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00743	ft/ft

Worksheet for PIPE 23

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	5.50	ft
Discharge	223.00	ft ³ /s

Results

Normal Depth	4.23	ft
Flow Area	19.63	ft ²
Wetted Perimeter	11.78	ft
Hydraulic Radius	1.67	ft
Top Width	4.63	ft
Critical Depth	4.18	ft
Percent Full	77.0	%
Critical Slope	0.00515	ft/ft
Velocity	11.36	ft/s
Velocity Head	2.01	ft
Specific Energy	6.24	ft
Froude Number	0.97	
Maximum Discharge	255.42	ft ³ /s
Discharge Full	237.44	ft ³ /s
Slope Full	0.00441	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	76.99	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 23

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.23	ft
Critical Depth	4.18	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00515	ft/ft

Worksheet for PIPE 24

Project Description

Friction Method **Manning Formula**
Solve For **Normal Depth**

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	8.00	ft ³ /s

Results

Normal Depth	0.82	ft
Flow Area	1.22	ft ²
Wetted Perimeter	2.78	ft
Hydraulic Radius	0.44	ft
Top Width	1.97	ft
Critical Depth	1.01	ft
Percent Full	41.1	%
Critical Slope	0.00489	ft/ft
Velocity	6.58	ft/s
Velocity Head	0.67	ft
Specific Energy	1.49	ft
Froude Number	1.48	
Maximum Discharge	24.33	ft ³ /s
Discharge Full	22.62	ft ³ /s
Slope Full	0.00125	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	41.07	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 24

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.82	ft
Critical Depth	1.01	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00489	ft/ft

Worksheet for PIPE 25

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	15.00	ft ³ /s

Results

Normal Depth	1.19	ft
Flow Area	1.95	ft ²
Wetted Perimeter	3.52	ft
Hydraulic Radius	0.55	ft
Top Width	1.96	ft
Critical Depth	1.40	ft
Percent Full	59.5	%
Critical Slope	0.00632	ft/ft
Velocity	7.70	ft/s
Velocity Head	0.92	ft
Specific Energy	2.11	ft
Froude Number	1.36	
Maximum Discharge	24.33	ft ³ /s
Discharge Full	22.62	ft ³ /s
Slope Full	0.00440	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	59.50	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 25

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.19	ft
Critical Depth	1.40	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00632	ft/ft

Worksheet for PIPE 26

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	17.00	ft ³ /s

Results

Normal Depth	1.29	ft
Flow Area	2.15	ft ²
Wetted Perimeter	3.74	ft
Hydraulic Radius	0.58	ft
Top Width	1.91	ft
Critical Depth	1.49	ft
Percent Full	64.7	%
Critical Slope	0.00694	ft/ft
Velocity	7.91	ft/s
Velocity Head	0.97	ft
Specific Energy	2.27	ft
Froude Number	1.31	
Maximum Discharge	24.33	ft ³ /s
Discharge Full	22.62	ft ³ /s
Slope Full	0.00565	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	64.69	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 26

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.29	ft
Critical Depth	1.49	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00694	ft/ft

Worksheet for PIPE 27

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	3.00	ft
Discharge	24.00	ft ³ /s

Results

Normal Depth	1.52	ft
Flow Area	3.58	ft ²
Wetted Perimeter	4.74	ft
Hydraulic Radius	0.76	ft
Top Width	3.00	ft
Critical Depth	1.58	ft
Percent Full	50.5	%
Critical Slope	0.00436	ft/ft
Velocity	6.70	ft/s
Velocity Head	0.70	ft
Specific Energy	2.21	ft
Froude Number	1.08	
Maximum Discharge	50.73	ft ³ /s
Discharge Full	47.16	ft ³ /s
Slope Full	0.00129	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	50.53	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 27

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.52	ft
Critical Depth	1.58	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00436	ft/ft

Worksheet for PIPE 28

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	3.00	ft
Discharge	39.00	ft ³ /s

Results

Normal Depth	1.65	ft
Flow Area	3.98	ft ²
Wetted Perimeter	5.01	ft
Hydraulic Radius	0.79	ft
Top Width	2.99	ft
Critical Depth	2.03	ft
Percent Full	54.9	%
Critical Slope	0.00532	ft/ft
Velocity	9.80	ft/s
Velocity Head	1.49	ft
Specific Energy	3.14	ft
Froude Number	1.50	
Maximum Discharge	71.74	ft ³ /s
Discharge Full	66.69	ft ³ /s
Slope Full	0.00342	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	54.94	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 28

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.65	ft
Critical Depth	2.03	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00532	ft/ft

Worksheet for PIPE 29

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01500	ft/ft
Diameter	3.00	ft
Discharge	79.00	ft ³ /s

Results

Normal Depth	2.37	ft
Flow Area	6.00	ft ²
Wetted Perimeter	6.58	ft
Hydraulic Radius	0.91	ft
Top Width	2.44	ft
Critical Depth	2.76	ft
Percent Full	79.2	%
Critical Slope	0.01218	ft/ft
Velocity	13.17	ft/s
Velocity Head	2.69	ft
Specific Energy	5.07	ft
Froude Number	1.48	
Maximum Discharge	87.87	ft ³ /s
Discharge Full	81.68	ft ³ /s
Slope Full	0.01403	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	79.15	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 29

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.37	ft
Critical Depth	2.76	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.01218	ft/ft

CHANNEL IMPROVEMENTS

Cathy Tessin

From: Chris Jorgensen <CJorgensen@laplatallc.com>
Sent: Friday, October 19, 2018 8:45 AM
To: Steve Rossoll; Kyle Campbell; Cathy Tessin; P. E. Richard Wray - Kiowa Engineering Corporation (rwrap@kiowaengineering.com)
Cc: Tom Taylor; Douglas Reinelt; Mitchell, Timothy
Subject: The Farm Channel Embankments Proposed Schedule
Attachments: 20181019082436.pdf

All

Here is what I am showing for my development forecast. As I understand, we owe improvements as we build stuff. We seem to have everything going at the same time!
Please see the attached exhibit for embankment name correlation. Please back in the proper design start dates, and provide topo so we can get going. The geotech reports are almost done.

BSC Embankment 6 (Orange) – Start construction in November 2018

BSC Embankment 4 (Yellow) – Start construction in February 2019

Middle Creek Embankment and Associated Drop Structures – Start construction in April 2019

BSC Embankment 5 and associated Bank Stabilization (Red) – Start construction in June 2019

BSC Embankment 2 (Purple) – Start construction in August 2019

BSC Embankment 1 (Purple) – Start construction in September 2019

BSC Filing 7 Bank Stabilization (Blue) – Start construction in March 2020

Please let me know if you have questions.

Thanks,
Chris

Chris Jorgensen, PE (CO,UT)

Project Manager

LA PLATA

C O M M U N I T I E S

1755 Telstar Drive, Suite 211

Colorado Springs, CO 80920

Cell: 801.673.0193

Fax: 719.260.7088

EXISTING CONDITIONS



Squirrel Creek channel improvements due to permitting requirements from the Core of Engineers and Fish and Wildlife. If channel improvements have not been started when this detention facility is required, a temporary private detention pond will be provided at that time. Upon construction of the permanent detention facility (BS-1) the temporary detention facility will be removed.

● BLACK SQUIRREL – 2 DRAINAGE BASIN ●

Basin BS-2A ($Q_5= 17.72$ cfs, $Q_{100}= 33.20$ cfs) is 6.9 acres and consists of building, landscaping, a portion of the Federal Drive extension and parking lot flows. Runoff from this basin will sheet flow across the proposed parking lot and drives and travel as sheet flow and curb and gutter flow into the proposed storm sewer system to Design Point 35 ($Q_5= 85.55$ cfs, $Q_{100}= 158.06$ cfs) combining with flows from Basins BS-2B and BS-2C. At this point, where a 60" RCP pipe Conveyance 31) will accept both the 5-yr. and 100-yr. developed flows and convey them to Design Point 36/ Pond BS-2.

Basin BS-2B ($Q_5= 37.35$ cfs, $Q_{100}= 68.43$ cfs) is 13.7 acres and consists of future building, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to point, where a 42" RCP pipe (Conveyance 30) will accept both the 5-yr. and 100-year developed flows conveying them to Design Point 35.

Basin BS-2C ($Q_5= 30.92$ cfs, $Q_{100}= 56.77$ cfs) is 11.4 acres and consists of future building, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to Design Point 35.

Basin BS-2D ($Q_5= 4.63$ cfs, $Q_{100}= 8.49$ cfs) is 1.7 acres and is the area for Detention Pond BS-2. Runoff from this basin will flow to Design Point 36/ Pond BS-2 ($Q_5= 90.18$ cfs, $Q_{100}= 166.54$ cfs).

Basin BS-2E ($Q_5= 0.44$ cfs, $Q_{100}= 2.81$ cfs) is 1.8 acres in area is a portion of the basin that will not be landscaped and will bypass Detention Pond BS-2. Runoff from this basin will drain to Design Point 13.



Design Point 36 ($Q_5 = 90.18$ cfs, $Q_{100} = 166.54$ cfs), is the inflow into Private Detention Pond BS-2 and Design Point 13 represents the restricted released flows. The allowable flow for Design Point 13 ($Q_5 = 5.83$ cfs, $Q_{100} = 43.98$ cfs) (based upon the historic flow from an equal area of land draining to Design Point 13 in the developed condition). This pond has been modeled to release flows which are close to the allowable rates ($Q_{100} = 42.40$ cfs). However, final pond design and appropriate outlet structure will be specified at the time of known site development within a specific final drainage report.

BLACK SQUIRREL – 3 DRAINAGE BASIN

Basin BS-3A ($Q_5 = 24.83$ cfs, $Q_{100} = 45.54$ cfs) is 9.1 acres and consists of building, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to a point, where a 36" RCP pipe (Conveyance 35) will route the flows to Design Point 41.

Basin BS-3B ($Q_5 = 37.10$ cfs, $Q_{100} = 71.98$ cfs) is 15.2 acres and consists of future building, roadway, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to Design Point 41 ($Q_5 = 61.45$ cfs, $Q_{100} = 117.03$ cfs), where a 48" RCP pipe (Conveyance 36) will convey the developed flows to Design Point 42.

Basin BS-3C ($Q_5 = 40.58$ cfs, $Q_{100} = 74.48$ cfs) is 14.9 acres and consists of future building, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to Design Point 42 ($Q_5 = 100.66$ cfs, $Q_{100} = 183.49$ cfs), where a 60" RCP pipe (Conveyance 37) will convey the flows to Design Point 43/ Pond BS-3.

Basin BS-3D ($Q_5 = 54.90$ cfs, $Q_{100} = 101.33$ cfs) is 20.4 acres and consists of future building, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to Design Point 43/ Pond BS-3.

Basin BS-3E ($Q_5 = 34.63$ cfs, $Q_{100} = 63.98$ cfs) is 12.9 acres and consists of future building, landscaping and parking lot flows. Runoff from this basin will sheet flow across the parking lot and drives and travel as sheet flow and curb and gutter flow into the storm sewer system to a point, where a 42" RCP pipe (Conveyance 38) will accept both the 5-yr. and 100-yr. developed flows and route to Design Point 43/ Pond BS-3.

Basin BS-3F ($Q_5 = 10.61$ cfs, $Q_{100} = 19.48$ cfs) is 3.9 acres and is the area for Detention Pond BS-3. Runoff from this basin will flow to Design Point 43 ($Q_5 = 197.70$ cfs, $Q_{100} = 366.68$ cfs).

Basin BS-3G ($Q_5 = 13.91$ cfs, $Q_{100} = 26.23$ cfs) is 5.6 acres in area is a portion of the basin that will not be developed and will bypass Detention Pond BS-3. Runoff from this basin will drain to Design Point 14.

Design Point 43 ($Q_5 = 197.70$ cfs, $Q_{100} = 366.68$ cfs) is the inflow into Private Detention Pond BS-3 and DP-14 represents the restricted pond release. The allowable flow for Design Point 14 ($Q_5 = 11.06$ cfs, $Q_{100} = 84.58$ cfs) (based upon the historic flow from an equal area of land draining to Design Point 13 in the developed condition). This pond has been modeled to release flows which are close to the allowable rates ($Q_{100} = 83.77$ cfs). However, final pond design and appropriate outlet structure will be specified at the time of known site development within a specific final drainage report. See "Final Design Report for Allison Valley On-Site Reaches of Black Squirrel Creek and Middle Tributary Creek Channel Improvements," by Classic Consulting, June 2007 for creek/channel improvement specifics.

INTERIM CONDITIONS – Filing Nos. 1 & 2 (see "Interim Conditions Drainage Map")

The purpose of this analysis is to prove adequate release rates using the SCS drainage analysis method at the main overall basin outfalls across Interstate 25 with the development of the first phase of construction (Filing No. 1 & 2).

MASTER DEVELOPMENT DRAINAGE PLAN MARKETPLACE AT INTERQUEST DEVELOPED CONDITIONS DRAINAGE MAP

WATER QUALITY SUMMARY

POND	WQ BASIN AREA (acres)	WQ BASIN % IMPERVIOUS	WQ VOLUME REQUIRED (cfs)	WQ PONDING ELEV. (ft)	WQ PONDING HEIGHT (ft)	WQ OFFICE COLUMNS	WQ # ROWS	WQ OFFICE DIAMETER (inches)
EK-3C	25.2	90	2.106	6652.3	2.2	2	8	0.750
EK-3B	53.7	90	4.438	6654.6	3.7	1	9	1.128
BS-2	37.2	90	1.795	6673.0	3.8	1	10	1.000
BS-3	74.2	90	2.979	6681.3	4.3	2	13	0.938

DETENTION POND SUMMARY

POND	DESIGN DIMENSIONS (feet)	RISER CREST ELEV. (feet)	PIPE DIAMETER (inches)	OUTLET PIPE INVERT (feet)	OUTLET PIPE SLOPE (%)	INVERT OF POND (feet)	LENGTH OF EMERG. SPILLWAY (feet)	EMERGENCY SPILLWAY FLOW DEPTH (feet)	FREEBOARD DEPTH (feet)	CREST OF DAM (feet)
EK-3C	7.2 x 4.0	6037.00	36" RCP	6008.0	0.5	6008.00	60.00	3.0	2.0	60.00
EK-3B	7.2 x 4.0	6038.00	48" RCP	6009.0	0.5	6009.00	60.00	3.0	2.8	60.00
EK-4	7.2 x 4.0	6027.45	36" RCP	6007.5	2.0	6007.50	60.00	3.0	1.0	60.00
BS-4	7.2 x 4.0	6027.45	36" RCP	6007.5	2.0	6007.50	60.00	3.0	1.0	60.00
BS-1	7.2 x 4.0	6027.45	36" RCP	6007.5	2.0	6007.50	60.00	3.0	1.0	60.00
BS-2	7.2 x 4.0	6027.45	36" RCP	6007.5	2.0	6007.50	60.00	3.0	1.0	60.00
BS-3	7.2 x 4.0	6027.45	36" RCP	6007.5	2.0	6007.50	60.00	3.0	1.0	60.00

DRAINAGE DESIGN POINTS SUMMARY

Design Point	Q 2 Yr	Q 5 Yr	Q 10 Yr	Q 25 Yr	Q 50 Yr	Q 100 Yr
BS-1	11.2	11.2	11.2	11.2	11.2	11.2
BS-2	11.2	11.2	11.2	11.2	11.2	11.2
BS-3	11.2	11.2	11.2	11.2	11.2	11.2
BS-4	11.2	11.2	11.2	11.2	11.2	11.2
BS-5	11.2	11.2	11.2	11.2	11.2	11.2
BS-6	11.2	11.2	11.2	11.2	11.2	11.2
BS-7	11.2	11.2	11.2	11.2	11.2	11.2
BS-8	11.2	11.2	11.2	11.2	11.2	11.2
BS-9	11.2	11.2	11.2	11.2	11.2	11.2
BS-10	11.2	11.2	11.2	11.2	11.2	11.2
BS-11	11.2	11.2	11.2	11.2	11.2	11.2
BS-12	11.2	11.2	11.2	11.2	11.2	11.2
BS-13	11.2	11.2	11.2	11.2	11.2	11.2
BS-14	11.2	11.2	11.2	11.2	11.2	11.2
BS-15	11.2	11.2	11.2	11.2	11.2	11.2
BS-16	11.2	11.2	11.2	11.2	11.2	11.2
BS-17	11.2	11.2	11.2	11.2	11.2	11.2
BS-18	11.2	11.2	11.2	11.2	11.2	11.2
BS-19	11.2	11.2	11.2	11.2	11.2	11.2
BS-20	11.2	11.2	11.2	11.2	11.2	11.2
BS-21	11.2	11.2	11.2	11.2	11.2	11.2
BS-22	11.2	11.2	11.2	11.2	11.2	11.2
BS-23	11.2	11.2	11.2	11.2	11.2	11.2
BS-24	11.2	11.2	11.2	11.2	11.2	11.2
BS-25	11.2	11.2	11.2	11.2	11.2	11.2
BS-26	11.2	11.2	11.2	11.2	11.2	11.2
BS-27	11.2	11.2	11.2	11.2	11.2	11.2
BS-28	11.2	11.2	11.2	11.2	11.2	11.2
BS-29	11.2	11.2	11.2	11.2	11.2	11.2
BS-30	11.2	11.2	11.2	11.2	11.2	11.2
BS-31	11.2	11.2	11.2	11.2	11.2	11.2
BS-32	11.2	11.2	11.2	11.2	11.2	11.2
BS-33	11.2	11.2	11.2	11.2	11.2	11.2
BS-34	11.2	11.2	11.2	11.2	11.2	11.2
BS-35	11.2	11.2	11.2	11.2	11.2	11.2
BS-36	11.2	11.2	11.2	11.2	11.2	11.2
BS-37	11.2	11.2	11.2	11.2	11.2	11.2
BS-38	11.2	11.2	11.2	11.2	11.2	11.2
BS-39	11.2	11.2	11.2	11.2	11.2	11.2
BS-40	11.2	11.2	11.2	11.2	11.2	11.2
BS-41	11.2	11.2	11.2	11.2	11.2	11.2
BS-42	11.2	11.2	11.2	11.2	11.2	11.2
BS-43	11.2	11.2	11.2	11.2	11.2	11.2
BS-44	11.2	11.2	11.2	11.2	11.2	11.2
BS-45	11.2	11.2	11.2	11.2	11.2	11.2
BS-46	11.2	11.2	11.2	11.2	11.2	11.2
BS-47	11.2	11.2	11.2	11.2	11.2	11.2
BS-48	11.2	11.2	11.2	11.2	11.2	11.2
BS-49	11.2	11.2	11.2	11.2	11.2	11.2
BS-50	11.2	11.2	11.2	11.2	11.2	11.2

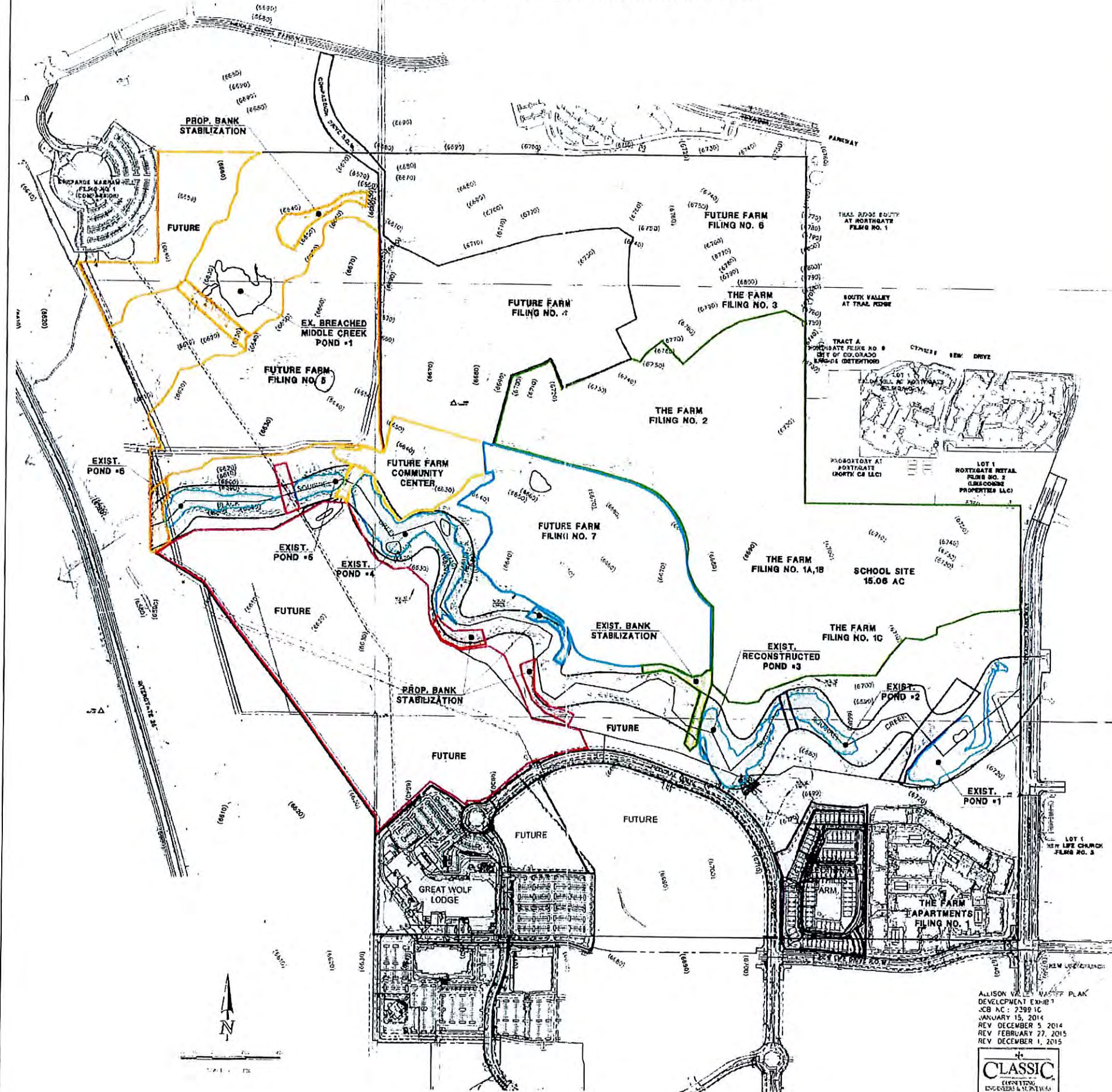
DRAINAGE BASIN SUMMARY

Basin	Area (Acres)	Total Area (Acres)	Total Volume (cfs)	Total Length (ft)	Total Depth (ft)	Total Area (Acres)	Total Volume (cfs)	Total Length (ft)	Total Depth (ft)
BS-1	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-3	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-4	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-5	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-6	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-7	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-8	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-9	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-10	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-11	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-12	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-13	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-14	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-15	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-16	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-17	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-18	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-19	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-20	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-21	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-22	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-23	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-24	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-25	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-26	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-27	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-28	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-29	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-30	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-31	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-32	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-33	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-34	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-35	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-36	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-37	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-38	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-39	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-40	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-41	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-42	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-43	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-44	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-45	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-46	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-47	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-48	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
BS-49	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
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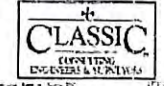
DRAINAGE CONVEYANCE SUMMARY

Conveyance Label	Type	Length (ft)	Upper Invert (ft)	Lower Invert (ft)	Slope (%)	Side Slope	Manning's N	Available Depth (ft)	Q 5 Yr (cfs)	Q 10 Yr (cfs)	Q 25 Yr (cfs)	Q 50 Yr (cfs)	Q 100 Yr (cfs)
C1	Open Channel	100	6700.00	6690.00	1.0	2:1	0.045	1.0	100	150	200	250	300
C2	Open Channel	100	6700.00	6690.00	1.0	2:1	0.045	1.0	100	150	200	250	300
C3	Open Channel	100	6700.00	6690.00	1.0	2:1	0.045	1.0	100	150	200	250	300
C4	Open Channel	100	6700.00	6690.00	1.0	2:1	0.045	1.0	100	150	200	250	300
C5	Open Channel	100	6700.00	6690.00	1.0	2:1	0.045	1.0	100	150	200	250	300
C6	Open Channel	100	6700.00	6690.00	1.0	2:1							

DEVELOPMENT EXHIBIT ALLISON VALLEY MASTER PLAN

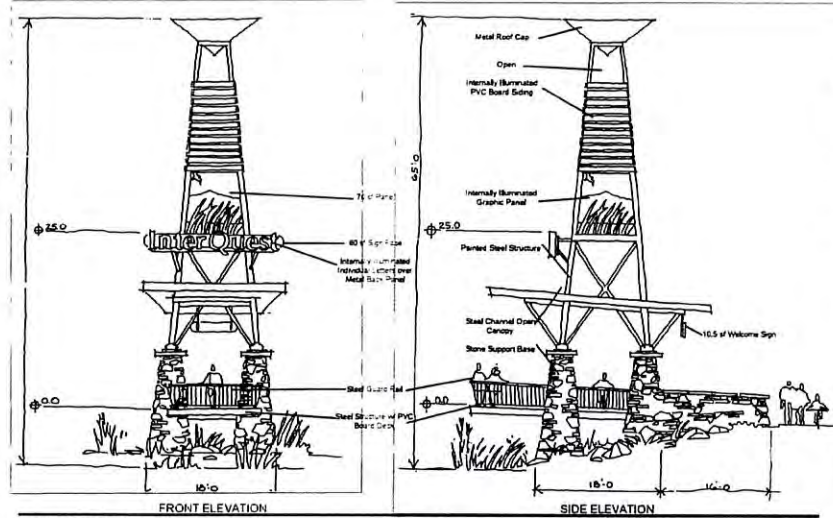


ALLISON VALLEY MASTER PLAN
 DEVELOPMENT EXHIBIT
 JCB AC - 2399 1G
 JANUARY 15, 2014
 REV DECEMBER 5, 2014
 REV FEBRUARY 27, 2015
 REV DECEMBER 1, 2015

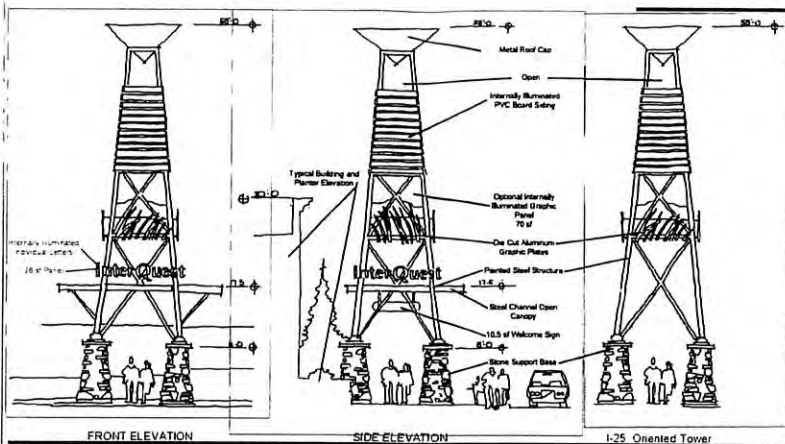


InterQuest Marketplace

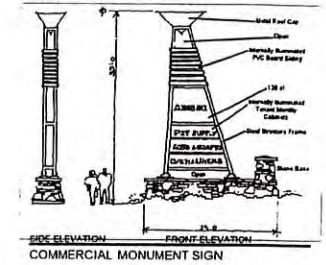
COLORADO SPRINGS, COLORADO



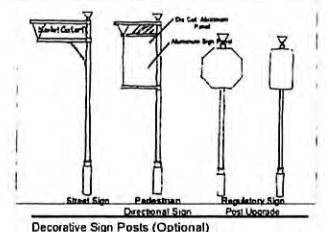
LANDMARK TOWER



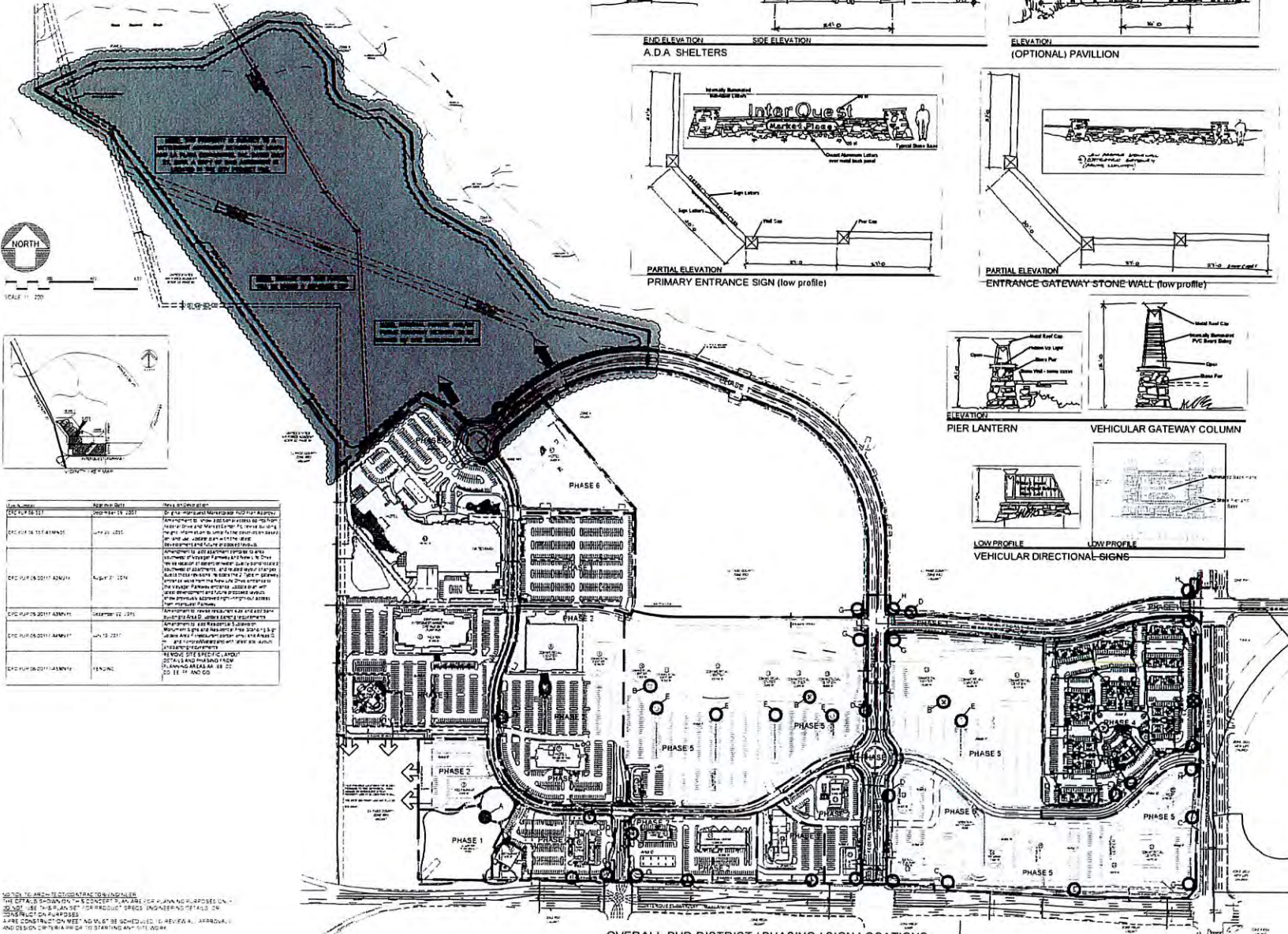
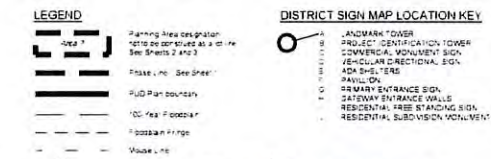
PROJECT IDENTIFICATION TOWER



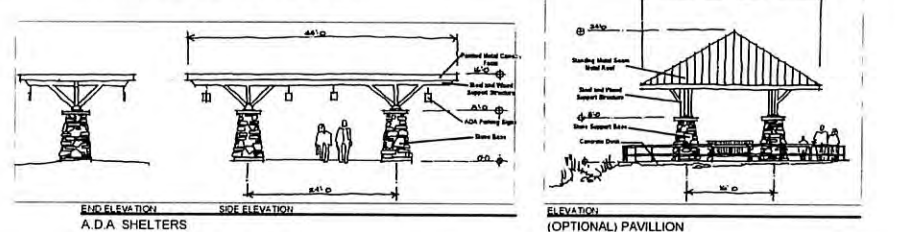
COMMERCIAL MONUMENT SIGN



Decorative Sign Posts (Optional)

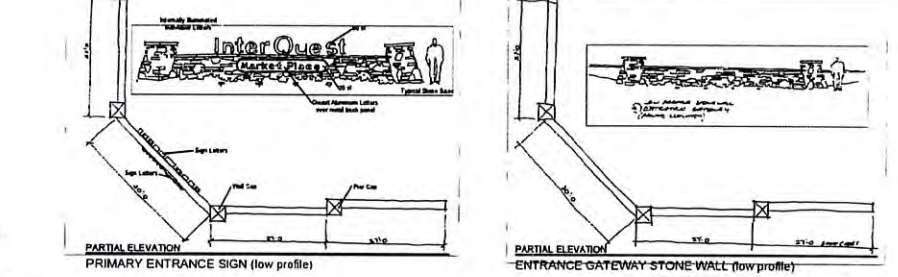


Sign Type	Sign Size	Sign Location
Commercial Monument Sign	12' x 12'	Phase 1, 2, 3, 4, 5, 6
Vehicular Directional Sign	8' x 12'	Phase 1, 2, 3, 4, 5, 6
Primary Entrance Sign	12' x 12'	Phase 1, 2, 3, 4, 5, 6
Gateway Entrance Wall	12' x 12'	Phase 1, 2, 3, 4, 5, 6
Residential Free-Standing Sign	12' x 12'	Phase 1, 2, 3, 4, 5, 6
Residential Subdivision Monument Sign	12' x 12'	Phase 1, 2, 3, 4, 5, 6



A.D.A. SHELTERS

(OPTIONAL) PAVILION



PRIMARY ENTRANCE SIGN (low profile)

ENTRANCE GATEWAY STONE WALL (low profile)



PIER LANTERN

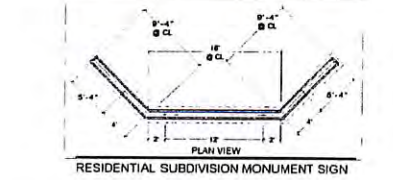
VEHICULAR GATEWAY COLUMN



VEHICULAR DIRECTIONAL SIGNS



RESIDENTIAL SUBDIVISION MONUMENT SIGN



RESIDENTIAL SUBDIVISION MONUMENT SIGN



RESIDENTIAL FREE-STANDING SIGN



RESIDENTIAL FREE-STANDING SIGN

STORAGE AND LANDMARK/PROJECT IDENTIFICATION TOWER PROVISIONS

Building mounted signs in Planning Area 4-R will be permitted, used and installed in the primary area of the PUD site subject to the existing City Sign Code. Use of the existing and monument signs with the exception of the PUD District signs in this plan will be permitted in Planning Area 4-R, except as otherwise noted below.

Landmark Tower: A landmark tower with a height of 120 feet will be permitted in the PUD District as a landmark tower for the InterQuest Marketplace development. The tower will have a maximum height of 120 feet. It shall be located on the tower with a maximum height of 120 feet. The tower shall be located on the tower with a maximum height of 120 feet. The tower shall be located on the tower with a maximum height of 120 feet.

Project Identification Tower: A project identification tower with a height of 120 feet will be permitted in the PUD District as a project identification tower for the InterQuest Marketplace development. The tower will have a maximum height of 120 feet. It shall be located on the tower with a maximum height of 120 feet. The tower shall be located on the tower with a maximum height of 120 feet.

Monument Signs: Monument Signs 12' in height will be provided for the entire site. The signs will be provided for the entire site. The signs will be provided for the entire site. The signs will be provided for the entire site. The signs will be provided for the entire site.

Vehicle Directional Signs: Vehicle Directional Signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site.

Primary Entrance Signs and Gateway Entrance Signs: Primary Entrance Signs and Gateway Entrance Signs will be provided for the entire site. The signs will be provided for the entire site. The signs will be provided for the entire site. The signs will be provided for the entire site. The signs will be provided for the entire site.

Residential Free-Standing Signs: Residential Free-Standing Signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site.

Residential Subdivision Monument Signs: Residential Subdivision Monument Signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site.

Decorative Sign Posts: Decorative Sign Posts for residential and commercial street signs will be provided in the district as an option by the developer.

Use of Service Line Signs: Use of Service Line Signs to the public utility or for the use of the utility will be permitted.

All signs must be installed in the PUD District.

Use of signs that are not listed in this plan is prohibited.

EXISTING ZONE PUD
PERMITTED AND CONDITIONAL LAND USES: As permitted and conditional uses as shown in the PUD District (see map on page 20).
HEIGHTS: 120 feet.
WATER PLAN: As per the Water Plan and InterQuest Marketplace Water Plan.
TRAFFIC BASIN: As per the Traffic Basin and InterQuest Marketplace Traffic Basin.
MAXIMUM BASE BUILDING HEIGHT: 45 feet. (See Building Height Schedule on page 20).
Sign Height Exceptions: The following 10' signs in Planning Area 4-R will be allowed a maximum building height of 120 feet in Planning Area 4-R. The signs will be allowed a maximum building height of 120 feet in Planning Area 4-R. The signs will be allowed a maximum building height of 120 feet in Planning Area 4-R. The signs will be allowed a maximum building height of 120 feet in Planning Area 4-R. The signs will be allowed a maximum building height of 120 feet in Planning Area 4-R.

NOTES:
 1. Data areas and parking are permitted throughout the PUD District as shown on the site plan.
 2. All signs must be installed in the PUD District.
 3. Use of signs that are not listed in this plan is prohibited.
 4. All signs must be installed in the PUD District.
 5. Use of signs that are not listed in this plan is prohibited.
 6. All signs must be installed in the PUD District.
 7. Use of signs that are not listed in this plan is prohibited.
 8. All signs must be installed in the PUD District.
 9. Use of signs that are not listed in this plan is prohibited.
 10. All signs must be installed in the PUD District.

VEHICULAR GATEWAY COLUMN
 Vehicular Gateway Columns are used throughout the site to direct drivers to various areas within the site. The columns are used throughout the site to direct drivers to various areas within the site. The columns are used throughout the site to direct drivers to various areas within the site. The columns are used throughout the site to direct drivers to various areas within the site.

VEHICULAR DIRECTIONAL SIGNS
 Vehicular Directional Signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site. The signs are used throughout the site to direct drivers to various areas within the site.

VEHICULAR GATEWAY COLUMN
 Vehicular Gateway Columns are used throughout the site to direct drivers to various areas within the site. The columns are used throughout the site to direct drivers to various areas within the site. The columns are used throughout the site to direct drivers to various areas within the site. The columns are used throughout the site to direct drivers to various areas within the site.

COLORADO SPRING
 09/07/2018
 3:29:27 PM
 dsexton

Amendment to **InterQuest Marketplace PUD Plan**
 COLORADO SPRINGS, COLORADO

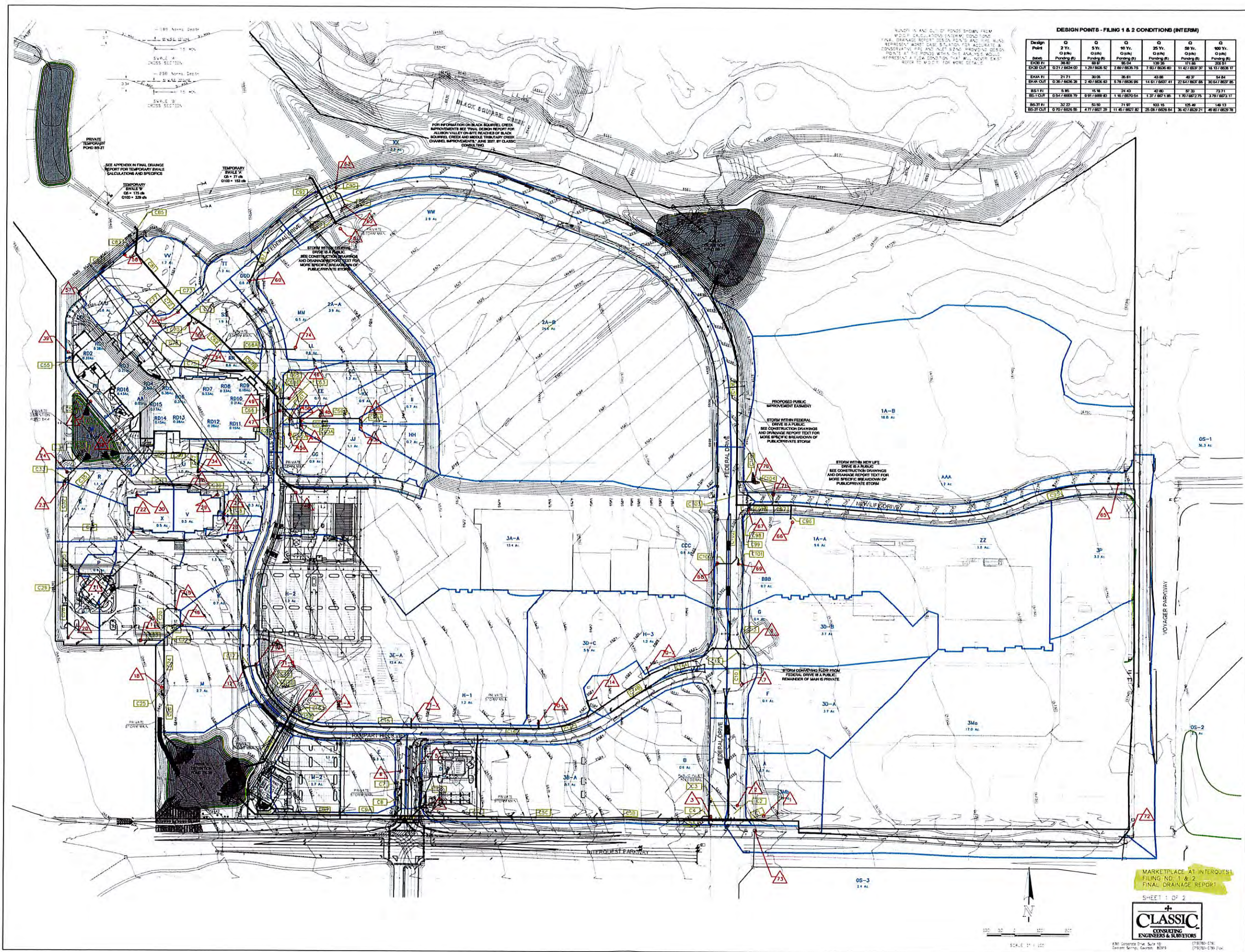
INTERQUEST MARKETPLACE LLC
 111 S. Tejon Street, Suite 202
 Colorado Springs, CO 80902
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 (719) 573-2600

PREPARATION: 9-30-17
 REVISION: 9-14-17, 9-15-17, 9-16-17, 9-18-17, 9-19-17
 CITY FILE NO: CPC PUP 09-00117-15M218

Sheet 1 of 2

C:\220600\REF\PROJECTS\10000004 - Fibregl and 2 - Fibregl\2206000104 - Hotel.dwg, 5/4/2010, 2:45:28 PM, E. SZOZDA



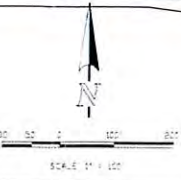
WINDS AND GUSTS SHOWN FROM MODEL CALCULATIONS (ASHRAE) SHOULD BE FINAL. DRAINAGE REPORT DESIGN CONDITIONS REPRESENT A BEST CASE ESTIMATE FOR ACCURATE AND CONSERVATIVE PIPE AND PONDING THROUGH DESIGN POINTS AT THE POINTS WITHIN THE AREA'S WINDS REPRESENT A BEST CASE THAT WILL NEVER EXIST. REFER TO WINDS FOR MORE DETAILS.

DESIGN POINTS - FILING 1 & 2 CONDITIONS (INTERM)

Design Point (feet)	Q 2 Yr. (cfs)	Q 5 Yr. (cfs)	Q 10 Yr. (cfs)	Q 25 Yr. (cfs)	Q 50 Yr. (cfs)	Q 100 Yr. (cfs)
ES-31	36.85	69.51	128.32	218.52	371.88	525.81
ES-31 OUT	0.217/6634.01	1.287/6636.32	2.487/6636.15	7.807/6636.80	11.427/6637.31	16.137/6636.17
ES-31	31.71	36.08	36.81	43.88	49.20	54.84
ES-31 OUT	0.367/6636.28	2.497/6636.83	5.787/6636.96	14.617/6637.41	22.647/6637.88	30.677/6637.85
BS-1	5.85	15.16	24.43	42.80	57.30	73.71
BS-1 OUT	0.547/6636.79	0.917/6636.81	1.187/6636.84	1.277/6636.85	1.307/6636.86	1.337/6636.87
BS-2	32.22	65.57	111.87	201.15	325.48	469.53
BS-2 OUT	0.107/6636.86	4.777/6637.20	11.477/6637.82	25.937/6638.84	36.477/6639.31	48.477/6639.78

MARKETPLACE AT INTERQUEST
FILING NO. 1 & 2
FINAL DRAINAGE REPORT

SHEET 1 OF 2



1300 Corporate Drive, Suite 100
Savannah, Georgia 31404
(912) 436-1700
(912) 436-1799 (fax)

MASTER DEVELOPMENT DRAINAGE PLAN MARKETPLACE AT INTERQUEST DEVELOPED CONDITIONS DRAINAGE MAP

WATER QUALITY SUMMARY

POND	WQ BASIN AREA (SQ FT)	WQ BASIN VOLUME (CU FT)	WQ PONDING ELEV.	WQ PONDING HEIGHT	WQ DRIFTE COLUMNS	WQ DRIFTE RODS	WQ DRIFTE DIAMETER
14-35	2,177	1,581	532.0	2.2	1	1	2.00
14-36	1,171	795	532.0	2.2	1	1	2.00
14-37	1,171	795	532.0	2.2	1	1	2.00
14-38	1,171	795	532.0	2.2	1	1	2.00
14-39	1,171	795	532.0	2.2	1	1	2.00

DETENTION POND SUMMARY

POND	RISER DIMENSIONS	RISER CREST ELEV.	OUTLET PIPE DIAMETER	OUTLET PIPE SLOPE	INVERT OF POND	INVERT OF ENERGY SPILLWAY	LENGTH OF SPILLWAY	EMERGENCY FLOW DEPTH	FREE BOARD DEPTH	CREST SP. DAM
14-35	10' x 10'	532.0	24" RCP	0.00%	529.0	529.0	30'	1.0'	2.0'	532.0
14-36	10' x 10'	532.0	24" RCP	0.00%	529.0	529.0	30'	1.0'	2.0'	532.0
14-37	10' x 10'	532.0	24" RCP	0.00%	529.0	529.0	30'	1.0'	2.0'	532.0
14-38	10' x 10'	532.0	24" RCP	0.00%	529.0	529.0	30'	1.0'	2.0'	532.0
14-39	10' x 10'	532.0	24" RCP	0.00%	529.0	529.0	30'	1.0'	2.0'	532.0

DRAINAGE DESIGN POINTS SUMMARY

Design Point	Q 2 yr	Q 5 yr	Q 10 yr	Q 50 yr	Q 100 yr
14-35	1,171	1,171	1,171	1,171	1,171
14-36	1,171	1,171	1,171	1,171	1,171
14-37	1,171	1,171	1,171	1,171	1,171
14-38	1,171	1,171	1,171	1,171	1,171
14-39	1,171	1,171	1,171	1,171	1,171

DRAINAGE BASIN SUMMARY

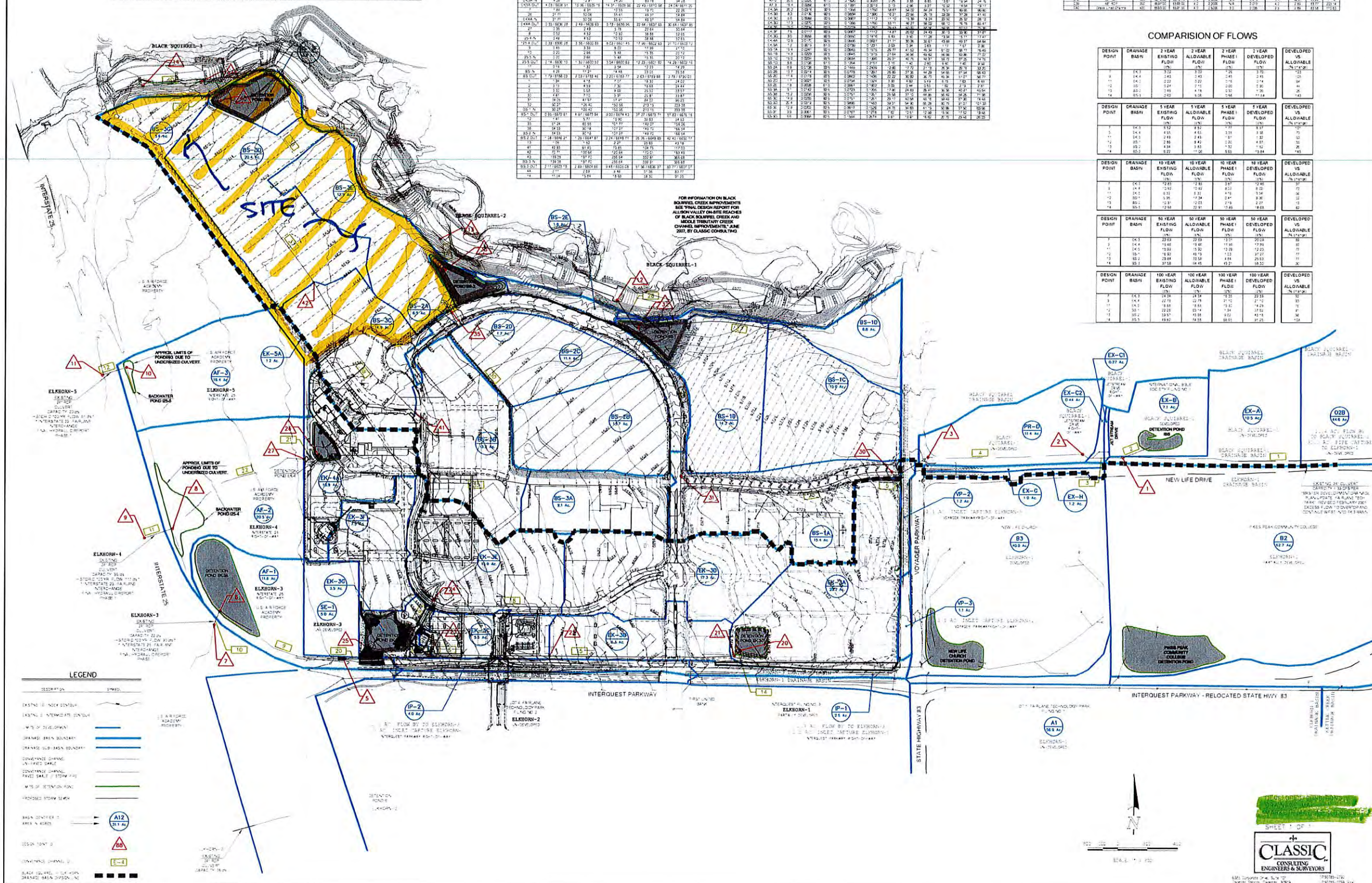
BASIN	TOTAL BASIN AREA	TOTAL LAKELINE	TOTAL Q 2 yr	TOTAL Q 5 yr	TOTAL Q 10 yr	TOTAL Q 50 yr	TOTAL Q 100 yr
14-35	2,177	1,581	1,171	1,171	1,171	1,171	1,171
14-36	1,171	795	1,171	1,171	1,171	1,171	1,171
14-37	1,171	795	1,171	1,171	1,171	1,171	1,171
14-38	1,171	795	1,171	1,171	1,171	1,171	1,171
14-39	1,171	795	1,171	1,171	1,171	1,171	1,171

DRAINAGE CONVEYANCE SUMMARY

Conveyance Point	Type	Length	Upper Invert	Lower Invert	Bottom	Slope	Sub. Rock	Manning's n	Available Depth	Q 2 yr	Q 5 yr	Q 10 yr	Q 50 yr	Q 100 yr
14-35	12" RCP	100'	532.0	529.0	529.0	0.00%	1.49	0.05	2.0'	1,171	1,171	1,171	1,171	1,171
14-36	12" RCP	100'	532.0	529.0	529.0	0.00%	1.49	0.05	2.0'	1,171	1,171	1,171	1,171	1,171
14-37	12" RCP	100'	532.0	529.0	529.0	0.00%	1.49	0.05	2.0'	1,171	1,171	1,171	1,171	1,171
14-38	12" RCP	100'	532.0	529.0	529.0	0.00%	1.49	0.05	2.0'	1,171	1,171	1,171	1,171	1,171
14-39	12" RCP	100'	532.0	529.0	529.0	0.00%	1.49	0.05	2.0'	1,171	1,171	1,171	1,171	1,171

COMPARISON OF FLOWS

DESIGN POINT	DRAINAGE BASIN	5 YEAR EXISTING FLOW	5 YEAR ALLOWABLE FLOW	5 YEAR PHASE I DEVELOPED FLOW	5 YEAR PHASE II DEVELOPED FLOW	DEVELOPED VS ALLOWABLE % DIFF
1	14-35	1,171	1,171	1,171	1,171	0%
2	14-36	1,171	1,171	1,171	1,171	0%
3	14-37	1,171	1,171	1,171	1,171	0%
4	14-38	1,171	1,171	1,171	1,171	0%
5	14-39	1,171	1,171	1,171	1,171	0%



MASTER DEVELOPMENT DRAINAGE PLAN MARKETPLACE AT INTERQUEST DEVELOPED CONDITIONS DRAINAGE MAP

WATER QUALITY SUMMARY

POND	WG BASIN AREA	WG BASIN VOLUME	WG PONDING REQUIRED	WG PONDING ELEV	WG PONDING HEIGHT	# WQ OFFICE COLUMNS	# WQ OFFICE ROWS	WG OFFICE DIAMETER
ELKHORN-1	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-2	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-3	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-4	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-5	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-6	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-7	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-8	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-9	1.1	1.1	1.1	1.1	1.1	1	1	1.1
ELKHORN-10	1.1	1.1	1.1	1.1	1.1	1	1	1.1

DETENTION POND SUMMARY

POND	USER DIMENSIONS	INLET PIPE DIAMETER	OUTLET PIPE DIAMETER	INVERT OF POND	INVERT OF EMERG. SPILLWAY	LENGTH OF EMERG. SPILLWAY	EMERGENCY FLOWDEPTH	FREE BOARD DEPTH	CREST OF DAM
ELKHORN-1	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-2	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-3	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-4	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-5	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-6	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-7	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-8	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-9	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00
ELKHORN-10	10' x 10'	24" RCP	24" RCP	100.00	100.00	10'	1.0'	1.0'	101.00

DRAINAGE DESIGN POINTS SUMMARY

DESIGN POINT	Q 2 Yr	Q 5 Yr	Q 10 Yr	Q 50 Yr	Q 100 Yr
DP-1	1.1	1.1	1.1	1.1	1.1
DP-2	1.1	1.1	1.1	1.1	1.1
DP-3	1.1	1.1	1.1	1.1	1.1
DP-4	1.1	1.1	1.1	1.1	1.1
DP-5	1.1	1.1	1.1	1.1	1.1
DP-6	1.1	1.1	1.1	1.1	1.1
DP-7	1.1	1.1	1.1	1.1	1.1
DP-8	1.1	1.1	1.1	1.1	1.1
DP-9	1.1	1.1	1.1	1.1	1.1
DP-10	1.1	1.1	1.1	1.1	1.1

DRAINAGE BASIN SUMMARY

BASIN	TOTAL BASIN AREA	TOTAL BASIN VOLUME	WEIGHTED Q	TOTAL Q	Q 2 Yr	Q 5 Yr	Q 10 Yr	Q 50 Yr	Q 100 Yr
BS-1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-4	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-5	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-7	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BS-10	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

DRAINAGE CONVEYANCE SUMMARY

Conveyance Label	Type	Length	Upper Invert	Lower Invert	Bottom Width	Slope %	Side Slope	Manning's N	Available Depth	Q 2 Yr	Q 5 Yr	Q 10 Yr	Q 50 Yr	Q 100 Yr
EX-1	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-2	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-3	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-4	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-5	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-6	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-7	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-8	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-9	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1
EX-10	Channel	100'	100.00	100.00	10'	0.01	1:1	0.04	1.0'	1.1	1.1	1.1	1.1	1.1

COMPARISON OF FLOWS

DESIGN POINT	DRAINAGE BASIN	5 YEAR EXISTING FLOW	5 YEAR ALLOWABLE FLOW	5 YEAR PHASE FLOW	5 YEAR DEVELOPED FLOW	DEVELOPED VS ALLOWABLE
DP-1	BS-1	1.1	1.1	1.1	1.1	OK
DP-2	BS-2	1.1	1.1	1.1	1.1	OK
DP-3	BS-3	1.1	1.1	1.1	1.1	OK
DP-4	BS-4	1.1	1.1	1.1	1.1	OK
DP-5	BS-5	1.1	1.1	1.1	1.1	OK
DP-6	BS-6	1.1	1.1	1.1	1.1	OK
DP-7	BS-7	1.1	1.1	1.1	1.1	OK
DP-8	BS-8	1.1	1.1	1.1	1.1	OK
DP-9	BS-9	1.1	1.1	1.1	1.1	OK
DP-10	BS-10	1.1	1.1	1.1	1.1	OK

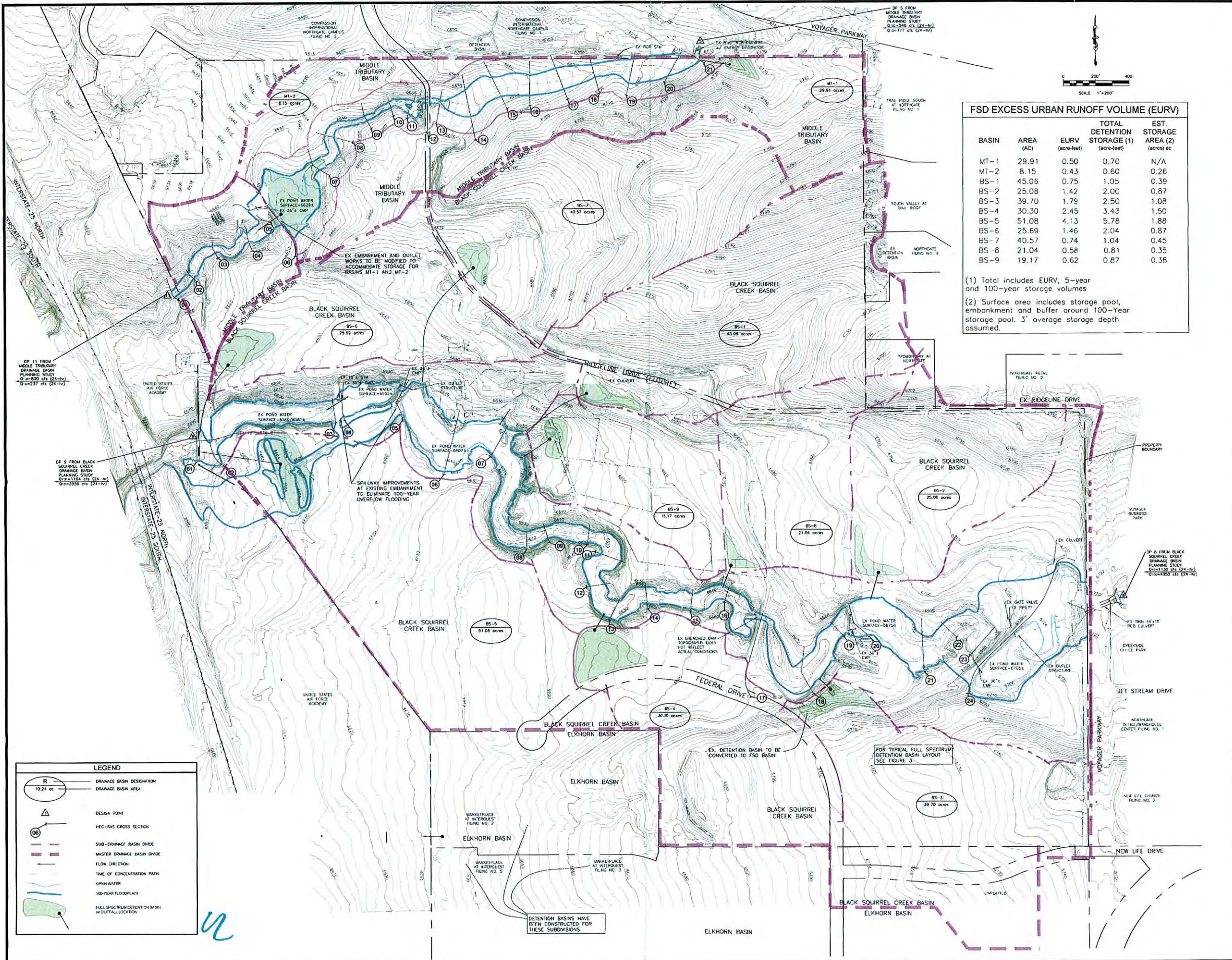


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**ALLISON VALLEY MASTER DEVELOPMENT DRAINAGE PLAN
MASTER DEVELOPMENT DRAINAGE PLAN
EXISTING AND PROPOSED CONDITIONS
COLORADO SPRINGS, COLORADO**

Project No: 10051
Date: November 8, 2011
Design: RNV/JED
Drawn: JED
Check: RNV
Reviewed:

SHEET
DP1
OF 1 SHEETS



**DRAINAGE MAP
DEVELOPED CONDITIONS**

KNOW ALL MEN BY THESE PRESENTS:
 THAT ALLISON VALLEY DEVELOPMENT COMPANY, LLC, A COLORADO LIMITED LIABILITY COMPANY
 AND GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY, BEING THE OWNERS OF THE
 FOLLOWING DESCRIBED TRACT OF LAND, TO WIT:

LEGAL DESCRIPTION:

A PARCEL OF LAND BEING PORTIONS OF SECTIONS 17, 18, 19 AND 20, TOWNSHIP 12 SOUTH,
 RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, EL PASO COUNTY, COLORADO, BEING MORE
 PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: A PORTION OF THE NORTHERLY BOUNDARY OF LOT 1 AS PLATTED IN
 MARKETPLACE AT INTERQUEST FILING NO. 2 RECORDED UNDER RECEPTION
 NO. 206712784, RECORDS OF EL PASO COUNTY, COLORADO BEING
 MONUMENTED AT BOTH ENDS BY A 1-1/2" DICH ALUMINUM SURVEYING CAP
 STAMPED "COES LLC PLS. 30910", IS ASSIGNED TO BEAR S48°06'02"W A
 DISTANCE OF 460.45 FEET.

COMMENCING AT THE NORTHWESTERLY CORNER OF LOT 1 AS PLATTED IN MARKETPLACE AT
 INTERQUEST FILING NO. 2 RECORDED UNDER RECEPTION NO. 206712784, RECORDS OF EL PASO
 COUNTY, COLORADO, SAID POINT BEING ON THE WEST LINE OF THE NORTHWEST QUARTER OF
 THE NORTHWEST QUARTER OF SECTION 20, TOWNSHIP 12 SOUTH, RANGE 66 WEST OF THE SIXTH
 PRINCIPAL MERIDIAN, SAID POINT ALSO BEING ON THE EASTERLY BOUNDARY OF THE UNITED
 STATES AIR FORCE ACADEMY AS RECORDED IN PLAT BOOK O-2 AT PAGE 84, RECORDS OF EL
 PASO COUNTY, COLORADO, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE N00°13'03"W, ON SAID EASTERLY BOUNDARY AND SAID WEST LINE OF THE NORTHWEST
 QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 20, A DISTANCE OF 112.94 FEET TO
 THE MOST SOUTHWEST CORNER OF A TRACT OF LAND DESCRIBED IN A DOCUMENT RECORDED IN
 BOOK 5762 AT PAGE 818;
 THENCE N30°37'18"W, ON THE WESTERLY BOUNDARY OF SAID TRACT OF LAND DESCRIBED IN A
 DOCUMENT RECORDED IN BOOK 5762 AT PAGE 818 AND THE EASTERLY BOUNDARY OF A TRACT OF
 LAND DESCRIBED IN BOOK 5762 AT PAGE 822, A DISTANCE OF 174.64 FEET;
 THENCE N09°45'15"W, CONTINUING ON SAID EASTERLY BOUNDARY OF A TRACT OF LAND
 DESCRIBED IN BOOK 5762 AT PAGE 822, A DISTANCE OF 303.61 FEET;

THENCE N65°46'13"E, A DISTANCE OF 318.41 FEET;
 THENCE N84°04'08"E, A DISTANCE OF 226.08 FEET;
 THENCE N89°50'53"E, A DISTANCE OF 247.73 FEET;
 THENCE N60°05'21"E, A DISTANCE OF 344.30 FEET;
 THENCE S84°00'18"W, A DISTANCE OF 150.79 FEET TO A POINT OF TANGENCY FOR EL PASO
 THENCE S41°37'58"E, A DISTANCE OF 227.74 FEET;
 THENCE S03°07'07"E, A DISTANCE OF 132.82 FEET;
 THENCE S34°01'01"W, A DISTANCE OF 57.21 FEET TO A POINT ON CURVE;
 THENCE S88°18'43"E, A DISTANCE OF 84.48 FEET;
 THENCE S60°44'08"E, A DISTANCE OF 52.84 FEET;
 THENCE N04°43'00"E, A DISTANCE OF 80.01 FEET;
 THENCE S48°30'54"E, A DISTANCE OF 185.84 FEET;
 THENCE S02°31'17"E, A DISTANCE OF 98.84 FEET;
 THENCE S34°01'01"W, A DISTANCE OF 197.24 FEET TO A POINT ON CURVE;
 THENCE ON THE ARC OF A CURVE TO THE RIGHT WHOSE CENTER BEARS S34°03'30"W, HAVING
 A DELTA OF 30°20'43", A RADIUS OF 275.00 FEET AND A DISTANCE OF 198.84 FEET TO A
 POINT OF TANGENCY;
 THENCE S48°30'54"E, A DISTANCE OF 154.84 FEET TO A POINT ON CURVE;
 THENCE ON THE ARC OF A CURVE TO THE RIGHT WHOSE CENTER BEARS S00°26'00"E, HAVING A
 DELTA OF 25°45'18", A RADIUS OF 80.00 FEET AND A DISTANCE OF 40.48 FEET TO A POINT ON
 CURVE;
 THENCE N73°24'00"E, A DISTANCE OF 42.48 FEET TO A POINT ON CURVE;
 THENCE ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF 78°22'21", A RADIUS OF
 265.00 FEET AND A DISTANCE OF 308.84 FEET TO A POINT OF TANGENCY;
 THENCE S09°13'50"W, A DISTANCE OF 451.75 FEET TO SAID POINT BEING
 ON THE NORTHERLY RIGHT OF WAY LINE OF FEDERAL DRIVE AS PLATTED IN SAID MARKETPLACE
 AT INTERQUEST FILING NO. 2

THENCE ON SAID NORTHERLY RIGHT OF WAY LINE, THE FOLLOWING (5) FIVE COURSES:

1. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S25°47'22"E, HAVING A
 DELTA OF 00°20'29", A RADIUS OF 840.00 FEET AND A DISTANCE OF 5.00 FEET;
2. N21°30'30"E, A DISTANCE OF 15.00 FEET;
3. S01°48'21"W, A DISTANCE OF 60.00 FEET;
4. S28°13'39"E, A DISTANCE OF 15.00 FEET TO A POINT ON CURVE;
5. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S30°19'27"E, HAVING A
 DELTA OF 00°20'29", A RADIUS OF 840.00 FEET AND A DISTANCE OF 5.00 FEET TO A
 POINT ON CURVE;

THENCE N28°13'39"W, A DISTANCE OF 451.75 FEET TO A POINT OF CURVE;
 THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 62°07'53", A RADIUS OF
 215.00 FEET AND A DISTANCE OF 233.15 FEET TO A POINT OF COMPOUND CURVE;
 THENCE ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S00°21'32"E, HAVING A
 DELTA OF 20°08'42", A RADIUS OF 100.00 FEET AND A DISTANCE OF 50.81 FEET TO A POINT
 OF TANGENCY;
 THENCE S00°31'46"W, A DISTANCE OF 3.41 FEET TO A POINT OF CURVE;
 THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 27°33'32", A RADIUS OF
 108.30 FEET AND A DISTANCE OF 54.85 TO A POINT ON CURVE;
 THENCE ON THE ARC OF A CURVE TO THE RIGHT WHOSE CENTER BEARS N04°23'23"W, HAVING
 A DELTA OF 54°05'01", A RADIUS OF 80.00 FEET AND A DISTANCE OF 85.30 FEET TO A POINT
 ON CURVE;
 THENCE S18°30'50"E, A DISTANCE OF 133.05 FEET TO A POINT OF CURVE;
 THENCE ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF 11°30'50", A RADIUS OF
 271.00 FEET AND A DISTANCE OF 54.84 FEET TO A POINT OF TANGENCY;
 THENCE S04°50'40"E, A DISTANCE OF 170.07 FEET TO A POINT OF CURVE;
 THENCE ON THE ARC OF A CURVE TO THE LEFT HAVING A DELTA OF 35°50'18", A RADIUS OF
 378.00 FEET AND A DISTANCE OF 237.62 FEET TO A POINT OF TANGENCY;
 THENCE S40°37'47"E, A DISTANCE OF 47.58 FEET TO A POINT ON CURVE, SAID POINT BEING A
 POINT ON SAID NORTHERLY RIGHT OF WAY LINE OF FEDERAL DRIVE AS PLATTED IN
 MARKETPLACE AT INTERQUEST FILING NO. 2

THENCE ON SAID NORTHERLY RIGHT OF WAY LINE ON THE ARC OF A CURVE TO THE LEFT
 WHOSE CENTER BEARS S19°12'32"E, HAVING A DELTA OF 32°30'30", A RADIUS OF 80.00 FEET
 AND A DISTANCE OF 07.58 FEET TO A POINT ON CURVE, SAID POINT BEING A POINT ON THE
 NORTHERLY BOUNDARY OF LOT 1 AS PLATTED IN SAID MARKETPLACE AT INTERQUEST FILING NO. 2

THENCE ON THE NORTHERLY BOUNDARY OF SAID LOT 1, THE FOLLOWING (3) THREE COURSES:

1. ON THE ARC OF A CURVE TO THE LEFT WHOSE CENTER BEARS S47°35'50"W, HAVING A
 DELTA OF 22°03'20", A RADIUS OF 483.00 FEET AND A DISTANCE OF 183.95 FEET TO A
 POINT OF REVERSE CURVE;
2. ON THE ARC OF A CURVE TO THE RIGHT HAVING A DELTA OF 05°14'30", A RADIUS OF
 71.00 FEET AND A DISTANCE OF 65.82 FEET TO A POINT ON CURVE;
3. S49°00'00"W, A DISTANCE OF 480.45 FEET TO THE POINT OF BEGINNING;

CONTAINING A CALCULATED AREA OF 1,969,081 SQUARE FEET (42,908 ACRES)

DEDICATION:

THE UNDERSIGNED OWNERS HAVE CAUSED SAID TRACT OF LAND TO BE PLATTED INTO A LOT, A
 STREET, TRACTS AND EASEMENTS, AS SHOWN ON THE PLAT. THE UNDERSIGNED DOES HEREBY
 DEDICATE, GRANT AND CONVEY TO THE CITY OF COLORADO SPRINGS THOSE PUBLIC STREETS, PUBLIC
 EASEMENTS, AND TRACTS A AND B AS SHOWN ON THE PLAT, AND FURTHER RESTRICTS THE USE OF
 ALL PUBLIC EASEMENTS TO THE CITY OF COLORADO SPRINGS AND/OR ITS ASSIGNS, PROVIDED
 HOWEVER, THAT THE SOLE RIGHT AND AUTHORITY TO VACATE, RELEASE OR OUTCLEAN ALL OR ANY
 DESIGNATED STREETS, PUBLIC EASEMENTS, AND TRACTS A AND B SHALL REMAIN EXCLUSIVELY VESTED
 IN THE CITY OF COLORADO SPRINGS. THIS TRACT OF LAND AS PLATTED HEREIN SHALL BE KNOWN AS
 "FOOTHILLS FARM CAMPUS FILING NO. 2" IN THE CITY OF COLORADO SPRINGS, EL PASO COUNTY,
 COLORADO. ALL PUBLIC STREETS AND TRACTS A AND B ARE HEREBY DEDICATED TO THE CITY OF
 COLORADO SPRINGS FOR PUBLIC USE.

FOOTHILLS FARM CAMPUS FILING NO. 2

A PORTION OF SECTIONS 17, 18, 19 AND 20, TOWNSHIP 12 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF COLORADO SPRINGS, EL PASO COUNTY, COLORADO

OWNER:
 ALLISON VALLEY DEVELOPMENT COMPANY, LLC, A COLORADO LIMITED LIABILITY COMPANY
 HAS EXECUTED THIS INSTRUMENT THE _____ DAY OF _____, 20____, A.D.

BY:
 ALLISON VALLEY DEVELOPMENT COMPANY, LLC, A COLORADO LIMITED LIABILITY COMPANY
 BY: LA PLATA COMMUNITIES, INC., A COLORADO CORPORATION, MANAGER
 B. DOUGLAS QUINBY, PRESIDENT AND CEO

BY:
 ALLISON VALLEY DEVELOPMENT COMPANY, LLC, A COLORADO LIMITED LIABILITY COMPANY
 DENISE WALLACE, SECRETARY

STATE OF COLORADO }
 COUNTY OF EL PASO } ss

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY
 OF _____, 20____, A.D., BY B. DOUGLAS QUINBY, PRESIDENT AND CEO
 AND DENISE WALLACE AS SECRETARY OF LA PLATA COMMUNITIES, INC., A COLORADO
 CORPORATION, MANAGER FOR ALLISON VALLEY DEVELOPMENT COMPANY, LLC A COLORADO
 LIMITED LIABILITY COMPANY.

WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES: _____ NOTARY PUBLIC

LIEN HOLDER:
 GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY HAS EXECUTED THIS
 INSTRUMENT THE _____ DAY OF _____, 20____, A.D.
 BY: _____ AS _____
 OF GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY

STATE OF _____ }
 COUNTY OF _____ } ss

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY
 OF _____, 20____, A.D., BY _____ AS _____
 OF GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY

WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES: _____ NOTARY PUBLIC

GENERAL NOTES:

1. THE DATE OF PREPARATION IS JANUARY 28, 2018.
2. FLOODPLAIN STATEMENT:
 THIS SITE, FOOTHILLS FARM CAMPUS FILING NO. 2, IS NOT WITHIN
 A DESIGNATED FEMA FLOODPLAIN AS DETERMINED BY THE
 FLOOD INSURANCE RATE MAP, COMMUNITY PLANET NUMBER
 080410200G, 080410200G, 080410200G AND 080410200G,
 EFFECTIVE DECEMBER 7, 2018.
3. PORTIONS OF TRACTS A AND B ARE INCLUDED IN THE ALLISON
 VALLEY METROPOLITAN DISTRICT NO. 1 PER FININGS AND
 DECREE RECORDED UNDER RECEPTION NO. 206170522, AND AS
 AMENDED.
4. PORTIONS OF TRACTS A AND B ARE INCLUDED IN THE ALLISON
 VALLEY METROPOLITAN DISTRICT NO. 2 PER FININGS AND
 DECREE RECORDED UNDER RECEPTION NO. 21513656, AND AS
 AMENDED.
5. TRACT A IS FOR PUBLIC IMPROVEMENTS, PUBLIC UTILITIES AND
 ANY OTHER PUBLIC USE THE CITY DEEMS APPROPRIATE, TO BE
 OWNED AND MAINTAINED BY THE CITY OF COLORADO SPRINGS.
6. TRACT B IS FOR PUBLIC UTILITIES, PUBLIC IMPROVEMENTS, USAFA
 EMERGENCY LANDING AREA, ORANGE, LANDSCAPE, TRAILS AND
 SIGNALS, AND ANY OTHER USE THE CITY DEEMS APPROPRIATE
 TO BE OWNED AND MAINTAINED BY THE CITY OF COLORADO
 SPRINGS. MAINTENANCE OF TRAILS AND AESTHETIC APPEARANCE
 BY ALLISON VALLEY METROPOLITAN DISTRICT NO. 2.
7. TRACT C IS FOR FUTURE DEVELOPMENT TO BE OWNED AND
 MAINTAINED BY THE OWNER OF LOT 1.
8. NOTICE: THIS PROPERTY MAY BE IMPACTED BY NOISE AND OTHER
 SIMILAR SONSORY EFFECTS OF FLIGHT BY AIRCRAFT USED IN THE
 UNITED STATES AND OTHER COUNTRIES. AIRCRAFT APPROXIMATE
 THIS NOTICE SHALL REMAIN IN EFFECT UNTIL THE AIR FORCE
 ACADEMY SHALL CEASE TO BE USED FOR PILOT TRAINING
 PURPOSES. THIS NOTICE SHALL RUN WITH THE LAND.
9. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES
 ANY PUBLIC LAND SURVEY MONUMENT OR LAND MONUMENT OR
 ACCESSORY, OWNS A CLASS TWO (2) MONUMENT OR
 PURSUANT TO STATE STATUTE ISM-1-1046, C.R.S.
10. THE ADDRESSES () SHOWN ON THIS PLAT ARE FOR
 INFORMATIONAL PURPOSES ONLY. THEY ARE NOT THE LEGAL
 DESCRIPTION AND ARE SUBJECT TO CHANGE.
11. ALL CEMENTS DEDICATED HEREIN FOR PUBLIC UTILITY
 PURPOSES SHALL BE SUBJECT TO THOSE TERMS AND CONDITIONS
 AS SPECIFIED IN THE INSTRUMENT RECORDED AT RECEPTION NO.
 21715448 OF THE RECORDS OF EL PASO COUNTY, COLORADO.
 ALL OTHER EASEMENTS OR INTERESTS OF RECORD AFFECTING
 ANY OF THE PLATTED PROPERTY DECIED HEREIN SHALL NOT

OWNER:
 GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY
 HAS EXECUTED THIS INSTRUMENT THE _____ DAY OF _____, 20____, A.D.

BY:
 GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY

STATE OF COLORADO }
 COUNTY OF EL PASO } ss

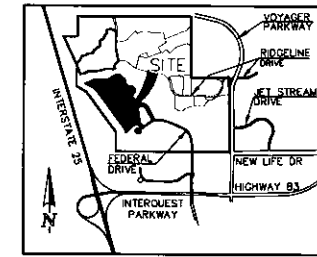
THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____ DAY
 OF _____, 20____, A.D., BY _____ OF
 GINGER I, LLC, A COLORADO LIMITED LIABILITY COMPANY.

WITNESS MY HAND AND OFFICIAL SEAL.

MY COMMISSION EXPIRES: _____ NOTARY PUBLIC

GENERAL NOTES (CONTD):

- BE AFFECTED AND SHALL REMAIN IN FULL FORCE AND EFFECT.
12. THIS PLAT DOES NOT CONSTITUTE A TITLE SEARCH TO DETERMINE
 OWNERSHIP OR EASEMENTS OF RECORD. FOR ALL INFORMATION
 REGARDING EASEMENTS, RIGHT-OF-WAY AND TITLE OF RECORD,
 CLASSIC CONSULTING ENGINEERS AND SURVEYORS AND THE
 SUPERVISOR OF RECORDS RELIED UPON THE TITLE COMMITMENT
 ORDER NUMBER _____ ISSUED BY LAND
 TITLE GUARANTEE COMPANY DATED _____
13. THE ALLISON VALLEY METROPOLITAN DISTRICT NO. 1 SHALL
 MAINTAIN ALL IMPROVEMENTS LYING WITHIN THE MEDIAN AS
 CONSTRUCTED IN FEDERAL DRIVE AS PLATTED IN MARKETPLACE
 AT INTERQUEST FILING NO. 2.
14. ALL PROPERTY WITHIN THIS SUBDIVISION IS SUBJECT TO AN
 AVIATION EASEMENT TO THE UNITED STATES AIR FORCE
 ACADEMY AS RECORDED UNDER RECEPTION NO. _____ IN
 THE OFFICE OF THE CLERK AND RECORDER OF EL PASO COUNTY,
 COLORADO.
15. THE PRIVATE STREET, ENT PARKWAY, SHALL BE OWNED BY THE
 OWNER OF LOT 1, AS PLATTED.
16. THIS PROPERTY IS SUBJECT TO THE FININGS, SUMMARY, AND
 CONCLUSIONS OF A GEOLOGIC HAZARD REPORT PREPARED BY
 CIL/THOMPSON, INC. DATED 11-02-04. A COPY OF SAID
 REPORT HAS BEEN PLACED WITH FILE CPC NO.
 04-00234-ASMT4 OF THE CITY OF COLORADO SPRINGS
 DEVELOPMENT DIVISION. CONTACT DEVELOPMENT SERVICES
 DIVISION, 30 SOUTH NEVADA AVENUE, SUITE 30 COLORADO
 SPRINGS, CO, IF YOU WOULD LIKE TO REVIEW SAID REPORT.
17. THE RESTRICTED USE AREA AS SHOWN WITHIN TRACT B IS
 LIMITED TO EXISTING LEGAL USAFA USE, PUBLIC TRAILS,
 TEMPORARY GRADING AND NOISE HABITAT MITIGATION.



VICINITY MAP
 N.T.S.

NOTICE IS HEREBY GIVEN:
 THAT THE AREA INCLUDED IN THE PLAT DESCRIBED HEREIN IS SUBJECT TO THE
 CODE OF THE CITY OF COLORADO SPRINGS, 2001, AS AMENDED.

NO BUILDING PERMITS SHALL BE ISSUED FOR BUILDING SITES WITHIN THIS PLAT
 UNTIL ALL REQUIRED PUBLIC IMPROVEMENTS HAVE BEEN INSTALLED AS SPECIFIED
 BY THE CITY OF COLORADO SPRINGS, OR ALTERNATIVELY, UNTIL ACCEPTABLE
 ASSURANCES, INCLUDING BUT NOT LIMITED TO LETTERS OF CREDIT, CASH,
 SUBDIVISION BONDS, OR COMBINATIONS THEREOF, GUARANTEEING THE COMPLETION
 OF ALL REQUIRED PUBLIC IMPROVEMENTS, INCLUDING, BUT NOT LIMITED TO
 DRAINAGE, STREET AND EROSION CONTROL, HAVE BEEN PLACED ON FILE WITH
 THE CITY OF COLORADO SPRINGS.

EASEMENTS:
 AS SHOWN HEREON WITH SURFACE MAINTENANCE THE RESPONSIBILITY OF THE
 INDIVIDUAL LANDOWNER.

SURVEYOR'S STATEMENT:
 THE UNDERSIGNED PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF
 COLORADO, HEREBY STATES AND CERTIFIES THAT THE ACCOMPANYING PLAT WAS
 SURVEYED AND DRAWN UNDER HIS RESPONSIBLE CHARGE AND ACCURATELY
 SHOWS THE DESCRIBED TRACT OF LAND, AND SUBDIVISION THEREOF, AND THAT
 THE REQUIREMENTS OF TITLE 38 OF THE COLORADO REVISED STATUTES, 1973, AS
 AMENDED, HAVE BEEN MET TO THE BEST OF HIS KNOWLEDGE AND BELIEF.

DOUGLAS P. BENNETT, PROFESSIONAL LAND SURVEYOR DATE _____
 COLORADO P.L.S. NO. 3018
 FOR AND ON BEHALF OF CLASSIC CONSULTING
 ENGINEERS AND SURVEYORS, LLC

NOTICE:
 ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED
 UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST
 DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BE BASED UPON ANY
 DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE
 OF THE CERTIFICATION SHOWN HEREON.

CITY APPROVAL:
 ON BEHALF OF THE CITY OF COLORADO SPRINGS, THE UNDERSIGNED HEREBY
 APPROVE FOR FILING THE ACCOMPANYING PLAT OF "FOOTHILLS FARM CAMPUS
 FILING NO. 2".

CITY PLANNING DIRECTOR _____ DATE _____

CITY ENGINEER _____ DATE _____

CITY CLERK _____ DATE _____

CLERK AND RECORDER:

STATE OF COLORADO }
 COUNTY OF EL PASO } ss

I, HEREBY CERTIFY THAT THIS INSTRUMENT WAS FILED FOR RECORD IN MY OFFICE AT
 O'ROURK AT THIS _____ DAY OF _____, 20____, A.D., AND IS BEING RECORDED
 AT RECEPTION NO. _____ OF THE RECORDS OF EL PASO COUNTY,
 COLORADO.

CHUCK BRIDGEMAN, RECORDER

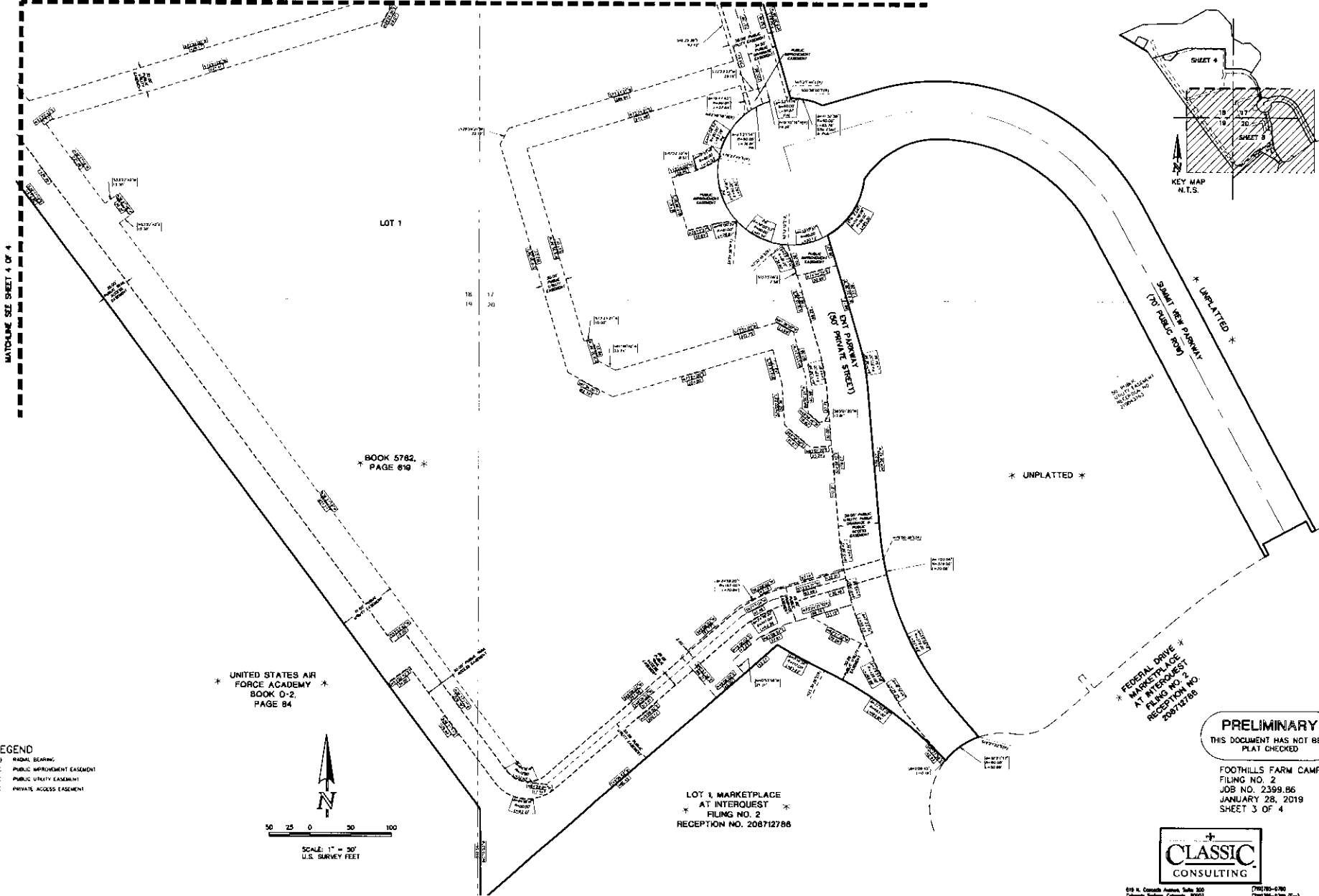
BY: _____
 DEPUTY
 FEE: _____
 SURCHARGE: _____
 DRAINAGE: _____
 BROOD FEE: _____
 PARK FEE: _____
 SCHOOL FEE: _____

FOOTHILLS FARM CAMPUS
 FILING NO. 2
 JUNE NO. 2399.86
 JANUARY 28, 2019
 SHEET 1 OF 4



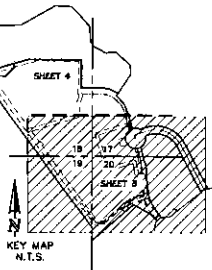
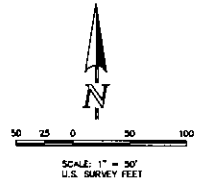
FOOTHILLS FARM CAMPUS FILING NO. 2

MATCH LINE SEE SHEET 4 OF 4



LEGEND
 (B) BOUNDARY BEARING
 P.I.E. PUBLIC IMPROVEMENT EASEMENT
 P.U.E. PUBLIC UTILITY EASEMENT
 P.A.E. PRIVATE ACCESS EASEMENT

* UNITED STATES AIR FORCE ACADEMY
 BOOK D-2
 PAGE 84 *



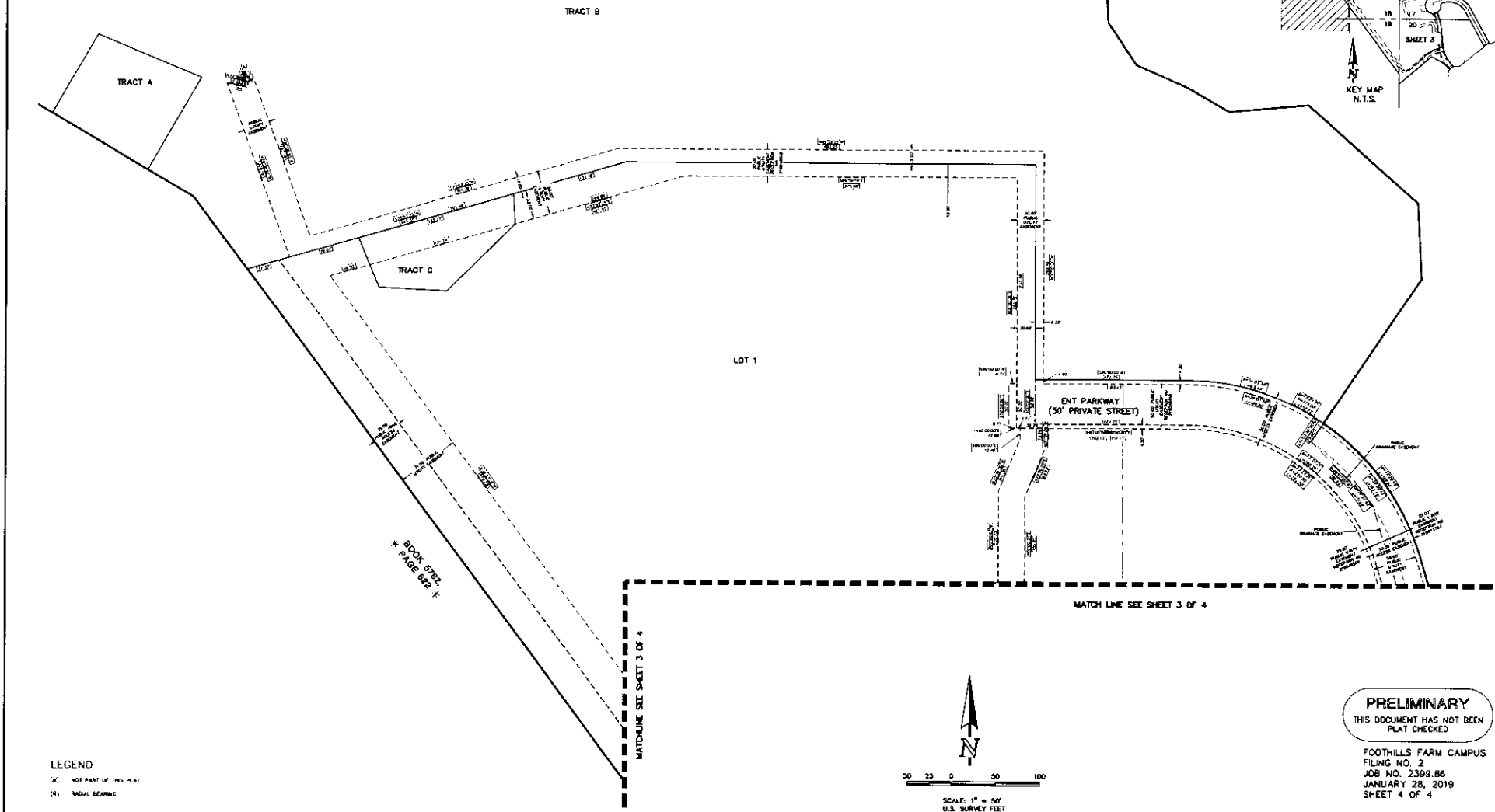
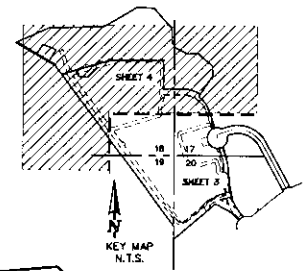
PRELIMINARY
 THIS DOCUMENT HAS NOT BEEN
 PLAT CHECKED

FOOTHILLS FARM CAMPUS
 FILING NO. 2
 JOB NO. 2399.B6
 JANUARY 28, 2019
 SHEET 3 OF 4

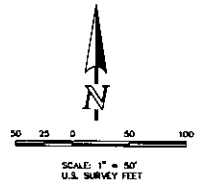


818 N. Cascade Avenue, Suite 300
 Colorado Springs, Colorado 80903 (719) 785-0780
 (719) 785-5789 (FAX)

FOOTHILLS FARM CAMPUS FILING NO. 2



LEGEND
 * NOT PART OF THIS PLAT
 (B) RADIAL BEARING



PRELIMINARY
 THIS DOCUMENT HAS NOT BEEN
 PLAT CHECKED

FOOTHILLS FARM CAMPUS
 FILING NO. 2
 JOB NO. 2399.86
 JANUARY 28, 2019
 SHEET 4 OF 4



818 N. Collins Avenue, Suite 202
 Orlando, Florida 32803 (781) 765-8760
 (407) 765-8769 (Fax)



June 27, 2019

City of Colorado Springs
Water Resources Engineering Division
30 S. Nevada Avenue, Suite 401
Colorado Springs, CO 80903

ATTN: Ms. Anna Bergmark

RE: Foothills Farm Campus Fil. No. 2- Phase 2 Storm Variance Request related to Velocity

Dear Ms. Bergmark:

Classic Consulting Engineers & Surveyors, LLC (CCES), on behalf of our client, Allison Development Company, respectfully requests the City's consideration of the following variance:

1. Maximum velocity in storm sewer pipe -Drainage Criteria Manual Volume 1, (Chapter 9, Section 7.1)

Background:

Foothills Farm Campus Filing No. 2 is a 42.890-acre site located in Sections 17, 18, 19, and 20, Township 12 South, Range 66 West of the Sixth Principal Meridian in the City of Colorado Springs, County of El Paso, State of Colorado. The site is bound on the south by existing Marketplace at Interquest retail development and Federal Drive, to the west by existing USAFA vacant property and Interstate 25, and to the east Black Squirrel Creek. This site includes a platted lot, public street right of way, and tracts to support the proposed Ent Credit Union headquarters office campus development within the previously approved Marketplace at Interquest PUD plan.

The following variance are respectfully requested:

1. Maximum velocity in storm sewer pipe (Chapter 9, Section 7.1) – The maximum velocity is limited to 18 feet per second (fps) for all sewers. However, Appendix 9A section 634.2 allows for additional pipe protection to be used in cases where the velocity exceeds 18 feet per second (fps). Based upon the topography of the site and the design constraints related to pond inlet elevations and upstream pipe crossings, every effort has been made to reduce velocity where possible within the storm pipe. This applies to Pipe 23 Section 4 where the velocity at 19.02 fps. Manufacturer information for this pipe material shows that this pipe has an equivalent strength as Class IV. This data also shows that the proposed Class III RCP also provides the increased abrasion resistance desired for all reaches of storm sewer that exceed 18 feet per second (fps) since the actual concrete compressive strengths exceed the minimum required for RCP Class IV (4000 psi) and RCP Class V (6000 psi). The pipe class required D-load minimum capacity is given in ASTM C 76 or AASHTO M170. Please see attached data sheets for further information. The outfall of the storm pipe system into the pond will be released across appropriate energy dissipation at the concrete impact structure and forebay. The impact structure and forebay will be constructed within the Full Spectrum Detention Facility D in accordance with UDFCD Volume 2.

Justification:

We feel this variance is justified as it meets the criteria of Appendix 9A, Section 634.2 for the Pipe Velocity variance. Based upon this request, the overall design approval will not affect peak flows or water quality in

Fountain Creek, as all stormwater will continue to be treated and detained per the approved Final Drainage report.

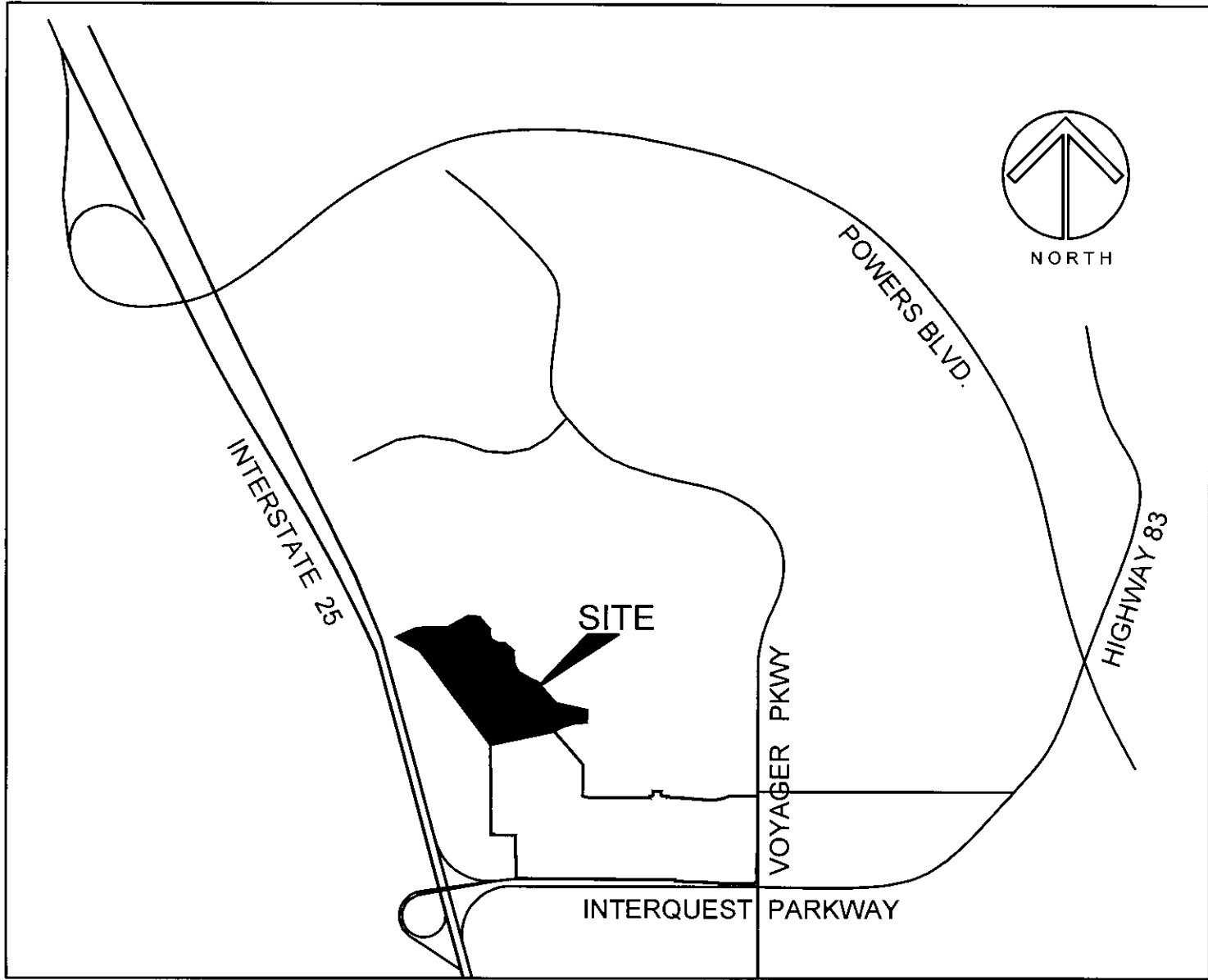
We respectfully request your favorable consideration of this request.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "Cathy M. Tessin", is written over a red circular professional seal. The seal contains the text "STATE OF CALIFORNIA" at the top, "CATHY M. TESSIN" in the center, and "REGISTERED PROFESSIONAL ENGINEER" at the bottom.

Cathy M. Tessin, P.E.
Project Manager

Attachment: Vicinity Map
Concrete Pipe testing results



VICINITY / KEY MAP



Forterra
 9455 Boston Court
 Henderson, CO 80640
 P 303.867.6700
 F 303.350.4140

MATERIALS TESTING REPORT

Date of Production: 2-Jan-19
 ID Number: Bidi #1 4500 psi
 Tester: Derek Coffey
 Report by: Jose Flores
 Test Date: _____
 Batch Time: 11:05

Testing Standard Information	
Reference:	ASTM C 39
Name:	Compressive Strength of Cylindrical Concrete Specimens
Test for:	Compressive Strength

Sample Information	
Description:	4X8 Drycast Cylinder
Product Description:	24 C3
Temp. of Concrete:	46

Summary of Results for Compressive Strength			
Minimum at 28 days (psi):	4500	≤	Test Result (psi) 7420
			Pass/Fail PASS

NOTES:
 "Reference" data refers to Section(s) of Standard Reference
 Manually Entered Data
 Calculated Data

Specimen Information								
Number	1	2	3	4	5	6	7	Reference
Break (days)	1	2	2	7	28	28	28	
d (in)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	9.1.2
A (in ²)	12.57	12.57	12.57	12.57	12.57	12.57	12.57	9.1.3
L _{MAX} (lbs)		50895	47075	68960	85700	98090	96075	9.1.4
CS (psi)	0	4050	3745	5488	6820	7804	7645	9.1.5
Fracture Type (1-6)		4	5	5	5	2	5	9.1.6

where:
 d= Diameter
 A= Area
 L_{MAX}= Maximum Load
 CS= Compressive Strength
 Fracture Type= Per ASTM C39, Figure 2

A= $(\rho * d^2) / 4$
 CS= L_{MAX} / A



Forterra
 9455 Boston Court
 Henderson, CO 80640
 P 303.867.6700
 F 303.350.4140

MATERIALS TESTING REPORT

Date of Production: 18-Feb-19
 ID Number: Bidi #1 4500 psi
 Tester: Jose Flores
 Report by: Jose Flores
 Test Date:
 Batch Time:

Testing Standard Information	
Reference:	ASTM C 39
Name:	Compressive Strength of Cylindrical Concrete Specimens
Test for:	Compressive Strength

Sample Information	
Description:	4X8 Drycast Cylinder
Product Description:	36 C3
Temp. of Concrete:	44

Summary of Results for Compressive Strength			
Minimum at 28 days (psi):	4500	≤	Test Result (psi) 6800
			Pass/Fail PASS

NOTES:
 "Reference" data refers to Section(s) of Standard Reference
 Manually Entered Data
 Calculated Data

Specimen Information								
Number	1	2	3	4	5	6	7	Reference
Break (days)	1	2	7	7	28	28	28	
d (in)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	9.1.2
A (in ²)	12.57	12.57	12.57	12.57	12.57	12.57	12.57	9.1.3
L _{MAX} (lbs)	54980	55255	80520	80975	97125	78105	78105	9.1.4
CS (psi)	0	4375	4395	6405	6445	7727	6215	9.1.5
Fracture Type (1-6)		4	4	5	5	5	5	9.1.6

where:
 d= Diameter
 A= Area
 L_{MAX}= Maximum Load
 CS= Compressive Strength
 Fracture Type= Per ASTM C39, Figure 2

A= $(\rho * d^2) / 4$
 CS= L_{MAX} / A



Forterra
 9455 Boston Court
 Henderson, CO 80640
 P 303.867.6700
 F 303.350.4140

MATERIALS TESTING REPORT

Date of Production: 6-May-19
 ID Number: Bidi #1 4500 psi
 Tester: Jose Flores
 Report by: Jose Flores
 Test Date: _____
 Batch Time: 10:40 AM

Testing Standard Information	
Reference:	ASTM C 39
Name:	Compressive Strength of Cylindrical Concrete Specimens
Test for:	Compressive Strength

Sample Information	
Description:	4X8 Drycast Cylinder
Product Description:	60C3
Temp. of Concrete:	79

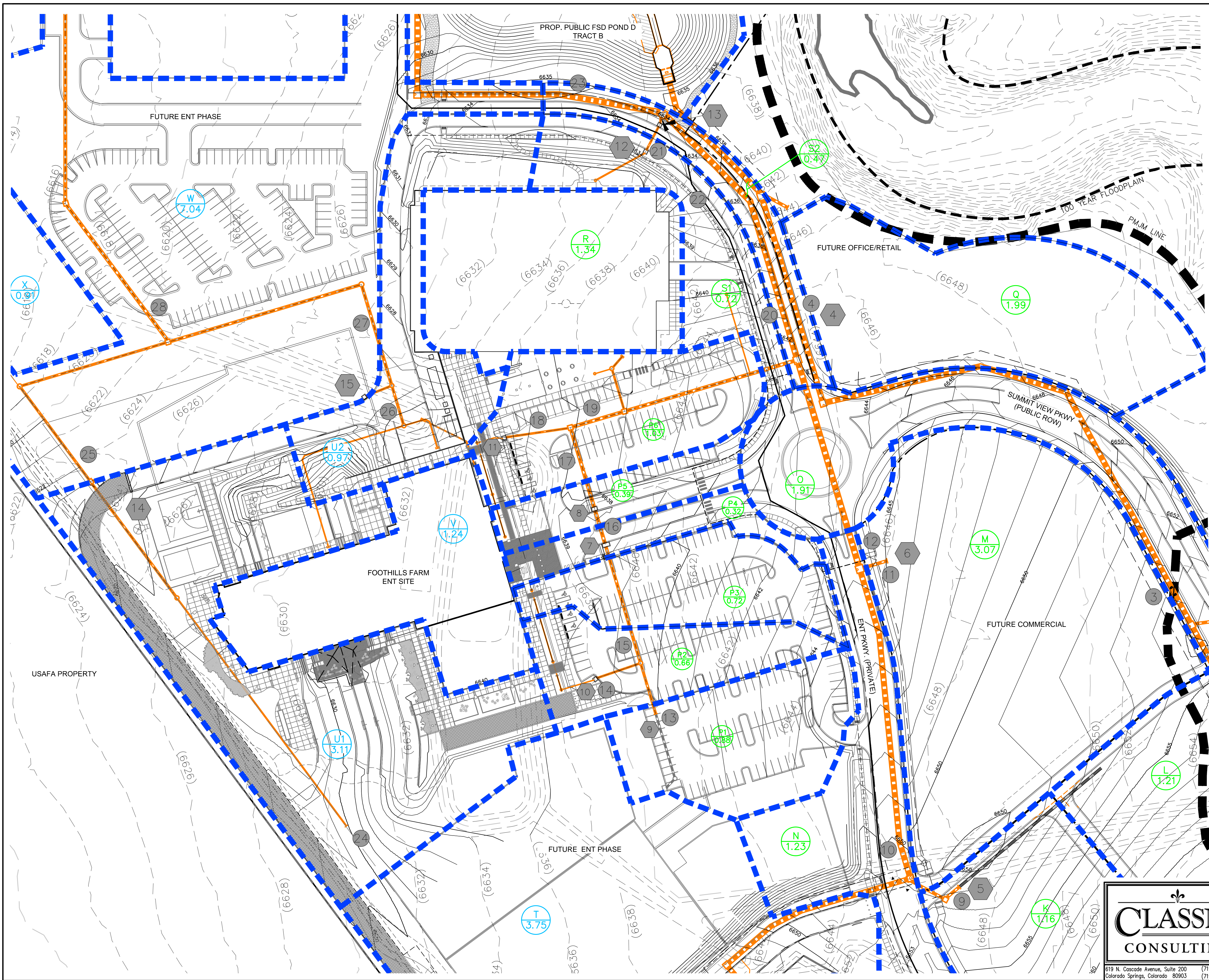
Summary of Results for Compressive Strength			
Minimum at 28 days (psi):	4500	≤	Test Result (psi) 6400
			Pass/Fail PASS

NOTES:
 "Reference" data refers to Section(s) of Standard Reference
 Manually Entered Data
 Calculated Data

Specimen Information								Reference
Number	1	2	3	4	5	6	7	
Break (days)	1	2	7	7	28	28	28	
d (in)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	9.1.2
A (in ²)	12.57	12.57	12.57	12.57	12.57	12.57	12.57	9.1.3
L _{MAX} (lbs)		49500	65505	66695	81475	80035	79915	9.1.4
CS (psi)	0	3939	5213	5307	6484	6367	6359	9.1.5
Fracture Type (1-6)		5	2	5	5	5	5	9.1.6

where:
 d= Diameter
 A= Area
 L_{MAX}= Maximum Load
 CS= Compressive Strength
 Fracture Type= Per ASTM C39, Figure 2

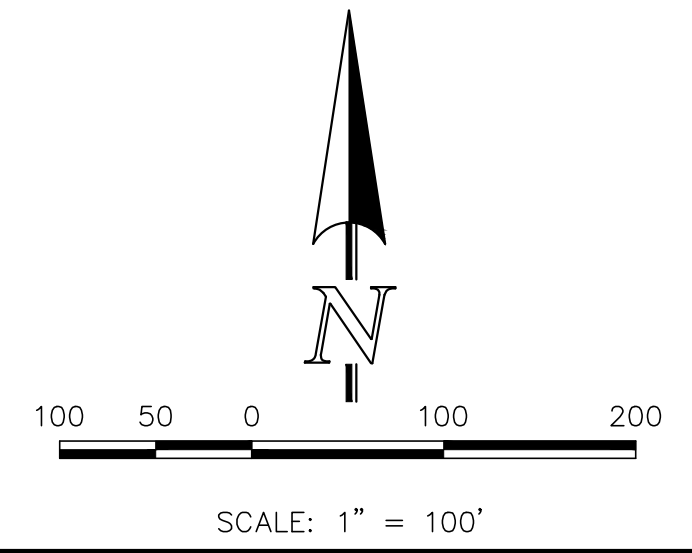
A= $(p * d^2) / 4$
 CS= L_{MAX} / A



LEGEND

EXISTING GROUND CONTOUR	5910
PROPOSED FINISHED CONTOUR	5910
SUBDIVISION BOUNDARY	---
LOT LINE	---
PROPOSED BASIN BOUNDARY	---
OVERFLOW ROUTE	→→
DIRECTION OF DRAINAGE	→
EXISTING STORM SEWER	---
EXISTING STORM INLET	□
PROPOSED STORM SEWER	---
PROPOSED STORM INLET	□
LOW POINT/HIGH POINT	LP/HP
BASIN IDENTIFIER	D
AREA IN ACRES	1.41
DESIGN POINT	2
PIPE RUN	2

NOTES:
 1) ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED.
 2) ALL CURBS TO BE TYPE 3 C&G UNLESS OTHERWISE NOTED.



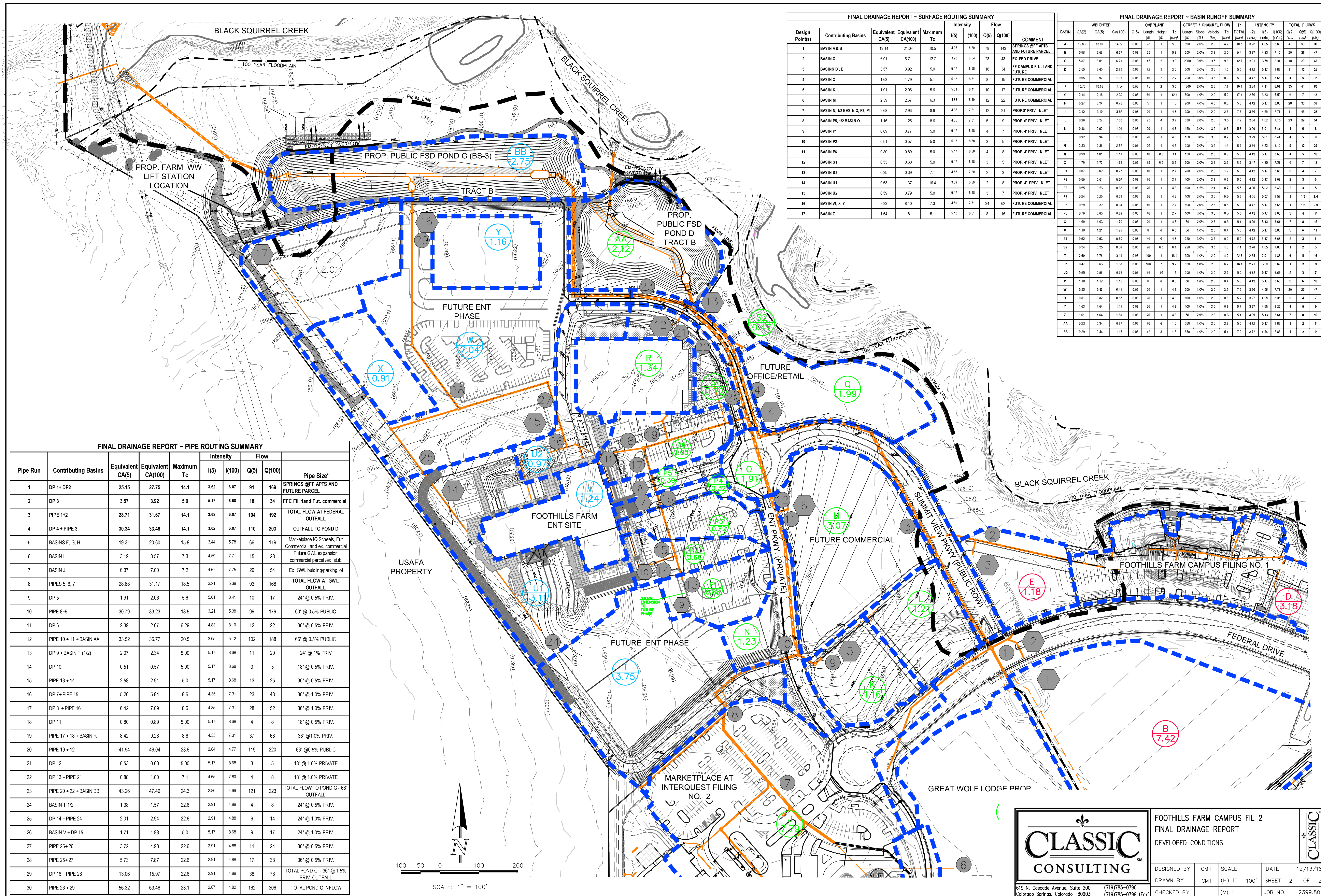
CLASSIC CONSULTING

619 N. Cascade Avenue, Suite 200
 Colorado Springs, Colorado 80903
 (719)785-0790
 (719)785-0799 (Fax)

FOOTHILLS FARM CAMPUS FIL. 2
FINAL DRAINAGE REPORT
 DEVELOPED CONDITIONS
 (COPY AT 50 SCALE)

DESIGNED BY	CMT	SCALE	DATE	05/13/2019
DRAWN BY	CMT	(H) 1" = 50'	SHEET	3 OF 3
CHECKED BY	(V) 1" = N/A	JOB NO.	2399.80	

N:\2399\80\Footer\239980.dwg PRELIM 50 SCALE.dwg 6/27/2019 2:08:37 PM 1:1



Design Point(s)	Contributing Basins	Intensity			Flow		COMMENT		
		Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	I(5)	I(100)		Q(5)	Q(100)
1	BASIN A & B	19.14	21.04	10.5	4.05	6.80	78	143	SPRINGS @FF APTS AND FUTURE PARCEL
2	BASIN C	6.01	6.71	12.7	3.78	6.34	23	43	EX. FED DRIVE
3	BASINS D, E	3.57	3.92	5.0	5.17	8.68	10	34	FF CAMPUS FIL. 1 AND FUTURE
4	BASIN Q	1.63	1.78	5.1	5.13	8.61	8	15	FUTURE COMMERCIAL
5	BASIN K, L	1.91	2.06	5.6	5.01	8.41	10	17	FUTURE COMMERCIAL
6	BASIN M	2.39	2.67	6.3	4.83	8.10	12	22	FUTURE COMMERCIAL
7	BASIN N, 1/2 BASIN O, P3, P4	2.68	2.93	8.6	4.36	7.31	12	21	PROP. # PRIV. INLET
8	BASIN P5, 1/2 BASIN O	1.16	1.25	8.6	4.36	7.31	5	9	PROP. # PRIV. INLET
9	BASIN P1	0.69	0.77	5.0	5.17	8.68	4	7	PROP. # PRIV. INLET
10	BASIN P2	0.51	0.57	5.0	5.17	8.68	3	5	PROP. # PRIV. INLET
11	BASIN P6	0.80	0.89	5.0	5.17	8.68	4	8	PROP. # PRIV. INLET
12	BASIN S1	0.53	0.60	5.0	5.17	8.68	3	5	PROP. # PRIV. INLET
13	BASIN S2	0.35	0.39	7.1	4.65	7.80	2	3	PROP. # PRIV. INLET
14	BASIN U1	0.63	1.37	16.4	3.39	5.69	2	8	PROP. # PRIV. INLET
15	BASIN U2	0.59	0.79	5.0	5.17	8.68	3	7	PROP. # PRIV. INLET
16	BASIN W, X, Y	7.33	8.10	7.3	4.59	7.71	34	62	FUTURE COMMERCIAL
17	BASIN Z	1.04	1.81	5.1	5.13	8.61	8	16	FUTURE COMMERCIAL

BASIN	CA(2)	CA(5)	CA(100)	OVERLAND		STREET / CHANNEL FLOW		TOTAL (cfs)	TOTAL FLOWS									
				Length (ft)	Height (ft)	Length (ft)	Velocity (ft/s)		Q(5)	Q(100)								
A	12.83	13.07	14.32	0.08	25	1	5.8	800	2.6%	2.8	4.7	19.5	323	4.05	6.80	41	53	98
B	5.96	6.07	6.67	0.08	25	1	5.8	600	2.0%	2.8	3.5	9.4	337	4.23	7.10	20	26	47
C	5.87	6.01	6.71	0.08	15	2	3.0	2000	3.0%	3.5	9.6	12.7	3.01	5.76	5.34	19	23	43
D	2.50	2.60	2.88	0.08	42	2	2.5	200	3.0%	3.5	10	9.0	4.42	5.17	6.88	11	13	25
E	0.95	0.97	1.06	0.08	80	2	2.2	200	3.0%	3.5	0.0	5.0	4.42	5.17	6.88	4	5	9
F	10.70	10.82	11.54	0.08	15	2	3.0	1200	2.6%	2.8	7.1	16.1	3.25	4.11	6.91	35	44	80
G	2.14	2.16	2.30	0.08	60	1	12.1	600	1.6%	2.0	5.0	17.1	2.66	3.33	5.56	6	7	13
H	6.27	6.34	6.78	0.08	5	1	1.5	200	4.0%	4.0	0.8	5.0	4.42	5.17	6.88	26	33	50
I	3.12	3.19	3.57	0.08	20	1	4.8	300	1.6%	2.0	2.5	7.3	3.66	4.56	7.71	11	15	28
J	4.36	4.37	7.00	0.08	25	4	3.7	600	2.0%	2.8	3.5	7.3	3.65	4.63	7.75	73	26	54
K	0.88	0.89	1.01	0.08	20	1	4.8	100	3.0%	3.5	0.7	5.6	3.99	5.01	6.41	4	5	8
L	0.92	0.94	1.05	0.08	20	1	4.8	100	3.0%	3.5	0.7	5.6	3.99	5.01	6.41	4	5	8
M	2.33	2.38	2.67	0.08	20	1	4.8	300	3.0%	3.5	1.4	6.3	3.85	4.83	6.10	8	12	22
N	0.89	1.01	1.11	0.08	10	0.5	2.4	100	2.0%	2.8	0.9	5.0	4.42	5.17	6.88	4	5	10
O	1.70	1.72	1.83	0.08	15	0.3	5.7	500	2.0%	2.8	2.9	8.6	3.47	4.35	7.31	6	7	13
P1	0.67	0.69	0.77	0.08	10	1	2.7	200	2.6%	2.8	1.2	5.0	4.42	5.17	6.88	3	4	7
P2	0.50	0.51	0.57	0.08	10	1	2.7	100	2.0%	2.8	0.6	5.0	4.42	5.17	6.88	2	3	5
P3	0.55	0.56	0.65	0.08	20	1	4.8	100	1.5%	2.4	0.7	5.5	4.00	5.02	6.45	2	3	5
P4	0.24	0.25	0.28	0.08	20	1	4.8	100	3.0%	3.5	0.5	5.3	4.05	5.07	6.52	1	1.3	2.4
P5	0.29	0.30	0.34	0.08	10	1	2.7	100	2.0%	2.8	0.6	5.0	4.42	5.17	6.88	1	1.6	2.9
P6	0.78	0.80	0.89	0.08	10	1	2.7	100	3.0%	3.5	0.5	5.0	4.42	5.17	6.88	3	4	8
Q	1.60	1.63	1.79	0.08	20	1	4.8	50	2.0%	2.8	0.3	5.1	4.09	5.13	6.51	7	8	15
R	1.10	1.21	1.29	0.08	0	0	0.0	50	1.6%	2.0	0.4	5.0	4.42	5.17	6.88	0	6	11
S1	0.52	0.53	0.60	0.08	40	6	4.8	220	3.0%	3.5	0.0	5.0	4.42	5.17	6.88	2	3	5
S2	0.34	0.35	0.39	0.08	20	0.5	6.1	220	3.0%	3.5	1.0	7.1	3.70	4.65	7.80	1	2	3
T	2.69	2.76	3.14	0.08	100	1	18.4	500	1.6%	2.0	4.2	22.6	2.33	2.81	4.88	8	8	15
U1	0.47	0.63	1.37	0.08	100	7	9.7	800	1.6%	2.0	6.7	16.4	2.71	3.39	5.69	1	2	3
U2	0.55	0.58	0.79	0.08	15	10	1.8	300	1.6%	2.0	2.5	5.0	4.42	5.17	6.88	2	3	7
V	1.10	1.12	1.19	0.08	0	0	0.0	50	1.6%	2.0	0.4	5.0	4.42	5.17	6.88	0	6	10
W	5.35	5.47	6.11	0.08	20	1	4.8	300	1.6%	2.0	2.5	7.3	3.66	4.56	7.71	25	25	47
X	0.81	0.82	0.87	0.08	20	1	4.8	100	1.6%	2.0	0.8	5.7	3.97	4.98	6.36	3	4	7
Y	1.03	1.04	1.11	0.08	20	1	4.8	100	1.6%	2.0	0.8	5.7	3.97	4.98	6.36	4	5	9
Z	1.61	1.64	1.81	0.08	20	1	4.8	50	2.0%	2.8	0.3	5.1	4.09	5.13	6.51	7	8	16
AA	0.23	0.34	0.87	0.08	80	6	1.5	300	1.6%	2.0	2.0	5.0	4.42	5.17	6.88	1	2	8
BB	0.20	0.44	1.13	0.08	12	8	1.6	600	1.6%	2.0	5.4	7.0	3.72	4.66	7.80	1	2	9

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP 1+DP2	25.15	27.75	14.1	3.62	6.07	91	169	SPRINGS @FF APTS AND FUTURE PARCEL
2	DP 3	3.57	3.92	5.0	5.17	8.68	18	34	FF Camp. Fil. 1 and Fut. commercial
3	PIPE 1+2	28.71	31.67	14.1	3.62	6.07	104	192	TOTAL FLOW AT FEDERAL OUTFALL
4	DP 4 + PIPE 3	30.34	33.46	14.1	3.62	6.07	110	203	OUTFALL TO POND D
5	BASINS F, G, H	19.31	20.60	15.8	3.44	5.78	66	119	Marketplace IQ Scheels, Fut Commercial, and ex. commercial
6	BASIN I	3.19	3.57	7.3	4.59	7.71	15	28	Future GWL expansion commercial parcel / ex. stub
7	BASIN J	6.37	7.00	7.2	4.62	7.75	29	54	Ex. GWL, building/parking lot
8	PIPES 5, 6, 7	28.88	31.17	18.5	3.21	5.38	93	168	TOTAL FLOW AT GWL OUTFALL
9	DP 5	1.91	2.06	5.6	5.01	8.41	10	17	24" @ 0.5% PRIV.
10	PIPE 8+9	30.79	33.23	18.5	3.21	5.38	99	179	60" @ 0.5% PUBLIC
11	DP 6	2.39	2.67	6.29	4.83	8.10	12	22	30" @ 0.5% PRIV.
12	PIPE 10 + 11 + BASIN AA	33.52	36.77	20.5	3.05	5.12	102	188	66" @ 0.5% PUBLIC
13	DP 9 + BASIN T (12)	2.07	2.34	5.00	5.17	8.68	11	20	24" @ 1% PRIV.
14	DP 10	0.51	0.57	5.00	5.17	8.68	3	5	18" @ 0.5% PRIV.
15	PIPE 13 + 14	2.58	2.91	5.0	5.17	8.68	13	25	30" @ 0.5% PRIV.
16	DP 7 + PIPE 15	5.26	5.84	8.6	4.35	7.31	23	43	30" @ 1.0% PRIV.
17	DP 8 + PIPE 16	6.42	7.09	8.6	4.35	7.31	28	52	36" @ 1.0% PRIV.
18	DP 11	0.80	0.89	5.00	5.17	8.68	4	8	18" @ 0.5% PRIV.
19	PIPE 17 + 18 + BASIN R	8.42	9.28	8.6	4.35	7.31	37	68	36" @ 1.0% PRIV.
20	PIPE 19 + 12	41.94	46.04	23.6	2.84	4.77	119	220	66" @ 0.5% PUBLIC
21	DP 12	0.53	0.60	5.00	5.17	8.68	3	5	18" @ 1.0% PRIVATE
22	DP 13 + PIPE 21	0.88	1.00	7.1	4.65	7.80	4	8	18" @ 1.0% PRIVATE
23	PIPE 20 + 22 + BASIN BB	43.26	47.49	24.3	2.80	4.69	121	223	TOTAL FLOW TO POND G - 66" OUTFALL
24	BASIN T 1/2	1.38	1.57	22.6	2.91	4.88	4	8	24" @ 0.5% PRIV.
25	DP 14 + PIPE 24	2.01	2.94	22.6	2.91	4.88	6	14	24" @ 1.0% PRIV.
26	BASIN V + DP 15	1.71	1.98	5.0	5.17	8.68	9	17	24" @ 1.0% PRIV.
27	PIPE 25+26	3.72	4.93	22.6	2.91	4.88	11	24	30" @ 0.5% PRIV.
28	PIPE 25+27	5.73	7.87	22.6	2.91	4.88	17	38	36" @ 0.5% PRIV.
29	DP 16 + PIPE 28	13.06	15.97	22.6	2.91	4.88	38	78	TOTAL POND G - 36" @ 1.5% PRIV. OUTFALL
30	PIPE 23 + 29	56.32	63.46	23.1	2.87	4.82	162	306	TOTAL POND G INFLOW

619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903

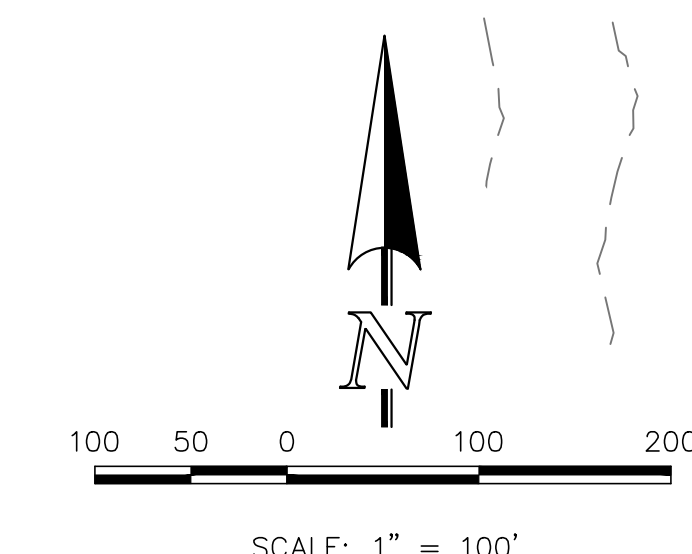
(719)785-0790
(719)785-0799 (Fax)

FOOTHILLS FARM CAMPUS FIL 2
FINAL DRAINAGE REPORT
DEVELOPED CONDITIONS

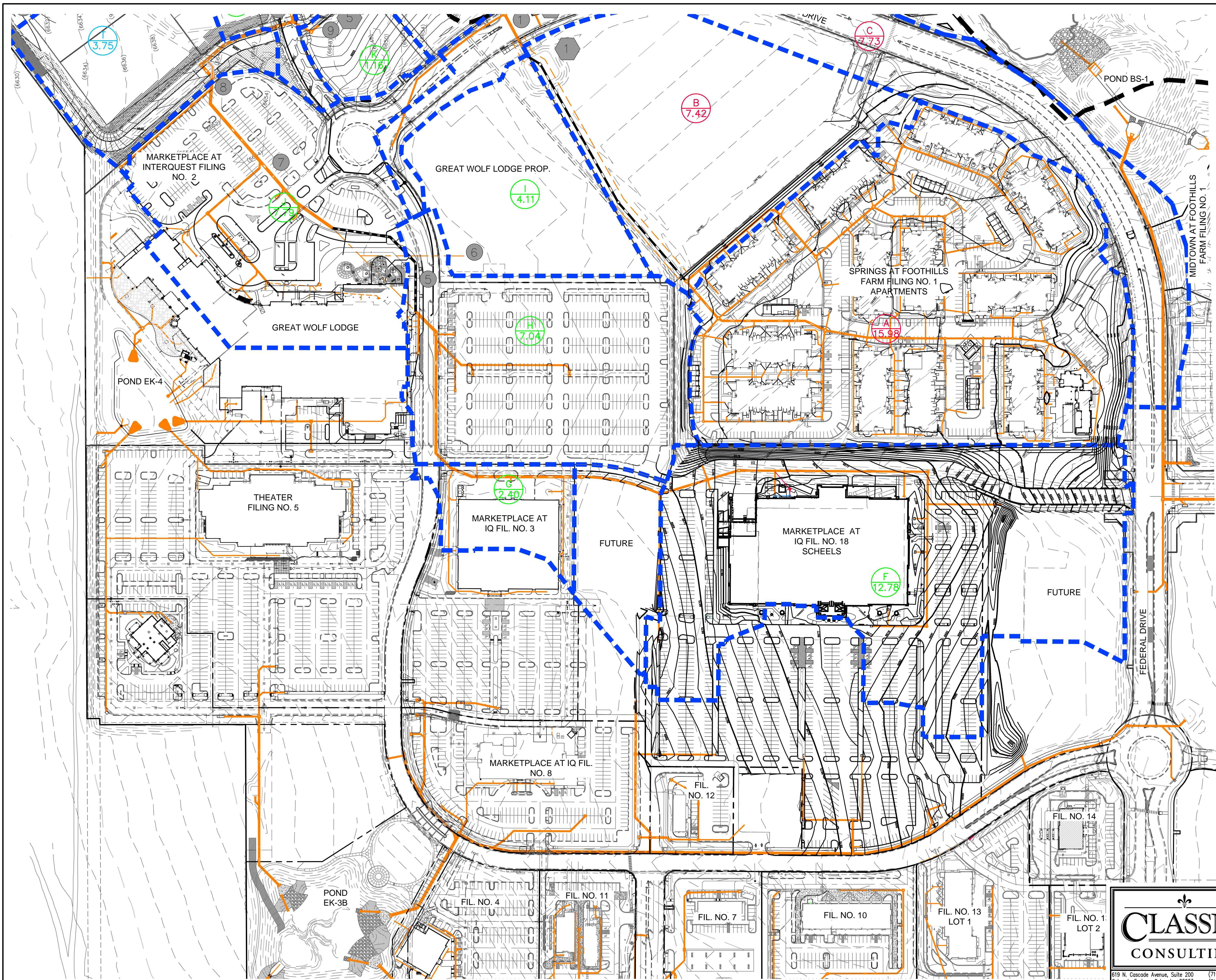
DESIGNED BY: CMT
DRAWN BY: CMT
CHECKED BY:

SCALE: (H) 1" = 100'
(V) 1" =

DATE: 12/13/18
SHEET 2 OF 2
JOB NO. 2399.80



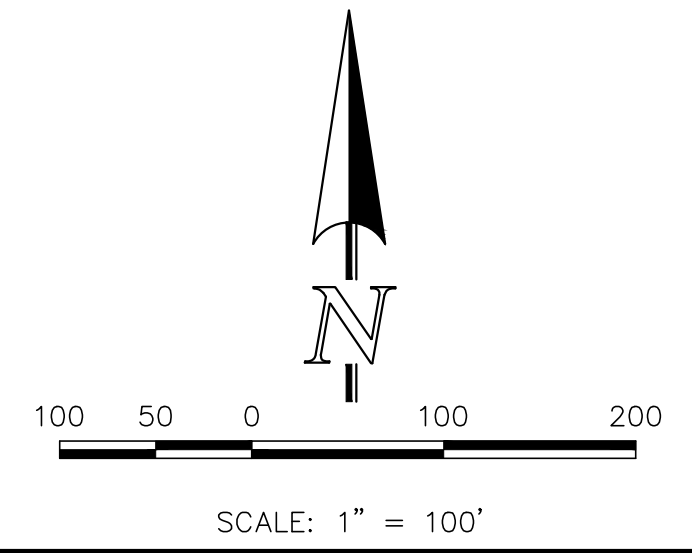
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LEGEND

EXISTING GROUND CONTOUR	5910
PROPOSED FINISHED CONTOUR	5910
SUBDIVISION BOUNDARY	---
LOT LINE	---
PROPOSED BASIN BOUNDARY	---
OVERFLOW ROUTE	→→
DIRECTION OF DRAINAGE	→
EXISTING STORM SEWER	---
EXISTING STORM INLET	□
PROPOSED STORM SEWER	---
PROPOSED STORM INLET	□
LOW POINT/HIGH POINT	LP/HP
BASIN IDENTIFIER	D
AREA IN ACRES	1.41
DESIGN POINT	2
PIPE RUN	2

NOTES:
 1) ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED.
 2) ALL CURBS TO BE TYPE 3 C&G UNLESS OTHERWISE NOTED.



	FOOTHILLS FARM CAMPUS FIL. 2 FINAL DRAINAGE REPORT DEVELOPED CONDITIONS	
	DESIGNED BY CMT	SCALE (H) 1" = 100' (V) 1" =
DRAWN BY CMT	CHECKED BY	(719) 785-0790 (719) 785-0799 (Fax)

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