



## **Falcon Highlands Filing No. 3**

### **Master Development Drainage Plan**

**Owner/Developer**

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**Atwell Project Number**

21000656

***Submitted by: Atwell, LLC***

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Please switch Appendix F & G.  
Drainage Maps should be last items  
in report.

## **INTRODUCTION**

This Master Development Drainage Plan Report has been completed for Challenger Homes in order to present an effective storm water management plan for the Falcon Highlands Filing No. 3 development, hereinafter referred to as the Site. This report is intended to guide the development of the site and recommend general drainage concepts that can be implemented as development progresses. Included within this report is a proposed drainage plan for the Site along with reference information for drainage basins and storm water conveyance facilities.

The Site was most recently studied in the *Falcon Highlands Filing No. 2 & 3 Final Drainage Report* by Terra Nova Engineering, Inc., latest revision August 2010 for the development of Filing No. 2. Prior to that Final Drainage Report, a Master Development Drainage Plan report entitled *Falcon Highlands Phase 2, Filing No. 2 & 3 Master Development Drainage Plan and Preliminary Drainage Report* by Terra Nova Engineering, Inc. latest revision September 2005 was developed. This new Master Development Drainage Plan (MDDP) acts as an update of the previous MDDP for the development of Falcon Highlands Filing No. 3 area and basins.

The entire site for Falcon Highlands Filing No. 3 is approximately 125.6 acres and will include a total of approximately 380 units. This is an additional 224 units from the previously approved reports of 156 units which had more quarter-acre and half-acre lots. In addition to greater lot density, roadway alignments have changed to accommodate the new lot layouts with approximately 2.75 miles of right-of-way improvements for paved roadways, curb and gutter, and attached sidewalks with 12.2 acres of open space interior to the subdivision not including tracts for drainage easements, with a dedicated park area central to the subdivision. This compares to the previously approved plans which had approximately 2.5 miles of right-of-way improvements and 7.0 acres of open space interior to the subdivision not including tracts for drainage easements, with no designated park areas. The drainage exhibits and calculations within the appendix present Filing No. 2 and other off-site basins consistent with that of previous reports. The total acreage of Filing No. 2 and 3 is approximately 257.7 acres and a portion of Filing No. 1 area totaling 10.6 acre was included for consistency in presenting tributary areas to existing detention ponds with that of previous studies.

Proposed herein is a network of storm infrastructure, ponds and channels that will meet the relevant criteria for storm water quality and detention, but also allow for aesthetically pleasing landscape and enjoyable green spaces within the PUD community.

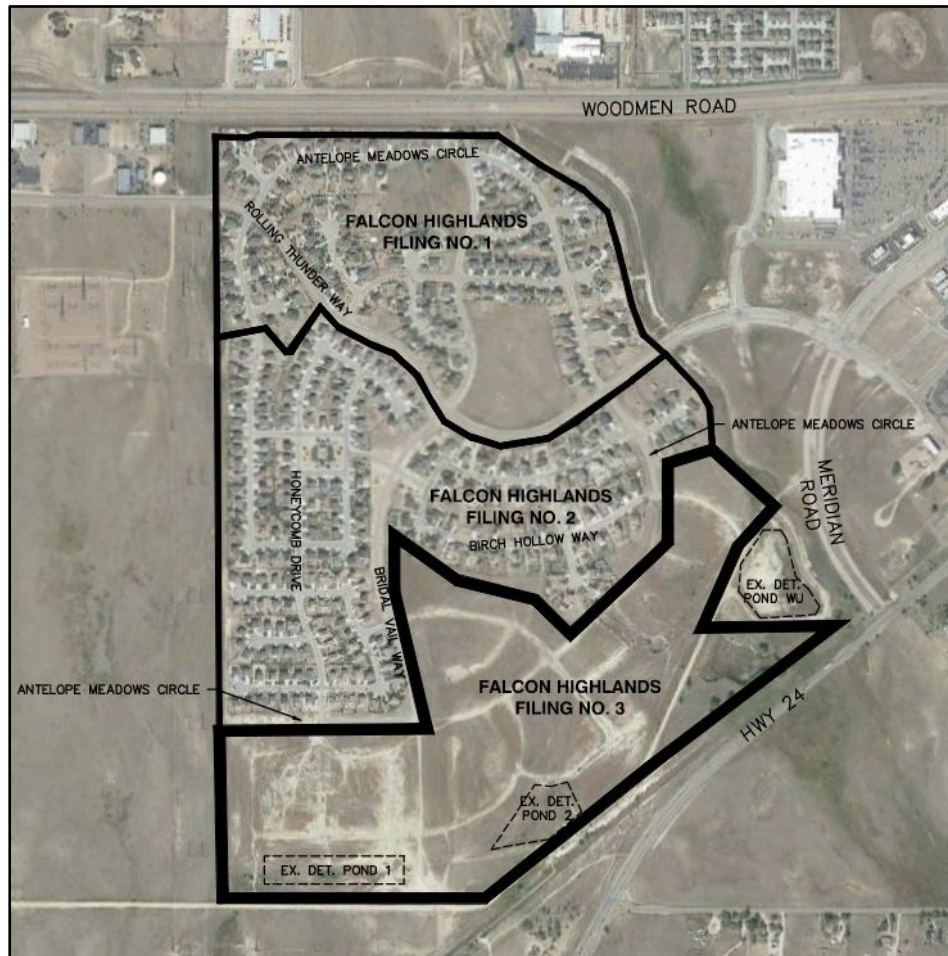
## **GENERAL LOCATION AND DESCRIPTION**

The Site is located within Section 12, Township 13 South, Range 65 West of the Sixth Principal Meridian, County of El Paso, State of Colorado. The Site is bounded by Tamlin Road to the south and east, Birch Hollow Way to the north and Bridal Vail Way to the west for the northern portion of the Site and Antelope Meadow Circle to the north for the western end of the Site. The Site, or Filing No. 3 specifically, is directly adjacent and south of Falcon Highlands Filing No. 2 and adjacent to the east and north of Banning Lewis Ranch subdivisions. The overall area consists of

approximately 125.6 acres that is proposed to be developed into approximately 380 single-family residential units including 24 nearly half-acre lots, 243 eighth-acre lots, 113 smaller (one-twelfth acre) lots. In addition to the single-family residential units and lots, there is proposed development for approximately 37 acres of open space, a well site, and associated roadways and landscaping. Of this 37 acres, approximately 12.2 acres is interior to the development which includes a park area of 3.53 acres. An off-site lift station property subject to potential upgrades to serve the development exists to the south central area of the Site.

The filing is initially planned to be built in three phases to plan for and accommodate water supply by the Metro District for what is anticipated to be approximately 55 water service taps in the initial Phase 1 of the development based on available water and an additional 191 taps following the new well connection, which includes Phases 1 and 2. Future Phases are included within this study to encompass the development of the entire Filing No. 3 as well as off-site, upstream Filing No. 2.

A map displaying the location and delineation of the Falcon Highlands Filings 1, 2, and 3 is shown below.



## **SOILS AND EXISTING SITE CONDITIONS**

The majority of the Site is currently undeveloped. Of the development within the Site, there are existing dirt roadways and sanitary sewer infrastructure installed per the Preliminary Plan and Development Plan for Falcon Highlands Phase 2, Filing No. 2 & 3 prepared by Terra Nova Engineering, most recent revised date of September 15, 2005. The ALTA survey conducted by Atwell, LLC., shows the existing conditions of Filing No. 3 and adjacent development of Filing No. 2. The Site is nearly 100% existing natural grass vegetation typical of the eastern plains with sparse vegetative cover at its outer limits to the south and southeast. There is an existing regional drainage pond referred to as Pond WU, east of the Site within Falcon Highlands Filing No. 2 dedicated to water quality and detention for storm water runoff from Falcon Highlands Filing No. 1, 2, and a small portion (Basin D) of Filing No. 3. There are two existing water quality and detention ponds to the south of the Site that were cut in during the construction of Filing No. 2 that were designed for development of both Filings Nos. 2 and 3. The on site slopes range from 0 percent to 10 percent and generally sheet flows from west to east. A Historic Drainage Map is included in Appendix F showing the delineated drainage basins.

The west edge of the Site has existing electric power lines and natural gas main within an existing utility easement. The south side of the Site has a 12" water main and a fiber optic line within what is considered future Tamlin Road right of way.

The Site is made up of mostly loamy sand soils with 100 percent of the soils being Hydrologic Soil Group A. The on-site soils are specified as Blakeland loamy sand (8), Blakeland Complex (8), and Columbine (19) as mapped by the Soil Conservation Service (SCS). The Natural Resources Conservation Service of the United State Department of Agriculture Web Soil Survey has been included in Appendix B for reference.

The western two thirds of the Site are contained within the Sand Creek Basin, the rest within the Falcon Basin.

Per previous drainage studies for the Site and the environmental study for Filing No. 1, there is a high ground water table that should be addressed with the final soils reports for this development. It is recommended that subsurface drains be installed for proposed structures.

Drainage improvements for the Site will include storm sewer infrastructure to capture runoff before street capacities are exceeded and at sump locations as well as channels and swales for potential overflow areas. The existing detention and water quality ponds south of the Site are assessed in this report and are to be constructed according to engineered construction drawings and a Final Drainage Report for Filing No. 3. More specific details regarding the proposed drainage improvements for the Site will be provided in the Final Drainage Report.

## **FLOODPLAIN**

According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map No. 08041C0561G and 08041C0545G dated December 7, 2018, the vast majority of the Site lies

within Zone X, which is designated as “Areas determined to be outside the 0.2% annual chance flood hazard area”, a portion of the site to the east that is proposed open space is located within a Zone A, which is designated as “Areas determined to be within the 0.2% annual chance flood hazard area”. The Zone A designation to the east of Tamlin Road is comprised of an Unnamed Tributary that drains to the Black Squirrel Creek No. 2. The FEMA FIRM, Community Panels Nos. 08041 C 0561 G and 08041 C 0545 G (effective December 7,2018) are included in Appendix C for reference.

El Paso County is involved with the Colorado Hazard Mapping Program (CHAMP) because the CWCB delegates its authority to the County to enforce the regulatory floodplain. El Paso County is part of the NFIP (National Flood Insurance Program) which provides assistance to property owners affected by flooding. Inclusion into this program requires that the County enforce floodplain regulations and any changes made to the regulatory maps. Failure to implement these changes could result in the County losing its NFIP status as such a Preliminary FEMA FIRM panel is also included in Appendix C that was remapped as part of CHAMP. Drainage Maps of existing and proposed conditions can be found in Appendix F.

The site falls within the Sand Creek Drainage Basin as well as partially within the Falcon Drainage Basin. The Drainage Basin Planning Study (DBPS) for Sand Creek Drainage Basin by Stantec HDR Dewberry, dated January 2021 and the City of Colorado Springs Sand Creek Basin GIS website show that the nearest creek EF1R9-T1R1 is located approximately 400 feet west of the site, located on the Banning Lewis Ranch Property. The Falcon Drainage Study by Matrix Design Group, dated September 2015, shows no existing or future drainageway improvements within the Site. Drainage from the site will outflow per historical conditions.

## **DRAINAGE DESIGN CRITERIA**

The El Paso County Drainage Criteria Manual and El Paso County Engineering Criteria Manual were used in conjunction with the Mile High Flood District Criteria Manual. The rational method was used for drainage basin less than 100-acres. The 5-year design frequency was used for the minor storm and a 100-year design frequency was used for the major storm in calculating onsite storm facility hydraulics. The one-hour point rainfall depth used for the 5-year storm was 1.50 inches and 2.52 inches for the 100-year event. The City of Colorado Springs IDF Curve (Figure 6-5 of the Drainage Criteria Manual Volume 1) was used for calculating rainfall intensity.

## **Existing HISTORIC AND OFFSITE DRAINAGE BASINS**

The Site has been assessed previously via the *Falcon Highlands Phase 2, Filing No. 2 & 3 Master Development Drainage Plan and Preliminary Drainage Report* developed by Terra Nova Engineering, Inc. latest revision September 2005 as well as a Final Drainage Report for Filing No. 2 & 3 by Terra Nova Engineering, Inc. dated August 2010.

The developments of Falcon Highlands Filing No. 1 & 2 remained consistent with their respective Master Development Drainage Plans and Final Drainage Reports and therefore offsite drainage

Include discussion that existing conditions is with Filing 2 developed and historic conditions (pre-Filing 2 development) was done as existing conditions in previous reports and calculations can be found there

basin descriptions and delineations provided in this report are based on those previous County approved reports. Relevant excerpts from these reports are included in Appendix G.

spelling

All off-site drainage basin runoff data and calculations have been updated for current codes and standards consistent with the El Paso County Drainage Criteria Manual. Part of the Site lies within the Sand Creek Basin and the other part within the Falcon Basin. Therefore, the *Sand Creek Drainage Basin Study* and the *Falcon Basin Drainage Basin Planning Study* were both referenced as well as the El Paso County Master Plan approved in May of 2021. Previous studies show the delineation between the two basins. This delineation is shown on the Drainage Basin Map.

The site has been broken down into six major off-site basins upstream of Filing No. 3, within the existing development of Filing No. 2 and relatively small portions of Filing No. 1. Descriptions of the major basins and their respective sub-basins are below. The off-site basins match the naming convention of the previous Final Drainage Report for Filing No. 2 and 3 to be consistent. A drainage map is in the appendix.

Appendix shows information is from Preliminary Drainage Report.

**OS-1 (6.38 ac,  $Q_5 = 10.7$  cfs,  $Q_{100} = 21.7$  cfs)** is an off-site basin located on the northwest of Falcon Highlands Filing No. 2 and consists of PUD residential zoned lots rear yard area. The historic drainage pattern sheet flows southwesterly where it is captured by basin OS-1.

This is Basin OS-1. Did you mean Basin OS-5?

**OS-2 (3.12 ac,  $Q_5 = 7.8$  cfs,  $Q_{100} = 13.6$  cfs)** is an off-site sub-basin within the developed area of Filing No. 1 for quarter-acre lots and is an off-site basin that was included in the MDDP for Filing No. 2. The basin's runoff sheet flows due south in Filing No. 2 and is captured by the roadways and storm system in Filing No. 2 which is connected to the storm system of Filing No. 3, and ultimately outfalls into the existing Pond 1.

**OS-3 (1.14 ac,  $Q_5 = 3.4$  cfs,  $Q_{100} = 6.0$  cfs)** is an off-site basin within Filing No. 1 that includes the developed right-of-way of Rolling Thunder Way. This sub-basin was included in the previous MDDP as an off-site basin and represents a portion of the landscaped right of way on the south side of Rolling Thunder Way that sheet flows due south into the developed areas of Filing No. 2 and ultimately into the public storm system shared with Filing No. 3, outfalling to existing Detention Pond 2.

**OS-4 (9.53 ac,  $Q_5 = 14.9$  cfs,  $Q_{100} = 31.7$  cfs)** is an off-site basin located on the southwestern part of Falcon Highlands Filing No. 2 and consists of mostly Tract A and portions of PUD residential zoned lots rear yard areas. The historic drainage pattern sheet flows south where it is captured by basin A.

OS-4

**OS-5 (63.24 ac,  $Q_5 = 82.7$  cfs,  $Q_{100} = 166.6$  cfs)** is an off-site basin that stretches from the eastern border of basin OS-1 to the eastern edge of Bridal Vail Way within Filing No. 2. The basin is zoned as PUD residential lots of about quarter-acre size. Runoff is carried in the public rights-of-way where the flow travels south through a series of public curb and gutters, sump inlets and storm infrastructure connected to Filing No. 2 where the flow outfalls into the existing Pond 1.



**OS-6 (35.75 ac,  $Q_5 = 31.9$  cfs,  $Q_{100} = 58.4$  cfs)** is off-site basin located between Bridal Vail Way and Antelope Meadows Circle within Filing 2. This basin includes PUD residential zoned lots of half-acre size and contains drainage tracts. The basin is captured by a series of public curb and gutter systems in the rights-of-way where inlets and various size RCPs convey storm water to the end of the cul-de-sac of Wagon Track Drive where the public storm system of Filing No. 2 connects and daylight to Filing No. 3 within future Antelope Meadows Circle right-of-way.

OS-4

How does flow n through Basin C existing condition

**Basin A (3.74 ac,  $Q_5 = 1.2$  cfs,  $Q_{100} = 7.7$  cfs)** is the basin located southwest of Antelope Meadows Circle, just below basin OS-1, west of Basin B. The majority of the site is comprised of Tract A and consists of some rear yard runoff from the PUD lots at the western edge of Basin B. The storm water runoff sheet flows south and off-site and per historical drainage patterns is not tributary to on-site detention ponds.

Include discussion of DP 1, combined flow of Basins OS-4 & A, exits site and where does it go?

**Basin B (38.93 ac,  $Q_5 = 10.2$  cfs,  $Q_{100} = 68.6$  cfs)** is located south of Antelope Meadows Circle, adjacent to basin A. The site is covered in native grasses with limited grading work from a previous development. Runoff from the site sheet flows southwesterly overland to a dedicated existing pond, Pond 1.

**Basin C (57.81 ac,  $Q_5 = 16.3$  cfs,  $Q_{100} = 109.7$  cfs)** is located adjacent to basin B and covered in native grasses. The site has limited grading due to work from a previous development that did not finish. Runoff from the site sheet flows southwesterly overland to a dedicated existing pond, Pond 2.

**Basin D (10.54 ac,  $Q_5 = 3.3$  cfs,  $Q_{100} = 22.4$  cfs)** is located to the northeast of the Filing and consist of undeveloped area with native grasses. The basin flows directly to existing Pond WU.

**Basin E (3.14 ac,  $Q_5 = 1.8$  cfs,  $Q_{100} = 4.2$  cfs)** is the undeveloped, natural landscaped area between Tamlin Road and the existing Detention Pond 1. Runoff flows to a low point where an inline inlet will capture the flow and direct it south offsite along with the allowable release rate of the pond. This drainage concept is presented in the previous master plan and is to remain as the intended plan.

E?

Is this an existing inlet & ditch? If so, please show and label on plan. Update paragraph to state they are existing. Is there a change in flows from this plan to the previous plan mentioned?

**Basin F (3.67 ac,  $Q_5 = 5.3$  cfs,  $Q_{100} = 12.5$  cfs)** is the undeveloped area between Tamlin Road and the existing Detention Pond 2. The runoff from Basin F is directed by a ditch section to a low point where an inline inlet will capture the flow and direct it south offsite along with the allowable release rate of the existing Pond 2. This drainage concept and its associated storm infrastructure is presented in the previous master plan and is to remain as the intended plan.

**Basin G (7.85 ac,  $Q_5 = 6.8$  cfs,  $Q_{100} = 16.0$  cfs)** is the area east of Basin C that is not to be disturbed and remain as open, natural landscape. The runoff from Basin F sheet flows downstream and is undetained. There is no increase runoff and the drainage pattern remains that of its historical flow path in the channel south to the box culverts at Highway 24.

G?

## **PROPOSED DRAINAGE BASINS**

This report has been prepared in accordance with the El Paso County Drainage Criteria Manual and the Mile High Flood District Criteria Manual. The 5-year storm was used as the minor storm event, while the 100-year storm was used as the major event. The one-hour point rainfall depth used for the 5-year storm was 1.50 inches and 2.52 inches for the 100-year event.

Grading design is preliminary or has not begun for much of the site. Due to this, the assumption has been made that the developed conditions drainage patterns presented in the previous MDDP (Terra Nova Engineering, Inc., September 2005) and FDR (Terra Nova Engineering, Inc., August 2010) will remain for all relevant developed areas consistent with the updated design plan and assumed drainage patterns within altered design areas will conform with the design intent. As design and development progress, this should be revisited to confirm the proposed drainage patterns used in this analysis are still applicable. Since the development of Filing No. 2, sketch plans for Filing No. 3 have been altered from the previous MDDP and FDR. Due to the change in the layout of Filing No. 3 from previous design plans and reports, this report serves to provide updated drainage information for the planned development based on new concept grading and drainage patterns. However, as mentioned previously, the drainage concept for the new layout aims to follow previous master plans as closely as possible including basin delineation areas and pond routing in order to keep with previous detention and water quality pond designs.

The overarching premise of the drainage design is to route overland flow from residential lots and units to adjacent rights-of-way where public storm infrastructure will be installed and ultimately convey the storm water to respective ponds to provide water quality treatment as well as flow attenuation and detention. Previous studies designed the existing Ponds 1 and 2 in order to provide full spectrum detention and water quality for Filing Nos. 2 and 3. The analysis within this report provides more defined pond sizing requirements due to the change in layout for Filing No. 3 as well as preliminary locations and sizes for culverts and/or open channels and the public storm system. This idea is intended to be followed for the entirety of the developed site. Basins which are not along the main drainageways within the proposed developed areas or which are expected to flow offsite have been analyzed. There are no engineered channels that exit the Site.

There is a proposed grass-lined, natural ditch to convey stormwater from the rear of B-lot sites within Basin C to existing Pond 2. The design of this swale is to be included in the Final Drainage Report. All Pond outlets daylight to the southern open space of the Site, but are not directed to any formal channels or drainageways.

Preliminary pond sizing and conveyance structures will be analyzed as development progresses to ensure that the final design meets the standards set forward in the El Paso County Engineering Criteria Manual as well as the Mile-High Flood Control Criteria Manual.

existing

13 existing

A-G

As with the historic conditions, the fourteen historic major drainage basins have been delineated into six major basins based on preliminary grading of the Site – basins A1 through F1 within the limits of Filing No. 3 and basins OS-1 through OS-6 for off-site basins consistent with the historic conditions for the developed areas of Filing No. 2 and relatively small developed area of Filing

existing

B & C

B,C,D and E

No. 1. Of the major basins within the Site, basins B1, C1, D1, and E1 are consistent with previous reports for Filing Nos. 2 and 3 as those basins are not to be altered during the development of Filing No. 3. Basins B1 and C1 are the basins in which development of Filing No. 3 is to occur. Sub-basin analysis within these major basins is provided as a part of the hydrology calculations in order to plan for storm infrastructure and channels on the Site.

the preliminary and final drainage reports

will be provided

The rational method was used to estimate runoff rates for the proposed development and are in accordance to El Paso County Drainage Criteria Manual and any references within the County criteria to the City of Colorado. These calculations can be found in volumes 1, 2, and 3. These

This statement doesn't make sense and is used throughout several times. Please revise description for clarity.

change all references from historical to existing

OS-5?

**Offsite Basin OS-1 (6.38 ac,  $Q_5 = 10.7$  cfs,  $Q_{100} = 21.7$  cfs)** remains as presented in the **Historical** Drainage Conditions section due to the full development of Filing No. 2 located directly above basin OS-1. **Basin B has been delineated between Filing Nos. 2 and 3 for this report** and any basin area tributary to the existing Pond 1 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 8 which continues to drain through Filing 3's Basin A.

Update flows to match spreadsheet

OS-5?

**Offsite Basin OS-2 (3.12 ac,  $Q_5 = 1.8$  cfs,  $Q_{100} = 4.2$  cfs)** remains as presented in the **Historical** Drainage Conditions section due to the full development of Filing No. 2. Basin B has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 1 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 9 where it continues through Filing 2's Basin OS-3 as shown on the drainage map for this study.

OS-3?

**Offsite Basin OS-3 (1.14 ac,  $Q_5 = 3.4$  cfs,  $Q_{100} = 6.0$  cfs)** remains as presented in the **Historical** Drainage Conditions section due to the full development of Filing No. 2. Basin C has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 2 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 10 where it continues to flow through Filing 2's Basin OS-6 as shown on the drainage map for this study.

OS-4?

**Offsite Basin OS-4 (9.53 ac,  $Q_5 = 14.9$  cfs,  $Q_{100} = 31.7$  cfs)** remains as presented in the **Historical** Drainage Conditions section due to the full development of Filing No. 2. Basin A has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to off-site drainage within Filing No. 2 is now considered off-site basin area. The runoff from this basin is directed offsite and goes through the western boundary of Filing No. 3 to Design Point 11.

Flow does not match spreadsheet

OS-5?

**Offsite Basin OS-5 (63.24 ac,  $Q_5 = 82.7$  cfs,  $Q_{100} = 166.6$  cfs)** remains as presented in the **Historical** Drainage Conditions section due to the full development of Filing No. 2. Basin B has been delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 1 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 12 which is the pipe run for the public 60" RCP storm sewer line that outfalls directly into Pond 1.

**Offsite Basin OS-6 (35.75 ac,  $Q_5 = 31.9$  cfs,  $Q_{100} = 58.4$  cfs)** remains as presented in the **Historical** Drainage Conditions section due to the full development of Filing No. 2. Basin C has been

OS-6?

delineated between Filing Nos. 2 and 3 for this report and any basin area tributary to the existing Pond 2 within Filing No. 2 is now considered off-site basin area. The basin drains to Design Point 13 where an existing public 10' D-10-R inlet collects stormwater and conveys it to Antelope Meadows Circle within Filing 3. **Need to show & label inlet on plan**

**Basin A (3.74 ac,  $Q_5 = 5.8$  cfs,  $Q_{100} = 8.2$  cfs)** is the western most basin of the site and consists of the open space Tract A and some small portions of the rear lots of the lots. The runoff from Basin A sheet flows west off site and onto the reductions via grass buffers and natural landscape to Design Point 1 basin as no downstream conditions will be affected. An area of discharge property is the west end of Antelope Meadows Circle where it will that temporary control measures such as straw bales or sediment control dead end for energy dissipation and to disperse any channelized flow from the curb and gutter. **Antelope Meadow Cir is within Basin OS-4. Please removed reference of this to Basin OS-4 description. No affects to downstream is not reason for no detention, please revise statement.**

**Basin B (40.37 ac,  $Q_5 = 73.5$  cfs,  $Q_{100} = 176.7$  cfs)** is the southwestern portion of Filing No. 3 consisting of the area south of Antelope Meadows Circle and west of Basin C. Basin B is laid out with several 50' public right of way roadways with curb and gutter, detached pedestrian sidewalk, and landscape areas. The PUD residential developments within Basin B are shown as 123 lots, varying from 50'x110' to 60'x110'. The roadways consist of high points at the eastern and western edges and low points central to the basin with a drainage Tract that flows north to south. The general drainage pattern is due south to the existing Pond 1. Within the roadways is a public storm system and a series of sump inlets at the low points to capture surface runoff and convey storm water to forebays within the existing Pond 1 (Design Point 2). A relatively small portion of the northern half-acre lots east of Bridal Vail Way are included in Basin B where a low point in the western cul-de-sac is to have a sump inlet for surface runoff collection that connects to the existing Pond 1 storm system.

**Basin C (57.12 ac,  $Q_5 = 64.8$  cfs,  $Q_{100} = 170.6$  cfs)** is the more central to east basin within Filing No. 3 that is tributary to Pond 2. The basin includes the majority of the half-acre PUD residential lots in the northern area south of Filing No. 2 and east of Bridal Vail Way, and stretches south to the very south and east edges of the Filing with the exception of Pond WU areas and Basin D. Basin C areas south of Antelope Meadows Circle consists of approximately 248 lots with some lots of 35'x110' and others of 50'x110' and 60'x110' in size. A public storm system is to be designed within the roadways to convey storm water from the off-site Basin OS-5 and Basin OS-6 within Filing No. 2 and the runoff from the entire Basin C areas. The storm system is to outfall into the existing Pond 2 (Design Point 3).

**Basin D (7.96 ac,  $Q_5 = 12.9$  cfs,  $Q_{100} = 30.5$  cfs)** is the northeast area of the Filing for one-eighth acre PUD residential lots at the extension of Birch Hollow Way. The basin is tributary to existing Pond WU which is an existing and recently improved pond under the jurisdiction of El Paso County. The basin drains directly to the existing pond (Design Point 4) via overland flow.

**Basin E (3.14 ac,  $Q_5 = 1.8$  cfs,  $Q_{100} = 4.2$  cfs)** is the undeveloped, natural landscaped area between Tamlin Road and existing Detention Pond 1. Runoff from Basin E is directed by a ditch section to a low point where an inline inlet will capture flow and direct it south offsite along with the

 **existing inlet?**

allowable release rate of the existing pond. This drainage concept and its associated storm infrastructure is presented in the previous master plan and is to remain as the intended plan. The flow directed offsite is accounted for in existing Pond 1. The basin drains to Design Point 5 and is directed offsite at the southwest corner of the Filing.

**Basin F (5.50 ac,  $Q_5 = 5.3$  cfs,  $Q_{100} = 12.5$  cfs)** is the area south of Basin C that is not to be disturbed and remain as open, natural landscape. The runoff from Basin F sheet flows downstream and is undetained. There is no increase runoff and the drainage pattern remains that of its historical flow path in the channel south to the box culverts at Highway 24. The flow directed offsite is accounted for in existing Pond 1. The basin drains to Design Point 6 and is directed offsite through Tract K.

**Basin G (7.85 ac,  $Q_5 = 6.8$  cfs,  $Q_{100} = 16.0$  cfs)** is an open, undeveloped area east of Basin C within Tract Z that is to remain undisturbed. The basin drains southeast to the ditch between dedicated future Tamlin Road and Highway 24. The basin drains to Design Point 7 and is directed offsite due southwest.

OS-5

Spreadsheet shows 16 ac-ft to top of embankment

**Existing Pond 1:** The existing Detention Pond 1 (Design Point 2) is a 17-acre-foot pond for water quality and detention basin for the 100-year storm event. The basins that are tributary to Pond 1 are Offsite Basins OS-1, OS-2, OS-3, and OS-4 and On-site Basins A and B. The undetained storm water runoff from Basins E and F are accounted for within the pond.

Do you mean you are overdetecting?

Existing Pond 1 was sized using Haestad's Pondpack program in the previous study by Terra Nova, dated September of 2010. The pond will need to have more detail taken into account at the time of the Final Drainage Report when runoff calculations are finalized and the required pond volumes for WQCV (Water Quality Capture Volume), EURV (Excess Urban Runoff Volume), and 100-year detention and release rates are determined. The Existing Pond 1 conditions to determine if earthwork for volume adjustments is required. Existing pond infrastructure is required including the outlet structure, orifice plate, micropool, and spillway. The existing infrastructure will be as-built to verify elevation.

State what required volumes are for WQ, EURV and 100-year (both ponds).

State what allowable pond release rates are per previous reports (both ponds) and what report they came from.

An existing 42" RCP outlet pipe from the existing outlet structure discharges to the existing Pond 1 due south under the future dedicated right-of-way of Tamlin Road. The outlet pipe is located on undeveloped Banning Lewis Ranch property. Rip rap protection will need to be provided at the end of the outlet pipe at the time of final construction. According to the previous study from 2010, the released runoff drains south across a defined broad open grassland swale to Highway 24. A 72' wide emergency spillway set at 6817.00 will pass the complete 100-year developed flow safely over the proposed riprap lined weir. Downstream drainage patterns mentioned in the previous report are to be assessed in the Final Drainage Report.

Preliminary calculations for the adjusted site layout can be found in Appendix E of this report including effective imperviousness calculations using the UD-BMP IRF calculator and WQCV, EURV, and 100-year detention calculations using the UD-Detention spreadsheet by the Mile High Flood District.

**Existing Pond 2:** The existing Detention Pond 2 (Design Point 3) is a 7-acre-foot pond for water quality and detention basin for the 100-year storm event. The basins that are tributary to the existing pond are Offsite Basins OS-5 and OS-6 and On-site Basins C. The undetained storm water runoff from Basin G is accounted for within the pond.

Existing Pond 2 was sized using Haestad's Pondpack program in the previous study by Terra Nova, dated September of 2010. The pond will need to have more detail taken into account at the time of the Final Drainage Report when runoff calculations are finalized and the required pond volumes for WQCV, EURV, and 100-year detention and release rates are determined. The Existing Pond will be assessed for final conditions to determine if earthwork for volume addition is required and if retrofitting of existing pond infrastructure is required including the outlet structure, outlet plate, micropool, and spillway. The existing infrastructure will be as-built to existing sizes.

State what proposed flows are at each location exiting site, to show no increase.  
Include analysis of culverts & channel. Show culverts & channel are adequate to handle proposed flows.

An existing 42" RCP outlet pipe from the existing outlet structure discharges flow from existing Pond 2 due south under the future dedicated right-of-way of Tamlin Road onto the adjacent undeveloped Banning Lewis Ranch property. Rip rap protection will need to be provided at the end of the outlet pipe at the time of final construction. From here the runoff drains south to an existing channel and then is directed to a Highway 24 culvert. According to the 2010 study, a 50' wide emergency spillway set at 6817.50 will pass the complete 100-year developed flow. Downstream drainage patterns mentioned in the previous report are to be assessed in the Final Drainage Report. Impervious factors and extended detention basin calculations for this pond can be found in Appendix E of this report.

Note: Additional improvements may be warranted at Pond WU (specifically a trickle channel may need to be built). Include statement that this will be addressed with Preliminary & Final Drainage Reports

**Existing Pond WU:** The existing Detention Pond WU (Design Point 4) is a 7-acre-foot storm water quality and detention facility that is owned and maintained by the City of Lakewood. The previous MDDP called for developed flow conditions to drain to the Falcon Basin. The Falcon Basin has a slight increase in density with one-eighth acre lots from the previous study. The amount of open space in the new layout yields a runoff value at or below the previous analysis for this basin and therefore there is no increase to water quality capture volume or detention volume from the previous study or from recent improvements.

State what the area and imperviousness were and are now (to show decrease to Pond).

Due to the revised layout and grading of the site, approximately 31 acres of area that was tributary to the Falcon Basin will now be tributary to the Sand Creek Basin. This cross-basin transfer should not cause any downstream problems as detention of the additional runoff and release rates conforming to drainage standards will be implemented.

The Developed Condition's runoff flows are kept at or below historic flows by way of detention within existing Pond WU, existing Detention Pond 1, and existing Detention Pond 2; all of which are designed for water quality capture and to release storm water at rates conforming to the El Paso County Drainage Criteria Manual. It is anticipated that there will be no negative affects to downstream areas due to developed drainage conditions.

Need to state what flows are at each location exiting site, to show no increase.

## **STORM WATER CONVEYANCE AND STORAGE FACILITIES**

The proposed on-site conveyance facilities will consist of a combination of storm pipe, swales/channels, curb/gutter, and inlets. Proposed drainage patterns will generally follow the **existing** **historic** drainage patterns outlined in the previous sections of this report, including previous master plans and reports for upstream filings. Within the proposed roadway network, stormwater runoff will be conveyed overland via surface flow of streets in the curb and gutter until street capacities have been exceeded or where storm sewer inlets have been designed. At sump locations, they will be sized to collect 100-year flows. Runoff entering the inlets will be conveyed to the storm sewer system to detention and water quality ponds. The general onsite drainage patterns were previously discussed in the Proposed Drainage Basins section of this report.

State that sizing of all this facilities will be sized with the Final drainage report

The existing pond outfalls are routed to the Sand Creek Basin. These outfalls have been preliminarily sized based on standard pond release rates required by the MHFD criteria. Release rates will be further evaluated during the preliminary and final drainage studies.

Detention and Water Quality Ponds for the Site have been preliminarily designed based on previous MDDP and FDR studies for off-site basins and for Filing No. 3 with the methods outlined in the MHFD Urban Storm Drainage Criteria Manual Volumes 1, 2 and 3 along with the MHFD MHFD-Detention\_v4.00. The ponds are designed to detain the EURV and the 100-year Detention Volume.

The existing ponds have outlet structures that contain 2.5-ft deep micro-pools. EURV release rates will be controlled by an orifice plate designed to meet the MHFD release rate criteria. The 100-year storage volume is routed through a grate and restricted by a plate that was sized to limit the release rate to the allowable release rate.

The existing ponds have been previously designed using the runoff data from the Final Drainage Reports from Filing No. 1 and Filing No. 2 as well as assumed runoff data for Filing No. 3 via the most recent FDR in August of 2010 for the development of Filing No. 2. The existing infrastructure is to be assessed for final conditions within a Final Drainage Report to determine if retrofits are required.

This report provides more concise drainage calculations for Filing No. 3, consistent with the new layout and grading concept and thus for the tributary areas to Ponds 1 and 2. The MHFD UD-Detention calculator was used to determine existing Pond 1 and Pond 2's required WQCV, EURV, the 100-year detention volume, and the total volume required as a total of each zone.

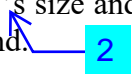
Include statement that ponds will be designed/updated to function as full-spectrum detention facilities

A summary of the required pond volumes is presented in the table below.

<b>Extended Detention Pond Volumes</b>				
	<b>Zone 1 (WQCV)</b>	<b>Zone 2 (EURV - Zone 1)</b>	<b>Zone 3 (100-Year - Zones 1 &amp; 2)</b>	<b>Total Volume Required</b>
Pond 1	1.914 ac-ft	3.271 ac-ft	3.865 ac-ft	9.050 ac-ft
Pond 2	1.434 ac-ft	2.115 ac-ft	2.928 ac-ft	6.476 ac-ft

This MDDP consists of the most up to date calculations for percent imperviousness for the tributary areas to existing Ponds 1 and 2 and therefore has new, adjusted volume requirements compared to that of previous reports.

The existing Pond 1 was calculated to require 9.050 ac-ft and was sized for a 17 ac-ft pond using Haestad’s Pondpack Program and HEC modeling according to the 2010 report. A Final Drainage Report for Filing No. 3 will require analysis of Pond 1’s size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the pond for the new, more dense site layout.

Our calculations require 6.476 ac-ft within existing Pond 2 and the original report sized the pond for 9.43 ac-ft according to the Haestad’s Pondpack Program and HEC modeling. A Final Drainage Report for Filing No. 3 will require analysis of Pond 1’s size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the pond. 

A Final Drainage Report for Filing No. 3 will require analysis of both existing ponds for size and infrastructure to adjust to final hydrology and hydraulic conditions tributary to the respective facilities.

Existing Regional Detention Pond WU was designed and built as a part of Filing No. 2 and accounted for a portion of future development within Basin D of Filing No. 3 according to the previous MDDP and FDR.

## **WATER QUALITY ENHANCEMENT BEST MANAGEMENT PRACTICES**

The existing detention ponds discussed in the previous section have been designed in accordance with the MHFD Urban Storm Drainage Criteria Manual Volumes 1, 2 and 3 as well as the El Paso County and City of Colorado Springs Drainage Criteria Manuals. The ponds are designed to provide WQCV and detain the EURV and the 100-year Detention Volume. Runoff from the upstream tributary areas will be conveyed to the ponds via storm sewer and designed channels as emergency overflow routes directed to the ponds.

Non-structural Best Management Practices that will be incorporated into the project are anticipated to include grass swales.

Discuss how water quality will be addressed/provided for on Basins which do not reach either of the ponds. (Basins will minimally grading, no impervious areas or buildings, remain open, etc.)

25.7110



Grass swales was listed under Non-structural BMP's.

Structural Best Management Practices that are incorporated in the Site design include grass swales and extended detention ponds.

**MAINTENANCE**

Maintenance of the existing Detention Ponds 1 and 2 shall be by the Falcon Highlands Metro District along with the outlet works for the pond. Public Pond WU will be maintained by El Paso County along with the channel on the east side of the property. The proposed storm sewer system in the internal streets will be owned and maintained by El Paso County once approved.

**FLOODPLAIN MODIFICATIONS**

A portion of the Site within Flood Zone AE is delineated as Basin F1 and previously discussed in this report. Basin F1 is an open natural landscaped area not to be disturbed therefore there will be no modifications to the 100-year floodplain, nor will the development be impacted by said floodplain.

Update this paragraph. There is no Basin F1 and floodplain is not within this project, but adjacent to it.

**CONCLUSION**

This Master Development Drainage Plan report covers the conceptual storm water management plan for the Falcon Highlands Filing No. 3 development. Detailed design will be required to develop individual portions of the site, but this document will provide guidance so that the drainage infrastructure constructed throughout the Falcon Highlands Filing No. 3 development will function efficiently and effectively. This report follows all standard criteria set forth by the El Paso County Drainage Criteria Manual, El Paso County Engineering Criteria Manual, the City of Colorado Springs Drainage Criteria Manuals Volumes 1, 2, and 3, and the Mile High Flood District Urban Storm Drainage Criteria Manual, with no requested variances. Downstream drainage facilities will not be negatively affected, as historic drainage patterns and allowable release rates are planned to be maintained. The Drainage Basin Planning Studies for both Sand Creek and Falcon have no existing or future plans within The Site. Furthermore, Pond WU will remain undisturbed and is not tributary to any of the proposed development.

existing

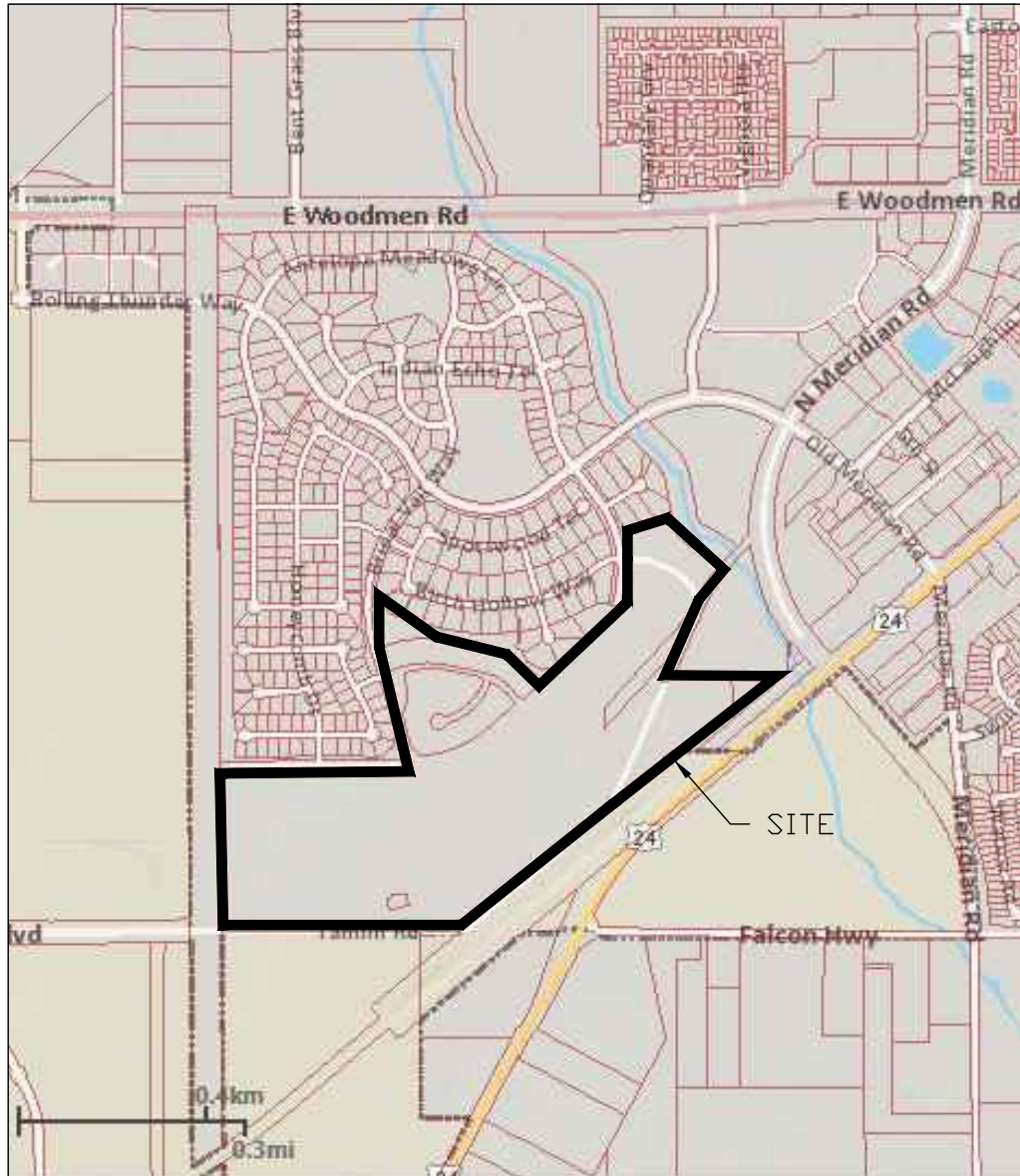
## **REFERENCES**

- 1) Urban Storm Drainage Criteria Manuals; Mile High Flood District; latest edition
- 2) El Paso County Engineering Criteria Manual (ECM), latest revision 6 dated December 13, 2016
- 3) El Paso County Drainage Criteria Manual (DCM), latest revision October 31, 2018
- 4) City of Colorado Springs Drainage Criteria Manuals, Volumes 1, 2, and 3, latest revision May 2014
- 5) Flood Insurance Rate Map of El Paso County Colorado, Federal Emergency Management Agency, Flood Insurance Rate Map No. 08041C0561G and 08041C0545G dated December 7, 2018.
- 6) Hydrologic Soil Group – El Paso County, Colorado, Web Soil Survey, National Cooperative Soils Survey, May 21, 2021
- 7) *Falcon Highlands Filing No. 2 & 3 Final Drainage Report* by Terra Nova Engineering, Inc., latest revision August 2010.
- 8) *Falcon Highlands Phase 2, Filing No. 2 & 3 Master Development Drainage Plan and Preliminary Drainage Report* by Terra Nova Engineering, Inc. latest revision September 2005
- 9) URS Section for Regional Detention Pond WU, developed by Galloway & Company
- 10) Sand Creek DBPS, developed by Stantec, HDR, and Dewberry dated January 2021
- 11) Falcon DBPS, developed by Matrix Design Group dated September 2015

**APPENDIX A**  
**VICINITY MAP**

# Falcon Highlands - Filing No. 3

A PART OF SECTION 12, TOWNSHIP 13 SOUTH, RANGE 65 WEST  
OF THE SIXTH PRINCIPAL MERIDIAN,  
COUNTY OF EL PASO,  
STATE OF COLORADO



PROJECT NO.: 21000656  
DATE: 01/28/2022



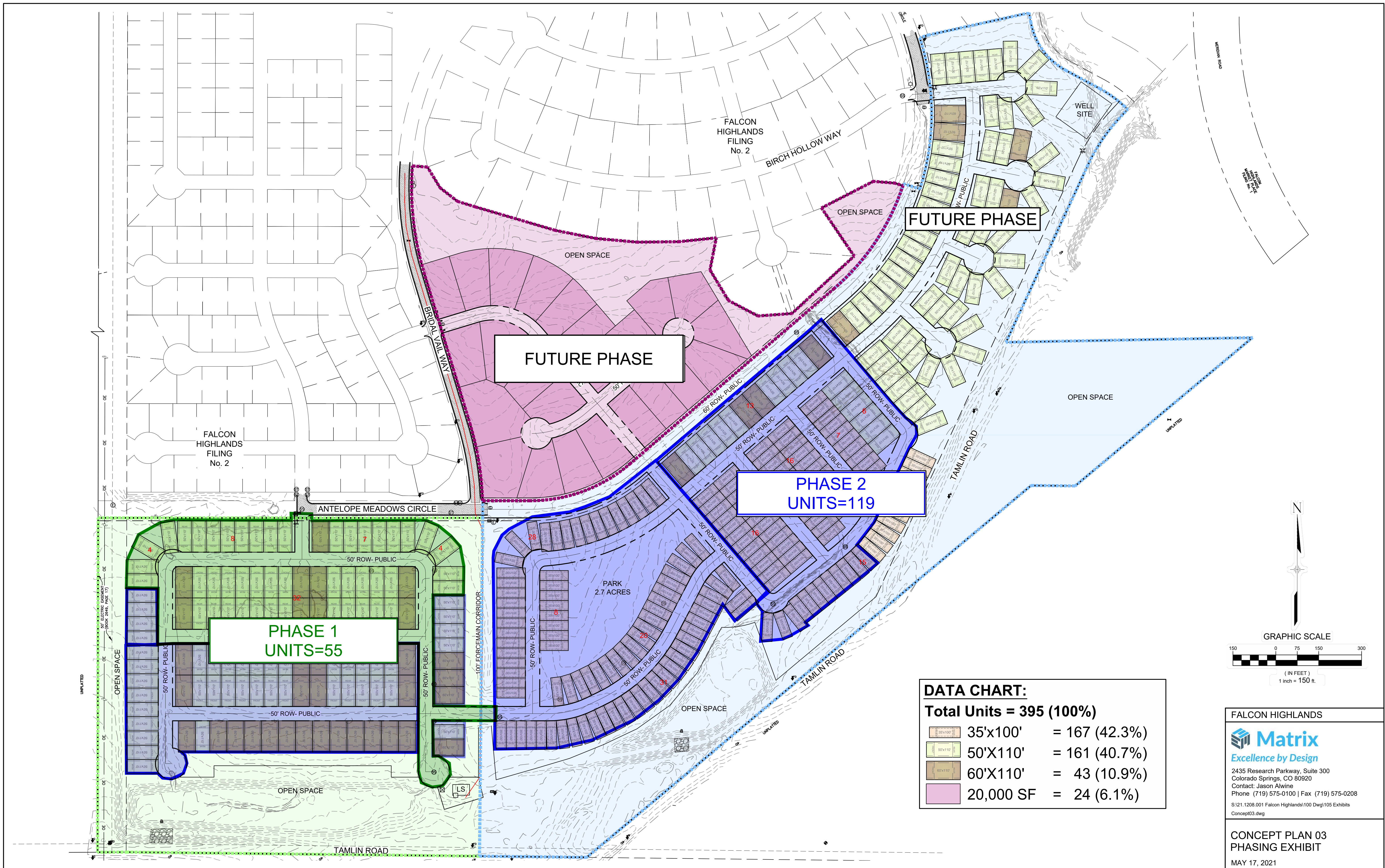
**ATWELL**

866.850.4200 [www.atwell-group.com](http://www.atwell-group.com)

6200 S. SYRACUSE WAY, SUITE 470  
GREENWOOD VILLAGE, CO 80111  
303.825.7100

CONTACT: DAN CHARDY/DON  
DMADRON@ATWELLCORPORATION

SCALE: 1" = 0.3mi



FALCON HIGHLANDS FILING No. 2

FALCON HIGHLANDS FILING No. 2

FUTURE PHASE

FUTURE PHASE

PHASE 2 UNITS=119

PHASE 1 UNITS=55

PARK 2.7 ACRES

OPEN SPACE

OPEN SPACE

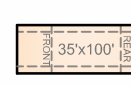



OPEN SPACE

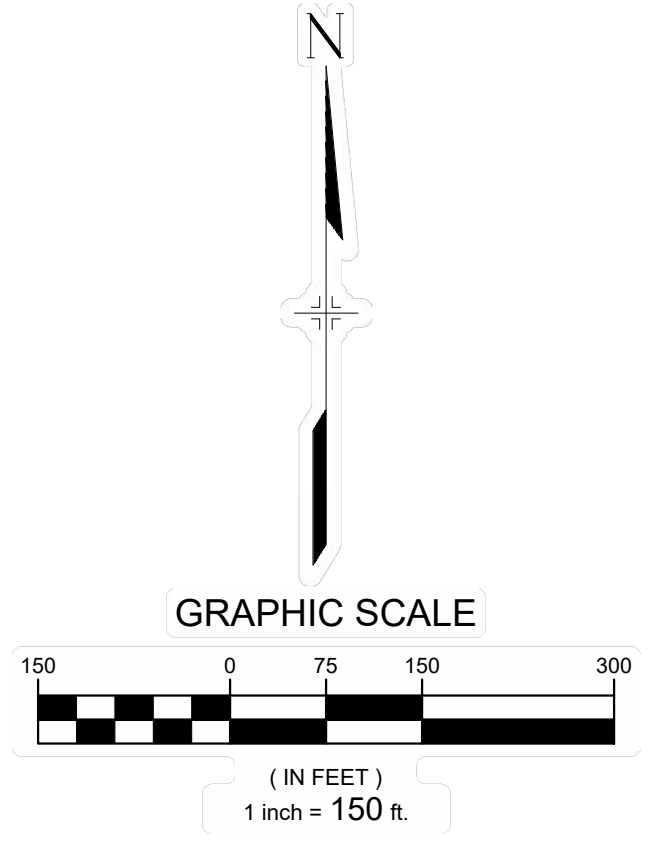
OPEN SPACE

OPEN SPACE

**DATA CHART:**

**Total Units = 395 (100%)**

	35'x100'	= 167 (42.3%)
	50'x110'	= 161 (40.7%)
	60'x110'	= 43 (10.9%)
	20,000 SF	= 24 (6.1%)



FALCON HIGHLANDS

**Matrix**  
Excellence by Design

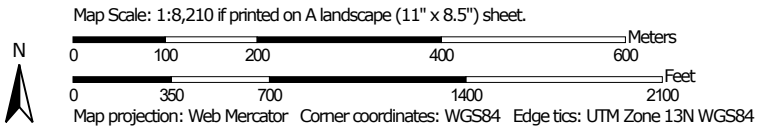
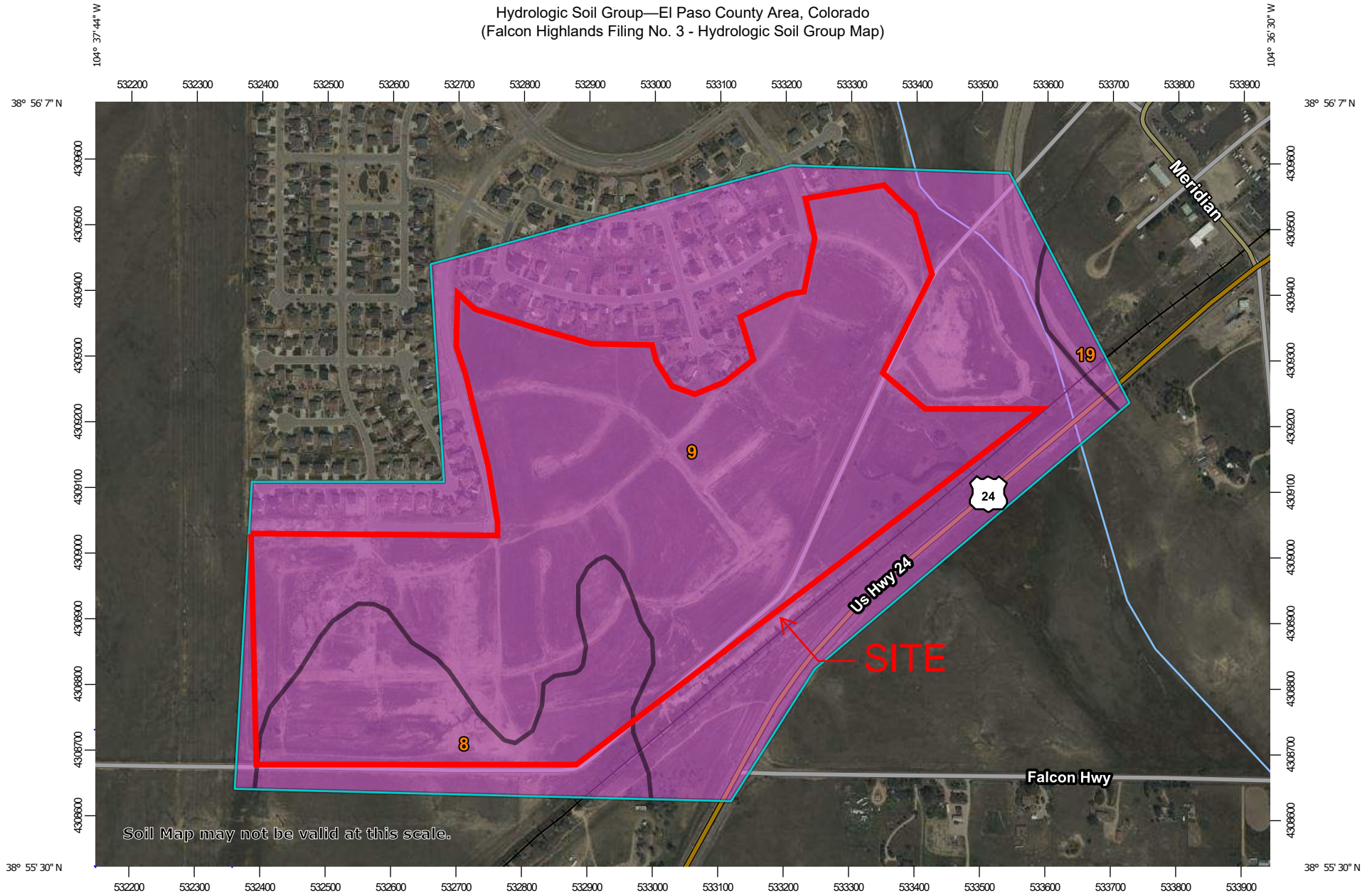
2435 Research Parkway, Suite 300  
Colorado Springs, CO 80920  
Contact: Jason Alwine  
Phone (719) 575-0100 | Fax (719) 575-0208  
S:\21.1208.001 Falcon Highlands\100 Dwg\105 Exhibits  
Concept03.dwg

CONCEPT PLAN 03  
PHASING EXHIBIT  
MAY 17, 2021
































**APPENDIX B**

**SOILS SURVEY**

Hydrologic Soil Group—El Paso County Area, Colorado  
(Falcon Highlands Filing No. 3 - Hydrologic Soil Group Map)



## MAP LEGEND

<b>Area of Interest (AOI)</b>		 C
Area of Interest (AOI)		 C/D
		 D
		 Not rated or not available
<b>Soils</b>		
<b>Soil Rating Polygons</b>		
 A		
 A/D		
 B		
 B/D		
 C		
 C/D		
 D		
 Not rated or not available		
<b>Soil Rating Lines</b>		
 A		
 A/D		
 B		
 B/D		
 C		
 C/D		
 D		
 Not rated or not available		
<b>Soil Rating Points</b>		
 A		
 A/D		
 B		
 B/D		
		<b>Water Features</b>
		 Streams and Canals
		<b>Transportation</b>
		 Rails
		 Interstate Highways
		 US Routes
		 Major Roads
		 Local Roads
		<b>Background</b>
		 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 18, Jun 5, 2020

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

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

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



## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	31.0	14.2%
9	Blakeland-Fluvaquentic Haplaquolls	A	184.2	84.5%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	2.8	1.3%
<b>Totals for Area of Interest</b>			<b>218.0</b>	<b>100.0%</b>

## Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

**APPENDIX C**  
**FEMA FIRMETTE**

**NOTES TO USERS**

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

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

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

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

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

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA, NIMS12  
National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, MD 20910-3282

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

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

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

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

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

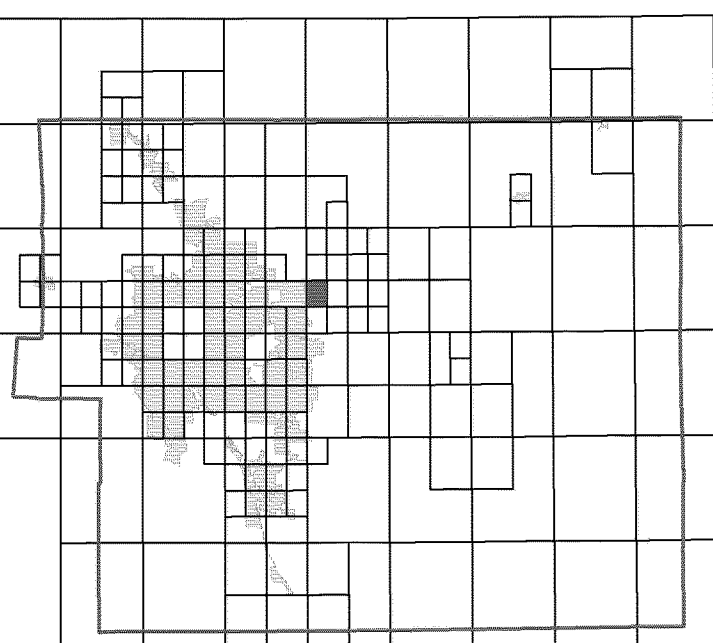
Contact **FEMA Map Service Center (MSC)** via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

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

**El Paso County Vertical Datum Offset Table**

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

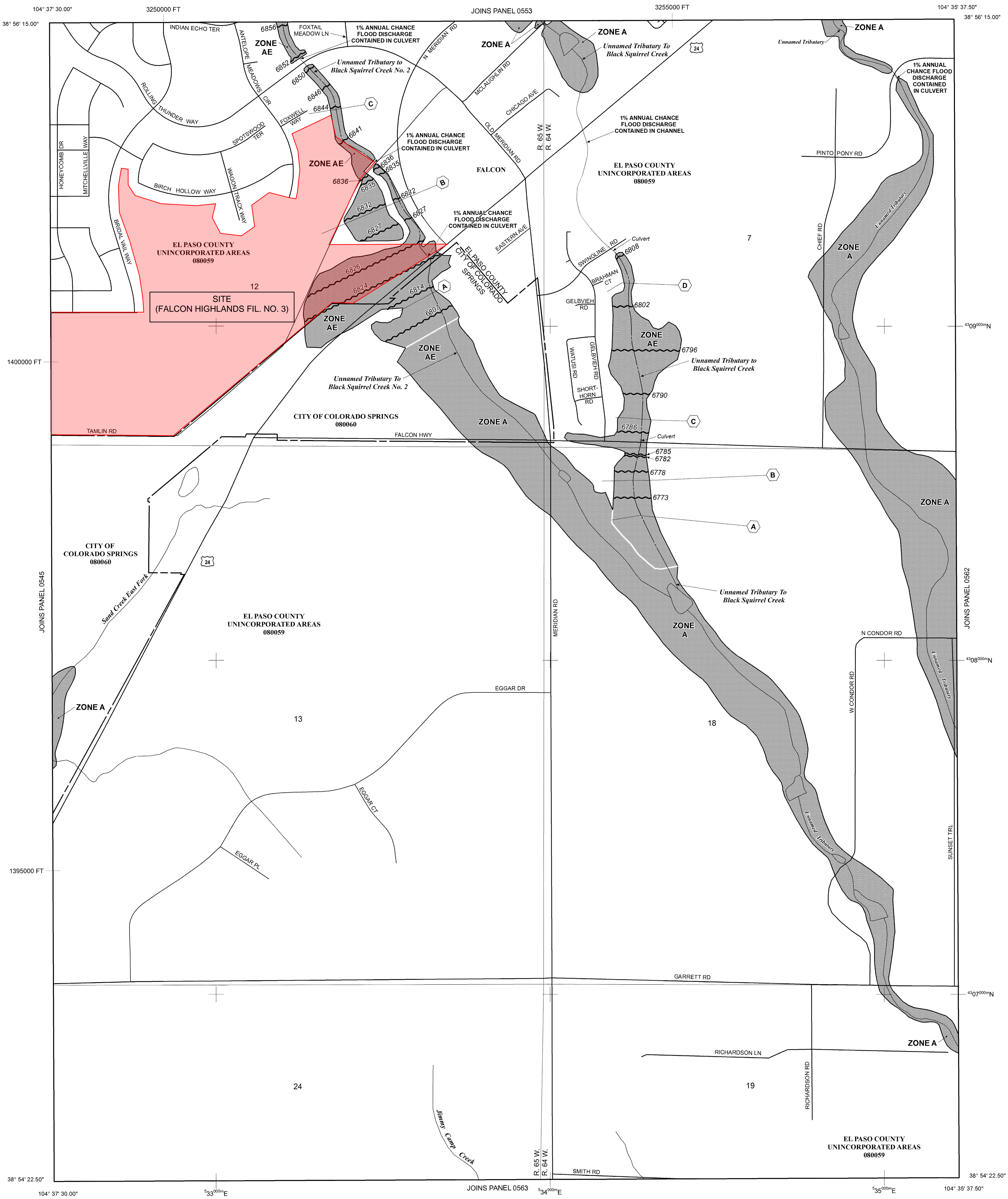
**Panel Location Map**



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



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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST, AND TOWNSHIP 13 SOUTH, RANGE 65 WEST.

**LEGEND**

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

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

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

**FLOODWAY AREAS IN ZONE AE**

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

**OTHER FLOOD AREAS**

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

**OTHER AREAS**

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

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAs)**

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

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

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

— Cross section line  
 — Transsect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-meter Universal Transverse Mercator grid ticks, zone 13  
 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)  
 M1.5 River Mile

**MAP REPOSITORIES**  
 Refer to Map Repositories list on Map Index

**EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**  
**MARCH 17, 1997**

**EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL**  
**DECEMBER 7, 2018** to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.  
 To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

**MAP SCALE 1" = 500'**

250 0 500 1000  
 FEET  
 150 0 150 300  
 METERS

**NFIP**

**PANEL 0561G**

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**EL PASO COUNTY, COLORADO AND INCORPORATED AREAS**

**PANEL 561 OF 1300**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

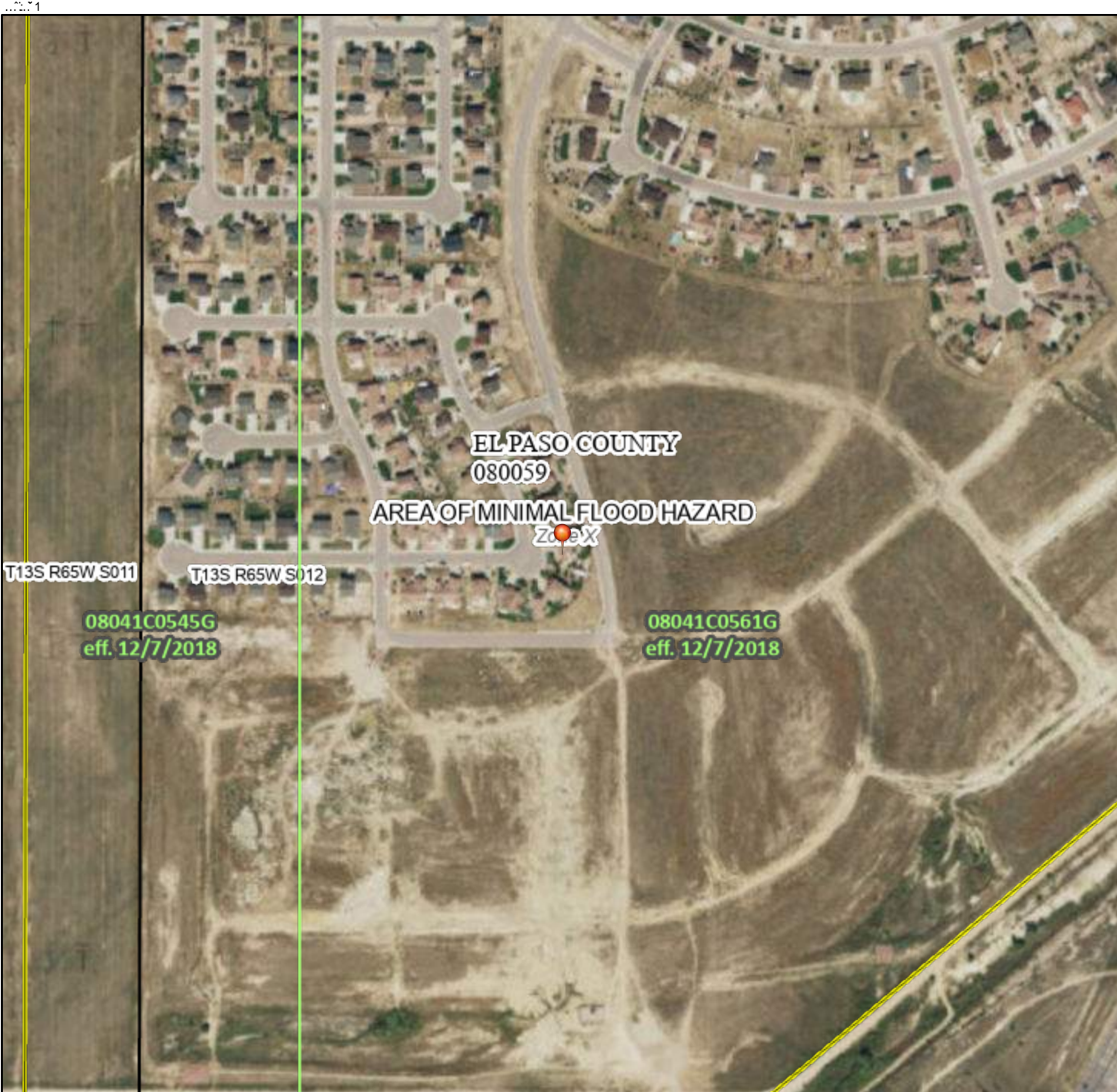
COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0561	G
EL PASO COUNTY	080059	0561	G

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

**MAP NUMBER 08041C0561G**

**MAP REVISED DECEMBER 7, 2018**

Federal Emergency Management Agency



6) 688 88(8) 88888

68882 68888	L.WKRW %DHPFGOHYDMLRQ % -FCH\$ 9 \$ L.WK%RUFBVK -FCH\$ 88-9 \$ \$KODWRA)DRRQ
26882 26888	\$DQD &OHPH)RRG-EPUG \$UHV/ R DQDQ FROFH)RRGZ.WKDHUHD G-SVKOHV WKOQRHFRW RU Z.WKGDLO DUHV/R OHV WKOQRHFRW)UEOH#CH; XWUH&Q.L.WLRQ/\$DQD &OHPH)RRG-EPUG -FCH; \$UHZWK&GHG)DRRQ&LNGHWR HMH GH RVHV -FCH; \$UHZWK)DRRQ&LNGHWRHMH -FCH
26886 68886	\$UHR OQ.EO)DRRQ-EPUG -FCH; (HFWL.YH#V \$UHR &GWHUHQG)DRRQ-EPUG -FCH
68886	&OQD &OYUW RU &VRUR#ZU HMLNH RU DRRQD
26886 68886	&URV &FWLRQ/ZWK\$DQD &OHPH DVHU &UIDH)OHYDMLRQ &DWD 7UDQFW %DHPFGOHYDMLRQLQ % LEW R &VXG -XULVL.FVLRQ%&OQD &DWD 7UDQFW %DHLQ &URLOH%DHLQ &URUD&L.F)DVUH
68886	L.L.WDQ DWD\$DLO.DEH RL.L.WDQ DWD\$DLO.DEH &BSS-G

74HSL.QG.VSDHGRQWKHBSLV)DQD&UR)BWH  
SRLQV V)OHFWHG&WKXHU DQGGRV)QRV UH)UH  
DQD&UR)BWH)DQD&UR)BWH)DQD&UR)BWH

74LV B&F&D)H/ZWK)DV WDDQDUG/IRU WKH)XHR  
G.L.WDQ IO RRG)B/LI LW LV)QRV YRLGDV)G)FWL)G)B)O)RZ  
74H)ED)H)B)V)K)Q)D)F&D)H)ZWK)DV)ED)H)B)  
D)F)X)D)R)W)D)D)Q)D)G)

74H)IO)R)G)K)Q)D)G)L)Q)R)U)B)W)L)R)Q)D)V)G)U)L)Y)G)G)U)H)F)W)O)I)U)R)W)K)H  
D)W)K)U)L)W)D)M)L)Y)H)Z)E)V)H)U)L)F)V)S)U)R)L)G)G)B)D) 74LV)B)S)  
Z)V)H)S)U)W)H)G)R)Q) D)V) \$) D)Q)G)R)H)V)Q)R)W)  
U)H)O)H)W)F)O)Q)H)V)R)U)D)Q)G)Q)W)V)X)E)H)X)Q)V)W)R)W)K)L)V)G)D)H)D)Q)G)  
W)L)F) 74H)Z)D)G)H)I)F)W)L)Y)H)L)Q)R)U)B)W)L)R)Q)B)F)O)Q)H)R)U)  
B)F)F)R)W)S)U)W)H)G)G)E)Q)Z)D)D)V)D)R)Y)H)U)W)L)F)

74LV)B)S)L)B)H)L)V)Y)R)G)L)I)W)K)H)Q)H)R)U)R)U)H)R)W)K)H)I)R)O)R)Z)Q)J)B)S)  
H)O)H)Q)W)V)G)R)Q)W)D)S)S)D)U)E)D)H)S)L)B)H)U)IO)R)G)R)Q)H)O)D)E)H)O)V)  
O)H)H)G)V)D)D)H)E)D)B)S)F)U)H)D)M)L)R)Q)D)M)H)F)F)Q)W)L)G)Q)M)L)H)U)V)  
)S)S)Q)H)O)Q)E)H)U)D)G)G)H)I)F)W)L)Y)H)G)D)H)O)S)L)B)H)I)R)U)  
X)B)S)S)G)D)Q)G)X)R)G)U)Q)J)G)D)H)D)H)F)O)Q)R)W)E)H)X)H)G)I)R)U)  
U)H)K)O)D)M)R)U)S)U)S)R)H)V)

**APPENDIX D**  
**HYDROLOGICAL CALCULATIONS**

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY			
		10		100	
		A&B*	C&D*	A&B*	C&D*
Business					
Commercial Areas	95	0.90	0.90	0.90	0.90
Neighborhood Areas	70	0.75	0.75	0.80	0.80
Residential					
1/8 Acre or less	65	0.60	0.70	0.70	0.80
1/4 Acre	40	0.50	0.60	0.60	0.70
1/3 Acre	30	0.40	0.50	0.55	0.60
1/2 Acre	25	0.35	0.45	0.45	0.55
1 Acre	20	0.30	0.40	0.40	0.50
Industrial					
Light Areas	80	0.70	0.70	0.80	0.80
Heavy Areas	90	0.80	0.80	0.90	0.90
Parks and Cemeteries	7	0.30	0.35	0.55	0.60
Playgrounds	13	0.30	0.35	0.60	0.65
Railroad Yard Areas	40	0.50	0.55	0.60	0.65

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY			
		10		100	
		A&B*	C&D*	A&B*	C&D*
Undeveloped Areas					
Historic Flow Analysis- Greenbelts, Agricultural	2	0.15	0.25	0.20	0.30
Pasture/Meadow	0	0.25	0.30	0.35	0.45
Forest	0	0.10	0.15	0.15	0.20
Exposed Rock	100	0.90	0.90	0.95	0.95
Offsite Flow Analysis (when land use not defined)	45	0.55	0.60	0.65	0.70
Streets					
Paved	100	0.90	0.90	0.95	0.95
Gravel	80	0.80	0.80	0.85	0.85
Drive and Walks	100	0.90	0.90	0.95	0.95
Roofs	90	0.90	0.90	0.95	0.95
Lawns	0	0.25	0.30	0.35	0.45
*Hydrologic Soil Group					



**RUNOFF COEFFICIENTS AND IMPERVIOUSNESS**  
**Falcon Highlands Filing No. 3 - EXISTING CONDITIONS**  
**El Paso County, Colorado**

Basin No	Hydrologic Grouping	Total Area (AC)	1/8 Acre or Less			Drive and Walks			1/2 Acre			1/4 Acre			Historic Flow Analysis -- Greenbelts, Agriculture			Runoff Coefficient		Imperviousness (%)
			65%			100%			25%			40%			2%			5-Year	100-Year	
			C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)			
A	A	3.74	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	3.74	0.09	0.36	2.0%
B	A	38.93	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	38.93	0.09	0.36	2.0%
C	A	57.81	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	57.81	0.09	0.36	2.0%
D	A	10.54	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	10.54	0.09	0.36	2.0%
E	A	3.14	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	3.14	0.09	0.36	2.0%
F	A	3.67	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	3.67	0.09	0.36	2.0%
G	A	7.85	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	7.85	0.09	0.36	2.0%
OS-1	A	6.38	0.45	0.59	1.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	3.77	0.09	0.36	1.61	0.27	0.48	34.3%
OS-2	A	3.12	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	3.12	0.09	0.36	0.00	0.30	0.50	40.0%
OS-3	A	1.14	0.45	0.59	0.00	0.90	0.96	1.14	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
OS-4	A	9.53	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	1.61	0.09	0.36	7.92	0.13	0.38	8.4%
OS-5	A	63.24	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	0.00	0.30	0.5	63.24	0.09	0.36	0.00	0.30	0.50	40.0%
OS-6	A	35.75	0.45	0.59	0.00	0.90	0.96	0.00	0.22	0.46	35.75	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
<b>TOTAL</b>		<b>244.84</b>			<b>1.0</b>			<b>1.1</b>			<b>35.8</b>		<b>71.7</b>				<b>135.2</b>			<b>17.2%</b>

**TIME OF CONCENTRATION**  
**Falcon Highlands Filing No. 3 - EXISTING CONDITIONS**  
**El Paso County, Colorado**

DATE: 2/4/2022  
 CALCULATED BY: AMC/ARP

PROJECT: 21000656  
 DESIGN STORM: 5 Year

TRIBUTARY BASINS	AREA Ac (2)	C5 (3)	INITIAL/OVERLAND TIME (ti)			TRAVEL TIME (tt)					tc CHECK (URBANIZED BASINS)			FINAL tc
			LENGTH Ft (4)	SLOPE % (5)	ti Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	Conveyance Coefficient	VEL fps (9)	tt Min. (10)	COMP. tc (11)	TOTAL LENGTH (12)	(L/180)+10 Min. (13)	Min. (14)
A	3.74	0.09	202	1.00	25.92	910	1.00	15	1.50	10.11	36.03	1112	16.18	16.18
B	38.93	0.09	1256	1.00	64.63	979	1.00	15	1.50	10.88	75.50	2235	22.42	22.42
C	57.81	0.09	1104	2.00	48.20	571	1.00	15	1.50	6.34	54.55	1675	19.31	19.31
D	10.54	0.09	540	1.00	42.38	360	1.00	15	1.50	4.00	46.38	900	15.00	15.00
E	3.14	0.09	108	1.00	18.95	842	1.00	15	1.50	9.36	28.31	950	15.28	15.28
F	3.67	0.09	0	0.00	0.00	1097	1.00	15	1.50	12.19	12.19	1097	16.09	12.19
G	7.85	0.09	340	3.00	23.40	0	0.00	15	0.00	0.00	23.40	340	11.89	11.89
OS-1	6.38	0.27	25	2.00	5.96	650	2.00	20	2.83	3.83	9.79	675	13.75	9.79
OS-2	3.12	0.30	50	2.00	8.13	2180	1.00	20	2.00	18.17	26.29	2230	22.39	22.39
OS-3	1.14	0.90	20	2.00	1.28	1190	2.00	20	2.83	7.01	8.30	1210	16.72	8.30
OS-4	9.53	0.13	80	2.00	12.52	2300	2.00	20	2.83	13.55	26.07	2380	23.22	23.22
OS-5	63.24	0.30	100	2.00	11.49	608	2.00	20	2.83	3.58	15.07	708	13.93	13.93
OS-6	35.75	0.22	100	2.00	12.64	0	0.60	20	1.55	0.00	12.64	100	10.56	10.56

**5-YEAR RUNOFF CALCULATIONS**  
**Falcon Highlands Filing No. 3 - EXISTING CONDITIONS**  
**El Paso County, Colorado**

DATE: 2/4/2022  
 CALCULATED BY: AMC/ARP

PROJECT: 21000656  
 DESIGN STORM: 5-Year

Sub-Basin	Design Point	FLOW TO INLETS								Minimum Street Slope (%)	Maximum Street/Paseo Capacity (cfs)	Under Capacity?	INLETS						Carry-Over to Sub-basin/ Design Point (DP)
		Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)				Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	
A	1	3.74	0.09	0.34	16.18	3.41	1.15	0.00	1.15	-	-	-	-	-	-	-	-	-	-
B	2	38.93	0.09	3.50	22.42	2.92	10.22	0.00	3.01	-	-	-	-	-	-	-	-	-	-
C	3	57.81	0.09	5.20	19.31	3.14	16.35	0.00	16.35	-	-	-	-	-	-	-	-	-	-
D	4	10.54	0.09	0.95	15.00	3.52	3.34	0.00	3.34	-	-	-	-	-	-	-	-	-	-
E	5	3.14	0.09	0.28			1.80	0.00	1.80	-	-	-	-	-	-	-	-	-	-
F	6	3.67	0.09	0.33			5.30	0.00	5.30	-	-	-	-	-	-	-	-	-	-
G	7	7.85	0.09	0.71			6.80	0.00	6.80	-	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.27	1.73			10.70	0.00	10.70	-	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.30	0.94			7.80	1.00	8.80	-	-	-	-	-	-	-	-	-	-
OS-3	10	1.14	0.90	1.03			3.40	0.00	3.40	-	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.13	1.20			14.90	0.00	14.90	-	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.30	18.97			82.70	1.00	83.70	-	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.22	7.87			31.90	0.00	31.90	-	-	-	-	-	-	-	-	-	-

Notes:

\*DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR SUBDIVISION

Does not match Summary table in Appendix G

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

**100-YEAR RUNOFF CALCULATIONS**  
**Falcon Highlands Filing No. 3 - EXISTING CONDITIONS**  
**El Paso County, Colorado**

DATE: 2/4/2022  
 CALCULATED BY: RDL

PROJECT: 21000656  
 DESIGN STORM: 100-Year

Sub-Basin	Design Point	FLOW TO INLETS								Minimum Street Slope (%)	Maximum Street/Paseo Capacity (cfs)	Under Capacity?	INLETS						Carry-Over to Sub-basin/ Design Point (DP)
		Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)				Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	
A	1	3.74	0.36	1.35	16.18	5.72	7.70	0.00	7.70	-	-	-	-	-	-	-	-	-	-
B	2	38.93	0.36	14.01	22.42	4.90	68.65	0.00	68.65	-	-	-	-	-	-	-	-	-	-
C	3	57.81	0.36	20.81	19.31	5.27	109.77	0.00	109.77	-	-	-	-	-	-	-	-	-	-
D	4	10.54	0.36	3.79	15.00	5.91	22.42	0.00	22.42	-	-	-	-	-	-	-	-	-	-
E	5	3.14	0.36	1.13			4.20	0.00	4.20	-	-	-	-	-	-	-	-	-	-
F	6	3.67	0.36	1.32			12.50	0.00	12.50	-	-	-	-	-	-	-	-	-	-
G	7	7.85	0.36	2.83			16.00	0.00	16.00	-	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.48	3.05			21.70	0.00	21.70	-	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.50	1.56			13.60	1.00	14.60	-	-	-	-	-	-	-	-	-	-
OS-3	10	1.14	0.96	1.09			6.00	0.00	6.00	-	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.38	3.66			31.70	0.00	31.70	-	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.50	31.62			166.60	0.00	166.60	-	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.46	16.45			58.40	0.00	58.40	-	-	-	-	-	-	-	-	-	-

Notes:

\*DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR SUBDIVISION

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Does not match Summary table in Appendix G

## EXISTING CONDITIONS DESIGN POINT SUMMARY

Basin	Design Point	Area (acres)	C <sub>5</sub>	C <sub>100</sub>	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
A	1	3.74	0.09	0.36	1.15	7.70
B	2	38.93	0.09	0.36	10.22	68.65
C	3	57.81	0.09	0.36	16.35	109.77
D	4	10.54	0.09	0.36	3.34	22.42
E	5	3.14	0.09	0.36	1.80	4.20
F	6	3.67	0.09	0.36	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
<b>TOTAL</b>		<b>244.84</b>			<b>196.36</b>	<b>539.25</b>

Include design point that combines DP 11 & DP 1, for flows exiting to west.

DP 5 should be combined flow of Basin E, DP 2, DP 8, DP 9, DP 10, & DP 12 and exits site to south.

DP 6 should be combined flow of Basin F and DP 13 & DP 3.

**RUNOFF COEFFICIENTS AND IMPERVIOUSNESS**  
**Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS**  
**El Paso County, Colorado**

Basin No	Hydrologic Grouping	Total Area (AC)	1/8 Acre or Less			Drive and Walks			Lawns			1/2 Acre			1/4 Acre			Historic Flow Analysis -- Greenbelts, Agriculture			Runoff Coefficient		Imperviousness (%)
			65%			100%			0%			25%			40%			2%			5-Year	100-Year	
			C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)	C5	C100	(AC)			
A	A	3.74	0.45	0.59	0.50	0.90	0.96	0.00	0.08	0.35	3.24	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.13	0.38	8.7%
B	A	40.37	0.45	0.59	31.28	0.90	0.96	0.00	0.08	0.35	4.23	0.22	0.46	4.86	0.30	0.5	0.00	0.09	0.36	0.00	0.38	0.55	53.4%
C	A	57.12	0.45	0.59	34.24	0.90	0.96	0.00	0.08	0.35	3.80	0.22	0.46	10.32	0.30	0.5	0.00	0.09	0.36	8.75	0.33	0.52	43.8%
D	A	7.96	0.45	0.59	5.74	0.90	0.96	0.00	0.08	0.35	2.22	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.46	0.64	59.4%
E	A	3.14	0.45	0.59	1.29	0.90	0.96	0.00	0.08	0.35	1.85	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.23	0.45	26.7%
F	A	5.50	0.45	0.59	0.34	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	5.16	0.11	0.37	5.9%
G	A	7.85	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	7.85	0.09	0.36	2.0%
OS-1	A	6.38	0.45	0.59	1.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	3.77	0.09	0.36	1.61	0.27	0.48	34.3%
OS-2	A	3.12	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	3.12	0.09	0.36	0.00	0.30	0.50	40.0%
OS-3	A	1.14	0.45	0.59	0.00	0.90	0.96	1.14	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	0.00	0.09	0.36	0.00	0.90	0.96	100.0%
OS-4	A	9.53	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	1.61	0.09	0.36	7.92	0.13	0.38	8.4%
OS-5	A	63.24	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	0.00	0.30	0.5	63.24	0.09	0.36	0.00	0.30	0.50	40.0%
OS-6	A	35.75	0.45	0.59	0.00	0.90	0.96	0.00	0.08	0.35	0.00	0.22	0.46	35.75	0.30	0.5	0.00	0.09	0.36	0.00	0.22	0.46	25.0%
<b>TOTAL</b>		<b>244.8</b>			<b>74.4</b>			<b>1.1</b>			<b>15.3</b>			<b>50.9</b>			<b>71.7</b>			<b>31.3</b>			<b>37.8%</b>

**TIME OF CONCENTRATION**  
**Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS**  
**El Paso County, Colorado**

DATE: 1/19/2022  
 CALCULATED BY: AMC/ARP

PROJECT: 21000656  
 DESIGN STORM: 5 Year

TRIBUTARY BASINS	AREA Ac (2)	C5 (3)	INITIAL/OVERLAND TIME (ti)			TRAVEL TIME (tt)					tc CHECK (URBANIZED BASINS)			FINAL tc
			LENGTH Ft (4)	SLOPE % (5)	ti Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	Conveyance Coefficient	VEL fps (9)	tt Min. (10)	COMP. tc (11)	TOTAL LENGTH (12)	(L/180)+10 Min. (13)	Min. (14)
A	3.74	0.13	180	2.00	18.70	900	1.00	20	2.00	7.50	26.20	1080	16.00	16.00
B	40.37	0.38	0	0.00	0.00	907	1.30	20	2.28	6.63	6.63	907	15.04	6.63
C	57.12	0.33	532	1.50	28.10	492	1.00	20	2.00	4.10	32.20	1024	15.69	15.69
D	7.96	0.46	200	1.00	16.35	650	1.00	20	2.00	5.42	21.76	850	14.72	14.72
E	3.14	0.23	75	2.00	10.80	150	3.50	20	3.74	0.67	11.47	225	11.25	11.25
F	5.50	0.11	90	8.30	8.41	1080	1.00	20	2.00	9.00	17.41	1170	16.50	16.50
G	7.85	0.09	125	4.90	12.07	630	1.60	20	2.53	4.15	16.22	755	14.19	14.19
OS-1	6.38	0.27	25	2.00	5.96	650	2.00	20	2.83	3.83	9.79	675	13.75	9.79
OS-2	3.12	0.30	50	2.00	8.13	2180	1.00	20	2.00	18.17	26.29	2230	22.39	22.39
OS-3	1.14	0.90	20	2.00	1.28	1190	2.00	20	2.83	7.01	8.30	1210	16.72	8.30
OS-4	9.53	0.13	80	2.00	12.52	2300	2.00	20	2.83	13.55	26.07	2380	23.22	23.22
OS-5	63.24	0.30	100	2.00	11.49	608	2.00	20	2.83	3.58	15.07	708	13.93	13.93
OS-6	35.75	0.22	100	2.00	12.64	0	0.60	20	1.55	0.00	12.64	100	10.56	10.56

Per City of Colorado Springs DCM Ch 6 Section 3.2.1 Max length for overland flow is 300' for non-urban and 100' for urban areas

**5-YEAR RUNOFF CALCULATIONS**  
**Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS**  
**El Paso County, Colorado**

DATE: 1/19/2022  
 CALCULATED BY: AMC/ARP

PROJECT: 21000656  
 DESIGN STORM: 5-Year

Does not match 5-year C from Coefficient & Imperviousness spreadsheet

Sub-Basin	Design Point	FLOW TO INLETS									Minimum Street Slope (%)	Maximum Street/Paseo Capacity (cfs)	Under Capacity?	INLETS						Carry-Over to Sub-basin/ Design Point (DP)
		Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)	Inlet				Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	R	Intercepted (cfs)	
A	1	3.74	0.45	1.68	16.00	3.42	5.76	0.00	5.76	-	-	-	-	-	-	-	-	-		
B	2	40.37	0.38	15.48	6.63	4.75	73.48	0.00	73.48	-	-	-	-	-	-	-	-	-		
C	3	57.12	0.33	18.77	15.69	3.45	64.83	0.00	64.83	-	-	-	-	-	-	-	-	-		
D	4	7.96	0.46	3.66	14.72	3.55	12.99	0.00	12.99	-	-	-	-	-	-	-	-	-		
E	5	3.14	0.23	0.73			1.80	0.00	1.80	-	-	-	-	-	-	-	-	-		
F	6	5.50	0.11	0.62			5.30	0.00	5.30	-	-	-	-	-	-	-	-	-		
G	7	7.85	0.09	0.71			6.80	0.00	6.80	-	-	-	-	-	-	-	-	-		
OS-1	8	6.38	0.27	1.73			10.70	0.00	10.70	-	-	-	-	-	-	-	-	-		
OS-2	9	3.12	0.30	0.94			7.80	0.00	7.80	-	-	-	-	-	-	-	-	-		
OS-3	10	1.14	0.90	1.03			3.40	0.00	3.40	-	-	-	-	-	-	-	-	-		
OS-4	11	9.53	0.13	1.20			14.90	0.00	14.90	-	-	-	-	-	-	-	-	-		
OS-5	12	63.24	0.30	18.97			82.70	0.00	31.90	-	-	-	-	-	-	-	-	-		
OS-6	13	35.75	0.22	7.87			31.90	0.00	31.90	-	-	-	-	-	-	-	-	-		

Notes:  
 \*DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR SUBDIVISION

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.



**100-YEAR RUNOFF CALCULATIONS**  
**Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS**  
**El Paso County, Colorado**

DATE: 1/19/2022  
 CALCULATED BY: RDL

PROJECT: 21000656  
 DESIGN STORM: 100-Year

Sub-Basin	Design Point	FLOW TO INLETS								Minimum Street Slope (%)	Maximum Street/Paseo Capacity (cfs)	Under Capacity?	INLETS					Carry-Over to Sub-basin/ Design Point (DP)
		Area (acres)	C	C x A	Tc (min)	Intensity (in/hr)	Qd = CIA (cfs)	Qco (cfs)	Qt (cfs)				Inlet	Type	Condition	Slope at Inlet (%)	Inlet Capacity (cfs)	
A	1	3.74	0.38	1.43	16.00	5.75	8.21	0.00	8.21	-	-	-	-	-	-	-	-	-
B	2	40.37	0.55	22.17	6.63	7.97	176.67	0.00	176.67	-	-	-	-	-	-	-	-	-
C	3	57.12	0.52	29.43	15.69	5.80	170.63	0.00	170.63	-	-	-	-	-	-	-	-	-
D	4	7.96	0.64	5.12	14.72	5.96	30.52	0.00	30.52	-	-	-	-	-	-	-	-	-
E	5	3.14	0.45	1.41			4.20	0.00	4.20	-	-	-	-	-	-	-	-	-
F	6	5.50	0.37	2.06			12.50	0.00	12.50	-	-	-	-	-	-	-	-	-
G	7	7.85	0.36	2.83			16.00	0.00	16.00	-	-	-	-	-	-	-	-	-
OS-1	8	6.38	0.48	3.05			21.70	0.00	21.70	-	-	-	-	-	-	-	-	-
OS-2	9	3.12	0.50	1.56			13.60	0.00	13.60	-	-	-	-	-	-	-	-	-
OS-3	10	1.14	0.96	1.09			6.00	0.00	58.40	-	-	-	-	-	-	-	-	-
OS-4	11	9.53	0.38	3.66			31.70	0.00	31.70	-	-	-	-	-	-	-	-	-
OS-5	12	63.24	0.50	31.62			166.60	0.00	64.40	-	-	-	-	-	-	-	-	-
OS-6	13	35.75	0.46	16.45			58.40	0.00	58.40	-	-	-	-	-	-	-	-	-

Notes:

\*DATA IN RED REPRESENTS VALUES PER PREVIOUS DRAINAGE REPORTS FOR SUBDIVISION

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Does not match flow from spreadsheet in Appendix G

<b>PROPOSED CONDITIONS DESIGN POINT SUMMARY</b>						
<b>Basin</b>	<b>Design Point</b>	<b>Area (acres)</b>	<b>C<sub>5</sub></b>	<b>C<sub>100</sub></b>	<b>Q<sub>5</sub> (cfs)</b>	<b>Q<sub>100</sub> (cfs)</b>
A	1	3.74	0.13	0.38	5.76	8.21
B	2	40.37	0.38	0.55	73.48	176.67
C	3	57.12	0.33	0.52	64.83	170.63
D	4	7.96	0.46	0.64	12.99	30.52
E	5	3.14	0.23	0.45	1.80	4.20
F	6	5.50	0.11	0.37	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
<b>TOTAL</b>		244.84			322.36	716.74

Does not match flow in previous spreadsheet

DP 5 should be combined flow of Basin E, and Pond 1 release rate and exits site to south.

DP 6 should be combined flow of Basin F and Pond 2 release rate and exits site to south.

**DEVELOPED CONDITIONS - SUMMARY OF FILING NO. 3 MDDP COMPARED TO 2010 FDR**

FIL NO. 3 MDDP			2010 FDR			DIFFERENCE		ULTIMATE DESIGN POINT
	Q5 (CFS)	Q100 (CFS)		Q5 (CFS)	Q100 (CFS)	Q5 (CFS)	Q100 (CFS)	
BASIN A + OS-4	20.7	39.9	BASIN A	14.9	31.7	5.8	8.2	OFF-SITE
BASIN B + E + OS-1 + OS-2 + OS-5	176.5	382.8	BASIN B + E + OS-1 + OS-2	133.6	259.8	42.9	123.0	POND 1
BASIN C + F + G + OS-3 + OS-6	112.2	294.1	BASIN C + D + F + G + OS-3	102.6	209.2	9.6	84.9	POND 2
BASIN D	13.0	30.5	BASIN D - BASIN D1.1	20.9	42.1	-7.9	-11.6	POND WU
<b>TOTAL</b>	<b>322.4</b>	<b>747.3</b>		<b>272.0</b>	<b>542.8</b>	<b>50.4</b>	<b>204.5</b>	

How do these flows compare to the proposed flows in this report, specifically in regards to Pond WU?

## **APPENDIX E**

### **HYDRAULIC CALCULATIONS**

Include analysis of existing channel & culvert at Highway 24, to ensure adequate to handle proposed flows. (Combined flow of DP 5 & DP 6 exiting site)

**POND 1 TRIBUTARY AREA AND IMPERVIOUSNESS**  
**Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS**  
**El Paso County, Colorado**  
**1/19/2022**

<b>Basin No</b>	<b>Total Area (AC)</b>	<b>Effective Imperviousness (%)</b>
A	3.74	8.7%
B	40.37	53.4%
E	3.14	26.7%
F	5.50	5.9%
Onsite Subtotal	52.75	43.7%
OS-1	6.38	34.3%
OS-2	3.12	40.0%
OS-4	9.53	8.4%
OS-5	63.24	40.0%
Offsite Subtotal	82.27	35.9%
<b>TOTAL</b>	<b>135.02</b>	<b>38.9%</b>

Basins E & F, per write up, do not reach Pond 1, but release directly offsite. Update contributing areas and % impervious accordingly.

**POND 2 TRIBUTARY AREA AND IMPERVIOUSNESS**  
**Falcon Highlands Filing No. 3 - PROPOSED CONDITIONS**  
**El Paso County, Colorado**  
**1/19/2022**

<b>Basin No</b>	<b>Total Area (AC)</b>	<b>Effective Imperviousness (%)</b>
C	57.12	43.8%
G	7.85	2.0%
Onsite Subtotal	64.97	38.7%
OS-3	1.14	100.0%
OS-6	35.75	25.0%
Offsite Subtotal	36.89	27.3%
<b>TOTAL</b>	<b>101.86</b>	<b>34.6%</b>

Basin G, per write up, does not reach Pond 2, but releases directly offsite. Update contributing areas and % impervious accordingly.

## Site-Level Low Impact Development (LID) Design Effective Impervious Calculator LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input		
Calculated cells		
***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60 inches
***Minor Storm: 1-Hour Rain Depth	10-Year Event	1.19 inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52 inches
Optional User Defined Storm	CUHP	
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event	
Max Intensity for Optional User Defined Storm		0

Designer: **Richard Lyon, PE**  
 Company: **Atwell, LLC**  
 Date: **February 4, 2022**  
 Project: **Falcon Highlands - Pond 1 Tributary Basins**  
 Location: **El Paso County**

Remove Basins E & F as they are not contributing to Pond 1

**SITE INFORMATION (USER-INPUT)**

Sub-basin Identifier	A	B	E	F	OS-1	OS-2	OS-4	OS-5							
Receiving Pervious Area Soil Type	Clay Loam	Sand	Sand	Sand	Clay Loam	Sand	Sand	Sand							
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	3.740	40.370	3.140	5.500	6.380	3.120	9.530	63.240							
Directly Connected Impervious Area (DCIA, acres)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Unconnected Impervious Area (UIA, acres)	0.551	18.972	0.000	0.340	2.158	1.248	0.644	25.296							
Receiving Pervious Area (RPA, acres)	0.000	21.398	0.000	5.160	4.222	1.872	8.886	37.944							
Separate Pervious Area (SPA, acres)	3.189	0.000	3.140	0.000	0.000	0.000	0.000	0.000							
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	V	V	V	V	V	V	V	V							

**CALCULATED RESULTS (OUTPUT)**

Total Calculated Area (ac, check against input)	3.740	40.370	3.140	5.500	6.380	3.120	9.530	63.240							
Directly Connected Impervious Area (DCIA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
Unconnected Impervious Area (UIA, %)	14.7%	47.0%	0.0%	6.2%	33.8%	40.0%	6.8%	40.0%							
Receiving Pervious Area (RPA, %)	0.0%	53.0%	0.0%	93.8%	66.2%	60.0%	93.2%	60.0%							
Separate Pervious Area (SPA, %)	85.3%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
A <sub>s</sub> (RPA / UIA)	0.000	1.128	0.000	15.176	1.956	1.500	13.798	1.500							
I <sub>s</sub> Check	1.000	0.470	1.000	0.060	0.340	0.400	0.070	0.400							
f / I for WQCV Event:	0.4	9.8	9.8	9.8	0.4	9.8	9.8	9.8							
f / I for 10-Year Event:	0.3	0.6	0.6	0.6	0.3	0.6	0.6	0.6							
f / I for 100-Year Event:	0.1	0.6	0.6	0.6	0.1	0.6	0.6	0.6							
<b>f / I for Optional User Defined Storm CUHP:</b>															
IRF for WQCV Event:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
IRF for 10-Year Event:	1.00	0.83	1.00	0.21	0.90	0.81	0.25	0.81							
IRF for 100-Year Event:	1.00	0.84	1.00	0.22	0.95	0.83	0.25	0.83							
<b>IRF for Optional User Defined Storm CUHP:</b>															
Total Site Imperviousness: I <sub>total</sub>	14.7%	47.0%	0.0%	6.2%	33.8%	40.0%	6.8%	40.0%							
Effective Imperviousness for WQCV Event:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
Effective Imperviousness for 10-Year Event:	14.7%	39.0%	0.0%	1.3%	30.3%	32.4%	1.7%	32.4%							
Effective Imperviousness for 100-Year Event:	14.7%	39.6%	0.0%	1.3%	32.0%	33.0%	1.7%	33.0%							
<b>Effective Imperviousness for Optional User Defined Storm CUHP:</b>															

**LID / EFFECTIVE IMPERVIOUSNESS CREDITS**

WQCV Event CREDIT: Reduce Detention By:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-Year Event CREDIT**: Reduce Detention By:	0.0%	17.9%	N/A	116.5%	11.0%	19.9%	106.9%	19.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	0.0%	15.6%	N/A	116.1%	5.4%	17.7%	106.2%	17.7%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:															

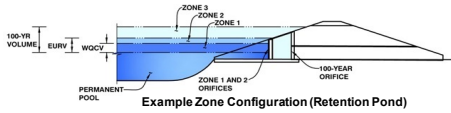
<b>IMPERVIOUSNESS USED FOR UD-DET CALCS</b>	<b>Total Site Imperviousness:</b>	<b>36.4%</b>
	<b>Total Site Effective Imperviousness for WQCV Event:</b>	<b>0.0%</b>
	<b>Total Site Effective Imperviousness for 10-Year Event:</b>	<b>29.6%</b>
	<b>Total Site Effective Imperviousness for 100-Year Event:</b>	<b>30.2%</b>
	<b>Total Site Effective Imperviousness for Optional User Defined Storm CUHP:</b>	

Notes:  
 \* Use Green-Ampt average infiltration rate values from Table 3-3.  
 \*\* Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.  
 \*\*\* Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

Project: **FALCON HIGHLANDS FILING NO. 3**  
 Basin ID: **DETENTION POND 1 (BASIN B)**



**Example Zone Configuration (Retention Pond)**

**Watershed Information**

Selected BMP Type =	<b>EDB</b>	
Watershed Area =	135.02	ac
Watershed Length =	3,600	ft
Watershed Length to Centroid =	800	ft
Watershed Slope =	0.010	ft/ft
Watershed Imperviousness =	36.40%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths = User Input		

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

Update based on previous comments

Water Quality Capture Volume (WQCV) =	1,914	acre-feet
Excess Urban Runoff Volume (EURV) =	5,185	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	3,836	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	5,198	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	6,283	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	8,584	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	10,785	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	13,689	acre-feet
500-yr Runoff Volume (P1 = 3.14 in.) =	19,926	acre-feet
Approximate 2-yr Detention Volume =	3,288	acre-feet
Approximate 5-yr Detention Volume =	4,354	acre-feet
Approximate 10-yr Detention Volume =	5,406	acre-feet
Approximate 25-yr Detention Volume =	6,747	acre-feet
Approximate 50-yr Detention Volume =	7,682	acre-feet
Approximate 100-yr Detention Volume =	9,050	acre-feet

**Optional User Overrides**

		acre-feet
		acre-feet
	1.19	inches
	1.50	inches
	1.75	inches
	2.00	inches
	2.25	inches
	2.52	inches
		inches

**Define Zones and Basin Geometry**

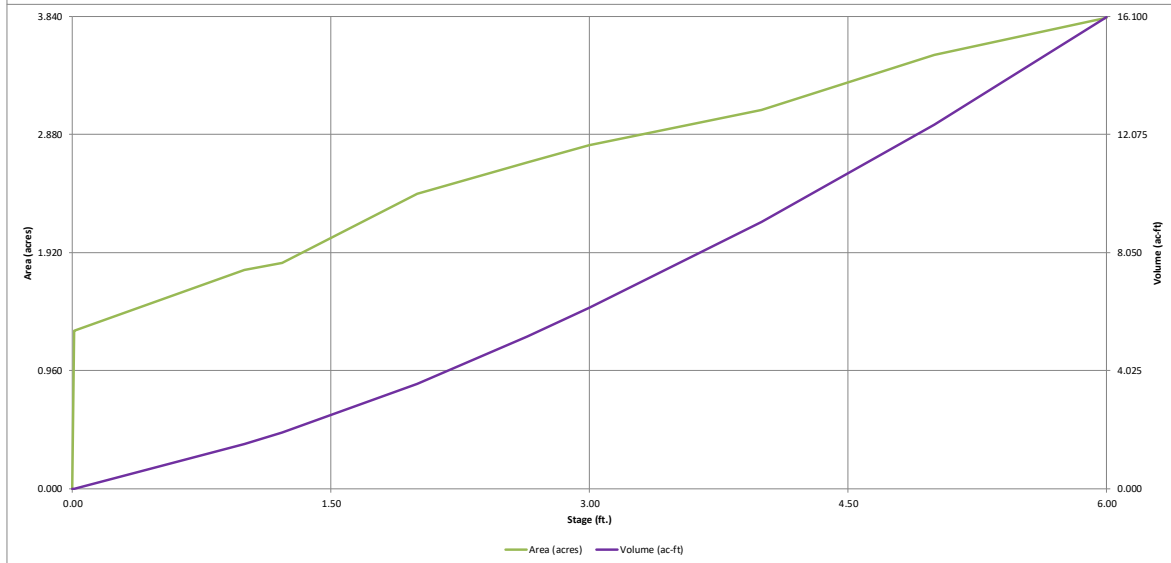
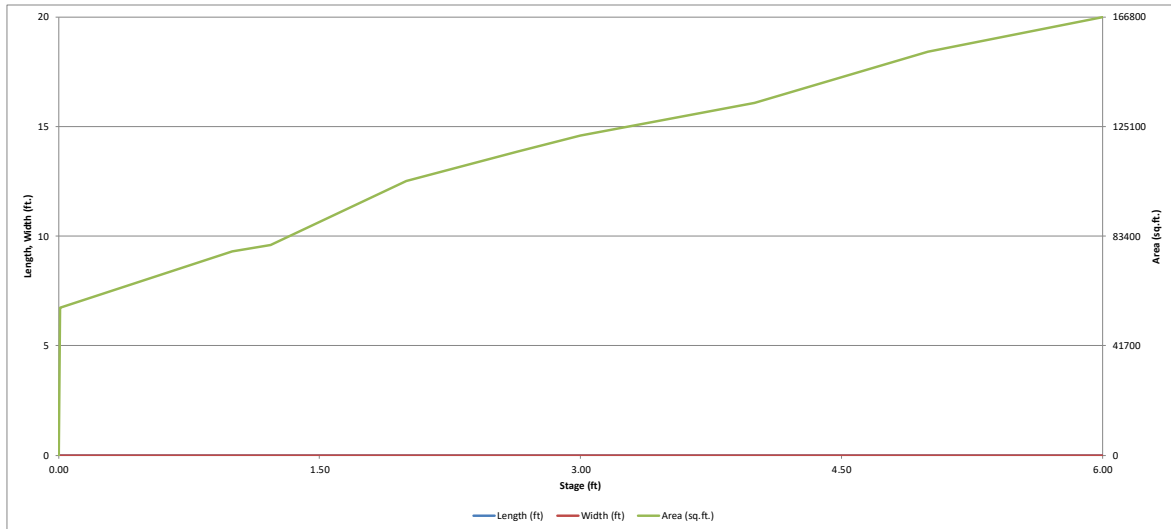
Zone 1 Volume (WQCV) =	1,914	acre-feet
Zone 2 Volume (EURV - Zone 1) =	3,271	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3,865	acre-feet
Total Detention Basin Volume =	9,050	acre-feet
Initial Surcharge Volume (ISV) =	user	ft <sup>3</sup>
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H <sub>total</sub> ) =	user	ft
Depth of Trickle Channel (H <sub>TC</sub> ) =	user	ft
Slope of Trickle Channel (S <sub>TC</sub> ) =	user	ft/ft
Slopes of Main Basin Sides (S <sub>main</sub> ) =	user	H:V
Basin Length-to-Width Ratio (R <sub>L/W</sub> ) =	user	
Initial Surcharge Area (A <sub>ISV</sub> ) =	user	ft <sup>2</sup>
Surcharge Volume Length (L <sub>ISV</sub> ) =	user	ft
Surcharge Volume Width (W <sub>ISV</sub> ) =	user	ft
Depth of Basin Floor (H <sub>FLOOR</sub> ) =	user	ft
Length of Basin Floor (L <sub>FLOOR</sub> ) =	user	ft
Width of Basin Floor (W <sub>FLOOR</sub> ) =	user	ft
Area of Basin Floor (A <sub>FLOOR</sub> ) =	user	ft <sup>2</sup>
Volume of Basin Floor (V <sub>FLOOR</sub> ) =	user	ft <sup>3</sup>
Depth of Main Basin (H <sub>MAN</sub> ) =	user	ft
Length of Main Basin (L <sub>MAN</sub> ) =	user	ft
Width of Main Basin (W <sub>MAN</sub> ) =	user	ft
Area of Main Basin (A <sub>MAN</sub> ) =	user	ft <sup>2</sup>
Volume of Main Basin (V <sub>MAN</sub> ) =	user	ft <sup>3</sup>
Calculated Total Basin Volume (V <sub>total</sub> ) =	user	acre-feet

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft <sup>2</sup> )	Optional Override Area (ft <sup>2</sup> )	Area (acre)	Volume (ft <sup>3</sup> )	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.00		
	2	0.01	--	--	--			187	0.004
	3	1.00	--	--	--	56,053	1.287	66,304	1.522
	413.22	1.22	--	--	--	79,955	1.836	83,626	1.920
	4	2.00	--	--	--	104,380	2.396	155,517	3.570
	114.64	2.64	--	--	--	115,600	2.654	225,911	5.186
	5	3.00	--	--	--	121,670	2.793	268,619	6.167
100-YR: 6516	--	4.00	--	--	--	134,100	3.079	396,504	9.102
6517	--	5.00	--	--	--	153,600	3.526	540,354	12.405
6518	--	6.00	--	--	--	166,800	3.829	700,554	16.083



# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

*MHFD-Detention, Version 4.04 (February 2021)*



## Site-Level Low Impact Development (LID) Design Effective Impervious Calculator LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input			
Calculated cells			
***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches
***Minor Storm: 1-Hour Rain Depth	10-Year Event	1.19	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event		
Max Intensity for Optional User Defined Storm		0	

Designer: Richard Lyon, PE  
 Company: Atwell, LLC  
 Date: February 4, 2022  
 Project: Falcon Highlands - Pond 2 Tributary Basins  
 Location: El Paso County

Remove Basin G as it is not contributing to Pond 2

**SITE INFORMATION (USER-INPUT)**

Sub-basin Identifier	C	G	OS-3	OS-6															
Receiving Pervious Area Soil Type	Sand	Sand	Sand	Sand															
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	64.680	7.850	1.140	35.750															
Directly Connected Impervious Area (DCIA, acres)	0.000	0.000	0.000	0.000															
Unconnected Impervious Area (UIA, acres)	24.836	0.000	1.140	8.938															
Receiving Pervious Area (RPA, acres)	39.844	0.000	0.000	26.813															
Separate Pervious Area (SPA, acres)	0.000	7.850	0.000	0.000															
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	V	V	V	V															

**CALCULATED RESULTS (OUTPUT)**

Total Calculated Area (ac, check against input)	64.680	7.850	1.140	35.750															
Directly Connected Impervious Area (DCIA, %)	0.0%	0.0%	0.0%	0.0%															
Unconnected Impervious Area (UIA, %)	38.4%	0.0%	100.0%	25.0%															
Receiving Pervious Area (RPA, %)	61.6%	0.0%	0.0%	75.0%															
Separate Pervious Area (SPA, %)	0.0%	100.0%	0.0%	0.0%															
A <sub>s</sub> (RPA / UIA)	1.604	0.000	0.000	3.000															
I <sub>s</sub> Check	0.380	1.000	1.000	0.250															
f / I for WQCV Event:	9.8	9.8	9.8	9.8															
f / I for 10-Year Event:	0.6	0.6	0.6	0.6															
f / I for 100-Year Event:	0.6	0.6	0.6	0.6															
<b>f / I for Optional User Defined Storm CUHP:</b>																			
IRF for WQCV Event:	0.00	0.00	0.00	0.00															
IRF for 10-Year Event:	0.80	1.00	1.00	0.73															
IRF for 100-Year Event:	0.82	1.00	1.00	0.75															
<b>IRF for Optional User Defined Storm CUHP:</b>																			
Total Site Imperviousness: I <sub>total</sub>	38.4%	0.0%	100.0%	25.0%															
Effective Imperviousness for WQCV Event:	0.0%	0.0%	0.0%	0.0%															
Effective Imperviousness for 10-Year Event:	30.8%	0.0%	100.0%	18.4%															
Effective Imperviousness for 100-Year Event:	31.3%	0.0%	100.0%	18.7%															
<b>Effective Imperviousness for Optional User Defined Storm CUHP:</b>																			

**LID / EFFECTIVE IMPERVIOUSNESS CREDITS**

WQCV Event CREDIT: Reduce Detention By:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-Year Event CREDIT**: Reduce Detention By:	21.0%	N/A	0.0%	28.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	18.8%	N/A	0.0%	26.7%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:																			

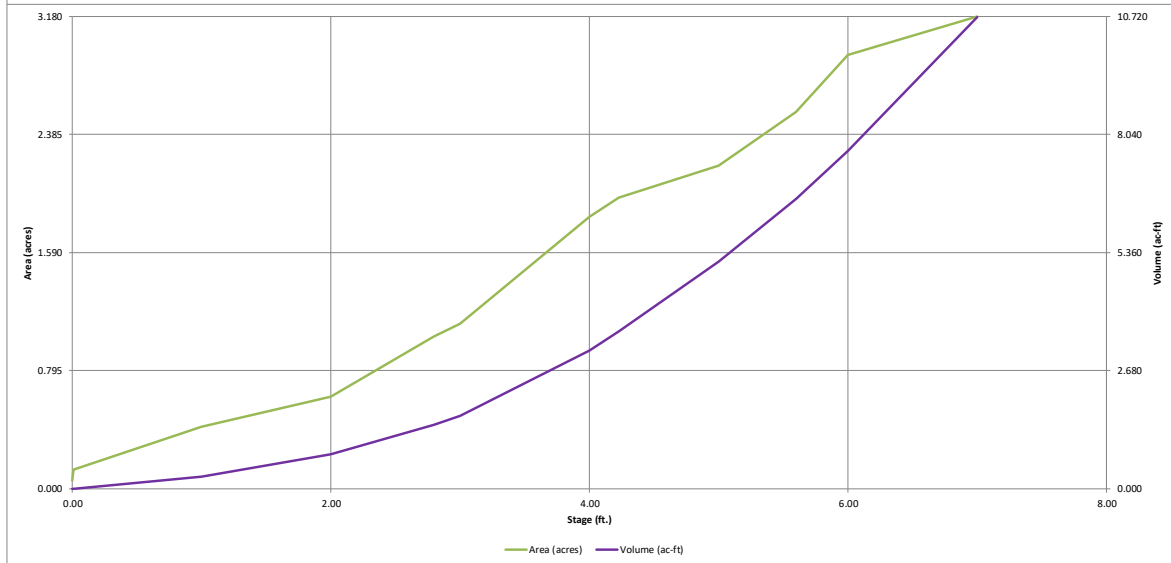
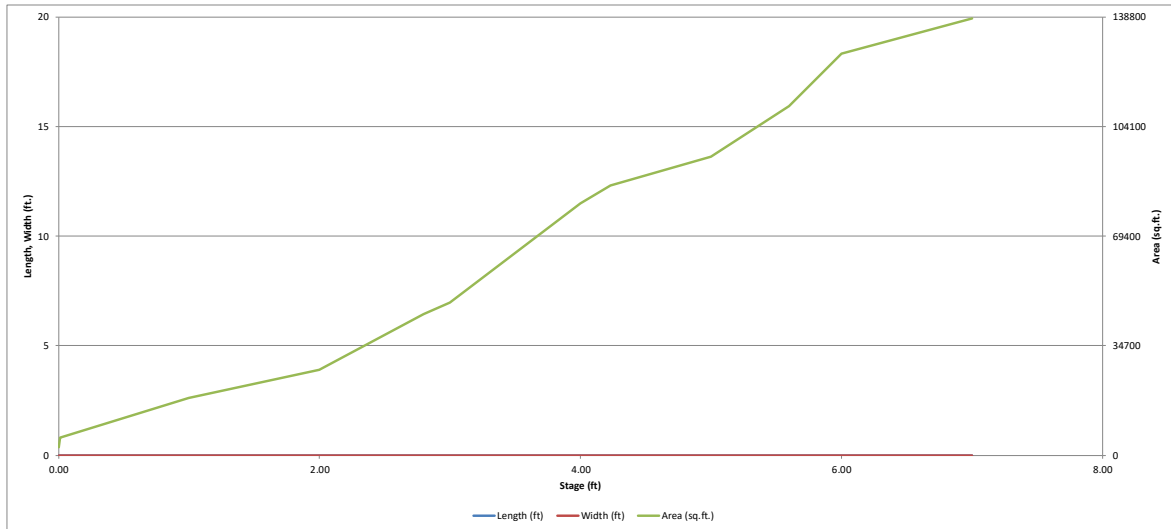
<b>IMPERVIOUSNESS USED FOR UD-DET CALCS</b>	<b>Total Site Imperviousness:</b>	<b>31.9%</b>
	<b>Total Site Effective Imperviousness for WQCV Event:</b>	<b>0.0%</b>
	<b>Total Site Effective Imperviousness for 10-Year Event:</b>	<b>25.2%</b>
	<b>Total Site Effective Imperviousness for 100-Year Event:</b>	<b>25.7%</b>
	<b>Total Site Effective Imperviousness for Optional User Defined Storm CUHP:</b>	

Notes:  
 \* Use Green-Ampt average infiltration rate values from Table 3-3.  
 \*\* Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.  
 \*\*\* Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed



# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

*MHFD-Detention, Version 4.04 (February 2021)*



**APPENDIX F**  
**DRAINAGE MAPS**

EXISTING CONDITIONS DESIGN POINT SUMMARY						
Basin	Design Point	Area (acres)	C <sub>s</sub>	C <sub>100</sub>	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
A	1	3.74	0.09	0.36	1.15	7.70
B	2	38.93	0.09	0.36	10.22	68.65
C	3	57.81	0.09	0.36	16.35	109.77
D	4	10.54	0.09	0.36	3.34	22.42
E	5	3.14	0.09	0.36	1.80	4.20
F	6	3.67	0.09	0.36	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
<b>TOTAL</b>		<b>244.84</b>			<b>196.36</b>	<b>539.25</b>

**811**  
Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE: CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

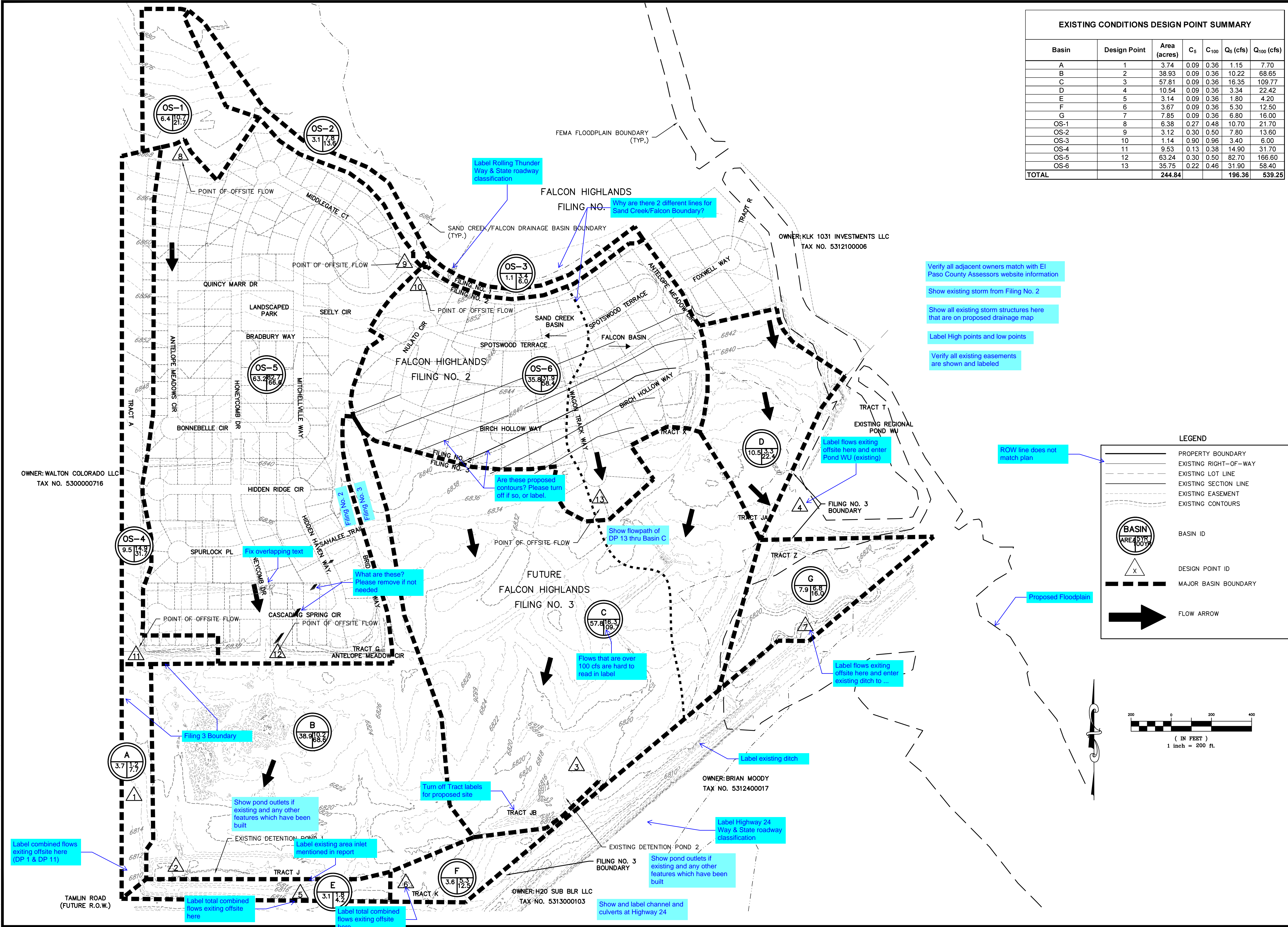
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303.462.1100

CHALLENGER HOMES  
8605 EXPLORER DRIVE, STE. 250  
COLORADO SPRINGS, CO 80920  
(719) 598-5192  
JIM BYERS

CHALLENGER HOMES  
FALCON HIGHLANDS FILING NO. 3  
EL PASO COUNTY, COLORADO  
DRAINAGE MAP  
EXISTING CONDITIONS

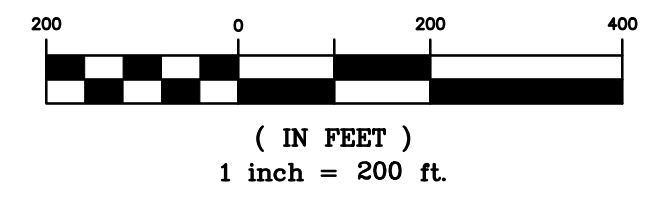
CLIENT: CHALLENGER HOMES  
DATE: 2/4/2022  
A 1st SUBMITTAL TO JURISDICTION 00/00/20XX - 0E  
REVISIONS:  
DR: AMC CH: RDL  
P.M: RDL  
JOB: 21000656  
SHEET NO. 1  
EX-01



- Verify all adjacent owners match with El Paso County Assessors website information
- Show existing storm from Filing No. 2
- Show all existing storm structures here that are on proposed drainage map
- Label High points and low points
- Verify all existing easements are shown and labeled

**LEGEND**

- PROPERTY BOUNDARY
- EXISTING RIGHT-OF-WAY
- EXISTING LOT LINE
- EXISTING SECTION LINE
- EXISTING EASEMENT
- EXISTING CONTOURS
- BASIN ID
- DESIGN POINT ID
- MAJOR BASIN BOUNDARY
- FLOW ARROW



Label Rolling Thunder Way & State roadway classification

Why are there 2 different lines for Sand Creek/Falcon Boundary?

Verify all adjacent owners match with El Paso County Assessors website information

Show existing storm from Filing No. 2

Show all existing storm structures here that are on proposed drainage map

Label High points and low points

Verify all existing easements are shown and labeled

Label flows exiting offsite here and enter Pond WU (existing)

ROW line does not match plan

Proposed Floodplain

Are these proposed contours? Please turn off if so, or label.

Show flowpath of DP 13 thru Basin C

Flows that are over 100 cfs are hard to read in label

Label flows exiting offsite here and enter existing ditch to ...

Label existing ditch

Label Highway 24 Way & State roadway classification

Show pond outlets if existing and any other features which have been built

Label total combined flows exiting offsite here

Label total combined flows exiting offsite here

Label total combined flows exiting offsite here (DP 1 & DP 11)

Label existing area inlet mentioned in report

Turn off Tract labels for proposed site

Show pond outlets if existing and any other features which have been built

Show and label channel and culverts at Highway 24

Fix overlapping text

What are these? Please remove if not needed

Label combined flows exiting offsite here (DP 1 & DP 11)

Label total combined flows exiting offsite here

Label total combined flows exiting offsite here

Label total combined flows exiting offsite here

OWNER: WALTON COLORADO LLC  
TAX NO. 5300000716

OWNER: KLK 1031 INVESTMENTS LLC  
TAX NO. 5312100006

OWNER: BRIAN MOODY  
TAX NO. 5312400017

OWNER: H2O SUB BLR LLC  
TAX NO. 5313000103

**PROPOSED CONDITIONS DRAINAGE BASIN SUMMARY**

Basin	Design Point	Area (acres)	C <sub>s</sub>	C <sub>100</sub>	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
A	1	3.74	0.13	0.38	5.76	8.21
B	2	40.37	0.38	0.55	73.48	176.67
C	3	57.12	0.33	0.52	64.83	170.63
D	4	7.96	0.46	0.64	12.99	30.52
E	5	3.14	0.23	0.45	1.80	4.20
F	6	5.50	0.11	0.37	5.30	12.50
G	7	7.85	0.09	0.36	6.80	16.00
OS-1	8	6.38	0.27	0.48	10.70	21.70
OS-2	9	3.12	0.30	0.50	7.80	13.60
OS-3	10	1.14	0.90	0.96	3.40	6.00
OS-4	11	9.53	0.13	0.38	14.90	31.70
OS-5	12	63.24	0.30	0.50	82.70	166.60
OS-6	13	35.75	0.22	0.46	31.90	58.40
<b>TOTAL</b>		<b>244.84</b>			<b>322.36</b>	<b>716.74</b>

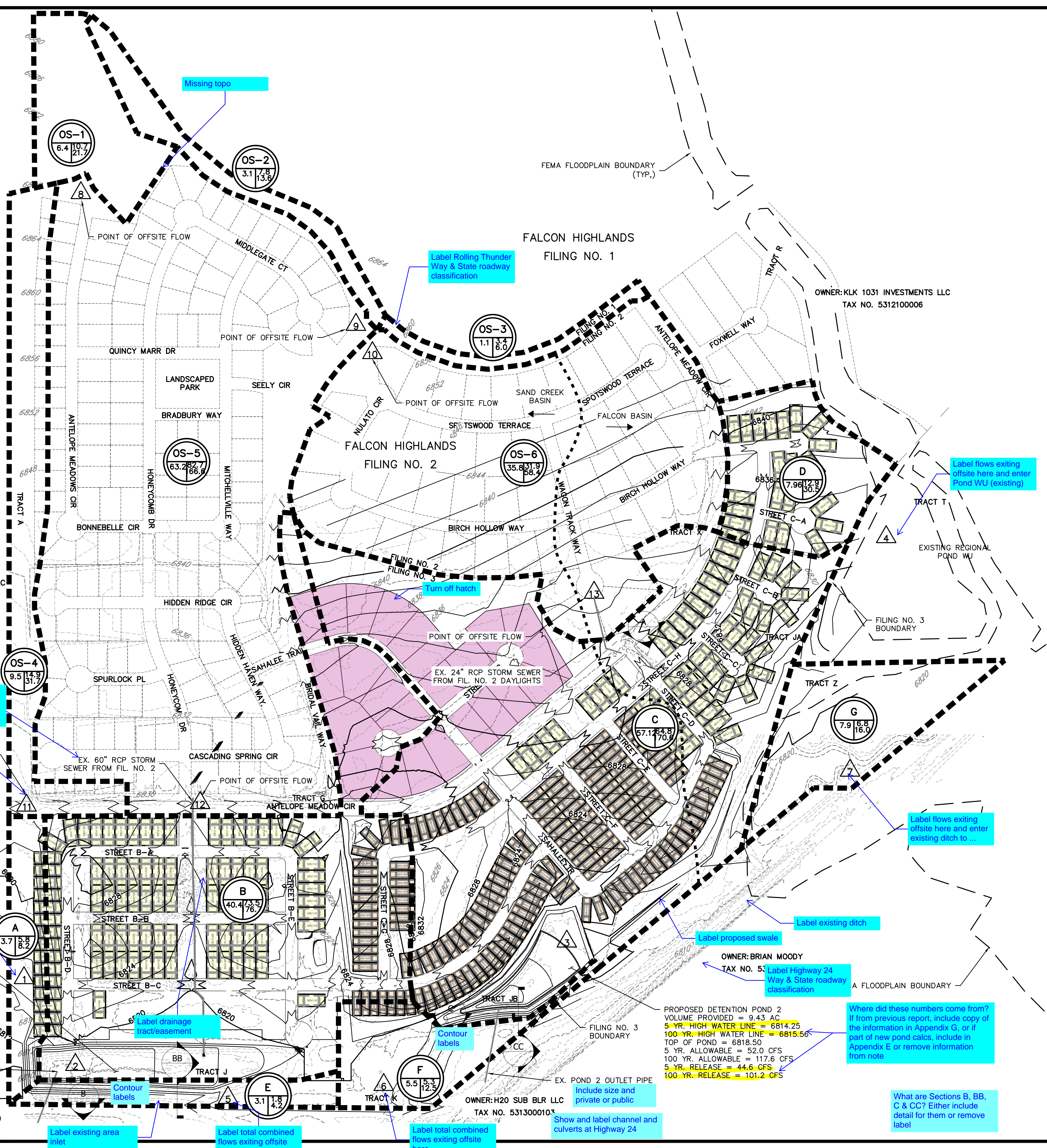
**811**  
Know what's below. Call before you dig.  
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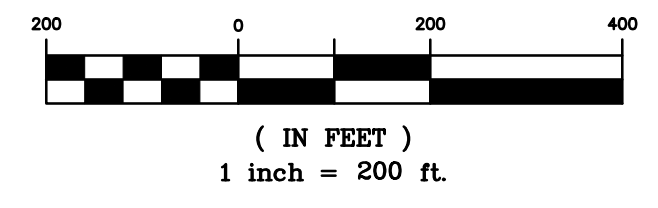
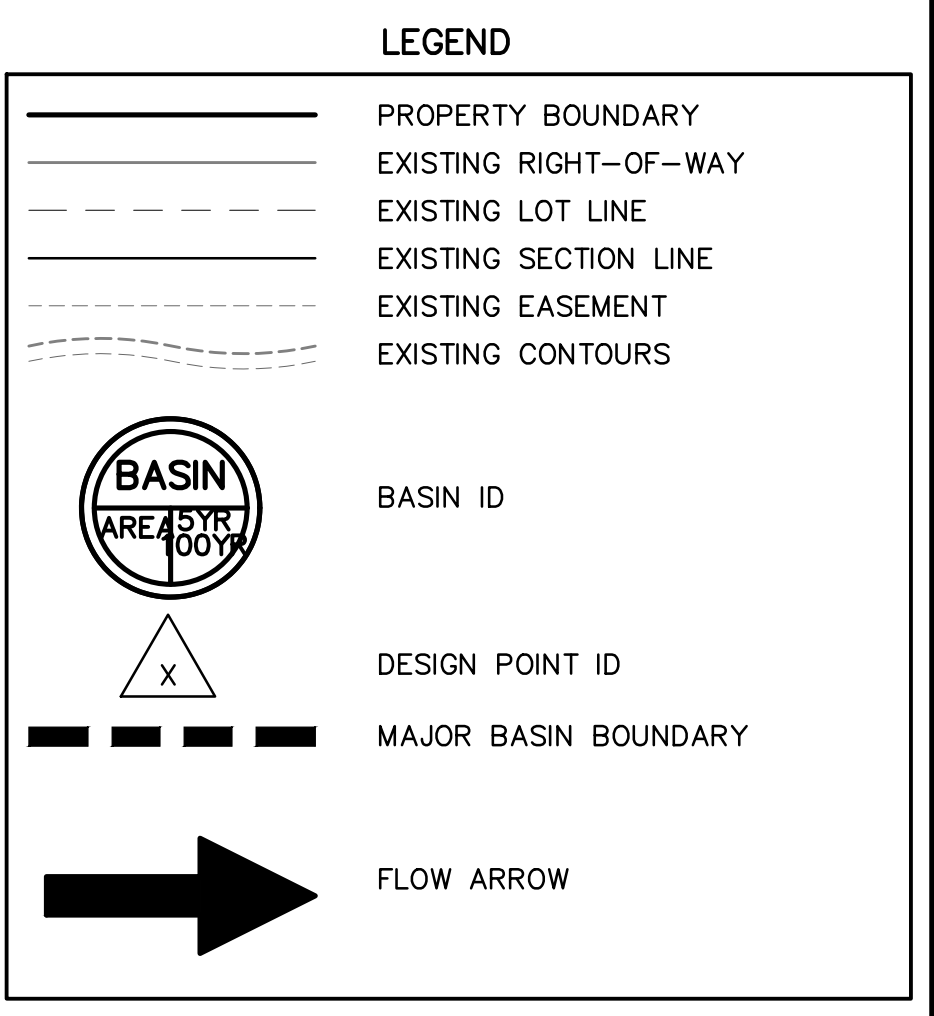
**CHALLENGER HOMES**  
8605 EXPLORER DRIVE, STE. 250  
COLORADO SPRINGS, CO 80920  
(719) 598-5192  
JIM BYERS

**CHALLENGER HOMES**  
FALCON HIGHLANDS FILING NO. 3  
EL PASO COUNTY, COLORADO  
DRAINAGE MAP  
PROPOSED CONDITIONS

CLIENT: CHALLENGER HOMES  
DATE: 2/4/2022  
SUBMITTAL TO JURISDICTION: 00/00/20XX - 00  
REVISIONS:  
DR: AMC CH: RDL  
P.M: RDL  
JOB: 21000656  
SHEET NO. 1  
EX-02



Verify all adjacent owners match with El Paso County Assessors website information  
Show existing storm from Filing No. 2  
Label High points and low points & include flow arrows  
Verify all existing easements are shown and labeled



Be sure to include any existing structures shown on this plan on the existing map.

POINT OF OFFSITE FLOW  
Label flows exiting offsite here

Label flows exiting offsite here

PROPOSED DETENTION POND 1  
VOLUME PROVIDED = 13.80 AC  
5 YR. HIGH WATER LINE = 6814.60  
100 YR. HIGH WATER LINE = 6816.10  
TOP OF POND = 6818.00  
5 YR. ALLOWABLE = 32.2 CFS  
100 YR. ALLOWABLE = 73.2 CFS  
5 YR. RELEASE = 28.9 CFS  
100 YR. RELEASE = 73.3 CFS

Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note

EX. POND 1 OUTLET PIPE  
Include size and private or public

Label existing area inlet

Contour labels

Label total combined flows exiting offsite here

Label total combined flows exiting offsite here

Label total combined flows exiting offsite here

Label existing area inlet

Label existing area inlet

Label total combined flows exiting offsite here

PROPOSED DETENTION POND 2  
VOLUME PROVIDED = 9.43 AC  
5 YR. HIGH WATER LINE = 6814.25  
100 YR. HIGH WATER LINE = 6815.55  
TOP OF POND = 6818.50  
5 YR. ALLOWABLE = 52.0 CFS  
100 YR. ALLOWABLE = 117.6 CFS  
5 YR. RELEASE = 44.6 CFS  
100 YR. RELEASE = 101.2 CFS

EX. POND 2 OUTLET PIPE  
Include size and private or public

Label total combined flows exiting offsite here

Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note

What are Sections B, BB, C & CC? Either include detail for them or remove label

Show and label channel and culverts at Highway 24

ZONE AE

A FLOODPLAIN BOUNDARY

OWNER: H20 SUB BLR LLC  
TAX NO. 5313000103

Label existing area inlet

OWNER: BRIAN MOODY  
TAX NO. 5313000103  
Label Highway 24 Way & State roadway classification

Label existing area inlet

Label total combined flows exiting offsite here

OWNER: WALTON COLORADO LLC  
TAX NO. 5300000716

Label existing area inlet

Label total combined flows exiting offsite here

OWNER: KLK 1031 INVESTMENTS LLC  
TAX NO. 5312100006

Label existing area inlet

Label total combined flows exiting offsite here

**APPENDIX G**  
**REFERENCE CALCULATIONS & MAPS**



## **HYDROLOGIC PDR CALCULATIONS**

Per the references listed, there is a FDR. Why is the calculations from the PDR being used instead of the FDR?

**FALCON HIGHLANDS FILING NO. 2 & 3**  
**PDR BASINS**  
**(Area Runoff Coefficient Summary)**

BASIN	TOTAL AREA (Acres)	STREETS / DEVELOPED			OVERLAND / UNDEVELOPED			COMPOSITE C	
		AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	C <sub>100</sub>
A	14.75	14.75	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B1	14.01	14.01	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B2	3.88	3.88	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B3	7.42	7.42	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B4	17.74	16.65	0.50	0.60	1.09	0.25	0.35	0.48	0.58
B5	11.59	11.59	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B5A	8.76	8.76	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B5B	5.95	5.95	0.45	0.55	0.00	0.25	0.35	0.45	0.55
B6	14.79	13.70	0.50	0.60	1.09	0.25	0.35	0.48	0.58
B7	13.61	13.61	0.50	0.60	0.00	0.25	0.35	0.50	0.60
B8	6.96	6.96	0.50	0.60	0.00	0.25	0.35	0.50	0.60
C1	10.94	10.94	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C2	11.37	11.37	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C3	2.56	2.56	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C5	16.11	12.86	0.45	0.55	3.25	0.25	0.35	0.41	0.51
C8	8.20	6.99	0.45	0.55	1.21	0.25	0.35	0.42	0.52
C9	6.30	6.30	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C9A	6.72	6.72	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C10	12.35	12.35	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C11	10.13	10.13	0.45	0.55	0.00	0.25	0.35	0.45	0.55
C12	3.67	3.67	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D1	9.79	9.79	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D2	3.37	3.37	0.45	0.55	0.00	0.25	0.35	0.45	0.55
D3	14.62	14.62	0.90	0.95	0.00	0.25	0.35	0.90	0.95
E	2.20	0.00	0.50	0.60	2.20	0.25	0.35	0.25	0.35
F	6.34	0.00	0.50	0.60	6.34	0.25	0.35	0.25	0.35
G	8.84	0.00	0.50	0.60	8.84	0.25	0.35	0.25	0.35
OS-1	6.38	6.38	0.50	0.60	0.00	0.25	0.35	0.50	0.60
OS-2	3.12	3.12	0.90	0.95	0.00	0.25	0.35	0.90	0.95
OS-3	1.14	1.14	0.90	0.95	0.00	0.25	0.35	0.90	0.95

Calculated by: QNA  
Date: 05/05/05

**FALCON HIGHLANDS FILING NO. 2 & 3**  
**PDR BASINS**  
**(Area Drainage Summary)**

BASIN	AREA TOTAL (Acres)	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>t</sub>	T <sub>c</sub> USED	INTENSITY		TOTAL FLOWS	
		C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	TOTAL (min)		I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
A	14.75	0.50	0.60	0.25	105	2.1	13.0	1625	1.5%	2.4	11.3	24.2	24.2	2.8	4.6	20.5	40.5
B1	14.01	0.50	0.60	0.25	105	2.1	13.0	1625	1.5%	2.4	11.3	24.2	24.2	2.8	4.6	19.4	38.5
B2	3.88	0.50	0.60	0.25	110	2.2	13.3	390	0.9%	1.9	3.4	16.7	16.7	3.3	5.6	6.4	13.0
B3	7.42	0.48	0.58	0.25	135	2.7	14.7	900	0.9%	1.9	7.9	22.6	22.6	2.9	4.8	10.3	20.7
B4	17.74	0.48	0.58	0.25	165	3.3	16.2	1550	1.3%	2.2	11.7	28.0	28.0	2.6	4.2	22.1	43.8
B5	11.59	0.50	0.60	0.25	210	4.2	18.3	1100	2.0%	2.3	8.0	26.3	26.3	2.7	4.4	15.4	30.4
B5A	8.76	0.50	0.60	0.25	112	5.0	10.3	2500	1.3%	2.2	18.9	29.2	29.2	2.5	4.1	11.0	21.6
B5B	5.95	0.45	0.55	0.25	200	4.0	17.9	133	1.3%	2.2	1.0	18.9	18.9	3.1	5.2	8.4	17.2
B6	14.79	0.48	0.58	0.25	150	3.0	15.5	1425	0.7%	1.8	13.2	28.7	28.7	2.5	4.2	18.1	35.8
B7	13.61	0.50	0.60	0.25	150	3.0	15.5	950	1.0%	2.0	7.9	23.4	23.4	2.8	4.7	19.2	38.1
B8	6.96	0.50	0.60	0.25	265	7.0	18.8	860	0.9%	1.9	7.5	26.3	26.3	2.7	4.4	9.2	18.2
C1	10.94	0.45	0.55	0.25	180	3.6	17.0	1390	1.4%	2.3	10.1	27.0	27.0	2.6	4.3	12.9	25.9
C2	11.37	0.45	0.55	0.25	180	4.0	16.4	1700	1.1%	2.0	14.2	30.6	30.6	2.5	4.0	12.6	25.1
C3	2.56	0.45	0.55	0.25	190	4.0	17.1	140	1.6%	2.5	0.9	18.1	18.1	3.2	5.4	3.7	7.5

# FALCON HIGHLANDS FILING NO. 2 & 3

## PDR BASINS

### (Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>c</sub>	T <sub>c</sub> USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>c</sub> (min)	TOTAL (min)	(min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
		<i>* For Coles See Runoff Summary</i>															
C5	16.11	0.41	0.51	0.25	250	4.0	21.5	1530	1.0%	2.0	12.8	34.3	34.3	2.3	3.7	15.2	30.7
C8	8.20	0.42	0.52	0.25	300	7.0	20.8	286	1.7%	2.6	1.8	22.6	22.6	2.9	4.8	9.9	20.3
C9	6.30	0.45	0.55	0.25	180	3.6	17.0	425	1.2%	2.2	3.2	20.2	20.2	3.0	5.1	8.6	17.5
C9A	6.72	0.45	0.55	0.25	180	3.6	17.0	670	1.0%	2.0	5.6	22.5	22.5	2.9	4.8	8.7	17.6
C10	12.35	0.45	0.55	0.25	180	3.6	17.0	980	0.9%	1.9	8.6	25.6	25.6	2.7	4.4	15.0	30.2
C11	10.13	0.45	0.55	0.25	150	3.0	15.5	450	1.1%	2.1	3.6	19.1	19.1	3.1	5.2	14.2	29.1
C12	3.67	0.45	0.55	0.25	185	10.0	12.4	100	2.0%	2.3	0.7	13.1	13.1	3.7	6.3	6.1	12.7
D1	9.79	0.45	0.55	0.25	180	3.6	17.0	1300	1.3%	2.2	9.8	26.8	26.8	2.6	4.3	11.6	23.3
D2	3.37	0.45	0.55	0.25	70	1.4	10.6	300	1.7%	4.3	1.2	11.7	11.7	3.8	6.6	5.8	12.2
D3	14.62	0.90	0.95	0.25	185	10.0	12.4	103	1.9%	5.3	0.3	12.7	12.7	3.7	6.4	48.9	88.5
E	2.20	0.25	0.35	0.25	90	5.0	8.6	1080	1.0%	2.0	9.0	17.6	17.6	3.2	5.4	1.8	4.2
F	6.34	0.25	0.35	0.25	125	4.0	12.1	630	1.6%	2.5	4.2	16.3	16.3	3.3	5.7	5.3	12.5
G	8.84	0.25	0.35	0.25	200	5.0	16.6	360	1.1%	2.1	2.9	19.5	19.5	3.1	5.2	6.8	16.0
OS-1	6.38	0.50	0.60	0.25	100	2.0	12.6	608	2.0%	2.8	3.6	16.3	16.3	3.4	5.7	10.7	21.7

**FALCON HIGHLANDS FILING NO. 2 & 3**  
**PDR BASINS**  
**(Area Drainage Summary)**

BASIN	AREA TOTAL (Acres)	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>t</sub>	T <sub>e</sub> USED	INTENSITY		TOTAL FLOWS	
		C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	TOTAL (min)		I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
OS-2	3.12	0.90	0.95	0.25	100	2.0	12.6	1525	1.2%	2.2	11.6	24.2	24.2	2.8	4.6	7.8	13.6
OS-3	1.14	0.90	0.95	0.25	20	0.4	5.7	1190	0.6%	1.8	11.0	16.7	16.7	3.3	5.6	3.4	6.0

Calculated by: QNA  
Date: 5/5/05

**FALCON HIGHLANDS FILING NO. 223**  
**PDR BASINS**  
**(Surface Routing Summary)**

Design Point(s)	Contributing Basins	Equivalent CA <sub>5</sub>	Equivalent CA <sub>100</sub>	Maximum T <sub>C</sub>	Intensity		Flow	
					I <sub>5</sub>	I <sub>100</sub>	Q <sub>5</sub>	Q <sub>100</sub>
1	B1 & OS-1	10.20	12.24	24.2	2.8	4.6	28.3	56.0
2	B2 & DP1 F.B.	5.61	6.98	24.2	2.8	4.6	15.6	32.0
3	B3 AND DP2 F.B.	5.31	7.25	24.2	2.8	4.6	14.7	33.2
4	B4	8.60	10.37	28.0	2.6	4.2	22.1	43.8
5	B5 & DP4 & DP 13 F.B.	8.14	11.09	28.0	2.6	4.2	21.0	46.8
6	B6	7.12	8.60	28.7	2.5	4.2	18.1	35.8
7	B7	6.80	8.16	23.4	2.8	4.7	19.2	38.1
8	C1	4.92	6.02	27.0	2.6	4.3	12.9	25.9
9	C2	5.12	6.25	30.6	2.5	4.0	12.6	25.1
10	C3, DP8 & DP9 F.B.	6.35	9.64	30.6	2.5	4.0	15.6	38.6
11	C5	6.60	8.21	34.3	2.3	3.7	15.2	30.7
12	B5B	2.68	3.27	18.9	3.1	5.2	8.4	17.2
13	B5A	4.38	5.26	29.2	2.5	4.1	11.0	21.6
14	C8	3.45	4.27	22.6	2.9	4.8	9.9	20.3
15	C9	2.83	3.46	20.2	3.0	5.1	8.6	17.5

**FALCON HIGHLANDS FILING NO. 2 & 3**  
**PDR BASINS**  
**(Surface Routing Summary)**

<i>Design Point(s)</i>	<i>Contributing Basins</i>	<i>Equivalent CA<sub>5</sub></i>	<i>Equivalent CA<sub>100</sub></i>	<i>Maximum T<sub>c</sub></i>	<i>Intensity</i>		<i>Flow</i>	
					<i>I<sub>5</sub></i>	<i>I<sub>100</sub></i>	<i>Q<sub>5</sub></i>	<i>Q<sub>100</sub></i>
15A	C9A	3.02	3.70	22.5	2.9	4.8	8.7	17.6
16	C10	5.56	6.79	25.6	2.7	4.4	15.0	30.2
17	C11	4.56	5.57	19.1	3.1	5.2	14.2	29.1
18	D1	4.41	5.39	26.8	2.6	4.3	11.6	23.3
19	D2	1.52	1.85	11.7	3.8	6.6	5.8	12.2
20	E	0.55	0.77	17.6	3.2	5.4	1.8	4.2
21	F	1.58	2.22	16.3	3.3	5.7	5.3	12.5

Calculated by: QNA  
Date: 5/5/05  
Checked by: \_\_\_\_\_

**FALCON HIGHLANDS FILING NO. 2 & 3**  
**PDR BASINS**  
**(Pipe Routing Summary)**

<i>Pipe Routes</i>	<i>Contributing Design Points</i>	<i>Equivalent CA<sub>5</sub></i>	<i>Equivalent CA<sub>100</sub></i>	<i>Maximum T<sub>C</sub></i>	<i>Intensity</i>		<i>Flow</i>	
					<i>I<sub>5</sub></i>	<i>I<sub>100</sub></i>	<i>Q<sub>5</sub></i>	<i>Q<sub>100</sub></i>
<b>1</b>	<b>DP-1 &amp; DP-4</b>	13.31	15.11	28.0	2.6	4.2	<b>34.3</b>	<b>63.8</b>
<b>2</b>	<b>PR-1 &amp; DP-2</b>	17.22	19.27	28.0	2.6	4.2	<b>44.3</b>	<b>81.3</b>
<b>3</b>	<b>PR-2, DP-3 &amp; DP-5</b>	30.67	37.60	28.0	2.6	4.2	<b>79.0</b>	<b>158.6</b>
<b>4</b>	<b>PR-3 &amp; DP-6</b>	37.79	46.20	28.7	2.5	4.2	<b>96.0</b>	<b>192.2</b>
<b>5</b>	<b>DP-7</b>	13.32	15.39	29.2	2.5	4.1	<b>33.5</b>	<b>63.3</b>
<b>6</b>	<b>DP-8 &amp; DP-9</b>	4.83	4.04	30.6	2.5	4.0	<b>11.9</b>	<b>16.2</b>
<b>7</b>	<b>PR-6 &amp; DP-10</b>	11.19	13.67	30.6	2.5	4.0	<b>27.5</b>	<b>54.8</b>
<b>8</b>	<b>PR-7 &amp; DP-14</b>	14.63	17.94	30.6	2.5	4.0	<b>35.9</b>	<b>71.9</b>
<b>9</b>	<b>PR-8 &amp; DP-15</b>	17.47	21.41	30.6	2.5	4.0	<b>42.9</b>	<b>85.8</b>
<b>10</b>	<b>PR-9 &amp; DP-15A</b>	20.49	25.10	30.6	2.5	4.0	<b>50.3</b>	<b>100.6</b>
<b>11</b>	<b>DP-12</b>	2.68	3.27	18.9	3.1	5.2	<b>8.4</b>	<b>17.2</b>
<b>11A</b>	<b>DP-13 PICK UP</b>	3.84	3.95	29.2	2.5	4.1	<b>9.7</b>	<b>16.3</b>
<b>11B</b>	<b>PR-11B &amp; DP-11A</b>	6.52	7.23	29.2	2.5	4.1	<b>16.4</b>	<b>29.7</b>
<b>12</b>	<b>DP-11</b>	6.60	8.21	34.3	2.3	3.7	<b>15.2</b>	<b>30.7</b>
<b>13</b>	<b>PR-12, DP-16 &amp; DP-17</b>	16.72	20.57	34.3	2.3	3.7	<b>38.5</b>	<b>76.9</b>
<b>14</b>	<b>DP-18</b>	4.41	5.39	26.81	2.6	4.3	<b>11.6</b>	<b>23.3</b>



**FALCON HIGHLANDS FILING NO. 2 & 3**  
**PDR BASINS**  
**(Pipe Routing Summary)**

<i>Pipe Routes</i>	<i>Contributing Design Points</i>	<i>Equivalent CA<sub>5</sub></i>	<i>Equivalent CA<sub>100</sub></i>	<i>Maximum T<sub>C</sub></i>	<i>Intensity</i>		<i>Flow</i>	
					<i>I<sub>5</sub></i>	<i>I<sub>100</sub></i>	<i>Q<sub>5</sub></i>	<i>Q<sub>100</sub></i>
15	DP-19	1.52	1.85	11.74	3.8	6.6	5.8	12.2

Calculated by: QNA  
Date: 5/5/05  
Checked by: \_\_\_\_\_

**HYDROLOGIC MDDP CALCULATIONS  
PRELIMINARY POND ROUTING**

**FALCON HIGHLANDS PHASE 2**  
**FILING No. 2 and 3**  
**MDDP MAJOR BASINS**  
**(Area Runoff Coefficient Summary)**

<b>HISTORIC</b>									
		<i>STREETS / DEVELOPED</i>			<i>OVERLAND / UNDEVELOPED</i>			<i>COMPOSITE C</i>	
BASIN	TOTAL AREA (Acres)	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	C <sub>100</sub>
<i>EX-1</i>	21.75	0.00	0.60	0.70	21.75	0.25	0.35	0.25	0.35
<i>EX-2</i>	64.61	0.00	0.60	0.70	64.61	0.25	0.35	0.25	0.35
<i>EX-3</i>	99.57	0.00	0.60	0.70	99.57	0.25	0.35	0.25	0.35
<i>EX-4</i>	71.71	0.00	0.60	0.70	71.71	0.25	0.35	0.25	0.35

EX-1 and EX-2 areas are part of Basin 78 from the Sand Creek DBPS and will use rational method to find the Historic Runoff  
EX-3 is the area in Phase 2 that is tributary to Design Point 38 of the Sand Creek DBPS, and will use rational method to find the Historic Runoff  
EX-4 is the area in Phase 2 that is tributary to Pond WU in the Falcon Basin DBPS

<b>PROPOSED</b>									
		<i>STREETS / DEVELOPED</i>			<i>OVERLAND / UNDEVELOPED</i>			<i>COMPOSITE C</i>	
BASIN	TOTAL AREA (Acres)	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	AREA (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	C <sub>100</sub>
<i>A</i>	14.81	6.21	0.50	0.60	8.60	0.25	0.35	0.35	0.45
<i>B</i>	105.45	101.13	0.50	0.60	4.32	0.25	0.35	0.49	0.59
<i>C</i>	88.47	77.31	0.45	0.55	11.16	0.25	0.35	0.42	0.52
<i>D</i>	27.78	27.00	0.45	0.55	0.78	0.25	0.35	0.44	0.54
<i>E</i>	2.20	0.00	0.50	0.60	2.20	0.25	0.35	0.25	0.35
<i>F</i>	6.34	0.00	0.50	0.60	6.34	0.25	0.35	0.25	0.35
<i>G</i>	12.61	0.00	0.50	0.60	12.61	0.25	0.35	0.25	0.35
<i>OS-1</i>	6.38	6.38	0.50	0.60	0.00	0.25	0.35	0.50	0.60
<i>OS-2</i>	3.12	3.12	0.90	0.95	0.00	0.25	0.35	0.90	0.95
<i>OS-3</i>	1.14	1.14	0.90	0.95	0.00	0.25	0.35	0.90	0.95

Calculated by: QNA  
Date: 5/5/05

**FALCON HIGHLANDS PHASE 2**  
**FILING No. 2 and 3**  
**MDDP MAJOR BASINS**  
**(Area Drainage Summary)**  
**HISTORIC**

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>t</sub>	T <sub>c</sub> USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	TOTAL (min)	(min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
		<i>* For Calcs See Runoff Summary</i>															
EX-1	21.75	0.25	0.35	0.25	360	10.0	21.5	0	0.0%	0.0	0.0	21.5	21.5	2.9	4.9	16.0	37.2
EX-2	64.61	0.25	0.35	0.25	300	10.0	18.5	3750	1.5%	3.0	20.8	39.3	39.3	2.1	3.4	34.4	77.6
EX-3	99.57	0.25	0.35	0.25	300	8.0	19.9	2770	1.7%	3.2	14.4	34.3	34.3	2.3	3.7	57.3	130.1
EX-4	71.71	0.25	0.35	0.25	280	8.0	18.8	1900	1.3%	2.7	11.7	30.5	30.5	2.5	4.0	44.0	100.6

EX-1 and EX-2 area is planimeted from Sand Creek DBPS and will use rational method to find the Historic Runoff  
EX-3 is the area in Phase 2 that is tributary to Design Point 38 of the Sand Creek DBPS.  
EX-4 is the area in Phase 2 that is tributary to Pond WU in the Falcon Basin DBPS

**PROPOSED**

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>t</sub>	T <sub>c</sub> USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	TOTAL (min)	(min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
		<i>* For Calcs See Runoff Summary</i>															
A	14.81	0.35	0.45	0.25	300	6.0	21.9	233	3.0%	3.3	1.2	23.1	23.1	2.8	4.7	14.9	31.7
B	105.45	0.49	0.59	0.25	170	3.4	16.5	3890	2.5%	3.1	20.9	37.4	37.4	2.2	3.5	113.3	220.3
C	88.47	0.42	0.52	0.25	110	4.0	10.9	3255	1.3%	2.2	24.7	35.5	35.5	2.3	3.7	84.9	169.7

**FALCON HIGHLANDS PHASE 2**  
**FILING No. 2 and 3**  
**MDDP MAJOR BASINS**  
**(Area Drainage Summary)**

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>i</sub>	T <sub>c</sub> USED	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Height (ft)	T <sub>c</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>i</sub> (min)	TOTAL (min)	(min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
		<i>* For Calcs See Runoff Summary</i>															
<b>D</b>	27.78	0.44	0.54	0.25	180	3.6	17.0	1420	1.5%	2.4	9.9	26.8	26.8	2.6	4.3	32.5	65.4
<b>E</b>	2.20	0.25	0.35	0.25	90	5.0	8.6	1080	1.0%	2.0	9.0	17.6	17.6	3.2	5.4	1.8	4.2
<b>F</b>	6.34	0.25	0.35	0.25	125	4.0	12.1	630	1.6%	2.5	4.2	16.3	16.3	3.3	5.7	5.3	12.5
<b>G</b>	12.61	0.25	0.35	0.25	300	7.0	20.8	285	1.8%	2.6	1.8	22.6	22.6	2.9	4.8	9.0	21.0
<b>OS-1</b>	6.38	0.50	0.60	0.25	100	2.0	12.6	608	2.0%	2.8	3.6	16.3	16.3	3.4	5.7	10.7	21.7
<b>OS-2</b>	3.12	0.90	0.95	0.25	100	2.0	12.6	1525	1.2%	2.2	11.6	24.2	24.2	2.8	4.6	7.8	13.6
<b>OS-3</b>	1.14	0.90	0.95	0.25	20	0.4	5.7	1190	0.6%	1.8	11.0	16.7	16.7	3.3	5.6	3.4	6.0

Calculated by: QNA  
Date: 5/5/05

**FALCON HIGHLANDS PHASE 2**  
**FILING No. 2 and 3**  
**MDDP MAJOR BASINS**  
**(Surface Routing Summary)**

**HISTORIC**

Design Point(s)	Contributing Basins	Equivalent CA <sub>5</sub>	Equivalent CA <sub>100</sub>	Maximum T <sub>C</sub>	Intensity		Flow	
					I <sub>5</sub>	I <sub>100</sub>	Q <sub>5</sub>	Q <sub>100</sub>
1	"EX-1"	5.44	7.61	21.5	2.9	4.9	16.0	37.2
2	"EX-2"	16.15	22.61	39.3	2.1	3.4	34.4	77.6
3	"EX-3"	24.89	34.85	34.3	2.3	3.7	57.3	130.1
4	"EX-4"	17.93	25.10	30.5	2.5	4.0	44.0	100.6

**PROPOSED**

Design Point(s)	Contributing Basins	Equivalent CA <sub>5</sub>	Equivalent CA <sub>100</sub>	Maximum T <sub>C</sub>	Intensity		Flow	
					I <sub>5</sub>	I <sub>100</sub>	Q <sub>5</sub>	Q <sub>100</sub>
1	"A"	5.25	6.73	23.1	2.8	4.7	14.9	31.7
2	"B", "OS-1" & "OS-2",	57.64	68.98	37.4	2.2	3.5	126.4	244.3
3	"C", & "OS-3"	38.60	47.51	35.5	2.3	3.7	87.2	173.6
4	"D"	12.35	15.12	26.8	2.6	4.3	32.5	65.4

Calculated by: QNA  
Date: 5/5/05  
Checked by: \_\_\_\_\_

# FALCON HIGHLANDS FILING NO. 2 POND EMERGENCY OVERFLOW SPILLWAYS

## Pond 1

The general form of the equation for horizontal crested weirs is  $Q = CLH^{3/2}$  where:

Q = Weir flow discharge (cfs)	244.30
C = Weir flow coefficient	3.4
H = Depth of flow over the weir (ft)	1.00
L = Length of the weir (ft)	7.19

## Pond 2

The general form of the equation for horizontal crested weirs is  $Q = CLH^{3/2}$  where:

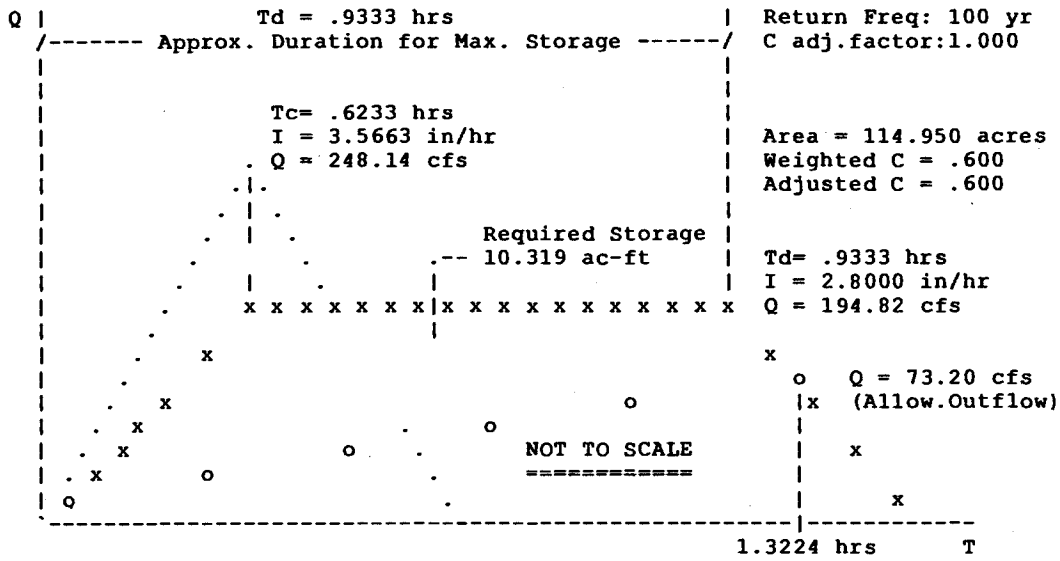
Q = Weir flow discharge (cfs)	169.70
C = Weir flow coefficient	3.4
H = Depth of flow over the weir (ft)	1.00
L = Length of the weir (ft)	9.9

MODIFIED RATIONAL METHOD  
 ---- Graphical Summary for Maximum Required Storage ----  
 Method I

Q = CiA \* Units Conversion; Where Conversion = 43560 / (12 \* 3600)

```

*****
* RETURN FREQUENCY: 100 yr | Allowable Outflow: 73.20 cfs *
* 'C' Adjustment: 1.000 | Required Storage: 10.319 ac-ft *
-----
* Peak Inflow: 194.82 cfs *
* .HYG File: 100y *
*****
  
```





File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND WEST DP-2.PPW

RATIONAL C COEFFICIENT DATA

.....

---

Soil/Surface Description	C	Area acres	C x Area acres
basin b	.5900	105.450	62.216
basin os-1	.6000	6.380	3.828
basin os-2	.9500	3.120	2.964
WEIGHTED C & TOTAL AREA --->	.6003	114.950	69.007

.....

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\  
 Inflow HYG file = NONE STORED - POND WEST IN 100y  
 Outflow HYG file = NONE STORED - POND WEST OUT 100y

Pond Node Data = POND WEST  
 Pond Volume Data = POND WEST  
 Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

-----  
 Starting WS Elev = 6809.50 ft  
 Starting Volume = .000 ac-ft  
 Starting Outflow = .00 cfs  
 Starting Infiltr. = .00 cfs  
 Starting Total Qout = .00 cfs  
 Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====

Peak Inflow	=	194.82 cfs	at	.6500 hrs
Peak Outflow	=	71.73 cfs	at	1.3500 hrs

-----

Peak Elevation	=	6816.08 ft
Peak Storage	=	10.620 ac-ft

=====

MASS BALANCE (ac-ft)

-----

+ Initial Vol	=	.000
+ HYG Vol IN	=	15.012
- Infiltration	=	.000
- HYG Vol OUT	=	15.011
- Retained Vol	=	.000

-----

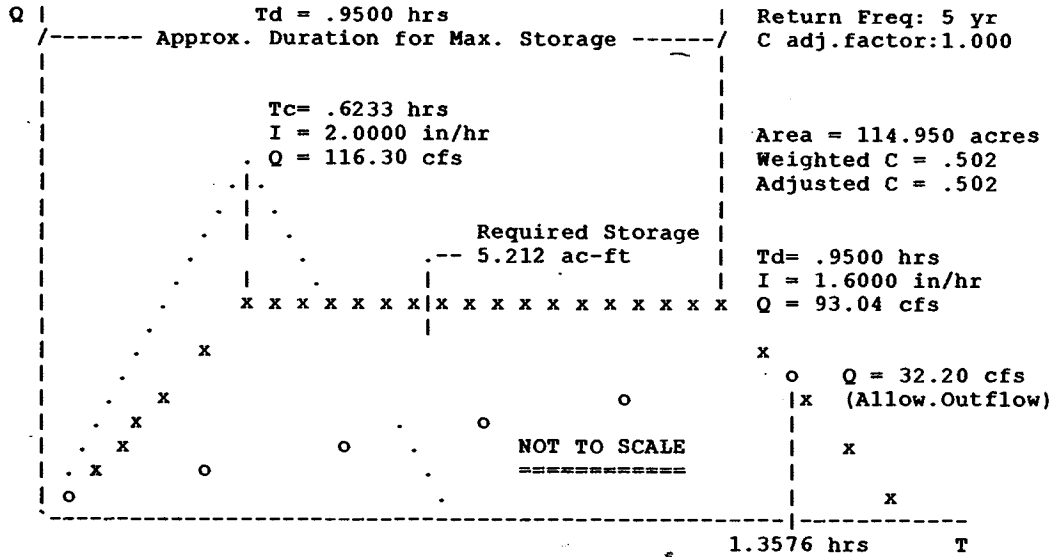
Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

MODIFIED RATIONAL METHOD  
 ---- Graphical Summary for Maximum Required Storage ----  
 Method I

$Q = CiA * \text{Units Conversion}; \text{ Where Conversion} = 43560 / (12 * 3600)$

```

*****
* RETURN FREQUENCY: 5 yr      | Allowable Outflow: 32.20 cfs  *
* 'C' Adjustment: 1.000     | Required Storage: 5.212 ac-ft *
*-----*
* Peak Inflow: 93.04 cfs      *
* .HYG File: 5Y              *
*****
  
```



File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND WEST DP-2.PPW

RATIONAL C COEFFICIENT DATA

.....

---

Soil/Surface Description	C	Area acres	C x Area acres
basin b	.4900	105.450	51.671
basin os-1	.5000	6.380	3.190
basin os-2	.9000	3.120	2.808

WEIGHTED C & TOTAL AREA ---> .5017 114.950 57.669  
.....

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\  
Inflow HYG file = NONE STORED - POND WEST IN 5Y  
Outflow HYG file = NONE STORED - POND WEST OUT 5Y

Pond Node Data = POND WEST  
Pond Volume Data = POND WEST  
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

-----  
Starting WS Elev = 6809.50 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout = .00 cfs  
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====  
Peak Inflow = 93.04 cfs at .6500 hrs  
Peak Outflow = 21.05 cfs at 1.4500 hrs  
-----  
Peak Elevation = 6814.33 ft  
Peak Storage = 5.588 ac-ft  
=====

MASS BALANCE (ac-ft)

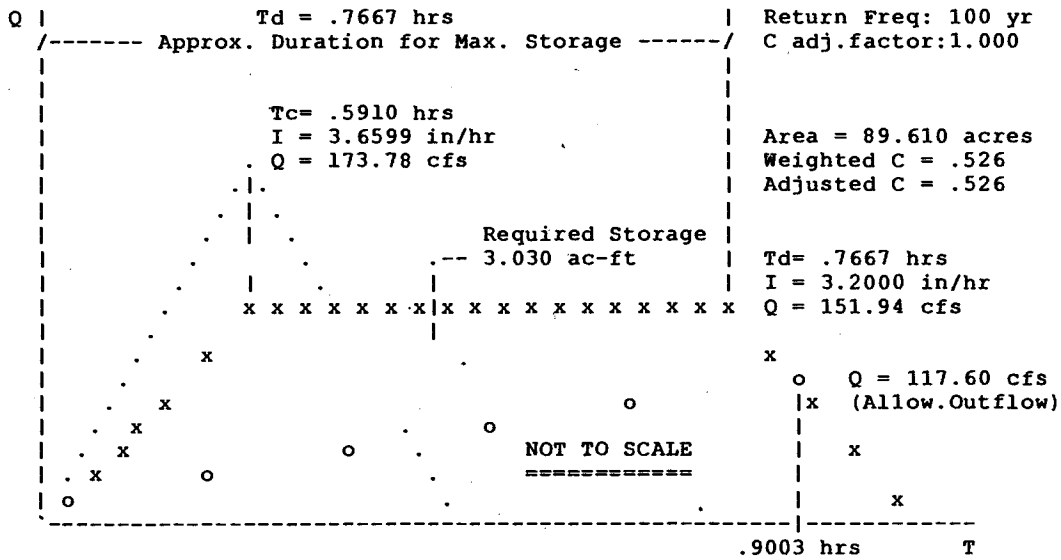
-----  
+ Initial Vol = .000  
+ HYG Vol IN = 7.290  
- Infiltration = .000  
- HYG Vol OUT = 7.290  
- Retained Vol = .000  
-----  
Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

MODIFIED RATIONAL METHOD  
 ---- Graphical Summary for Maximum Required Storage ----  
 Method I

Q = CiA \* Units Conversion; Where Conversion = 43560 / (12 \* 3600)

```

*****
* RETURN FREQUENCY: 100 yr | Allowable Outflow: 117.60 cfs *
* 'C' Adjustment: 1.000 | Required Storage: 3.030 ac-ft *
*-----*
* Peak Inflow: 151.94 cfs *
* .HYG File: 100y *
*****
  
```



File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND EAST DP-3.PPW

RATIONAL C COEFFICIENT DATA

.....

---

Soil/Surface Description	C	Area acres	C x Area acres
Basin C	.5200	88.470	46.004
Basin OS-3	.9500	1.140	1.083
WEIGHTED C & TOTAL AREA --->	.5255	89.610	47.087

.....

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra.nova engineering\Jobs\0429.00\DRAINAGE\  
Inflow HYG file = NONE STORED - POND EAST IN 100y  
Outflow HYG file = NONE STORED - POND EAST OUT 100y

Pond Node Data = POND EAST  
Pond Volume Data = POND EAST  
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

-----  
Starting WS Elev = 6811.00 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout= .00 cfs  
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====  
Peak Inflow = 151.94 cfs at .6000 hrs  
Peak Outflow = 111.46 cfs at .9000 hrs  
-----  
Peak Elevation = 6817.19 ft  
Peak Storage = 4.352 ac-ft  
=====

MASS BALANCE (ac-ft)

-----  
+ Initial Vol = .000  
+ HYG Vol IN = 9.623  
- Infiltration = .000  
- HYG Vol OUT = 9.623  
- Retained Vol = .000  
-----  
Unrouted Vol = -.000 ac-ft (.000% of Inflow Volume)



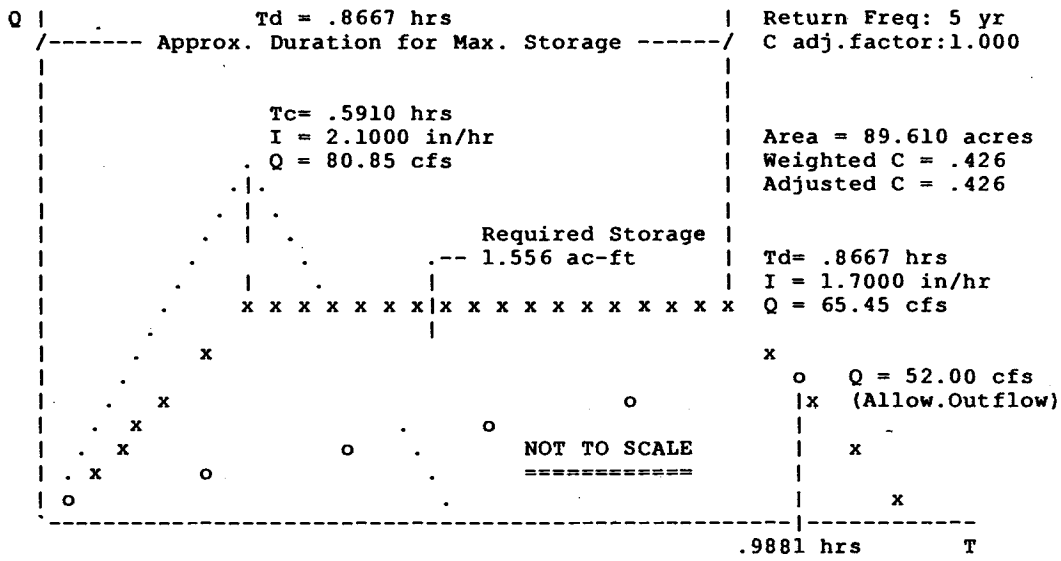
MODIFIED RATIONAL METHOD  
 ---- Graphical Summary for Maximum Required Storage ----  
 Method I

$Q = CiA * \text{Units Conversion}; \text{ Where Conversion} = 43560 / (12 * 3600)$

```

*****
* RETURN FREQUENCY: 5 yr      | Allowable Outflow: 52.00 cfs      *
* 'C' Adjustment: 1.000      | Required Storage: 1.556 ac-ft      *
-----*
* Peak Inflow: 65.45 cfs      *
* .HYG File: 5y              *
*****

```



RATIONAL C COEFFICIENT DATA

.....

Soil/Surface Description	C	Area acres	C x Area acres
Basin C	.4200	88.470	37.157
Basin OS-3	.9000	1.140	1.026

WEIGHTED C & TOTAL AREA ---> .4261 89.610 38.183  
 .....

Type.... Pond Routing Summary  
Name.... POND EAST OUT Tag: 5y  
File.... \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\POND EAST DP-3.PPW  
Storm... cos5yr Tag: 5y

Page 12.06

Event: 5 yr

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\Luanne\terra nova engineering\Jobs\0429.00\DRAINAGE\  
Inflow HYG file = NONE STORED - POND EAST IN 5y  
Outflow HYG file = NONE STORED - POND EAST OUT 5y

Pond Node Data = POND EAST  
Pond Volume Data = POND EAST  
Pond Outlet Data = Outlet 2

No Infiltration

INITIAL CONDITIONS

-----  
Starting WS Elev = 6811.00 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout = .00 cfs  
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

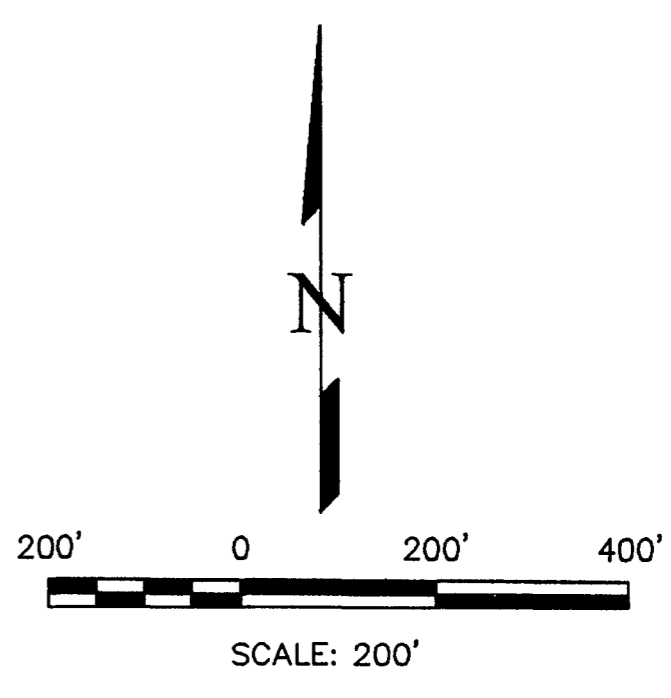
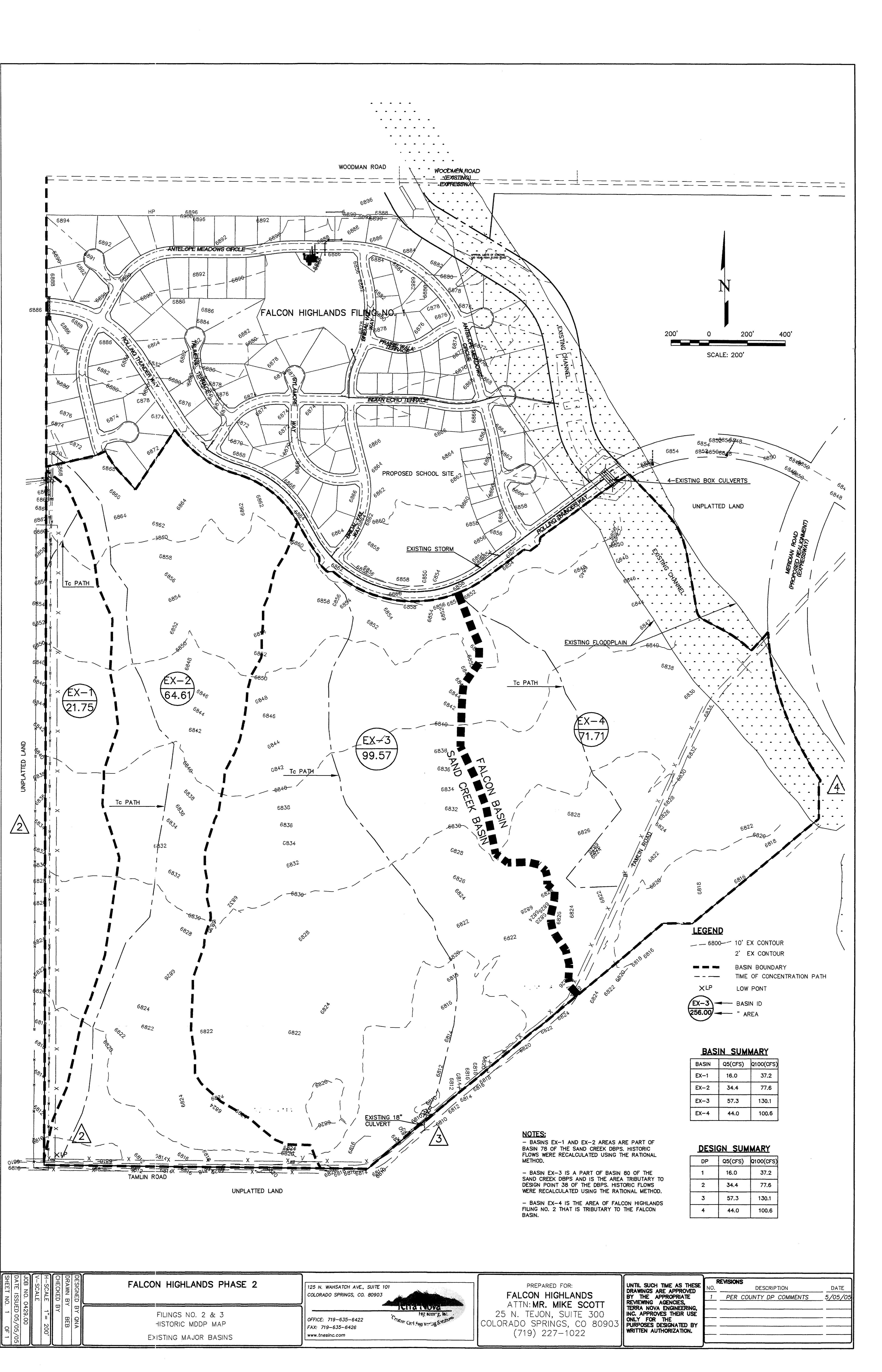
=====  
Peak Inflow = 65.45 cfs at .6000 hrs  
Peak Outflow = 46.07 cfs at 1.0500 hrs  
-----  
Peak Elevation = 6815.70 ft  
Peak Storage = 2.203 ac-ft  
=====

MASS BALANCE (ac-ft)

-----  
+ Initial Vol = .000  
+ HYG Vol IN = 4.686  
- Infiltration = .000  
- HYG Vol OUT = 4.686  
- Retained Vol = .000  
-----  
Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

**DRAINAGE MAPS**





**LEGEND**

- - - 6800 10' EX CONTOUR
- - - 2' EX CONTOUR
- - - BASIN BOUNDARY
- - - TIME OF CONCENTRATION PATH
- X LP LOW POINT
- EX-3 BASIN ID
- 256.00 " AREA

**BASIN SUMMARY**

BASIN	Q5(CFS)	Q100(CFS)
EX-1	16.0	37.2
EX-2	34.4	77.6
EX-3	57.3	130.1
EX-4	44.0	100.6

**DESIGN SUMMARY**

DP	Q5(CFS)	Q100(CFS)
1	16.0	37.2
2	34.4	77.6
3	57.3	130.1
4	44.0	100.6

**NOTES:**

- BASINS EX-1 AND EX-2 ARE PART OF BASIN 78 OF THE SAND CREEK DBPS. HISTORIC FLOWS WERE RECALCULATED USING THE RATIONAL METHOD.
- BASIN EX-3 IS A PART OF BASIN 80 OF THE SAND CREEK DBPS AND IS THE AREA TRIBUTARY TO DESIGN POINT 38 OF THE DBPS. HISTORIC FLOWS WERE RECALCULATED USING THE RATIONAL METHOD.
- BASIN EX-4 IS THE AREA OF FALCON HIGHLANDS FLING NO. 2 THAT IS TRIBUTARY TO THE FALCON BASIN.

**FALCON HIGHLANDS PHASE 2**

FILINGS NO. 2 & 3  
HISTORIC MDDP MAP  
EXISTING MAJOR BASINS

125 N. WAHSATCH AVE., SUITE 101  
COLORADO SPRINGS, CO. 80903

OFFICE: 719-635-6422  
FAX: 719-635-6426  
www.tnesinc.com

PREPARED FOR:  
**FALCON HIGHLANDS**  
ATTN: MR. MIKE SCOTT  
25 N. TEJON, SUITE 300  
COLORADO SPRINGS, CO 80903  
(719) 227-1022

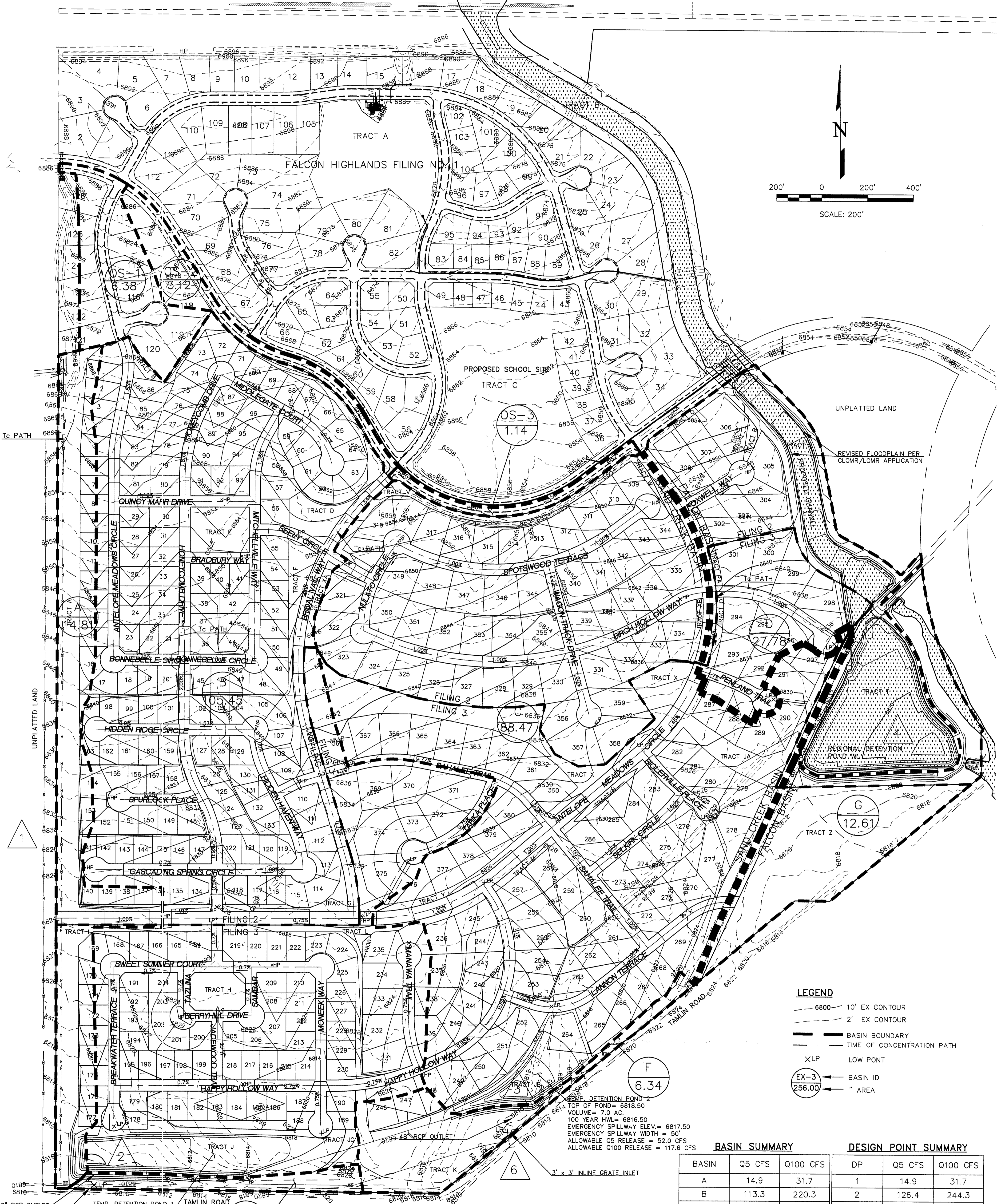
UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, TERRA NOVA ENGINEERING, INC. APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

**REVISIONS**

NO.	DESCRIPTION	DATE
1	PER COUNTY DP COMMENTS	5/05/05

SHEET NO. 1 OF 1

DESIGNED BY: ONA  
DRAWN BY: BEB  
CHECKED BY:  
H-SCALE: 1" = 200'  
V-SCALE:  
JOB NO. 0428.00  
DATE ISSUED 05/05/05



- LEGEND**
- 6800 10' EX CONTOUR
  - 6810 2' EX CONTOUR
  - BASIN BOUNDARY
  - TIME OF CONCENTRATION PATH
  - XLP LOW POINT
  - EX-3 BASIN ID
  - 256.00 " AREA

BASIN SUMMARY			DESIGN POINT SUMMARY		
BASIN	Q5 CFS	Q100 CFS	DP	Q5 CFS	Q100 CFS
A	14.9	31.7	1	14.9	31.7
B	113.3	220.3	2	126.4	244.3
C	84.9	169.7	3	87.2	173.6
D	32.5	65.4	4	32.5	65.4
E	1.8	4.2	5	32.2	73.2
F	5.3	12.5	6	52.0	117.6
G	9.0	21.0			
OS-1	10.7	21.7			
OS-2	7.8	13.6			
OS-3	3.4	6.0			

TEMP. DETENTION POND 1  
 TOP OF POND = 6818.30  
 VOLUME = 13.0 AC  
 100 YEAR HWL = 6816.00  
 EMERGENCY SPILLWAY ELEV. = 6817.00  
 EMERGENCY SPILLWAY WIDTH = 72  
 ALLOWABLE Q5 RELEASE = 32.2 CFS  
 ALLOWABLE Q100 RELEASE = 73.2 CFS

TEMP. DETENTION POND 2  
 TOP OF POND = 6818.50  
 VOLUME = 7.0 AC  
 100 YEAR HWL = 6816.50  
 EMERGENCY SPILLWAY ELEV. = 6817.50  
 EMERGENCY SPILLWAY WIDTH = 50'  
 ALLOWABLE Q5 RELEASE = 52.0 CFS  
 ALLOWABLE Q100 RELEASE = 117.6 CFS

**FALCON HIGHLANDS PHASE 2**

DESIGNED BY QUA  
 DRAWN BY BEB  
 CHECKED BY  
 H-SCALE 1" = 200'  
 V-SCALE  
 JOB NO. 042300  
 DATE ISSUED 9/16/05  
 SHEET NO. 1 OF 1

FILINGS NO. 2 & 3  
 DEVELOPED MDDP MAP  
 PROPOSED MAJOR BASINS

125 N. WAHSATCH AVE., SUITE 101  
 COLORADO SPRINGS, CO. 80903

OFFICE: 719-635-6422  
 FAX: 719-635-6426  
 www.tnesinc.com

PREPARED FOR:  
**FALCON HIGHLANDS**  
 ATTN: MR. MIKE SCOTT  
 25 N. TEJON, SUITE 300  
 COORADO SPRINGS, CO 80903  
 (719) 227-1022

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, TERRA NOVA ENGINEERING, INC. APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

NO.	DESCRIPTION	DATE
1	PER COUNTY DP COMMENTS	5/05/05
2	PER COUNTY DP COMMENTS	9/16/05

# ENG-SKP214-R2-MDDP.pdf Markup Summary

CDurham (153)

those previous County  
pend.G.  
d for current codes and  
art of the Site lies within  
refore the Sand Creek

spelling

**Subject:** Callout  
**Page Label:** 8  
**Author:** CDurham  
**Date:** 3/1/2022 2:04:07 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

spelling

OB-4	9.53	
OB-5	13.25	
Offsite Detention	12.72	
<b>TOTAL</b>	<b>35.50</b>	

Basins E & F, per write up, do not reach  
Pond 1, but release directly offsite.  
Update contributing areas and %  
impervious accordingly.

**Subject:** Text Box  
**Page Label:** 45  
**Author:** CDurham  
**Date:** 3/2/2022 1:23:16 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Basins E & F, per write up, do not reach Pond 1, but release directly offsite. Update contributing areas and % impervious accordingly.

OB-2	1.16	100
OB-3	33.75	250
Offsite Detention	32.90	225
<b>TOTAL</b>	<b>67.81</b>	<b>575</b>

Basin G, per write up, does not reach  
Pond 2, but release directly offsite.  
Update contributing areas and %  
impervious accordingly.

**Subject:** Text Box  
**Page Label:** 46  
**Author:** CDurham  
**Date:** 3/2/2022 1:25:18 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Basin G, per write up, does not reach Pond 2, but releases directly offsite. Update contributing areas and % impervious accordingly.

OB-1	1.16	100
OB-2	33.75	250
Offsite Detention	32.90	225
<b>TOTAL</b>	<b>67.81</b>	<b>575</b>

Remove Basins E & F as they are not contributing to Pond 1

**Subject:** Text Box  
**Page Label:** 47  
**Author:** CDurham  
**Date:** 3/2/2022 1:30:32 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Remove Basins E & F as they are not contributing to Pond 1

OB-1	1.16	100
OB-2	33.75	250
Offsite Detention	32.90	225
<b>TOTAL</b>	<b>67.81</b>	<b>575</b>

Update based on previous comments

**Subject:** Text Box  
**Page Label:** 48  
**Author:** CDurham  
**Date:** 3/2/2022 1:31:38 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Update based on previous comments

OB-1	1.16	100
OB-2	33.75	250
Offsite Detention	32.90	225
<b>TOTAL</b>	<b>67.81</b>	<b>575</b>

Remove Basin G as it is not contributing to Pond 2

**Subject:** Text Box  
**Page Label:** 50  
**Author:** CDurham  
**Date:** 3/2/2022 1:33:31 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Remove Basin G as it is not contributing to Pond 2





Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

**Subject:** Callout  
**Page Label:** 36  
**Author:** CDurham  
**Date:** 3/2/2022 11:31:32 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Per City of Colorado Springs DCM Ch 6 Section 3.2.1 Max length for overland flow is 300' for non-urban and 100' for urban areas

**Subject:** Callout  
**Page Label:** 39  
**Author:** CDurham  
**Date:** 3/2/2022 11:41:22 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Per City of Colorado Springs DCM Ch 6 Section 3.2.1 Max length for overland flow is 300' for non-urban and 100' for urban areas

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

**Subject:** Callout  
**Page Label:** 40  
**Author:** CDurham  
**Date:** 3/2/2022 11:43:15 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

**Subject:** Callout  
**Page Label:** 41  
**Author:** CDurham  
**Date:** 3/2/2022 11:43:36 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Did not see Basins OS-4 thru OS-6 in summary table in appendix G. Please include copies of where those flows were obtained, or change the text to black and add Tc information in this table.

Does not match 5-year C from Coefficient & Imperviousness spreadsheet

**Subject:** Callout  
**Page Label:** 40  
**Author:** CDurham  
**Date:** 3/2/2022 11:52:13 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Does not match 5-year C from Coefficient & Imperviousness spreadsheet

Does not match flow from spreadsheet in Appendix G

**Subject:** Callout  
**Page Label:** 41  
**Author:** CDurham  
**Date:** 3/2/2022 11:55:43 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Does not match flow from spreadsheet in Appendix G

1	0.95	0.95	0.70	0.60	0.10
2	1.14	0.95	0.95	0.40	0.00
3	0.95	0.11	0.30	0.90	0.70
4	0.34	0.30	0.90	0.70	0.60
5	0.70	0.22	0.40	0.30	0.60
6	0.41	0.41	0.22	0.22	0.71

Does this match flow in previous spreadsheet?

**Subject:** Callout  
**Page Label:** 42  
**Author:** CDurham  
**Date:** 3/2/2022 11:59:11 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Does not match flow in previous spreadsheet

HYDROLOGIC PDR CALCULATIONS  
 For the watershed listed there is a PDR. Why do the calculations from the PDR being used instead of the PDR?

**Subject:** Text Box  
**Page Label:** 57  
**Author:** CDurham  
**Date:** 3/2/2022 12:32:51 PM  
**Status:**  
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Per the references listed, there is a FDR. Why is the calculations from the PDR being used instead of the FDR?

1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00

How do these flows compare to the proposed flows in this report, specifically in regards to Pond WU?

**Subject:** Callout  
**Page Label:** 43  
**Author:** CDurham  
**Date:** 3/2/2022 12:33:22 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

How do these flows compare to the proposed flows in this report, specifically in regards to Pond WU?

ward areas. The historic  
 OS-4  
 $Q_5 = 82.7$  cfs,  $Q_{100} = 1$   
 OS-1 to the eastern e  
 accidental late of about

**Subject:** Callout  
**Page Label:** 8  
**Author:** CDurham  
**Date:** 3/2/2022 2:03:10 PM  
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**Space:**

OS-4

cui-de-sac or wage  
 id daylight to Filing  
 OS-4  
 .74 ac,  $Q_5 = 1.2$  cfs, ( )  
 below basin OS-1, ( )  
 of some proposed

**Subject:** Callout  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:05:57 PM  
**Status:**  
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OS-4

and certain storage tanks. The basin is captured by a series of ditches cut  
 in the right-of-way when ditches and basins are RFP's every water  
 about 100 feet. These ditches along the public water system of Filing  
 (Figure 1) are 1.7 miles from the site. The basin is located north of the site.  
 $Q_5 = 1.2$  cfs,  $Q_{100} = 1.2$  cfs. The basin is located north of the site.  
 on Basin OS-5, west of Basin OS-4. The majority of the site is composed of  
 some use and forest from the PDR. The site is located north of Basin OS-4.  
 and other areas. The site is located north of Basin OS-4.  
 (Figure 1) is a map of the site and other areas.  
 1 ac,  $Q_5 = 1.2$  cfs,  $Q_{100} = 1.2$  cfs. The basin is located north of Basin OS-4.  
 a 1.7 miles from the site. The basin is located north of Basin OS-4.  
 1 ac,  $Q_5 = 1.2$  cfs,  $Q_{100} = 1.2$  cfs. The basin is located north of Basin OS-4.  
 The site is located north of Basin OS-4.  
 from the site. The basin is located north of Basin OS-4.

**Subject:** Text Box  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:08:04 PM  
**Status:**  
**Color:** ■  
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**Space:**

Include discussion of DP 1, combined flow of Basins OS-4 & A, exits site and where does it go?

northeast of the Filing  
ly to existing Pond WU  
E?  
l, natural landscaped ar  
sin D is directed by a d  
ect it south offsite alo

**Subject:** Callout  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:11:24 PM  
**Status:**  
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E?

We are providing this information to you in accordance with the provisions of the Freedom of Information Act. This information is provided for informational purposes only and is not intended to constitute an offer of insurance or any other financial product. Please contact your agent for more information.  
We are providing this information to you in accordance with the provisions of the Freedom of Information Act. This information is provided for informational purposes only and is not intended to constitute an offer of insurance or any other financial product. Please contact your agent for more information.

**Subject:** Callout  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:15:23 PM  
**Status:**  
**Color:** ■  
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Is this an existing inlet & ditch? If so, please show and label on plan. Update paragraph to state they are existing. Is there a change in flows from this plan to the previous plan mentioned?

a east C

**Subject:** Text Box  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:16:03 PM  
**Status:**  
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east

n Basin F sheet flows down  
attern remains that of its hi  
4.  
G?

**Subject:** Callout  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:17:07 PM  
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G?

l Paso County Engin  
ial.  
A-G  
asins have been deliv  
s A1 through F1 with

**Subject:** Callout  
**Page Label:** 10  
**Author:** CDurham  
**Date:** 3/2/2022 2:20:51 PM  
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A-G

Manual as well  
existing  
he historic cor

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**Author:** CDurham  
**Date:** 3/2/2022 2:21:15 PM  
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existing

he standards set for  
High Flood Control  
13 existing  
fourteen historic m  
nary grading of t

**Subject:** Text Box  
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**Author:** CDurham  
**Date:** 3/2/2022 2:22:47 PM  
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13 existing

with the  
historic  
of Filing

existing

7

**Subject:** Callout  
**Page Label:** 10  
**Author:** CDurham  
**Date:** 3/2/2022 2:23:12 PM  
**Status:**  
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existing

6-5 of the D1  
Existing  
**HISTORIC**

**Subject:** Text Box  
**Page Label:** 7  
**Author:** CDurham  
**Date:** 3/2/2022 2:24:12 PM  
**Status:**  
**Color:** ■  
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Existing

**HISTORIC**

**Subject:** Text Box  
**Page Label:** 7  
**Author:** CDurham  
**Date:** 3/2/2022 2:25:55 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Include discussion that existing conditions is with  
Filing 2 developed and historic conditions  
(pre-Filing 2 development) was done as existing  
conditions in previous reports and calculations can  
be found there

B,C,D and E  
basins B1, C1, D1, and E1 ar  
ins are not to be altered d  
is in which development r

**Subject:** Text Box  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:26:31 PM  
**Status:**  
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B,C,D and E

B & C  
No. 1. Of the major basins wit  
reports for Filing Nos. 2 and  
Filing No. 3. Basins B1 and C  
Sub-basin analysis within the

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:26:45 PM  
**Status:**  
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B & C

e Site, basin B1, C1, D1, and E1 are consistent with previous basin basins are not to be altered during the development of the basins in which development of Filing No. 3 is to occur or basins located in a part of the hydrology calculations are and channels on the site. **will be provided**

estimate runoff rates for the proposed development and are in some Criteria Manual and any references within the County map Drainage Criteria Manuals, volumes 1, 2, and 3. These are 18.7 cfs. **OS-21.7 cfs** remains as presented in the Historical **OS-21.7** cfs. **OS-21.7** cfs. **OS-21.7** cfs. **OS-21.7** cfs.

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:27:11 PM  
**Status:**  
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will be provided

No. 1. Of the major basins within the Site, basins B1, C1, D1, and E1 are consistent with previous basin basins are not to be altered during the development of the basins in which development of Filing No. 3 is to occur or basins located in a part of the hydrology calculations are and channels on the site. **will be provided**

The rational method is used to estimate runoff rates for the proposed development and are in some Criteria Manual and any references within the County map Drainage Criteria Manuals, volumes 1, 2, and 3. These are 18.7 cfs. **OS-21.7 cfs** remains as presented in the Historical **OS-21.7** cfs. **OS-21.7** cfs. **OS-21.7** cfs.

**Subject:** Callout  
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**Author:** CDurham  
**Date:** 3/2/2022 2:27:44 PM  
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the preliminary and final drainage reports

Filing No. 3. Basin Sub-basin analysis **order to plan** for The rational method

**Subject:** Highlight  
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**Author:** CDurham  
**Date:** 3/2/2022 2:27:52 PM  
**Status:**  
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order to plan

development and are in some Criteria Manual and any references within the County map Drainage Criteria Manuals, volumes 1, 2, and 3. These are 18.7 cfs. **OS-21.7 cfs** remains as presented in the Historical **OS-21.7** cfs. **OS-21.7** cfs. **OS-21.7** cfs.

**Subject:** Text Box  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:28:54 PM  
**Status:**  
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**Space:**

change all references from historical to existing

the **Historical** directly above and any basin

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:28:58 PM  
**Status:**  
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Historical

criteria to the calculations c **OS-5?** Offsite Basin Drainage Cor basin OS-1. E area tributary

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:29:19 PM  
**Status:**  
**Color:** ■  
**Layer:**  
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OS-5?

...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...  
...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...  
...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:31:08 PM  
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Basin B has been delineated between Filing Nos. 2 and 3 for this report

...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...  
...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...  
...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:32:35 PM  
**Status:**  
**Color:**   
**Layer:**  
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This statement doesn't make sense and is used throughout several times. Please revise description for clarity.

basin area. T1  
OS-5?

**Subject:** Text Box  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:32:38 PM  
**Status:**  
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OS-5?

1.8 cfs,  
to the ft

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**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:02 PM  
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1.8 c

10 = 4.2 cfs)  
developmen

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**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:04 PM  
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**Space:**


4.2 c

...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...  
...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...  
...of Filing No. 2 and 3 in these basins are set to be about during the development of Basin B. ...

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:27 PM  
**Status:**  
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**Layer:**  
**Space:**

Update flows to match spreadsheet


the **Historical**  
n B has been  
to the existing

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:36 PM  
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Historical


for this study.

the **Historical**  
n C has been  
to the existing

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:39 PM  
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Historical


the **Historical**  
n A has been  
ary to off-site

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**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:41 PM  
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Historical


ount 11.

the **Historical**  
n B has been  
to the existing

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:44 PM  
**Status:**  
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Historical

the **Historical**  
n C has been

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:33:47 PM  
**Status:**  
**Color:**   
**Layer:**  
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Historical

The basin drains to Design  
the drainage map for this  
**OS-3?**  
is as presented in the Hi  
iling No. 2. Basin C he  
sin area tributary to the c

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:47:43 PM  
**Status:**  
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OS-3?



How does flow make it's way through Basin C to pond under existing conditions?

**Subject:** Text Box  
**Page Label:** 9  
**Author:** CDurham  
**Date:** 3/2/2022 2:54:09 PM  
**Status:**  
**Color:** ■  
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**Space:**

How does flow make it's way through Basin C to pond under existing conditions?

The basin drains to Designation shown on the drainage map

OS-4?

Basins as presented in the Hydrology Filing No. 2. Basin A has a tributary basin area tributary to

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:55:09 PM  
**Status:**  
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OS-4?

Summary of the development of the report and any

166.6 cfs

**Subject:** Highlight  
**Page Label:** 11  
**Author:** CDurham  
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166.6 cf

10 where it continues to flow through Filing 2's Basin OS-6 as a study.

Offsite Basin OS-4 (18.5 ac, Q=14.9 cfs, Q<sub>100</sub>=31.7 cfs) was Drainage Conditions section due to the full development of additional between Filing Nos. 2 and 3 for this report and an drainage within Filing No. 2 is now considered off-site basin in drainage.

Offsite Basin OS-5 (63.24 ac, Q=92.7 cfs, Q<sub>100</sub>=168.4 cfs) was Drainage Conditions section due to the full development of additional between Filing Nos. 2 and 3 for this report and was a Basin 1 within Filing No. 2 is now considered off-site basin area-12 which is the pipe run for the public 60" RCP storm sewer in 1.

Offsite Basin OS-6 (15.7 ac, Q=11.9 cfs, Q<sub>100</sub>=24.6 cfs) was

**Subject:** Callout  
**Page Label:** 11  
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Flow does not match spreadsheet

The runoff from this basin is presented in the Hydrology Filing No. 2. Basin B has a tributary area tributary to the e

OS-5?

Point 11.

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:56:20 PM  
**Status:**  
**Color:** ■  
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OS-5?

Basins as presented in the Hydrology Filing No. 2. Basin C has

OS-6?

**Subject:** Callout  
**Page Label:** 11  
**Author:** CDurham  
**Date:** 3/2/2022 2:56:51 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

OS-6?

No. 2 and 3 for this report and any basin area tributary to the storm considered off-site basin area. The basin drain the 10' D-10-R inlet collects stormwater and conveys it to Antelope Meadow Cir. [Need to show & label inlet on plan](#)

4 cfs. Q<sub>100</sub> = 8.2 cfs) is the western most basin of the site. It is a small portion of the east lot of the one-eight. In a sheet flows west off site and onto the adjacent lots and natural landscape to Design Point 1. Allow for conditions will be affected. An area of discharge from it

**Subject:** Text Box  
**Page Label:** 12  
**Author:** CDurham  
**Date:** 3/2/2022 2:57:39 PM  
**Status:**  
**Color:**    
**Layer:**  
**Space:**

Need to show & label inlet on plan

run. The main drain to convey stormwater and convey it to Antelope Meadow Cir. [Need to show & label inlet on plan](#)

is of the Antelope Meadow Cir in Basin OS-4. Please remove reference of this to Basin OS-4 description. No affects to downstream is not reason for no detention, please revise statement.

and flow from the curb and gutter.

outwestern portion of Filing No. 3 west of Basin C. Basin B is laid out

**Subject:** Text Box  
**Page Label:** 12  
**Author:** CDurham  
**Date:** 3/2/2022 3:03:02 PM  
**Status:**  
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Antelope Meadow Cir is within Basin OS-4. Please removed reference of this to Basin OS-4 description. No affects to downstream is not reason for no detention, please revise statement.

Q<sub>100</sub> = 4.2 cfs) is the undeveloped, retention Pond 1. Runoff from Basin E will capture flow and direct it to the existing inlet? [existing inlet?](#)

**Subject:** Callout  
**Page Label:** 12  
**Author:** CDurham  
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**Status:**  
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existing inlet?

flow directed offsite is accounted for directed offsite through Tract K. Relocated area east of Basin C within site to the ditch between dedicated sign Point 7. [Spreadsheet shows 16 ac-ft to top of embankment](#)

2) is a 17-acre-foot pond for water basins that are tributary to Pond 1 and A and B. The undetained storm pond.

**Subject:** Callout  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 3/2/2022 3:09:56 PM  
**Status:**  
**Color:**    
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Spreadsheet shows 16 ac-ft to top of embankment

ing Detention Pond 1 (Design for the 100-year storm event OS-2, OS-3, and OS-4 and C and F are accounted for with Basin Haestad's Pondback 1

**Subject:** Line  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 3/2/2022 3:11:28 PM  
**Status:**  
**Color:**    
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Highway 24. The basin drains OS-5

ing Detention Pond 1 (Design for the 100-year storm event OS-2, OS-3, and OS-4 and On-s E and F are accounted for with

**Subject:** Callout  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 3/2/2022 3:11:56 PM  
**Status:**  
**Color:**    
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OS-5

... see the street intersection ...  
... 17' is a 17'-wide-foot-pool for water ...  
... Do you mean you are overdetaining?  
... the previous study by Terra Nova, ...  
... (Urban Runoff Volume), and 100- ...  
... is required and if retrofitting of

**Subject:** Text Box  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 3/2/2022 3:14:18 PM  
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**Color:** ■  
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Do you mean you are overdetaining?

... the previous study by Terra Nova, ...  
... and the required pond volumes ...  
... (Urban Runoff Volume), and 100- ...  
... are discharges flow from existing ...  
... Tamlin Road onto the adjacent

**Subject:** Text Box  
**Page Label:** 13  
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**Color:** ■  
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State what required volumes are for WQ, EURV and 100-year (both ponds).

... the previous study by Terra Nova, ...  
... and the required pond volumes ...  
... (Urban Runoff Volume), and 100- ...  
... are discharges flow from existing ...  
... Tamlin Road onto the adjacent

**Subject:** Callout  
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**Author:** CDurham  
**Date:** 3/2/2022 3:18:33 PM  
**Status:**  
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**Layer:**  
**Space:**

State what proposed flows are at these culverts & channel. Include analysis to show culverts & channel are adequate to handle proposed flows.

swales/cha  
**historic** dra  
plans and 1

**Subject:** Highlight  
**Page Label:** 15  
**Author:** CDurham  
**Date:** 3/2/2022 3:21:17 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

historic

existing  
The swai  
histo  
plan  
will

**Subject:** Callout  
**Page Label:** 15  
**Author:** CDurham  
**Date:** 3/2/2022 3:21:37 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

existing

... stormwater runoff ...  
... until street capacities ...  
... State that sizing of all ...  
... this facilities will be sized ...  
... with the Final drainage ...  
... report.  
... outfalls have been ...  
... FD criteria. Release ...

**Subject:** Text Box  
**Page Label:** 15  
**Author:** CDurham  
**Date:** 3/2/2022 3:22:39 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

State that sizing of all this facilities will be sized with the Final drainage report

No. 3, consistent with the new standards 1 and 2. The MHPD U.D. and 2's required WQCV, EUBV, total of each zone.

Include statement that ponds will be designated/updated to function as full-spectrum detention facilities

**Subject:** Text Box  
**Page Label:** 15  
**Author:** CDurham  
**Date:** 3/2/2022 3:24:49 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Include statement that ponds will be designed/updated to function as full-spectrum detention facilities

1's size and in pond. 2  
analysis of bot

**Subject:** Callout  
**Page Label:** 16  
**Author:** CDurham  
**Date:** 3/2/2022 3:26:47 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

2

Grass swales were listed under Non-structural BMP's incorporated in the Site design include grass swales

**Subject:** Callout  
**Page Label:** 17  
**Author:** CDurham  
**Date:** 3/2/2022 3:27:41 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Grass swales was listed under Non-structural BMP's.

l, with no requested variances. E s historic drainage patterns and allo Basin Planning Studies for both S The Site. Furthermore, Pond WU s sed development.

existing

**Subject:** Callout  
**Page Label:** 17  
**Author:** CDurham  
**Date:** 3/2/2022 3:31:24 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

existing

OS-1	6	21
OS-2	10	31
OS-3	11	31
OS-4	12	31
OS-5	13	31
<b>TOTAL</b>		<b>24</b>

Include design point that combines DP 11 & DP 1, for flows exiting to west.

**Subject:** Text Box  
**Page Label:** 37  
**Author:** CDurham  
**Date:** 3/2/2022 3:35:48 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Include design point that combines DP 11 & DP 1, for flows exiting to west.

OS-6	13	31
<b>TOTAL</b>		<b>24</b>

DP 5 should be combined flow of Basin E, DP 2, DP 8, DP 9, DP 10, & DP 12 and exits site to south.

**Subject:** Text Box  
**Page Label:** 37  
**Author:** CDurham  
**Date:** 3/2/2022 3:37:22 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

DP 5 should be combined flow of Basin E, DP 2, DP 8, DP 9, DP 10, & DP 12 and exits site to south.

DP 6 should be combined flow of Basin F and DP 13 & DP 3.

**Subject:** Text Box  
**Page Label:** 37  
**Author:** CDurham  
**Date:** 3/2/2022 3:38:19 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

DP 6 should be combined flow of Basin F and DP 13 & DP 3.

DP 5 should be combined flow of Basin E, and Pond 1 release rate and exits site to south.

**Subject:** Text Box  
**Page Label:** 42  
**Author:** CDurham  
**Date:** 3/2/2022 3:39:15 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

DP 5 should be combined flow of Basin E, and Pond 1 release rate and exits site to south.

DP 6 should be combined flow of Basin F and Pond 2 release rate and exits site to south.

**Subject:** Text Box  
**Page Label:** 42  
**Author:** CDurham  
**Date:** 3/2/2022 3:39:38 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

DP 6 should be combined flow of Basin F and Pond 2 release rate and exits site to south.

HYDRAULIC CAL.

Include analysis of existing channel & culvert at Highway 24, to ensure adequate to handle proposed flows. (Combined flow of DP 5 & DP 6 exiting site)

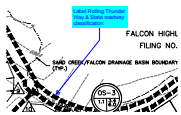
**Subject:** Text Box  
**Page Label:** 44  
**Author:** CDurham  
**Date:** 3/2/2022 3:40:40 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Include analysis of existing channel & culvert at Highway 24, to ensure adequate to handle proposed flows. (Combined flow of DP 5 & DP 6 exiting site)

Verify all adjacent owners match with El Paso County Assessors website information

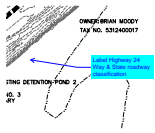
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:44:38 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Verify all adjacent owners match with El Paso County Assessors website information



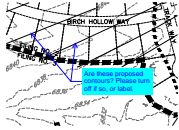
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:45:41 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label Rolling Thunder Way & State roadway classification



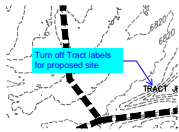
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:46:11 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label Highway 24 Way & State roadway classification



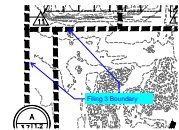
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:47:47 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Are these proposed contours? Please turn off if so, or label.



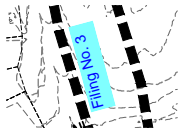
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:48:05 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Turn off Tract labels for proposed site



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:48:39 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Filing 3 Boundary



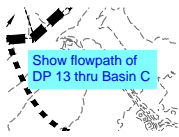
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:49:34 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Filing No. 3



**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:49:45 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Filing No. 2



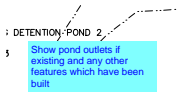
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:51:11 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show flowpath of DP 13 thru Basin C



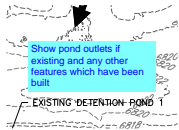
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:52:29 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show and label channel and culverts at Highway 24



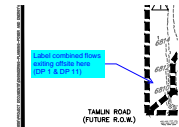
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:53:06 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show pond outlets if existing and any other features which have been built



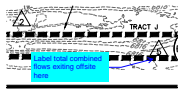
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:53:16 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show pond outlets if existing and any other features which have been built



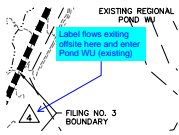
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:53:49 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label combined flows exiting offsite here (DP 1 & DP 11)



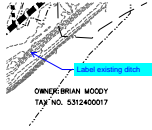
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:54:28 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label total combined flows exiting offsite here



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:55:15 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label flows exiting offsite here and enter Pond WU (existing)



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:55:32 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label existing ditch



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:55:56 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label flows exiting offsite here and enter existing ditch to ...



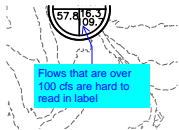
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:56:36 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Fix overlapping text



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:57:08 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

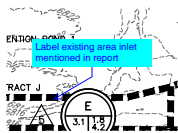
What are these? Please remove if not needed



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:57:40 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Flows that are over 100 cfs are hard to read in label





**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 3:58:42 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label existing area inlet mentioned in report

Show existing storm from Filing No. 2

**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:07:10 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show existing storm from Filing No. 2

Label High points and low points

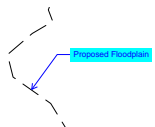
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:07:13 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label High points and low points

Show all existing storm structures here that are on proposed drainage map

**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:07:17 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show all existing storm structures here that are on proposed drainage map



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:10:21 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Proposed Floodplain

Need to state what flows are at each location exiting site, to show no increase.

**Subject:** Text Box  
**Page Label:** 14  
**Author:** CDurham  
**Date:** 3/2/2022 4:11:36 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Need to state what flows are at each location exiting site, to show no increase.

According to the 2010 study, a 50' minimum 100-year developed flow spot are to be assessed in the Final Basin Calculations for this pond area.

Note: Additional improvements may be warranted at Pond WU (specifically a trickle channel may need to be built). Include statement that this will be addressed with Preliminary & Final Drainage Reports before the previous analysis for this spot volume or 100-year detention is.

**Subject:** Text Box  
**Page Label:** 14  
**Author:** CDurham  
**Date:** 3/2/2022 4:19:36 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Note: Additional improvements may be warranted at Pond WU (specifically a trickle channel may need to be built). Include statement that this will be addressed with Preliminary & Final Drainage Reports

signed by El Paso County. The his existing facility and it was any. While the updated layout shows larger lots, the amount of perviousness were and are now (to show decrease to Pond). Acres of area that was tributary his cross-basin transfer should well runoff and release rates

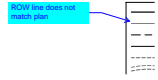
**Subject:** Text Box  
**Page Label:** 14  
**Author:** CDurham  
**Date:** 3/2/2022 4:20:11 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

State what the area and Imperviousness were and are now (to show decrease to Pond).

APPENDIX C FEMA FIRMETTE  
APPENDIX E HYDROLOGICAL CAL  
APPENDIX D HYDRAULIC CALCUL  
APPENDIX F DRAINAGE MAPS  
APPENDIX G REFERENCE CALCUL  
Please switch Appendix F & G. Drainage Maps should be last items in report.

**Subject:** Text Box  
**Page Label:** 3  
**Author:** CDurham  
**Date:** 3/2/2022 4:21:36 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Please switch Appendix F & G. Drainage Maps should be last items in report.



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:22:07 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

ROW line does not match plan

Verify all existing easements are shown and labeled

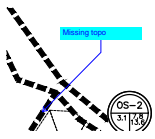
**Subject:** Text Box  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:22:38 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Verify all existing easements are shown and labeled



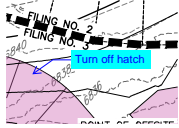
**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:22:42 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Why are there 2 different lines for Sand Creek/Falcon Boundary?



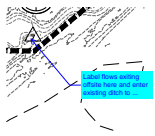
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:23:03 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Missing topo



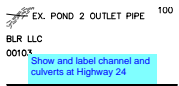
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:23:35 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Turn off hatch



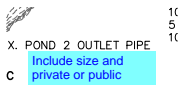
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:24:19 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label flows exiting offsite here and enter existing ditch to ...



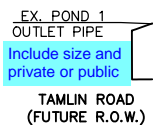
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:24:34 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show and label channel and culverts at Highway 24



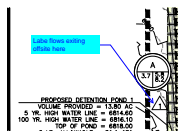
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:24:53 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Include size and private or public



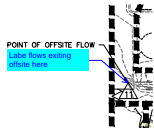
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:25:05 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Include size and private or public



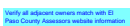
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:25:34 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Labe flows exiting offsite here



**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:25:49 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Labe flows exiting offsite here



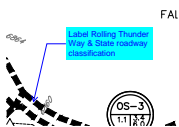
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:26:44 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Verify all adjacent owners match with El Paso County Assessors website information



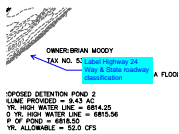
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:26:57 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Show existing storm from Filing No. 2



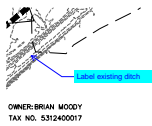
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:27:59 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label Rolling Thunder Way & State roadway classification



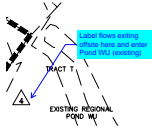
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:28:12 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label Highway 24 Way & State roadway classification



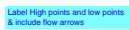
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:28:27 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label existing ditch



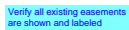
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:28:45 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label flows exiting offsite here and enter Pond WU (existing)



**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:29:07 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label High points and low points & include flow arrows



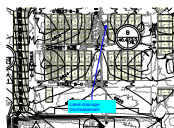
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:29:09 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Verify all existing easements are shown and labeled



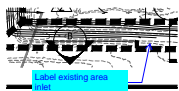
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:29:38 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label proposed swale



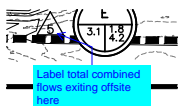
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**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:30:37 PM  
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**Layer:**  
**Space:**

Label drainage tract/easement



**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:31:22 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label existing area inlet



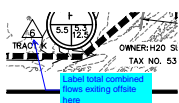
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**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:31:25 PM  
**Status:**  
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Label total combined flows exiting offsite here



**Subject:** Callout  
**Page Label:** 54  
**Author:** CDurham  
**Date:** 3/2/2022 4:31:31 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label total combined flows exiting offsite here



**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:31:41 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Label total combined flows exiting offsite here



**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:32:05 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**


Contour labels



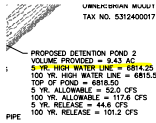
**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:32:17 PM  
**Status:**  
**Color:** ■  
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**Space:**


Contour labels

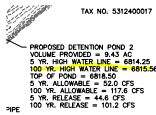
What are Sections B, BB, C & CC? Either include detail for them or remove label


**Subject:** Text Box  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:32:56 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

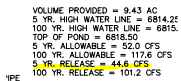
What are Sections B, BB, C & CC? Either include detail for them or remove label




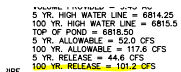
**Subject:** Highlight  
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**Author:** CDurham  
**Date:** 3/2/2022 4:33:05 PM  
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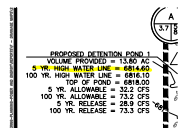
**Subject:** Highlight  
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**Author:** CDurham  
**Date:** 3/2/2022 4:33:07 PM  
**Status:**  
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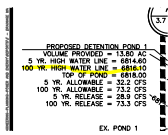
**Subject:** Highlight  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:33:10 PM  
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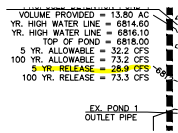
**Subject:** Highlight  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:33:12 PM  
**Status:**  
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**Layer:**  
**Space:**



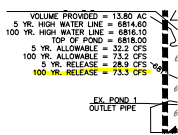
**Subject:** Highlight  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:34:26 PM  
**Status:**  
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**Layer:**  
**Space:**



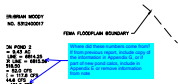
**Subject:** Highlight  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:34:28 PM  
**Status:**  
**Color:** ■  
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**Subject:** Highlight  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:34:32 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

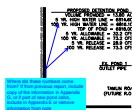


**Subject:** Highlight  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:34:34 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**



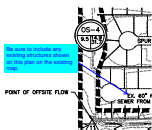
**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:35:15 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note



**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:35:35 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Where did these numbers come from? If from previous report, include copy of the information in Appendix G, or if part of new pond calcs, include in Appendix E or remove information from note



**Subject:** Callout  
**Page Label:** 55  
**Author:** CDurham  
**Date:** 3/2/2022 4:36:51 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Be sure to include any existing structures shown on this plan on the existing map.



maintained by a rain cistern once approved.

All is delineated as Basin F1 and previously discussed in submittal area not to be disturbed because there will be a plan, we will the development be impacted by said. Update this paragraph. There is no Basin F1 and floodplain is not within this project, but adjacent to it.

A report covers the conceptual storm water management in a development. Detailed design will be required for a final document will provide guidance on that the drainage plan. Highway 24. A 100-year developed flow study shows all standard criteria set forth by the 13 Para County and Engineering Criteria Manual, the City of Colorado.

**Subject:** Text Box  
**Page Label:** 17  
**Author:** CDurham  
**Date:** 3/2/2022 4:38:53 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Update this paragraph. There is no Basin F1 and floodplain is not within this project, but adjacent to it.

with the 100-year developed flow study. The 100-year developed flow study will be required for a final document will provide guidance on that the drainage plan. Highway 24. A 100-year developed flow study shows all standard criteria set forth by the 13 Para County and Engineering Criteria Manual, the City of Colorado.

A report covers the conceptual storm water management in a development. Detailed design will be required for a final document will provide guidance on that the drainage plan. Highway 24. A 100-year developed flow study shows all standard criteria set forth by the 13 Para County and Engineering Criteria Manual, the City of Colorado.

**Subject:** Text Box  
**Page Label:** 16  
**Author:** CDurham  
**Date:** 3/2/2022 4:39:13 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Discuss how water quality will be addressed/provided for on Basins which do not reach either of the ponds. (Basins will minimally grading, no impervious areas or buildings, remain open, etc.)

and the required pond volumes. Urban Runoff Volume, and 100-year Pond will be assessed for final is required and if remodeling of state, or face plate, interconnect, and evaluate. State what allowable pond release rates are per previous reports (both are the ponds) and what report they came from.

A report covers the conceptual storm water management in a development. Detailed design will be required for a final document will provide guidance on that the drainage plan. Highway 24. A 100-year developed flow study shows all standard criteria set forth by the 13 Para County and Engineering Criteria Manual, the City of Colorado.

**Subject:** Text Box  
**Page Label:** 13  
**Author:** CDurham  
**Date:** 3/2/2022 4:40:09 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

State what allowable pond release rates are per previous reports (both ponds) and what report they came from.