

**MASTER DEVELOPMENT DRAINAGE
REPORT FOR DUBLIN COMMONS AND
FINAL DRAINAGE REPORT FOR DUBLIN
COMMONS FILING NO. 1**

AUG 06, 2013

Prepared for:

Powers Dublin Development Company
102 North Cascade Avenue, Suite 610
Colorado Springs, Co 80903

Prepared By:

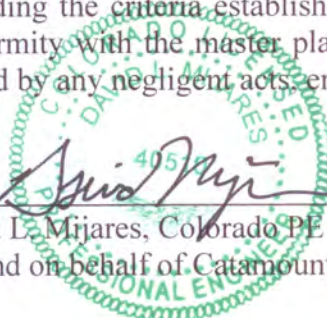
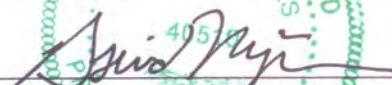


PO Box 692
Divide, CO 80814
719-426-2124

**MASTER DEVELOPMENT DRAINAGE REPORT FOR DUBLIN
COMMONS AND FINAL DRAINAGE REPORT FOR DUBLIN
COMMONS FILING NO. 1**

Engineer's Statement:

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

David L. Mijares, Colorado PE #40510
For and on behalf of Catamount Engineering

8-29-13
Date

Developer's Statement:

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

Powers Dublin Development Company
Business Name

By:  _____

Title: MANAGER _____

Address: 102 North Cascade, Suite 610 _____

Colorado Springs, Co 80903 _____

City of Colorado Springs Only:

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



For the City Engineer

9/3/13
Date

Conditions:

MASTER DEVELOPMENT DRAINAGE REPORT FOR DUBLIN COMMONS AND FINAL DRAINAGE REPORT FOR DUBLIN COMMONS FILING NO. 1

PURPOSE

The purpose of this drainage report is to quantify developed runoff from the proposed development and identify specific design solutions, safely convey runoff from the site, and exhibit conformance of the proposed development with previous studies. Additionally the report will develop drainage fees associated with platting of the development and provide cost estimates for required collection and conveyance facilities.

1. GENERAL LOCATION AND DESCRIPTION

Location:

The proposed development is located within the western ½ of Section 18, Township 13 South, Range 65 West of the 6th principal meridian in the city of Colorado Springs, county of El Paso.

The site is located within the Sand Creek and Cottonwood Creek Drainage Basin. The major basin boundary is created by the vacated portion of Templeton Gap Road which bisects the site from South to North.

The site is bounded to the west by Powers Boulevard, to the North by Dublin Boulevard, to the east by Tutt Boulevard, and to the South by Ridgeview Business Center Filing No. 1A

Filing No. 1 consists only of the entrance roadways within the northernmost portion of the site and tract 'B' developed for detention pond 1.

Description of Property:

The subject property consists of 29.57 acres generally covered with native grasses. The existing site has been overlot graded and temporary sedimentation facilities installed with the development of the adjacent portion of Tutt Blvd. The intent of previous grading was to more closely approximate the grade of adjacent Tutt Blvd. The site drains to both the Southeast and Southwest from the ridgeline created by the abandoned Templeton Gap Roadway improvements.

Existing soils on the site consist entirely of Blakeland loamy sand (Map Symbol '8') as determined by the USDA SCS Soil Survey of El Paso County Area, Colorado. Characteristics of the on-site soils, as listed in the SCS Soil Survey, are moderate permeability, high available water capacity, medium surface runoff, and a slight hazard of erosion. Blakeland loamy sand is characterized as a Hydrologic Group 'A' Soil.

2. DRAINAGE BASINS AND SUB-BASINS

Major Basin Descriptions:

The proposed development is included within the Sand Creek Drainage Basin Planning Study completed by Kiowa Engineering dated March 1996 and the Master Development Drainage Plan for Ridgeview Subdivision completed by URS Greiner dated October 1998. The property's and surrounding development's general drainage pattern is defined by the Final Drainage Report and Erosion Control Plan for Tutt Boulevard Ridgeview at Stetson Hills Filing No. 15 by URS, revised August 02, 2001.

The site and adjacent areas west of Tutt Boulevard are zoned PBC with substantial portions of the overall development completed.

The portion of the site east of the vacated Templeton Gap roadway is proposed in the final drainage report for Tutt Boulevard to drain to the east into the existing Tutt Boulevard storm system. Upon collection within the Tutt Boulevard storm drain system runoff is conveyed south to improved facilities adjacent to Stetson Hills Boulevard which outfall to Sand Creek.

The portion of the site tributary to the Cottonwood Creek Drainage Basin and west of the vacated Templeton Gap roadway is identified as within DBPS Basin H2. Basin H2 as represented in the DBPS was much larger, 67.7 acres and a developed flow of 286.4 cfs was proposed for the 100-yr event. The majority of proposed flow was diverted into the Sand Creek Basin with the construction of Tutt Boulevard and associated storm systems. DBPS Basin H2 historically drains to an existing triple 48" CMP crossing Powers Boulevard. The DBPS developed by Ayers and Associates for Cottonwood Creek did not refine the hydrology presented in the DBPS developed by URS for basin H2, and both reports propose a 72" RCP storm system to convey developed flows from basin H2 to DBPS design point 13D at the intersection of Templeton Gap and Apaloosa Drive. Although the DBPS allows for undetained release from basin H2 release to the Powers Crossing is limited to $Q_5 = 49$ cfs, $Q_{100} = 85$ cfs per the Ridgeview Filing No. 15 (Tutt Blvd) Final Drainage Report until the downstream conveyance to Cottonwood Creek is in place.

The current deficient downstream infrastructure is detailed in the Final Drainage Report for Sundown Villas by Leigh Whitehead & Associates, dated September 1999. The Sundown Villas report accepts flows of $Q_5 = 41.6$ cfs, $Q_{100} = 88.6$ cfs from the triple 48" CMP crossing of Powers Boulevard into a single 42" HDPE constructed with the development

Floodplain Statement:

No portion of the development lies within an F.E.M.A. designated floodplain per FIRM 08041C0537 F or 08041C0536 F, effective March 17, 1997. The F.E.M.A. Flood Insurance Rate Maps have been provided in the appendix.

Sub-Basin Description:

The portion of the site within Basin C (Basin L as identified in the Final Drainage report for Tutt Boulevard/RV Fil. No. 15) drains to the East and anticipated developed runoff of $Q_5 = 21$ cfs, $Q_{100} = 37$ cfs. Developed flows are proposed to be collected in an existing 30" RCP stubbed into the site from the Article Drive and Tutt Boulevard intersection.

The portion of the site within Basin B (Basin N as identified in the Final Drainage report for Tutt Boulevard/RV Fil. No. 15) drains to the east and anticipated developed runoff of $Q_5 = 24$ cfs, $Q_{100} = 42$ cfs. Developed flows are proposed to be collected in an existing 36" RCP stubbed into the site from Tutt Boulevard.

The portion of the site within Basin D (Basin P as identified in the Final Drainage report for Tutt Boulevard/RV Gil. No. 15) drains to the east and anticipated developed runoff of $Q_5 = 25$ cfs, $Q_{100} = 44$ cfs. Developed flows are proposed to be collected in an existing 36" RCP stubbed into the site from the Tutt Boulevard storm system.

The portion of the site west of the vacated Templeton Gap roadway identified as Basin A (Basin OS-1 in the Final Drainage report for Tutt Boulevard is tributary to the existing triple 48" CMP crossing of Powers Boulevard. Developed Runoff to the triple 48" CMP is limited to $Q_5 = 49$ cfs, $Q_{100} = 85$ cfs until improvement of downstream conveyance facilities. Excess developed flows will be required to be detained in temporary detention facilities on-site until downstream facilities as defined in the DBPS for Cottonwood Creek Drainage Basin Planning Study prepared by Ayres Associates, dated June 2000 are in place. The owner will have the option of modifying or removing temporary facilities upon installation of all downstream conveyance facilities and approval of City Engineering.

Existing Drainage Analysis:

In its existing condition the 29.57 acre parcel drains both southwest to Cottonwood Creek via the triple 48" CMP crossing of Powers Boulevard and southeast overland into Tutt Boulevard which outfalls to Sand Creek. Basin E1 (25.2 acres, $Q_5 = 27$ cfs, $Q_{100} = 68$ cfs) drains to the triple 48" CMP crossing. Discharge to the triple 48" CMP crossing is limited to $Q_5 = 49$ cfs, $Q_{100} = 85$ cfs based upon the size of the historic Cottonwood Creek basin. Basin E2 (4.4 acres, $Q_5 = 3$ cfs, $Q_{100} = 8$ cfs) drains overland into Tutt Boulevard. The Tutt Boulevard system was sized to accept developed flows from the site.

3. DRAINAGE DESIGN CRITERIA

References:

City of Colorado Springs and El Paso County Drainage Criteria Manual, updated October 1994

Sand Creek Drainage Basin Planning Study (DBPS), prepared by Kiowa Engineering, dated March 1996

Master Development Drainage Plan for Ridgeview Subdivision (MDDP), prepared by URS Greiner Woodward Clyde Inc., dated October 1998

Final Drainage Report and Erosion Control Plan for Tutt Boulevard/Ridgeview at Stetson Hills Filing No. 15, prepared by URS, revised August 2001

Construction Set Tutt Boulevard Filing No. 5, prepared by URS, dated May 21, 2001

Cottonwood Creek Drainage Basin Planning Study (DBPS), prepared by URS Consultants, dated June 9, 1994

Cottonwood Creek Drainage Basin Planning Study (DBPS), prepared by Ayres Associates, dated June 2000

Final Drainage Report for Sundown Villas, prepared by Leigh Whitehead and Associates Inc., dated September 1999

Final Drainage Report for Dublin Boulevard Filing No. 3, prepared by Matrix Design Group, revised July 16, 2002.

Flood Insurance Rate Map Number 08041C0537 F, effective date march 17, 1997

Soil Map-El Paso County Area, Colorado, generated from the Natural Resources Conservation Service Web Soil Survey, generated 10/25/2009

Hydrologic Criteria:

This drainage report was prepared in accordance to the criteria established in the City of Colorado Springs and El Paso County Drainage Criteria Manual, updated in October 1994.

The rational method for drainage basin study areas of less than 100 acres was utilized in the analysis. For the Rational Method, flows were calculated for the 5-year and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 5-1 and the Intensity-Duration-Frequency curves are taken from Figure 5-1 of the City/County Drainage Criteria Manual. Time of concentration for overland flow and storm drain or gutter flow are calculated per Section 5.2.3 of the City/County Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report.

4. DRAINAGE FACILITY DESIGN

General Concept:

Existing Basins OS-1 and OS-2 will continue to be collected within both the Dublin Boulevard storm system and the easterly Powers Boulevard roadside ditch. Flows will be conveyed to the triple 48" crossing of Powers Boulevard within the existing ditch. Offsite Flows will not be combined with on-site developed flows from Basins A1 and A2 until on-site flows have been routed through the proposed extended detention basin (EDB 4) at the southwest corner of the development.

Runoff generated from the area of the site tributary to Tutt Boulevard, basins B, C, and D, will be collected in parking and drive aisles and conveyed to on-site extended detention basins sized for the proposed development through a private storm system. The proposed detention/water quality pond will discharge directly to the Tutt boulevard storm system.

Runoff generated from the area of the tributary to the Cottonwood Creek Basin, basins A1 (9.3 acres, $C_5=.80$, $C_{100}=0.85$) and A2 (4.5 acres, $C_5=.80$, $C_{100}=0.86$), will initially be collected in a graded swale conveying flows to a temporary sedimentation basin at DP-9. Analysis of the permanent extended detention basin has been provided in this report. Initial conveyance to the extended detention basin for development in the northerly portions of Basin A will be via a graded swale along the westerly edge of the basin coincident with proposed future curb line of commercial parcels. The proposed graded swale will be defined in the overlot grading plan for the development. In general the swale will be grass-lined and graded to maintain a longitudinal slope of 2%. In areas of excessive longitudinal slope additional measures will be defined in the overlot grading plan.

Project Storm sewer will be extended through basin A with development of individual lots within the development. Development of subsequent phases of Dublin Commons will require further analysis and submittal of Final Drainage Reports for determination of on-site collection, conveyance, and water quality facilities.

On Site Basin Developed Conditions:

Basin A1 (9.3 acres, $Q_5 = 24$ cfs, $Q_{100} = 42$ cfs) consist of future commercial development to be collected within a private inlet and storm drain system on site and routed to a privately owned and maintained extended detention basin at DP-9 prior to release to the triple 48" CMP crossing of Powers Boulevard. Runoff generated within Basin A1 will be conveyed in a graded swale along the westerly edge of the basin to DP-9 until development occurs within the lower reaches of the basin. Basin A2 (4.5 acres, $Q_5 = 14$ cfs, $Q_{100} = 27$ cfs) consists of future development to be collected within a private inlet and storm drain system on site and routed to a privately owned and maintained extended detention basin at DP-9 prior to release to the triple 48" CMP crossing of Powers Boulevard. Proposed Extended Detention Basin 4 (DP-9) releases $Q_5 = 1$ cfs, $Q_{100} = 36$ cfs to DP-10. Development of storm sewer conveyance to the extended detention basin at DP-9 within Basin A will be analyzed and constructed with future development of the basin.

Basin OS-1 (2.2 acres, $Q_5 = 7$ cfs, $Q_{100} = 14$ cfs) is detailed in the Final Drainage Report for Dublin Boulevard Filing No. 3. Calculations for the basin are taken directly from the approved report. Runoff generated within Basin OS-1 is conveyed in the existing roadside ditch to the triple 48" CMP crossing of Powers Boulevard at DP-10. Basin OS-2 (9.3 acres, $Q_5 = 12$ cfs, $Q_{100} = 27$ cfs) consists of the easterly half of Powers Boulevard and adjacent landscape area. Runoff generated within Basin OS-2 is conveyed in the existing roadside ditch to the triple 48" CMP crossing at DP-10.

The existing triple 48" CMP crossing at DP-10 is limited to historic capacity of $Q_5 = 49$ cfs, $Q_{100} = 85$ cfs until downstream improvements have been implemented. Combined peak runoff generated from Basins OS-1, OS-2, and release from extended detention basin 4 to DP-10 are $Q_5 = 25$ cfs, $Q_{100} = 58$ cfs.

Basin B (3.5 acres, $Q_5 = 12$ cfs, $Q_{100} = 23$ cfs) consists of future commercial development to be collected within a private inlet and storm drain system and routed to a privately owned and maintained extended detention basin at DP-2 prior to outfall into the Tutt Boulevard Storm System at DP-6. Flows collected in extended detention basin 2 will have release controlled through a combination orifice/weir outfall to the existing 36" RCP stub from the Tutt Boulevard system. Developed flows from extended detention basin-2 are $Q_5 = 8$ cfs, $Q_{100} = 21$ cfs. Basin B is included in the Tutt Boulevard FDR as a portion of Basin N which anticipates developed flows of $Q_5 = 24$ cfs, $Q_{100} = 42$ cfs. Storm Conveyance within Basin B to DP-2 will be analyzed and constructed with future development of the basin.

Basin C1 (0.2 acres, $Q_5 = 0.9$ cfs, $Q_{100} = 1.6$ cfs) consists of the southerly half of the private street and landscaping. Runoff generated in Basin C1 will be collected in the roadway curb section and conveyed to a 4' D-10-R sump inlet at DP-3. Collected runoff will be conveyed in a private 18" RCP to DP-P2 and outfall to privately owned and maintained EDB-1 proposed with the development of Filing No. 1.

Basin C2 (1.9 acres, $Q_5 = 8.5$ cfs, $Q_{100} = 15.1$ cfs) consists of future commercial development and the northerly and easterly halves of the street system proposed with Filing No. 1. Runoff generated in Basin C2 will be collected in the roadway section and conveyed to a 10' D-10-R sump inlet at DP-4. Cumulative runoff from DP-P2 will be conveyed in a private 24" RCP to the privately owned and maintained EDB proposed with the development of Filing No. 1.

Basin C3 (1.86 acres, $Q_5 = 8.5$ cfs, $Q_{100} = 15.1$ cfs) consists of future commercial development and the tract proposed in Filing No. 1 for the private extended detention basin. Runoff generated within Basin C3 will be collected in on-site curb and gutter and outfall directly to extended detention basin 1.

Combined flows from Basins C1, C2, and C3 will be collected in extended detention basin 1 and release controlled through a combination orifice/weir to the existing 30" stub from the Tutt Boulevard Storm system at DP5. Basin C is included in the Tutt Boulevard FDR as Basin L and anticipates developed flow of $Q_5 = 21$ cfs, and $Q_{100} = 37$ cfs.

Basin D (3.5 acres, $Q_5 = 20$ cfs, $Q_{100} = 38$ cfs) consists of future commercial development to be collected within a private inlet and storm drain system and routed to a privately owned and

maintained extended detention basin at DP-7 prior to outfall into the Tutt Boulevard Storm System. Flows collected in extended detention basin 3 will have release controlled through a combination orifice/weir outfall to the existing 36" RCP stub from the Tutt Boulevard system. Developed flows from extended detention basin-3 are $Q_5 = 9$ cfs, $Q_{100} = 28$ cfs. Basin D is included in the Tutt Boulevard FDR as a portion of Basin P which anticipates developed flows of $Q_5 = 25$ cfs, $Q_{100} = 44$ cfs. Storm Conveyance within Basin D to DP-7 will be analyzed and constructed with future development of the basin.

Extended Detention Basins:

Extended Detention Basin 1 (DP-P):

The developed area tributary to the Extended Detention Basin is 4.0 acres and requires a Water Quality Capture Volume of 0.11 acre-ft. A Water Quality Volume below the primary outlet of 0.12 acre-ft has been designed. The pond outlet will be detailed in the final construction documents and will conform to the design conditions of this report. The outlet structure is designed to convey the initial event and the minor and major storm events to the existing 30" outfall without ponding to the elevation of the emergency overflow to the existing private street. Hydraulic qualities of the pond are summarized in the following table:

STORM EVENT	2-YR $WQ_{(CFS)}$	5-YR $_{(CFS)}$	100-YR $_{(CFS)}$
Q_{IN}	12.8	17.7	31.6
Q_{OUT}	.09	1.2	17.1
W.S.E.	6822.00	6822.61	6823.17
DRAIN TIME $_{(HRS)}$	40	-	-

The Extended Detention Basin will outfall directly to the 30" RCP through a 24" RCP. The structure will release $Q_{2(WQ)} = .09$ cfs, $Q_5 = 1.2$ cfs, and $Q_{100} = 17.1$ cfs. The release from the proposed EDB is less than anticipated by the Tutt Boulevard FDR.

In the case of complete inlet failure, the pond will overflow through the emergency overflow weir into the adjacent private street and be conveyed into Tutt Boulevard. The extended detention basin will be privately owned and maintained.

Extended Detention Basin 2 (DP-2):

The developed area tributary to the Extended Detention Basin is 3.5 acres and requires a Water Quality Capture Volume of 0.12 acre-ft. A Water Quality Volume below the primary outlet of 0.12 acre-ft has been designed. The pond outlet will be detailed in the final construction documents and will conform to the design conditions of this report. The outlet structure is designed to convey the initial event and the major storm to the existing 36" outfall without ponding to the elevation of the emergency overflow to the existing private street. Hydraulic qualities of the pond are summarized in the following table:

STORM EVENT	2-YR $WQ_{(CFS)}$	5-YR $_{(CFS)}$	100-YR $_{(CFS)}$
Q_{IN}	8.8	12	23
Q_{OUT}	.03	8	21
W.S.E.	6813.00	6813.40	6813.77
DRAIN TIME $_{(HRS)}$	50	-	-

The Extended Detention Basin will outfall directly to the 36" RCP through a 24" RCP. The structure will release $Q_{2(WQ)} = .03$ cfs, $Q_5 = 8$ cfs, and $Q_{100} = 21$ cfs. The release from the proposed EDB is less than anticipated by the Tutt Boulevard FDR.

In the case of complete inlet failure, the pond will overflow through the emergency overflow weir into the adjacent private street and be conveyed into Tutt Boulevard.

The extended detention basin will be privately owned and maintained.

Extended Detention Basin 3 (DP-7):

The developed area tributary to the Extended Detention Basin is 6.5 acres and requires a Water Quality Capture Volume of 0.21 acre-ft. A Water Quality Volume below the primary outlet of 0.23 acre-ft has been designed. The pond outlet will be detailed in the final construction documents and will conform to the design conditions of this report. The outlet structure is designed to convey the initial event and the major storm to the existing 36" outfall without ponding to the elevation of the emergency overflow to the existing private street. Hydraulic qualities of the pond are summarized in the following table:

STORM EVENT	2-YR $WQ_{(CFS)}$	5-YR $_{(CFS)}$	100-YR $_{(CFS)}$
Q_{IN}	14.5	17.7	31.6
Q_{OUT}	.16	9	28
W.S.E.	6794.21	6794.42	6794.93
DRAIN TIME $_{(HRS)}$	44	-	-

The Extended Detention Basin will outfall directly to the 36" RCP through a 24" RCP. The structure will release $Q_{2(WQ)} = .16$ cfs, $Q_5 = 9$ cfs, and $Q_{100} = 28$ cfs. The release from the proposed EDB is less than anticipated by the Tutt Boulevard FDR.

In the case of complete inlet failure, the pond will overflow through the emergency overflow weir into adjacent extended detention basin 4 and into the Powers Boulevard ditch. The extended detention basin will be privately owned and maintained.

Extended Detention Basin 4 (DP-9):

The developed area tributary to the Extended Detention Basin is 13.8 acres and requires a Water Quality Capture Volume of 0.45 acre-ft. A Water Quality Volume below the primary outlet of 0.67 acre-ft has been designed. The pond outlet will be detailed in the final construction documents and will conform to the design conditions of this report. The outlet structure is designed to convey the initial event and the major storm to the existing triple 48" outfall at design point 10 without ponding to the elevation of the emergency overflow. Hydraulic qualities of the pond are summarized in the following table:

STORM EVENT	2-YR $WQ_{(CFS)}$	5-YR $_{(CFS)}$	100-YR $_{(CFS)}$
Q_{IN}	25	33	65
Q_{OUT}	0.50	1.0	36
W.S.E.	6792.74	6793.15	6793.88
DRAIN TIME $_{(HRS)}$	50	-	-

The Extended Detention Basin will outfall to a FES adjacent to the ripple 48" RCP crossing at DP-10. The structure will release $Q_{2(WQ)} = .50$ cfs, $Q_5 = 1.0$ cfs, and $Q_{100} = 36$ cfs. Combined flow at DP-10 is less than anticipated flows to the triple 48" CMP crossing.

In the case of complete inlet failure, the pond will overflow through the emergency overflow weir into the adjacent powers boulevard ditch system.

On Site Storm Drain System:

Design for the on-site storm collection and conveyance will be defined in the Final Construction Documents for Dublin Commons Filing No. 1. The storm system pipes and inlets will be privately owned and maintained.

Estimate of Probable Costs

PRIVATE FACILITIES (NON-REIMBURSABLE):

10' SUMP INLET	1	@\$ 7,000/EA	\$ 7,000
4' SUMP INLET	1	@\$ 5,000/ea	\$ 5,000
WATER QUALITY POND	1	@\$ 5,500/ea	\$ 5,500
18" RCP	40	@\$ 30/ea	\$ 1,200
24" RCP	88	@\$ 38/ea	\$ 3,344
24" FES	1	@\$ 250/ea	\$ 250
RIP RAP OUTFALL	1	@\$ 150/ea	\$ 150
SUBTOTAL			\$ 22,444
<i>15% CONTINGENCY</i>			<i>\$ 3,367</i>
TOTAL			\$ 25,811

DRAINAGE FEES

The Dublin Commons commercial development proposes to plat 0.79 acres in the Sand Creek Drainage Basin and 0.49 acres in the Cottonwood Creek basin with Dublin Commons Filing No. 1. A summary of fees for platting the entire 29.57 acres is provided.

Filing No. 1: Sand Creek

Drainage Fee: (0.79 acres X \$9,765/ac)	=	\$ 7,714.35
Bridge Fee: (0.79 acres X \$596/ac)	=	\$ 470.84
Pond Land Fee: (0.79 acres X \$1,070/ac)	=	\$ 845.30
Pond Facilities Fee: (0.79 acres X \$2,881/ac)	=	\$ 2,275.99
Sand Creek Detention Pond #2 Surcharge (0.79 acres X \$1,045/ac)	=	\$ 825.55
TOTAL		<u>\$12,132.03</u>

Filing No. 1: Cottonwood Creek

Drainage Fee: (0.49 acres X \$12,015/ac)	=	\$ 5,887.35
Bridge Fee: (0.49 acres X \$886/ac)	=	\$ 434.13
TOTAL		<u>\$ 6,321.49</u>

Entire Parcel:

Portions of the overall parcel fall within both the Cottonwood Creek and Sand Creek Drainage Fee Basins. A revised fee analysis will be required at time of platting individual lots within the development.

Entire Parcel (Sand Creek Portion):

Drainage Fee: (14.48 acres X \$9,765/ac)	=	\$ 141,397.20
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Bridge Fee:			
(14.48 acres X \$596/ac)	=	\$	8,630.80
Pond Land Fee:			
(14.48 acres X \$1,070/ac)	=	\$	15,493.60
Pond Facilities Fee:			
(14.48 acres X \$2,881/ac)	=	\$	41,716.88
Sand Creek Detention Pond #2 Surcharge			
(14.48 acres X \$1,045/ac)	=	\$	15,131.60
TOTAL			<u>\$ 222,369.36</u>

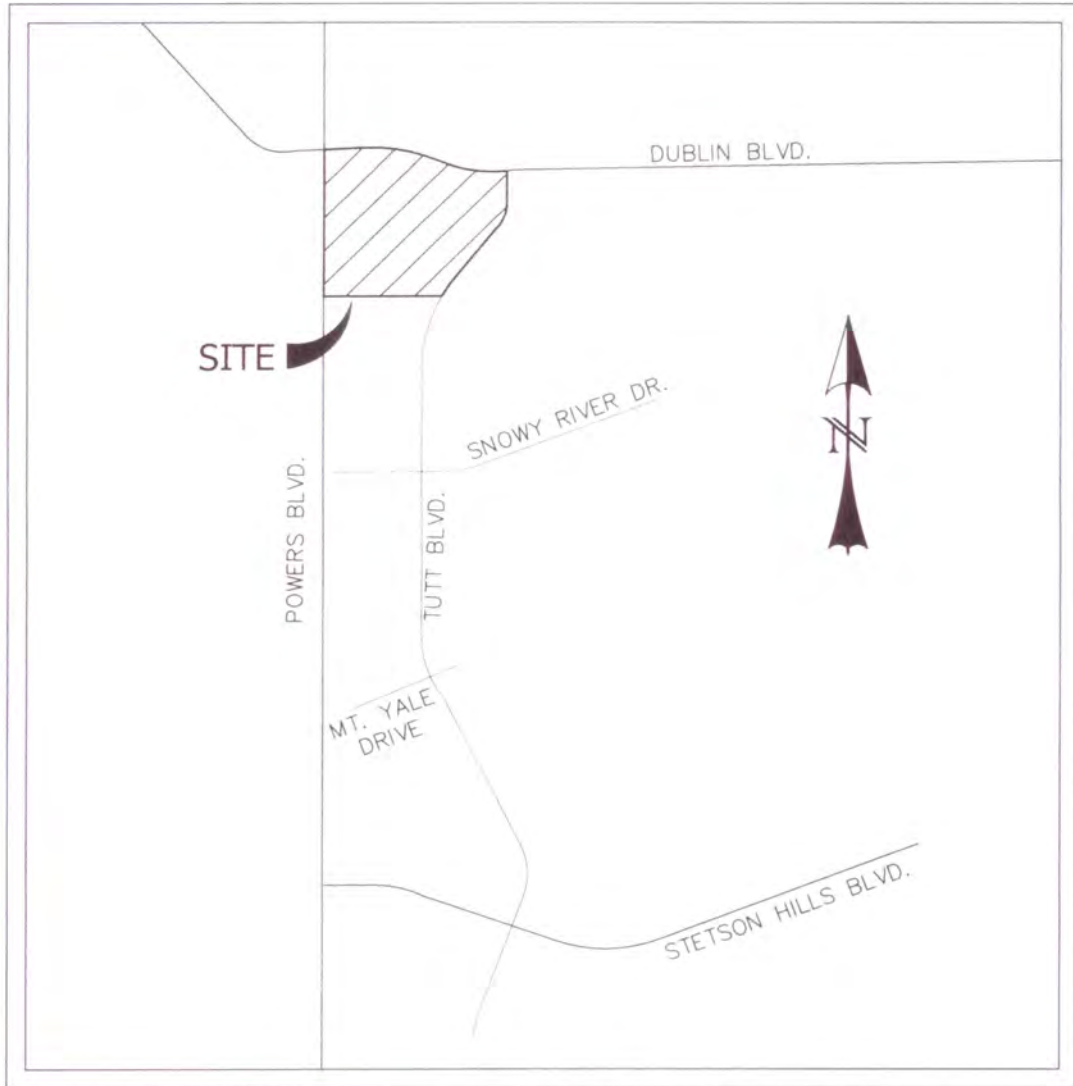
Filing No. 1: Cottonwood Creek

Drainage Fee:			
(14.72 acres X \$12,015/ac)	=	\$	176,860.80
Bridge Fee:			
(14.72 acres X \$886/ac)	=	\$	13,041.92
TOTAL			<u>\$ 189,902.72</u>

EROSION CONTROL PLAN

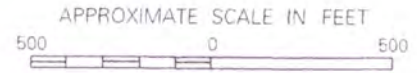
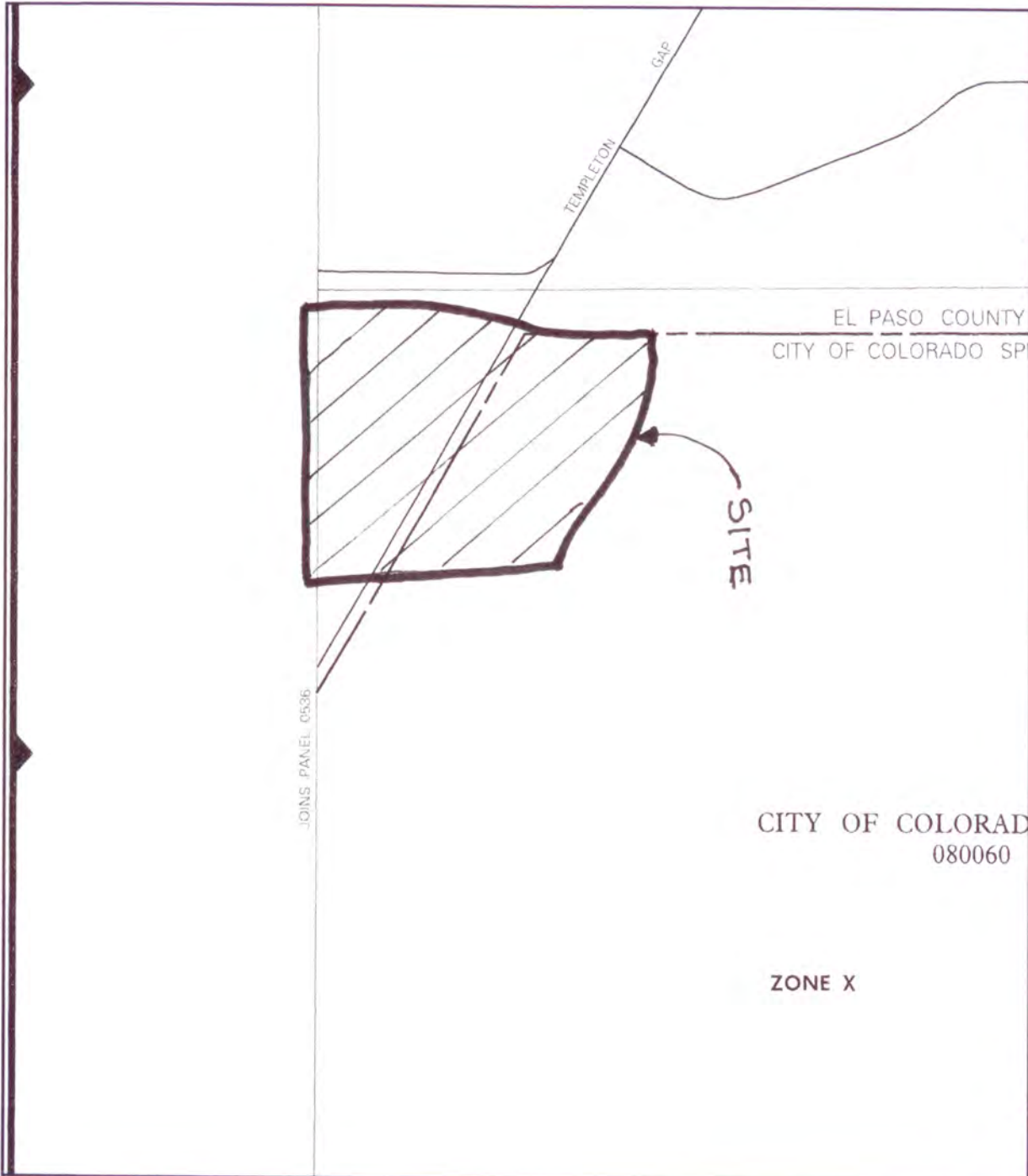
The City of Colorado Springs/El Paso County Drainage Criteria Manual specifies that an Erosion Control Plan and associated cost estimate be submitted in conjunction with the Final Drainage Report. Catamount Engineering respectfully request the Erosion Control Plan be submitted in conjunction with the Overlot Grading Plan and construction assurances posted prior to obtaining a grading permit. It is anticipated that the overlot grading plan will utilize vehicle tracking control devices at project entry points, inlet protection at storm sewer facility collection points, and straw bale check dams in rough cut streets and in overland swales. A portion of the overall site will be graded to drain to the permanent water quality pond which will also function as a temporary sedimentation facility. The remaining portions of the site will drain to temporary sedimentation facilities prior to runoff being directed off-site.

APPENDIX



VICINITY MAP
SCALE: N.T.S.

CATAMOUNT ENGINEERING <small>PO BOX 692E DIVIDE, CO 80814 (719) 337-8351</small>	DUBLIN COMMONS	SCALE: NTS	DATE: 12/03/12
		JOB NO.: 12-025	SHEET: 1 OF 1



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM
FLOOD INSURANCE RATE MAP**

EL PASO COUNTY,
COLORADO AND
INCORPORATED AREAS

PANEL 537 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS COMMUNITY	NUMBER	PANEL	SUFFIX
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CITY OF COLORADO SPRINGS CITY OF COLORADO	080060	537	F
EL PASO COUNTY			
INCORPORATED AREAS	080060	537	F

**MAP NUMBER
08041C0537 F**

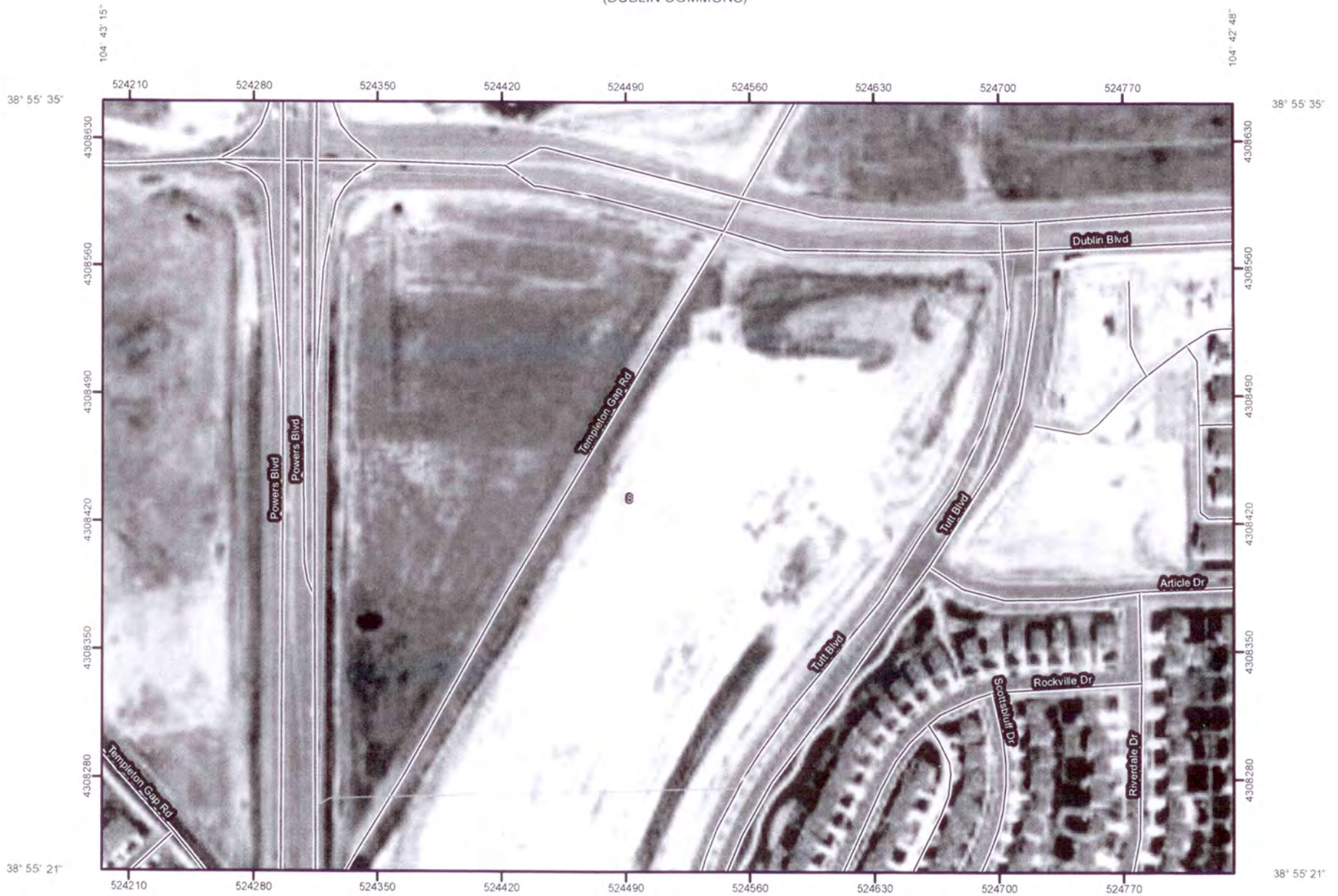
**EFFECTIVE DATE:
MARCH 17, 1997**



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Soil Map—El Paso County Area, Colorado
(DUBLIN COMMONS)



Map Scale: 1:3,020 if printed on A size (8.5" x 11") sheet.



Map Unit Legend

El Paso County Area, Colorado (CO625)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	25.9	100.0%
Totals for Area of Interest		25.9	100.0%

Report—Water Features

Water Features— El Paso County Area, Colorado										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Surface depth	Ponding		Flooding	
				Upper limit	Lower limit		Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
8—Blakeland loamy sand. 1 to 9 percent slopes										
Blakeland	A	Low	Jan-Dec	—	—	—	—	None	—	—

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
 Survey Area Data: Version 9, Sep 17, 2012

HYDROLOGIC CALCULATIONS

BASIN	AREA TOTAL (Acres)						CONVEYANCE TC					TT	INTENSITY		TOTAL FLOWS	
		C ₅	C ₁₀₀	Length	Height	TI	Length	Height	Slope	Velocity	TC	TOTAL	I ₅	I ₁₀₀	Q ₅	Q ₁₀₀
				(ft)	(ft)	(min)	(ft)	(ft)	(%)	(fps)	(min)	(min)	(in/hr)	(in/hr)	(c.f.s.)	(c.f.s.)
A1	9.3	0.80	0.85	70	4	7.5	2020	22	1.1%	3.7	9.2	16.7	3.3	5.9	24	42
GRASS	1.5	0.25	0.35				615	11	1.8%	4.7	2.2	DP1-DP9				
PAVED	7.8	0.90	0.95													
A2	4.5	0.80	0.86	70	3	8.2	611	4	0.7%	2.8	3.6	11.8	3.8	6.8	14	27
GRASS	0.7	0.25	0.35													
PAVED	3.8	0.90	0.95													
B	3.5	0.83	0.88	50	1.5	7.8	520	10	1.9%	4.9	1.8	9.6	4.2	7.4	12	23
GRASS	0.4	0.25	0.35													
PAVED	3.1	0.90	0.95													
CI	0.2	0.90	0.90	10	2	1.9	251	2	0.8%	3.1	1.3	3.2	5.6	10.0	1	2
C2	1.9	0.90	0.90	20	2	3.3	416	7	1.7%	4.5	1.5	4.9	5.1	9.2	9	15
C3	1.9	0.90	0.90	20	2	3.3	422	6	1.4%	4.2	1.7	5.0	5.1	9.1	9	15
D	6.5	0.77	0.83	70	3.5	7.8	821	15	1.8%	4.7	2.9	10.7	4.0	7.1	20	38
GRASS	1.3	0.25	0.35													
PAVED	5.2	0.90	0.95													
OS-1	2.2	0.79	0.85				1245	22	1.8%	4.7	4.5	8.8	4.3	7.6	7	14
												FES-DP10				
OS-2	9.3	0.43	0.52	150	4	14.1	1305	22	1.7%	4.5	4.8	18.9	3.1	5.5	12	27
GRASS	6.7	0.25	0.35													
PAVED	2.6	0.90	0.95													
E1	25.2	0.25	0.35	39	6	4.0	1461	34	2.3%	5.3	4.6	8.6	4.3	7.7	27	68
E2	4.4	0.25	0.35	129	3	13.7	1677	29	1.7%	4.6	6.1	19.7	3.0	5.4	3	8

Calculated by: DLM

Date: 8/5/2013

5YR-DEVELOPED

El Paso County 5-Year Duration=5 min, Inten=5.10 in/hr

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Subcatchment C1:

Runoff = 0.89 cfs @ 0.08 hrs, Volume= 0.006 af, Depth= 0.38"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=5 min, Inten=5.10 in/hr

Area (ac)	C	Description
0.200	0.90	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment C2:

Runoff = 8.49 cfs @ 0.08 hrs, Volume= 0.060 af, Depth= 0.38"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=5 min, Inten=5.10 in/hr

Area (ac)	C	Description
1.900	0.90	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment C3:

Runoff = 8.49 cfs @ 0.08 hrs, Volume= 0.060 af, Depth= 0.38"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=5 min, Inten=5.10 in/hr

Area (ac)	C	Description
1.900	0.90	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Reach P1: 18" RCP

Inflow Area = 0.200 ac, Inflow Depth = 0.38" for 5-Year event
 Inflow = 0.89 cfs @ 0.08 hrs, Volume= 0.006 af
 Outflow = 0.87 cfs @ 0.09 hrs, Volume= 0.006 af, Atten= 2%, Lag= 0.3 min

5YR-DEVELOPED*El Paso County 5-Year Duration=5 min, Inten=5.10 in/hr*

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Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.6 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 2.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.29' @ 0.09 hrs
 Capacity at bank full= 10.50 cfs
 18.0" Diameter Pipe n= 0.013 Length= 37.0' Slope= 0.0100 '/'

Reach P2: 24" RCP

Inflow Area = 2.100 ac, Inflow Depth = 0.38" for 5-Year event
 Inflow = 9.34 cfs @ 0.08 hrs, Volume= 0.067 af
 Outflow = 9.20 cfs @ 0.09 hrs, Volume= 0.067 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Max. Velocity= 8.8 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 4.8 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.74' @ 0.08 hrs
 Capacity at bank full= 31.99 cfs
 24.0" Diameter Pipe n= 0.013 Length= 36.0' Slope= 0.0200 '/'

Pond WQ1: EDB-1

Inflow Area = 4.000 ac, Inflow Depth = 0.38" for 5-Year event
 Inflow = 17.67 cfs @ 0.08 hrs, Volume= 0.127 af
 Outflow = 1.22 cfs @ 0.16 hrs, Volume= 0.025 af, Atten= 93%, Lag= 4.8 min
 Primary = 1.22 cfs @ 0.16 hrs, Volume= 0.025 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,822.61' @ 0.16 hrs Surf.Area= 2,533 sf Storage= 5,435 cf
 Plug-Flow detention time= 66.4 min calculated for 0.025 af (19% of inflow)
 Center-of-Mass det. time= 63.9 min (69.0 - 5.1)

#	Invert	Avail.Storage	Storage Description
1	6,817.00'	13,465 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,817.00	25	0	0
6,818.00	49	37	37
6,819.00	472	261	298
6,820.00	923	698	995
6,821.00	1,494	1,209	2,204
6,822.00	2,105	1,800	4,003
6,822.50	2,466	1,143	5,146
6,823.00	2,770	1,309	6,455
6,824.00	3,491	3,131	9,585
6,825.00	4,269	3,880	13,465

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#	Routing	Invert	Outlet Devices
1	Primary	6,819.00'	24.0" x 105.0' long Culvert RCP, square edge headwall, Ke= 0.500 Outlet Invert= 6,816.94' S= 0.0196 1/1 n= 0.013 Cc= 0.900
2	Device 1	6,819.50'	0.7" Vert. WQCV Outlet C= 0.600
3	Device 1	6,820.00'	0.7" Vert. WQCV Outlet C= 0.600
4	Device 1	6,820.50'	0.7" Vert. WQCV Outlet C= 0.600
5	Device 1	6,821.00'	0.7" Vert. WQCV Outlet C= 0.600
6	Device 1	6,822.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,825.00'	20.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.16 cfs @ 0.16 hrs HW=6,822.61' (Free Discharge)

- ↑ 1=Culvert (Passes 1.16 cfs of 24.42 cfs potential flow)
- ↑ 2=WQCV Outlet (Orifice Controls 0.02 cfs @ 8.4 fps)
- ↑ 3=WQCV Outlet (Orifice Controls 0.02 cfs @ 7.7 fps)
- ↑ 4=WQCV Outlet (Orifice Controls 0.02 cfs @ 6.9 fps)
- ↑ 5=WQCV Outlet (Orifice Controls 0.02 cfs @ 6.0 fps)
- ↑ 6=Orifice/Grate (Weir Controls 1.08 cfs @ 1.1 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,817.00' (Free Discharge)

- ↑ 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 3-OF: TUTT OVERFLOW

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 5: (E) 30" RCP

Inflow Area = 4.000 ac, Inflow Depth = 0.07" for 5-Year event
 Inflow = 1.22 cfs @ 0.16 hrs, Volume= 0.025 af
 Primary = 1.22 cfs @ 0.16 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

5YR-DEVELOPED

El Paso County 5-Year Duration=9 min, Inten=4.27 in/hr

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Subcatchment OS-1:

Runoff = 7.49 cfs @ 0.15 hrs, Volume= 0.093 af, Depth= 0.51"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=9 min, Inten=4.27 in/hr

Area (ac)	C	Description
2.200	0.79	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8					Direct Entry,

Reach D1: CHANNEL

Inflow Area = 2.200 ac, Inflow Depth = 0.51" for 5-Year event
 Inflow = 7.49 cfs @ 0.15 hrs, Volume= 0.093 af
 Outflow = 5.59 cfs @ 0.26 hrs, Volume= 0.093 af, Atten= 25%, Lag= 6.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.5 fps, Min. Travel Time= 4.1 min
 Avg. Velocity = 0.7 fps, Avg. Travel Time= 15.6 min

Peak Depth= 0.47' @ 0.19 hrs
 Capacity at bank full= 264.10 cfs
 Inlet Invert= 6,809.00', Outlet Invert= 6,798.00'
 0.00' x 2.00' deep channel, n= 0.030 Length= 615.0' Slope= 0.0179 '/'
 Side Slope Z-value= 10.0 '/'

5YR-DEVELOPED

El Paso County 5-Year Duration=10 min, Inten=4.10 in/hr

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Subcatchment B:

Runoff = 12.04 cfs @ 0.16 hrs, Volume= 0.165 af, Depth= 0.57"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 El Paso County 5-Year Duration=10 min, Inten=4.10 in/hr

Area (ac)	C	Description
3.500	0.83	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6					Direct Entry,

Pond WQ2: EDB-2

Inflow Area = 3.500 ac, Inflow Depth = 0.57" for 5-Year event
 Inflow = 12.04 cfs @ 0.16 hrs, Volume= 0.165 af
 Outflow = 7.78 cfs @ 0.22 hrs, Volume= 0.076 af, Atten= 35%, Lag= 3.7 min
 Primary = 7.78 cfs @ 0.22 hrs, Volume= 0.076 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,813.40' @ 0.22 hrs Surf.Area= 2,246 sf Storage= 4,868 cf
 Plug-Flow detention time= 13.9 min calculated for 0.076 af (46% of inflow)
 Center-of-Mass det. time= 10.8 min (20.6 - 9.8)

#	Invert	Avail.Storage	Storage Description
1	6,810.00'	16,550 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,810.00	649	0	0
6,812.00	1,411	2,060	2,060
6,814.00	2,606	4,017	6,077
6,815.00	3,625	3,116	9,193
6,816.00	11,090	7,358	16,550

#	Routing	Invert	Outlet Devices
1	Primary	6,809.50'	36.0" x 100.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,807.50' S= 0.0200 '/' n= 0.013 Cc= 0.900
2	Device 1	6,810.00'	0.2" Vert. Orifice/Grate X 2.00 C= 0.600
3	Device 1	6,810.50'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,811.00'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,811.50'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,813.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,815.00'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

5YR-DEVELOPED

El Paso County 5-Year Duration=10 min, Inten=4.10 in/hr

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Primary OutFlow Max=7.70 cfs @ 0.22 hrs HW=6,813.40' (Free Discharge)

- ↳ 1=Culvert (Passes 7.70 cfs of 52.68 cfs potential flow)
 - ↳ 2=Orifice/Grate (Orifice Controls 0.00 cfs @ 8.9 fps)
 - ↳ 3=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.2 fps)
 - ↳ 4=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.4 fps)
 - ↳ 5=Orifice/Grate (Orifice Controls 0.01 cfs @ 6.6 fps)
 - ↳ 6=Orifice/Grate (Weir Controls 7.68 cfs @ 2.1 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,810.00' (Free Discharge)

- ↳ 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 6: (E) 36" RCP

Inflow Area = 3.500 ac, Inflow Depth = 0.26" for 5-Year event
 Inflow = 7.78 cfs @ 0.22 hrs, Volume= 0.076 af
 Primary = 7.78 cfs @ 0.22 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 6-OF: TUTT OVERFLOW

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

5YR-DEVELOPED

El Paso County 5-Year Duration=11 min, Inten=3.95 in/hr

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Subcatchment D:

Runoff = 19.94 cfs @ 0.18 hrs, Volume= 0.302 af, Depth= 0.56"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 El Paso County 5-Year Duration=11 min, Inten=3.95 in/hr

Area (ac)	C	Description
6.500	0.77	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7					Direct Entry,

Pond WQ3: EDB-3

Inflow Area = 6.500 ac, Inflow Depth = 0.56" for 5-Year event
 Inflow = 19.94 cfs @ 0.18 hrs, Volume= 0.302 af
 Outflow = 8.71 cfs @ 0.28 hrs, Volume= 0.158 af, Atten= 56%, Lag= 6.2 min
 Primary = 8.71 cfs @ 0.28 hrs, Volume= 0.158 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,794.42' @ 0.28 hrs Surf.Area= 5,848 sf Storage= 10,143 cf
 Plug-Flow detention time= 31.3 min calculated for 0.158 af (52% of inflow)
 Center-of-Mass det. time= 27.9 min (38.7 - 10.9)

#	Invert	Avail.Storage	Storage Description
1	6,791.00'	21,100 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,791.00	1,000	0	0
6,791.50	1,200	550	550
6,792.00	1,400	650	1,200
6,794.00	5,000	6,400	7,600
6,795.00	7,000	6,000	13,600
6,796.00	8,000	7,500	21,100

#	Routing	Invert	Outlet Devices
1	Primary	6,790.80'	36.0" x 65.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,790.50' S= 0.0046 '/' n= 0.013 Cc= 0.900
2	Device 1	6,791.30'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
3	Device 1	6,791.80'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
4	Device 1	6,792.30'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
5	Device 1	6,792.80'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
6	Device 1	6,794.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,795.50'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67

5YR-DEVELOPED

El Paso County 5-Year Duration=11 min, Inten=3.95 in/hr

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2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=8.68 cfs @ 0.28 hrs HW=6,794.42' (Free Discharge)

- ↑1=Culvert (Passes 8.68 cfs of 43.32 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.06 cfs @ 8.5 fps)
- ↑3=Orifice/Grate (Orifice Controls 0.05 cfs @ 7.8 fps)
- ↑4=Orifice/Grate (Orifice Controls 0.05 cfs @ 7.0 fps)
- ↑5=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.1 fps)
- ↑6=Orifice/Grate (Weir Controls 8.48 cfs @ 2.1 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,791.00' (Free Discharge)

- ↑7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 8: (E) 36" RCP

Inflow Area = 6.500 ac, Inflow Depth = 0.29" for 5-Year event
Inflow = 8.71 cfs @ 0.28 hrs, Volume= 0.158 af
Primary = 8.71 cfs @ 0.28 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

5YR-DEVELOPED

El Paso County 5-Year Duration=12 min, Inten=3.82 in/hr

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Subcatchment A2:

Runoff = 13.87 cfs @ 0.20 hrs, Volume= 0.229 af, Depth= 0.61"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=12 min, Inten=3.82 in/hr

Area (ac)	C	Description
4.500	0.80	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					Direct Entry,

5YR-DEVELOPED*El Paso County 5-Year Duration=17 min, Inten=3.27 in/hr*

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Subcatchment A1:

Runoff = 24.53 cfs @ 0.28 hrs, Volume= 0.574 af, Depth= 0.74"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=17 min, Inten=3.27 in/hr

Area (ac)	C	Description
9.300	0.80	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7					Direct Entry,

Subcatchment A2:

Runoff = 11.87 cfs @ 0.20 hrs, Volume= 0.278 af, Depth= 0.74"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=17 min, Inten=3.27 in/hr

Area (ac)	C	Description
4.500	0.80	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					Direct Entry,

Reach D2: CHANNEL

Inflow Area = 9.300 ac, Inflow Depth = 0.74" for 5-Year event

Inflow = 24.53 cfs @ 0.28 hrs, Volume= 0.574 af

Outflow = 23.27 cfs @ 0.33 hrs, Volume= 0.574 af, Atten= 5%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Max. Velocity= 5.6 fps, Min. Travel Time= 1.8 min

Avg. Velocity = 1.5 fps, Avg. Travel Time= 6.6 min

Peak Depth= 1.18' @ 0.30 hrs

Capacity at bank full= 279.12 cfs

Inlet Invert= 6,804.00', Outlet Invert= 6,795.00'

0.00' x 3.00' deep channel, n= 0.022 Length= 615.0' Slope= 0.0146 '/'

Side Slope Z-value= 3.0 '/'

5YR-DEVELOPED*El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr*

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Subcatchment A1:

Runoff = 23.18 cfs @ 0.28 hrs, Volume= 0.607 af, Depth= 0.78"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

Area (ac)	C	Description
9.300	0.80	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7					Direct Entry,

Subcatchment A2:

Runoff = 11.22 cfs @ 0.20 hrs, Volume= 0.293 af, Depth= 0.78"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

Area (ac)	C	Description
4.500	0.80	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					Direct Entry,

Subcatchment OS-1:

Runoff = 5.42 cfs @ 0.15 hrs, Volume= 0.142 af, Depth= 0.77"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

Area (ac)	C	Description
2.200	0.79	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8					Direct Entry,

Subcatchment OS-2: POWERS

Runoff = 12.36 cfs @ 0.32 hrs, Volume= 0.326 af, Depth= 0.42"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

5YR-DEVELOPED

El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

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Area (ac)	C	Description
9.300	0.43	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9					Direct Entry,

Reach D1: CHANNEL

Inflow Area = 2.200 ac, Inflow Depth = 0.77" for 5-Year event
 Inflow = 5.42 cfs @ 0.15 hrs, Volume= 0.142 af
 Outflow = 5.32 cfs @ 0.39 hrs, Volume= 0.142 af, Atten= 2%, Lag= 14.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.5 fps, Min. Travel Time= 4.1 min
 Avg. Velocity = 0.8 fps, Avg. Travel Time= 13.6 min

Peak Depth= 0.46' @ 0.32 hrs
 Capacity at bank full= 264.10 cfs
 Inlet Invert= 6,809.00', Outlet Invert= 6,798.00'
 0.00' x 2.00' deep channel, n= 0.030 Length= 615.0' Slope= 0.0179 '/
 Side Slope Z-value= 10.0 '/

Reach D2: CHANNEL

Inflow Area = 9.300 ac, Inflow Depth = 0.78" for 5-Year event
 Inflow = 23.18 cfs @ 0.28 hrs, Volume= 0.607 af
 Outflow = 22.79 cfs @ 0.35 hrs, Volume= 0.607 af, Atten= 2%, Lag= 4.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.5 fps, Min. Travel Time= 1.9 min
 Avg. Velocity = 1.6 fps, Avg. Travel Time= 6.5 min

Peak Depth= 1.17' @ 0.32 hrs
 Capacity at bank full= 279.12 cfs
 Inlet Invert= 6,804.00', Outlet Invert= 6,795.00'
 0.00' x 3.00' deep channel, n= 0.022 Length= 615.0' Slope= 0.0146 '/
 Side Slope Z-value= 3.0 '/

Pond WQ4: EDB-4

Inflow Area = 13.800 ac, Inflow Depth = 0.78" for 5-Year event
 Inflow = 32.94 cfs @ 0.32 hrs, Volume= 0.900 af
 Outflow = 0.52 cfs @ 0.71 hrs, Volume= 0.110 af, Atten= 98%, Lag= 23.2 min
 Primary = 0.52 cfs @ 0.71 hrs, Volume= 0.110 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,793.15' @ 0.71 hrs Surf.Area= 17,724 sf Storage= 38,363 cf
 Plug-Flow detention time= 91.1 min calculated for 0.110 af (12% of inflow)
 Center-of-Mass det. time= 79.0 min (98.7 - 19.7)

5YR-DEVELOPED

El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

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#	Invert	Avail.Storage	Storage Description
1	6,790.50'	73,750 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,790.50	5,000	0	0
6,791.00	12,000	4,250	4,250
6,792.00	16,000	14,000	18,250
6,794.00	19,000	35,000	53,250
6,795.00	22,000	20,500	73,750

#	Routing	Invert	Outlet Devices
1	Primary	6,790.50'	24.0" x 113.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,789.00' S= 0.0133 '/' n= 0.013 Cc= 0.900
2	Device 1	6,790.80'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
3	Device 1	6,791.30'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,791.80'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,792.30'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,794.00'	36.0" Vert. Orifice/Grate C= 0.600
7	Secondary	6,794.50'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.52 cfs @ 0.71 hrs HW=6,793.15' (Free Discharge)

- ↑ 1=Culvert (Passes 0.52 cfs of 19.43 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.3 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.5 fps)
- ↑ 4=Orifice/Grate (Orifice Controls 0.12 cfs @ 5.5 fps)
- ↑ 5=Orifice/Grate (Orifice Controls 0.09 cfs @ 4.3 fps)
- ↑ 6=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,790.50' (Free Discharge)

- ↑ 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 1:

Inflow Area = 9.300 ac, Inflow Depth = 0.78" for 5-Year event
 Inflow = 23.18 cfs @ 0.28 hrs, Volume= 0.607 af
 Primary = 23.18 cfs @ 0.28 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

5YR-DEVELOPED

El Paso County 5-Year Duration=19 min, Inten=3.09 in/hr

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Link 10: (E) 3-48" CMP

Inflow Area = 25.300 ac, Inflow Depth = 0.27" for 5-Year event
Inflow = 17.67 cfs @ 0.32 hrs, Volume= 0.578 af
Primary = 17.67 cfs @ 0.32 hrs, Volume= 0.578 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

100YR-DEVELOPED*El Paso County 100-Year Duration=5 min, Inten=9.09 in/hr*

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Subcatchment C1:

Runoff = 1.59 cfs @ 0.08 hrs, Volume= 0.011 af, Depth= 0.68"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=5 min, Inten=9.09 in/hr

Area (ac)	C	Description
0.200	0.90	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment C2:

Runoff = 15.12 cfs @ 0.08 hrs, Volume= 0.108 af, Depth= 0.68"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=5 min, Inten=9.09 in/hr

Area (ac)	C	Description
1.900	0.90	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment C3:

Runoff = 15.12 cfs @ 0.08 hrs, Volume= 0.108 af, Depth= 0.68"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=5 min, Inten=9.09 in/hr

Area (ac)	C	Description
1.900	0.90	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Reach P1: 18" RCP

Inflow Area = 0.200 ac, Inflow Depth = 0.68" for 100-Year event

Inflow = 1.59 cfs @ 0.08 hrs, Volume= 0.011 af

Outflow = 1.56 cfs @ 0.09 hrs, Volume= 0.011 af, Atten= 2%, Lag= 0.3 min

100YR-DEVELOPED*El Paso County 100-Year Duration=5 min, Inten=9.09 in/hr*

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Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Max. Velocity= 4.3 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 2.4 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.39' @ 0.09 hrs

Capacity at bank full= 10.50 cfs

18.0" Diameter Pipe n= 0.013 Length= 37.0' Slope= 0.0100 '/'

Reach P2: 24" RCP

Inflow Area = 2.100 ac, Inflow Depth = 0.68" for 100-Year event

Inflow = 16.65 cfs @ 0.08 hrs, Volume= 0.119 af

Outflow = 16.46 cfs @ 0.08 hrs, Volume= 0.119 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Max. Velocity= 10.2 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 5.8 fps, Avg. Travel Time= 0.1 min

Peak Depth= 1.02' @ 0.08 hrs

Capacity at bank full= 31.99 cfs

24.0" Diameter Pipe n= 0.013 Length= 36.0' Slope= 0.0200 '/'

Pond WQ1: EDB-1

Inflow Area = 4.000 ac, Inflow Depth = 0.68" for 100-Year event

Inflow = 31.55 cfs @ 0.08 hrs, Volume= 0.227 af

Outflow = 17.05 cfs @ 0.13 hrs, Volume= 0.124 af, Atten= 46%, Lag= 2.5 min

Primary = 17.05 cfs @ 0.13 hrs, Volume= 0.124 af

Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Peak Elev= 6,823.17' @ 0.13 hrs Surf.Area= 2,894 sf Storage= 6,992 cf

Plug-Flow detention time= 16.6 min calculated for 0.124 af (54% of inflow)

Center-of-Mass det. time= 15.6 min (20.7 - 5.1)

#	Invert	Avail.Storage	Storage Description
1	6,817.00'	13,465 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,817.00	25	0	0
6,818.00	49	37	37
6,819.00	472	261	298
6,820.00	923	698	995
6,821.00	1,494	1,209	2,204
6,822.00	2,105	1,800	4,003
6,822.50	2,466	1,143	5,146
6,823.00	2,770	1,309	6,455
6,824.00	3,491	3,131	9,585
6,825.00	4,269	3,880	13,465

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#	Routing	Invert	Outlet Devices
1	Primary	6,819.00'	24.0" x 105.0' long Culvert RCP, square edge headwall, Ke= 0.500 Outlet Invert= 6,816.94' S= 0.0196 '/' n= 0.013 Cc= 0.900
2	Device 1	6,819.50'	0.7" Vert. WQCV Outlet C= 0.600
3	Device 1	6,820.00'	0.7" Vert. WQCV Outlet C= 0.600
4	Device 1	6,820.50'	0.7" Vert. WQCV Outlet C= 0.600
5	Device 1	6,821.00'	0.7" Vert. WQCV Outlet C= 0.600
6	Device 1	6,822.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,825.00'	20.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=16.87 cfs @ 0.13 hrs HW=6,823.17' (Free Discharge)

- ↑ 1=Culvert (Passes 16.87 cfs of 26.92 cfs potential flow)
- ↑ 2=WQCV Outlet (Orifice Controls 0.02 cfs @ 9.2 fps)
- ↑ 3=WQCV Outlet (Orifice Controls 0.02 cfs @ 8.5 fps)
- ↑ 4=WQCV Outlet (Orifice Controls 0.02 cfs @ 7.8 fps)
- ↑ 5=WQCV Outlet (Orifice Controls 0.02 cfs @ 7.0 fps)
- ↑ 6=Orifice/Grate (Weir Controls 16.78 cfs @ 2.7 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,817.00' (Free Discharge)

- ↑ 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 3: 4' INLET

Inflow Area = 0.200 ac, Inflow Depth = 0.68" for 100-Year event
 Inflow = 1.59 cfs @ 0.08 hrs, Volume= 0.011 af
 Primary = 1.59 cfs @ 0.08 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3-OF: TUTT OVERFLOW

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 4: 8' INLET

Inflow Area = 1.900 ac, Inflow Depth = 0.68" for 100-Year event
 Inflow = 15.12 cfs @ 0.08 hrs, Volume= 0.108 af
 Primary = 15.12 cfs @ 0.08 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

100YR-DEVELOPED

El Paso County 100-Year Duration=5 min, Inten=9.09 in/hr

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Link 5: (E) 30" RCP

Inflow Area = 4.000 ac, Inflow Depth = 0.37" for 100-Year event

Inflow = 17.05 cfs @ 0.13 hrs, Volume= 0.124 af

Primary = 17.05 cfs @ 0.13 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

100YR-DEVELOPED

El Paso County 100-Year Duration=9 min, Inten=7.59 in/hr

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Subcatchment OS-1: DUBLIN

Runoff = 14.32 cfs @ 0.15 hrs, Volume= 0.177 af, Depth= 0.97"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=9 min, Inten=7.59 in/hr

Area (ac)	C	Description
2.200	0.85	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8					Direct Entry,

100YR-DEVELOPED

El Paso County 100-Year Duration=10 min, Inten=7.30 in/hr

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Subcatchment B:

Runoff = 22.73 cfs @ 0.16 hrs, Volume= 0.312 af, Depth= 1.07"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=10 min, Inten=7.30 in/hr

Area (ac)	C	Description
3.500	0.88	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6					Direct Entry,

Pond WQ2: EDB-2

Inflow Area = 3.500 ac, Inflow Depth = 1.07" for 100-Year event
 Inflow = 22.73 cfs @ 0.16 hrs, Volume= 0.312 af
 Outflow = 20.82 cfs @ 0.18 hrs, Volume= 0.223 af, Atten= 8%, Lag= 1.1 min
 Primary = 20.82 cfs @ 0.18 hrs, Volume= 0.223 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,813.77' @ 0.18 hrs Surf.Area= 2,468 sf Storage= 5,613 cf
 Plug-Flow detention time= 7.2 min calculated for 0.223 af (71% of inflow)
 Center-of-Mass det. time= 5.3 min (15.1 - 9.8)

#	Invert	Avail.Storage	Storage Description
1	6,810.00'	16,550 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,810.00	649	0	0
6,812.00	1,411	2,060	2,060
6,814.00	2,606	4,017	6,077
6,815.00	3,625	3,116	9,193
6,816.00	11,090	7,358	16,550

#	Routing	Invert	Outlet Devices
1	Primary	6,809.50'	36.0" x 100.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,807.50' S= 0.0200 ' n= 0.013 Cc= 0.900
2	Device 1	6,810.00'	0.2" Vert. Orifice/Grate X 2.00 C= 0.600
3	Device 1	6,810.50'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,811.00'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,811.50'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,813.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,815.00'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

100YR-DEVELOPED

El Paso County 100-Year Duration=10 min, Inten=7.30 in/hr

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Primary OutFlow Max=20.74 cfs @ 0.18 hrs HW=6,813.77' (Free Discharge)

- ↑1=Culvert (Passes 20.74 cfs of 56.62 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.00 cfs @ 9.3 fps)
- ↑3=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.7 fps)
- ↑4=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.0 fps)
- ↑5=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.2 fps)
- ↑6=Orifice/Grate (Weir Controls 20.71 cfs @ 2.9 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,810.00' (Free Discharge)

- ↑7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 6: (E) 36" RCP

Inflow Area = 3.500 ac, Inflow Depth = 0.76" for 100-Year event
 Inflow = 20.82 cfs @ 0.18 hrs, Volume= 0.223 af
 Primary = 20.82 cfs @ 0.18 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 6-OF: TUTT OVERFLOW

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

100YR-DEVELOPED

El Paso County 100-Year Duration=11 min, Inten=7.04 in/hr

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Subcatchment D:

Runoff = 38.30 cfs @ 0.18 hrs, Volume= 0.580 af, Depth= 1.07"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=11 min, Inten=7.04 in/hr

Area (ac)	C	Description
6.500	0.83	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7					Direct Entry,

Pond WQ3: EDB-3

Inflow Area = 6.500 ac, Inflow Depth = 1.07" for 100-Year event
 Inflow = 38.30 cfs @ 0.18 hrs, Volume= 0.580 af
 Outflow = 27.91 cfs @ 0.23 hrs, Volume= 0.435 af, Atten= 27%, Lag= 3.1 min
 Primary = 27.91 cfs @ 0.23 hrs, Volume= 0.435 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,794.93' @ 0.23 hrs Surf.Area= 6,862 sf Storage= 13,185 cf
 Plug-Flow detention time= 15.0 min calculated for 0.435 af (75% of inflow)
 Center-of-Mass det. time= 13.1 min (23.9 - 10.9)

#	Invert	Avail.Storage	Storage Description
1	6,791.00'	21,100 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,791.00	1,000	0	0
6,791.50	1,200	550	550
6,792.00	1,400	650	1,200
6,794.00	5,000	6,400	7,600
6,795.00	7,000	6,000	13,600
6,796.00	8,000	7,500	21,100

#	Routing	Invert	Outlet Devices
1	Primary	6,790.80'	36.0" x 65.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,790.50' S= 0.0046 '/' n= 0.013 Cc= 0.900
2	Device 1	6,791.30'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
3	Device 1	6,791.80'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
4	Device 1	6,792.30'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
5	Device 1	6,792.80'	0.5" Vert. Orifice/Grate X 5.00 C= 0.600
6	Device 1	6,794.00'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,795.50'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67

100YR-DEVELOPED

El Paso County 100-Year Duration=11 min, Inten=7.04 in/hr

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2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=27.85 cfs @ 0.23 hrs HW=6,794.93' (Free Discharge)

↑1=Culvert (Passes 27.85 cfs of 48.30 cfs potential flow)

↑2=Orifice/Grate (Orifice Controls 0.06 cfs @ 9.1 fps)

↑3=Orifice/Grate (Orifice Controls 0.06 cfs @ 8.5 fps)

↑4=Orifice/Grate (Orifice Controls 0.05 cfs @ 7.8 fps)

↑5=Orifice/Grate (Orifice Controls 0.05 cfs @ 7.0 fps)

↑6=Orifice/Grate (Weir Controls 27.62 cfs @ 3.2 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,791.00' (Free Discharge)

↑7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 8: (E) 36" RCP

Inflow Area = 6.500 ac, Inflow Depth = 0.80" for 100-Year event

Inflow = 27.91 cfs @ 0.23 hrs, Volume= 0.435 af

Primary = 27.91 cfs @ 0.23 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

100YR-DEVELOPED

El Paso County 100-Year Duration=12 min, Inten=6.79 in/hr

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Subcatchment A2:

Runoff = 26.51 cfs @ 0.20 hrs, Volume= 0.438 af, Depth= 1.17"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

El Paso County 100-Year Duration=12 min, Inten=6.79 in/hr

Area (ac)	C	Description
4.500	0.86	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					Direct Entry,

100YR-DEVELOPED*El Paso County 100-Year Duration=17 min, Inten=5.81 in/hr*

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Subcatchment A1:

Runoff = 41.89 cfs @ 0.28 hrs, Volume= 0.991 af, Depth= 1.28"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=17 min, Inten=5.81 in/hr

Area (ac)	C	Description
9.300	0.85	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.6					Direct Entry,

Link 1:

Inflow Area = 9.300 ac, Inflow Depth = 1.28" for 100-Year event

Inflow = 41.89 cfs @ 0.28 hrs, Volume= 0.991 af

Primary = 41.89 cfs @ 0.28 hrs, Volume= 0.991 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

100YR-DEVELOPED*El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr*

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Subcatchment A1:

Runoff = 43.98 cfs @ 0.31 hrs, Volume= 1.149 af, Depth= 1.48"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr

Area (ac)	C	Description
9.300	0.85	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.6					Direct Entry,

Subcatchment A2:

Runoff = 21.50 cfs @ 0.20 hrs, Volume= 0.563 af, Depth= 1.50"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr

Area (ac)	C	Description
4.500	0.86	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					Direct Entry,

Subcatchment OS-1: DUBLIN

Runoff = 10.39 cfs @ 0.15 hrs, Volume= 0.272 af, Depth= 1.48"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr

Area (ac)	C	Description
2.200	0.85	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8					Direct Entry,

Subcatchment OS-2: POWERS

Runoff = 26.65 cfs @ 0.32 hrs, Volume= 0.703 af, Depth= 0.91"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr

100YR-DEVELOPED

El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr

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Area (ac)	C	Description
9.300	0.52	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9					Direct Entry,

Pond WQ4: EDB-4

Inflow Area = 13.800 ac, Inflow Depth = 1.49" for 100-Year event
 Inflow = 65.44 cfs @ 0.31 hrs, Volume= 1.712 af
 Outflow = 35.26 cfs @ 0.44 hrs, Volume= 1.017 af, Atten= 46%, Lag= 7.5 min
 Primary = 35.26 cfs @ 0.44 hrs, Volume= 1.017 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,793.88' @ 0.44 hrs Surf.Area= 18,824 sf Storage= 51,192 cf
 Plug-Flow detention time= 26.2 min calculated for 1.017 af (59% of inflow)
 Center-of-Mass det. time= 21.2 min (38.9 - 17.7)

#	Invert	Avail.Storage	Storage Description
1	6,790.50'	73,750 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,790.50	5,000	0	0
6,791.00	12,000	4,250	4,250
6,792.00	16,000	14,000	18,250
6,794.00	19,000	35,000	53,250
6,795.00	22,000	20,500	73,750

#	Routing	Invert	Outlet Devices
1	Primary	6,790.40'	36.0" x 113.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,789.00' S= 0.0124 '/ n= 0.013 Cc= 0.900
2	Device 1	6,790.80'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
3	Device 1	6,791.30'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,791.80'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,792.30'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,792.80'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,794.50'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

100YR-DEVELOPED

El Paso County 100-Year Duration=19 min, Inten=5.51 in/hr

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Primary OutFlow Max=35.31 cfs @ 0.44 hrs HW=6,793.88' (Free Discharge)

- ↳ 1=Culvert (Passes 35.31 cfs of 47.91 cfs potential flow)
 - ↳ 2=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.4 fps)
 - ↳ 3=Orifice/Grate (Orifice Controls 0.17 cfs @ 7.7 fps)
 - ↳ 4=Orifice/Grate (Orifice Controls 0.15 cfs @ 6.9 fps)
 - ↳ 5=Orifice/Grate (Orifice Controls 0.13 cfs @ 6.0 fps)
 - ↳ 6=Orifice/Grate (Weir Controls 34.68 cfs @ 3.4 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,790.50' (Free Discharge)

- ↳ 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Link 1:

Inflow Area = 9.300 ac, Inflow Depth = 1.48" for 100-Year event
 Inflow = 43.98 cfs @ 0.31 hrs, Volume= 1.149 af
 Primary = 43.98 cfs @ 0.31 hrs, Volume= 1.149 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 10: (E) 3-48" CMP

Inflow Area = 25.300 ac, Inflow Depth = 0.94" for 100-Year event
 Inflow = 58.04 cfs @ 0.39 hrs, Volume= 1.991 af
 Primary = 58.04 cfs @ 0.39 hrs, Volume= 1.991 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

HYDRAULIC CALCULATIONS

Calculations for Sizing of Sump Inlets

Design Point	Q ₅ [cfs]	Q ₁₀₀ [cfs]	d _{5-yr.} [ft]	d _{100-yr.} [ft]	Length of Inlet, L _i [ft]	
					L _{i-5yr} [ft]	L _{i-100yr} [ft]
1	0.9	1.6	0.50	0.69	4	4
2	8.5	15.1	0.50	0.69	7	9

*Q_i *F= [1.7(L_i+1.8W)(d_{max}+w/12)^{1.85}]

*Equation taken from Figure 7-11 of the City of Colorado Springs Drainage Criteria Manual

where:
 Q_i = flow to inlet [cfs]
 L_i = length of inlet [ft]
 W = 2 gutter width[ft]
 d_{max} = 0.94 ponding depth[in]
 w = 3 depth of inlet depression [in]
 F = 1.25 clogging factor



Project: Dublin Commons Fil. No. 1
 Job No.: 12-025
 Engineer: David Mijares
 Date: 5-Dec-12

Design Procedure Form: Extended Detention Basin (EDB) - Sedimentation Facility

Designer: David Mijares
Company: Catamount Engineering
Date: August 5, 2013
Project: Dublin Commons Filing No. 1

Pond 1

1. Basin Storage Volume

A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)

$$I_a = \frac{70.00}{100} \% \\ i = \frac{70.00}{100} = 0.70$$

B) Contributing Watershed Area (Area)

$$\text{Area} = \frac{4.0}{1} \text{ acres}$$

C) Water Quality Capture Volume (WQCV)
($WQCV = 1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$)

$$WQCV = \frac{0.28}{1} \text{ watershed inches}$$

D) Design Volume: $\text{Vol} = (WQCV / 12) * \text{Area} * 1.2$

$$\text{Vol} = \frac{0.109}{1} \text{ acre-feet}$$

Pond WQ1: EDB-1

Inflow Area = 4.000 ac, Inflow Depth = 0.28" for 2-Year event
 Inflow = 12.84 cfs @ 0.08 hrs, Volume= 0.093 af
 Outflow = 0.09 cfs @ 0.18 hrs, Volume= 0.078 af, Atten= 99%, Lag= 5.7 min
 Primary = 0.09 cfs @ 0.18 hrs, Volume= 0.078 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,822.00' @ 0.18 hrs Surf.Area= 2,105 sf Storage= 4,004 cf
 Plug-Flow detention time= 532.8 min calculated for 0.078 af (84% of inflow)
 Center-of-Mass det. time= 532.2 min (537.3 - 5.1)

#	Invert	Avail.Storage	Storage Description
1	6,817.00'	13,465 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,817.00	25	0	0
6,818.00	49	37	37
6,819.00	472	261	298
6,820.00	923	698	995
6,821.00	1,494	1,209	2,204
6,822.00	2,105	1,800	4,003
6,822.50	2,466	1,143	5,146
6,823.00	2,770	1,309	6,455
6,824.00	3,491	3,131	9,585
6,825.00	4,269	3,880	13,465

#	Routing	Invert	Outlet Devices
1	Primary	6,819.00'	24.0" x 105.0' long Culvert RCP, square edge headwall, Ke= 0.500 Outlet Invert= 6,816.94' S= 0.0196 '/' n= 0.013 Cc= 0.900
2	Device 1	6,819.50'	0.8" Vert. WQCV Outlet C= 0.600
3	Device 1	6,820.00'	0.8" Vert. WQCV Outlet C= 0.600
4	Device 1	6,820.50'	0.8" Vert. WQCV Outlet C= 0.600
5	Device 1	6,821.00'	0.8" Vert. WQCV Outlet C= 0.600
6	Device 1	6,822.50'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,825.00'	20.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

2YR-DEVELOPED-WQ pond final

El Paso County 2-Year Duration=5 min, Inten=3.71 in/hr

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Primary OutFlow Max=0.09 cfs @ 0.18 hrs HW=6,822.00' (Free Discharge)

- ↑ 1=Culvert (Passes 0.09 cfs of 21.39 cfs potential flow)
- ↑ 2=WQCV Outlet (Orifice Controls 0.03 cfs @ 7.6 fps)
- ↑ 3=WQCV Outlet (Orifice Controls 0.02 cfs @ 6.8 fps)
- ↑ 4=WQCV Outlet (Orifice Controls 0.02 cfs @ 5.8 fps)
- ↑ 5=WQCV Outlet (Orifice Controls 0.02 cfs @ 4.7 fps)
- ↑ 6=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,817.00' (Free Discharge)

- ↑ 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

2YR-DEVELOPED-WQ pond final*El Paso County 2-Year Duration=5 min, Inten=3.71 in/hr*

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Hydrograph for Pond WQ1: EDB-1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	6,817.00	0.00	0.00	0.00
1.00	0.00	3,754	6,821.86	0.08	0.08	0.00
2.00	0.00	3,464	6,821.70	0.08	0.08	0.00
3.00	0.00	3,190	6,821.55	0.07	0.07	0.00
4.00	0.00	2,934	6,821.41	0.07	0.07	0.00
5.00	0.00	2,696	6,821.27	0.06	0.06	0.00
6.00	0.00	2,477	6,821.15	0.06	0.06	0.00
7.00	0.00	2,279	6,821.04	0.05	0.05	0.00
8.00	0.00	2,105	6,820.92	0.05	0.05	0.00
9.00	0.00	1,947	6,820.79	0.04	0.04	0.00
10.00	0.00	1,804	6,820.67	0.04	0.04	0.00
11.00	0.00	1,678	6,820.57	0.03	0.03	0.00
12.00	0.00	1,573	6,820.48	0.03	0.03	0.00
13.00	0.00	1,477	6,820.40	0.03	0.03	0.00
14.00	0.00	1,388	6,820.32	0.02	0.02	0.00
15.00	0.00	1,304	6,820.26	0.02	0.02	0.00
16.00	0.00	1,228	6,820.19	0.02	0.02	0.00
17.00	0.00	1,158	6,820.14	0.02	0.02	0.00
18.00	0.00	1,096	6,820.08	0.02	0.02	0.00
19.00	0.00	1,044	6,820.04	0.01	0.01	0.00
20.00	0.00	999	6,820.00	0.01	0.01	0.00
21.00	0.00	958	6,819.95	0.01	0.01	0.00
22.00	0.00	921	6,819.89	0.01	0.01	0.00
23.00	0.00	886	6,819.84	0.01	0.01	0.00
24.00	0.00	853	6,819.80	0.01	0.01	0.00
25.00	0.00	824	6,819.75	0.01	0.01	0.00
26.00	0.00	797	6,819.72	0.01	0.01	0.00
27.00	0.00	772	6,819.68	0.01	0.01	0.00
28.00	0.00	751	6,819.65	0.01	0.01	0.00
29.00	0.00	731	6,819.62	0.00	0.00	0.00
30.00	0.00	715	6,819.60	0.00	0.00	0.00
31.00	0.00	702	6,819.58	0.00	0.00	0.00
32.00	0.00	691	6,819.56	0.00	0.00	0.00
33.00	0.00	681	6,819.55	0.00	0.00	0.00
34.00	0.00	674	6,819.54	0.00	0.00	0.00
35.00	0.00	668	6,819.53	0.00	0.00	0.00
36.00	0.00	663	6,819.52	0.00	0.00	0.00
37.00	0.00	660	6,819.52	0.00	0.00	0.00
38.00	0.00	657	6,819.52	0.00	0.00	0.00
39.00	0.00	655	6,819.51	0.00	0.00	0.00
40.00	0.00	653	6,819.51	0.00	0.00	0.00
41.00	0.00	651	6,819.51	0.00	0.00	0.00
42.00	0.00	650	6,819.51	0.00	0.00	0.00
43.00	0.00	650	6,819.50	0.00	0.00	0.00
44.00	0.00	649	6,819.50	0.00	0.00	0.00
45.00	0.00	648	6,819.50	0.00	0.00	0.00
46.00	0.00	648	6,819.50	0.00	0.00	0.00
47.00	0.00	648	6,819.50	0.00	0.00	0.00
48.00	0.00	647	6,819.50	0.00	0.00	0.00
49.00	0.00	647	6,819.50	0.00	0.00	0.00
50.00	0.00	647	6,819.50	0.00	0.00	0.00

Design Procedure Form: Extended Detention Basin (EDB) - Sedimentation Facility

Designer: David Mijares
Company: Catamount Engineering
Date: May 15, 2013
Project: Dublin Commons Filing No. 1

Pond 2

<p>1. Basin Storage Volume</p> <p>A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)</p> <p>B) Contributing Watershed Area (Area)</p> <p>C) Water Quality Capture Volume (WQCV) ($WQCV = 1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$)</p> <p>D) Design Volume: $Vol = (WQCV / 12) * Area * 1.2$</p>	<p>$I_a =$ <u>80.00</u> %</p> <p>$i =$ <u>0.80</u></p> <p>Area = <u>3.5</u> acres</p> <p>WQCV = <u>0.33</u> watershed inches</p> <p>Vol = <u>0.115</u> acre-feet</p>
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2YR-DEVELOPED-WQ

El Paso County 2-Year Duration=10 min, Inten=2.98 in/hr

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Pond WQ2: EDB-2

Inflow Area = 3.500 ac, Inflow Depth = 0.41" for 2-Year event
 Inflow = 8.75 cfs @ 0.16 hrs, Volume= 0.120 af
 Outflow = 0.03 cfs @ 0.33 hrs, Volume= 0.087 af, Atten= 100%, Lag= 10.3 min
 Primary = 0.03 cfs @ 0.33 hrs, Volume= 0.087 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,813.57' @ 0.33 hrs Surf.Area= 2,351 sf Storage= 5,218 cf
 Plug-Flow detention time= 1,315.7 min calculated for 0.087 af (73% of inflow)
 Center-of-Mass det. time= 1,314.2 min (1,324.0 - 9.8)

#	Invert	Avail.Storage	Storage Description
1	6,810.00'	16,550 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,810.00	649	0	0
6,812.00	1,411	2,060	2,060
6,814.00	2,606	4,017	6,077
6,815.00	3,625	3,116	9,193
6,816.00	11,090	7,358	16,550

#	Routing	Invert	Outlet Devices
1	Primary	6,809.50'	36.0" x 100.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,807.50' S= 0.0200 '/' n= 0.013 Cc= 0.900
2	Device 1	6,810.00'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
3	Device 1	6,810.50'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,811.00'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,811.50'	0.2" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,813.60'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,815.00'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.03 cfs @ 0.33 hrs HW=6,813.57' (Free Discharge)

- 1=Culvert (Passes 0.03 cfs of 54.58 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.1 fps)
- 3=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.4 fps)
- 4=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.7 fps)
- 5=Orifice/Grate (Orifice Controls 0.01 cfs @ 6.9 fps)
- 6=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,810.00' (Free Discharge)

- 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

2YR-DEVELOPED-WQ*El Paso County 2-Year Duration=10 min, Inten=2.98 in/hr*

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5/16/2013

Hydrograph for Pond WQ2: EDB-2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	6,810.00	0.00	0.00	0.00
1.00	0.00	5,150	6,813.54	0.03	0.03	0.00
2.00	0.00	5,050	6,813.49	0.03	0.03	0.00
3.00	0.00	4,951	6,813.44	0.03	0.03	0.00
4.00	0.00	4,853	6,813.39	0.03	0.03	0.00
5.00	0.00	4,756	6,813.34	0.03	0.03	0.00
6.00	0.00	4,660	6,813.29	0.03	0.03	0.00
7.00	0.00	4,565	6,813.25	0.03	0.03	0.00
8.00	0.00	4,470	6,813.20	0.03	0.03	0.00
9.00	0.00	4,377	6,813.15	0.03	0.03	0.00
10.00	0.00	4,284	6,813.11	0.03	0.03	0.00
11.00	0.00	4,193	6,813.06	0.03	0.03	0.00
12.00	0.00	4,102	6,813.02	0.03	0.03	0.00
13.00	0.00	4,012	6,812.97	0.02	0.02	0.00
14.00	0.00	3,924	6,812.93	0.02	0.02	0.00
15.00	0.00	3,836	6,812.88	0.02	0.02	0.00
16.00	0.00	3,749	6,812.84	0.02	0.02	0.00
17.00	0.00	3,663	6,812.80	0.02	0.02	0.00
18.00	0.00	3,578	6,812.76	0.02	0.02	0.00
19.00	0.00	3,493	6,812.71	0.02	0.02	0.00
20.00	0.00	3,410	6,812.67	0.02	0.02	0.00
21.00	0.00	3,328	6,812.63	0.02	0.02	0.00
22.00	0.00	3,247	6,812.59	0.02	0.02	0.00
23.00	0.00	3,166	6,812.55	0.02	0.02	0.00
24.00	0.00	3,087	6,812.51	0.02	0.02	0.00
25.00	0.00	3,008	6,812.47	0.02	0.02	0.00
26.00	0.00	2,930	6,812.43	0.02	0.02	0.00
27.00	0.00	2,854	6,812.40	0.02	0.02	0.00
28.00	0.00	2,778	6,812.36	0.02	0.02	0.00
29.00	0.00	2,703	6,812.32	0.02	0.02	0.00
30.00	0.00	2,629	6,812.28	0.02	0.02	0.00
31.00	0.00	2,556	6,812.25	0.02	0.02	0.00
32.00	0.00	2,485	6,812.21	0.02	0.02	0.00
33.00	0.00	2,414	6,812.18	0.02	0.02	0.00
34.00	0.00	2,344	6,812.14	0.02	0.02	0.00
35.00	0.00	2,274	6,812.11	0.02	0.02	0.00
36.00	0.00	2,206	6,812.07	0.02	0.02	0.00
37.00	0.00	2,139	6,812.04	0.02	0.02	0.00
38.00	0.00	2,073	6,812.01	0.02	0.02	0.00
39.00	0.00	2,008	6,811.95	0.02	0.02	0.00
40.00	0.00	1,945	6,811.89	0.02	0.02	0.00
41.00	0.00	1,884	6,811.83	0.02	0.02	0.00
42.00	0.00	1,825	6,811.77	0.02	0.02	0.00
43.00	0.00	1,768	6,811.72	0.02	0.02	0.00
44.00	0.00	1,713	6,811.66	0.01	0.01	0.00
45.00	0.00	1,660	6,811.61	0.01	0.01	0.00
46.00	0.00	1,610	6,811.56	0.01	0.01	0.00
47.00	0.00	1,563	6,811.52	0.01	0.01	0.00
48.00	0.00	1,518	6,811.47	0.01	0.01	0.00
49.00	0.00	1,475	6,811.43	0.01	0.01	0.00
50.00	0.00	1,433	6,811.39	0.01	0.01	0.00

Design Procedure Form: Extended Detention Basin (EDB) - Sedimentation Facility

Designer: David Mijares
Company: Catamount Engineering
Date: May 15, 2013
Project: Dublin Commons Filing No. 1

Pond 3

1. Basin Storage Volume

A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)

B) Contributing Watershed Area (Area)

C) Water Quality Capture Volume (WQCV)
($WQCV = 1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$)

D) Design Volume: $Vol = (WQCV / 12) * Area * 1.2$

$$I_a = \frac{80.00}{100} \%$$

$$i = \frac{0.80}{100}$$

$$Area = \frac{6.5}{1} \text{ acres}$$

$$WQCV = \frac{0.33}{1} \text{ watershed inches}$$

$$Vol = \frac{0.213}{1} \text{ acre-feet}$$

2YR-DEVELOPED-WQ

El Paso County 2-Year Duration=11 min, Inten=2.87 in/hr

Prepared by Catamount Engineering

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5/16/2013

Pond WQ3: EDB-3

Inflow Area = 6.500 ac, Inflow Depth = 0.41" for 2-Year event
 Inflow = 14.49 cfs @ 0.18 hrs, Volume= 0.219 af
 Outflow = 0.16 cfs @ 0.36 hrs, Volume= 0.219 af, Atten= 99%, Lag= 10.9 min
 Primary = 0.16 cfs @ 0.36 hrs, Volume= 0.219 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,794.21' @ 0.36 hrs Surf.Area= 4,541 sf Storage= 9,432 cf
 Plug-Flow detention time= 725.5 min calculated for 0.219 af (100% of inflow)
 Center-of-Mass det. time= 725.9 min (736.8 - 10.9)

#	Invert	Avail.Storage	Storage Description
1	6,791.00'	20,260 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,791.00	1,250	0	0
6,791.50	1,450	675	675
6,792.00	2,500	988	1,663
6,794.00	4,197	6,697	8,360
6,795.00	5,802	5,000	13,359
6,796.00	8,000	6,901	20,260

#	Routing	Invert	Outlet Devices
1	Primary	6,790.80'	36.0" x 65.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,790.50' S= 0.0046 '/' n= 0.013 Cc= 0.900
2	Device 1	6,791.00'	0.5" Vert. Orifice/Grate X 4.00 C= 0.600
3	Device 1	6,791.50'	0.5" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,792.00'	0.5" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,792.50'	0.5" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,794.30'	36.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600
7	Secondary	6,795.50'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.16 cfs @ 0.36 hrs HW=6,794.21' (Free Discharge)

- 1=Culvert (Passes 0.16 cfs of 40.56 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 8.6 fps)
- 3=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.9 fps)
- 4=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.1 fps)
- 5=Orifice/Grate (Orifice Controls 0.03 cfs @ 6.3 fps)
- 6=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,791.00' (Free Discharge)

- 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

2YR-DEVELOPED-WQ*El Paso County 2-Year Duration=11 min, Inten=2.87 in/hr*

Prepared by Catamount Engineering

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5/16/2013

Hydrograph for Pond WQ3: EDB-3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	6,791.00	0.00	0.00	0.00
1.00	0.00	9,061	6,794.14	0.16	0.16	0.00
2.00	0.00	8,491	6,794.03	0.16	0.16	0.00
3.00	0.00	7,937	6,793.87	0.15	0.15	0.00
4.00	0.00	7,404	6,793.71	0.14	0.14	0.00
5.00	0.00	6,893	6,793.56	0.14	0.14	0.00
6.00	0.00	6,405	6,793.42	0.13	0.13	0.00
7.00	0.00	5,938	6,793.28	0.13	0.13	0.00
8.00	0.00	5,494	6,793.14	0.12	0.12	0.00
9.00	0.00	5,072	6,793.02	0.11	0.11	0.00
10.00	0.00	4,673	6,792.90	0.11	0.11	0.00
11.00	0.00	4,298	6,792.79	0.10	0.10	0.00
12.00	0.00	3,947	6,792.68	0.09	0.09	0.00
13.00	0.00	3,622	6,792.59	0.09	0.09	0.00
14.00	0.00	3,329	6,792.50	0.08	0.08	0.00
15.00	0.00	3,062	6,792.42	0.07	0.07	0.00
16.00	0.00	2,808	6,792.34	0.07	0.07	0.00
17.00	0.00	2,566	6,792.27	0.07	0.07	0.00
18.00	0.00	2,339	6,792.20	0.06	0.06	0.00
19.00	0.00	2,125	6,792.14	0.06	0.06	0.00
20.00	0.00	1,926	6,792.08	0.05	0.05	0.00
21.00	0.00	1,746	6,792.02	0.05	0.05	0.00
22.00	0.00	1,585	6,791.96	0.04	0.04	0.00
23.00	0.00	1,436	6,791.89	0.04	0.04	0.00
24.00	0.00	1,295	6,791.81	0.04	0.04	0.00
25.00	0.00	1,165	6,791.75	0.03	0.03	0.00
26.00	0.00	1,044	6,791.69	0.03	0.03	0.00
27.00	0.00	934	6,791.63	0.03	0.03	0.00
28.00	0.00	834	6,791.58	0.03	0.03	0.00
29.00	0.00	748	6,791.54	0.02	0.02	0.00
30.00	0.00	675	6,791.50	0.02	0.02	0.00
31.00	0.00	611	6,791.45	0.02	0.02	0.00
32.00	0.00	551	6,791.41	0.02	0.02	0.00
33.00	0.00	494	6,791.37	0.02	0.02	0.00
34.00	0.00	440	6,791.33	0.01	0.01	0.00
35.00	0.00	389	6,791.29	0.01	0.01	0.00
36.00	0.00	342	6,791.25	0.01	0.01	0.00
37.00	0.00	298	6,791.22	0.01	0.01	0.00
38.00	0.00	258	6,791.19	0.01	0.01	0.00
39.00	0.00	220	6,791.16	0.01	0.01	0.00
40.00	0.00	186	6,791.14	0.01	0.01	0.00
41.00	0.00	156	6,791.12	0.01	0.01	0.00
42.00	0.00	129	6,791.10	0.01	0.01	0.00
43.00	0.00	105	6,791.08	0.01	0.01	0.00
44.00	0.00	85	6,791.06	0.01	0.01	0.00
45.00	0.00	67	6,791.05	0.00	0.00	0.00
46.00	0.00	53	6,791.04	0.00	0.00	0.00
47.00	0.00	42	6,791.03	0.00	0.00	0.00
48.00	0.00	33	6,791.02	0.00	0.00	0.00
49.00	0.00	26	6,791.02	0.00	0.00	0.00
50.00	0.00	20	6,791.02	0.00	0.00	0.00

Design Procedure Form: Extended Detention Basin (EDB) - Sedimentation Facility

Designer: David Mijares
Company: Catamount Engineering
Date: May 15, 2013
Project: Dublin Commons Filing No. 1

Pond 4

<p>1. Basin Storage Volume</p> <p>A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)</p> <p>B) Contributing Watershed Area (Area)</p> <p>C) Water Quality Capture Volume (WQCV) ($WQCV = 1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$)</p> <p>D) Design Volume: $Vol = (WQCV / 12) * Area * 1.2$</p>	<p>$I_a =$ <u>80.00</u> %</p> <p>$i =$ <u>0.80</u></p> <p>Area = <u>13.8</u> acres</p> <p>WQCV = <u>0.33</u> watershed inches</p> <p>Vol = <u>0.453</u> acre-feet</p>
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2YR-DEVELOPED-WQ testing

El Paso County 2-Year Duration=19 min, Inten=2.25 in/hr

Prepared by Catamount Engineering

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5/16/2013

Pond WQ4: EDB-4

Inflow Area = 13.800 ac, Inflow Depth = 0.57" for 2-Year event
 Inflow = 25.05 cfs @ 0.28 hrs, Volume= 0.655 af
 Outflow = 0.50 cfs @ 0.59 hrs, Volume= 0.649 af, Atten= 98%, Lag= 18.4 min
 Primary = 0.50 cfs @ 0.59 hrs, Volume= 0.649 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
 Peak Elev= 6,792.74' @ 0.59 hrs Surf.Area= 16,710 sf Storage= 27,954 cf
 Plug-Flow detention time= 769.9 min calculated for 0.649 af (99% of inflow)
 Center-of-Mass det. time= 769.7 min (786.8 - 17.1)

#	Invert	Avail.Storage	Storage Description
1	6,790.50'	74,166 cf	Custom Stage Data (Prismatic) Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6,790.50	3,330	0	0
6,791.00	9,495	3,206	3,206
6,792.00	13,815	11,655	14,861
6,794.00	21,660	35,475	50,336
6,795.00	26,000	23,830	74,166

#	Routing	Invert	Outlet Devices
1	Primary	6,790.40'	24.0" x 113.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 6,789.00' S= 0.0124 ' /' n= 0.013 Cc= 0.900
2	Device 1	6,790.50'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
3	Device 1	6,791.00'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
4	Device 1	6,791.50'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
5	Device 1	6,792.00'	1.0" Vert. Orifice/Grate X 4.00 C= 0.600
6	Device 1	6,792.80'	36.0" Vert. Orifice/Grate C= 0.600
7	Secondary	6,794.50'	20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.50 cfs @ 0.59 hrs HW=6,792.74' (Free Discharge)

- 1=Culvert (Passes 0.50 cfs of 17.50 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.1 fps)
- 3=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.3 fps)
- 4=Orifice/Grate (Orifice Controls 0.11 cfs @ 5.3 fps)
- 5=Orifice/Grate (Orifice Controls 0.09 cfs @ 4.0 fps)
- 6=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6,790.50' (Free Discharge)

- 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

2YR-DEVELOPED-WQ testing*El Paso County 2-Year Duration=19 min, Inten=2.25 in/hr*

Prepared by Catamount Engineering

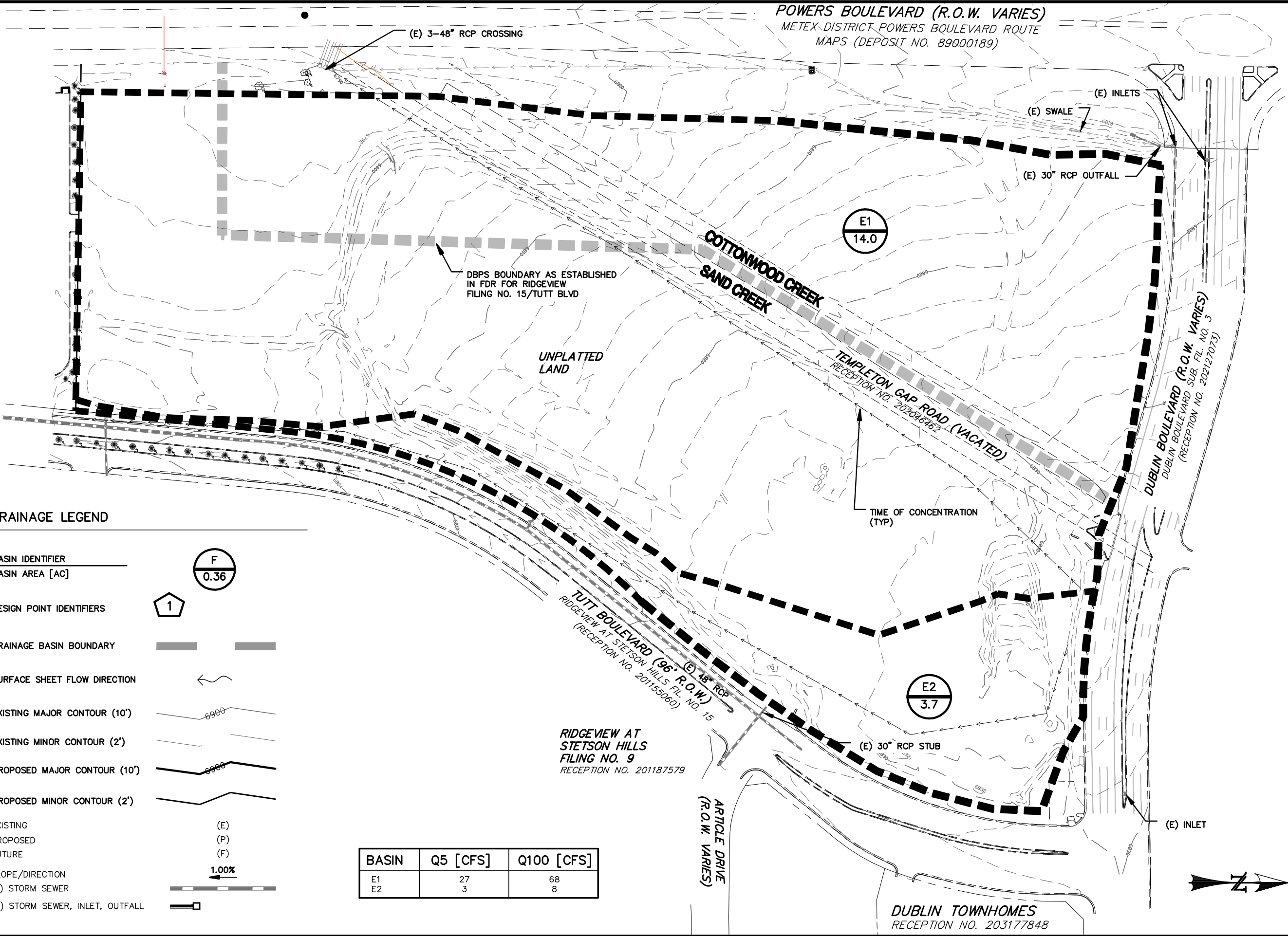
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5/16/2013

Hydrograph for Pond WQ4: EDB-4

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	6,790.50	0.00	0.00	0.00
1.00	0.00	27,234	6,792.70	0.49	0.49	0.00
2.00	0.00	25,513	6,792.60	0.47	0.47	0.00
3.00	0.00	23,861	6,792.51	0.45	0.45	0.00
4.00	0.00	22,278	6,792.42	0.43	0.43	0.00
5.00	0.00	20,766	6,792.33	0.41	0.41	0.00
6.00	0.00	19,327	6,792.25	0.39	0.39	0.00
7.00	0.00	17,963	6,792.17	0.37	0.37	0.00
8.00	0.00	16,681	6,792.10	0.34	0.34	0.00
9.00	0.00	15,498	6,792.04	0.31	0.31	0.00
10.00	0.00	14,408	6,791.96	0.29	0.29	0.00
11.00	0.00	13,380	6,791.87	0.28	0.28	0.00
12.00	0.00	12,411	6,791.79	0.26	0.26	0.00
13.00	0.00	11,505	6,791.71	0.24	0.24	0.00
14.00	0.00	10,664	6,791.64	0.22	0.22	0.00
15.00	0.00	9,897	6,791.57	0.20	0.20	0.00
16.00	0.00	9,215	6,791.52	0.18	0.18	0.00
17.00	0.00	8,593	6,791.46	0.17	0.17	0.00
18.00	0.00	7,998	6,791.41	0.16	0.16	0.00
19.00	0.00	7,428	6,791.36	0.15	0.15	0.00
20.00	0.00	6,885	6,791.32	0.15	0.15	0.00
21.00	0.00	6,368	6,791.27	0.14	0.14	0.00
22.00	0.00	5,877	6,791.23	0.13	0.13	0.00
23.00	0.00	5,414	6,791.19	0.12	0.12	0.00
24.00	0.00	4,979	6,791.15	0.12	0.12	0.00
25.00	0.00	4,573	6,791.12	0.11	0.11	0.00
26.00	0.00	4,200	6,791.09	0.10	0.10	0.00
27.00	0.00	3,863	6,791.06	0.09	0.09	0.00
28.00	0.00	3,565	6,791.03	0.08	0.08	0.00
29.00	0.00	3,294	6,791.01	0.07	0.07	0.00
30.00	0.00	3,039	6,790.97	0.07	0.07	0.00
31.00	0.00	2,796	6,790.94	0.07	0.07	0.00
32.00	0.00	2,565	6,790.90	0.06	0.06	0.00
33.00	0.00	2,344	6,790.87	0.06	0.06	0.00
34.00	0.00	2,134	6,790.83	0.06	0.06	0.00
35.00	0.00	1,936	6,790.80	0.05	0.05	0.00
36.00	0.00	1,749	6,790.77	0.05	0.05	0.00
37.00	0.00	1,573	6,790.75	0.05	0.05	0.00
38.00	0.00	1,408	6,790.72	0.04	0.04	0.00
39.00	0.00	1,254	6,790.70	0.04	0.04	0.00
40.00	0.00	1,112	6,790.67	0.04	0.04	0.00
41.00	0.00	981	6,790.65	0.03	0.03	0.00
42.00	0.00	861	6,790.63	0.03	0.03	0.00
43.00	0.00	753	6,790.62	0.03	0.03	0.00
44.00	0.00	655	6,790.60	0.03	0.03	0.00
45.00	0.00	570	6,790.59	0.02	0.02	0.00
46.00	0.00	497	6,790.58	0.02	0.02	0.00
47.00	0.00	436	6,790.57	0.02	0.02	0.00
48.00	0.00	384	6,790.56	0.01	0.01	0.00
49.00	0.00	339	6,790.55	0.01	0.01	0.00
50.00	0.00	300	6,790.55	0.01	0.01	0.00

DRAINAGE MAP



DRAINAGE LEGEND

- BASIN IDENTIFIER (F)
- BASIN AREA [AC] 0.36

- DESIGN POINT IDENTIFIERS 1

- DRAINAGE BASIN BOUNDARY [Thick Dashed Line]

- SURFACE SHEET FLOW DIRECTION [Arrow]

- EXISTING MAJOR CONTOUR (10') [Dashed Line]
- EXISTING MINOR CONTOUR (2') [Thin Dashed Line]
- PROPOSED MAJOR CONTOUR (10') [Thick Solid Line]
- PROPOSED MINOR CONTOUR (2') [Thin Solid Line]

- EXISTING (E)
- PROPOSED (P)
- FUTURE (F)

- SLOPE/DIRECTION 1.00%
- (E) STORM SEWER [Line with Arrow]
- (P) STORM SEWER, INLET, OUTFALL [Line with T-bar]

BASIN	Q5 [CFS]	Q100 [CFS]
E1	27	68
E2	3	8

SCALE:	1"=150'	JOB NUMBER	12-025
DRAWN BY:	DLM	SHEET	1 OF 1
DATE:	2/25/13		

DUBLIN COMMONS

EXISTING DRAINAGE PLAN

PREPARED FOR:
POWERS DUBLIN DEVELOPMENT COMPANY
 102 N. CASCADE AVE, STE 610
 COLORADO SPRINGS, CO 80903

PO BOX 682
 DIVIDE, CO 80814
 (719) 428-2124

POWERS BOULEVARD (R.O.W. VARIES)
 METEX DISTRICT POWERS BOULEVARD ROUTE
 MAPS (DEPOSIT NO. 89000189)

DBPS BOUNDARY AS ESTABLISHED
 IN FDR FOR RIDGEVIEW
 FILING NO. 15/TUTT BLVD

UNPLATTED
 LAND

TUTT BOULEVARD (96' R.O.W.)
 RIDGEVIEW AT STETSON HILLS FIL. NO. 15
 (RECEPTION NO. 201155060)

RIDGEVIEW AT STETSON HILLS
 FILING NO. 9
 RECEPTION NO. 201187579

ARTICLE DRIVE
 (R.O.W. VARIES)

DUBLIN TOWNHOMES
 RECEPTION NO. 203177848

E1
14.0

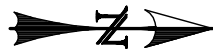
E2
3.7

(E) INLET

(E) SWALE

(E) 30" RCP OUTFALL

TIME OF CONCENTRATION
 (TYP)

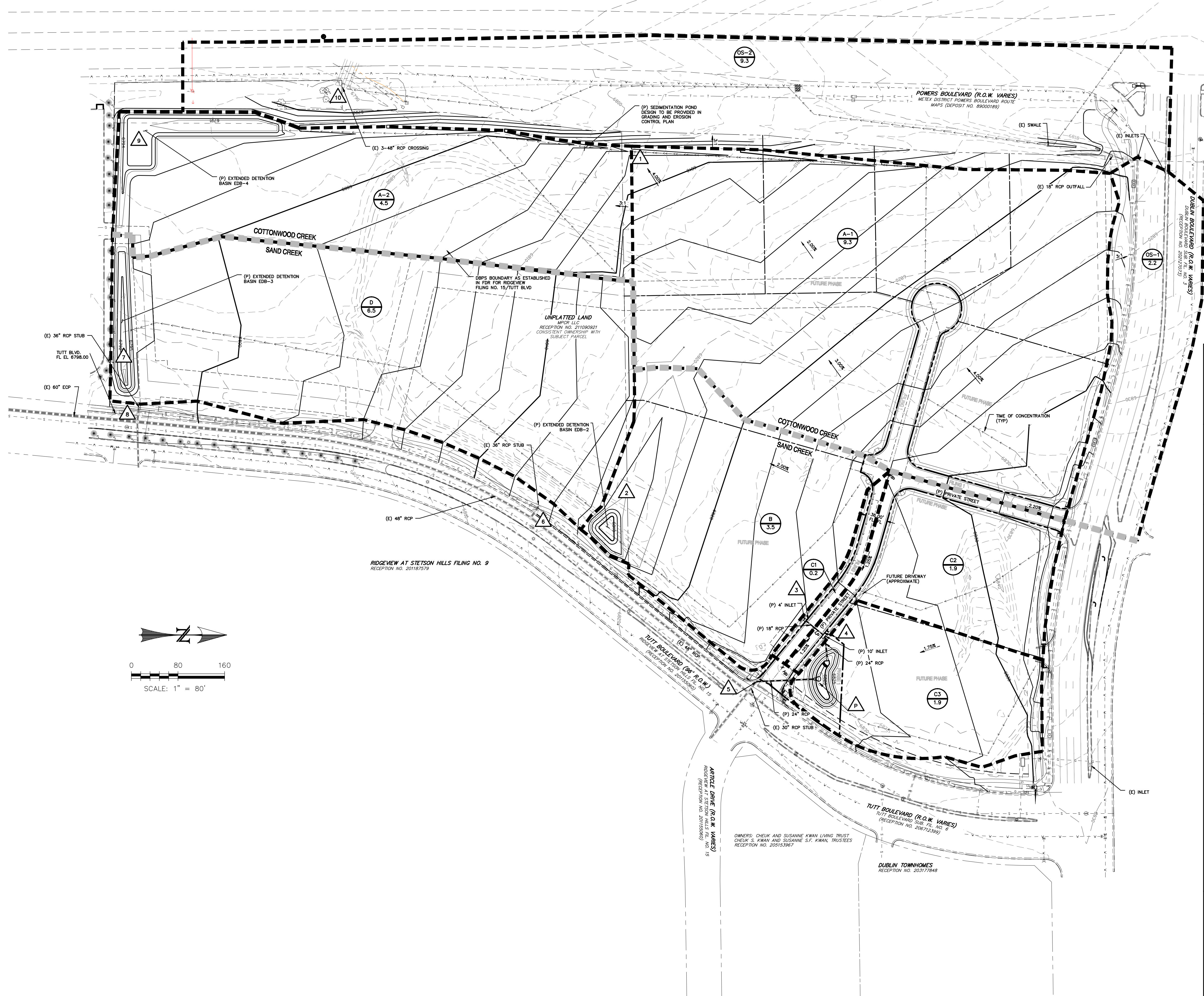
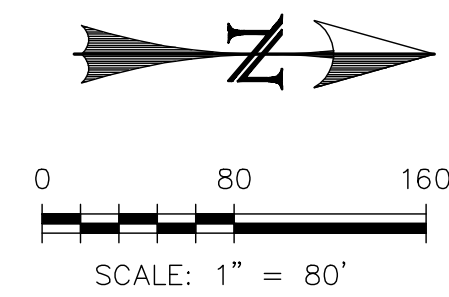


BASIN	Q5 [CFS]	Q100 [CFS]
A1	24	42
A2	14	27
B	12	23
C1	1	2
C2	9	15
C3	9	15
D	20	38
OS-1	7	14
OS-2	12	27

DESIGN POINT	Q5 [CFS]	Q100 [CFS]
1	24	42
2	12	23
3	1	2
4	9	16
P	18	32
5	1	17
6	8	21
7	20	38
8	9	28
9	33	65
10	25	58

DRAINAGE LEGEND

- BASIN IDENTIFIER F
- BASIN AREA [AC] 0.36
- DESIGN POINT IDENTIFIERS 1
- DRAINAGE BASIN BOUNDARY
- SURFACE SHEET FLOW DIRECTION
- EXISTING MAJOR CONTOUR (10')
- EXISTING MINOR CONTOUR (2')
- PROPOSED MAJOR CONTOUR (10')
- PROPOSED MINOR CONTOUR (2')
- EXISTING (E)
- PROPOSED (P)
- FUTURE (F)
- SLOPE/DIRECTION 1.00%
- (E) STORM SEWER
- (P) STORM SEWER, INLET, OUTFALL



DRAWN BY:	DJLM
DATE:	05/15/13
SCALE:	1" = 60'
JOB NUMBER:	12-025
SHEET:	1 OF 1

DUBLIN COMMONS
DRAINAGE PLAN

CATAMOUNT
ENGINEERING

PREPARED FOR:
POWERS, DUBLIN
DEVELOPMENT COMPANY
102 NORTH CASCADE AVE, SUITE 610
COLORADO SPRINGS, CO 80903

TITLE BLOCK
DENSE, CO 80911
(719) 597-0881