



RG AND ASSOCIATES, LLC

Del Norte • Wheat Ridge
303-293-8107 • www.rgengineers.com

MEMO

Date: June 30, 2021
To: El Paso County
From: RG and Associates, LLC
Paintbrush Hills Metropolitan District
RGA Job No. 1070.0022
RE: **Scenic View at Paintbrush Hills Pond Modifications**

Scenic View at Paintbrush Hills Pond Modifications:

Purpose and Scope

The purpose of this memorandum is to update the detention pond associated with the Final Drainage Report prepared by Core Engineering Group, LLC in July 2014, which provided a detailed analysis of existing and developed runoff from "Scenic View at Paintbrush Hills". This site is located within an area previously studied by the "Master Development Drainage Plan for Falcon Hills Development". The approved Final Drainage Report analyzed developed drainage patterns and storm sewer infrastructure necessary to convey developed runoff for the Scenic View at Paintbrush Hills development. The Scenic View at Paintbrush Hills Pond was surveyed, and record drawings provided on July 3, 2016. Excerpts are attached from the approved Final Drainage Report and Record Drawings.

Property Location and Description

The Scenic View at Paintbrush Hills is located on approximately 18.76 acres with 89 proposed single family residential units. The site is in the south $\frac{1}{2}$ of the southwest $\frac{1}{4}$ of Section 36, Township 12 South, Range 65 West of the 6th Principal Meridian, of El Paso County, State of Colorado. The property is bounded to the north by Falcon Middle School, on the east by Paintbrush Hills Filing No. 4, on the south by Stapleton Drive and on the west by Towner Avenue. See attached vicinity map.

According to the current FEMA Flood Insurance Rate Map (FIRM) number 08041CO515G; this site is not located within the 100-year floodplain. See attached FEMA Flood Map.

The site consists of the following soils: Pring Coarse Sandy Loam (98-percent) and Columbine Gravelly Sandy Loam (2-percent), these soil types being Type B and Type A soils classifications, respectively. See attached SCS Soil Map.

Pond Modifications

The existing Scenic View at Paintbrush Hills Pond will be modified and brought up to current Mile High Flood District (MHFD) design standards. The following modifications are proposed for the on-site detention pond:

- A concrete lined forebay will be installed at the outlet of the existing 42-RCP outfall (sized for 8-percent of the water quality capture volume).

- A concrete weir wall will be installed in the forebay to control the release from the forebay and overflow into the detention basin with a soil riprap mitigation on the downstream face (sized for 2-percent of the design inflow for the forebay notch and 100-percent of the inflow for the overflow).
- A concrete trickle channel will be installed between the forebay and the existing outlet structure (sized for 13-percent of the design inflow).
- The existing concrete outlet structure will be modified to conform to MHFD Excess Urban Runoff Volume (EURV) methodology. The existing Type C box will be increased in high by approximately 2-feet with a new EURV orifice plate installed and a new 100-year restrictor plate installed on the existing 21-inch RCP outlet pipe.
- The existing detention pond will be re-graded to obtain more volume with the existing top of berm raised by approximately 1-foot and the emergency spillway raised by approximately 0.70-feet.
- The remainder of the pond sides and pond bottom will remain unchanged.

Supporting calculations related to the Scenic View at Paintbrush Hill Detention Pond Modification have been attached.

Sincerely,



Gary E. Welp, P.E., CFM
Senior Project Manager





VICINITY MAP
1" = 2000 FEET

National Flood Hazard Layer FIRMette



104°37'37"W 38°58'26"N



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

- | | | |
|------------------------------------|--|--|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i> |
| | | Effective LOMRs |
| | | Area of Undetermined Flood Hazard <i>Zone D</i> |
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | 20.2 Cross Sections with 1% Annual Chance |
| | | 17.5 Water Surface Elevation |
| | | Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |



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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **6/29/2021 at 12:46 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for El Paso County Area, Colorado

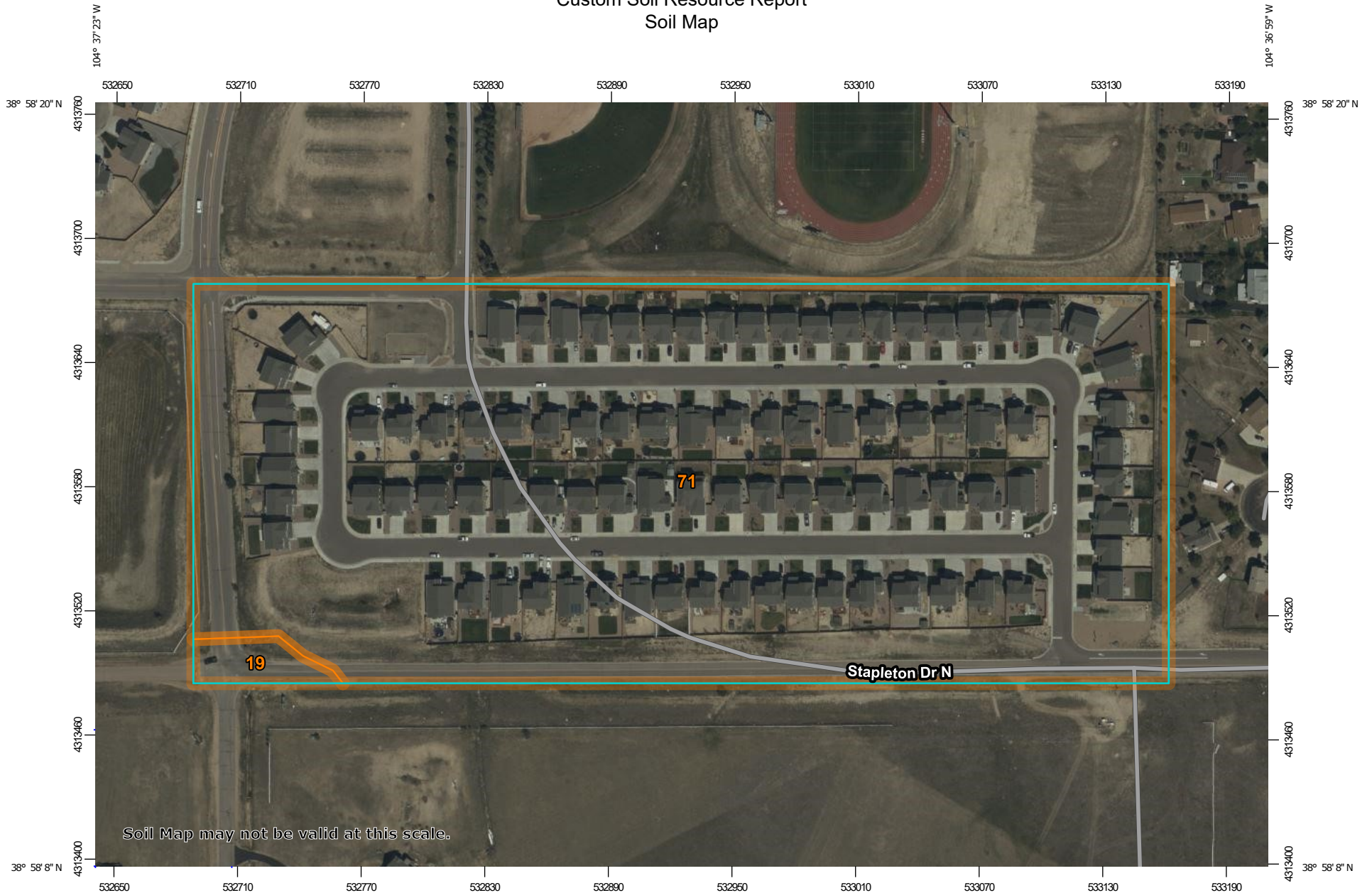
Scenic View Pond Subdivision



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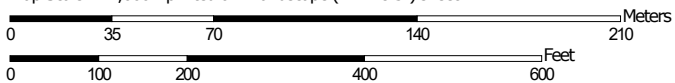
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Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.

Map Scale: 1:2,600 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
 Survey Area Data: Version 18, Jun 5, 2020

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

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

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	0.3	1.4%
71	Pring coarse sandy loam, 3 to 8 percent slopes	22.4	98.6%
Totals for Area of Interest		22.7	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Fans, flood plains, fan terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB215CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Fluvaquentic haplaquolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

71—Pring coarse sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369k
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Pring and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R048AY222CO
Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit:

Landform: Depressions

Hydric soil rating: Yes

Other soils

Percent of map unit:

Hydric soil rating: No



NOAA Atlas 14, Volume 8, Version 2
Location name: Peyton, Colorado, USA*
Latitude: 38.9707°, Longitude: -104.6207°
Elevation: 7152.99 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

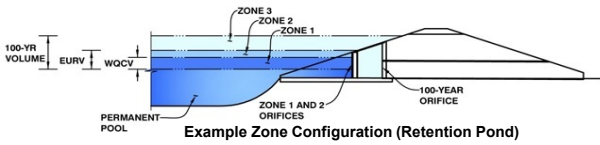
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.238 (0.192-0.297)	0.290 (0.233-0.362)	0.380 (0.305-0.476)	0.459 (0.366-0.578)	0.575 (0.445-0.755)	0.670 (0.505-0.890)	0.769 (0.560-1.05)	0.875 (0.611-1.22)	1.02 (0.685-1.47)	1.14 (0.742-1.65)
10-min	0.348 (0.281-0.435)	0.424 (0.342-0.531)	0.556 (0.446-0.697)	0.672 (0.536-0.846)	0.842 (0.652-1.11)	0.980 (0.740-1.30)	1.13 (0.820-1.53)	1.28 (0.894-1.79)	1.50 (1.00-2.15)	1.67 (1.09-2.42)
15-min	0.425 (0.342-0.531)	0.518 (0.417-0.647)	0.678 (0.544-0.850)	0.819 (0.654-1.03)	1.03 (0.795-1.35)	1.20 (0.902-1.59)	1.37 (1.00-1.87)	1.56 (1.09-2.18)	1.83 (1.22-2.62)	2.04 (1.33-2.95)
30-min	0.611 (0.492-0.763)	0.743 (0.598-0.930)	0.973 (0.780-1.22)	1.17 (0.937-1.48)	1.47 (1.14-1.93)	1.71 (1.29-2.27)	1.96 (1.43-2.67)	2.23 (1.56-3.11)	2.60 (1.74-3.73)	2.90 (1.89-4.20)
60-min	0.785 (0.632-0.980)	0.939 (0.756-1.18)	1.22 (0.976-1.53)	1.47 (1.17-1.85)	1.85 (1.44-2.45)	2.17 (1.65-2.90)	2.52 (1.84-3.44)	2.89 (2.02-4.06)	3.42 (2.30-4.93)	3.85 (2.51-5.58)
2-hr	0.959 (0.779-1.19)	1.14 (0.921-1.41)	1.46 (1.18-1.82)	1.77 (1.42-2.21)	2.24 (1.76-2.95)	2.64 (2.02-3.51)	3.08 (2.27-4.18)	3.56 (2.51-4.96)	4.25 (2.88-6.08)	4.81 (3.16-6.92)
3-hr	1.05 (0.860-1.30)	1.23 (1.00-1.52)	1.57 (1.28-1.95)	1.90 (1.53-2.36)	2.42 (1.92-3.19)	2.88 (2.22-3.82)	3.38 (2.51-4.59)	3.94 (2.80-5.49)	4.75 (3.24-6.79)	5.42 (3.58-7.78)
6-hr	1.22 (1.01-1.50)	1.41 (1.16-1.73)	1.79 (1.46-2.20)	2.16 (1.76-2.67)	2.77 (2.22-3.64)	3.31 (2.57-4.37)	3.91 (2.93-5.29)	4.58 (3.29-6.36)	5.58 (3.84-7.93)	6.40 (4.26-9.12)
12-hr	1.41 (1.17-1.72)	1.64 (1.36-1.99)	2.08 (1.71-2.53)	2.50 (2.05-3.06)	3.19 (2.58-4.15)	3.80 (2.98-4.97)	4.47 (3.38-6.00)	5.22 (3.78-7.19)	6.32 (4.39-8.93)	7.23 (4.85-10.2)
24-hr	1.63 (1.36-1.96)	1.91 (1.60-2.30)	2.43 (2.02-2.94)	2.92 (2.42-3.55)	3.69 (2.99-4.73)	4.35 (3.42-5.62)	5.06 (3.85-6.71)	5.85 (4.26-7.97)	6.99 (4.89-9.78)	7.92 (5.36-11.1)
2-day	1.89 (1.59-2.26)	2.24 (1.88-2.67)	2.85 (2.39-3.41)	3.41 (2.84-4.10)	4.25 (3.45-5.36)	4.95 (3.92-6.32)	5.70 (4.36-7.47)	6.51 (4.77-8.77)	7.66 (5.39-10.6)	8.59 (5.87-12.0)
3-day	2.08 (1.76-2.47)	2.45 (2.07-2.91)	3.11 (2.62-3.71)	3.71 (3.11-4.44)	4.60 (3.75-5.77)	5.34 (4.24-6.78)	6.12 (4.70-7.98)	6.97 (5.13-9.34)	8.17 (5.78-11.3)	9.13 (6.27-12.7)
4-day	2.24 (1.90-2.65)	2.63 (2.23-3.11)	3.31 (2.80-3.93)	3.93 (3.30-4.68)	4.85 (3.97-6.07)	5.62 (4.48-7.11)	6.43 (4.96-8.35)	7.31 (5.40-9.77)	8.55 (6.07-11.8)	9.55 (6.58-13.3)
7-day	2.65 (2.27-3.11)	3.06 (2.61-3.60)	3.79 (3.22-4.46)	4.44 (3.76-5.26)	5.42 (4.47-6.73)	6.24 (5.01-7.84)	7.11 (5.51-9.17)	8.04 (5.98-10.7)	9.37 (6.69-12.8)	10.4 (7.23-14.4)
10-day	3.01 (2.59-3.52)	3.46 (2.97-4.05)	4.24 (3.62-4.98)	4.94 (4.20-5.83)	5.98 (4.95-7.38)	6.84 (5.51-8.55)	7.75 (6.03-9.94)	8.73 (6.52-11.5)	10.1 (7.25-13.7)	11.2 (7.80-15.4)
20-day	4.03 (3.49-4.68)	4.64 (4.01-5.38)	5.67 (4.88-6.59)	6.54 (5.61-7.65)	7.80 (6.47-9.47)	8.79 (7.13-10.8)	9.82 (7.69-12.4)	10.9 (8.18-14.2)	12.4 (8.93-16.6)	13.5 (9.49-18.4)
30-day	4.86 (4.23-5.60)	5.61 (4.87-6.47)	6.83 (5.91-7.91)	7.85 (6.76-9.13)	9.27 (7.71-11.2)	10.4 (8.43-12.7)	11.5 (9.02-14.4)	12.6 (9.50-16.3)	14.1 (10.2-18.8)	15.3 (10.8-20.8)
45-day	5.88 (5.14-6.75)	6.78 (5.92-7.79)	8.23 (7.16-9.48)	9.41 (8.14-10.9)	11.0 (9.17-13.1)	12.2 (9.96-14.8)	13.4 (10.6-16.7)	14.6 (11.0-18.7)	16.1 (11.7-21.3)	17.2 (12.2-23.3)
60-day	6.74 (5.91-7.70)	7.75 (6.79-8.87)	9.36 (8.18-10.7)	10.7 (9.25-12.3)	12.4 (10.3-14.7)	13.6 (11.2-16.4)	14.9 (11.7-18.4)	16.0 (12.2-20.5)	17.6 (12.8-23.2)	18.6 (13.3-25.2)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

Project: Paintbrush Hills Scenic View Detention Pond
Basin ID: Pond #2



Watershed Information

Selected BMP Type =	EDB
Watershed Area =	19.72 acres
Watershed Length =	1,000 ft
Watershed Length to Centroid =	500 ft
Watershed Slope =	0.031 ft/ft
Watershed Imperviousness =	60.50% percent
Percentage Hydrologic Soil Group A =	2.0% percent
Percentage Hydrologic Soil Group B =	98.0% percent
Percentage Hydrologic Soil Groups C/D =	0.0% percent
Target WQCV Drain Time =	40.0 hours
Location for 1-hr Rainfall Depths =	User Input

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

Water Quality Capture Volume (WQCV) =	0.391 acre-feet
Excess Urban Runoff Volume (EURV) =	1.298 acre-feet
2-yr Runoff Volume (P1 = 0.94 in.) =	0.843 acre-feet
5-yr Runoff Volume (P1 = 1.22 in.) =	1.180 acre-feet
10-yr Runoff Volume (P1 = 1.47 in.) =	1.534 acre-feet
25-yr Runoff Volume (P1 = 1.85 in.) =	2.204 acre-feet
50-yr Runoff Volume (P1 = 2.17 in.) =	2.715 acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	3.340 acre-feet
500-yr Runoff Volume (P1 = 3.14 in.) =	4.364 acre-feet
Approximate 2-yr Detention Volume =	0.786 acre-feet
Approximate 5-yr Detention Volume =	1.092 acre-feet
Approximate 10-yr Detention Volume =	1.450 acre-feet
Approximate 25-yr Detention Volume =	1.729 acre-feet
Approximate 50-yr Detention Volume =	1.882 acre-feet
Approximate 100-yr Detention Volume =	2.128 acre-feet

Optional User Overrides

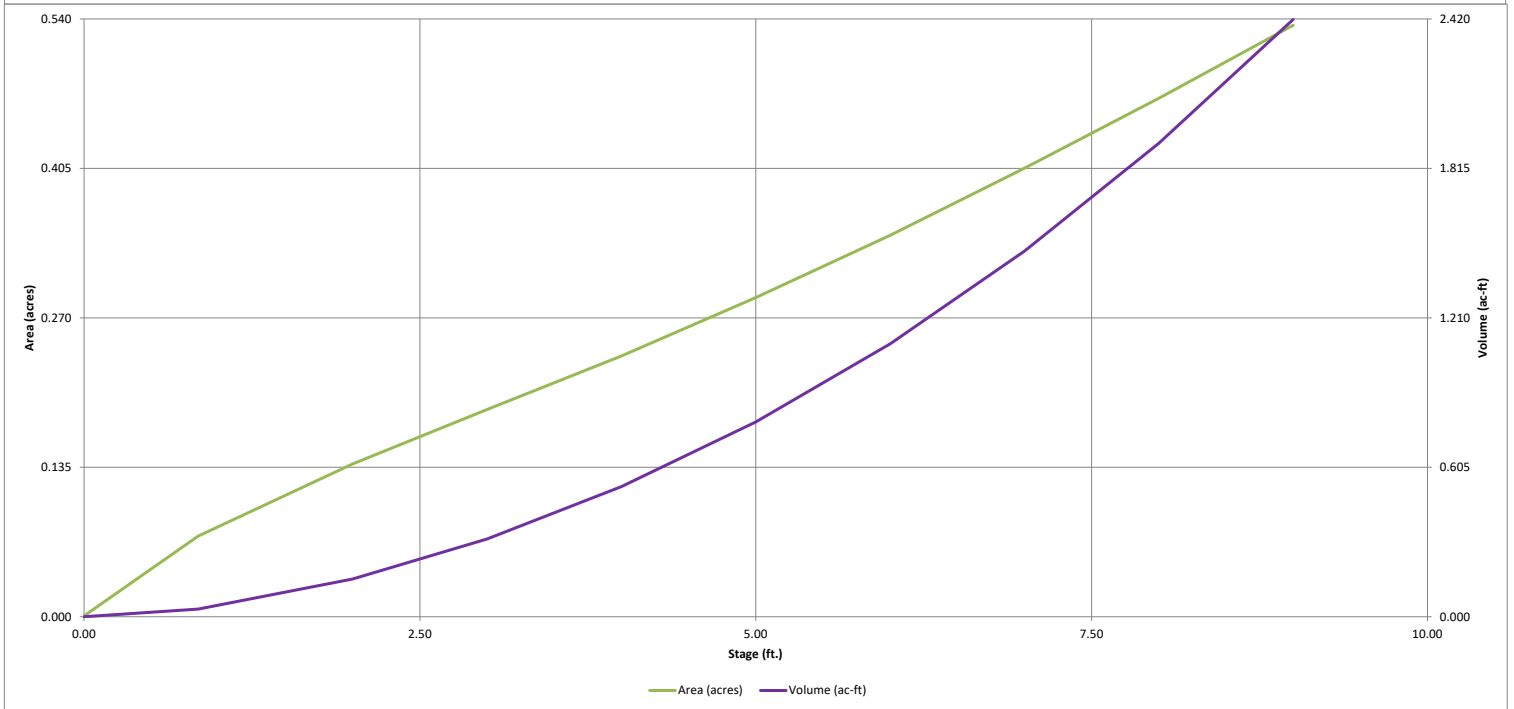
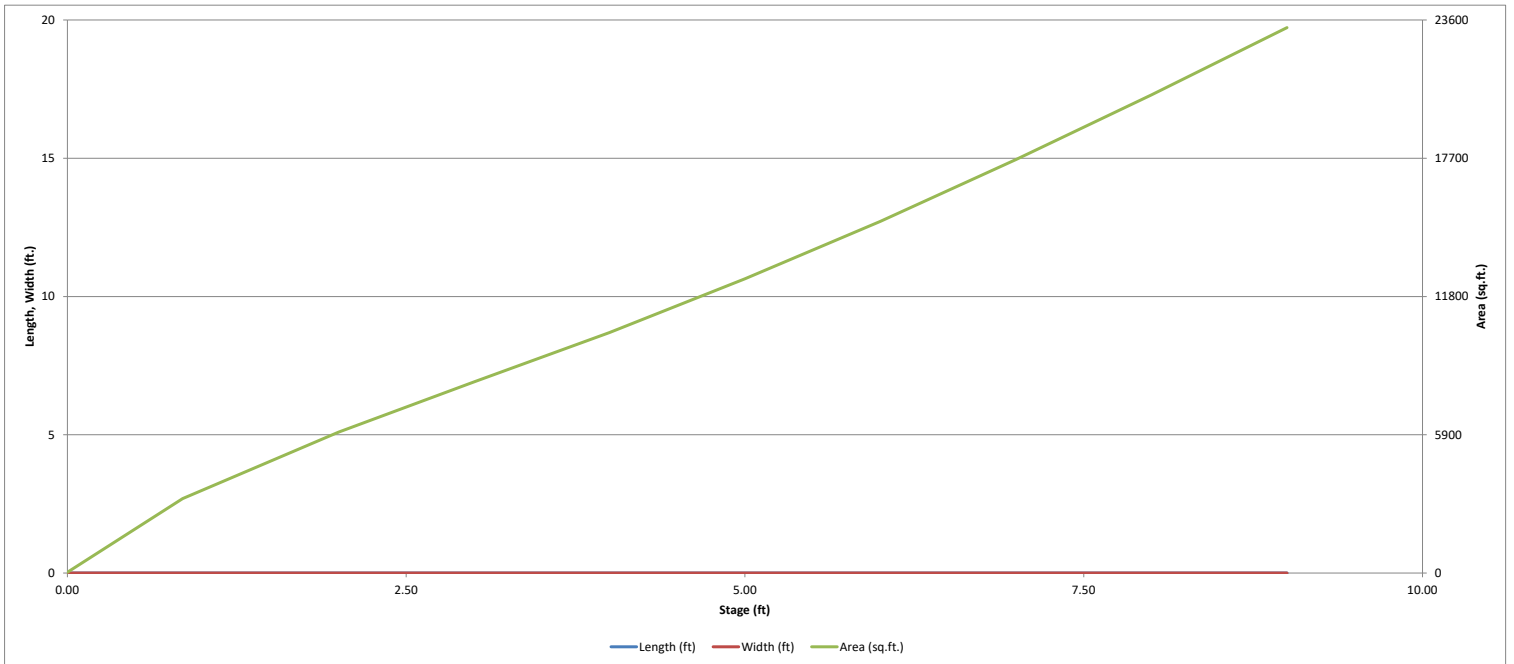
0.94	inches
1.22	inches
1.47	inches
1.85	inches
2.17	inches
2.52	inches

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.391 acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.907 acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.830 acre-feet
Total Detention Basin Volume =	2.128 acre-feet

Depth Increment = 1.00 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft ²)	Optional Override Area (ft ²)	Area (acre)	Volume (ft ³)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	33	0.001		
7138	--	0.85	--	--	--	3,174	0.073	1,363	0.031
7139	--	2.00	--	--	--	6,012	0.138	6,645	0.153
7140	--	3.00	--	--	--	8,153	0.187	13,727	0.315
7141	--	4.00	--	--	--	10,260	0.236	22,934	0.526
7142	--	5.00	--	--	--	12,558	0.288	34,343	0.788
7143	--	6.00	--	--	--	15,009	0.345	48,126	1.105
7144	--	7.00	--	--	--	17,647	0.405	64,454	1.480
7145	--	8.00	--	--	--	20,403	0.468	83,479	1.916
7146	--	9.00	--	--	--	23,274	0.534	105,318	2.418

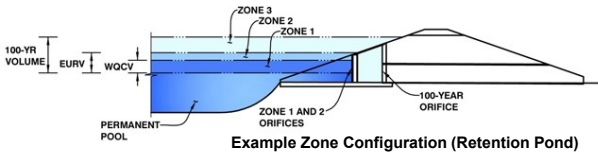


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.04 (February 2021)

Project: Paintbrush Hills Scenic View Detention Pond

Basin ID: Pond #2



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.39	0.391	Orifice Plate
Zone 2 (EURV)	6.54	0.907	Orifice Plate
Zone 3 (100-year)	8.44	0.830	Weir&Pipe (Circular)
Total (all zones)		2.128	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
 Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain
 Underdrain Orifice Area = ft²
 Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
 Orifice Plate: Orifice Vertical Spacing = inches
 Orifice Plate: Orifice Area per Row = sq. inches (diameter = 1-1/2 inches)

Calculated Parameters for Plate
 WQ Orifice Area per Row = ft²
 Elliptical Half-Width = feet
 Elliptical Slot Centroid = feet
 Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.50	3.00	4.50	6.00			
Orifice Area (sq. inches)	1.83	1.83	1.83	1.83	1.83			

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice
 Vertical Orifice Area = ft²
 Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe).

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.57	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	3.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	38%	N/A	%

Calculated Parameters for Overflow Weir
 Height of Grate Upper Edge, H_u = feet
 Overflow Weir Slope Length = feet
 Grate Open Area / 100-yr Orifice Area =
 Overflow Grate Open Area w/o Debris = ft²
 Overflow Grate Open Area w/ Debris = ft²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	0.75	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	21.00	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
 Outlet Orifice Area = ft²
 Outlet Orifice Centroid = feet
 Half-Central Angle of Restrictor Plate on Pipe = radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

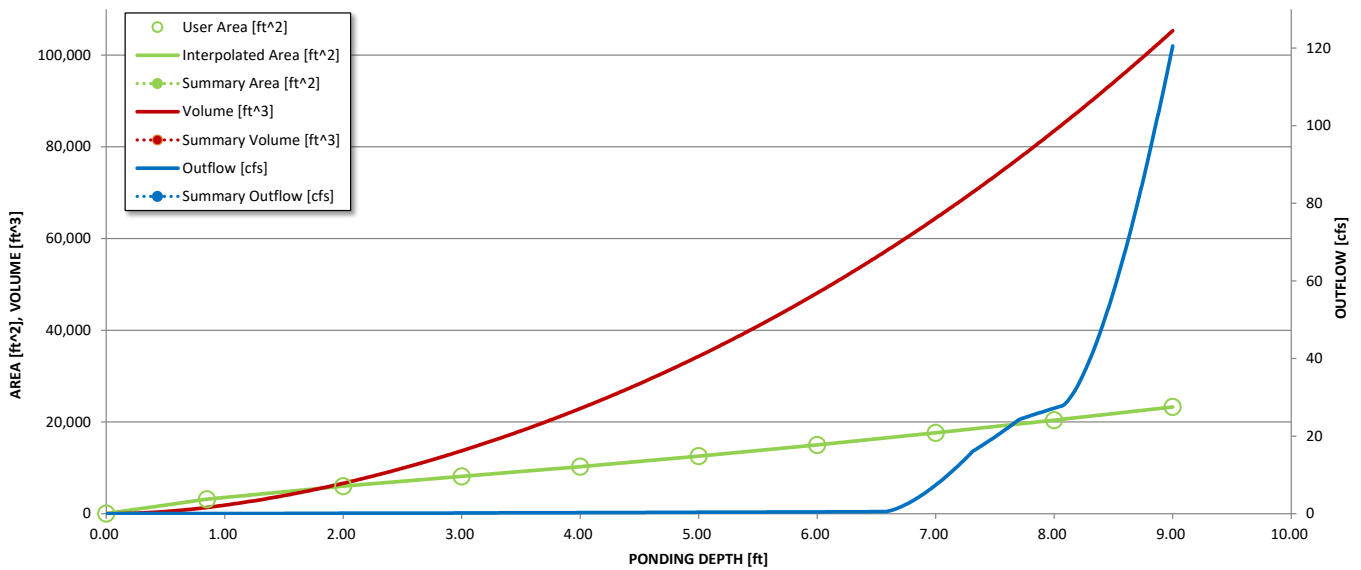
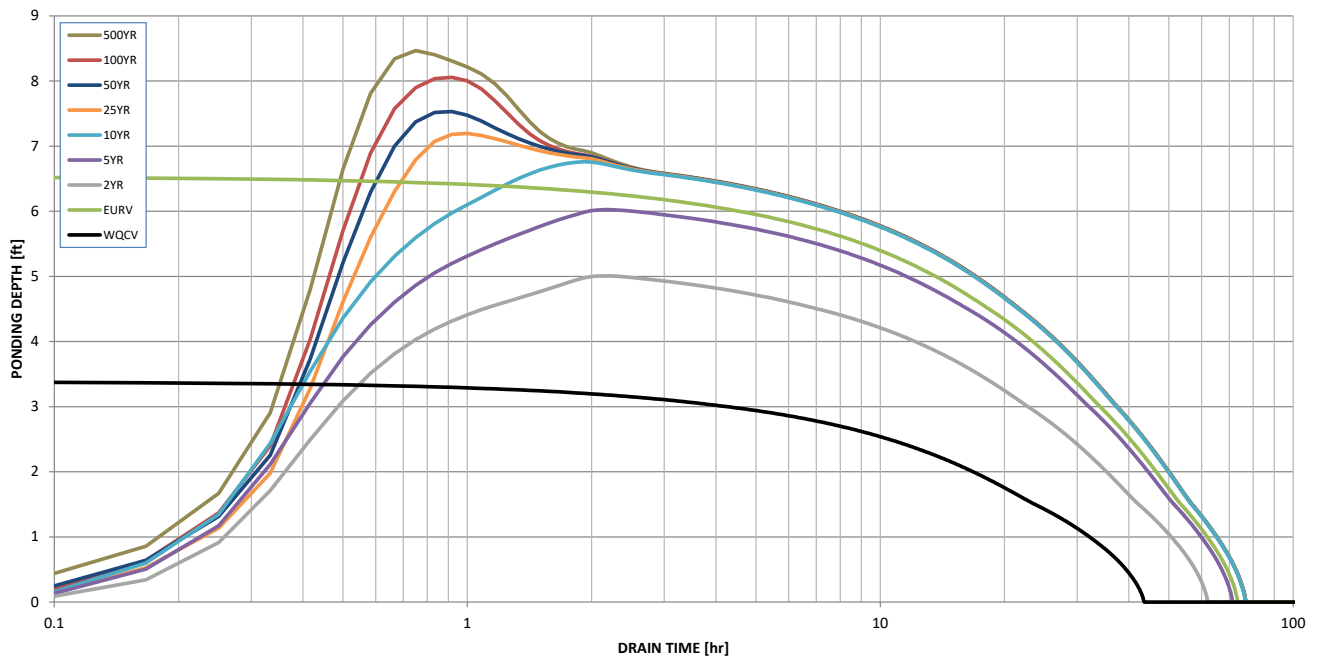
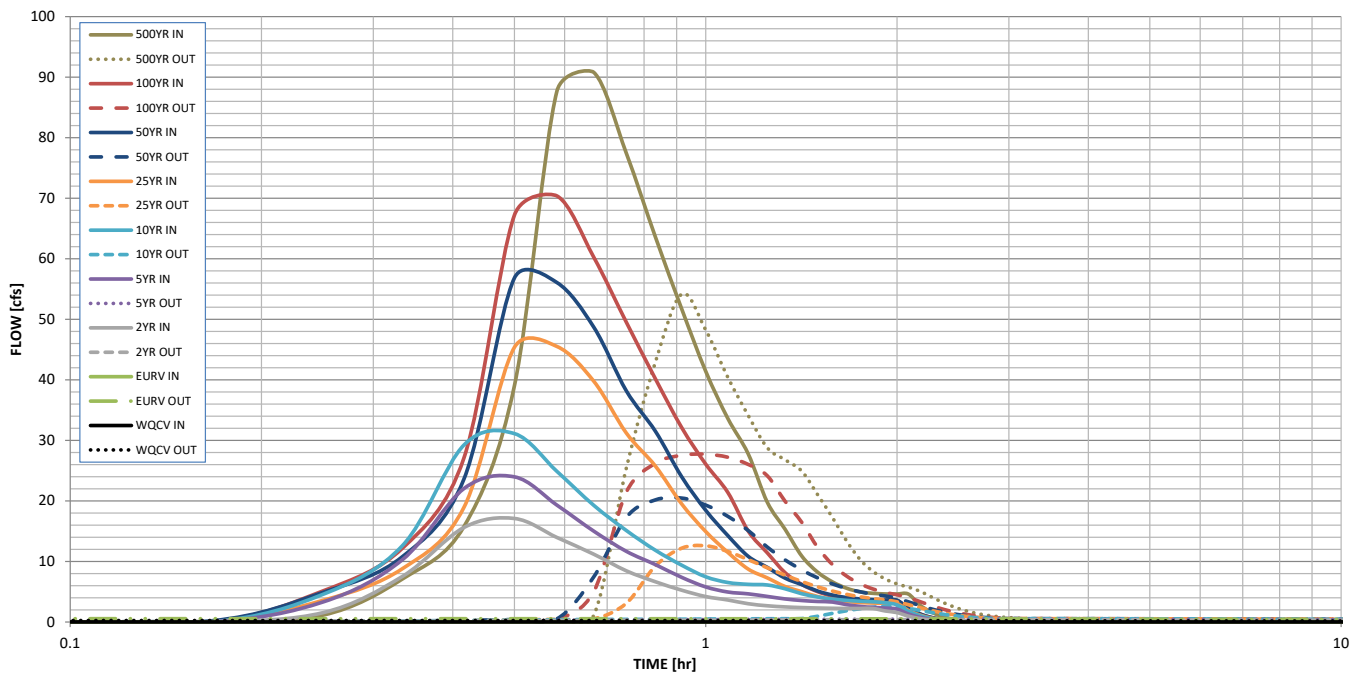
Spillway Invert Stage =	8.07	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	29.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway
 Spillway Design Flow Depth = feet
 Stage at Top of Freeboard = feet
 Basin Area at Top of Freeboard = acres
 Basin Volume at Top of Freeboard = acre-ft

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	0.94	1.22	1.47	1.85	2.17	2.52	3.14
One-Hour Rainfall Depth (in)	N/A	N/A	0.94	1.22	1.47	1.85	2.17	2.52	3.14
CUHP Runoff Volume (acre-ft)	0.391	1.298	0.843	1.180	1.534	2.204	2.715	3.340	4.364
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	0.843	1.180	1.534	2.204	2.715	3.340	4.364
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	0.3	2.5	6.6	17.9	24.7	33.1	46.1
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.02	0.12	0.34	0.91	1.25	1.68	2.34
Peak Inflow Q (cfs)	N/A	N/A	17.1	24.0	31.1	45.5	56.8	70.4	90.8
Peak Outflow Q (cfs)	0.2	0.5	0.4	0.5	2.6	12.6	20.5	27.7	54.1
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.2	0.4	0.7	0.8	0.8	1.2
Structure Controlling Flow	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps)	N/A	N/A	N/A	N/A	0.3	1.9	3.2	4.3	4.9
Max Velocity through Grate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	39	63	54	61	65	61	58	56	52
Time to Drain 99% of Inflow Volume (hours)	42	69	59	67	71	70	69	67	65
Maximum Ponding Depth (ft)	3.39	6.54	5.01	6.03	6.76	7.20	7.53	8.06	8.47
Area at Maximum Ponding Depth (acres)	0.21	0.38	0.29	0.35	0.39	0.42	0.44	0.47	0.50
Maximum Volume Stored (acre-ft)	0.392	1.300	0.788	1.112	1.384	1.558	1.703	1.940	2.139



Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 3

Designer: GEW
Company: RGA
Date: June 29, 2021
Project: Scenic View Detention Pond Modifications
Location: Paint Brush Hills

<p>1. Basin Storage Volume</p> <p>A) Effective Imperviousness of Tributary Area, I_a</p> <p>B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)</p> <p>C) Contributing Watershed Area</p> <p>D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm</p> <p>E) Design Concept (Select EURV when also designing for flood control)</p> <p>F) Design Volume (WQCV) Based on 40-hour Drain Time ($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area)$)</p> <p>G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume ($V_{WQCV\ OTHER} = (d_s * V_{DESIGN} / 0.43)$)</p> <p>H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)</p> <p>I) NRCS Hydrologic Soil Groups of Tributary Watershed i) Percentage of Watershed consisting of Type A Soils ii) Percentage of Watershed consisting of Type B Soils iii) Percentage of Watershed consisting of Type C/D Soils</p> <p>J) Excess Urban Runoff Volume (EURV) Design Volume For HSG A: $EURV_A = 1.68 * i^{1.28}$ For HSG B: $EURV_B = 1.36 * i^{1.08}$ For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$</p> <p>K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired)</p>	<p>$I_a =$ <input type="text" value="60.5"/> %</p> <p>$i =$ <input type="text" value="0.605"/></p> <p>Area = <input type="text" value="19.720"/> ac</p> <p>$d_s =$ <input type="text" value="0.43"/> in</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Choose One</p> <p><input type="radio"/> Water Quality Capture Volume (WQCV)</p> <p><input checked="" type="radio"/> Excess Urban Runoff Volume (EURV)</p> </div> <p>$V_{DESIGN} =$ <input type="text"/> ac-ft</p> <p>$V_{DESIGN\ OTHER} =$ <input type="text"/> ac-ft</p> <p>$V_{DESIGN\ USER} =$ <input type="text" value="0.391"/> ac-ft</p> <p>HSG_A = <input type="text" value="2"/> % HSG_B = <input type="text" value="98"/> % HSG_{C/D} = <input type="text" value="0"/> %</p> <p>EURV_{DESIGN} = <input type="text"/> ac-ft</p> <p>EURV_{DESIGN\ USER} = <input type="text" value="1.298"/> ac-ft</p>
<p>2. Basin Shape: Length to Width Ratio (A basin length to width ratio of at least 2:1 will improve TSS reduction.)</p>	<p>L : W = <input type="text" value="3.0"/> : 1</p>
<p>3. Basin Side Slopes</p> <p>A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred)</p>	<p>Z = <input type="text" value="4.00"/> ft / ft</p>
<p>4. Inlet</p> <p>A) Describe means of providing energy dissipation at concentrated inflow locations:</p>	<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>5. Forebay</p> <p>A) Minimum Forebay Volume ($V_{MIN} =$ <input type="text" value="3%"/> of the WQCV)</p> <p>B) Actual Forebay Volume</p> <p>C) Forebay Depth ($D_F =$ <input type="text" value="18"/> inch maximum)</p> <p>D) Forebay Discharge</p> <p>i) Undetained 100-year Peak Discharge</p> <p>ii) Forebay Discharge Design Flow ($Q_F = 0.02 * Q_{100}$)</p> <p>E) Forebay Discharge Design</p> <p>F) Discharge Pipe Size (minimum 8-inches)</p> <p>G) Rectangular Notch Width</p>	<p>$V_{MIN} =$ <input type="text" value="0.01200"/> ac-ft</p> <p>$V_F =$ <input type="text" value="0.034"/> ac-ft</p> <p>$D_F =$ <input type="text" value="18.0"/> in</p> <p>$Q_{100} =$ <input type="text" value="68.50"/> cfs</p> <p>$Q_F =$ <input type="text" value="1.37"/> cfs</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Choose One</p> <p><input type="radio"/> Berm With Pipe</p> <p><input checked="" type="radio"/> Wall with Rect. Notch</p> <p><input type="radio"/> Wall with V-Notch Weir</p> </div> <p>Calculated $D_P =$ <input type="text"/> in</p> <p>Calculated $W_N =$ <input type="text" value="6.3"/> in</p> <p style="color: blue; font-size: small;">Flow too small for berm w/ pipe</p>

Design Procedure Form: Extended Detention Basin (EDB)

Designer: GEW
Company: RGA
Date: June 29, 2021
Project: Scenic View Detention Pond Modifications
Location: Paint Brush Hills

<p>6. Trickle Channel</p> <p>A) Type of Trickle Channel</p> <p>F) Slope of Trickle Channel</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Choose One <input checked="" type="radio"/> Concrete <input type="radio"/> Soft Bottom </div> <p>S = <input style="width: 50px;" type="text" value="0.0050"/> ft / ft</p>
<p>7. Micropool and Outlet Structure</p> <p>A) Depth of Micropool (2.5-foot minimum)</p> <p>B) Surface Area of Micropool (10 ft² minimum)</p> <p>C) Outlet Type</p> <p>D) Smallest Dimension of Orifice Opening Based on Hydrograph Routing (Use UD-Detention)</p> <p>E) Total Outlet Area</p>	<p>D_M = <input style="width: 50px;" type="text"/> ft</p> <p>A_M = <input style="width: 50px;" type="text"/> sq ft</p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Choose One <input type="radio"/> Orifice Plate <input type="radio"/> Other (Describe): <hr/><hr/> </div> <p>D_{orifice} = <input style="width: 50px;" type="text"/> inches</p> <p>A_{tot} = <input style="width: 50px;" type="text"/> square inches</p>
<p>8. Initial Surcharge Volume</p> <p>A) Depth of Initial Surcharge Volume (Minimum recommended depth is 4 inches)</p> <p>B) Minimum Initial Surcharge Volume (Minimum volume of 0.3% of the WQCV)</p> <p>C) Initial Surcharge Provided Above Micropool</p>	<p>D_{IS} = <input style="width: 50px;" type="text"/> in</p> <p>V_{IS} = <input style="width: 50px;" type="text" value="51"/> cu ft</p> <p>V_s = <input style="width: 50px;" type="text"/> cu ft</p>
<p>9. Trash Rack</p> <p>A) Water Quality Screen Open Area: $A_t = A_{tot} * 38.5 * (e^{-0.095D})$</p> <p>B) Type of Screen (If specifying an alternative to the materials recommended in the USDCM, indicate "other" and enter the ratio of the total open are to the total screen are for the material specified.)</p> <p style="margin-left: 40px;">Other (Y/N): <input style="width: 50px;" type="text" value="N"/></p> <p>C) Ratio of Total Open Area to Total Area (only for type 'Other')</p> <p>D) Total Water Quality Screen Area (based on screen type)</p> <p>E) Depth of Design Volume (EURV or WQCV) (Based on design concept chosen under 1E)</p> <p>F) Height of Water Quality Screen (H_{TR})</p> <p>G) Width of Water Quality Screen Opening (W_{opening}) (Minimum of 12 inches is recommended)</p>	<p>A_t = <input style="width: 50px;" type="text"/> square inches</p> <div style="border: 1px solid black; height: 15px; width: 100%; margin-bottom: 5px;"></div> <hr/> <hr/> <hr/> <p>User Ratio = <input style="width: 50px;" type="text"/></p> <p>A_{total} = <input style="width: 50px;" type="text"/> sq. in.</p> <p>H = <input style="width: 50px;" type="text"/> feet</p> <p>H_{TR} = <input style="width: 50px;" type="text"/> inches</p> <p>W_{opening} = <input style="width: 50px;" type="text"/> inches</p>

Worksheet for Trickle Channel

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013
Channel Slope	0.5 %
Normal Depth	0.50 ft
Bottom Width	4.00 ft

Results

Discharge	8.78 ft ³ /s
Flow Area	2.00 ft ²
Wetted Perimeter	5.00 ft
Hydraulic Radius	0.40 ft
Top Width	4.00 ft
Critical Depth	0.53 ft
Critical Slope	0.00416 ft/ft
Velocity	4.39 ft/s
Velocity Head	0.30 ft
Specific Energy	0.80 ft
Froude Number	1.09
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.50 ft
Critical Depth	0.53 ft
Channel Slope	0.5 %
Critical Slope	0.00416 ft/ft



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FINAL DRAINAGE REPORT

**SCENIC VIEW
AT
PAINTBRUSH HILLS**

**NOVEMBER, 2013
FEBRUARY, 2014
APRIL, 2014
JUNE, 2014
JULY, 2014**

Prepared for:

Babcock Land Corp.
212 N. Wahsatch Ave, Suite 301
Colorado Springs, Colorado 80903
(719) 635-3200

Prepared by:

Core Engineering Group, LLC
15004 1st Avenue South
Burnsville Minnesota 55306
(719) 570-1100

Project No. 100.203

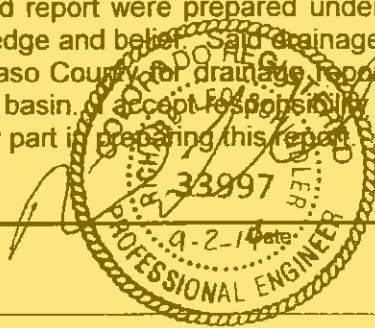


CORE
ENGINEERING GROUP

ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by El Paso 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.

Richard L. Schindler, P.E. #33997



OWNER'S STATEMENT

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

BABCOCK LAND CORP.

9/14/14

Business Name

Date

By

Title

212 North Wahsatch Avenue, Suite 301

Address

Colorado Springs, Colorado 80903

FLOODPLAIN STATEMENT

To the best of my knowledge and belief, this development is not located within a designated 100 year floodplain as shown on Flood Insurance Rate Map Panel No. 08041C0575 F, dated March 17, 1997. (See Appendix A, FEMA FIRM Exhibit)

EL PASO COUNTY

Filed in accordance with El Paso County Land Development Code, Drainage Criteria manual, Volumes 1 & 2, and the Engineering Criteria Manual, As Amended.

Andre Brackin, P.E., County Engineer / ECM Administrator

9-12-14

Date

Conditions:

Sub-Basin C6b

Sub-Basin C6b consists of residential lots and directs runoff east and south to the proposed street. The total developed flow from this 1.49 acre sub-basin is 3.7cfs for the 5-year event and 7.6cfs for the 100-year event. Runoff from this basin is directed westerly within the street to the proposed 10' type "R" inlet #2 on a continuous grade. For the 5-year flow of 4.7cfs (includes 1.0cfs flowby from inlet #2 in C6a), this inlet intercepts a total of 4.5cfs, with 0.2cfs flowby directed to inlet #4, for the 100-year flow of 12.9cfs (includes 5.3cfs flowby from inlet #2 in C6a) 8.1cfs will be intercepted with 4.8cfs flowby directed to inlet #4. Runoff from this proposed inlet is routed westerly underground via proposed 18" & 24" RCP's, then to the proposed detention pond located in the southwest corner of this development. See **Appendix B** for a flow summary of this basin.

Sub-Basin C6c

Sub-Basin C6c consists of residential lots and directs runoff south to the proposed street. The total developed flow from this 1.35 acre sub-basin is 3.5cfs for the 5-year event and 7.4cfs for the 100-year event. Runoff from this basin and the flowby is directed westerly within the street to the proposed 15' type "R" inlet #4 in a sump condition. This inlet will be discussed in greater detail in the following design point DP-4 section. See **Appendix B** for a flow summary of this basin.

Sub-Basin C6

Sub-Basin C consists of residential lots and directs runoff north and west to the proposed street. The peak developed flow from this 5.18 acre sub-basin is 12.8cfs for the 5-year event and 26.6cfs for the 100-year event, flows from this sub-basin have been intercepted as detailed previously in sub-basins C6a and C6b the remaining flow is directed to the proposed 15' type "R" inlet #4 in a sump condition. This inlet will be discussed in greater detail in the following design point DP-4 section. See **Appendix B** for a flow summary of this basin.

Design Point DP-4

Design Point DP-4 consists of sub-basins C5 and C6, the total developed flow from this combined 7.18 acre basin is 17.0cfs for the 5-year event and 35.2cfs for the 100-year event, of this flow, 10.1cfs for the 5-year event and 16.4cfs for the 100-year event have been intercepted upstream by inlets #2 and #3 and conveyed westerly underground via 18" & 24" RCP's to the low point in the proposed street. The remaining runoff is routed via curb and gutter to a proposed 15' type "R" inlet #4 in a sump condition on the north side of the proposed street. This 15' inlet will intercept the 5-year flow of 8.4cfs (4.7cfs from basin C5 + 3.5cfs from basin C6c + 0.2cfs flowby from inlet #3 = 8.4cfs; additive) at a depth of 0.48', the 100-year flow of 22.0cfs (9.8cfs from basin C5 + 7.4cfs from basin C6c + 4.8cfs flowby from inlet #3 = 22.0cfs; additive) will be intercepted at a depth of 0.69'. Runoff from this proposed inlet is routed southerly underground via proposed 24" RCP (pipe flow is 8.4cfs for the 5-year event and 22.0cfs for the 100-year event) to the proposed manhole, then a 42" RCP to proposed inlet #5, and the 42" RCP outlets into the proposed detention pond located in the southwest corner of this development. See **Appendix B** for a flow summary of this basin.

Sub-Basin C7

Sub-Basin C7 consists of residential lots and directs runoff north to the proposed street. The peak developed flow from this 1.65 acre sub-basin is 4.1cfs for the 5-year event and 8.6cfs for the 100-year event, these flows are routed westerly via curb and gutter to a proposed 20' type "R" inlet #5 in a sump condition on the south side of the proposed street. This inlet will be discussed in greater detail in the following design point DP-5 section. See **Appendix B** for a flow summary of this basin.

Sub-Basin C8

Sub-Basin C8 consists of residential lots and directs runoff easterly to the proposed street. The peak developed flow from this 1.54 acre sub-basin is 4.1cfs for the 5-year event and 8.4cfs for the 100-year event, these flows are routed southerly, the easterly via curb and gutter to a proposed 20' type "R"

inlet #5 in a sump condition on the south side of the proposed street. This inlet will be discussed in greater detail in the following design point DP-5 section. See **Appendix B** for a flow summary of this basin.

Design Point DP-5

Design Point DP-5 consists of design point DP-3 and sub-basins C7 and C8, the total developed flow from this combined 32.27 acre basin is 24.4cfs for the 5-year event and 60.1cfs for the 100-year event, a portion of the 5-year flow and the 100-year flow have been intercepted upstream and conveyed underground southerly and easterly via 30" RCP to the low point in the proposed street. The remaining runoff is routed via curb and gutter to a proposed 20' type "R" inlet #5 in a sump condition on the south side of the proposed street. This 20' inlet will intercept the 5-year flow of 9.6cfs (4.1cfs from basin C7 + 4.1cfs from basin C8 + 0.3cfs flowby from basin EX-B1 + 1.1cfs flowby from inlet #1 = 9.3cfs; additive) at a depth of 0.46', the 100-year flow of 32.2cfs (8.6cfs from basin C7 + 8.4cfs from basin C8 + 8.1cfs flowby from basin EX-B1 + 7.1cfs flowby from inlet #1 = 32.2cfs; additive) will be intercepted at a depth of 0.73'. Runoff from this proposed inlet is routed southerly underground via proposed 42" RCP to the proposed detention pond located in the southwest corner of this development. See **Appendix B** for a flow summary of this basin.

Design Point DP-6

Design Point DP-6 collects surface and pipe flow from design points DP-4 and DP-5, which includes the released flows of 10.9cfs for the 5-year event and 46.2cfs for the 100-year event from the existing detention pond. The total developed flow from this 39.45 acre design point is 32.5cfs for the 5-year event and 68.6cfs for the 100-year event. Design point DP-6 flows are directed to the proposed detention pond located in the southwest corner of this development. This pond will be discussed in greater detail in the following Detention Pond and Water Quality section. See **Appendix B** for a flow summary of this basin.

Sub-Basin C9

Sub-Basin C9 encompasses the detention pond area, contains 0.67 acres and generates a peak developed flow of 0.8cfs for the 5-year event and 2.1cfs for the 100-year event, flows are routed through the detention pond and outlets to the existing 30" RCP at the corner of Stapleton Drive and Towner Avenue via proposed 24" RCP. See **Appendix B** for a flow summary of this basin.

Design Point DP-6a

Design Point DP-6a collects surface and pipe flow from sub-basin C9 and design point DP-6, which includes the released flows of 10.9cfs for the 5-year event and 46.2cfs for the 100-year event from the existing detention pond. The total developed flow from this 40.12 acre design point is 33.2cfs for the 5-year event and 70.4cfs for the 100-year event. Design point DP-6a flows are directed to the proposed detention pond located in the southwest corner of this development. This pond will be discussed in greater detail in the following Detention Pond and Water Quality section. See **Appendix B** for a flow summary of this basin.

Design Point DP-7

Design Point DP-7 collects surface and pipe flow from design point DP-6a and basin J, which includes the released flows of 10.9cfs for the 5-year event and 46.2cfs for the 100-year event from the existing detention pond. The total developed flow from this 41.88 acre design point is 8.8cfs for the 5-year event and 28.6cfs for the 100-year event. Design point DP-7 is located at the southwest corner of this development at the intersection of Stapleton Drive and Towner Avenue. This design point does not generate an increase in runoff; therefore, there should be no downstream impacts. See **Appendix B** for a flow summary of this basin.

5.0 HYDRAULIC SUMMARY

Hydraulic and pond calculations have been performed using an Excel spreadsheet, Street and Inlet Hydraulics by Denver Urban Drainage and Flood Control District, Stormwater Quality Procedures by the City of Colorado Springs, Hydraflow for Storm Sewers, Hydraflow Hydrographs and Hydraflow Express by Intellisolve computer modeling programs. The inlets have been sized using local runoff for interception and runoff flows, if any. The pipe flows shown are based on an additive flow and was used for the sizing of the storm drain system only, and was not used for the hydraulic modeling of the proposed Scenic View Pond. A separate Hydrologic modeling program (Hydraflow Hydrographs; by Intellisolve) using peak flow at the various design points, was used to design the proposed Scenic View detention pond. These storm sewer calculations are located in **Appendix C**.

It is the intent of this FDR to use the proposed curb/gutter and storm sewer in the streets to convey runoff to the detention facility and water quality pond where runoff can be treated prior to discharge. Maintenance of the private grass swale sedimentation facility will be provided by the "Paint Brush Hills Metro District". Inlet locations have been indicated on the developed conditions drainage map and have been sized for the 5-year and 100-year storms. See **Appendix C** for detailed hydraulic calculations and the storm sewer model.

6.0 DRAINAGE AND BRIDGE FEES

Scenic View at Paintbrush Hills is located within the Falcon Area Drainage Basin which is currently a fee basin in El Paso County. Current El Paso County regulations require drainage and bridge fees to be paid for platting of land.

Scenic View at Paintbrush Hills Final Plat contains 18.76 acres and will be assessed Drainage and Bridge fees. This project has a percent impervious of 53%, this is based on 0.138 acre lots obtained from the "Addendum; Revised Drainage Basin Fees Based on Impervious Area". The 2014 drainage fees are \$8,115, and the bridge fees are \$3,115 per impervious acre. The fees are calculated as follows:

Table 1: Drainage/Bridge Fees

Type of Land Use	Total Area (ac)	Impervious	2014 Drainage Fees (\$8,115)	2014 Bridge Fees (\$3,115)
Residential	18.76	53%	\$80,686	\$30,972

7.0 DETENTION AND WATER QUALITY POND

Runoff from Scenic View at Paintbrush Hills drains southwest to the proposed Scenic View Pond; the total contributing area is 40.12 acres and generates a peak flow of 33.2cfs for the 5-year event and 70.4cfs for the 100-year event. Release rate is 8.8cfs for the 5-year event and 28.6cfs for the 100-year event. This pond also includes water quality. See the drainage map, also the early grading plan and detail sheet for the proposed pond that are included in the appendix of this report.

Current conditions Drainage Plan show peak flows exiting this site at 4 existing culverts, proposed conditions show that developed flow exiting at these locations are at or below current condition flows. Since these basins do not generate an increase in runoff; there should be no downstream impacts.

Table 1: Detention Pond Data

Pond	Incoming Flow	Pond Discharge	WSEL	Storage (ac-ft)	Water Quality
Scenic View Pond (5-yr.)	33.2cfs	8.8cfs	7141.74	0.70	yes
Scenic View Pond (100-yr)	70.4cfs	28.6cfs	7144.20	1.55	yes

Table 3: Water Quality Pond Summary

Pond	Tributary Area	WQCV	WSEL	Comments
Scenic View Pond	13.09 ac	0.33 ac-ft	7139.00	
Porous Landscape Detention	1.52 ac.	0.03 ac-ft	7147.69	1,122 cu-ft

8.0 CONCLUSIONS

This drainage report has been prepared in accordance with the City of Colorado Springs/El Paso County Drainage Criteria Manual. The proposed development and drainage infrastructure will not cause adverse impacts to adjacent properties or properties located downstream. Several key aspects of the development discussed above are summarized as follows:

- Developed runoff will be conveyed via curb/gutter and storm sewer facilities
- Detention for this filing is provided in Scenic View Pond
- Water Quality for this filing is provided in Scenic View Pond

9.0 REFERENCES

1. City of Colorado Springs/El Paso County Drainage Criteria Manual DCM
2. Soil Survey of El Paso County Area, Colorado by USDA, SCS
3. City of Colorado Springs "Drainage Criteria Manual, Volume 2
4. El Paso County "Engineering Criteria Manual"
5. MDDP for Falcon Hills Development, Dated October 22, 2002 by Kiowa Engineering
6. Paintbrush Hills Filing No. 4, Dated February, 1987, by KKBNA, Inc.
7. The Meadows Filing No. 3, Dated July, 2000, by Ladd Engineering Consultants, Inc.

PROJECT NAME: Scenic View at Paintbrush Hills
PROJECT NUMBER: 100.203
ENGINEER: LAB
DATE: 11/04/13

Final Drainage Plan
DEVELOPED CONDITIONS HYDROLOGY CALCULATIONS

BASIN	CRITERIA REFERENCE	Offsite EX-A	Offsite EX-B1	Offsite EX-C1	Offsite EX-C2	C1 & C2 DP-1	W/Det. DP-1	Offsite EX-C3	C4	C3 & C4	W/Det. DP-2	W/Det. DP-3	C5
AREA, A [ACRE]	-	9.18	2.19	3.11	19.47	22.58	22.58	1.43	2.91	4.34	26.92	29.08	2.00
RUN-OFF COEFFICIENT, C5	-	0.47	0.80	0.65	0.47	0.49		0.30	0.60	0.50			0.60
OVERLAND DROP [FT]	-	16.00	1.00	1.00	24.00	24.00		6.00	3.10	6.00			0.80
OVERLAND FLOW LENGTH, L _o [FT]	-	300.00	26.00	15.00	300.00	300.00		271.00	124.00	271.00			40.00
OVERLAND SLOPE, S _o [%]	-	5.33%	3.85%	6.67%	8.00%	8.00%		2.21%	2.50%	2.21%			2.00%
OVERLAND FLOW TIME, t _o [MIN]	-	11.24	1.76	1.67	9.82	9.51		18.19	7.38	13.64			4.52
TRAVEL FLOW DROP [FT]	-	51.00	31.30		34.00	34.00		10.00		16.80			
TRAVEL FLOW LENGTH, L _t [FT]	-	1536.0	738.0		1059.0	1059.0		151.0		261.0			
TRAVEL SLOPE, S _t [%]	-	3.32%			3.21%	3.21%				6.44%			
CHANNEL TRAVEL VELOCITY, V _c [FT/SEC]	-	3.11			2.82	2.82				2.67			
CHANNEL TRAVEL TIME, t _c [MIN]	Channel "t"	8.23	3.90		6.26	6.26		0.60		1.63			
STREET FLOW DROP [FT]	-		2.50	26.00					5.70	5.90			14.90
STREET FLOW LENGTH, L _s [FT]	-		81.0	807.0					895.0	791.0			1450.0
STREET TRAVEL SLOPE, S _s [%]	-		3.09%	3.22%					0.64%	0.75%			1.03%
STREET TRAVEL VELOCITY, V _s [FT/SEC]	29.4927*Slope ^{0.5}		5.18	5.29					2.35	2.55			2.99
STREET TRAVEL TIME, t _s [MIN]	Street "t"		0.26	2.54					6.34	5.18			8.08
PIPE DIAMETER	-		1.25										
PIPE FLOW DROP [FT]	-		2.44										
PIPE FLOW LENGTH, L _p [FT]	-		65.0										
PIPE TRAVEL SLOPE, S _p [%]	-		3.75%										
PIPE TRAVEL VELOCITY, V _p [FT/SEC]	V=1.486/n * R ^{2/3} * S ^{1/2}		10.20										
PIPE TRAVEL TIME, t _p [MIN]	Pipe "t"		0.11										
TIME OF CONCENTRATION, t _c	t _o +t _c	19.5	6.0	4.2	16.1	15.8	5 & 23	18.8	13.7	20.4	5 & 23	5 & 23	12.6
5-YR RUN-OFF COEFFICIENT, C5	-	0.47	0.80	0.65	0.47	0.49		0.30	0.60	0.50			0.60
5-YR RAINFALL INTENSITY, I5 [IN/HR]	-	3.22	5.11	5.20	3.53	3.56		3.28	3.80	3.14			3.94
5-YR MAXIMUM RUN-OFF, Q5 [CFS]	Q=CIA	13.9	8.8	10.5	32.3	39.4	10.9	1.4	6.6	6.8	12.6	20.0	4.7
100-YR RUN-OFF COEFFICIENT, C ₁₀₀	-	0.69	0.89	0.80	0.69	0.71		0.60	0.70	0.67			0.70
100-YR RAINFALL INTENSITY, I ₁₀₀ [IN/HR]	-	5.72	8.94	9.00	6.28	6.34		5.83	6.75	5.58			7.00
100-YR MAXIMUM RUN-OFF, Q ₁₀₀ [CFS]	Q=CIA	36.3	17.5	22.4	84.4	101.6	46.2	5.0	13.6	16.2	60.1	60.1	9.8

¹ City of Colorado Springs and El Paso County Drainage Criteria Manual

PROJECT NAME: Scenic View at Paintbrush Hills
 PROJECT NUMBER: 100.203
 ENGINEER: LAB
 DATE: 11/04/13

Final Drainage Plan
 DEVELOPED CONDITIONS HYDROLOGY CALCULATIONS

BASIN	CRITERIA REFERENCE	C6a	C6b	C6c	C6	C5 & C6 DP-4	C7	C8	C7 & C8	W/Det. DP-5	W/Det. DP-6	W/Det. DP-6a	C9
AREA, A [ACRE]	-	2.34	1.49	1.35	5.18	7.18	1.65	1.54	3.19	32.27	39.45	40.12	0.87
RUN-OFF COEFFICIENT, C5	-	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60				0.25
OVERLAND DROP [FT]	-	1.00	8.80	8.00	1.00	0.80	0.40	3.00	0.40				8.20
OVERLAND FLOW LENGTH, L _o [FT]	-	50.00	247.00	196.00	50.00	40.00	22.00	95.00	22.00				50.00
OVERLAND SLOPE, S _o [%]	-	2.00%	3.56%	4.08%	2.00%	2.00%	1.82%	3.16%	1.82%				16.40%
OVERLAND FLOW TIME, t _o [MIN]	-	5.05	9.26	7.88	5.05	4.52	3.46	5.98	3.46				4.26
TRAVEL FLOW DROP [FT]	-												1.60
TRAVEL FLOW LENGTH, L _t [FT]	-												160.0
TRAVEL SLOPE, S _t [%]	-												1.00%
CHANNEL TRAVEL VELOCITY, V _t [FT/SEC]	-												1.16
CHANNEL TRAVEL TIME, t _t [MIN]	Channel "tt"												2.29
STREET FLOW DROP [FT]	-	11.80	1.60	1.50	14.90	14.90	5.40	6.60	5.40				
STREET FLOW LENGTH, L _t [FT]	-	684.0	288.0	243.0	1215.0	1450.0	976.0	636.0	976.0				
STREET TRAVEL SLOPE, S _t [%]	-	1.73%	0.56%	0.62%	1.23%	1.03%	0.55%	1.04%	0.55%				
STREET TRAVEL VELOCITY, V _t [FT/SEC]	29.4927 * Slope ^{0.5}	3.87	2.20	2.32	3.27	2.99	2.19	3.00	2.19				
STREET TRAVEL TIME, t _t [MIN]	Street "tt"	2.94	2.18	1.75	6.20	8.08	7.42	3.53	7.42				
PIPE DIAMETER	-												
PIPE FLOW DROP [FT]	-												
PIPE FLOW LENGTH, L _t [FT]	-												
PIPE TRAVEL SLOPE, S _t [%]	-												
PIPE TRAVEL VELOCITY, V _t [FT/SEC]	V=1.486/n * R ^{2/3} * S ^{1/2}												
PIPE TRAVEL TIME, t _t [MIN]	Pipe "tt"												
TIME OF CONCENTRATION, t _c	t _o +t _t	8.0	11.4	9.6	11.3	12.6	10.9	9.5	10.9	8 & 24	9 & 8	6	6.5
5-YR RUN-OFF COEFFICIENT, C5	-	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60				0.25
5-YR RAINFALL INTENSITY, I ₅ [IN/HR]	-	4.68	4.10	4.38	4.13	3.94	4.18	4.40	4.18				4.99
5-YR MAXIMUM RUN-OFF, Q ₅ [CFS]	Q=CIA	6.6	3.7	3.5	12.8	17.0	4.1	4.1	8.0	24.4	32.5	33.2	0.8
100-YR RUN-OFF COEFFICIENT, C ₁₀₀	-	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70				0.35
100-YR RAINFALL INTENSITY, I ₁₀₀ [IN/HR]	-	8.33	7.29	7.79	7.34	7.00	7.44	7.83	7.44				8.87
100-YR MAXIMUM RUN-OFF, Q ₁₀₀ [CFS]	Q=CIA	13.6	7.6	7.4	26.6	35.2	8.6	8.4	16.6	60.1	68.6	70.4	2.1

¹ City of Colorado Springs and El Paso County Drainage Criteria

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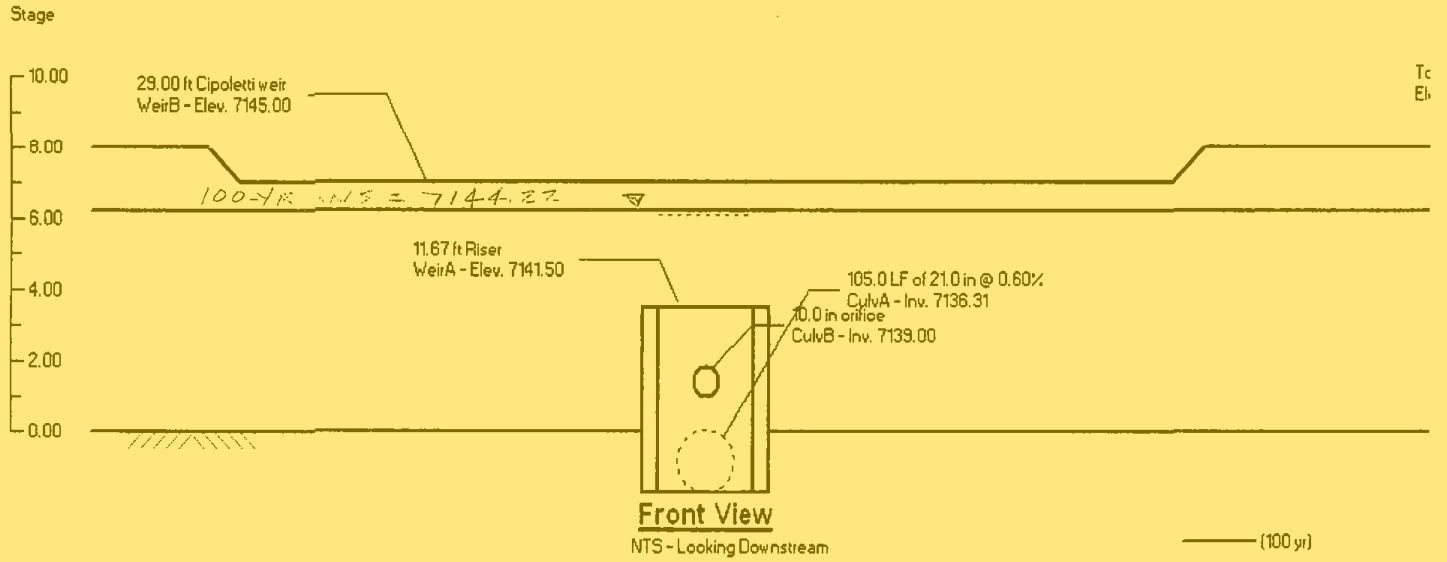
Final Drainage Plan
DEVELOPED CONDITIONS HYDROLOGY CALCULATIONS

Basin C Flow Does not include Existing offsite Detention,
But does include the Offsite EX-C1 & EX-C2 Sub-Basins.

BASIN	CRITERIA REFERENCE	W/O Det. C	W/Det. DP-7	Offsite EX-E1	E2	E	F	G	H	I	J		
AREA, A [ACRE]	-	37.99	41.88	0.29	0.44	0.73	1.02	1.52	0.87	0.94	1.76		
RUN-OFF COEFFICIENT, C5	-	0.52		0.30	0.60	0.48	0.38	0.60	0.44	0.38	0.60		
OVERLAND DROP [FT]	-	6.00		12.0	10.00	19.00	3.00	1.60	3.00	9.20	2.60		
OVERLAND FLOW LENGTH, L _O [FT]	-	271.00		134.0	265.00	330.00	100.00	78.00	70.00	93.00	76.00		
OVERLAND SLOPE, S _O [%]	-	2.21%		9.0%	3.77%	5.76%	3.00%	2.05%	4.29%	9.89%	3.42%		
OVERLAND FLOW TIME, t _O [MIN]	-	13.19		8.0	9.41	11.40	8.99	6.26	6.12	5.82	5.21		
TRAVEL FLOW DROP [FT]	-	16.80					5.60	2.00	5.00	1.40	14.00		
TRAVEL FLOW LENGTH, L _T [FT]	-	261.0					184.0	30.0	174.0	281.0	407.0		
TRAVEL SLOPE, S _T [%]	-	6.44%					3.04%	6.67%	2.87%	0.50%	3.44%		
CHANNEL TRAVEL VELOCITY, V _C [FT/SEC]	-	2.67					1.85	1.65	1.78	1.01	2.32		
CHANNEL TRAVEL TIME, t _C [MIN]	Channel "tt"	1.63					1.66	0.30	1.63	4.62	2.92		
STREET FLOW DROP [FT]	-	13.60						12.00					
STREET FLOW LENGTH, L _T [FT]	-	1475.0						312.0					
STREET TRAVEL SLOPE, S _T [%]	-	0.92%						3.85%					
STREET TRAVEL VELOCITY, V _T [FT/SEC]	29.4927 * Slope ^{0.5}	2.83						5.78					
STREET TRAVEL TIME, t _T [MIN]	Street "tt"	8.68						0.90					
PIPE DIAMETER	-												
PIPE FLOW DROP [FT]	-												
PIPE FLOW LENGTH, L _T [FT]	-												
PIPE TRAVEL SLOPE, S _P [%]	-												
PIPE TRAVEL VELOCITY, V _P [FT/SEC]	V=1.486/n * R ^{2/3} * S ^{1/2}												
PIPE TRAVEL TIME, t _P [MIN]	Pipe "tt"												
TIME OF CONCENTRATION, t _c	t _O +t _T	23.5	10 & 13	8.0	9.4	11.4	10.6	7.5	7.7	10.4	8.1		
5-YR RUN-OFF COEFFICIENT, C5	-	0.52		0.30	0.60	0.48	0.38	0.60	0.44	0.38	0.60		
5-YR RAINFALL INTENSITY, I5 [IN/HR]	-	2.92		4.68	4.42	3.92	4.22	4.79	4.73	4.25	4.66		
5-YR MAXIMUM RUN-OFF, Q5 [CFS]	Q=CIA	57.7	8.8	0.4	1.2	1.3	1.6	4.4	1.8	1.5	4.9		
100-YR RUN-OFF COEFFICIENT, C ₁₀₀	-	0.70		0.60	0.70	0.66	0.65	0.70	0.68	0.64	0.70		
100-YR RAINFALL INTENSITY, I ₁₀₀ [IN/HR]	-	5.19		8.32	7.86	7.30	7.50	8.52	8.42	7.56	8.28		
100-YR MAXIMUM RUN-OFF, Q ₁₀₀ [CFS]	Q=CIA	138.1	28.6	1.4	2.4	3.5	5.0	9.1	5.0	4.5	10.2		

¹ City of Colorado Springs and El Paso County Drainage Criteria

Scenic View Proposed Pond



Schematic only. Not for construction.

Pond Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Jun 24 2014, 9:37 AM

Pond No. 2 - Scenic View Proposed Pond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	7138.00	4,261	0	0 ← <i>Span</i>
1.00	7139.00	6,250	5,256	5,256
2.00	7140.00	8,240	7,245	12,501
3.00	7141.00	10,400	9,320	21,821
4.00	7142.00	12,558	11,479	33,300
5.00	7143.00	15,102	13,830	47,130
6.00	7144.00	17,647	16,375	63,504
7.00	7145.00	20,461	19,054	82,558
8.00	7146.00	23,274	21,868	104,426

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 21.00	10.00	0.00	0.00
Span (in)	= 21.00	10.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 7136.31	7139.00	0.00	0.00
Length (ft)	= 105.00	0.00	0.00	0.00
Slope (%)	= 0.60	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.67	29.00	0.00	0.00
Crest El. (ft)	= 7141.50	7145.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Cip/ti	—	—
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	7138.00	0.00	0.00	—	—	0.00	0.00	—	—	—	0.00
1.00	5,256	7139.00	9.02	0.00	—	—	0.00	0.00	—	—	—	0.00
2.00	12,501	7140.00	9.02	2.01	—	—	0.00	0.00	—	—	—	2.01
3.00	21,821	7141.00	9.02	3.30	—	—	0.00	0.00	—	—	—	3.30
4.00	33,300	7142.00	17.51	3.77	—	—	13.74	0.00	—	—	—	17.51
5.00	47,130	7143.00	25.94	0.68	—	—	25.25	0.00	—	—	—	25.93
6.00	63,504	7144.00	28.19	0.71	—	—	27.47	0.00	—	—	—	28.18
7.00	82,558	7145.00	30.27	0.74	—	—	29.53	0.00	—	—	—	30.26
8.00	104,426	7146.00	32.21	0.77	—	—	31.43	96.57	—	—	—	128.77

Designer: Len Beasley
 Company: Core Engineering Group
 Date: November 13, 2013
 Project: Scenic View at Paintbrush Hills
 Location: Scenic View Pond (SW Corner) #100.203

<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>65.00</u> %</p> <p>$i =$ <u>0.65</u></p> <p>Area = <u>13.09</u> acres</p> <p>WQCV = <u>0.25</u> watershed inches</p> <p>Vol = <u>0.333</u> acre-feet</p>
<p>2. Outlet Works</p> <p>A) Outlet Type (Check One)</p> <p>B) Depth at Outlet Above Lowest Perforation (H)</p> <p>C) Required Maximum Outlet Area per Row, (A_o)</p> <p>D) Perforation Dimensions (enter one only): i) Circular Perforation Diameter OR ii) 2" Height Rectangular Perforation Width</p> <p>E) Number of Columns (nc, See Table 6a-1 For Maximum)</p> <p>F) Actual Design Outlet Area per Row (A_o)</p> <p>G) Number of Rows (nr)</p> <p>H) Total Outlet Area (A_{ot})</p>	<p><input checked="" type="checkbox"/> Orifice Plate</p> <p><input type="checkbox"/> Perforated Riser Pipe</p> <p><input type="checkbox"/> Other: _____</p> <hr/> <p>H = <u>2.00</u> feet</p> <p>$A_o =$ <u>0.71</u> square inches</p> <p>D = <u>0.9000</u> inches, OR</p> <p>W = _____ inches</p> <p>$nc =$ <u>1</u> number</p> <p>$A_o =$ <u>0.64</u> square inches</p> <p>$nr =$ <u>6</u> number</p> <p>$A_{ot} =$ <u>3.82</u> square inches</p>
<p>3. Trash Rack</p> <p>A) Needed Open Area: $A_t = 0.5 * (\text{Figure 7 Value}) * A_{ot}$</p> <p>B) Type of Outlet Opening (Check One)</p> <p>C) For 2", or Smaller, Round Opening (Ref.: Figure 6a):</p> <p>i) Width of Trash Rack and Concrete Opening (W_{conc}) from Table 6a-1</p> <p>ii) Height of Trash Rack Screen (H_{TR})</p>	<p>$A_t =$ <u>131</u> square inches</p> <p><input checked="" type="checkbox"/> $\leq 2"$ Diameter Round</p> <p><input type="checkbox"/> 2" High Rectangular</p> <p><input type="checkbox"/> Other: _____</p> <hr/> <p>$W_{conc} =$ <u>6</u> inches (minimum) Use 11" to accomodate 10" Orifice</p> <p>$H_{TR} =$ <u>48</u> inches</p>

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<p>iii) Type of Screen (Based on Depth H), Describe if "Other"</p> <p>iv) Screen Opening Slot Dimension, Describe if "Other"</p> <p>v) Spacing of Support Rod (O.C.) Type and Size of Support Rod (Ref.: Table 6a-2)</p> <p>vi) Type and Size of Holding Frame (Ref.: Table 6a-2)</p> <p>D) For 2" High Rectangular Opening (Refer to Figure 6b):</p> <p>i) Width of Rectangular Opening (W)</p> <p>ii) Width of Perforated Plate Opening ($W_{conc} = W + 12"$)</p> <p>iii) Width of Trashrack Opening ($W_{opening}$) from Table 6b-1</p> <p>iv) Height of Trash Rack Screen (H_{TR})</p> <p>v) Type of Screen (based on depth H) (Describe if "Other")</p> <p>vi) Cross-bar Spacing (Based on Table 6b-1, Klemp™ KPP Grating). Describe if "Other"</p> <p>vii) Minimum Bearing Bar Size (Klemp™ Series, Table 6b-2) (Based on depth of WQCV surcharge)</p>	<p><u>x</u> S.S. #93 VEE Wire (US Filter) Other: _____</p> <hr/> <p><u>X</u> 0.139" (US Filter) Other: _____</p> <hr/> <p><u>0.75</u> inches #156 VEE</p> <hr/> <p>3/8 in. x 1.0 in. flat bar</p> <hr/> <p>W = _____ inches</p> <p>W_{conc} = _____ inches</p> <p>$W_{opening}$ = _____ inches</p> <p>H_{TR} = _____ inches</p> <p>_____ Klemp™ KPP Series Aluminum Other: _____</p> <hr/> <p>_____ inches Other: _____</p> <hr/> <p>_____</p> <hr/>
<p>4. Detention Basin length to width ratio</p>	<p><u>2.00</u> (L/W)</p>
<p>5 Pre-sedimentation Forebay Basin - Enter design values</p> <p>A) Volume (5 to 10% of the Design Volume in 1D)</p> <p>B) Surface Area</p> <p>C) Connector Pipe Diameter (Size to drain this volume in 5-minutes under inlet control)</p> <p>D) Paved/Hard Bottom and Sides</p>	<p><u>0.017</u> acre-feet</p> <p><u>0.017</u> acres</p> <p><u>2 - 8"</u> inches</p> <p><u>no</u> yes/no</p>

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 Company: Core Engineering Group
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 Project: Scenic View at Paintbrush Hills
 Location: Scenic View Pond (SW Corner) #100.203

<p>6. Two-Stage Design</p> <p>A) Top Stage ($D_{WQ} = 2'$ Minimum)</p> <p>B) Bottom Stage ($D_{BS} = D_{WQ} + 1.5'$ Minimum, $D_{WQ} + 3.0'$ Maximum, Storage = 5% to 15% of Total WQCV)</p> <p>C) Micro Pool (Minimum Depth = the Larger of $0.5 * \text{Top Stage Depth}$ or 2.5 Feet)</p> <p>D) Total Volume: $Vol_{tot} = \text{Storage from 5A} + 6A + 6B$ Must be \geq Design Volume in 1D</p>	<p>$D_{WQ} =$ <u>2.00</u> feet Storage= <u>0.300</u> acre-feet</p> <p>$D_{BS} =$ <u>3.50</u> feet Storage= <u>0.017</u> acre-feet Surf. Area= <u>0.005</u> acres</p> <p>Depth= <u>2.50</u> feet Storage= <u>0.003</u> acre-feet Surf. Area= <u>0.001</u> acres</p> <p>$Vol_{tot} =$ <u>0.334</u> acre-feet</p>
<p>7. Basin Side Slopes (Z, horizontal distance per unit vertical) Minimum Z = 3, Flatter Preferred</p>	<p>Z = <u>4.00</u> (horizontal/vertical)</p>
<p>8. Dam Embankment Side Slopes (Z, horizontal distance per unit vertical) Minimum Z = 3, Flatter Preferred</p>	<p>Z = <u>4.00</u> (horizontal/vertical)</p>
<p>9. Vegetation (Check the method or describe "Other")</p>	<p><input checked="" type="checkbox"/> Native Grass <input type="checkbox"/> Irrigated Turf Grass Other: _____ _____</p>

Notes: _____

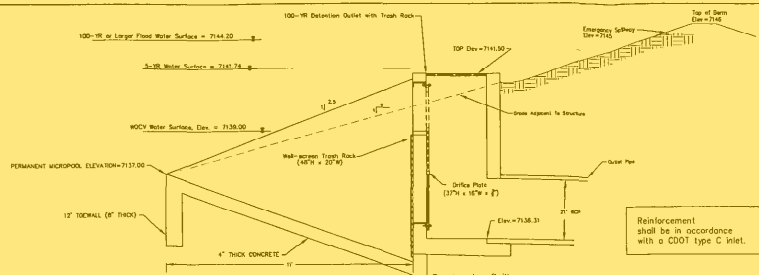


Figure 2
 Typical WOCV Outlet Structure Profiles
 Including 5-Year and 100-Year Detention

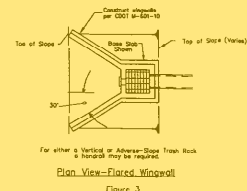


Figure 3
 Typical WOCV Outlet Structure
 Wingwall Configurations

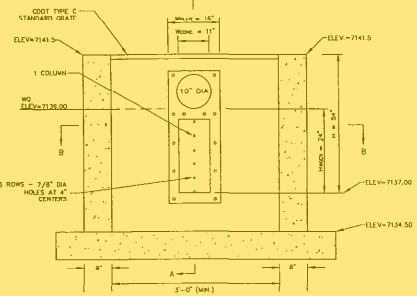
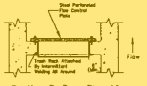
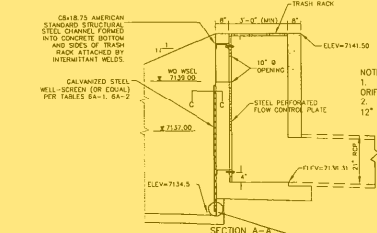


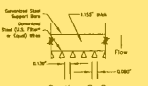
FIGURE 4:
 ORIFICE PERFORATION DETAILS
 SCALE: NTS



Section B-B - Plan View
 From Plans & Check Spacing Only
 Levels for New Standardized Design:
 1. All outlet plate openings are circular.
 2. Minimum diameter of opening = 3 inches.
 *U.S. Filter, St. Paul, Minnesota, USA

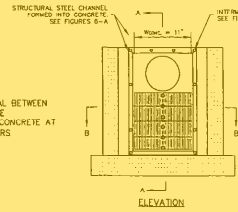


SECTION A-A
 WELL-SCREEN FRAME
 ATTACHED TO CHANNEL
 BY INTERMITTENT WELDS
 AND TO CONCRETE
 STRUCTURE



Section C-C
 From Plans & Check Spacing Only
 B Value = (set open area)/gross area = 0.60

POND DATA TABLE			
	INFLOW (CFS)	DISCHARGE (CFS)	STORAGE (AC FT)
WOCV	---	---	7139.00 0.33
5-YR	33.2	8.8	7141.74 0.70
100-YR	70.40	28.6	7144.20 1.55



ELEVATION

- WOCV Trash Rack:
- Well-screen trash racks shall be galvanized steel and shall be attached by intermittent welds along top edge of the retaining frame.
 - For grate trash racks shall be aluminum and shall be bolted using galvanized steel hardware.
 - Trash Rack width are for specified trash rack material. Frame well-screens or mesh size shall according to manufacturer. However, trash rack structure must be designed for maximum loading at different open area/gross area ratio (K value).
 - Structural design of trash rack shall be based on full hydrostatic head with zero head downstream of the rack.
- Overflow Trash Rack:
- All trash racks shall be mounted using galvanized steel hardware and provided with height and location or outside access panels.
 - Trash racks shall be galvanized steel, aluminum, or steel. Steel trash racks shall be hot dip galvanized and may be hot painted after galvanizing.
 - Trash Racks shall be designed such that the diagonal dimension of each opening is smaller than the diameter of the outlet pipe.
 - Structural design of trash rack shall be based on full hydrostatic head with zero head downstream of the rack.

Outlet Structure Details
 Scale: NTS

Figure 5-a
 Standardized Trash Rack and Outlet
 Design for WOCV Outlets With
 Circular Openings

PROPOSED SCENIC VIEW POND AT SOUTHWEST CORNER

STORM INFLOW (CFS)	EXISTING DISCHARGE (CFS)	DISCHARGE (CFS)	WELL	STORAGE (AC FT)	
RD			7147.69	0.03	
WGV			7136.00	0.33	
5-YR	33.2	13.3	8.6	7141.74	0.70
100-YR	70.4	29.9	29.0	7144.20	1.00

LEGEND

- EXISTING MAJOR BOUNDARY
- PROPOSED MAJOR BOUNDARY
- PROPOSED SCENIC VIEW POND
- PROPOSED EXISTING POND
- 24" RCP
- 18" RCP
- 12" RCP
- 8" RCP
- 6" RCP
- 4" RCP
- 3" RCP
- 2" RCP
- 1" RCP
- 1/2" RCP
- 1/4" RCP
- 1/8" RCP
- 1/16" RCP
- 1/32" RCP
- 1/64" RCP
- 1/128" RCP
- 1/256" RCP
- 1/512" RCP
- 1/1024" RCP
- 1/2048" RCP
- 1/4096" RCP
- 1/8192" RCP
- 1/16384" RCP
- 1/32768" RCP
- 1/65536" RCP
- 1/131072" RCP
- 1/262144" RCP
- 1/524288" RCP
- 1/1048576" RCP
- 1/2097152" RCP
- 1/4194304" RCP
- 1/8388608" RCP
- 1/16777216" RCP
- 1/33554432" RCP
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- 1/268435456" RCP
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- 1/17179869184" RCP
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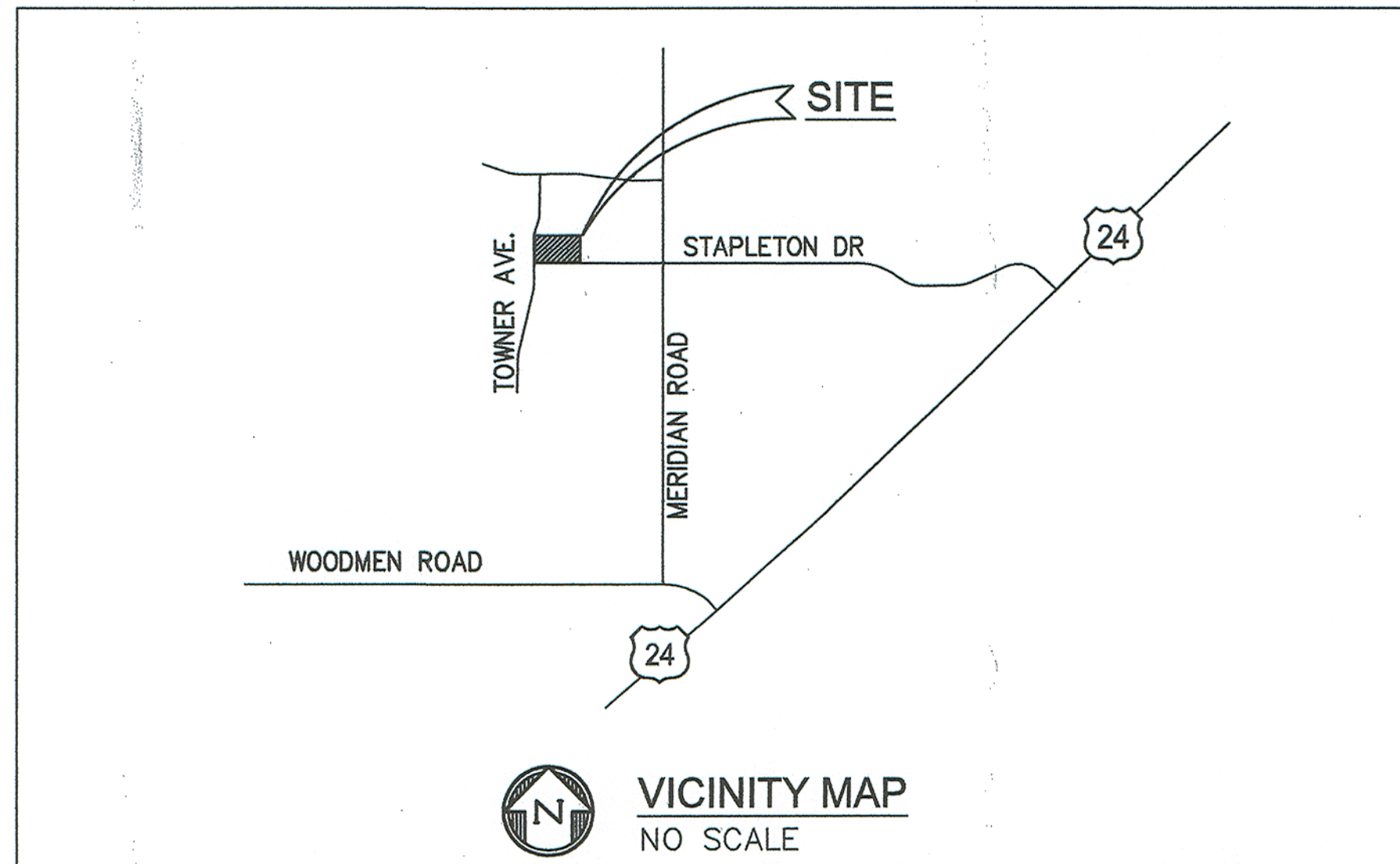
CONSTRUCTION PLANS
FOR
SCENIC VIEW AT PAINTBRUSH HILLS

**STREET, STORM
WATER AND SANITARY SEWER**



Know what's below.
Call before you dig.
CALL 2--BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE OR
EXCAVATE FOR THE MARKING OF
UNDERGROUND MEMBER UTILITIES

SHEET INDEX	
SHEET NO.	SHEET DESCRIPTION
C1.1	COVER SHEET
C1.2	NOTES
C1.3	TYPICAL SECTIONS
C2.1	STREET HORIZONTAL CONTROL
C3.1	UTILITY SERVICES PLAN
C5.1	SIGNING AND STRIPING
C6.1-C6.9	STREET AND STORM DRAIN PLAN AND PROFILE
C8.1-C8.8	WATER AND SANITARY SEWER PLAN AND PROFILE
C10.1	STREET DETAILS
C12.1	UTILITY DETAILS



RECORD DRAWING SHEETS ADDED
C4.2 - DETENTION POND
C4.3 - PLD DETAILS
C4.4 - POND OUTLET DETAILS

RECORD DRAWING
THESE RECORD DRAWINGS, PRODUCED BY CORE ENGINEERING GROUP ARE BASED ON FIELD INFORMATION GATHERED BY OTHERS. CORE ENGINEERING GROUP ASSUMES NO LIABILITY FOR THE ACCURACY OF THIS FIELD INFORMATION.

CORE ENGINEERING GROUP
15004 1st Ave. So.
Burnsville, MN 55306
Phone: 763-271-1100
Contact: Richard L. Schindler, P.E.
Email: Rich@cegi.com

DATE: _____
DESCRIPTION: _____
NO. _____
PROJECT: **SCENIC VIEW AT PAINTBRUSH HILLS**
PREPARED FOR: **BABCOCK LAND CORP.**
212 N. WAHSATCH AVE., SUITE 301
COLORADO SPRINGS, COLORADO 80903
STAPLETON DRIVE - TOWER AVENUE
FALCON, COLORADO
CONTACT: JEFF MARK

DEVELOPER'S STATEMENT
THE UNDERSIGNED OWNER/DEVELOPER HAS READ AND WILL COMPLY WITH ALL THE REQUIREMENTS SPECIFIED IN THESE CONSTRUCTION PLANS AND THE ACCOMPANYING DRAINAGE REPORT.
BUSINESS NAME BABCOCK LAND CORPORATION
BY [Signature] DATE 9/4/14
TITLE Director
ADDRESS 212 N. WAHSATCH AVE. SUITE 301
COLORADO SPRINGS, CO 80903

DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

COVER SHEET

DATE: **SEPT 2014**
PROJECT NO. **100.203**
SHEET NUMBER **C1.1**
TOTAL SHEETS: **25**

WATER / SANITARY
PAINTBRUSH HILLS METRO DISTRICT
9830 LIBERTY GROVE DRIVE
FALCON, CO 80831
719-495-8188

CABLE
COMCAST
P.O. BOX 173838
DENVER, CO 80217
970-641-4774

ELECTRIC
MOUNTAIN VIEW ELECTRIC
11140 E. WOODMEN RD.
COLORADO SPRINGS, CO 80831
719-495-2283

FALCON FIRE PROTECTION DISTRICT
7030 OLD MERIDIAN ROAD
FALCON, CO 80831
719-495-4050

PREPARED FOR:
BABCOCK LAND CORPORATION
212 N. WAHSATCH AVE., SUITE 301
COLORADO SPRINGS, CO 80903
719-635-3200
CONTACT: JEFF MARK

PREPARED BY:
CORE ENGINEERING GROUP
15004 1ST AVENUE S.
BURNSVILLE, MN 55306
719-570-1100
CONTACT: RICHARD L. SCHINDLER P.E.

FIRE DISTRICT APPROVAL
THE NUMBER OF FIRE HYDRANTS AND HYDRANT LOCATIONS TOGETHER WITH THE MAIN SIZES INDICATED ON THIS WATER INSTALLATION PLAN ARE ADEQUATE TO SATISFY THE REQUIREMENTS OF THE FALCON FIRE PROTECTION DISTRICT'S FIRE AND RESCUE DEPARTMENT. THIS APPROVAL IS BASED ON THE INFORMATION IN THESE PLANS, SPECIFICATIONS AND SUPPLEMENTAL INFORMATION PROVIDED BY THE DESIGN ENGINEER WHOSE SIGNATURE APPEARS IN THESE PLANS, AND THE PAINTBRUSH HILLS METROPOLITAN DISTRICT.
SIGNED [Signature] DATE 10-1-2014
BY FIRE PROTECTION CHIEF OR COORDINATOR

TELEPHONE
CENTURYLINK
7925 INDUSTRY ROAD
COLORADO SPRINGS, CO 80939
719-278-4651

GAS
BLACK HILLS ENGERGY
7060 ALLEGRE ST.
FOUNTAIN, CO 80817
719-393-6639

EL PASO COUNTY DEVELOPMENT SERVICES
2880 INTERNATIONAL CIRCLE
COLORADO SPRINGS, CO 80910
719-520-6300

DISTRICT APPROVAL (WATER)
THE PAINTBRUSH HILLS METROPOLITAN DISTRICT RECOGNIZES THE DESIGN ENGINEER AS HAVING RESPONSIBILITY FOR THE DESIGN. THE DISTRICT HAS LIMITED ITS SCOPE OF REVIEW ACCORDINGLY.

PAINTBRUSH HILLS METROPOLITAN DISTRICT
WATER DESIGN APPROVAL
DATE 10/1/2014 BY [Signature]
PROJECT NO. NA

CONSTRUCTION APPROVAL
COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUALS VOLUME 1 AND 2, AND ENGINEERING CRITERIA MANUAL AS AMENDED.
[Signature] DATE 9-12-14
ANDRE BRACKIN, COUNTY ENGINEER/ECM ADMINISTRATOR

BASIS OF BEARING
ALL BEARINGS USED HEREIN ARE BASED ON AN ASSUMED BEARING OF N89°04'59"E PER THE RECORDED PLAT OF PAINT BRUSH HILLS FILING NO. 10, AS RECORDED UNDER RECEPTION NO. 203174940 OF THE RECORDS OF THE EL PASO COUNTY CLERK AND RECORDER), A DISTANCE OF 2614.11 FEET BETWEEN THE SOUTHWEST CORNER OF SECTION 25, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6th P.M., AS MONUMENTED BY 3-1/4" ALUMINUM SURVEYORS CAP STAMPED "PLS 120103" AND THE SOUTH ONE-QUARTER CORNER OF SAID SECTION 25, AS MONUMENTED BY A 2-1/2" ALUMINUM SURVEYORS CAP STAMPED "P.L.S. 4842".

IN CASE OF ERRORS OR OMISSIONS WITH THE WATER DESIGN AS SHOWN ON THIS DOCUMENT THE STANDARDS AS DEFINED IN THE "RULES AND REGULATIONS FOR INSTALLATION OF WATER MAINS AND SERVICES" SHALL RULE.
APPROVAL EXPIRES 180 DAYS FROM DESIGN APPROVAL

BENCHMARK
THE NORTHWEST CORNER OF THE FALCON SCHOOL DISTRICT 49 PARCEL OF LAND AS DESCRIBED IN BOOK 2732 AT PAGE 860 OF THE RECORDS OF THE EL PASO COUNTY CLERK AND RECORDER, SAID POINT BEING A NO. 4 REBAR WITH YELLOW PLASTIC CAP STAMPED "PLS 4842" ELEVATION OF 7205.70'

DISTRICT APPROVAL (WASTEWATER)
THE PAINTBRUSH HILLS METROPOLITAN DISTRICT RECOGNIZES THE DESIGN ENGINEER AS HAVING RESPONSIBILITY FOR THE DESIGN. THE PAINTBRUSH HILLS METROPOLITAN DISTRICT HAS LIMITED ITS SCOPE OF REVIEW ACCORDINGLY.

PAINTBRUSH HILLS METROPOLITAN DISTRICT
WASTEWATER DESIGN APPROVAL
DATE 10/1/2014 BY [Signature]
PROJECT NO. NA

ENGINEER'S APPROVAL
THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, GRADING AND EROSION CONTROL PLANS AND SPECIFICATIONS, AND SAID PLANS AND SPECIFICATIONS ARE IN CONFORMANCE WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS IN MY PREPARED IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS.
[Signature]
RICHARD L. SCHINDLER, P.E. # 33997
FOR AND ON BEHALF OF CORE ENGINEERING GROUP

IN CASE OF ERRORS OR OMISSIONS WITH THE WATER DESIGN AS SHOWN ON THIS DOCUMENT THE STANDARDS AS DEFINED IN THE "RULES AND REGULATIONS FOR INSTALLATION OF WATER MAINS AND SERVICES" SHALL RULE.
APPROVAL EXPIRES 180 DAYS FROM DESIGN APPROVAL

RECEIVED
SEP 04 2014



POINT TABLE			
NUMBER	NORTHING	EASTING	ELEVATION
1	20161.78	21199.17	7137.06
2	20157.19	21233.17	7137.23
3	20158.71	21314.23	7137.63
4	20189.10	21178.90	7138
5	20172.68	21210.45	7138
6	20167.42	21252.07	7138
7	20180.43	21303.79	7138
8	20180.99	21328.75	7138
9	20148.26	21329.51	7138
10	20146.01	21230.11	7138
11	20153.13	21172.11	7138
12	20123.74	21148.82	7145
13	20122.34	21173.11	7145
14	20158.41	21291.80	7137.52
15	20158.74	21308.96	7137.61

CORE ENGINEERING GROUP
 15004 1ST AVE. SOUTH
 BURNSVILLE, MN 55306
 PH: 719.570.1100
 FAX: 719.570.1101
 EMAIL: REG@ceeg.com



DATE: _____
 DESCRIPTION: _____
 NO: _____

PREPARED FOR:
BABCOCK LAND CORPORATION
 212 N. WASHINGTON AVE. SUITE 301
 COLORADO SPRINGS, COLORADO 80903
 CONTACT: JEFF MARK

PROJECT:
**SCENIC VIEW AT
 PAINTBRUSH HILLS**
 STAPLETON DRIVE - TOWNER AVENUE
 FALCON, COLORADO

DRAWN: LJA
 DESIGNED: RLS
 CHECKED: RLS

DETENTION & WQ POND DETAILS

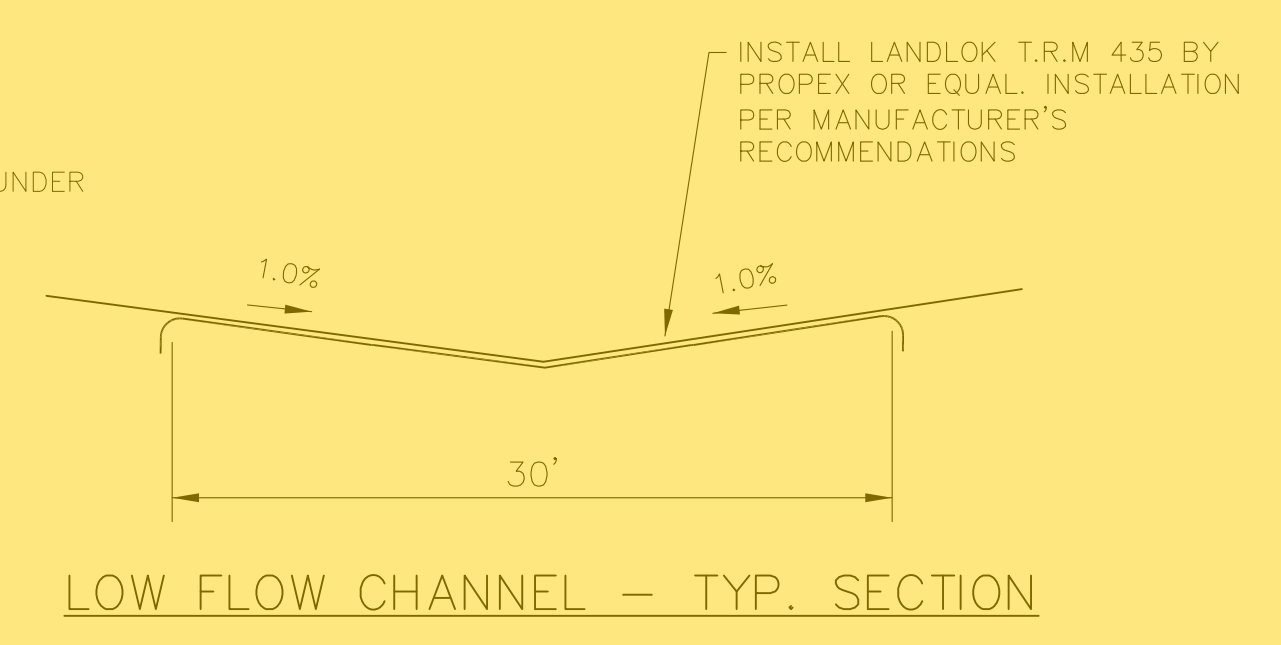
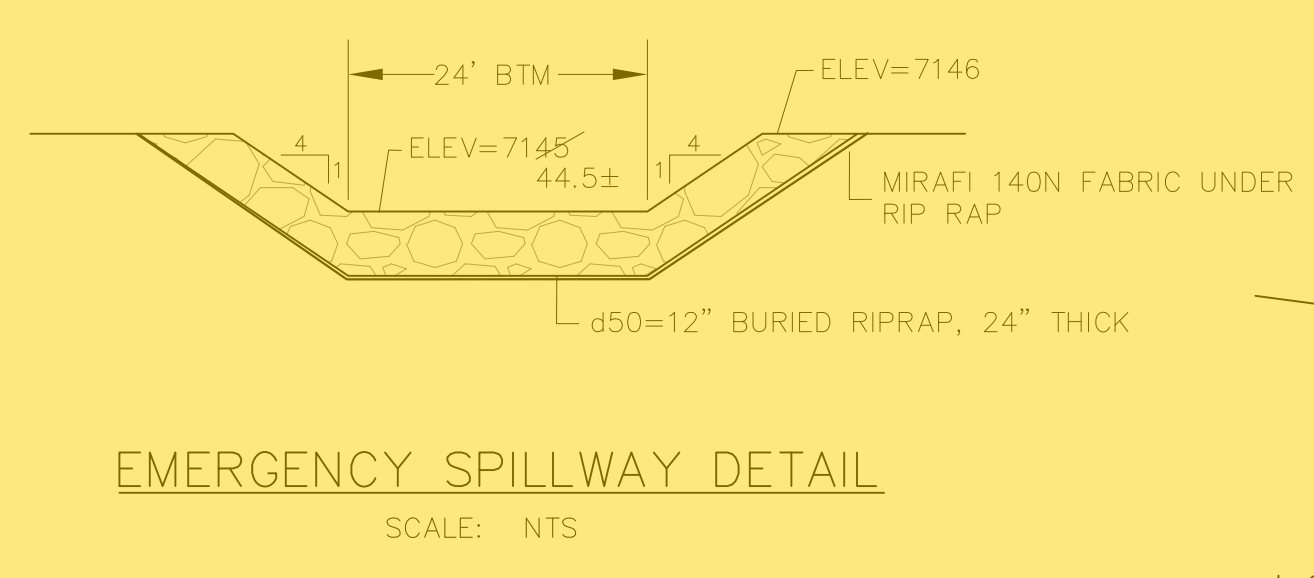
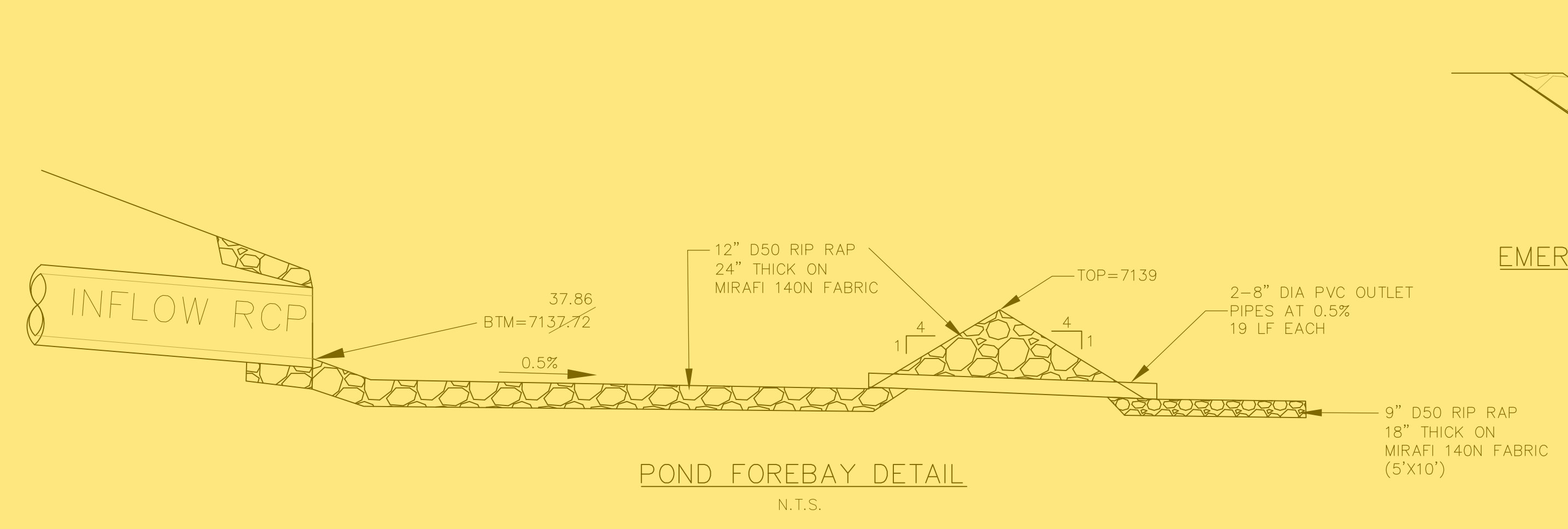
DATE: SEOT 2014

PROJECT NO. 100.203

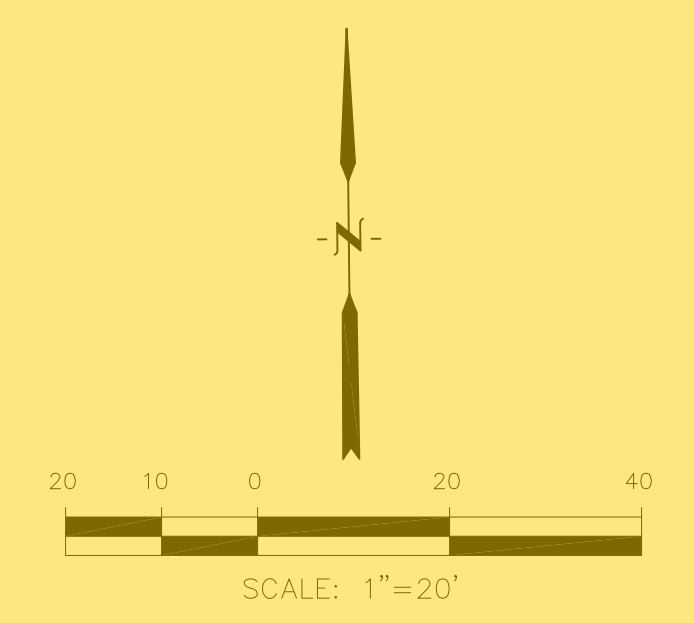
SHEET NUMBER

C4.2

TOTAL SHEETS: 8



RECORD DRAWINGS
 DATE: MARCH 16, 2016



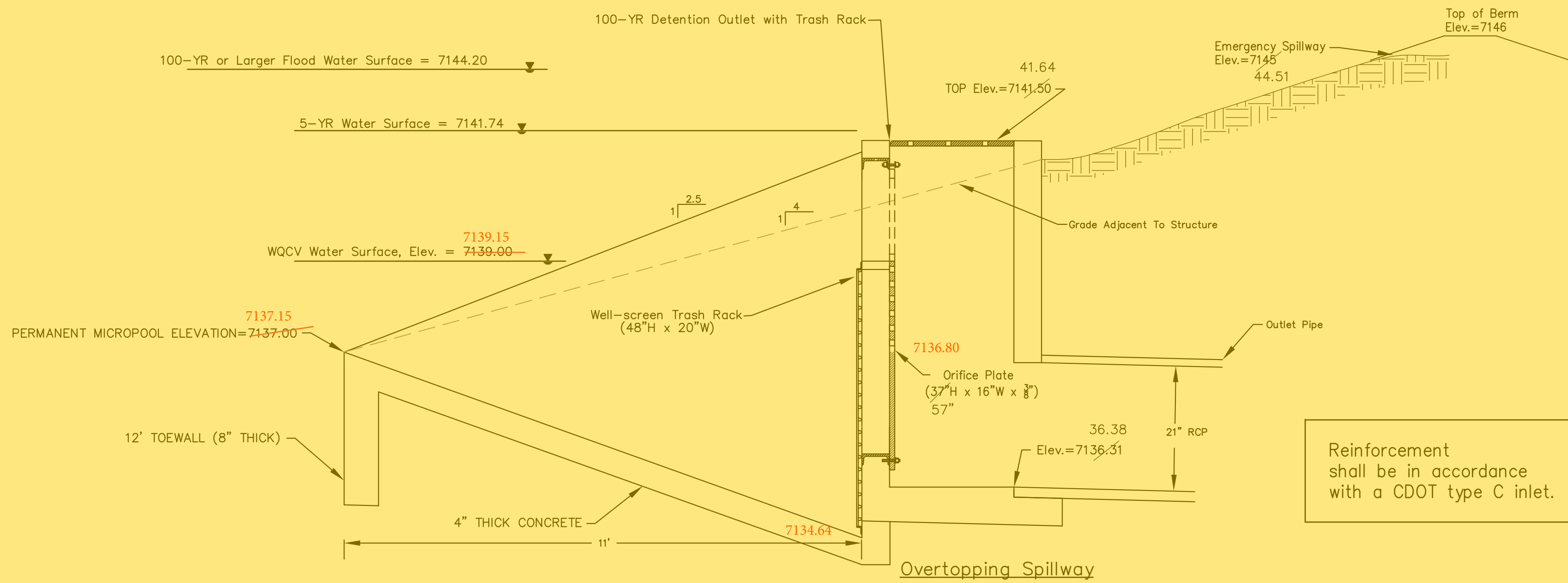
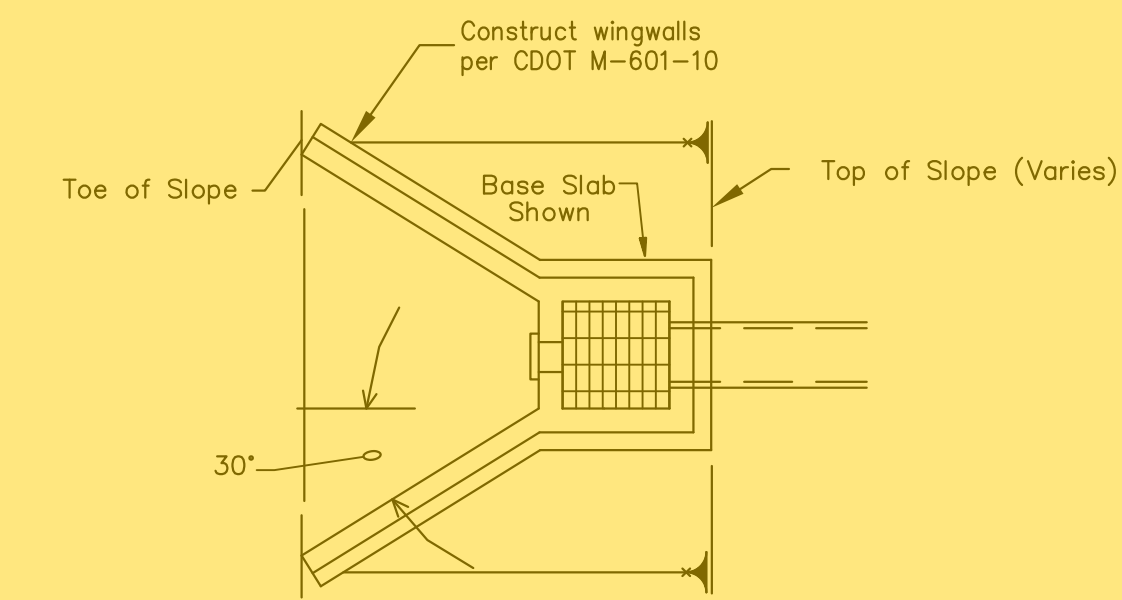


Figure 2
Typical WQCV Outlet Structure Profiles
Including 5-Year and 100-Year Detention

Reinforcement shall be in accordance with a CDOT type C inlet.



For either a Vertical or Adverse-Slope Trash Rack a handrail may be required.

Plan View-Flared Wingwall

Figure 3
Typical WQCV Outlet Structure
Wingwall Configurations

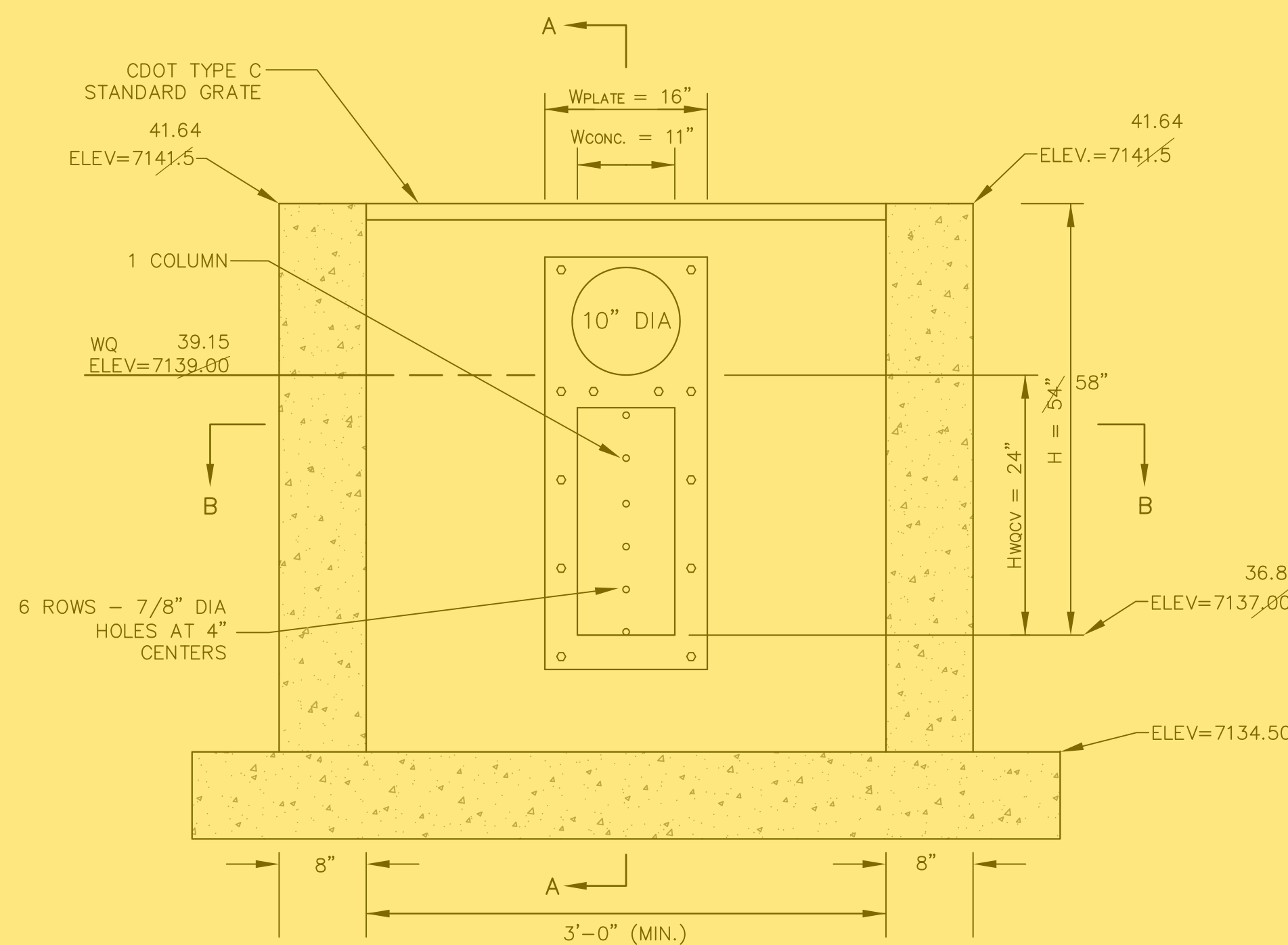
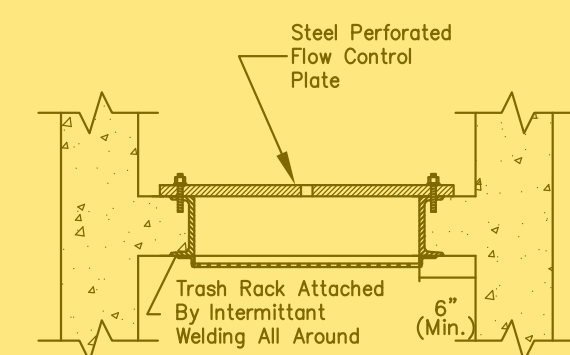
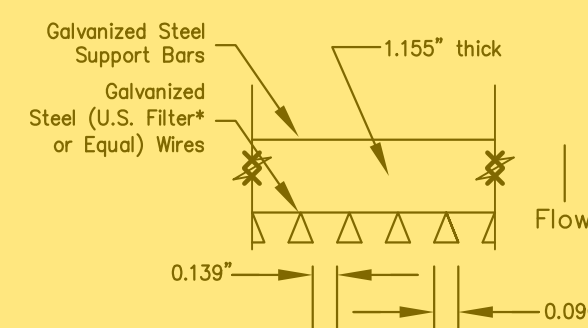


FIGURE 4:
ORIFICE PERFORATION DETAILS
SCALE: NTS



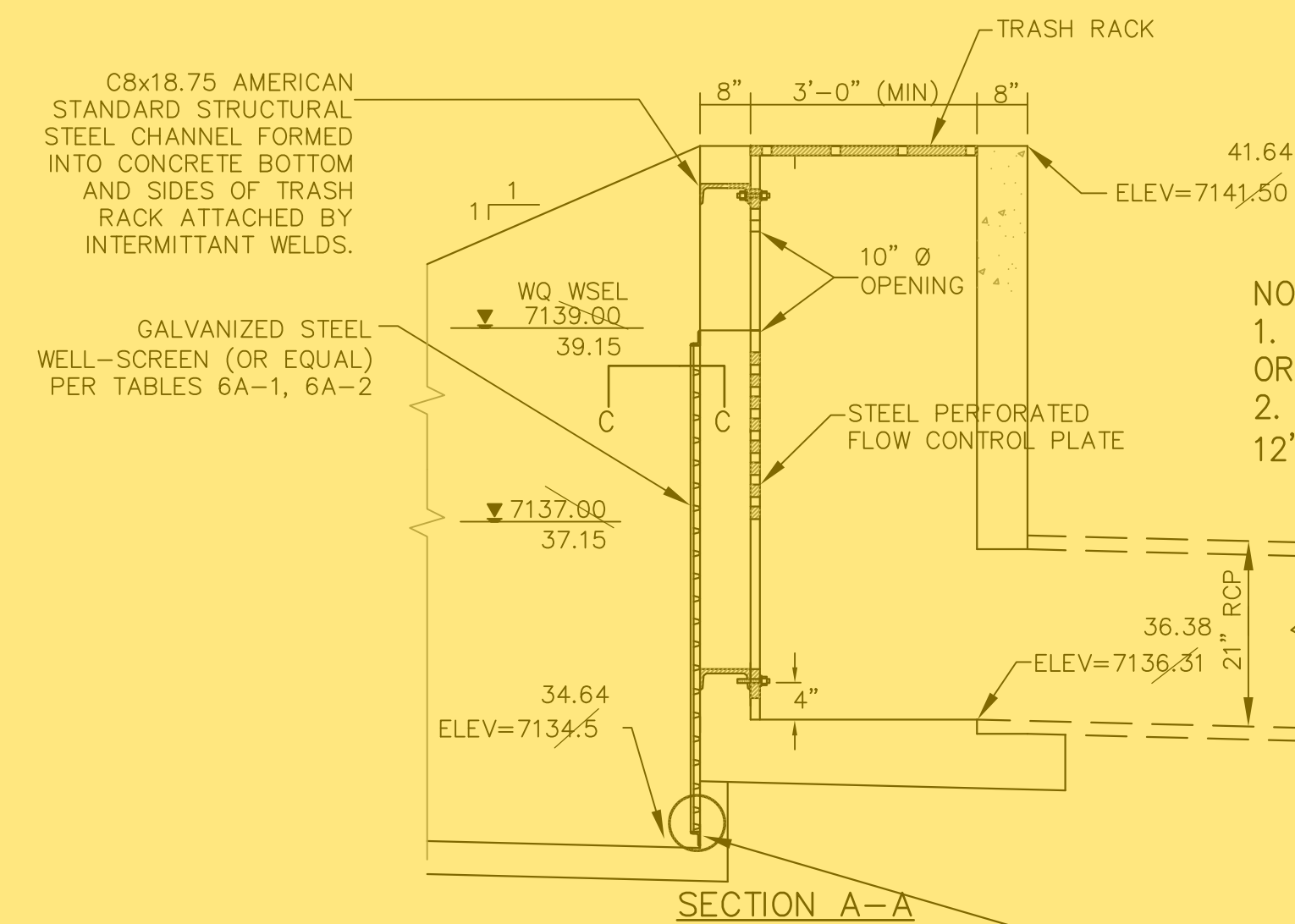
Section B-B - Plan View

- From Figure 6, Circular Openings Only
Limits for this Standardized Design:
- All outlet plate openings are circular.
 - Maximum diameter of opening = 2 inches.
- *U.S. Filter, St. Paul, Minnesota, USA



Section C-C

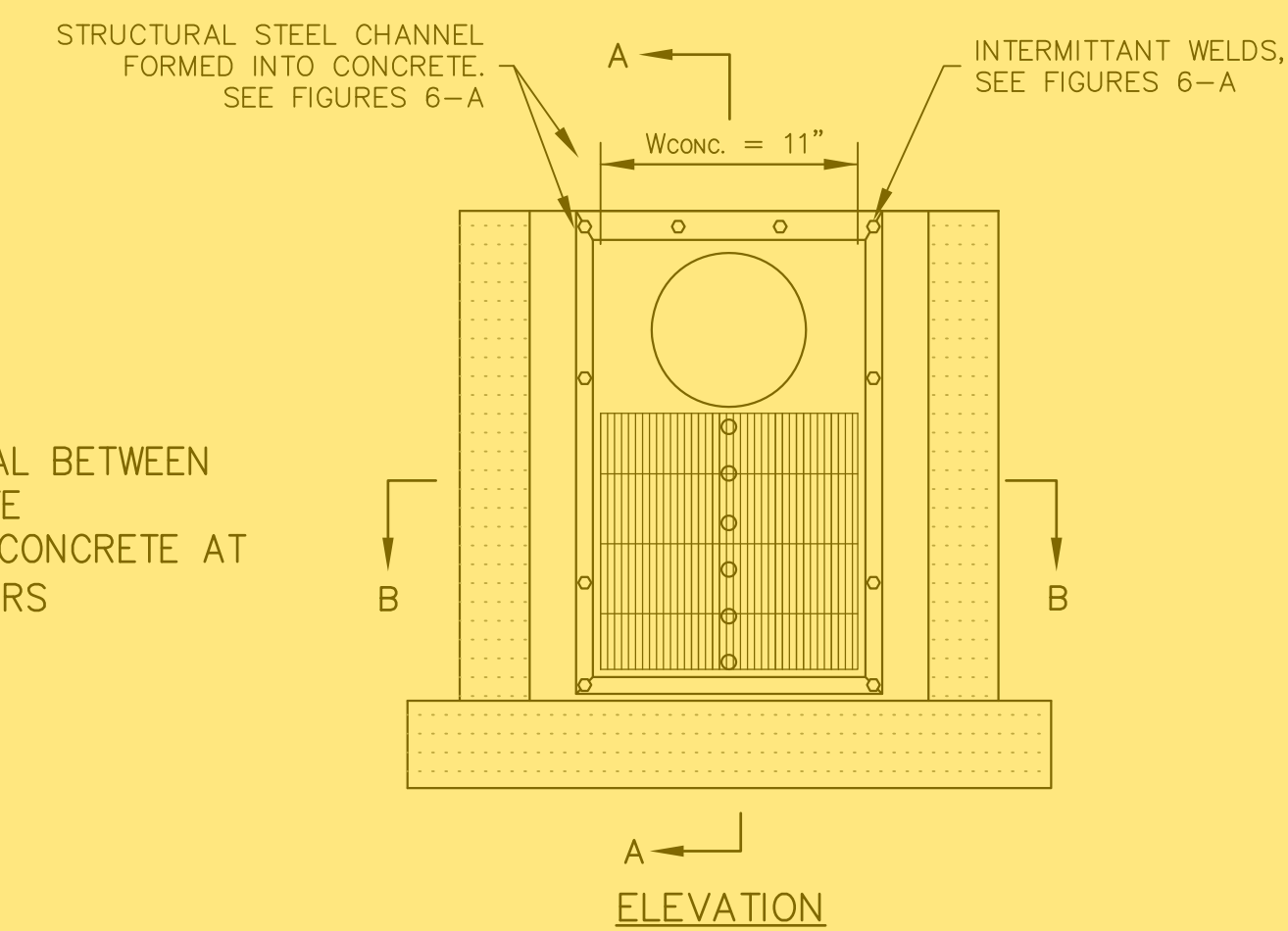
From Figure 6, Circular Openings Only
 $R \text{ Value} = (\text{net open area}) / (\text{gross rack area}) = 0.60$



SECTION A-A

WELL-SCREEN FRAME ATTACHED TO CHANNEL BY INTERMITTANT WELDS AND TO CONCRETE STRUCTURE

- NOTES:
- PROVIDE GASKET MATERIAL BETWEEN ORIFICE PLATE AND CONCRETE
 - BOLT ORIFICE PLATE TO CONCRETE AT 12\"/>



ELEVATION

WQCV Trash Racks:

- Well-screen trash racks shall be galvanized steel and shall be attached by intermittent welds along the edge of the mounting frame.
- Bar grate trash racks shall be aluminum and shall be bolted using galvanized steel hardware.
- Trash Rack widths are for specified trash rack material. Finer well-screen or mesh size than specified is acceptable, however, trash rack dimensions need to be adjusted for materials having a different open area/gross area ratio (R value)
- Structural design of trash rack shall be based on full hydrostatic head with zero head downstream of the rack.

Overflow Trash Racks:

- All trash racks shall be mounted using galvanized steel hardware and provided with hinged and lockable or boltable access panels.
- Trash racks shall be galvanized steel, aluminum, or steel. Steel trash racks shall be hot dip galvanized and may be hot powder painted after galvanizing.
- Trash Racks shall be designed such that the diagonal dimension of each opening is smaller than the diameter of the outlet pipe.
- Structural design of trash rack shall be based on full hydrostatic head with zero head downstream of the rack.

POND DATA TABLE				
	INFLOW (CFS)	DISCHARGE (CFS)	WSEL	STORAGE (AC FT)
WQCV	--	--	7139.00	0.33
5-YR	33.2	8.8	7141.74	0.70
100-YR	70.40	28.6	7144.20	1.55

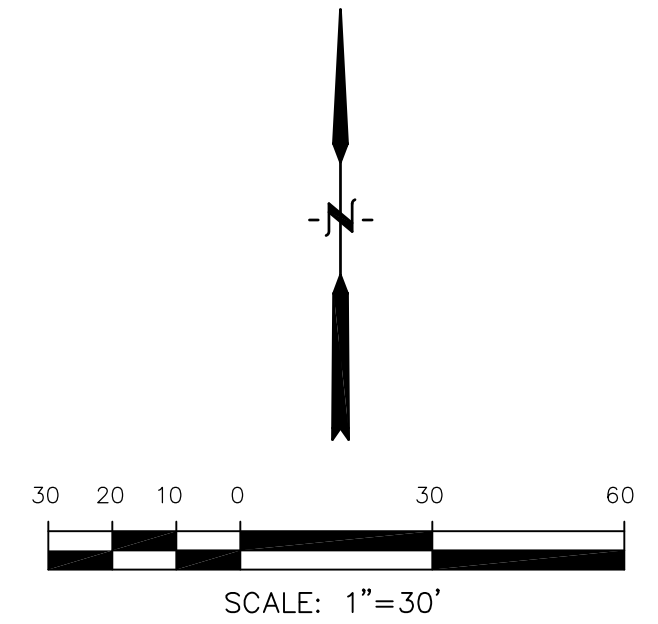
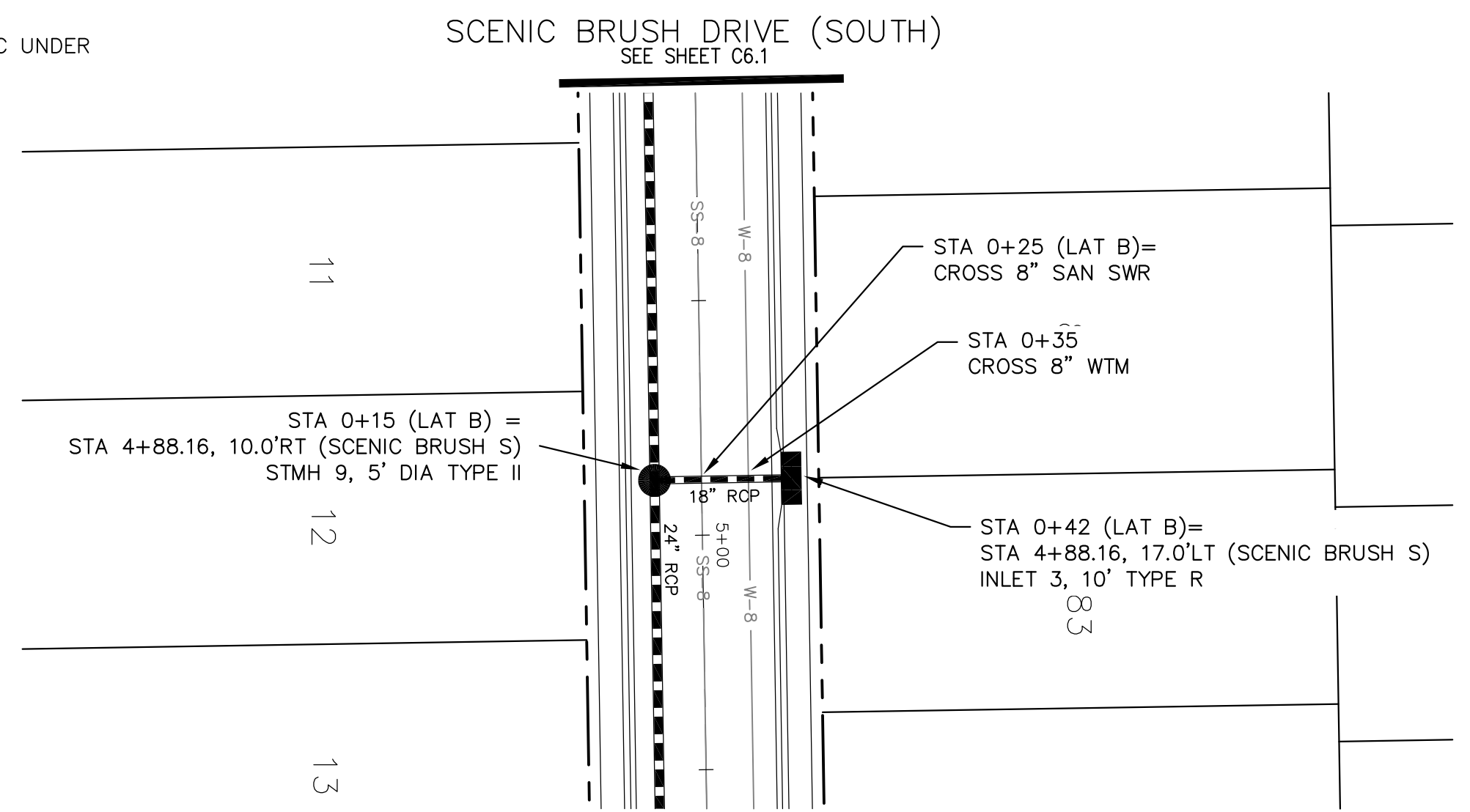
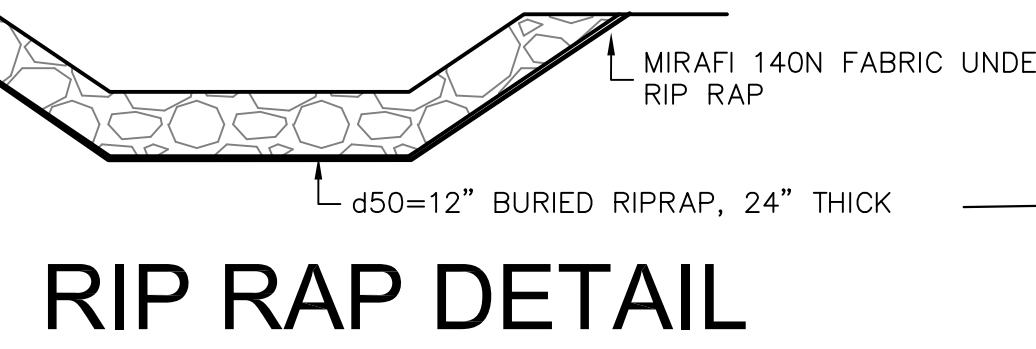
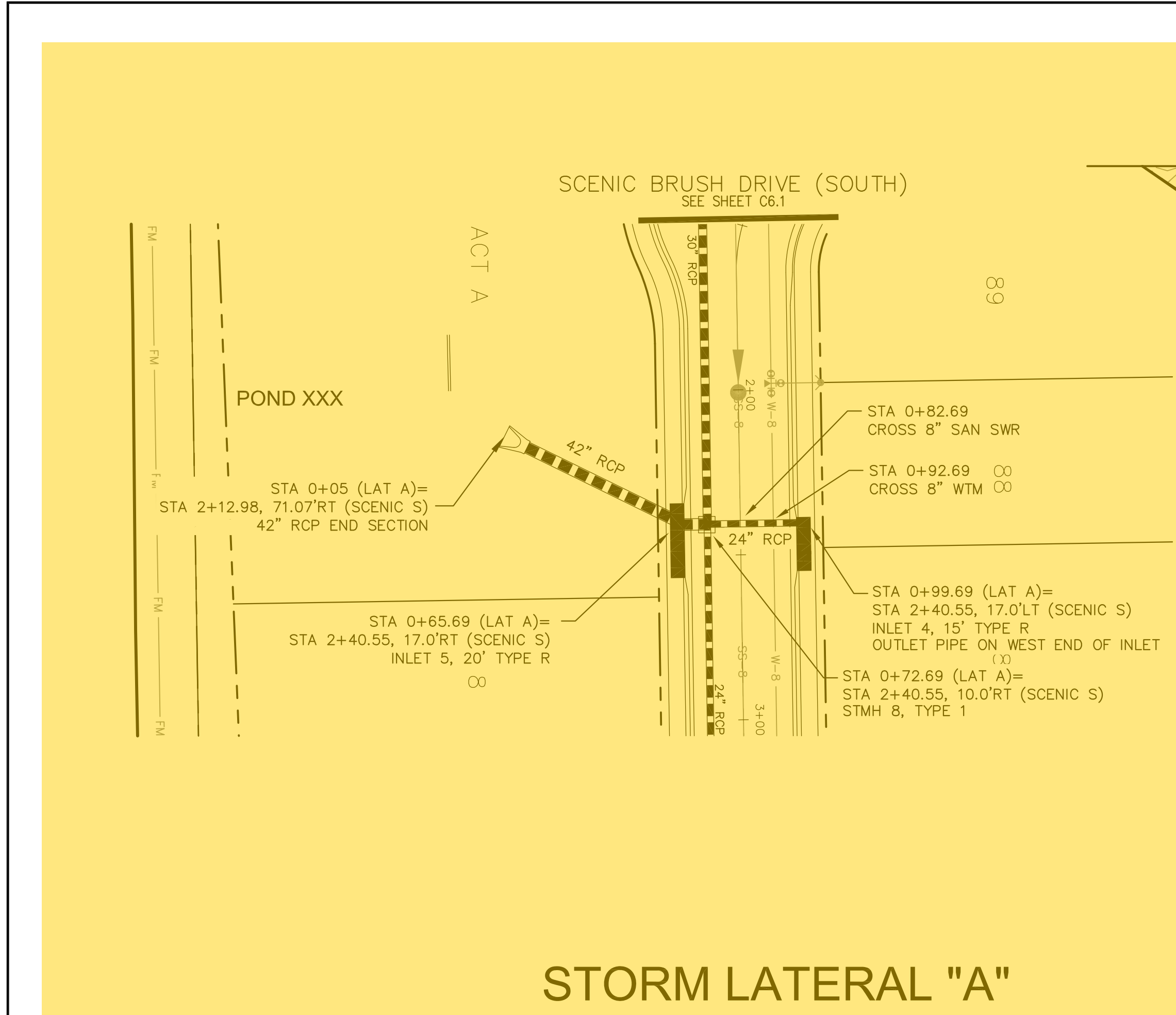
Figure 6-a
Standardized Trash Rack and Outlet
Design For WQCV Outlets With
Circular Openings

Outlet Structure Details
Scale: NTS

RECORD DRAWINGS

DATE: MARCH 16, 2016

WATER QUALITY POND
OUTLET STRUCTURE DETAILS



Station	Storm Lateral 'A' Details	Storm Lateral 'B' Details	Scale	Sheet No.
7165				7165
7160				7160
7155				7155
7150				7150
7145				7145
7140				7140
7135	<p>12" D50 RIP RAP 24" THICK ON FABRIC SEE EARLY GRADING PLANS</p> <p>60 LF 42" RCP @ 2.2% (INCLUDING END SECTION) Q5=53.5cfs Q100=108.2cfs</p> <p>7.00 LF 24" RCP @ 2.2% Q5=43.7cfs Q100=75.7cfs</p> <p>27 LF 24" RCP @ 3.75% Q5=8.5cfs Q100=22.0cfs</p> <p>WTM CROSSING STA 0+92.69 BTM STM=7141.23 TOP WTM=7139.53 CLR= 1.7'</p> <p>SAN CROSSING STA 0+82.69 BTM STM=7140.83 TOP SAN=7137.37 CLR= 3.46'</p>	<p>27 LF 18" RCP @ 1.00% Q5=4.5cfs Q100=8.1cfs</p> <p>WTM WTM CROSSING STA 0+35 BTM STM=7143.21 TOP WTM=7141.51 CLR= 1.7'</p> <p>SAN CROSSING STA 0+25 BTM STM=7143.11 TOP SAN=7136.25 CLR= 6.86'</p> <p>HGL-100YR HGL-5YR</p>	<p>SCALES: HORIZ. 1"=30' VERT. 1"=5'</p>	7135
7130				7130
7125				7125
7120			<p>RECORD DRAWINGS</p> <p>DATE: MARCH 16, 2016</p>	7120

CORE ENGINEERING GROUP
15004 1st AVE. SO.
BURNSVILLE, MN 55306
PH: 763.570.1100
FAX: 763.570.1101
EMAIL: Rich@cegi.com

PREPARED FOR:
BABCOCK LAND CORP.
10000 W. WYOMING AVE. SUITE 80003
COLORADO SPRINGS, COLORADO 80903
CONTACT: JEFF MARK

PROJECT: **SCENIC VIEW AT PAINTBRUSH HILLS**
STAPLETON DRIVE - TOWNER AVENUE
FALCON, COLORADO

DATE: _____
DESCRIPTION: _____
NO. _____

DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

**ROADWAY AND STORM SEWER
STORM LATERALS "A" & "B"
SCENIC BRUSH DRIVE(SOUTH)**

DATE: **SEPT, 2014**

PROJECT NO.: **100.203**

SHEET NUMBER: **C6.8**

TOTAL SHEETS: 25