

April 22, 2023

El Paso County Planning and Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

RE: Creekside South at Lorson Ranch Filing No. 1 (SF 20-017)
Certification Letter

Dear El Paso County PCD,

Based upon information gathered from as-built surveys and periodic visits to the project, Core Engineering Group is of the opinion that the subdivision improvements have been constructed in general conformance with the approved design plans as filed with El Paso County.

The site and adjacent properties (as affected by work performed under the County permit) appear to be stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and the improvements (public improvements, common development improvements, site grading and paving) visually appear to meet or exceed the minimum design requirements.

The sanitary and watermain located in the public ROW has also been completed in accordance with Widefield Water and Sanitation Districts criteria.

In addition, Core Engineering Group has verified that the Extended Detention Basin/WQ Pond J and E2 meet the volume and elevation requirements and are constructed in general compliance with the approved construction plans. The pond "as-built" documents are attached to this letter.

Based on information gathered during construction and post-construction, Core Engineering Group is of the opinion that the public streets, storm sewer, and Detention Pond J and E2 have been constructed in general accordance with the approved construction documents.

Sincerely,
Core Engineering Group, LLC



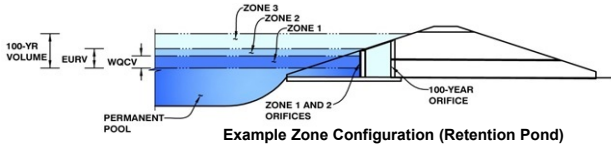
Richard L. Schindler, P.E. 33997

Attachments: Pond As-built elevations

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **Creekside South FDR**
Basin ID: **POND E2 asbuilt**



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.96	1.732	Orifice Plate
Zone 2 (EURV)	4.69	2.500	Rectangular Orifice
Zone 1 and 2 (100+1/2WQCV)	8.08	5.673	Weir&Pipe (Restrict)
		9.905	Total

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

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

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft ²
Underdrain Orifice Centroid =	N/A	feet

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

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	2.96	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	4.80	sq. inches (use rectangular openings)

Calculated Parameters for Plate

WQ Orifice Area per Row =	3.333E-02	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.75	1.55	2.55				
Orifice Area (sq. inches)	4.80	4.80	4.80	4.80				

	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)

	Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	3.50	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	4.69	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Height =	4.00	N/A	inches
Vertical Orifice Width =	18.00		inches

Calculated Parameters for Vertical Orifice

	Zone 2 Rectangular	Not Selected
Vertical Orifice Area =	0.50	N/A
Vertical Orifice Centroid =	0.17	N/A

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	5.85	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	17.70	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	6.70	N/A	feet
Overflow Grate Open Area % =	70%	N/A	% grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected
Height of Grate Upper Edge, H _i =	5.85	N/A
Over Flow Weir Slope Length =	6.70	N/A
Grate Open Area / 100-yr Orifice Area =	6.61	N/A
Overflow Grate Open Area w/o Debris =	83.01	N/A
Overflow Grate Open Area w/ Debris =	41.51	N/A

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.10	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	48.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	48.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected
Outlet Orifice Area =	12.57	N/A
Outlet Orifice Centroid =	2.00	N/A
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	8.09	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	55.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	0.50	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth =	1.51	feet
Stage at Top of Freeboard =	10.10	feet
Basin Area at Top of Freeboard =	1.88	acres

orifice=93.05

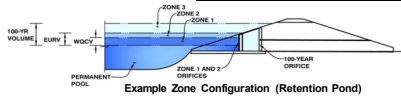
Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period =								
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52
Calculated Runoff Volume (acre-ft) =	1.732	4.232	3.645	5.556	7.847	12.045	14.974	18.724
OPTIONAL Override Runoff Volume (acre-ft) =								
Inflow Hydrograph Volume (acre-ft) =	1.732	4.233	3.646	5.554	7.843	12.049	14.970	18.731
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.02	0.10	0.34	0.87	1.17	1.53
Predevelopment Peak Q (cfs) =	0.0	0.0	2.0	12.4	42.6	108.8	146.0	191.3
Peak Inflow Q (cfs) =	32.7	78.8	68.1	102.8	143.9	218.1	268.6	333.2
Peak Outflow Q (cfs) =	0.8	3.3	2.7	4.3	25.5	103.4	139.0	150.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.6	1.0	1.0	0.8
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	1.2	1.6	1.7
Max Velocity through Grate 2 (fps) =	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	57	55	59	59	56	53	51
Time to Drain 99% of Inflow Volume (hours) =	41	60	59	64	65	64	63	61
Maximum Ponding Depth (ft) =	2.88	4.47	4.12	5.25	6.18	6.80	7.17	8.09
Area at Maximum Ponding Depth (acres) =	1.34	1.50	1.47	1.57	1.66	1.71	1.75	1.83
Maximum Volume Stored (acre-ft) =	1.620	3.890	3.371	5.088	6.607	7.652	8.292	9.940

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: **Creekside South FDR**
 Basin ID: **POND E2-asbuilt**



Required Volume Calculation

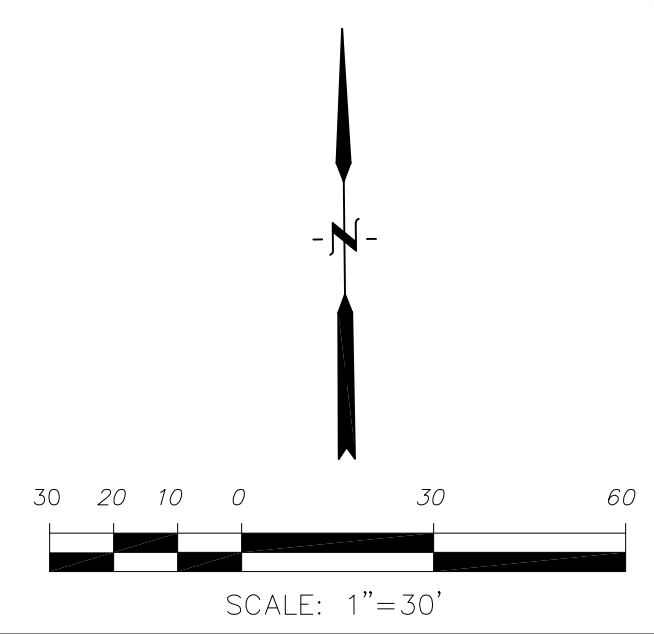
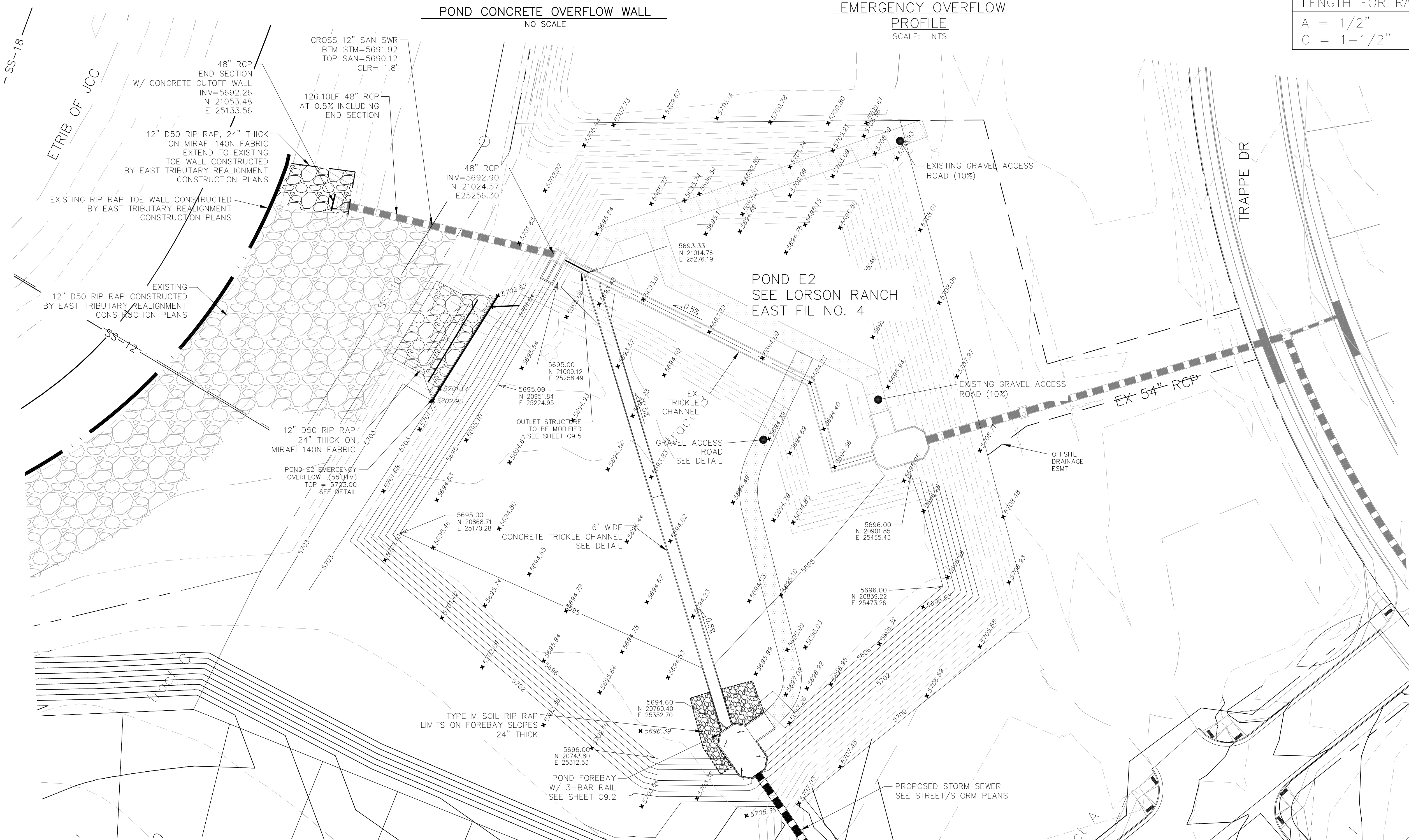
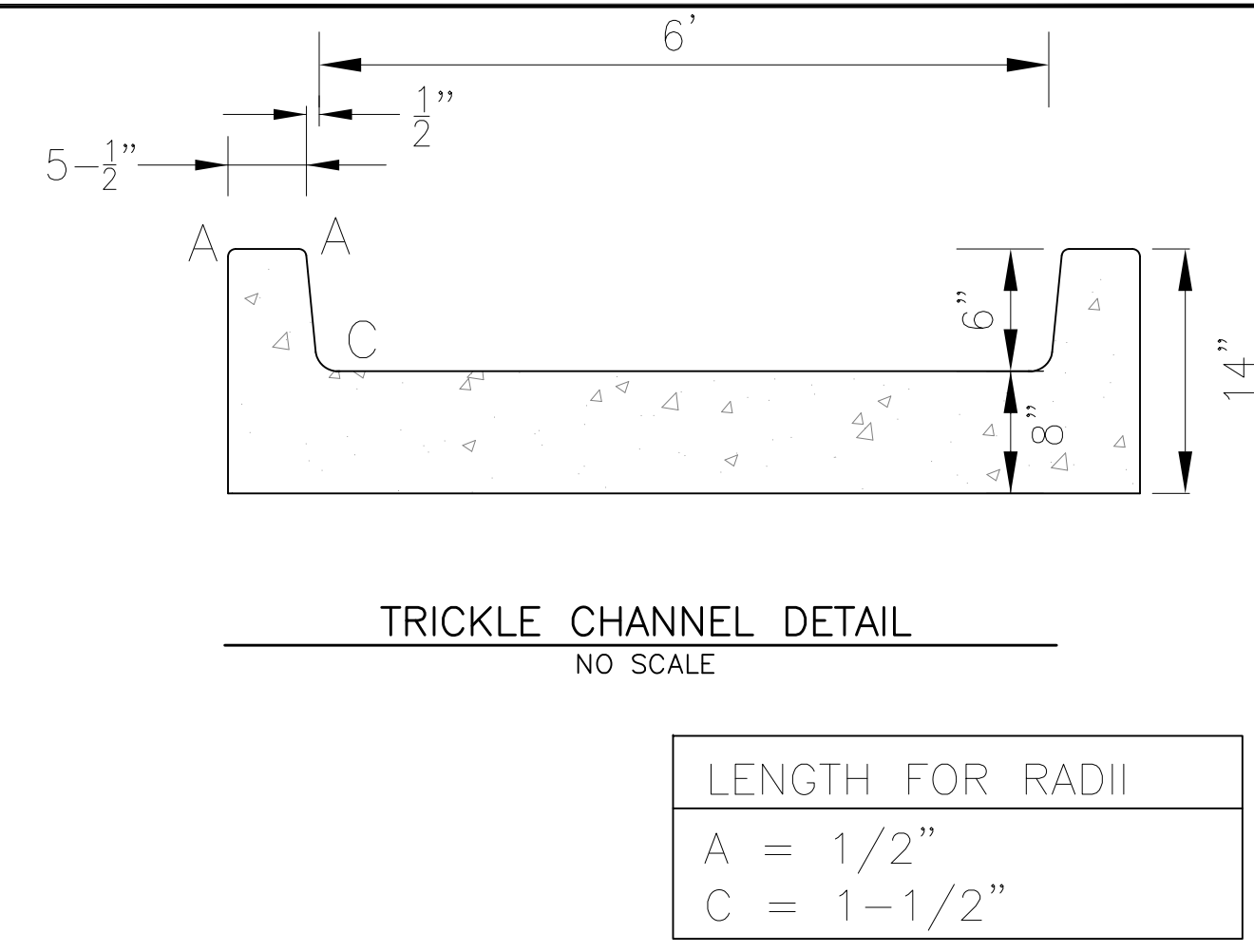
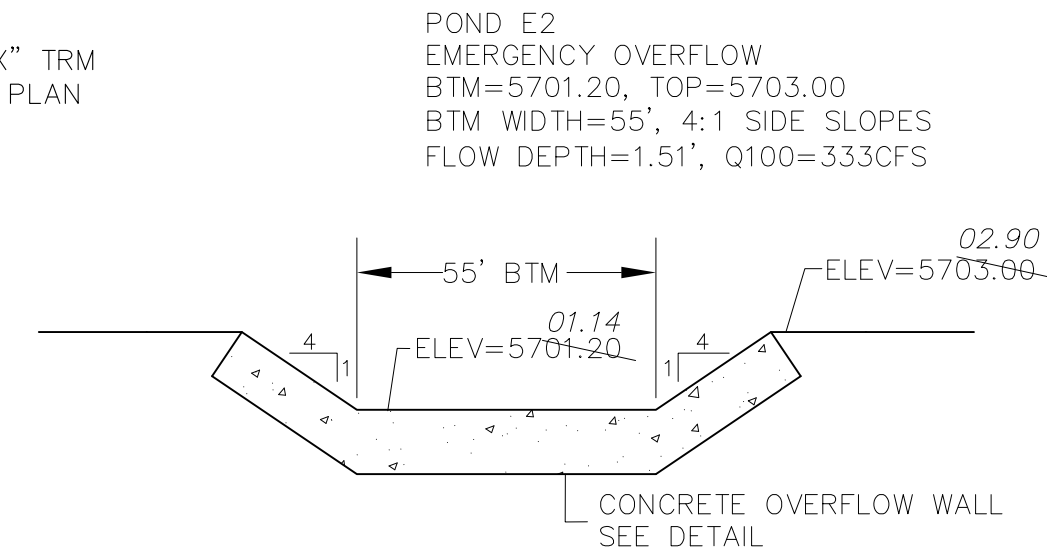
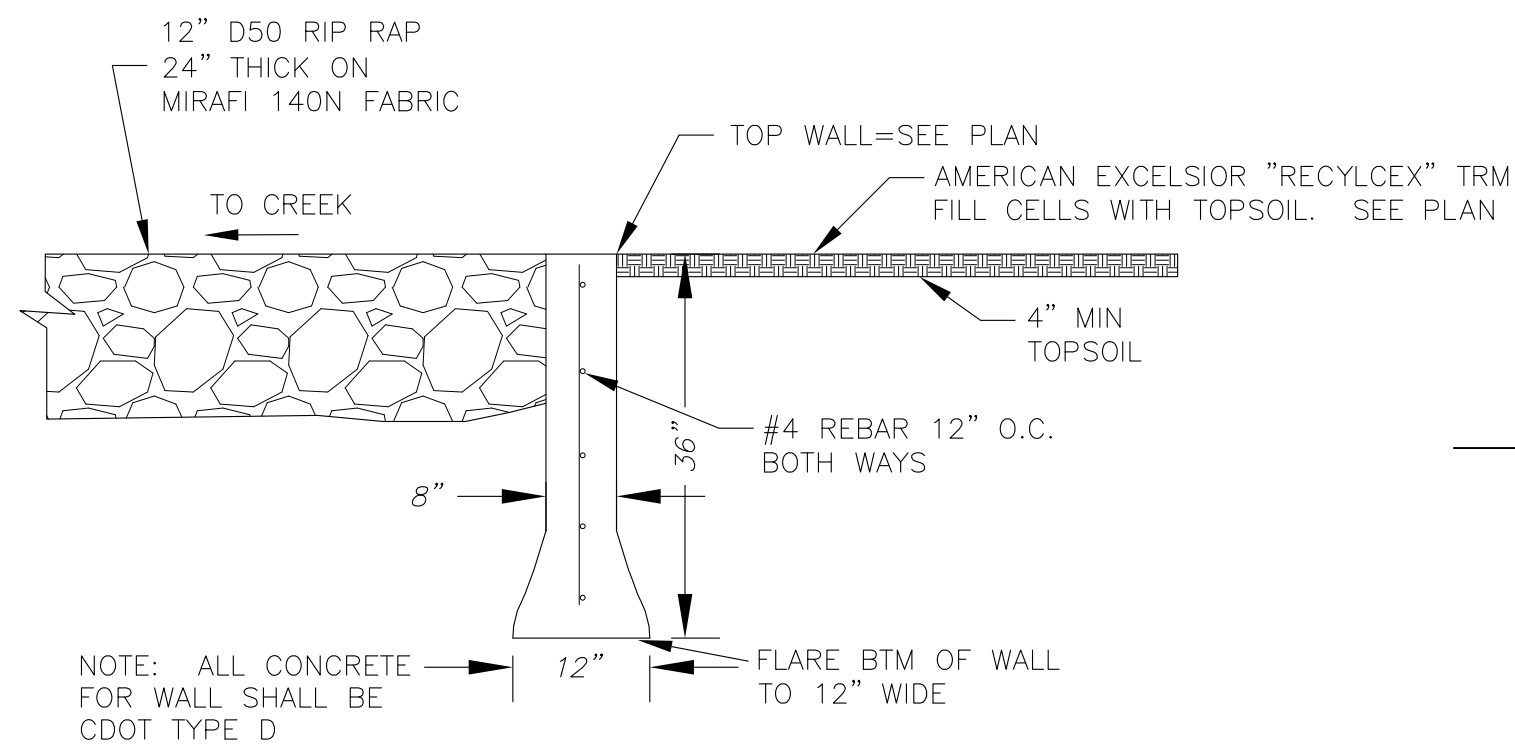
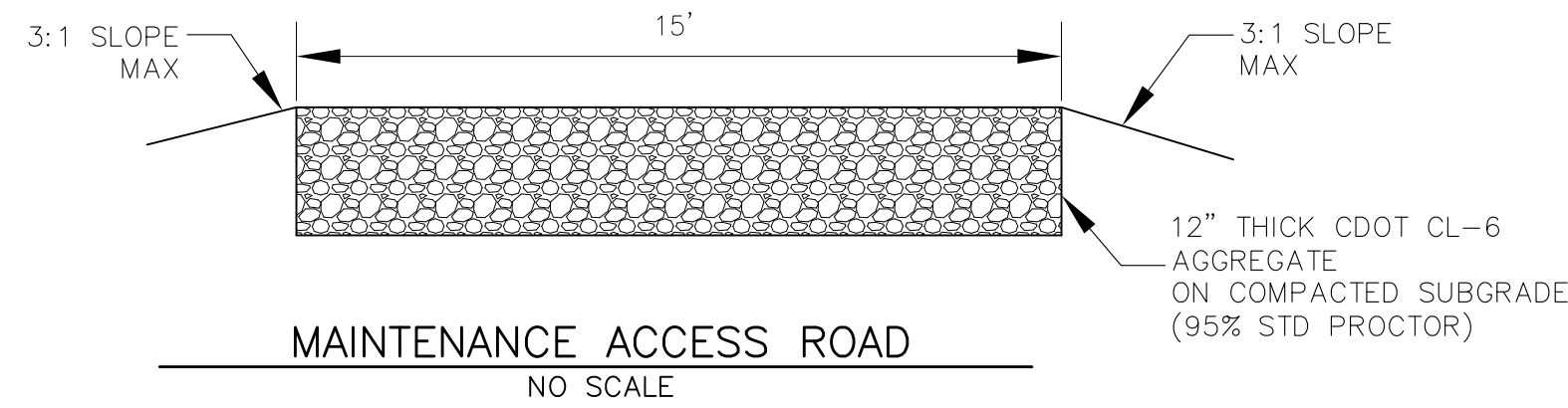
Selected BMP Type =	EDB	
Watershed Area =	125.00	acres
Watershed Length =	2,900	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	35.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	40.0%	percent
Percentage Hydrologic Soil Groups C/D =	60.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	1,732	acre-feet
Excess Urban Runoff Volume (EURV) =	4,232	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	3,645	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	5,556	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	7,847	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	12,045	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	14,974	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	18,724	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	3,411	acre-feet
Approximate 5-yr Detention Volume =	5,233	acre-feet
Approximate 10-yr Detention Volume =	6,938	acre-feet
Approximate 25-yr Detention Volume =	7,293	acre-feet
Approximate 50-yr Detention Volume =	7,634	acre-feet
Approximate 100-yr Detention Volume =	9,039	acre-feet

Optional User Override 1-hr Precipitation	
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	1,732	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2,500	acre-feet
Zone 3 (100yr + 1/2 WQCV - Zones 1 & 2) =	5,673	acre-feet
Total Detention Basin Volume =	9,905	acre-feet
Initial Surcharge Volume (ISV) =	user	ft ³
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H _{total}) =	user	ft
Depth of Trickle Channel (H _{TC}) =	user	ft
Slope of Trickle Channel (S _{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S _{main}) =	user	H/V
Basin Length-to-Width Ratio (R _{bas}) =	user	
Initial Surcharge Area (A _{ISV}) =	user	ft ²
Surcharge Volume Length (L _{ISV}) =	user	ft
Surcharge Volume Width (W _{ISV}) =	user	ft
Depth of Basin Floor (H _{b,100yr}) =	user	ft
Length of Basin Floor (L _{b,100yr}) =	user	ft
Width of Basin Floor (W _{b,100yr}) =	user	ft
Area of Basin Floor (A _{b,100yr}) =	user	ft ²
Volume of Basin Floor (V _{b,100yr}) =	user	ft ³
Depth of Main Basin (H _{main}) =	user	ft
Length of Main Basin (L _{main}) =	user	ft
Width of Main Basin (W _{main}) =	user	ft
Area of Main Basin (A _{main}) =	user	ft ²
Volume of Main Basin (V _{main}) =	user	ft ³
Calculated Total Basin Volume (V _{total}) =	user	acre-feet

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)
Depth Increment =	0.2								
bottom orifice=93.05									
Top of Micropool	--	0.00	--	--	--	20	0.000		
5693.33	--	0.28	--	--	--	50	0.001	9	0.000
5694	--	0.95	--	--	--	4,002	0.092	1,327	0.030
5695	--	1.95	--	--	--	42,067	0.966	23,982	0.551
5696	--	2.95	--	--	--	59,665	1.370	75,267	1.728
5697	--	3.95	--	--	--	63,159	1.450	136,679	3.138
5698	--	4.95	--	--	--	67,347	1.546	201,932	4.636
5699	--	5.95	--	--	--	71,339	1.638	271,275	6.228
5700	--	6.95	--	--	--	75,183	1.726	344,536	7.909
5701	--	7.95	--	--	--	79,405	1.823	421,830	9.684
5702	--	8.95	--	--	--	81,974	1.882	502,520	11.536



AS-BUILT
DATE: 09/29/2022

CORE ENGINEERING GROUP
15004 1ST AVENUE, SUITE 301
DENVER, CO 80202
PHONE: 719.570.1100
CONTACT: RICHARD L. SCHINDLER, P.E.
EMAIL: Rich@ceg1.com

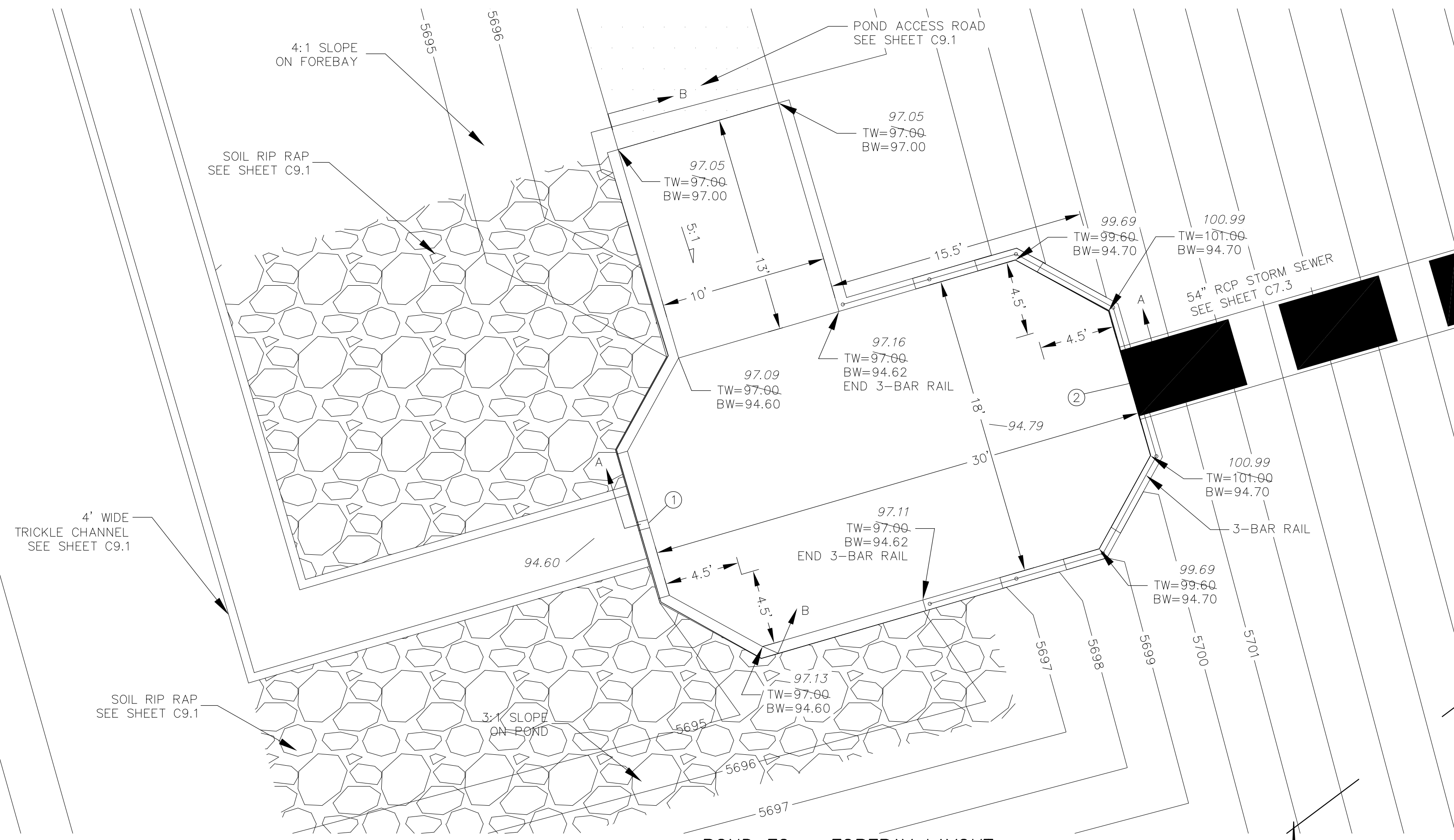
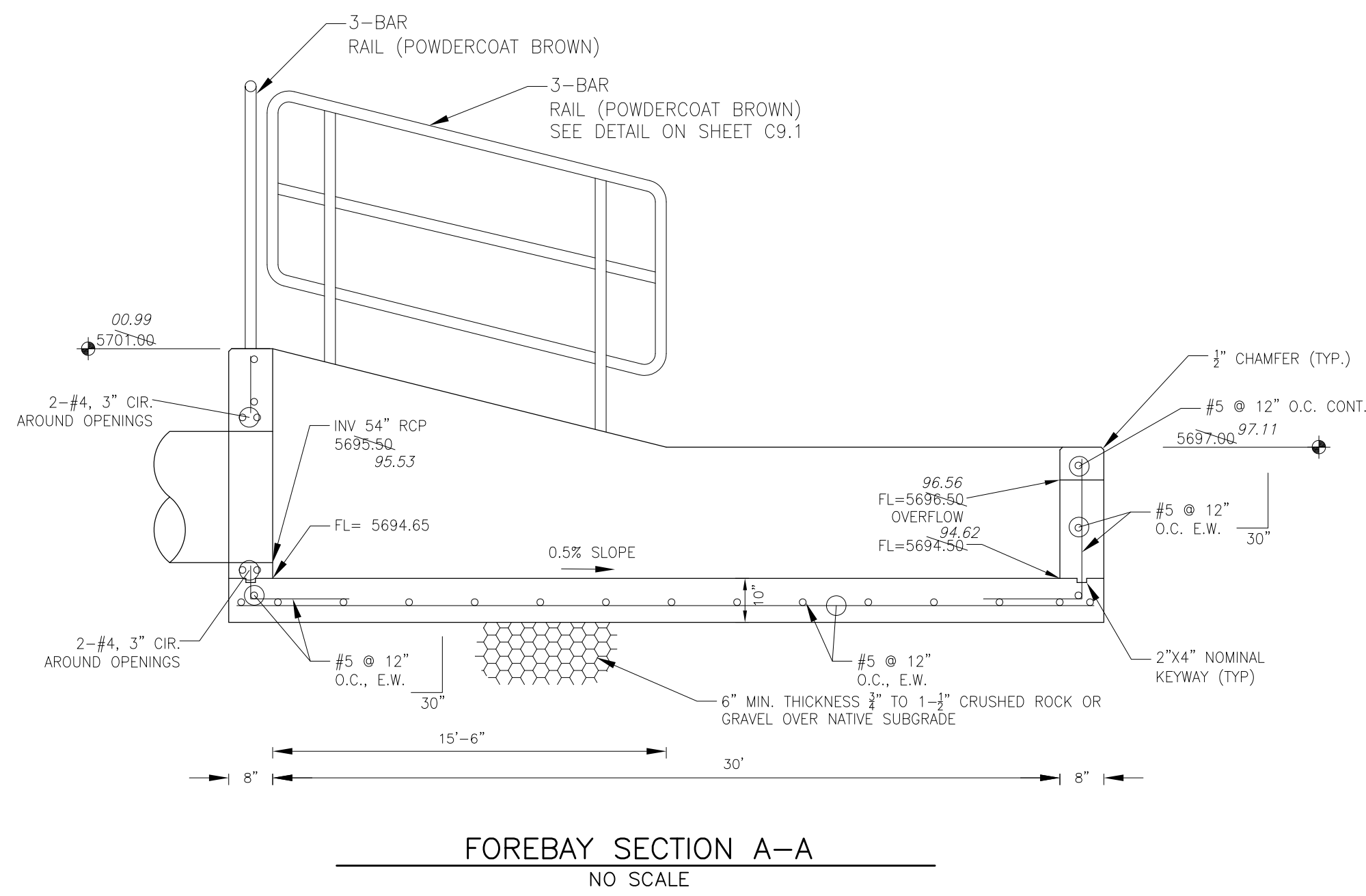
DATE: _____
DESCRIPTION: _____
NO: _____
PREPARED FOR: LORSON, LLC
212 N. WAHSATCH AVE, SUITE 301
COLORADO SPRINGS, COLORADO 80903
CONTACT: JEFF MARK

DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

**POND E2
POND E2 OUTFALL AND
TRICKLE CHANNEL**

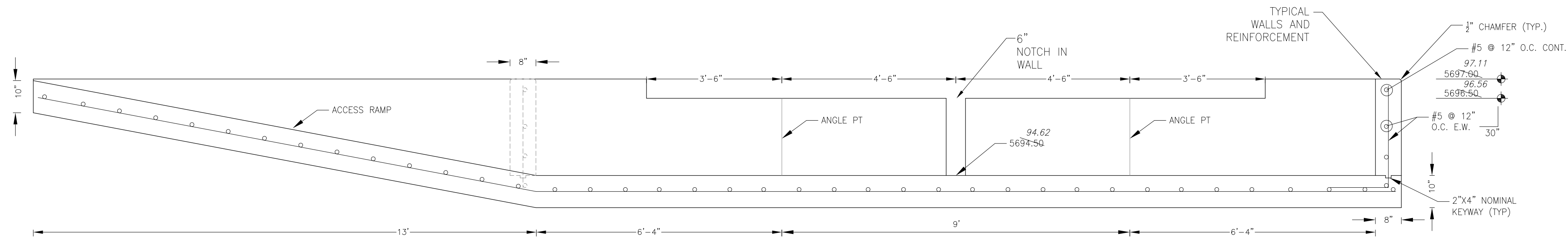


DATE: MAY 12, 2020
PROJECT NO. 100.051
SHEET NUMBER C9.1
TOTAL SHEETS: 15



POINT TABLE (FOREBAY)				
NUMBER	NORTHING	EASTING	ELEVATION	NOTES
1	20912.52	25435.24	5694.50	FOREBAY BOTTOM
2	20920.89	25464.05	5694.65	FOREBAY BOTTOM, INV 54\"/>

FOREBAY AT TRAPPE DR



NOTE: ALL CONCRETE FOR FOREBAY SHALL BE CDOT TYPE D

FOREBAY SECTION B-B
NO SCALE

AS-BUILT
DATE: 09/29/2022

CORE ENGINEERING GROUP
15004 1ST AVENUE S.
DENVER, CO 80202
PH: 719.570.1100
CONTACT: RICHARD L. SCHINDLER, P.E.
EMAIL: Rich@ceg1.com

DATE: _____
DESCRIPTION: _____
NO: _____
DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

PREPARED FOR:
LORSON, LLC
212 N. WAHSATCH AVE, SUITE 301
COLORADO SPRINGS, COLORADO 80903
CONTACT: JEFF MARK

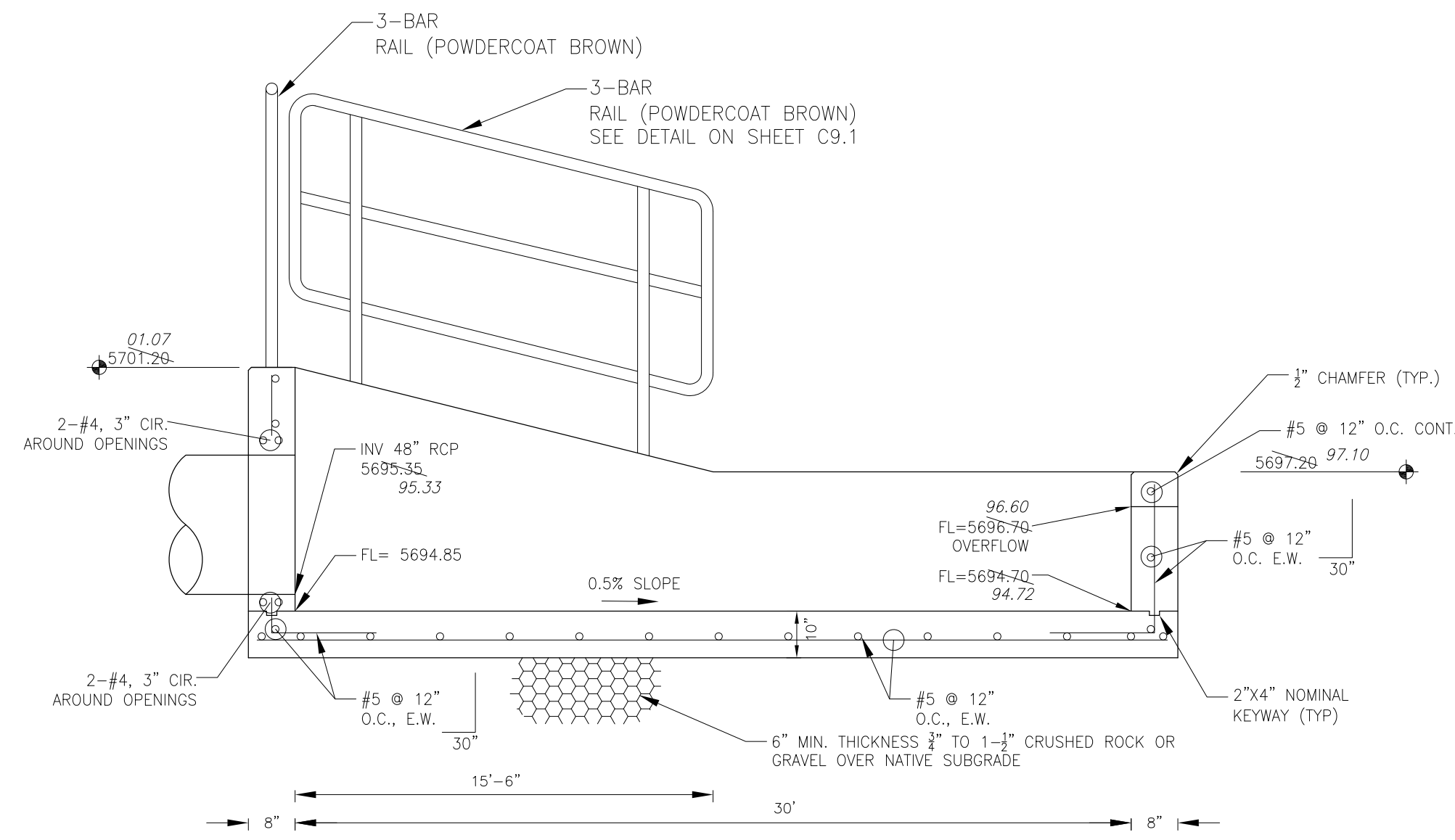
PROJECT:
LORSON RANCH EAST
FILING NO. 4
LORSON BLVD. - LAMPREY DR.
COLORADO SPRINGS, COLORADO

DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

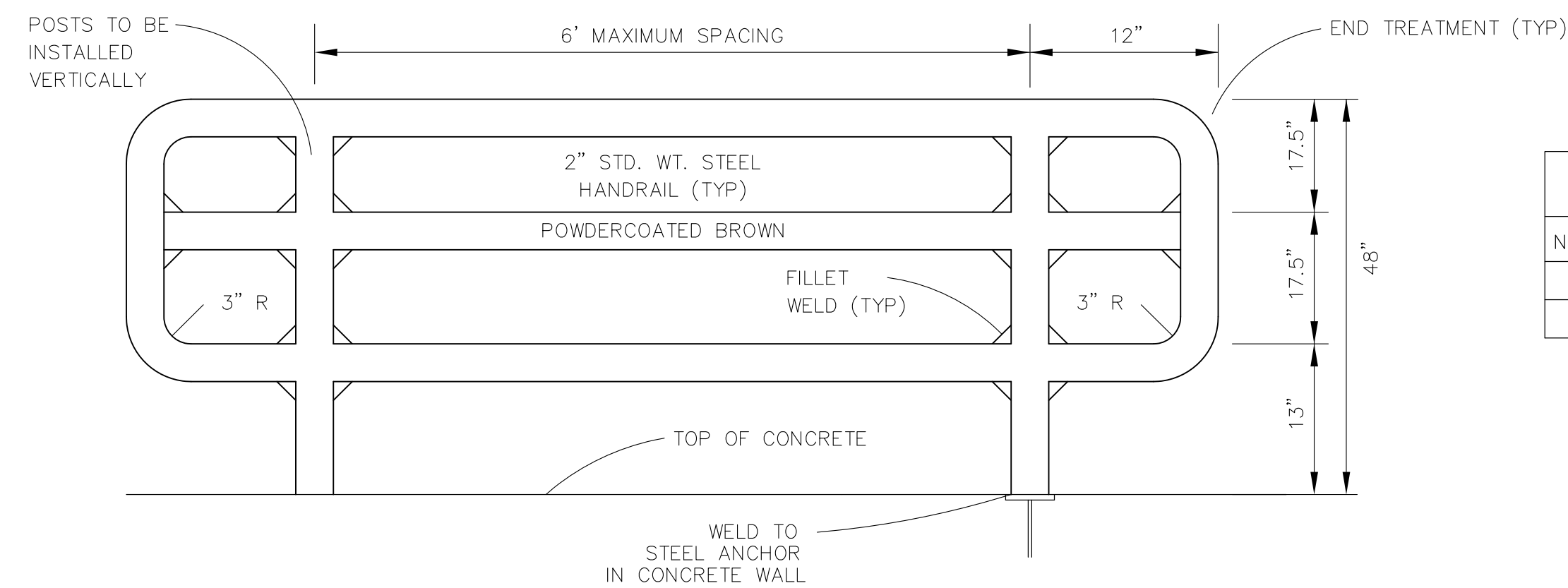
POND E2
FOREBAY DETAILS



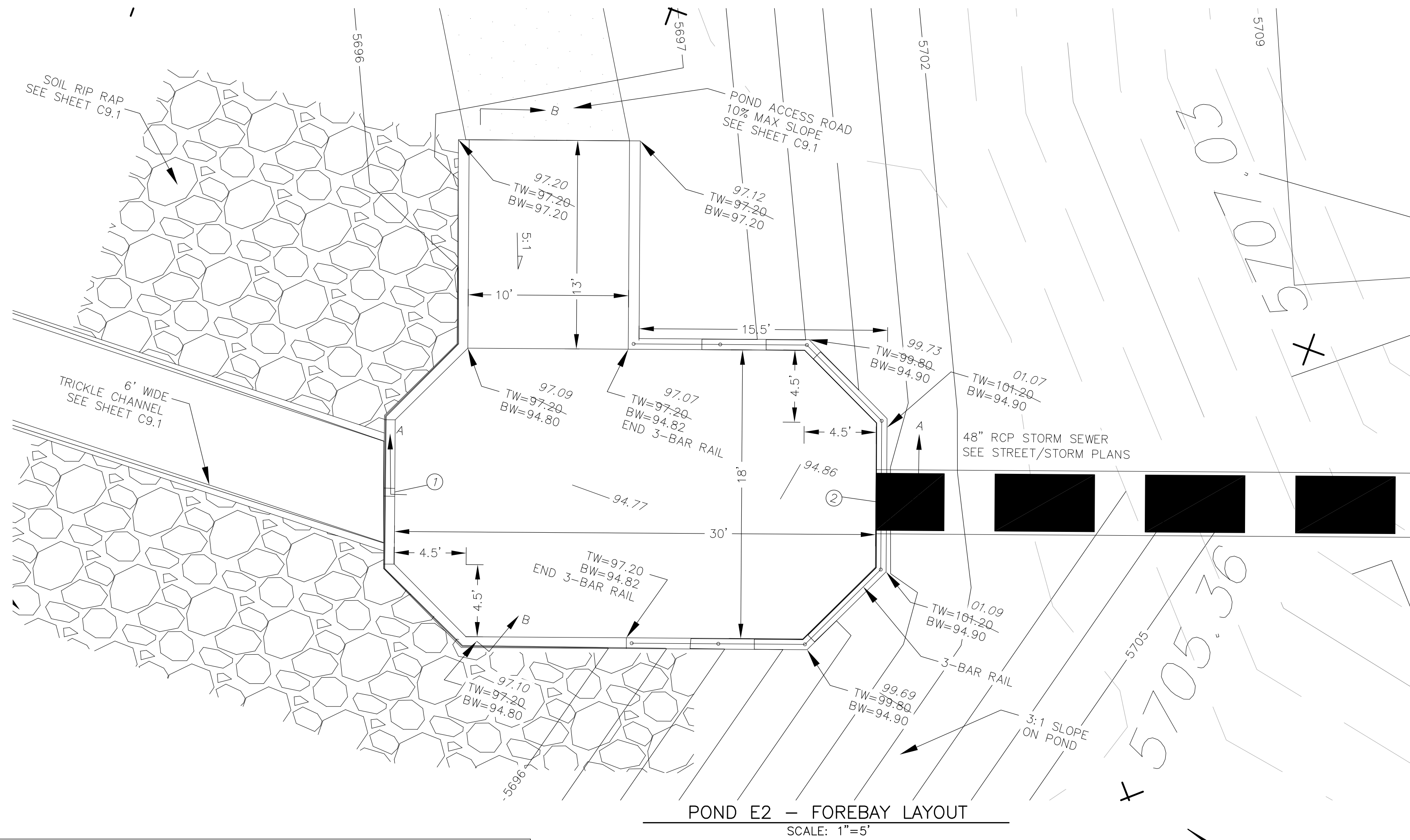
DATE: JUNE 1, 2019
PROJECT NO. 100.048
SHEET NUMBER **C9.2**
TOTAL SHEETS: 40



FOREBAY SECTION A-A
NO SCALE



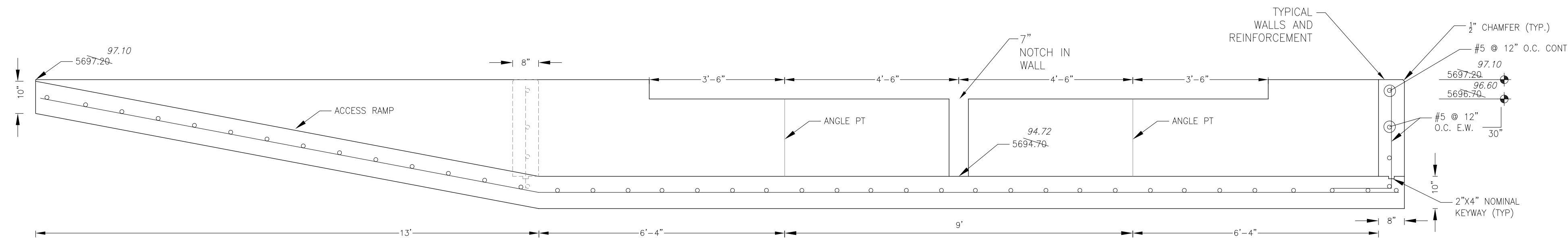
3-BAR RAIL DETAIL
NO SCALE



POND E2 - FOREBAY LAYOUT
SCALE: 1"=5'

POINT TABLE (FOREBAY)				
NUMBER	NORTHING	EASTING	ELEVATION	NOTES
1	20759.85	25353.08	5694.70	FOREBAY BOTTOM
2	20734.93	25369.79	5694.85	FOREBAY BOTTOM, INV 54"=5695.50

FOREBAY AT LUNETH DR



FOREBAY SECTION B-B
NO SCALE

NOTE: ALL CONCRETE FOR FOREBAY SHALL BE CDOT TYPE D

AS-BUILT
DATE: 09/29/2022

CORE ENGINEERING GROUP
15004 151ST AVENUE, S.
P.O. BOX 719 5707, 1100
CONTACT: RICHARD L. SCHINDLER, P.E.
EMAIL: Rich@ceg1.com

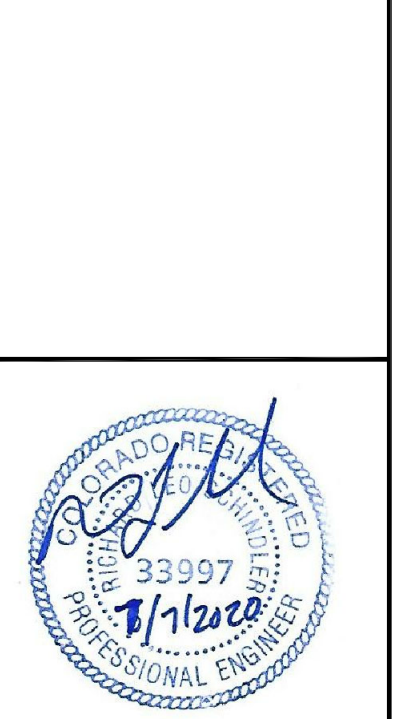
DATE: _____
DESCRIPTION: _____
NO: _____

PREPARED FOR:
LORSON, LLC
212 N. WAHSATCH AVE, SUITE 301
COLORADO SPRINGS, COLORADO 80903
CONTACT: JEFF MARK

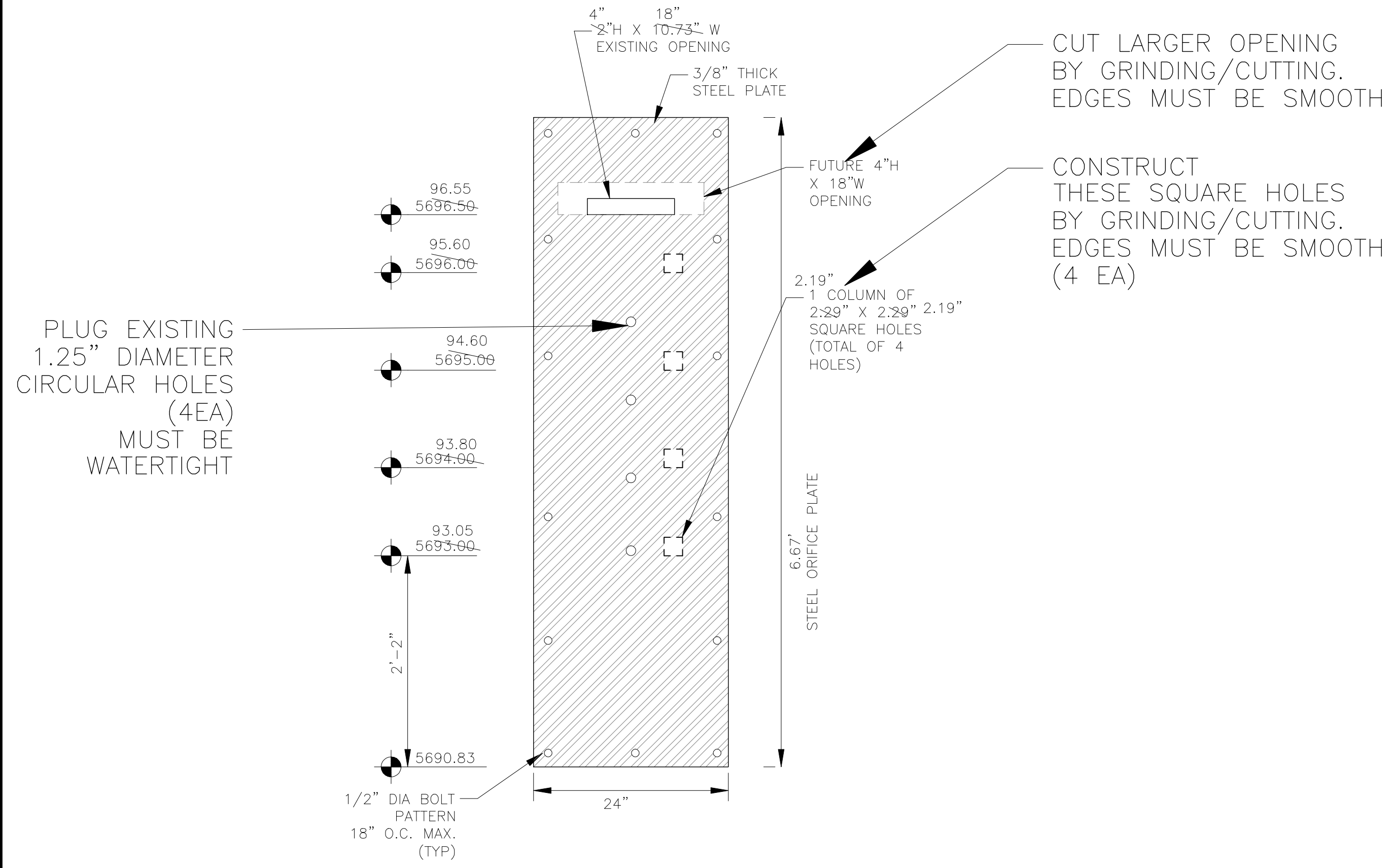
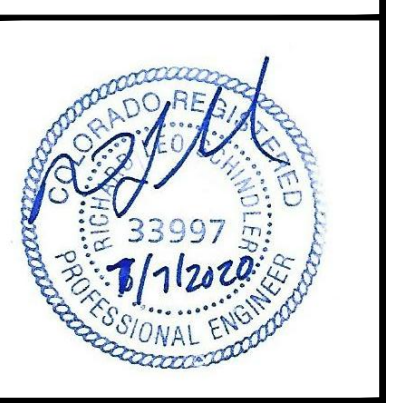
DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

PROJECT:
CREEKSIDE SOUTH AT LORSON RANCH
TRAPPE DR - HORTON DR
COLORADO SPRINGS, COLORADO

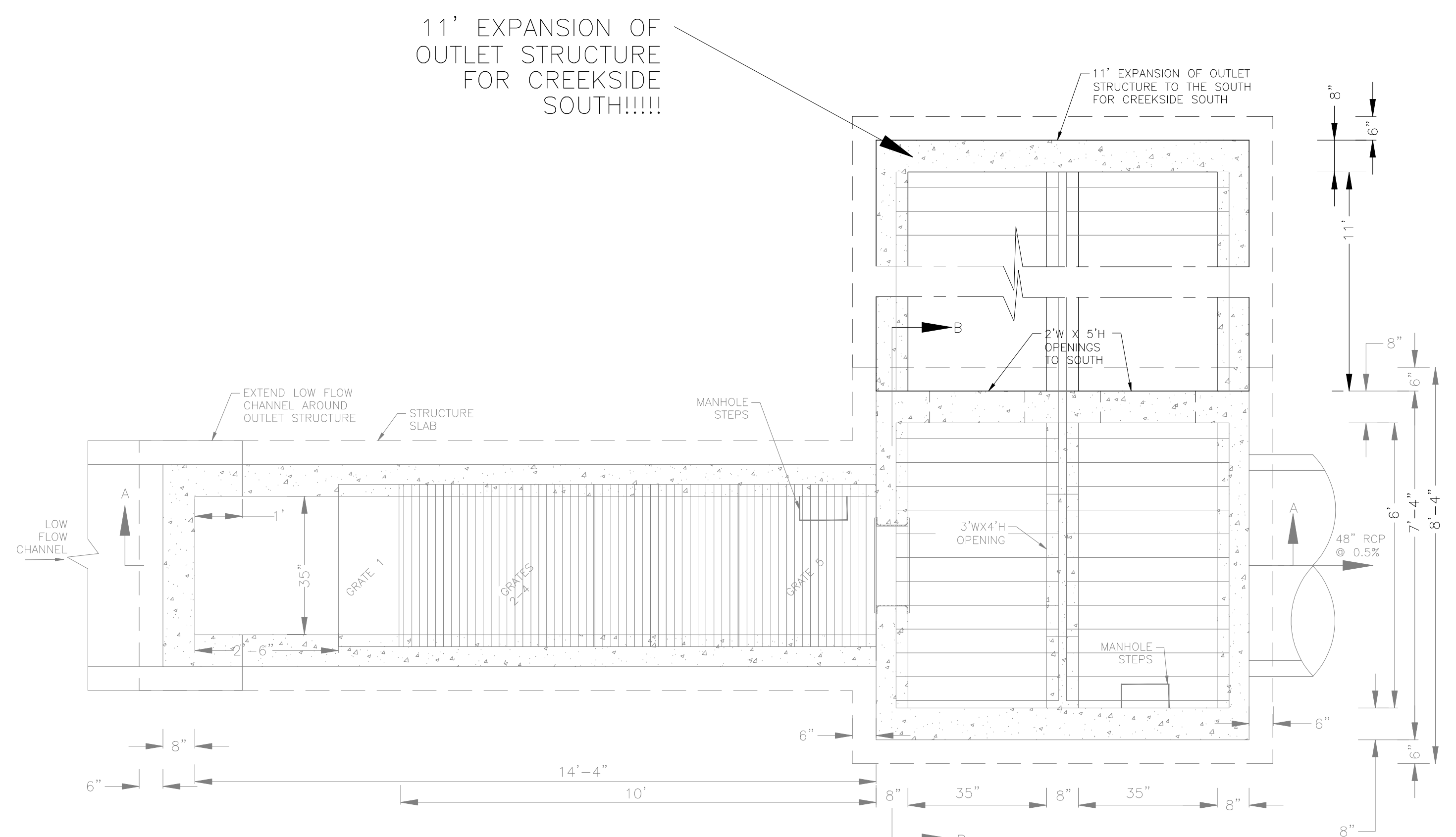
POND E2
FOREBAY DETAILS



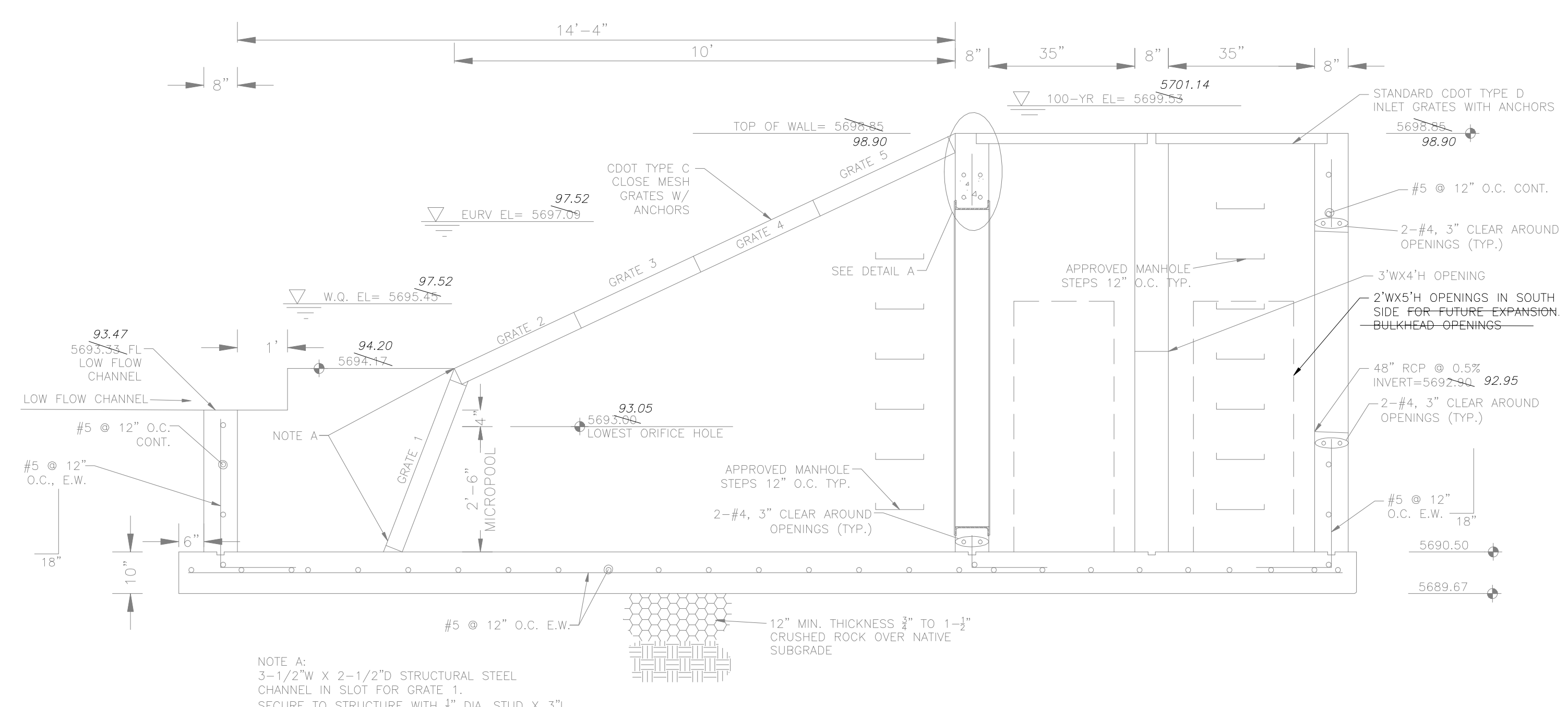
DATE: MAY 12, 2020
PROJECT NO. 100.051
SHEET NUMBER **C9.2**
TOTAL SHEETS: 15



ORIFICE PLATE DETAIL
 NO SCALE



OUTLET STRUCTURE DETAIL - PLAN VIEW
 NO SCALE



OUTLET STRUCTURE DETAIL - SECTION A-A
 NO SCALE

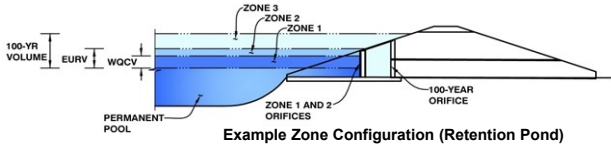
NOTE A:
 3-1/2"W X 2-1/2"D STRUCTURAL STEEL CHANNEL IN SLOT FOR GRATE 1. SECURE TO STRUCTURE WITH 1/2" DIA. STUD X 3", 18" O.C. MAX.

AS-BUILT
 DATE: **09/29/2022**

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **Creskide South**
Basin ID: **Pond J-asbuilt**



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.50	0.623	Orifice Plate
Zone 2 (EURV)	3.56	0.785	Rectangular Orifice
Zone 3 (100+1/2WQCV)	5.93	2.188	Weir&Pipe (Restrict)
		3.596	Total

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

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

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
Underdrain Orifice Centroid = feet

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

Invert of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 2.50 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = 2.12 sq. inches (diameter = 1-5/8 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row = 1.472E-02 ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.74	1.52					
Orifice Area (sq. inches)	2.12	2.12	2.12					

	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)

	Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	2.45	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	3.56	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Height =	2.00	N/A	inches
Vertical Orifice Width =	12.00		inches

Calculated Parameters for Vertical Orifice

	Zone 2 Rectangular	Not Selected
Vertical Orifice Area =	0.17	N/A
Vertical Orifice Centroid =	0.08	N/A

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	3.60	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	6.00	N/A	feet
Overflow Weir Slope =	6.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	6.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	% grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected
Height of Grate Upper Edge, H _i =	4.60	N/A
Over Flow Weir Slope Length =	6.08	N/A
Grate Open Area / 100-yr Orifice Area =	4.88	N/A
Overflow Grate Open Area w/o Debris =	25.55	N/A
Overflow Grate Open Area w/ Debris =	12.77	N/A

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.07	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	36.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	25.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected
Outlet Orifice Area =	5.24	N/A
Outlet Orifice Centroid =	1.16	N/A
Half-Central Angle of Restrictor Plate on Pipe =	1.97	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	6.07	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	25.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth =	1.20	feet
Stage at Top of Freeboard =	8.27	feet
Basin Area at Top of Freeboard =	1.26	acres

bottom orifice=81.67

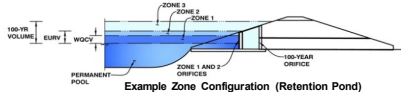
Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52
One-Hour Rainfall Depth (in) =	0.623	1.408	1.084	1.592	2.509	4.406	5.648	7.267
Calculated Runoff Volume (acre-ft) =								
OPTIONAL Override Runoff Volume (acre-ft) =								
Inflow Hydrograph Volume (acre-ft) =	0.622	1.409	1.084	1.593	2.510	4.409	5.647	7.267
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.03	0.21	0.67	0.92	1.24
Predevelopment Peak Q (cfs) =	0.0	0.0	0.7	1.7	11.4	36.1	49.8	66.7
Peak Inflow Q (cfs) =	10.2	23.0	17.7	25.9	40.6	70.6	90.0	115.1
Peak Outflow Q (cfs) =	0.3	1.1	0.9	1.2	9.2	33.0	48.8	55.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.7	0.8	0.9	1.0	0.8
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.0	0.3	1.2	1.8	2.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	47	45	48	48	43	40	38
Time to Drain 99% of Inflow Volume (hours) =	40	51	48	52	53	51	50	48
Maximum Ponding Depth (ft) =	2.44	3.39	3.00	3.60	4.23	4.91	5.23	5.88
Area at Maximum Ponding Depth (acres) =	0.68	0.78	0.74	0.80	0.87	0.94	0.97	1.04
Maximum Volume Stored (acre-ft) =	0.576	1.269	0.980	1.443	1.962	2.585	2.891	3.544

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Creekside South at Lorson Ranch
Basin ID: Pond J-Asbult



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type = **EDB**

Watershed Area =	54.00	acres
Watershed Length =	2,200	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	26.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	90.0%	percent
Percentage Hydrologic Soil Groups C/D =	10.0%	percent
Desired WOCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WOCV) =	0.623	acre-feet
Excess Urban Runoff Volume (EURV) =	1.408	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.084	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.592	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	2.509	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	4.406	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	5.648	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	7.267	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	1.011	acre-feet
Approximate 5-yr Detention Volume =	1.495	acre-feet
Approximate 10-yr Detention Volume =	2.192	acre-feet
Approximate 25-yr Detention Volume =	2.587	acre-feet
Approximate 50-yr Detention Volume =	2.728	acre-feet
Approximate 100-yr Detention Volume =	3.285	acre-feet

Optional User Override
1-hr Precipitation

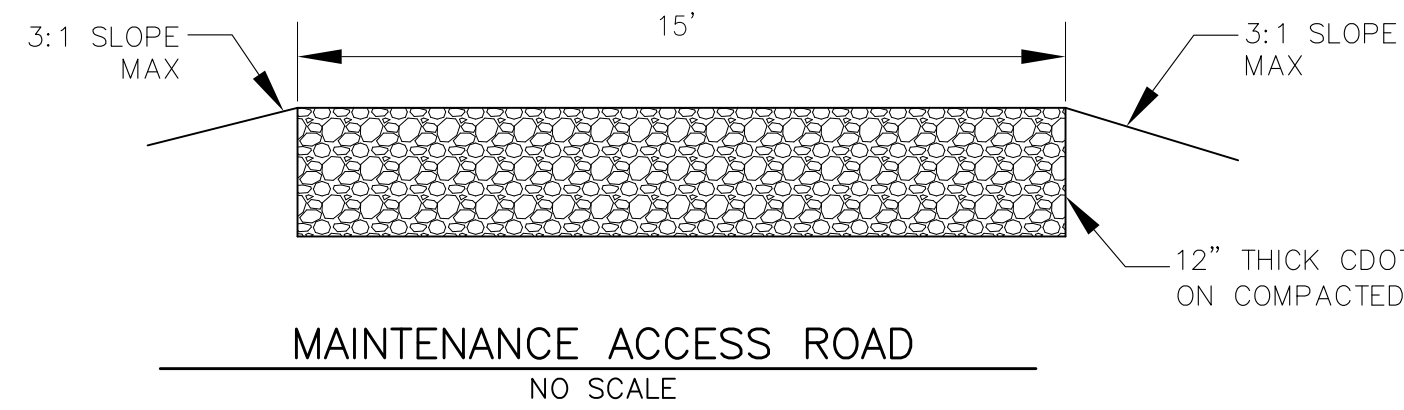
	1.19	inches
	1.50	inches
	1.75	inches
	2.00	inches
	2.25	inches
	2.52	inches

Stage-Storage Calculation

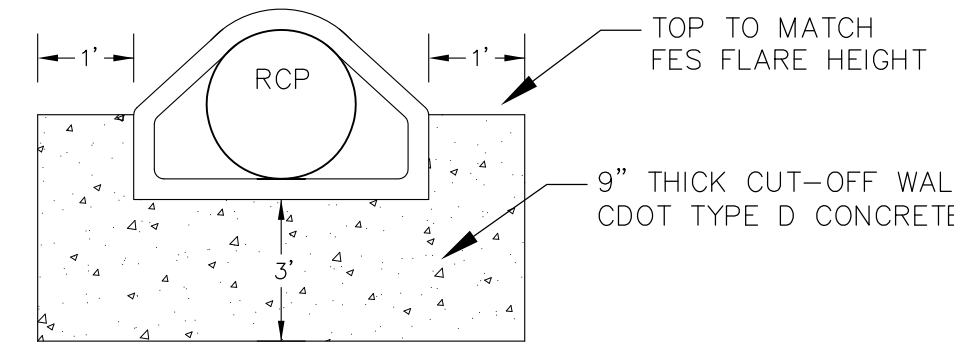
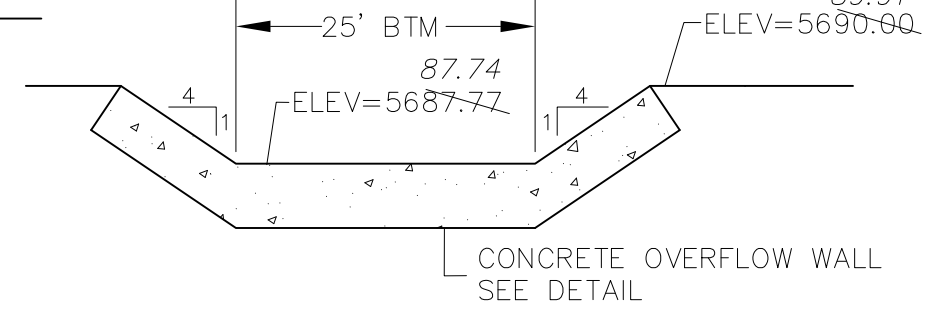
Zone 1 Volume (WOCV) =	0.623	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.785	acre-feet
Zone 3 (100yr + 1/2 WOCV - Zones 1 & 2) =	2.188	acre-feet
Total Detention Basin Volume =	3.596	acre-feet
Initial Surge Volume (ISV) =	user	ft ³
Initial Surge Depth (ISD) =	user	ft
Total Available Detention Depth (H _{total}) =	user	ft
Depth of Trickle Channel (H _{TC}) =	user	ft
Slope of Trickle Channel (S _{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S _{main}) =	user	H/V
Basin Length-to-Width Ratio (R _{bas}) =	user	

Initial Surge Area (A _{ISV}) =	user	ft ²
Surcharge Volume Length (L _{ISV}) =	user	ft
Surcharge Volume Width (W _{ISV}) =	user	ft
Depth of Basin Floor (H _{b,100yr}) =	user	ft
Length of Basin Floor (L _{b,100yr}) =	user	ft
Width of Basin Floor (W _{b,100yr}) =	user	ft
Area of Basin Floor (A _{b,100yr}) =	user	ft ²
Volume of Basin Floor (V _{b,100yr}) =	user	ft ³
Depth of Main Basin (H _{main}) =	user	ft
Length of Main Basin (L _{main}) =	user	ft
Width of Main Basin (W _{main}) =	user	ft
Area of Main Basin (A _{main}) =	user	ft ²
Volume of Main Basin (V _{main}) =	user	ft ³
Calculated Total Basin Volume (V _{total}) =	user	acre-feet

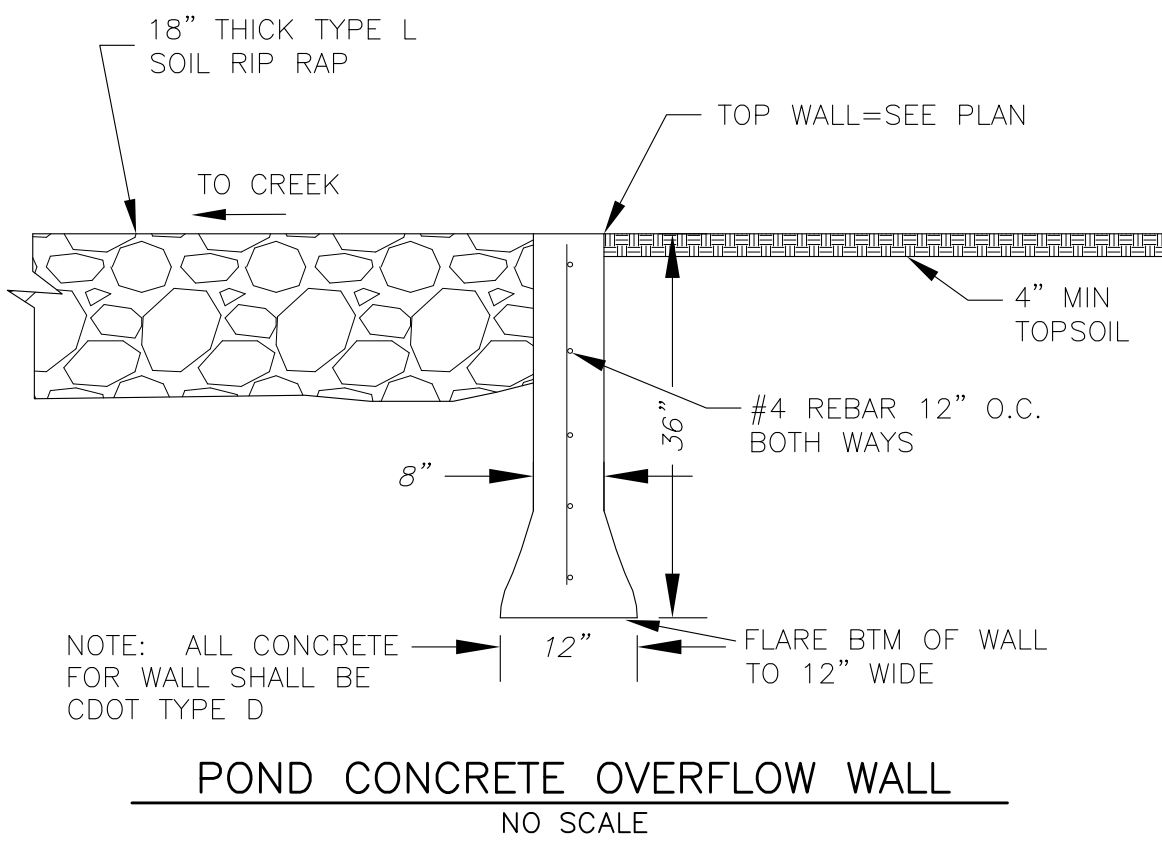
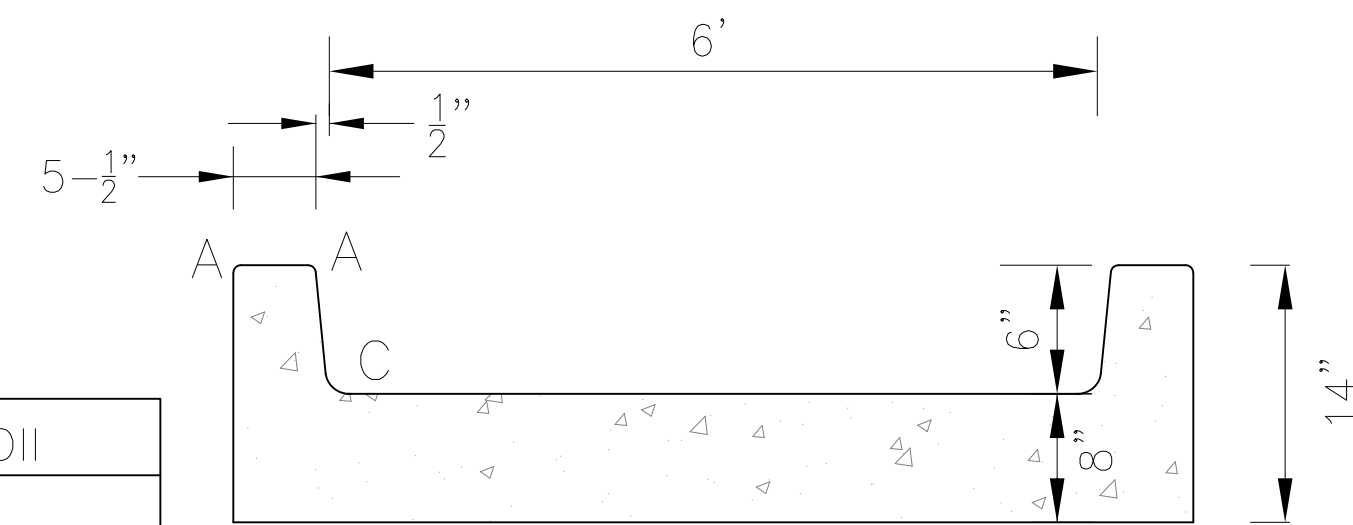
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft ²)	Optional Override Area (ft ²)	Area (acre)	Volume (ft ³)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	49	0.001	16	0.000
5682	--	0.33	--	--	--	50	0.001	16	0.000
5683	--	1.33	--	--	--	7,650	0.176	3,790	0.087
5684	--	2.33	--	--	--	28,968	0.665	22,175	0.509
5685	--	3.33	--	--	--	33,840	0.777	53,579	1.230
5686	--	4.33	--	--	--	38,293	0.879	89,646	2.058
5687	--	5.33	--	--	--	42,776	0.982	130,180	2.989
5688	--	6.33	--	--	--	47,250	1.085	175,193	4.022
5689	--	7.33	--	--	--	51,755	1.188	224,696	5.158
5690	--	8.30	--	--	--	55,000	1.263	276,472	6.347



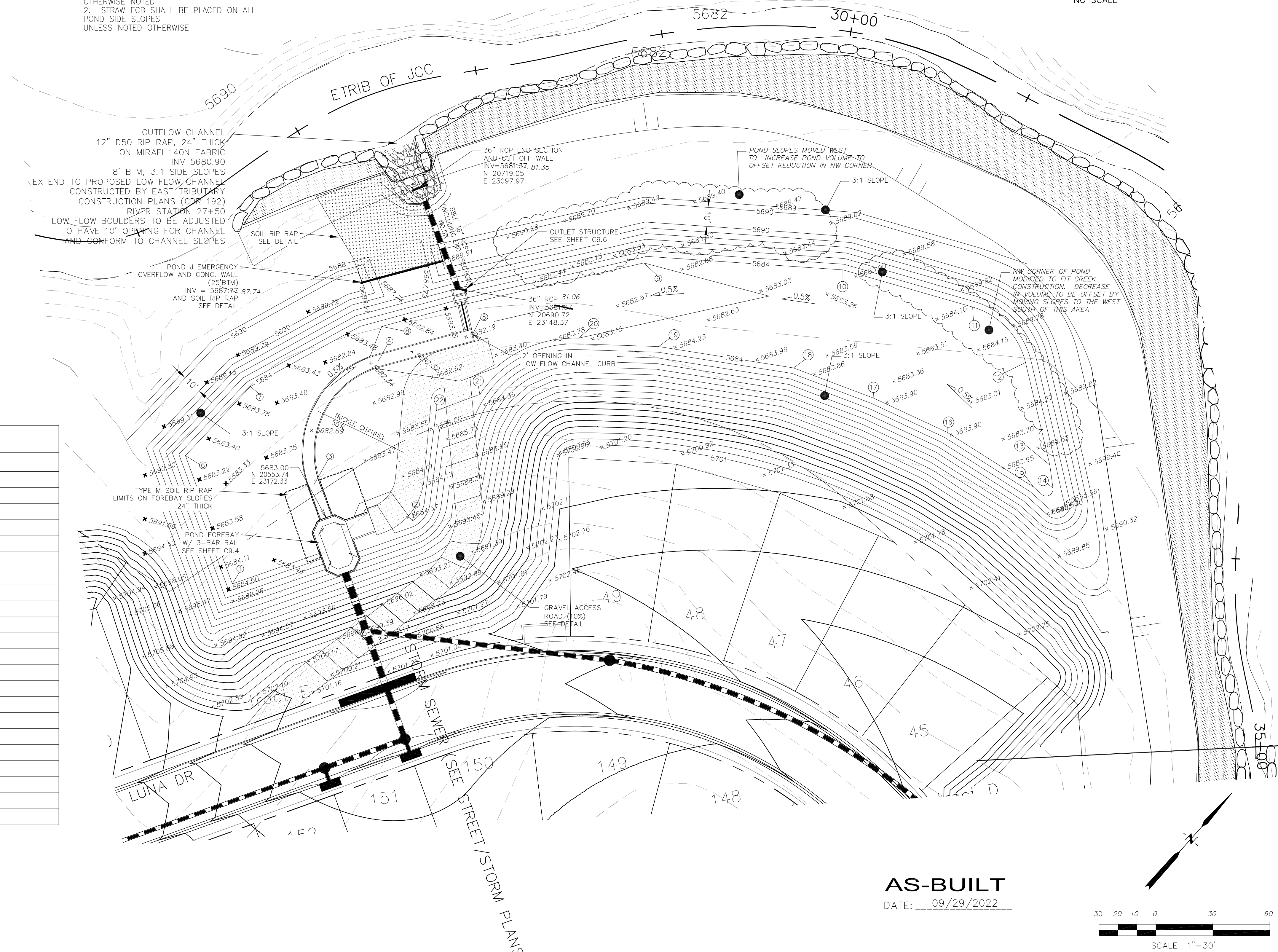
POND J
EMERGENCY OVERFLOW
BTM=5687.77, TOP=5690.00
BTM WIDTH=25', 4:1 SIDE SLOPES
FLOW DEPTH=1.20', Q100=115CFS



LENGTH FOR RADII
A = 1/2"
C = 1-1/2"



NOTE:
1. POND SLOPES SHALL BE 3:1 UNLESS OTHERWISE NOTED
2. STRAW ECB SHALL BE PLACED ON ALL POND SIDE SLOPES UNLESS NOTED OTHERWISE



POINT TABLE				
NUMBER	NORTHING	EASTING	ELEVATION	NOTES
1	20495.27	23156.87	5684.00	POND BOTTOM
2	20581.64	23208.23	5684.00	POND BOTTOM
3	20581.06	23097.31	5682.90	TRICKLE CHANNEL INVERT
4	20634.87	23140.28	5682.47	TRICKLE CHANNEL INVERT
5	20676.89	23169.46	5682.10	TRICKLE CHANNEL INVERT
6	20531.16	23094.47	5684.00	POND BOTTOM
7	20581.06	23097.31	5684.00	POND BOTTOM
8	20649.78	23129.96	5683.00	POND BOTTOM
9	20764.22	23214.29	5683.00	POND BOTTOM
10	20828.89	23297.02	5684.00	POND BOTTOM
11	20857.82	23361.97	5684.00	POND BOTTOM
12	20853.36	23402.14	5684.00	POND BOTTOM
13	20820.19	23446.66	5684.00	POND BOTTOM
14	20812.02	23455.68	5684.00	POND BOTTOM
15	20805.80	23447.70	5684.00	POND BOTTOM
16	20798.61	23394.12	5684.00	POND BOTTOM
17	20787.54	23352.97	5684.00	POND BOTTOM
18	20772.57	23310.30	5684.00	POND BOTTOM
19	20735.49	23248.59	5684.00	POND BOTTOM
20	20711.70	23213.38	5683.00	POND BOTTOM
21	20655.59	23192.65	5684.00	POND BOTTOM
22	20634.46	23180.98	5684.00	POND BOTTOM

CORE ENGINEERING GROUP
15004 1ST AVENUE S.
DENVER, CO 80202
PHONE: 719.570.1100
CONTACT: RICHARD L. SCHINDLER, P.E.
EMAIL: Rich@cegi.com

DATE: _____
DESCRIPTION: _____
NO: _____
PREPARED FOR: **LORSON, LLC**
212 N. WAHSATCH AVE, SUITE 301
COLORADO SPRINGS, COLORADO 80903
CONTACT: JEFF MARK

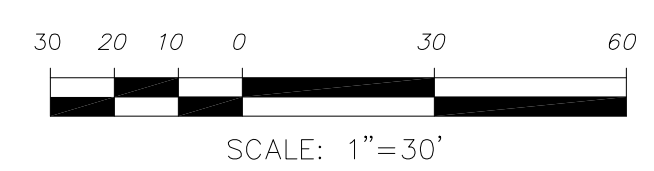
DRAWN: RLS
DESIGNED: RLS
CHECKED: RLS

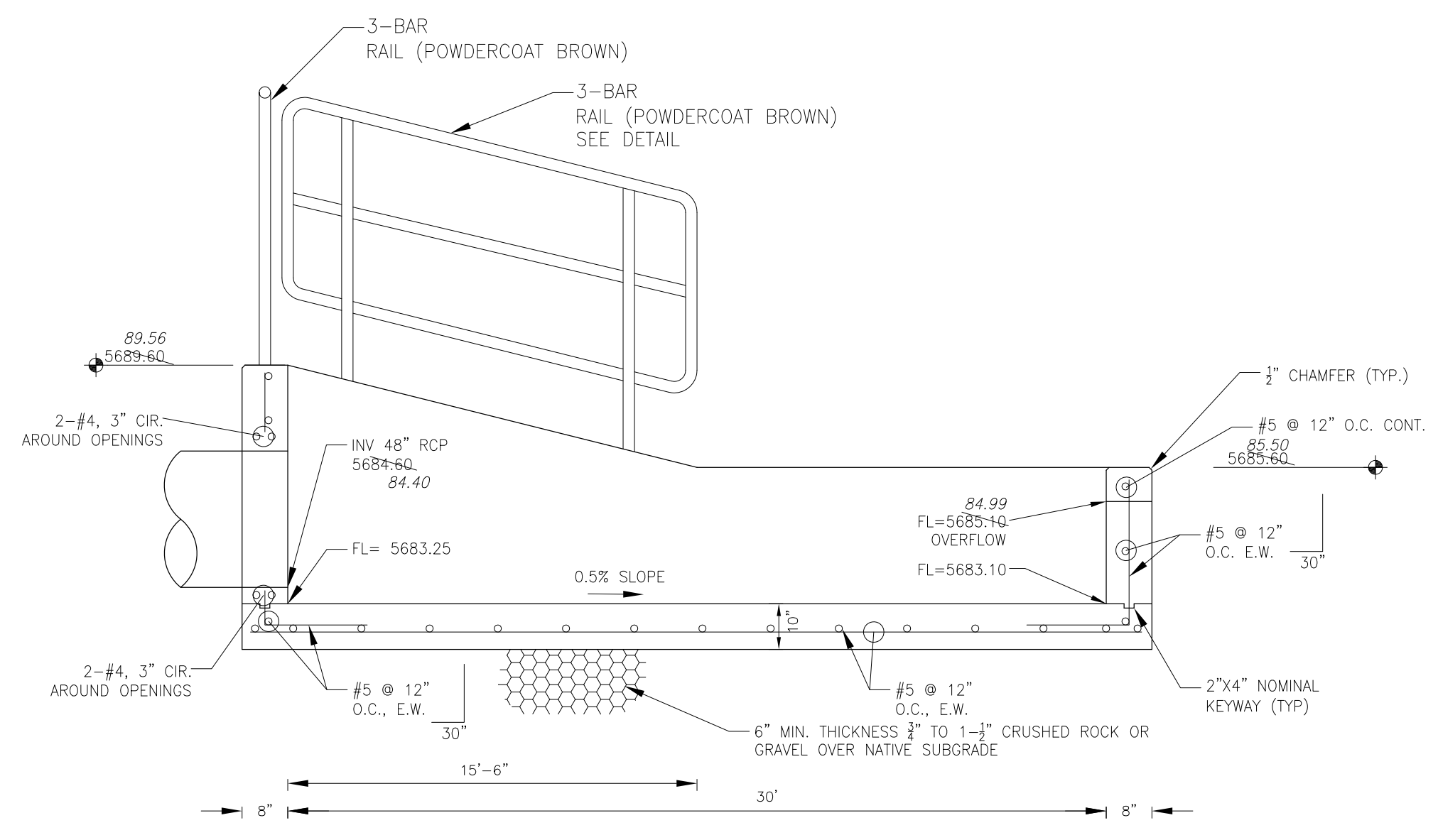
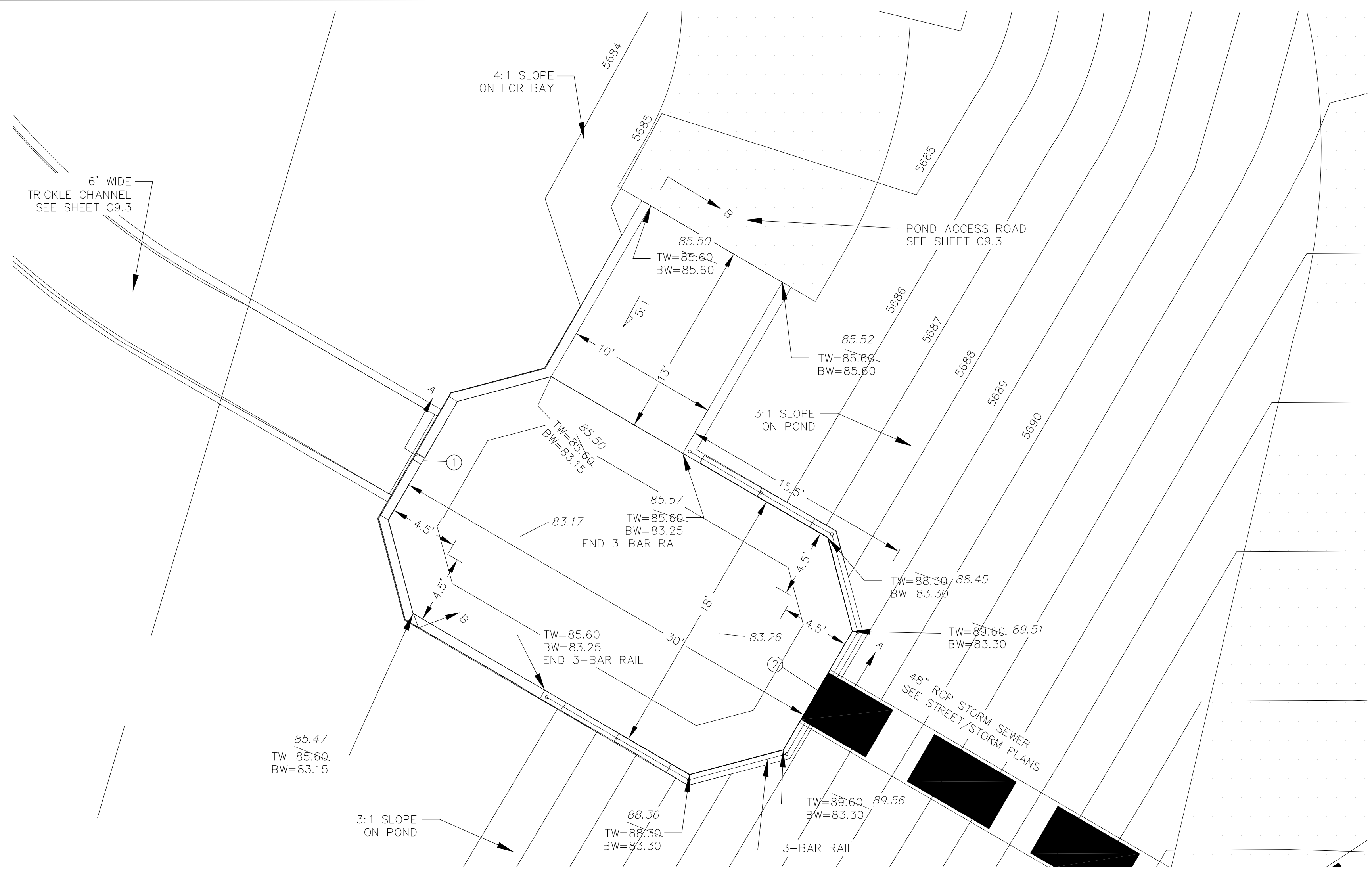
**POND J
POND J OUTFALL AND
TRICKLE CHANNEL**



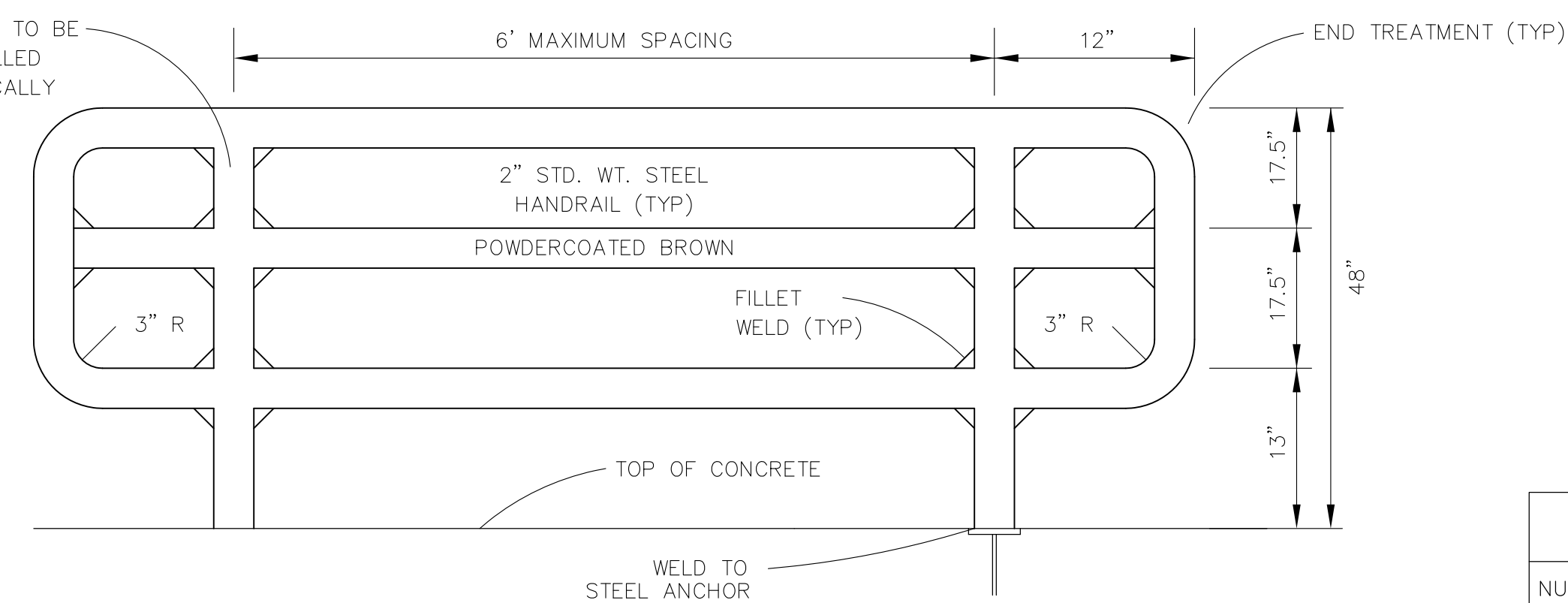
DATE: MAY 12, 2020
PROJECT NO. 100.051
SHEET NUMBER **C9.3**
TOTAL SHEETS: 15

AS-BUILT
DATE: 09/29/2022





FOREBAY SECTION A-A
 NO SCALE

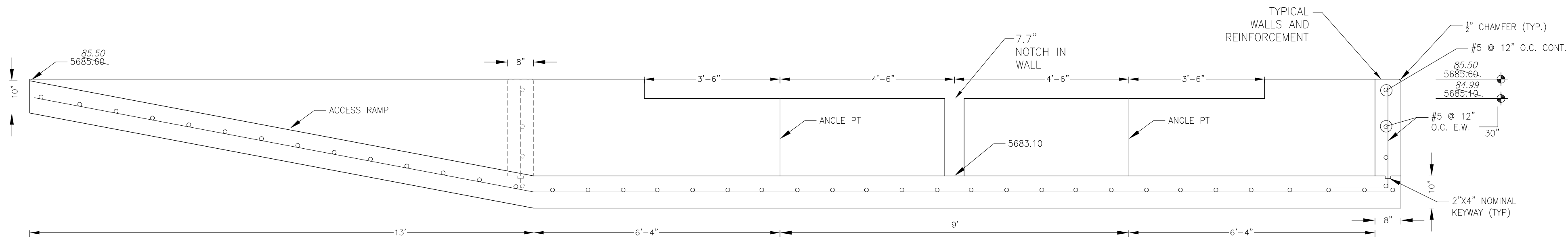
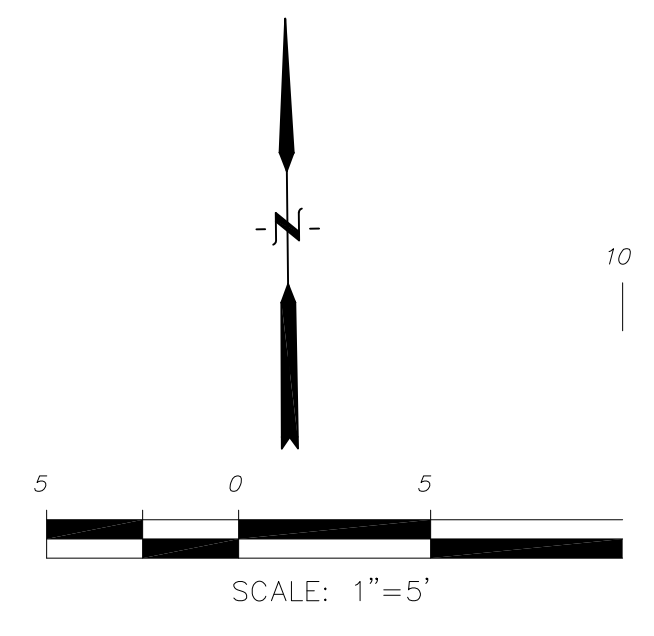


3-BAR RAIL DETAIL
 NO SCALE

POINT TABLE (FOREBAY)				
NUMBER	NORTHING	EASTING	ELEVATION	NOTES
1	20553.40	23172.91	5683.10	FOREBAY BOTTOM
2	20538.31	23198.84	5683.25	FOREBAY BOTTOM, INV 48\"/>

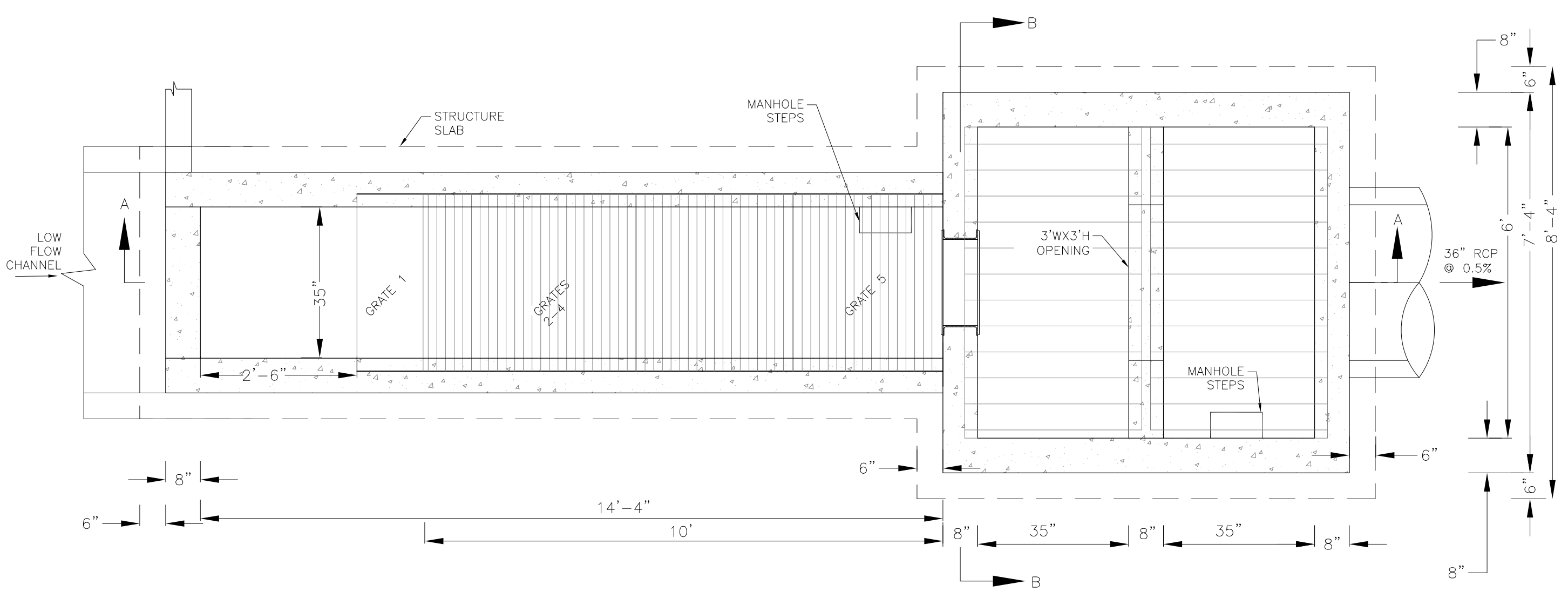
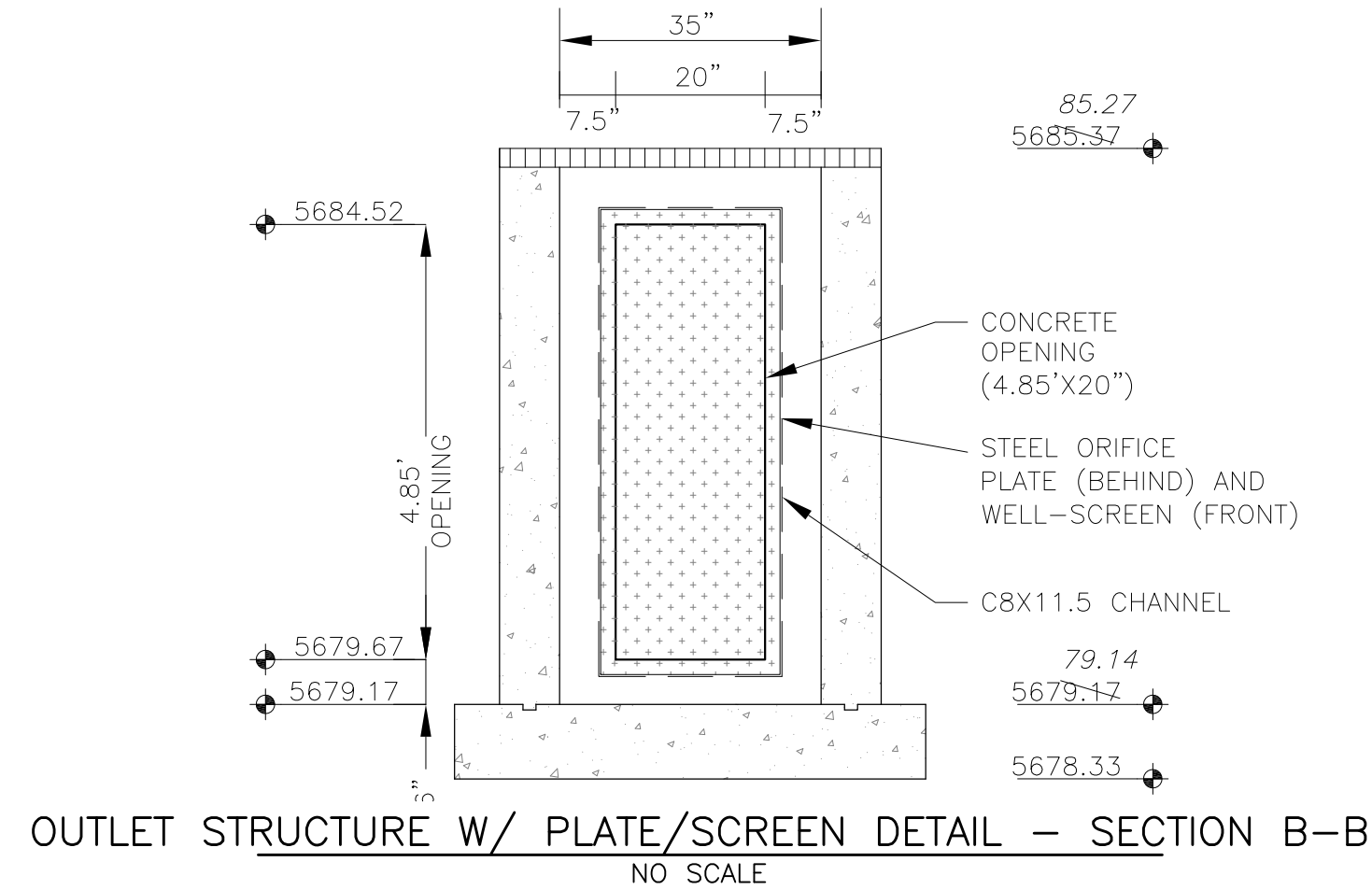
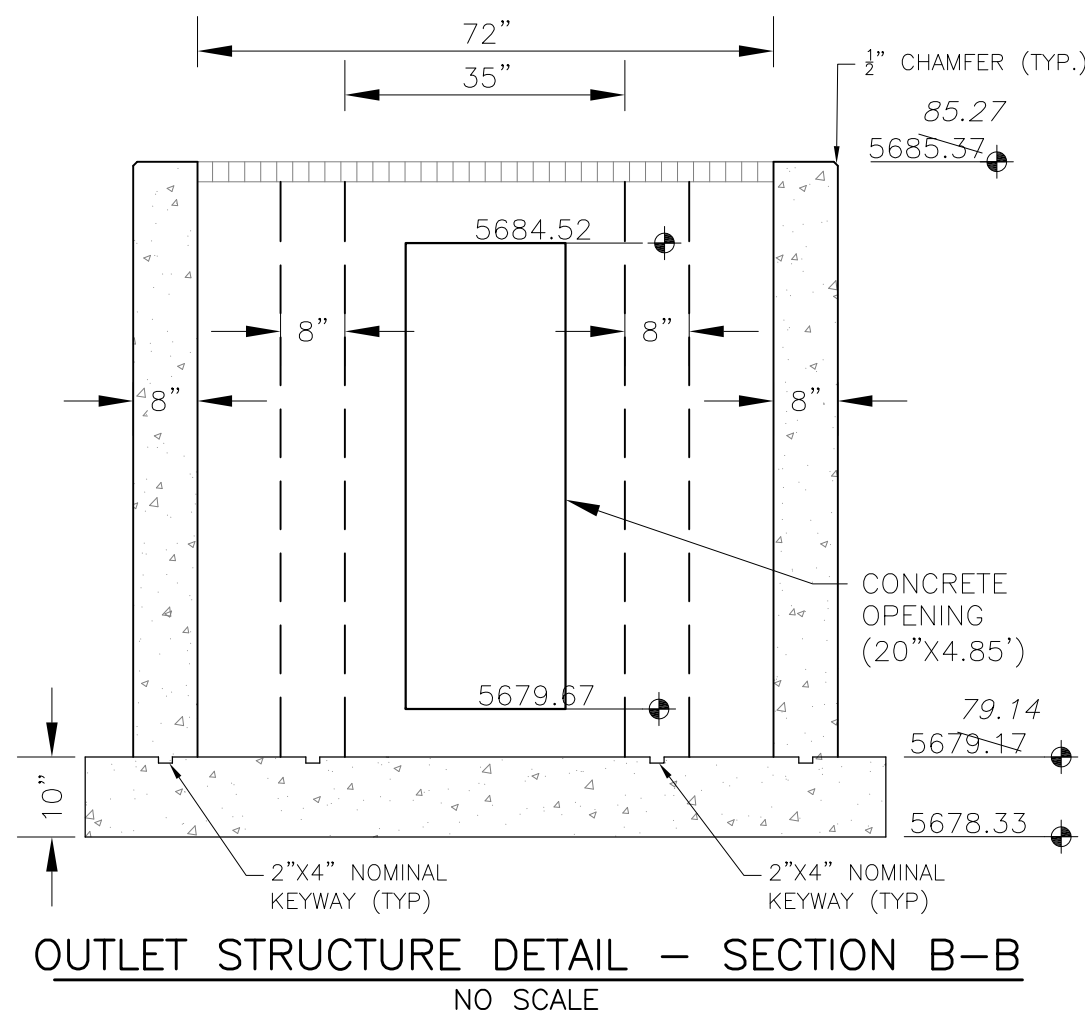
POND J - FOREBAY LAYOUT
 SCALE: 1\"/>

AS-BUILT
 DATE: 09/29/2022

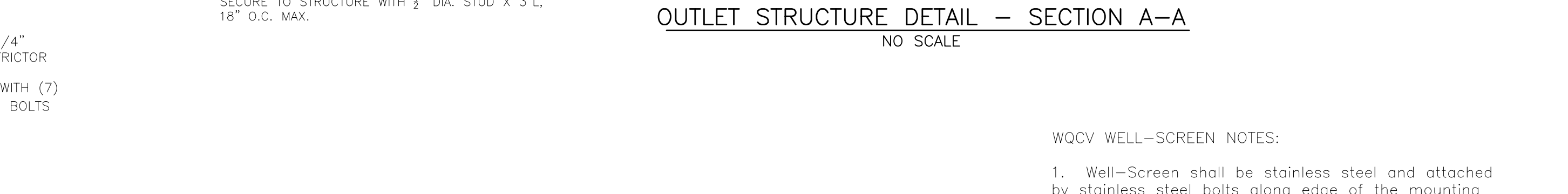
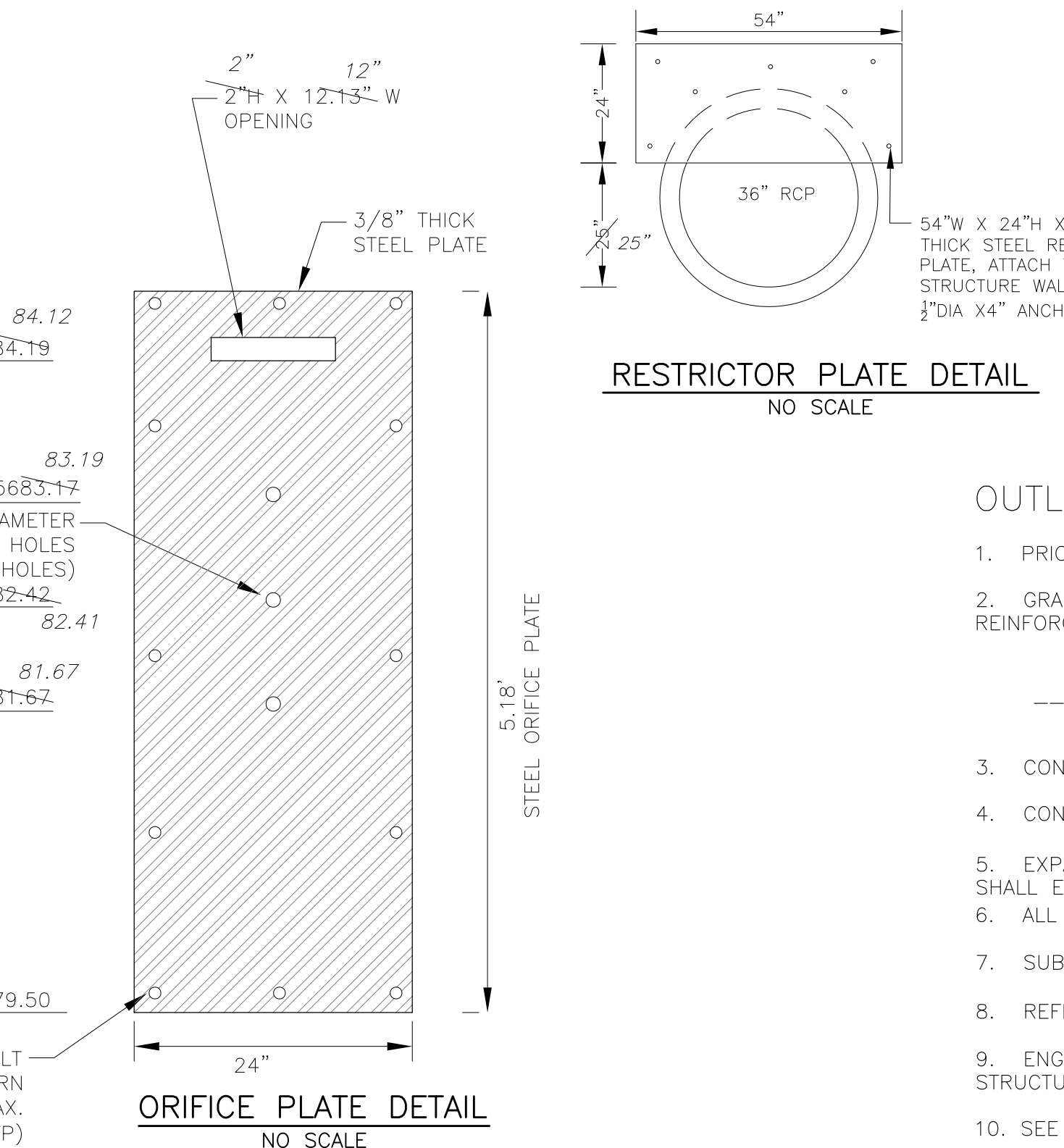
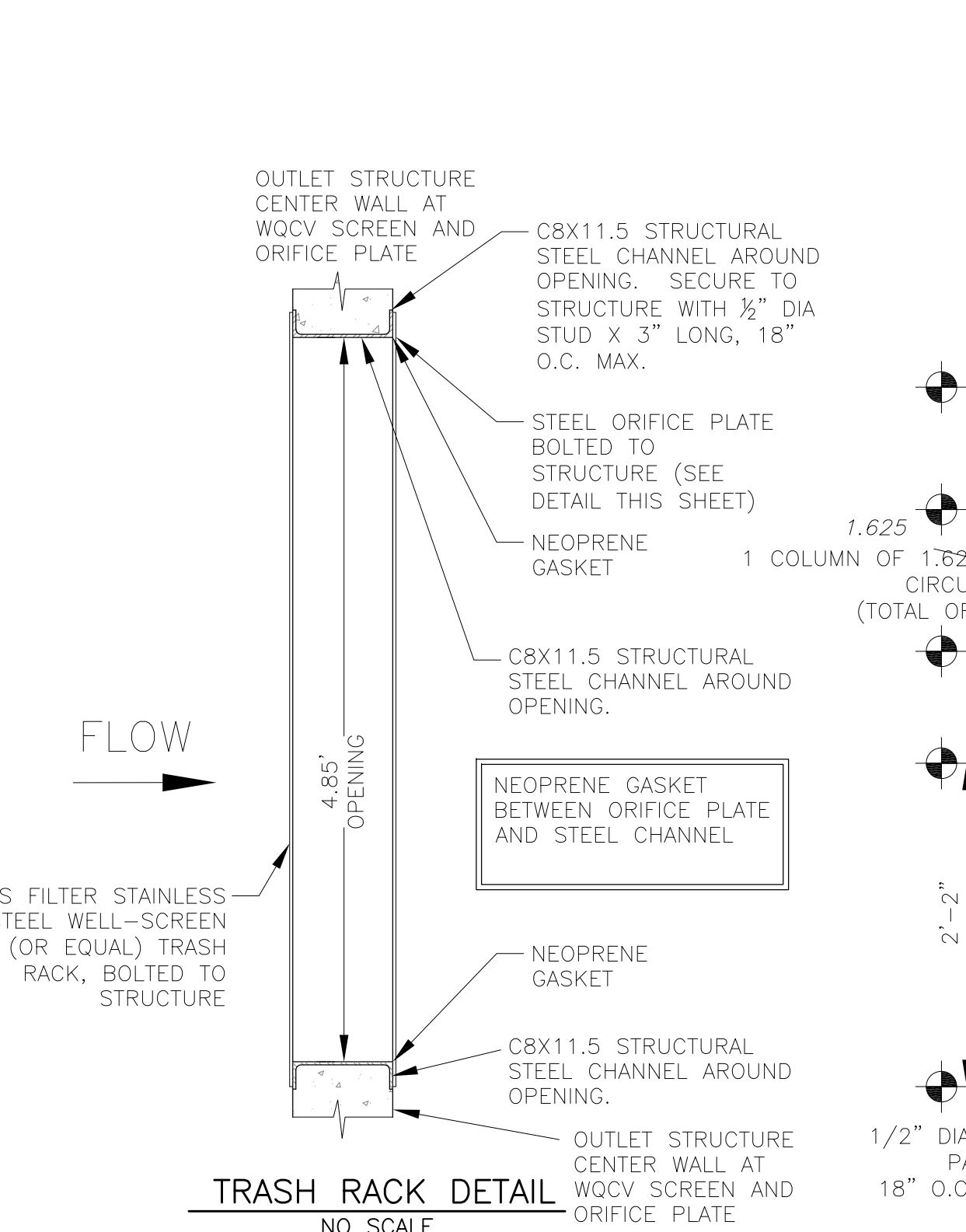
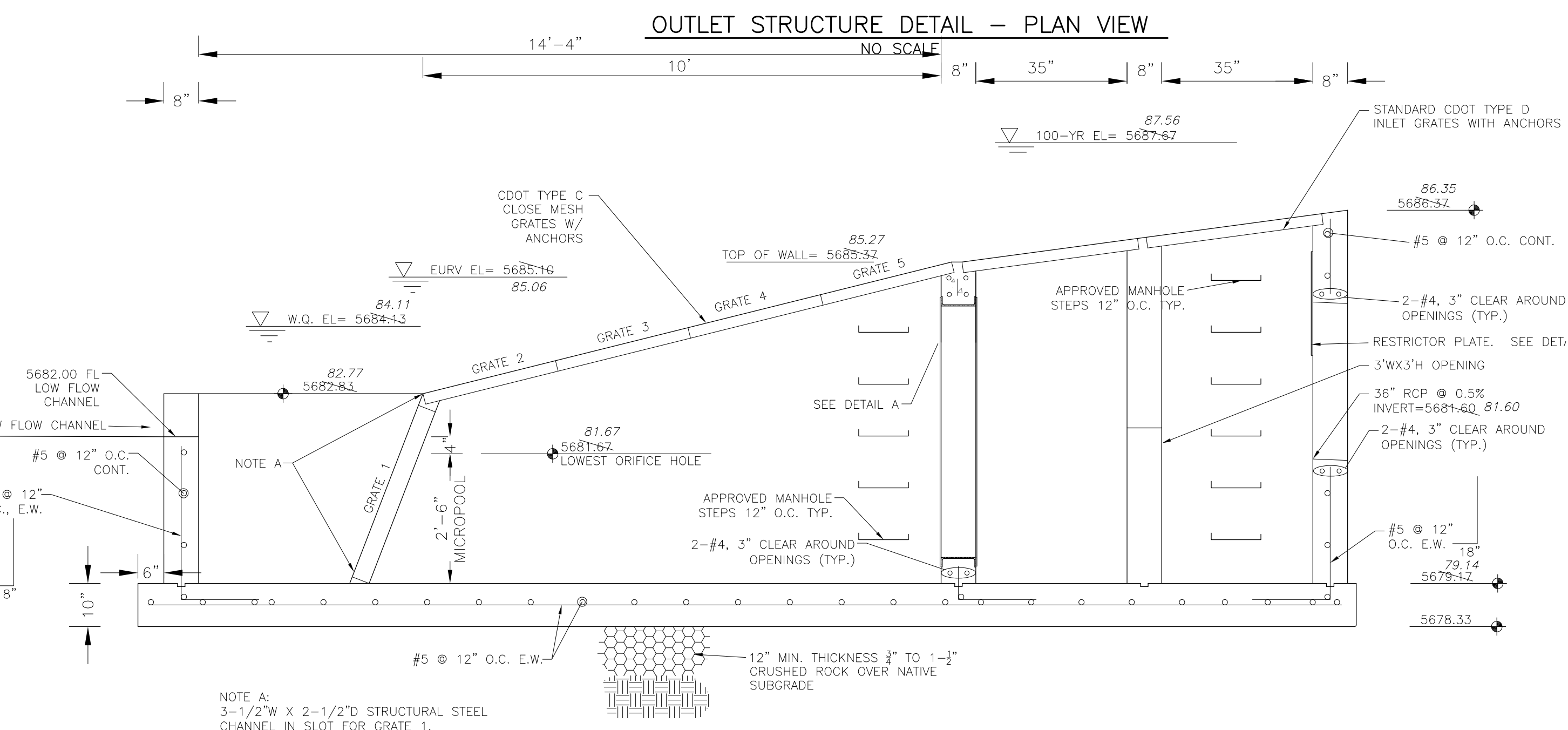
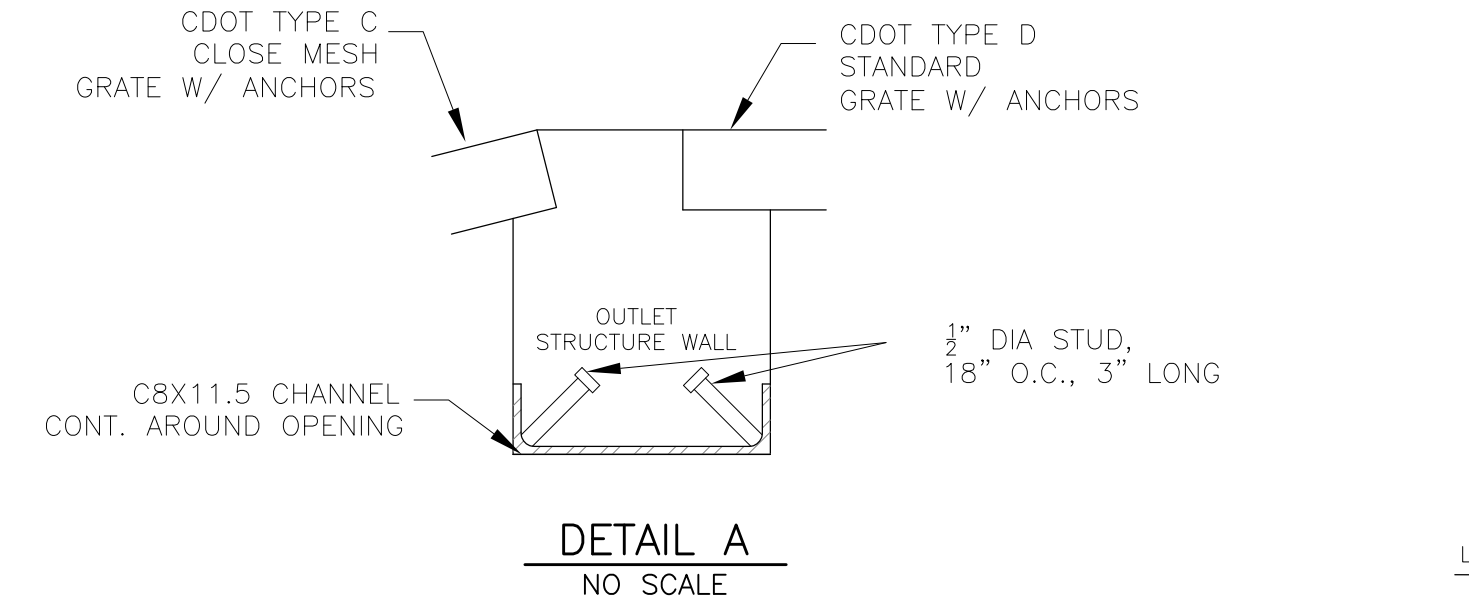
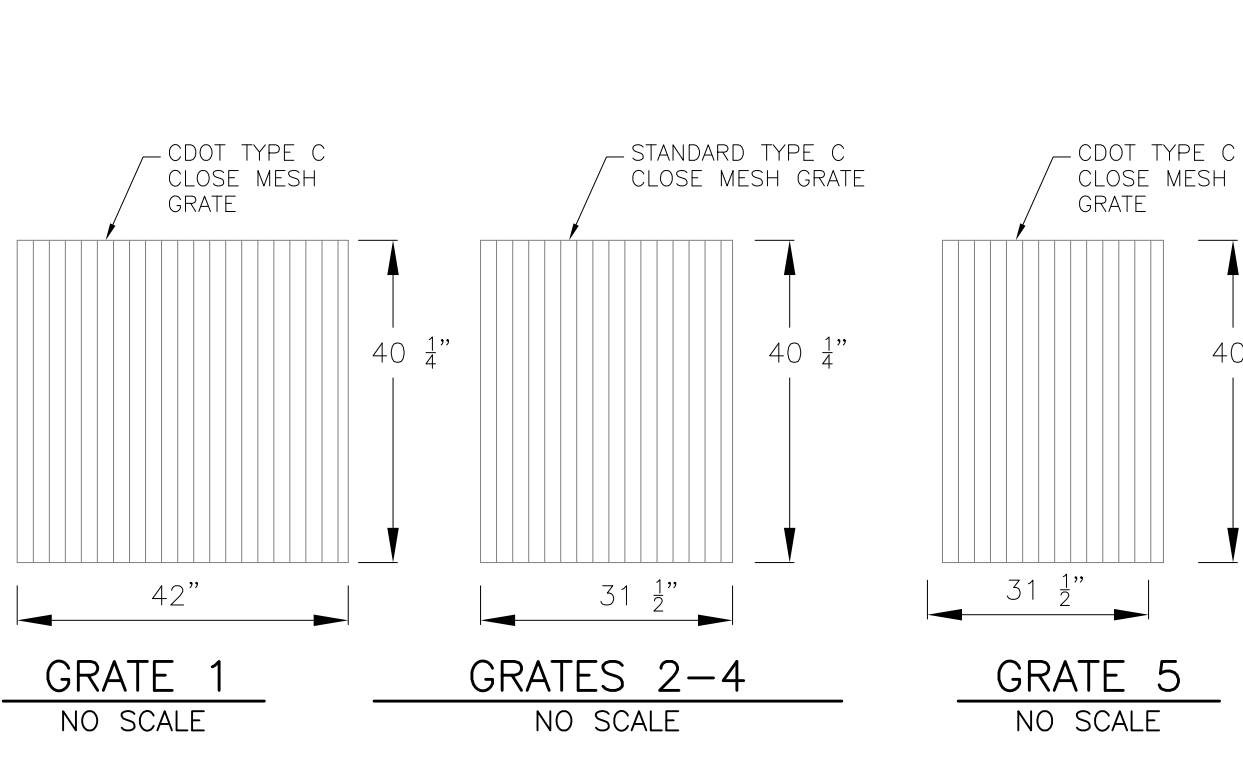


FOREBAY SECTION B-B
 NO SCALE

NOTE: ALL CONCRETE FOR FOREBAY SHALL BE CDOT TYPE D



NOTE:
AFTER CONCRETE STRUCTURE HAS BEEN POURED
ALL GRATE DIMENSIONS SHALL BE FIELD VERIFIED
PRIOR TO GRATE CONSTRUCTION



- OUTLET STRUCTURE, FOREBAY, AND DRAIN CHANNEL NOTES:**
- PRIOR TO CONSTRUCTION, CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR ALL COMPONENTS OF THE OUTLET STRUCTURE.
 - GRADE 60 REINFORCING STEEL REQUIRED. SEE TABLE FOR THE MINIMUM LAP SPLICE LENGTH FOR REINFORCING BARS. ALL REINFORCING STEEL SHALL HAVE A TWO-INCH MINIMUM CLEARANCE FROM EDGE OF CONCRETE, UNLESS OTHERWISE NOTED.
- | BAR SIZE | #4 | #5 | #6 |
|--------------------|-------|-------|-------|
| MIN. SPLICE LENGTH | 1'-3" | 1'-7" | 2'-0" |
- CONCRETE FOR THE OUTLET STRUCTURE AND FOREBAY SHALL BE CDOT CLASS D CONCRETE.
 - CONCRETE FOR DRAIN CHANNELS SHALL BE CDOT CLASS B CONCRETE.
 - EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M-213. EXPANSION JOINT MATERIAL SHALL BE 1/2" THICK, SHALL EXTEND THE FULL DEPTH OF CONTACT SURFACE AND THE JOINT SHALL BE SEALED, REFER TO DETAILS.
 - ALL EXPOSED CONCRETE CORNERS SHALL HAVE A 3/8" CHAMFER UNLESS OTHERWISE NOTED.
 - SUBGRADE TO BE 12" THICK CLEAN FILL COMPACTED TO 95% STANDARD PROCTOR DENSITY PER ASTM M698 UNDER STRUCTURE.
 - REFER TO SHEET C9.1 FOR PRESEDIMENTATION/FOREBAY DESIGN.
 - ENGINEER SHALL BE NOTIFIED PRIOR TO BEGINNING CONSTRUCTION OF OUTLET STRUCTURE TO SCHEDULE OBSERVATION VISITS FOR STRUCTURES.
 - SEE RIGHT FOR WELL-SCREEN DESIGN NOTES

- WQCV WELL-SCREEN NOTES:**
- Well-Screen shall be stainless steel and attached by stainless steel bolts along edge of the mounting frame.
 - WQCV Well Screen
 - Type of Screen: Stainless steel #93 Vee Wire (Johnson Vee Wire (tm) Stainless Steel Screen or equivalent with 60% open area)
 - Screen slot opening dimension: 0.139" (Screen #93 Vee Wire Slot Opening)
 - Type and Size of Support Rod: TE 0.074"x0.50"
 - Spacing of Support Rod (O.C.): 1.0 Inch
 - Total Screen Thickness: 0.655"
 - Carbon Steel Holding Frame Type: 3/4" x 1.0" angle

CORE ENGINEERING GROUP
15004 1ST AVENUE S.
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212 N. WAHSATCH AVE. SUITE 301
COLORADO SPRINGS, COLORADO 80903
(719) 635-3200
CONTACT: JEFF MARK

CREEKSIDE SOUTH AT LORSON RANCH
FULL SPECTRUM POND J
OUTLET STRUCTURE

DATE: MAY 12, 2020
PROJECT NO: 100.051
SHEET NUMBER: C9.6
TOTAL SHEETS: 15

AS-BUILT
DATE: 09/29/2022