

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

Ken MacKenzie, Executive Director
2480 W. 26th Avenue, Suite 156B
Denver, CO 80211-5304

Telephone 303-455-6277
Fax 303-455-7880
www.udfcd.org

May 8, 2018

UDFCD Maintenance Eligibility Program Referral Review Comments

Project: **Trails at Crowfoot Filing No. 1**
Stream: **Lemon Gulch**
UDFCD MEP Phase: **Design**
UD MEP ID: **106481**

Dear **Ms. Stacey Nerger**,

This letter is in response to the request for our comments concerning the referenced project. We appreciate the opportunity to review this proposal. We have reviewed this proposal only as it relates to major drainage features, in this case:

- Outfall at Lemon Gulch, Check Structure in Lemon Gulch, and Pond A

We have the following comments to offer:

1. Please see attached redlines.

Please feel free to contact me with any questions or concerns.

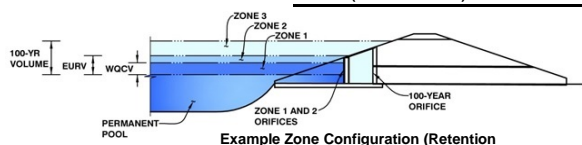
Sincerely,
Urban Drainage and Flood Control District

Richard Borchardt
Stream Services Program

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: TRAILS AT CROWFOOT
Basin ID: POND A (STAGE 0 = 5990')



Example Zone Configuration (Retention)

Zone	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.47	2.520	Orifice Plate
Zone 2 (EURV)	5.39	3.931	Circular Orifice
Zone 3 (100-year)	7.95	7.195	Weir&Pipe (Rect.)
		13.646	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 =	5.39	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	10.34	sq. inches (use rectangular openings)

Calculated Parameters for Plate

WQ Orifice Area per Row =	7.181E-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	1.74						
Orifice Area (sq. inches)	10.34	10.34						

	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 Circular	Not Selected	
Invert of Vertical Orifice =	3.47	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	5.39	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	2.52	N/A	inches

Calculated Parameters for Vertical Orifice

	Zone 2 Circular	Not Selected	
Vertical Orifice Area =	0.03	N/A	ft ²
Vertical Orifice Centroid =	0.11	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.39	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	44.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	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 ₁ =	6.39	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	8.66	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	126.99	N/A	ft ²
Overflow Grate Open Area w/ Debris =	63.50	N/A	ft ²

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

	Zone 3 Rectangular	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Rectangular Orifice Width =	48.00	N/A	inches
Rectangular Orifice Height =	44.00	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Rectangular	Not Selected	
Outlet Orifice Area =	14.67	N/A	ft ²
Outlet Orifice Centroid =	1.83	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	7.94	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	107.90	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

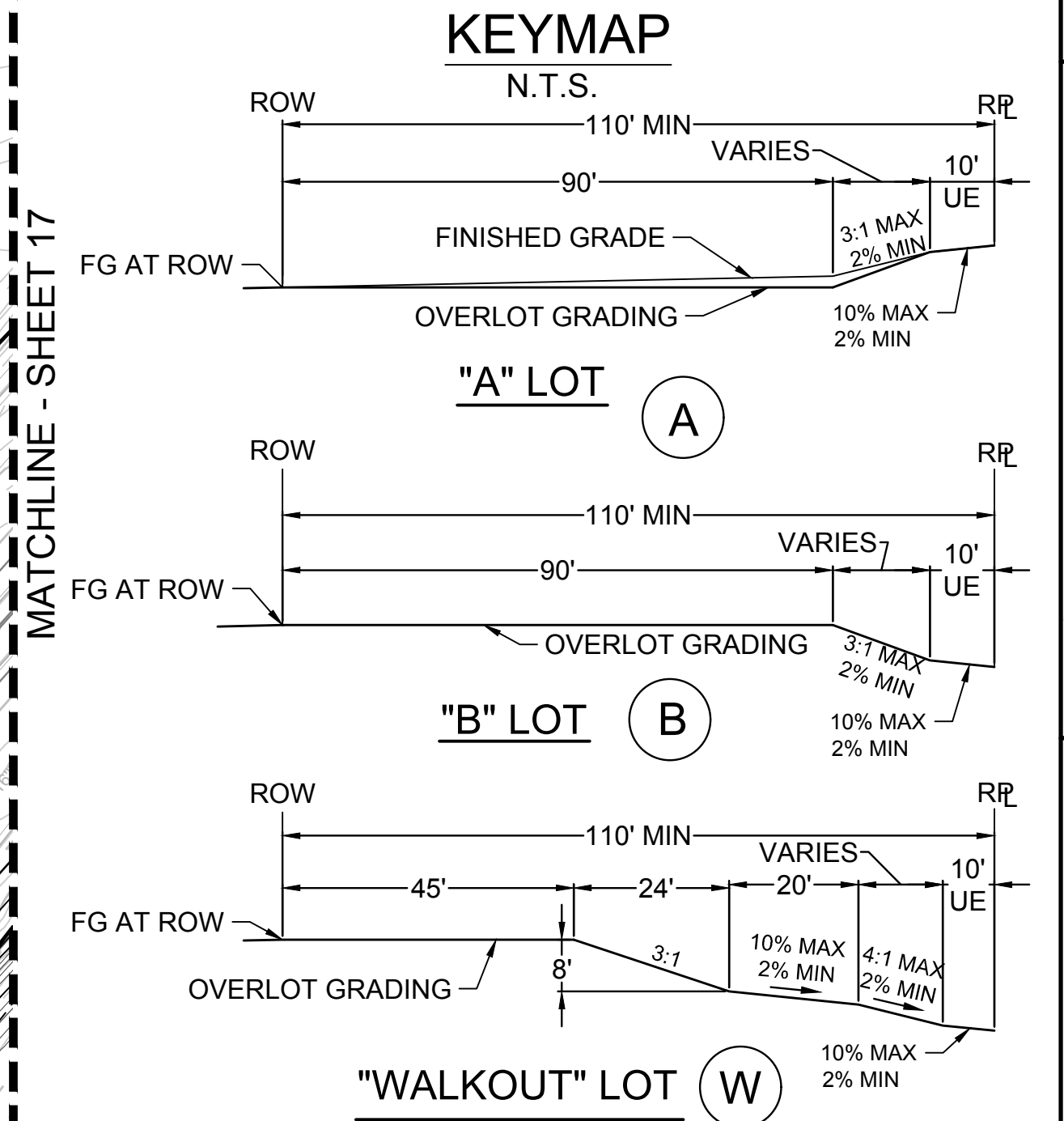
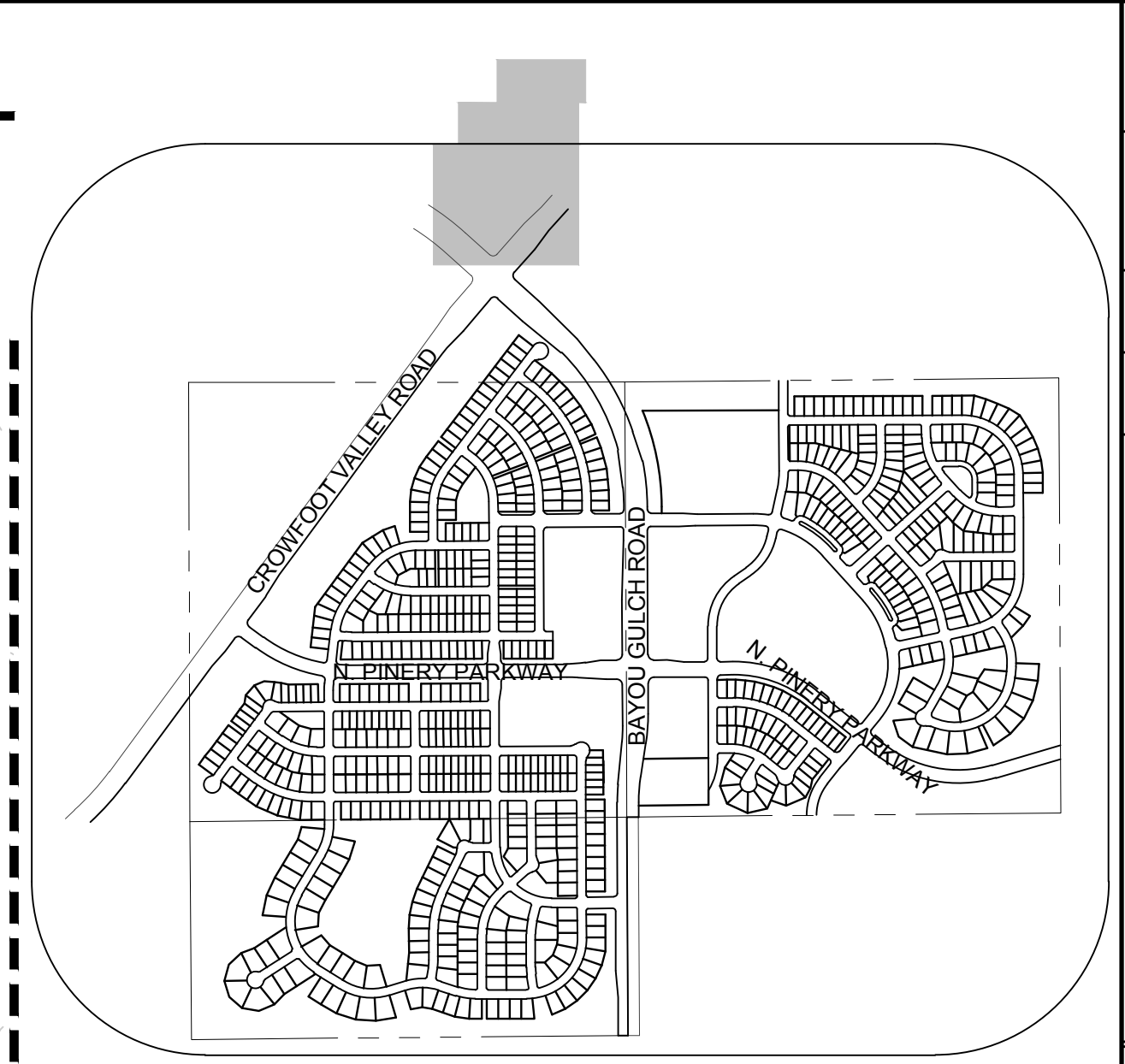
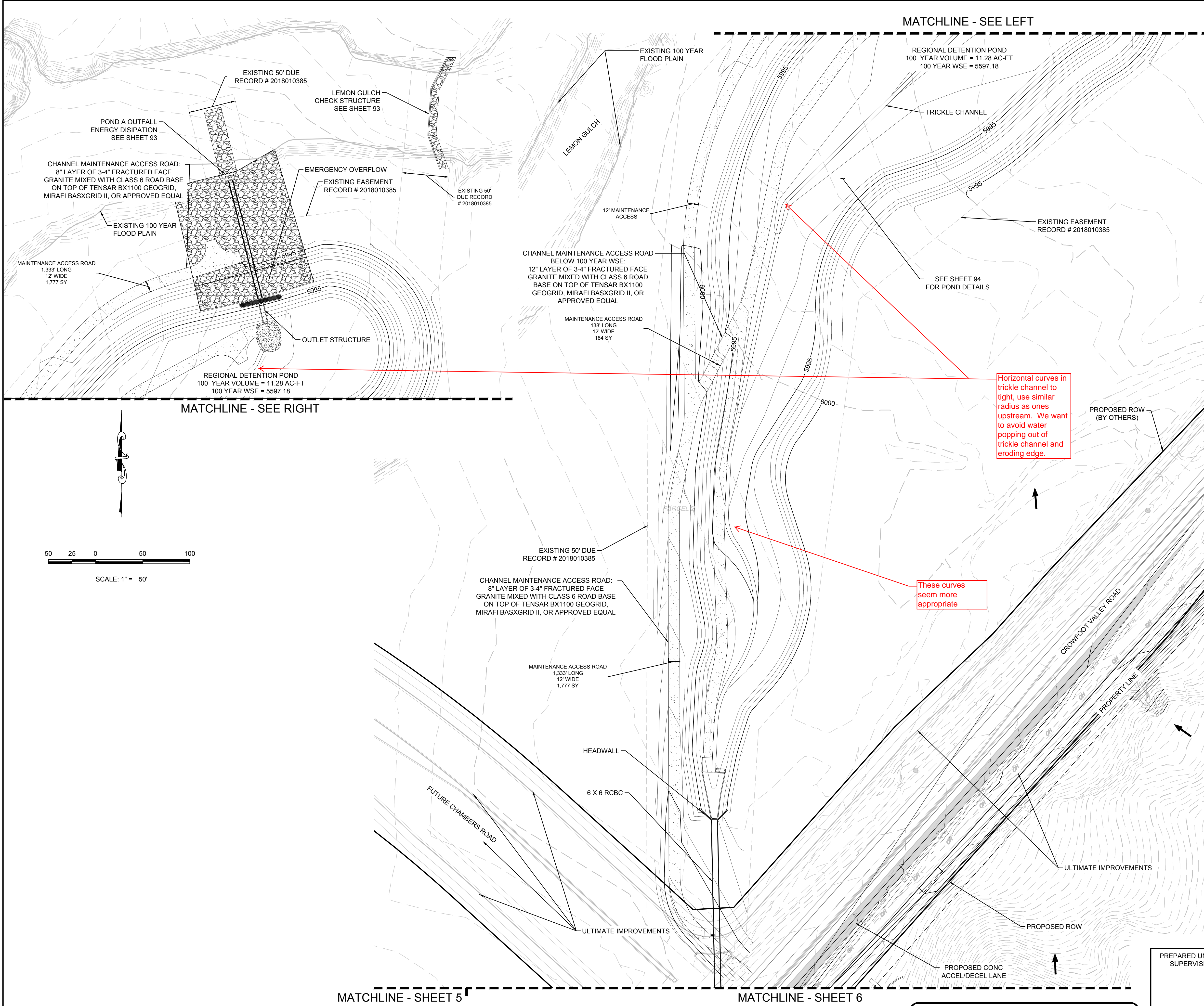
Calculated Parameters for Spillway

Spillway Design Flow Depth =	0.88	feet
Stage at Top of Freeboard =	9.82	feet
Basin Area at Top of Freeboard =	3.62	acre

The 5-year design appear to be a bit off. Please check.

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year		
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	0.99	1.39	1.64	1.98	2.31		
Calculated Runoff Volume (acre-ft) =	2.520	6.450	4.569	7.575	10.709	17.050	21.830	27.290	36.288
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	2.518	6.440	4.567	9.613	10.701	17.040	21.817	28.571	36.266
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.05	0.20	0.58	0.82	1.10	1.54
Predevelopment Peak Q (cfs) =	0.0	0.0	1.6	9.2	34.8	101.9	142.7	191.4	268.6
Peak Inflow Q (cfs) =	34.7	87.3	62.4	83.0	142.9	224.5	283.2	278.8	454.7
Peak Outflow Q (cfs) =	1.1	1.7	1.4	25.0	42.7	115.5	167.3	197.0	292.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	2.7	1.2	1.1	1.2	1.0	1.1
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	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.2	0.3	0.9	1.3	1.5	1.7
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) =	38	68	56	71	69	65	63	60	56
Time to Drain 99% of Inflow Volume (hours) =	40	72	58	76	75	73	72	71	68
Maximum Ponding Depth (ft) =	3.35	5.24	4.41	5.85	6.05	6.66	7.00	7.19	8.33
Area at Maximum Ponding Depth (acres) =	1.71	2.31	2.05	2.52	2.59	2.83	2.97	3.01	3.28
Maximum Volume Stored (acre-ft) =	2.314	6.120	4.291	7.569	8.080	9.733	10.748	11.287	14.906



LEGEND

②	BLOCK NUMBER	←	PROPOSED OVERLAND FLOW
(A)	LOT TYPE	---	CENTERLINE
6	LOT NUMBER	---	RIGHT-OF-WAY
⚡	EXISTING FLARED END SECTION	---	PROPERTY LINE
▬	EXISTING STORM DRAIN INLET	---	EDGE OF PAVEMENT
●	EXISTING STORM DRAIN MANHOLE	---	EXISTING 5' CONTOUR
○	PROPOSED LIGHT POLE	---	EXISTING 1' CONTOUR
▬	PROPOSED SIDEWALK	---	PROPOSED 5' CONTOUR
▬	PROPOSED SIDEWALK RAMP	---	PROPOSED 1' CONTOUR
10.00	EXISTING ELEVATION	---	EXISTING STORM DRAIN
10.00	PROPOSED DESIGN ELEVATION	---	SECTION LINE
00.0 FG	PROPOSED FINISHED GRADE	---	FILING BOUNDARY
		1.0%	PROPOSED SLOPE & DIRECTION

THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWN'S STANDARDS AND APPROVED VARIANCES. SUBJECT TO THESE PLANS BEING STAMPED, SIGN, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATIONS. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.

THIS REVIEW DOES NOT CONSTITUTE APPROVAL OF ANY PRIVATE ON-SITE IMPROVEMENTS WHICH MAY BE SHOWN. CONSTRUCTION CANNOT COMMENCE UNTIL ALL REQUIRED DRAINAGE/TRAFFIC REPORT(S), FINAL DEVELOPMENT PLAN(S), SPECIAL REVIEW(S), GRADING PERMIT, AND/OR OTHER PERMITS ARE COMPLETE, APPROVED AND ON FILE WITH THE TOWN OF PARKER.

PREPARED UNDER THE SUPERVISION OF
BRIAN P. WILSON
COLORADO P.E. 0050067

TOWN OF PARKER, DIRECTOR OF ENGINEERING _____ DATE _____

CALL 811
TWO WORKING DAYS
BEFORE YOU DIG
UNCC 1-800-922-1987

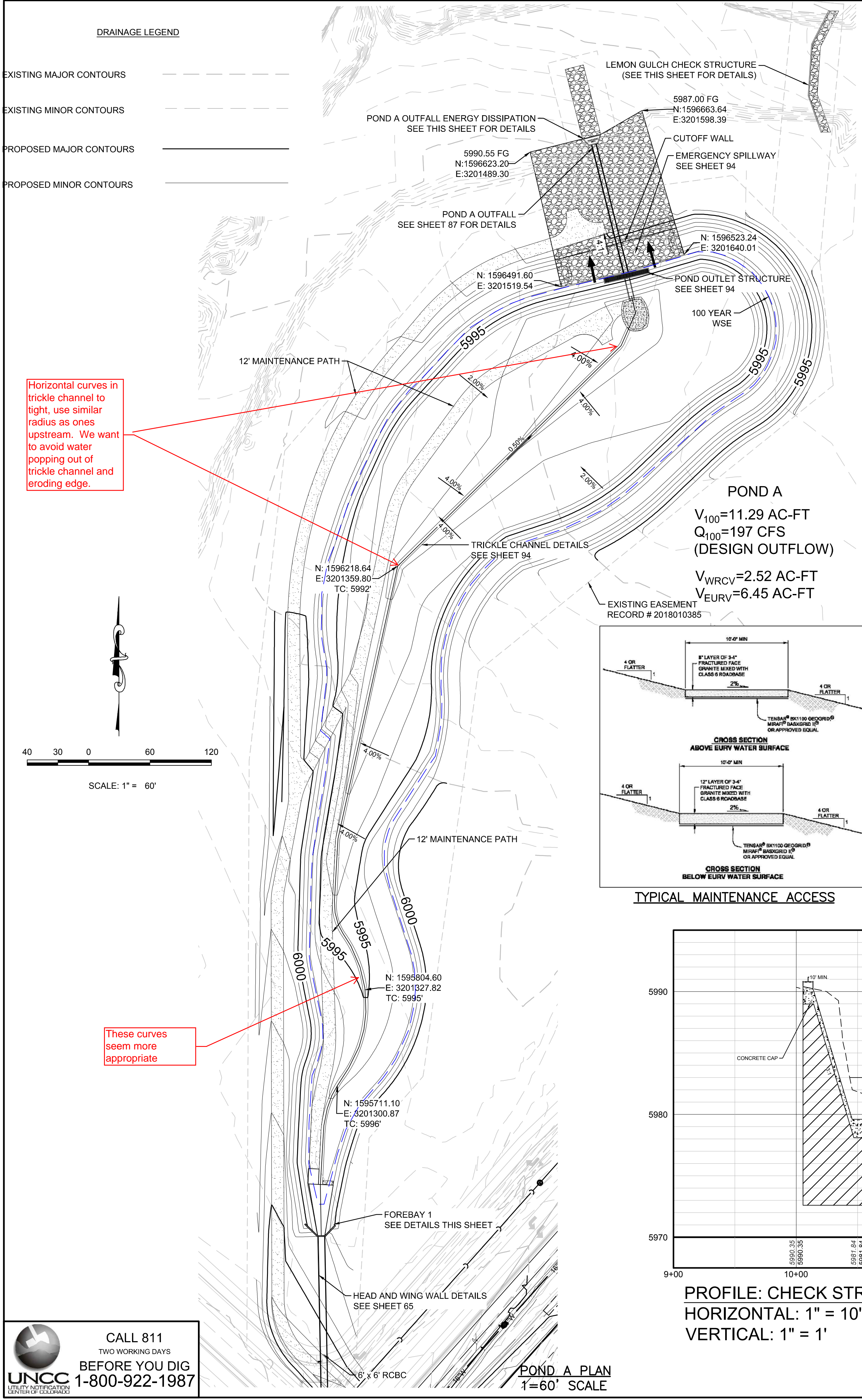
NOTES:
1. FILINGS 2,3,4,5,6,7 AND 8 TO BE OVERLOT GRADED WITH FILING 1.

BENCHMARK
DOUGLAS COUNTY CONTROL POINT KNOWN AS 1.069032, BEING A 3-1/4" ALUMINUM CAP, BEING LOCATED IN THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, HAVING A PUBLISHED ELEVATION OF 1799.2870 METERS (5903.13 FEET) NAVD '88 DATUM.

BASIS OF BEARINGS:
THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9 BEING MONUMENTED AT THE NORTHEAST CORNER OF SAID SECTION 9 BY A 3-1/4" ALUMINUM CAP STAMPED LS 23053 AND AT THE EAST QUARTER CORNER OF SAID SECTION 9 BY A 2-1/2" ALUMINUM CAP STAMPED LS 6935 BEING CONSIDERED TO BEAR SOUTH 00°15'06" EAST, 2648.70 FEET.

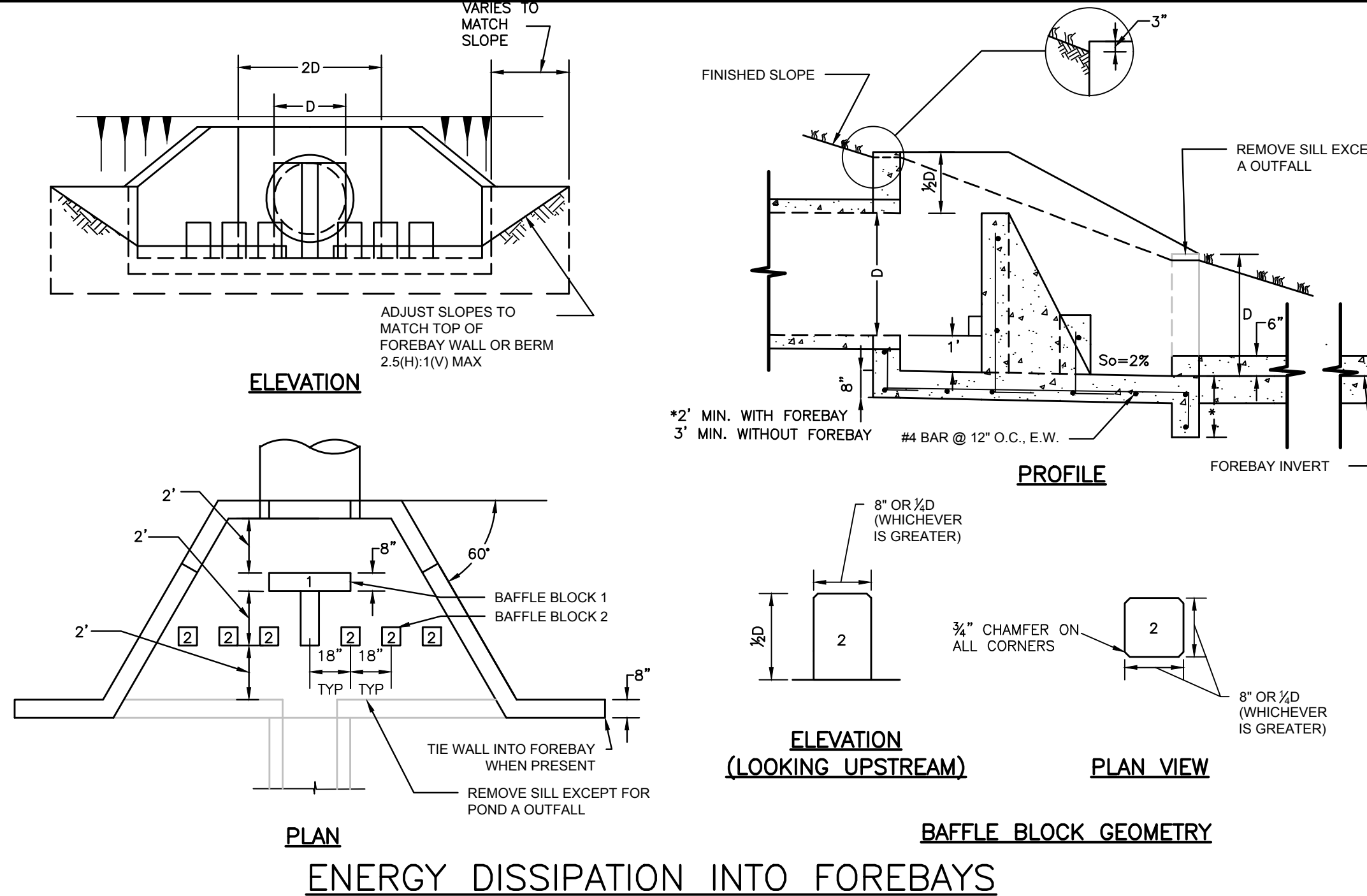
DATE: APRIL 2017

10333 E. Dry Creek Rd., Suite 410 Englewood, CO 80150 Tel: (720) 482-9526 Fax: (720) 482-9548	10333 E. Dry Creek Rd., Suite 410 Englewood, CO 80150 Tel: (720) 482-9526 Fax: (720) 482-9548	10333 E. Dry Creek Rd., Suite 410 Englewood, CO 80150 Tel: (720) 482-9526 Fax: (720) 482-9548	10333 E. Dry Creek Rd., Suite 410 Englewood, CO 80150 Tel: (720) 482-9526 Fax: (720) 482-9548
HR 935 LLC 7353 South Alton Way CENTENNIAL, CO 80112	HR 935 LLC 7353 South Alton Way CENTENNIAL, CO 80112	HR 935 LLC 7353 South Alton Way CENTENNIAL, CO 80112	HR 935 LLC 7353 South Alton Way CENTENNIAL, CO 80112
TRAILS AT CROWFOOT FILING 1 CONSTRUCTION DRAWINGS AREA GRADING PLAN	TRAILS AT CROWFOOT FILING 1 CONSTRUCTION DRAWINGS AREA GRADING PLAN	TRAILS AT CROWFOOT FILING 1 CONSTRUCTION DRAWINGS AREA GRADING PLAN	TRAILS AT CROWFOOT FILING 1 CONSTRUCTION DRAWINGS AREA GRADING PLAN
SCALE: AS SHOWN DRAWN BY: JLR CHECKED BY: JLU DATE: APRIL 2017	SCALE: AS SHOWN DRAWN BY: JLR CHECKED BY: JLU DATE: APRIL 2017	SCALE: AS SHOWN DRAWN BY: JLR CHECKED BY: JLU DATE: APRIL 2017	SCALE: AS SHOWN DRAWN BY: JLR CHECKED BY: JLU DATE: APRIL 2017
FILE NO: 8130283701	FILE NO: 8130283701	FILE NO: 8130283701	FILE NO: 8130283701
SHEET NUMBER 4	SHEET NUMBER 4	SHEET NUMBER 4	SHEET NUMBER 4



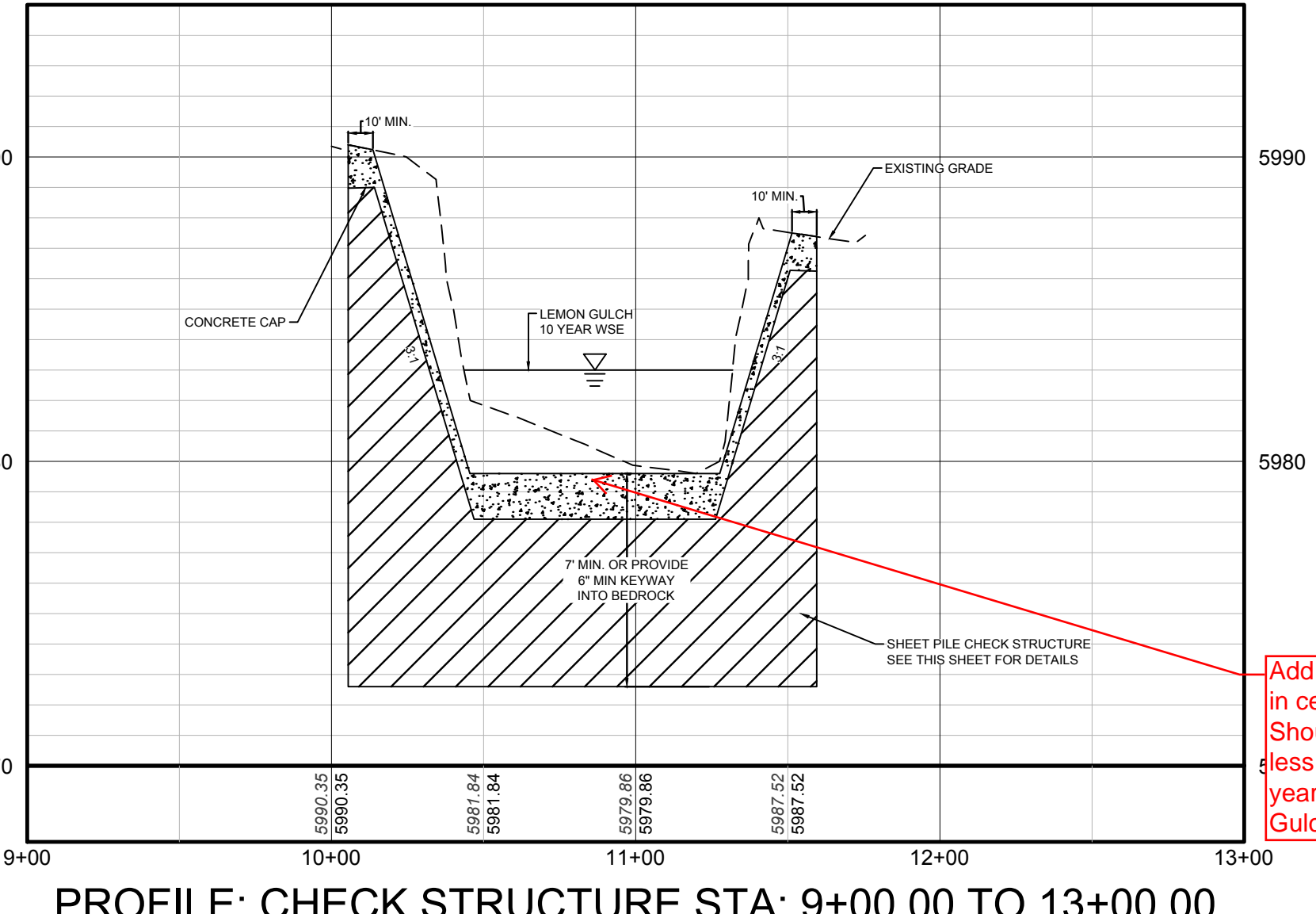
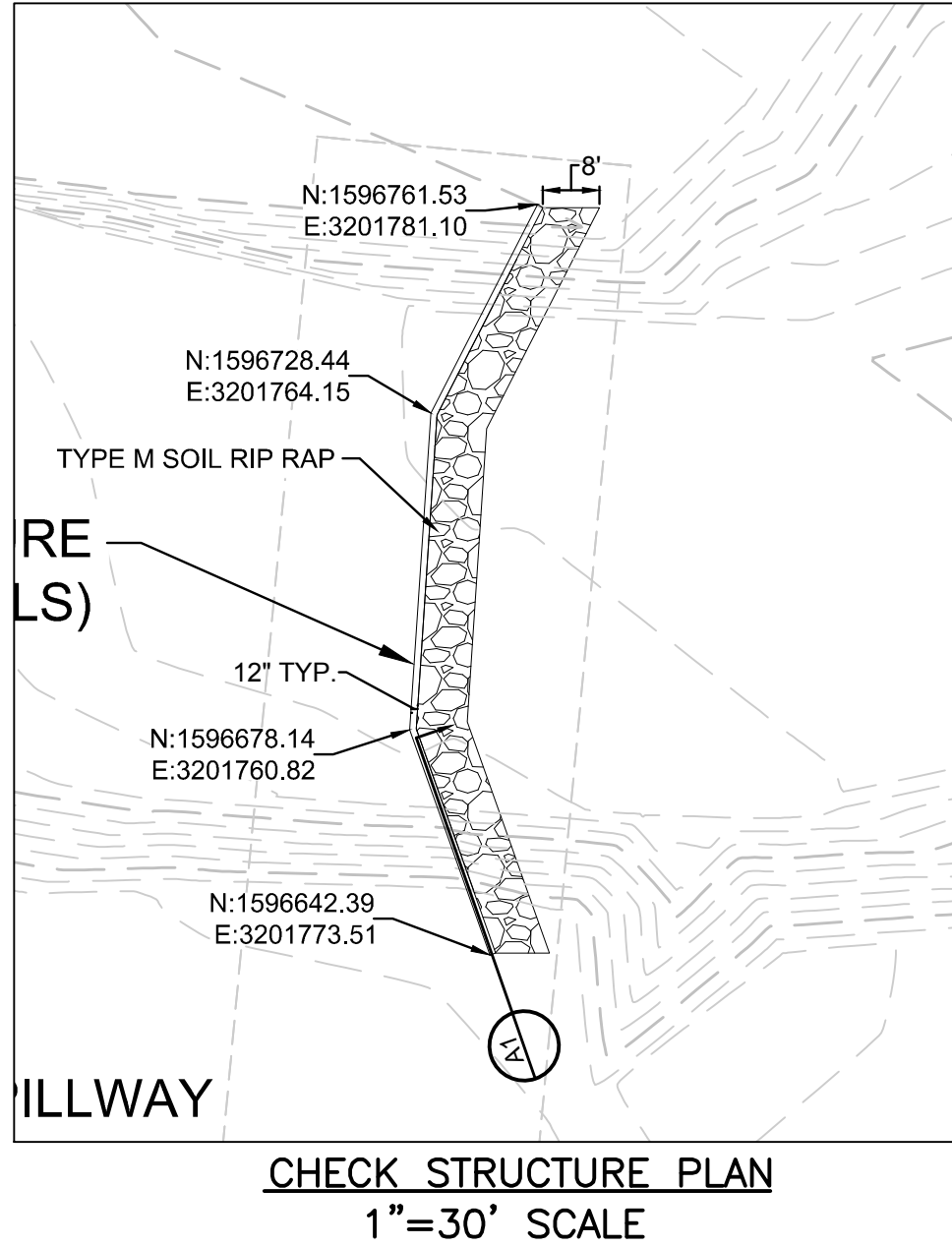
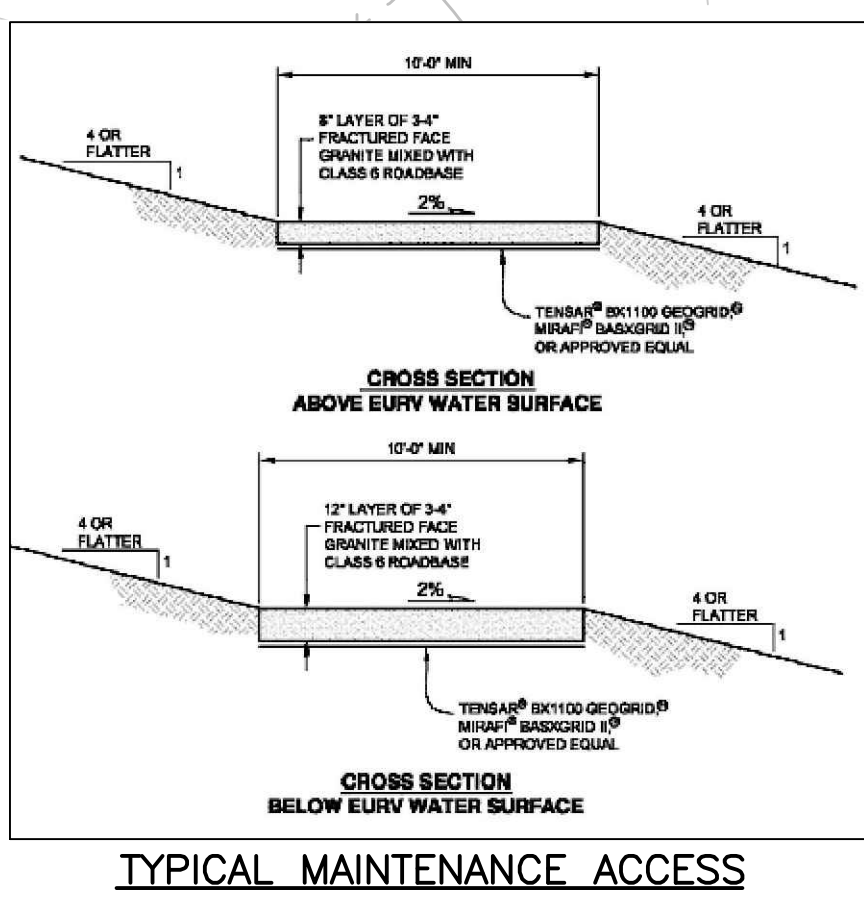
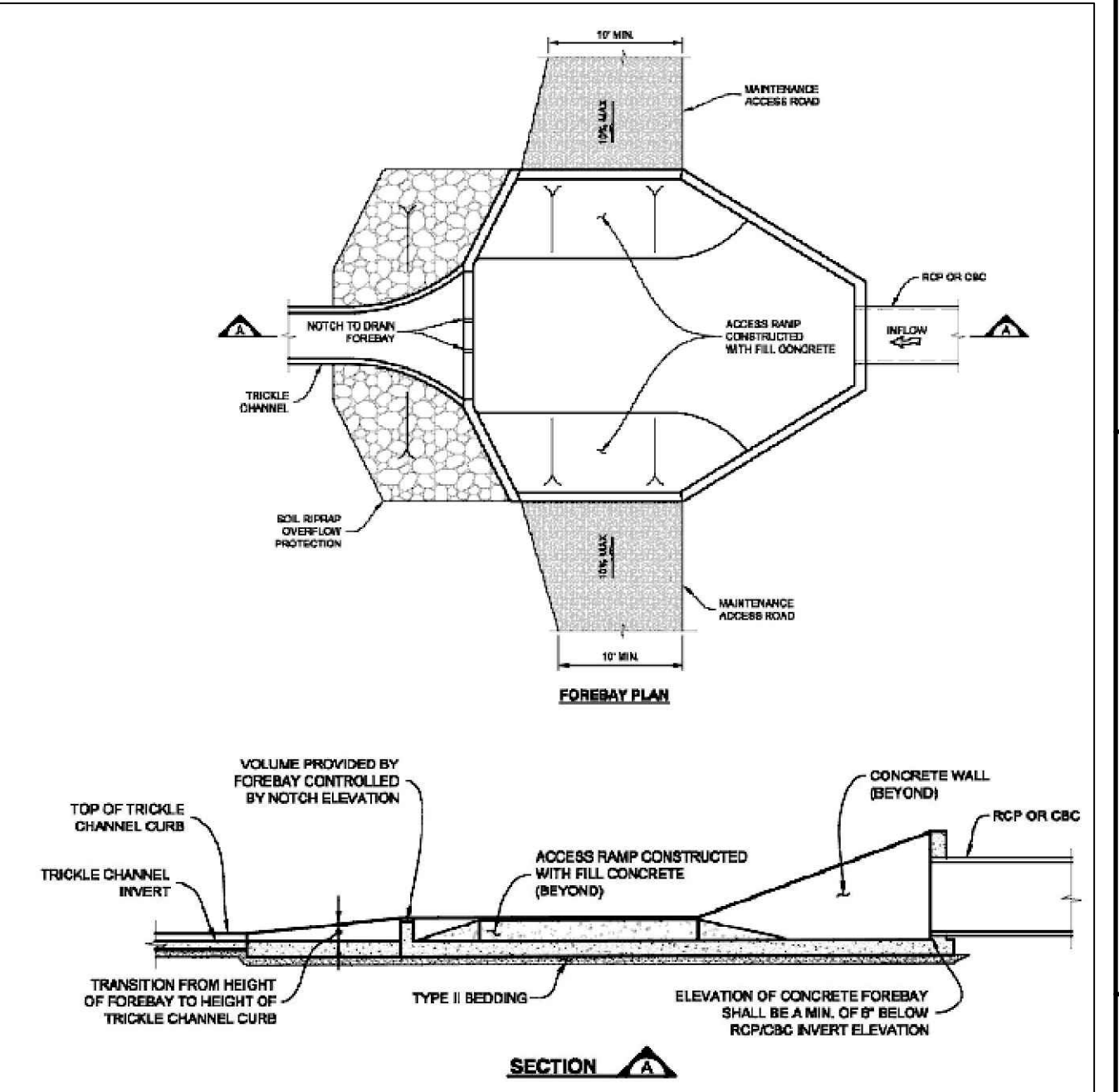
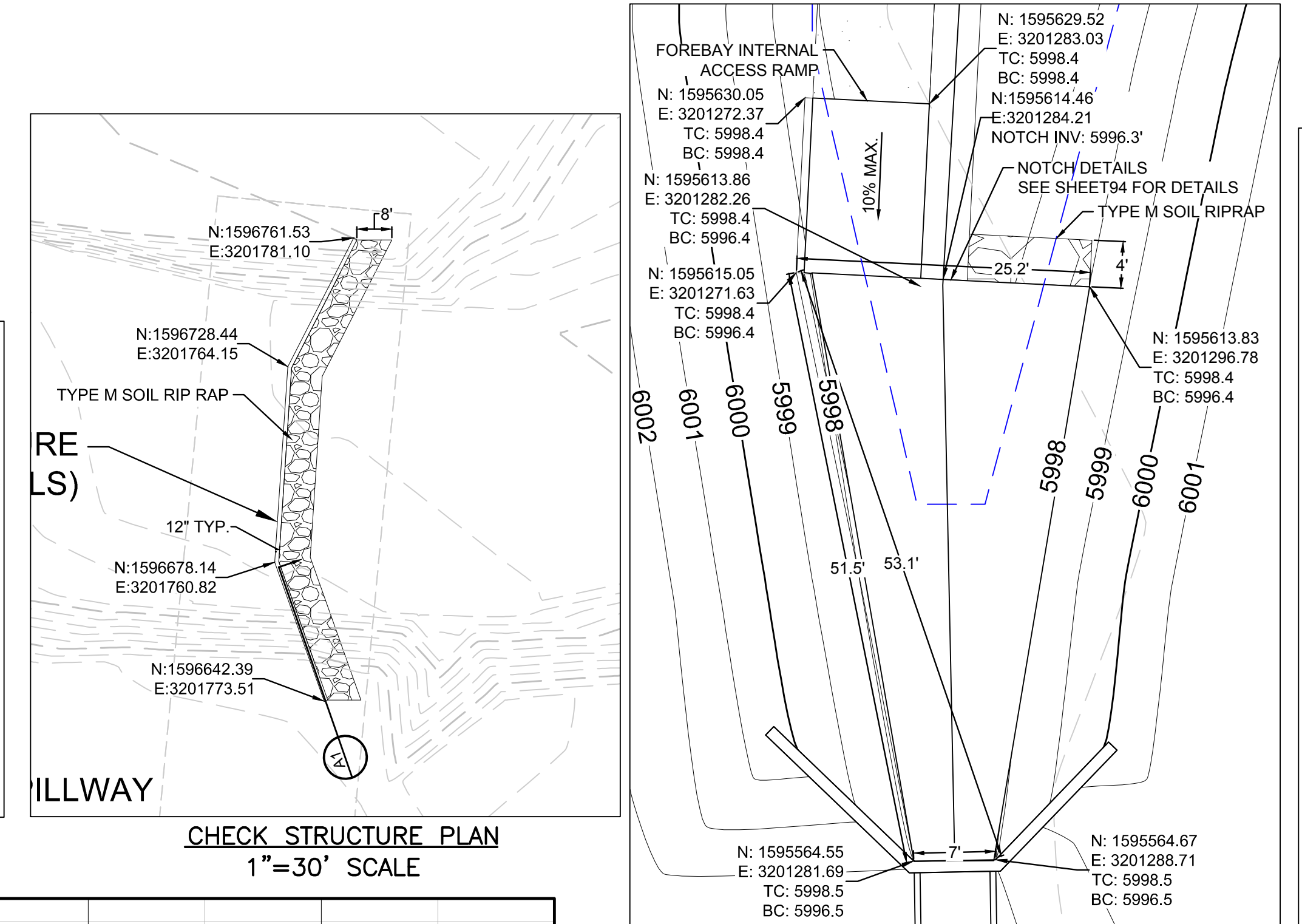
Horizontal curves in trickle channel to right, use similar radius as ones upstream. We want to avoid water popping out of trickle channel and eroding edge.

These curves seem more appropriate

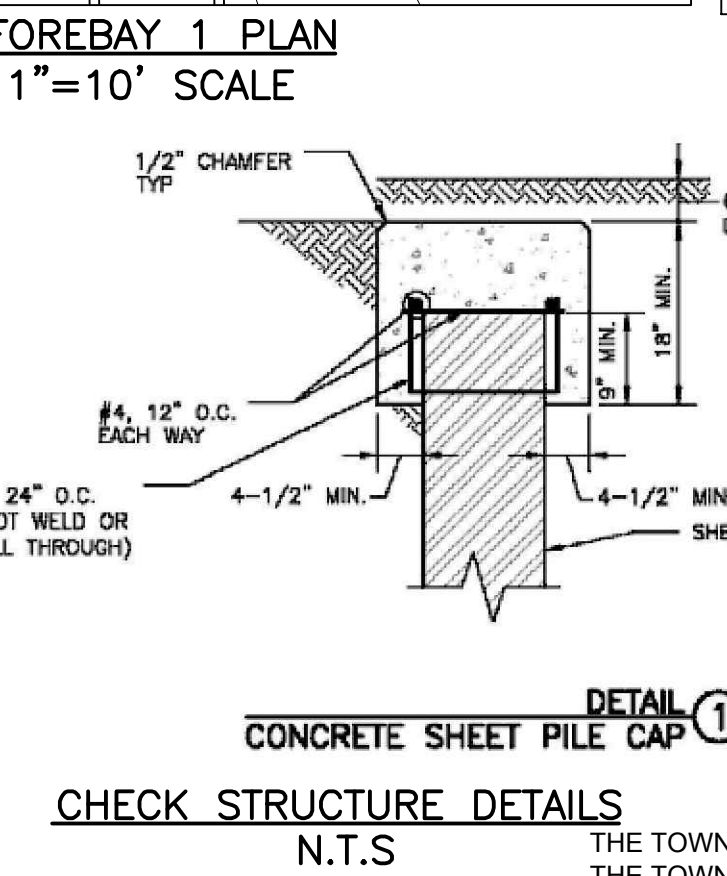


ENERGY DISSIPATION FOR PONDS A, B, C & D
N.T.S.

FOREBAY DIAMETER (ID)	BAFFLE BLOCK 1		BAFFLE BLOCK 2	
	HEIGHT (FT)	WIDTH (FT)	HEIGHT (FT)	WIDTH (FT)
1	(No energy dissipation necessary, velocity below 7 fps)			
2	3	4	3	1.5
3	2	3	2	1
4 (a)	3.5	4.5	3.5	1.75
4 (b)	2	3	2	1
4 (c)	3	4	3	1.5
5	2.5	3.5	2.5	1.25
6	3	4	3	1.5
7	4	5	4	2
8	3	4	3	1.5
Pond A Outfall	4	5	4	2



Add low flow notch in center of check. Should be a little less than the 2-year flow in Lemon Gulch.



THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWN'S STANDARDS AND APPROVED VARIANCES, SUBJECT TO THESE PLANS BEING STAMPED, SIGN, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATIONS. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.

THIS REVIEW DOES NOT CONSTITUTE APPROVAL OF ANY PRIVATE ON-SITE IMPROVEMENTS WHICH MAY BE SHOWN. CONSTRUCTION CANNOT COMMENCE UNTIL ALL REQUIRED DRAINAGE/TRAFFIC REPORT(S), FINAL DEVELOPMENT PLAN(S), SPECIAL REVIEW(S), GRADING PERMIT, AND/OR OTHER PERMITS ARE COMPLETE, APPROVED AND ON FILE WITH THE TOWN OF PARKER.

PREPARED UNDER THE SUPERVISION OF

MARK SCHEURER
COLORADO P.E. 48988

CALL 811
TWO WORKING DAYS
BEFORE YOU DIG
UNCC 1-800-922-1987

10333 E. Dry Creek Rd.
Suite 410
Englewood, Colorado 80150
Tel: (720) 482-9526
Fax: (720) 482-9548

CVL CONSULTANTS

HR 935 LLC
7353 South Alton Way
CENTENNIAL, CO 80112

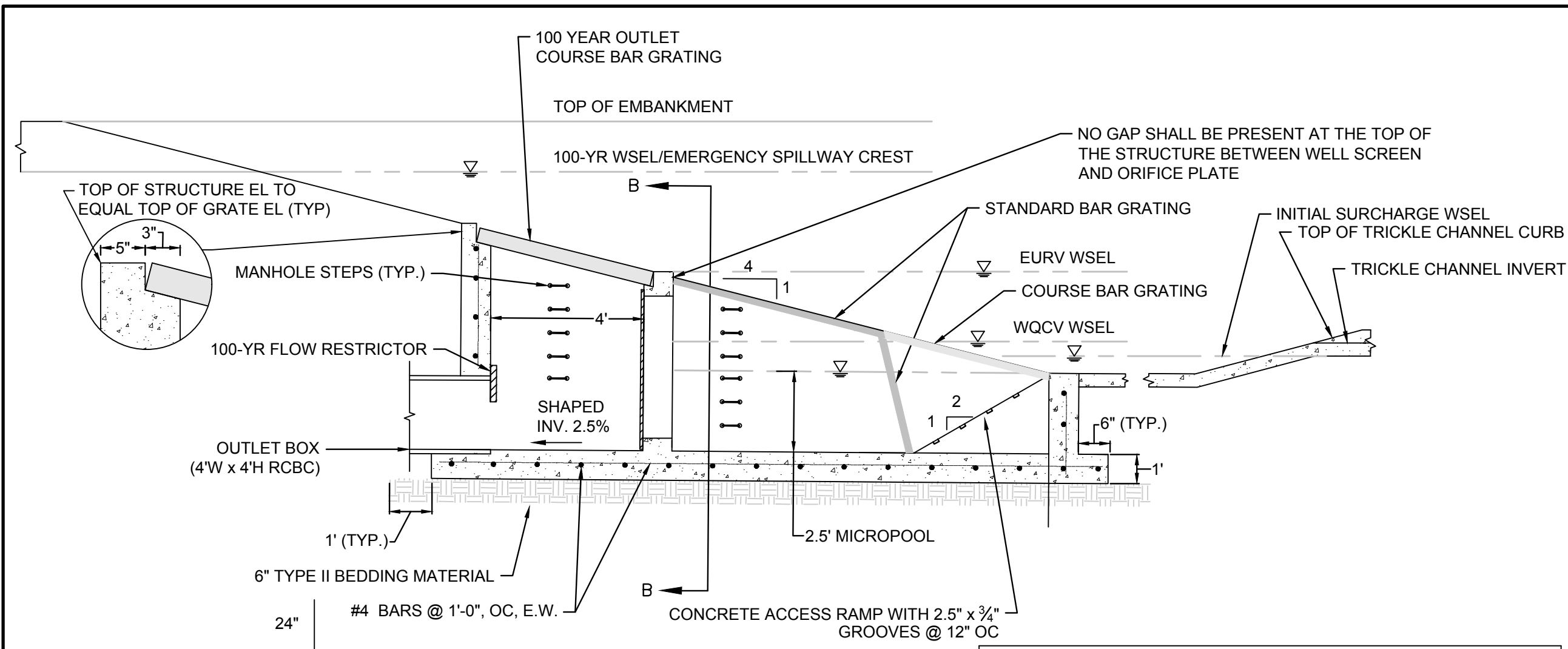
TRAILS AT CROWFOOT
FILING 1 CONSTRUCTION DRAWINGS
POND A OUTLET STRUCTURE PLAN

SCALE: AS SHOWN
FILE NO: 8130283701

DRAWN BY: AK
CHECKED BY: JJJ
DATE: APRIL 2017

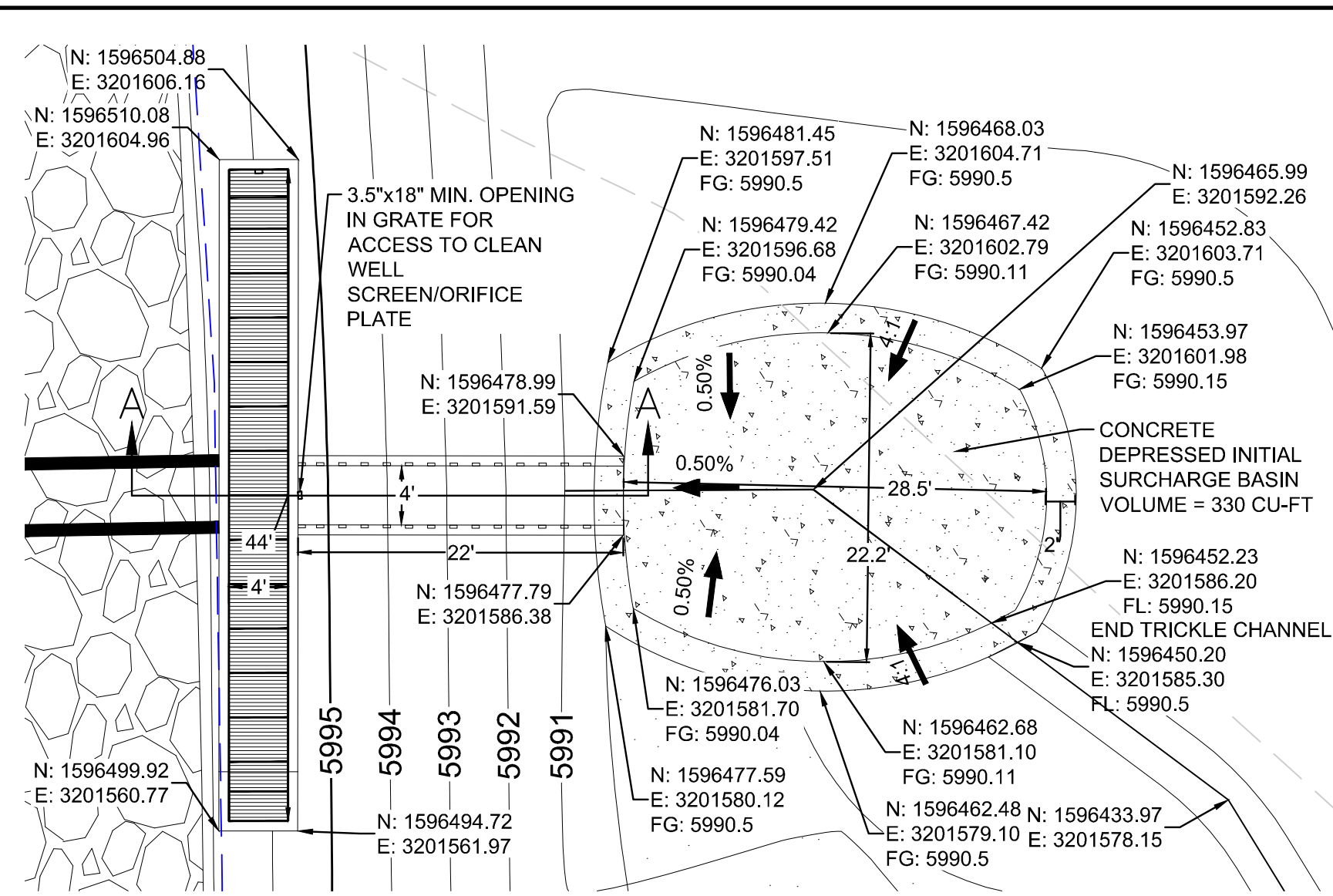
SHEET NUMBER: 93

TOWN OF PARKER, DIRECTOR OF ENGINEERING DATE

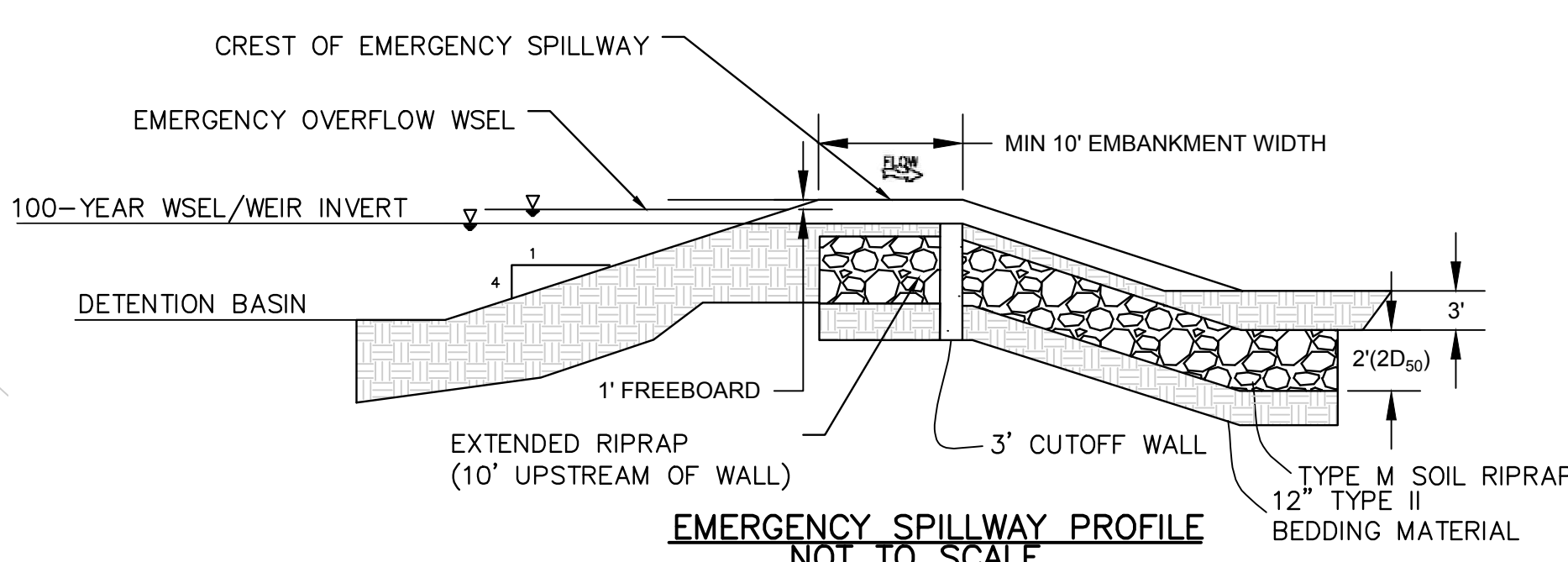


ELEVATION VIEW / X-SECTION A-A
NTS

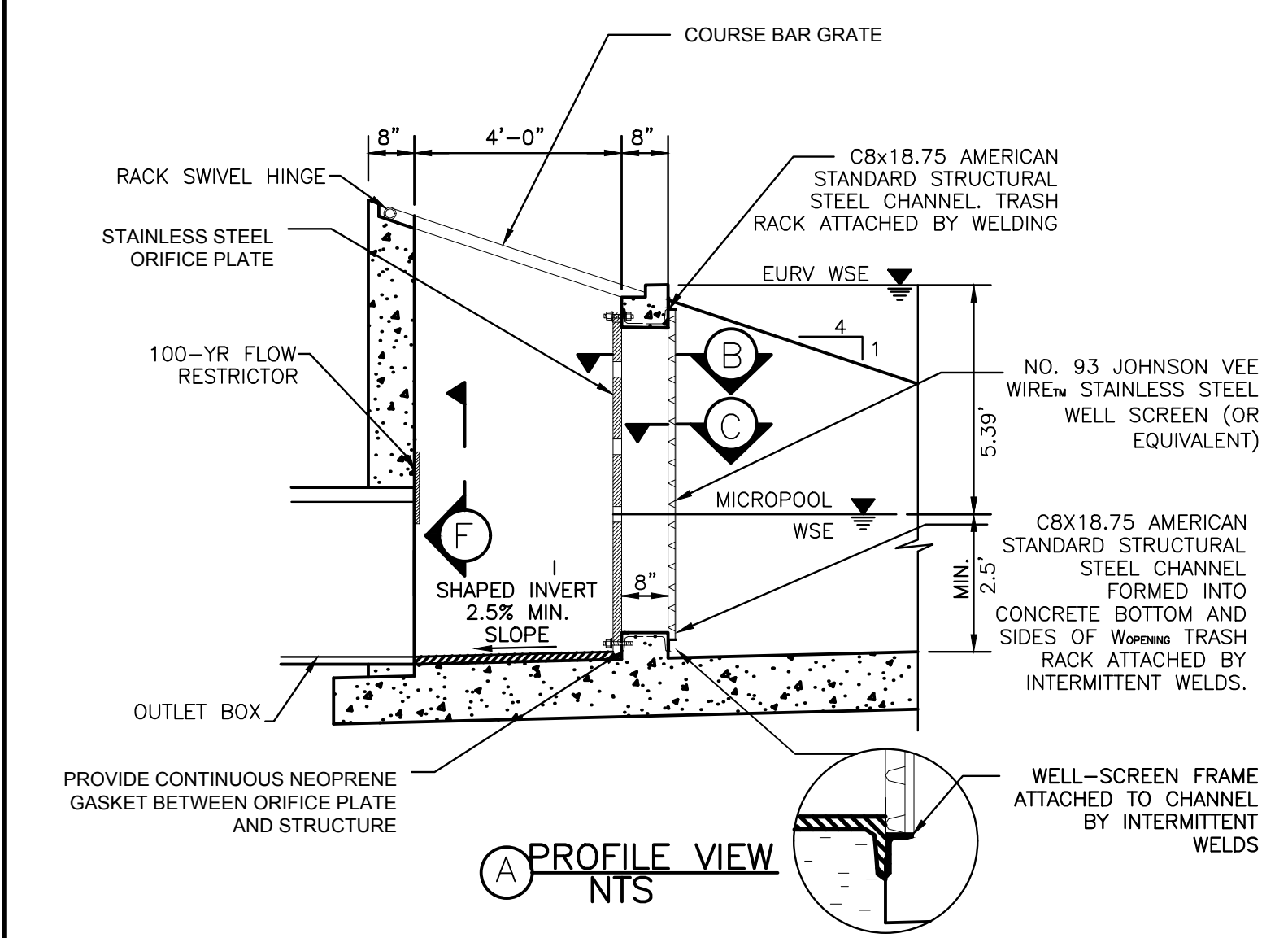
ELEMENT	ELEVATION (FT)
TOP OF EMBANKMENT	5599.08
EMERGENCY SPILLWAY CREST	5997.19
100-YR WSEL	5997.19
EURV WSEL	5995.39
WQCV WSEL	5993.47
INITIAL SURCHARGE BASIN WSEL	5990.50
MICROPOOL WSEL	5990.00
OUTLET BOX INV. EL	5587.50



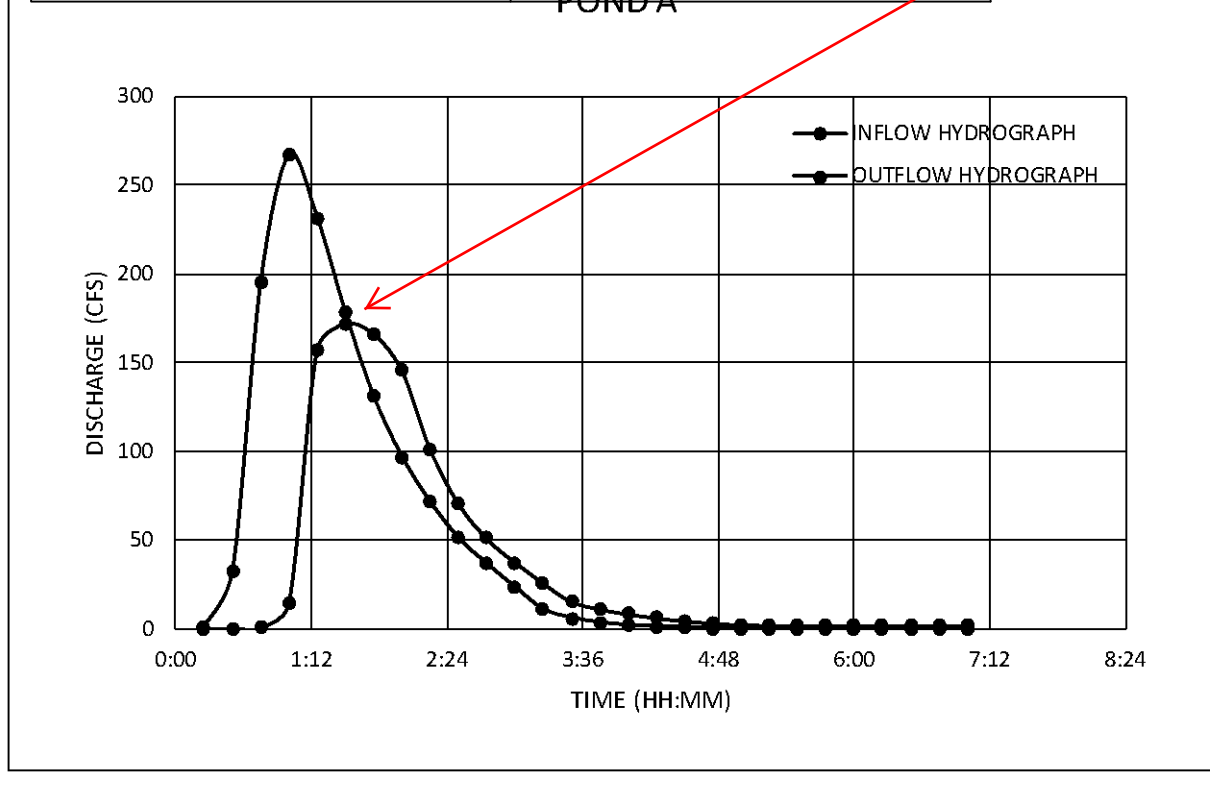
OUTLET STRUCTURE AND INITIAL SURCHARGE BASIN PLAN
1"=10' SCALE



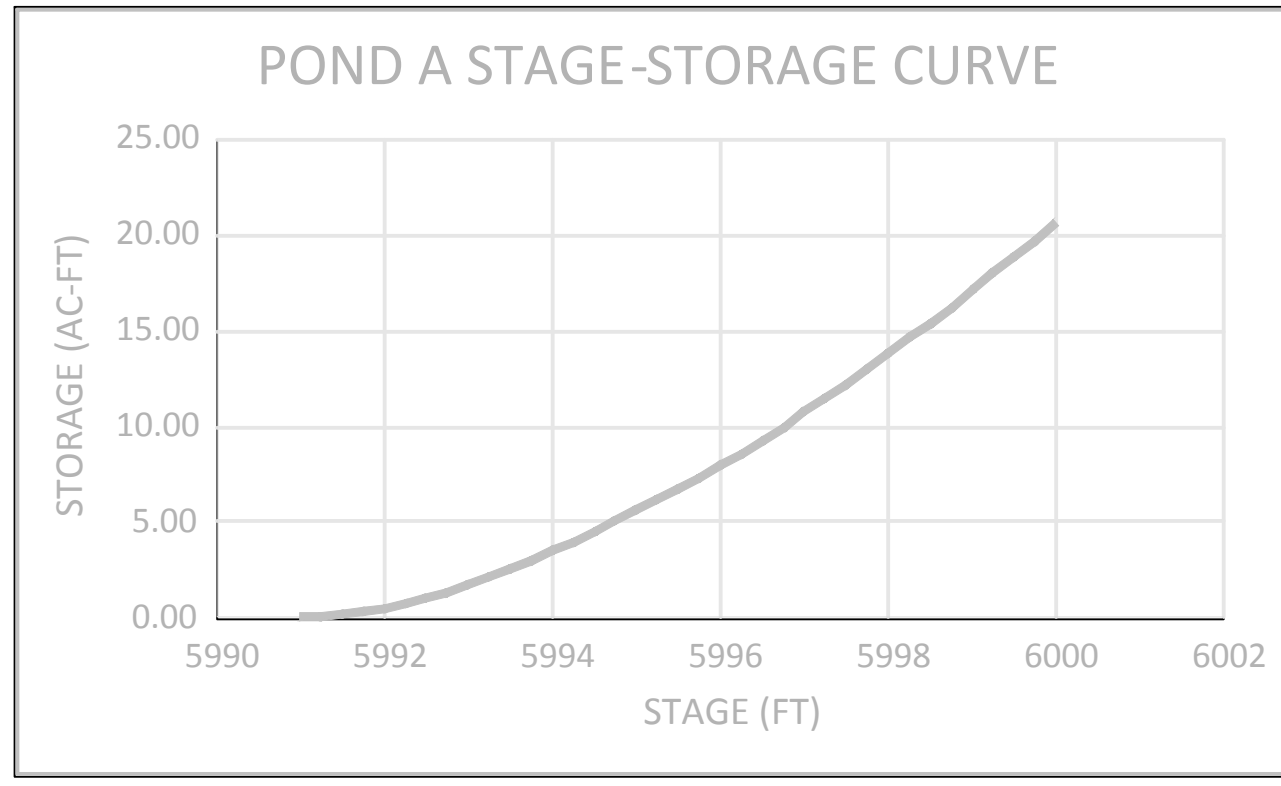
EMERGENCY SPILLWAY PROFILE
NOT TO SCALE



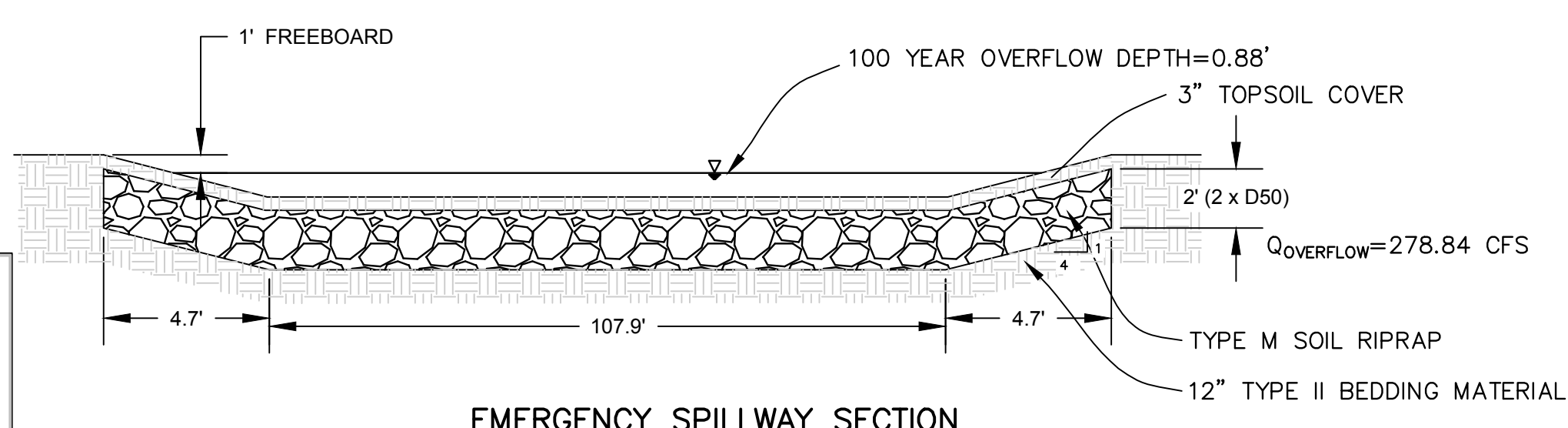
PROFILE VIEW
NTS



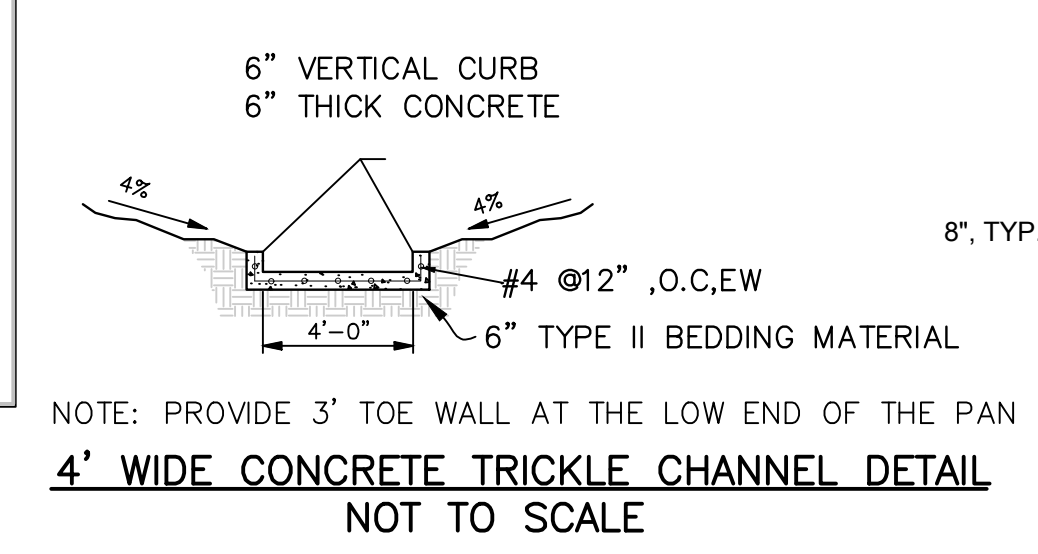
Outflow from UD Detention lists 197.0



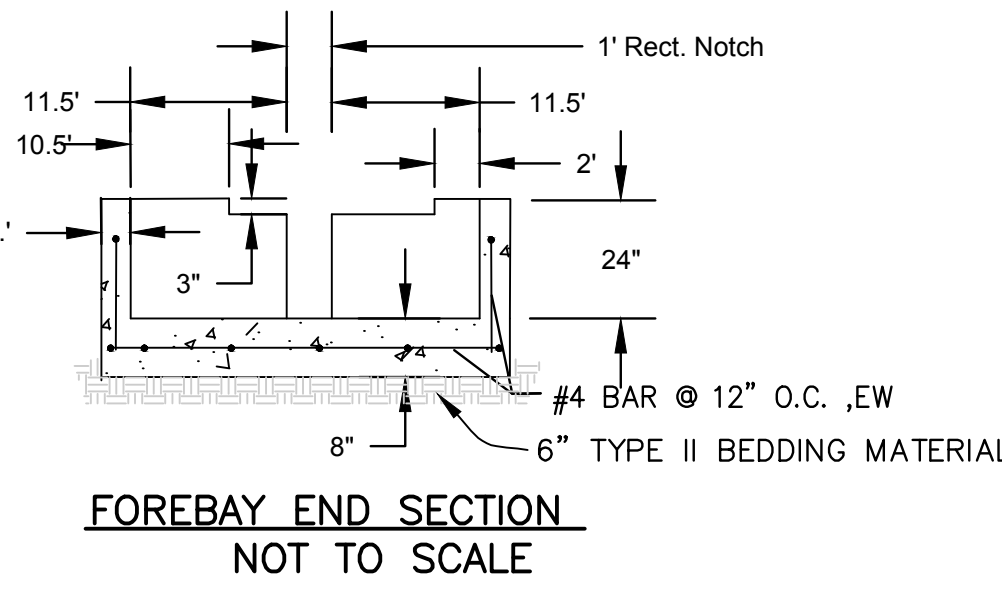
POND A STAGE-STORAGE CURVE



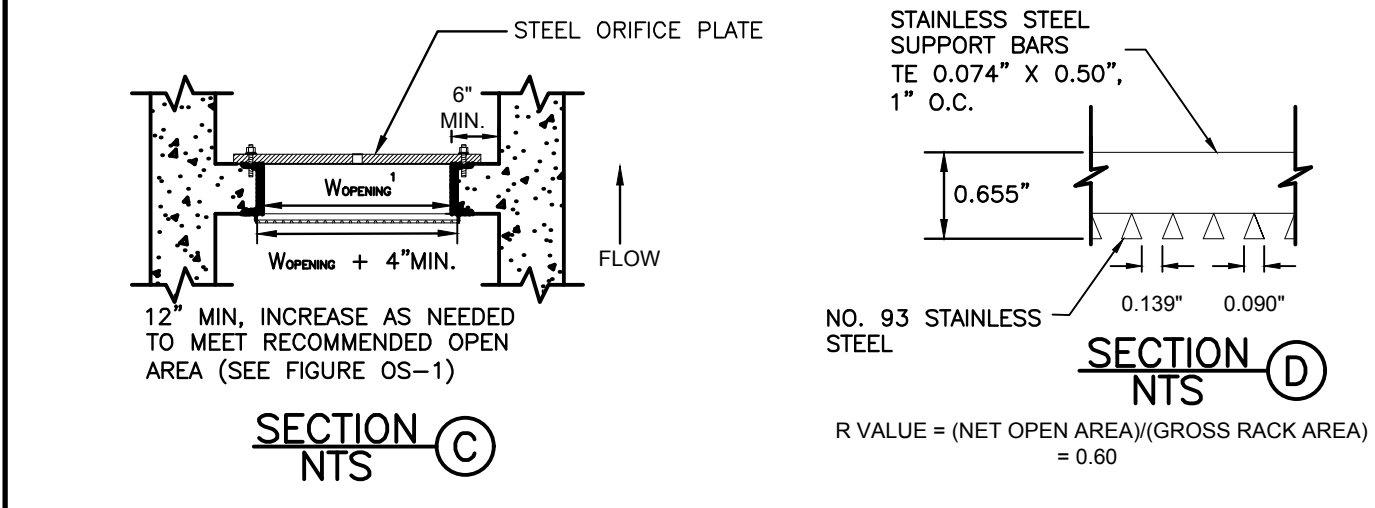
EMERGENCY SPILLWAY SECTION
NOT TO SCALE



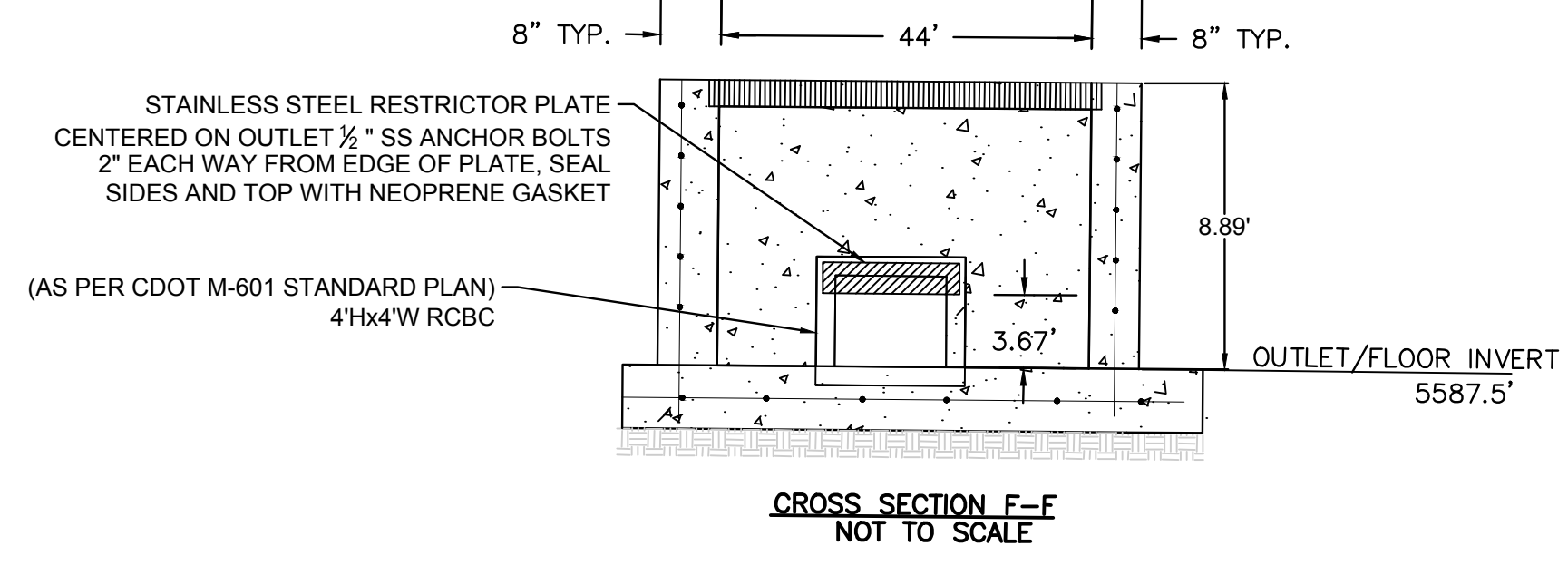
4" WIDE CONCRETE TRICKLE CHANNEL DETAIL
NOT TO SCALE



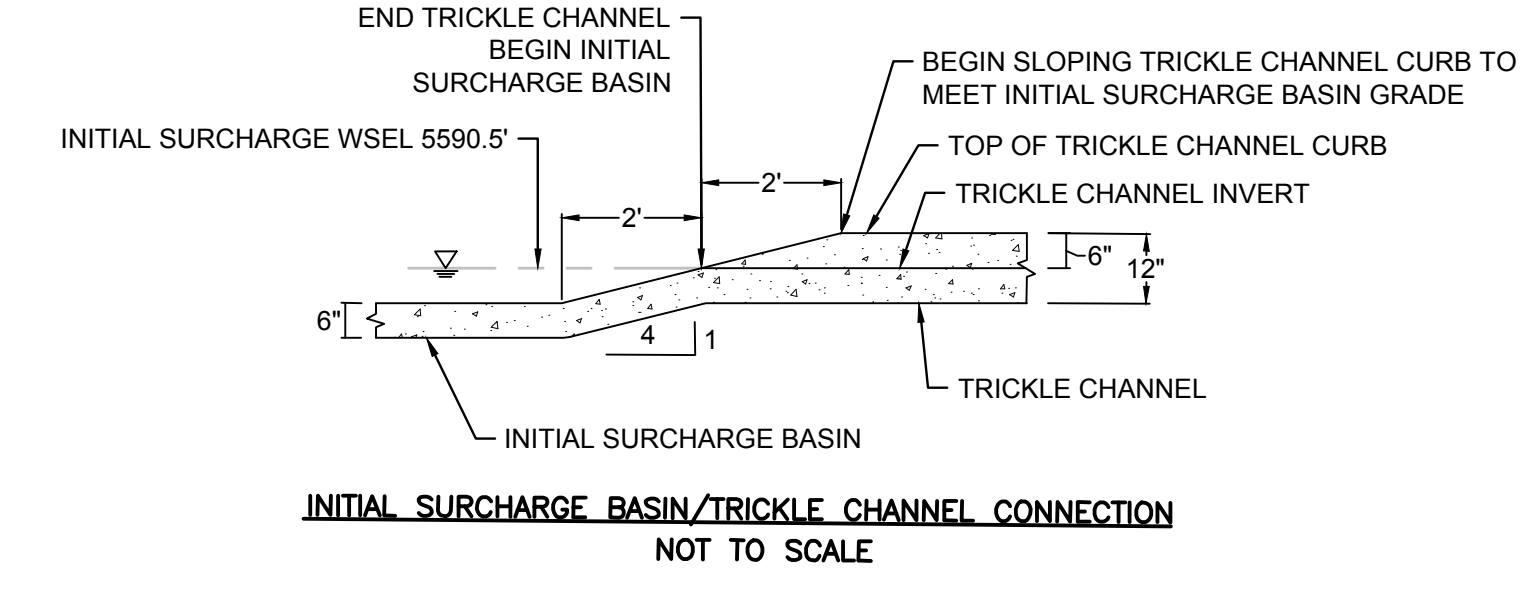
FOREBAY END SECTION
NOT TO SCALE



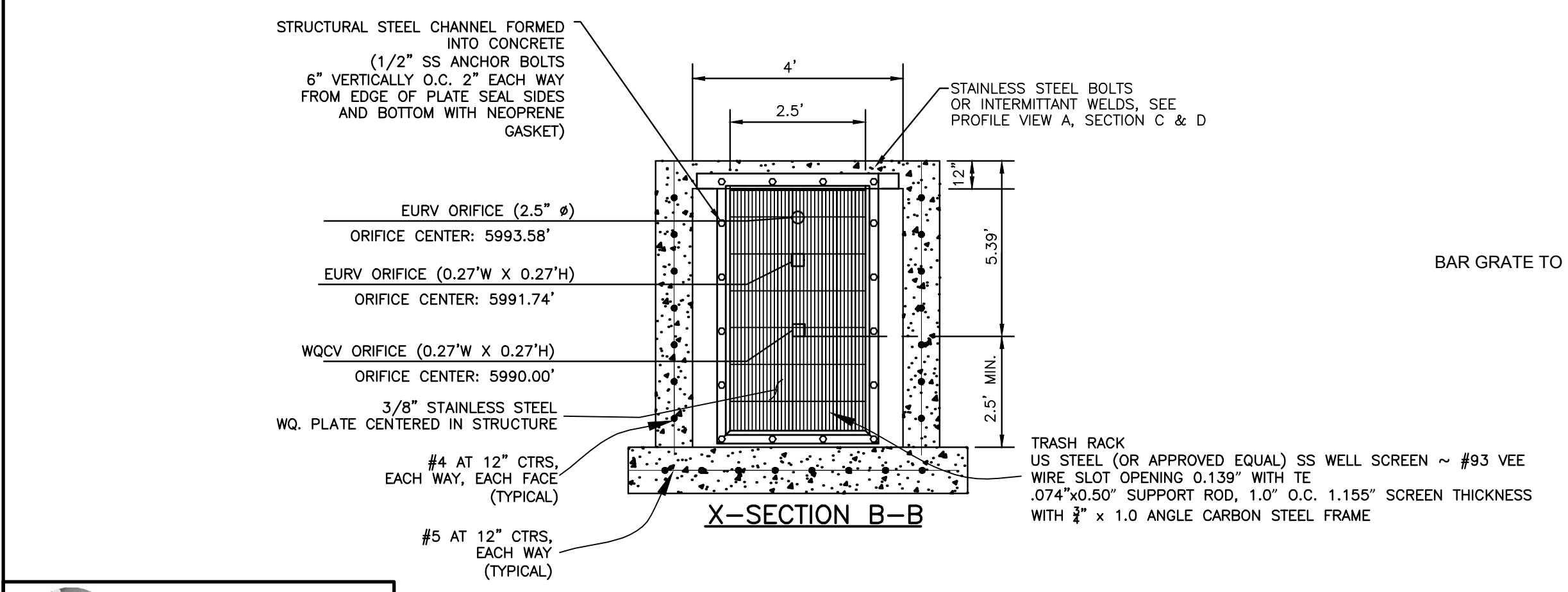
SECTION C
NTS



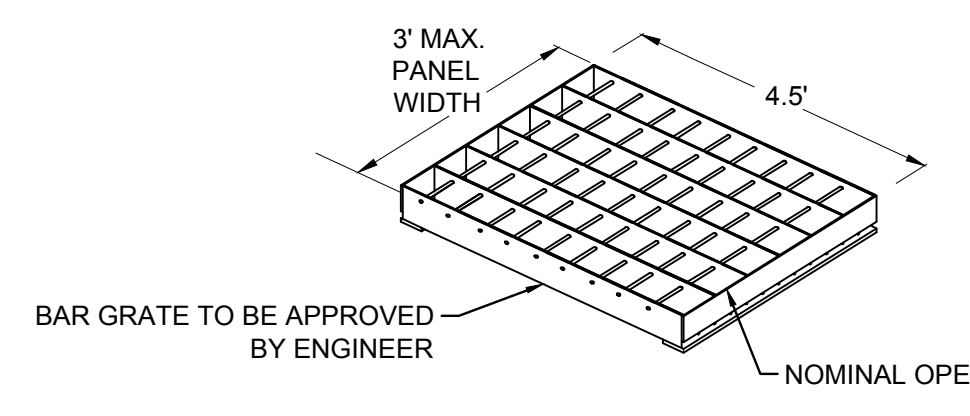
CROSS SECTION F-F
NOT TO SCALE



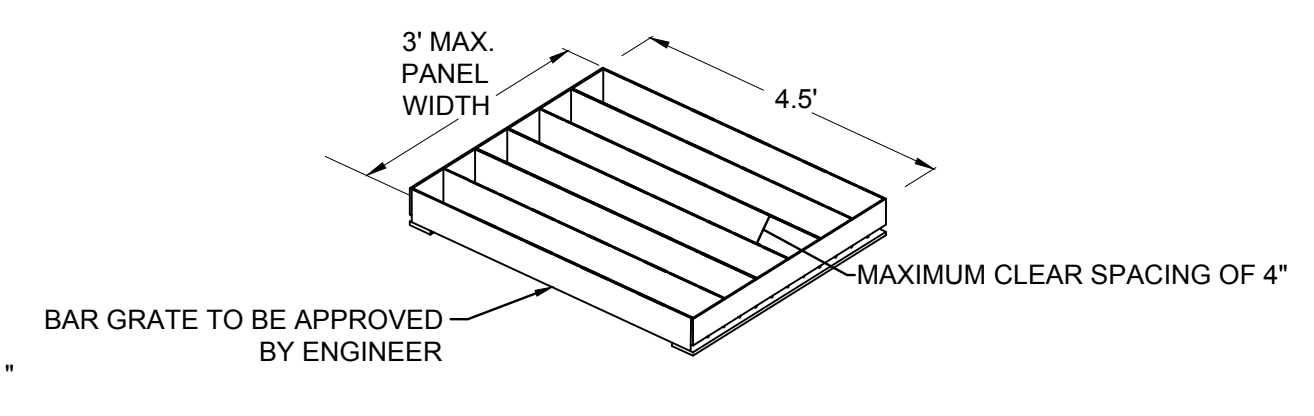
INITIAL SURCHARGE BASIN/TRICKLE CHANNEL CONNECTION
NOT TO SCALE



X-SECTION B-B



STANDARD BAR GRATE
NOT TO SCALE



COURSE BAR GRATE
NOT TO SCALE

- ORIFICE PLATE NOTES:
1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
 2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER, WITH 0.375" OF PLATE THICKNESS.

- EURV AND WQCV TRASH RACKS:
1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
 2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
 3. TRASH RACK OPEN AREAS ARE FOR SPECIFIED TRASH RACK MATERIALS. TOTAL TRASH RACK SIZE MAY NEED TO BE ADJUSTED FOR MATERIALS HAVING DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE).
 4. STRUCTURAL DESIGN OF TRASH RACKS SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

- BAR GRATES:
1. ALL BAR GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
 2. BAR GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
 3. BAR GRATES SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
 4. STRUCTURAL DESIGN OF BAR GRATES SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.
 5. BEARING BARS SHALL BE SIZED FOR A UNIFORM LOAD BETWEEN 100 AND 150 POUNDS PER SQUARE FOOT.

THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWN'S STANDARDS AND APPROVED VARIANCES, SUBJECT TO THESE PLANS BEING STAMPED, SIGN, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATIONS. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.

THIS REVIEW DOES NOT CONSTITUTE APPROVAL OF ANY PRIVATE ON-SITE IMPROVEMENTS WHICH MAY BE SHOWN. CONSTRUCTION CANNOT COMMENCE UNTIL ALL REQUIRED DRAINAGE/TRAFFIC REPORT(S), FINAL DEVELOPMENT PLAN(S), SPECIAL REVIEW(S), GRADING PERMIT, AND/OR OTHER PERMITS ARE COMPLETE, APPROVED AND ON FILE WITH THE TOWN OF PARKER.

TOWN OF PARKER, DIRECTOR OF ENGINEERING DATE

PREPARED UNDER THE SUPERVISION OF

MARK SCHEURER
COLORADO P.E. 48988

CALL 811
TWO WORKING DAYS
BEFORE YOU DIG
UNCC 1-800-922-1987

BENCHMARK
DOUGLAS COUNTY CONTROL POINT KNOWN AS 1.060032, BEING A 3-1/4" ALUMINUM CAP, BEING LOCATED IN THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, HAVING A PUBLISHED ELEVATION OF 1799.2870 METERS (5903.13 FEET) NAVD '88 DATUM.

BASIS OF BEARINGS:
THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9 BEING MONUMENTED AT THE NORTHEAST CORNER OF SAID SECTION 9 BY A 3-1/4" ALUMINUM CAP STAMPED LS 23053 AND AT THE EAST QUARTER CORNER OF SAID SECTION 9 BY A 2-1/2" ALUMINUM CAP STAMPED LS 6935 BEING CONSIDERED TO BEAR SOUTH 00°15'06" EAST, 2648.70 FEET.

10339 E. Dry Creek Rd. Suite 410 Englewood, Colorado 80150 Tel: (720) 482-9526 Fax: (720) 482-9546	Revisions	Date	Appr.	Date
CVL CONSULTANTS	No.			
HR 935 LLC 7353 South Alton Way CENTENNIAL, CO 80112				
TRAILS AT CROWFOOT FILING 1 CONSTRUCTION DRAWINGS POND A OUTLET STRUCTURE				
SCALE: AS SHOWN DRAWN BY: AK CHECKED BY: JU DATE: APRIL 2017				
FILE NO: 8130283701				
SHEET NUMBER 94				

Lemon Gulch -
Trails at Crowfoot
Tributary

PROJECT INFORMATION

1.0 GENERAL INFORMATION

A. UDFCD DRAINAGEWAY
B. PROPERTY OWNER
C. DESIGN ENGINEER

MEP ID # XXXX
TOWN OF PARKER
CVL CONSULTANTS
720-482-9526

106841

1.1 GENERAL INFORMATION

A. ONLINE OR OFFLINE FACILITY OFFLINE
B. FLOW RATES

EVENT	INFLOW	OUTFLOW
10 YEAR	143 CFS	43 CFS
100 YEAR	279 CFS	197 CFS

C. POND DESCRIPTION

OUTLET	VOLUME	10 YR WSE	100 YR WSE
POND	11.3 AC-FT	5595.39 FT	5997.19 FT
ORIFICE	6.1 AC-FT	5595.39 FT	5997.19 FT
WEIR	11.3 AC-FT	5997.19 FT	

D. OUTLET TYPE

REGIONAL POND WITH THREE ORIFICES FOR LOW FLOW AND A SEPARATE OVERFLOW WEIR

1.2 MISCELLANEOUS INFORMATION

A. PROJECT SURVEY INFORMATION

PLANIMETRIC SURVEY AND TOPOGRAPHY WAS PREPARED BY CVL CONSULTANTS. SURVEY CONTROL POINT: DOUGLAS COUNTY CONTROL POINT KNOWN AS 1.060032, BEING A 3-1/4" ALUMINUM CAP, BEING LOCATED IN THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 6 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, HAVING A PUBLISHED ELEVATION OF 1799.2870 METERS (5903.13 FEET) NAVD '88 DATUM.

B. SEED MIXES

UPLAND SEED			WETLAND SEED		
COMMON NAME, VARIETY	BOTANICAL NAME	% OF TOTAL	COMMON NAME, VARIETY	BOTANICAL NAME	% OF TOTAL
JUNEGRASS	KOELERIA MACHRANTHA	2	HARDSTEM BULRUSH	SCRIPUS ACUTUS	20
LITTLE BLUESTEM, PASTURA	SCHIZACHYRIUM SCOPARIUM	10	PRAIRIE CORDGRASS	SPARTINA PECTINATA	5
BLUE GRAMA, LOVINGTON	BOUTELOUA GRACILLIS	7	BLUE GRAMA, LOVINGTON	BOUTELOUA GRACILLIS	4
SAND DROPSSEED	SPOROBOLUS CRYPTANDRUS	1	SAND DROPSSEED	SPOROBOLUS CRYPTANDRUS	4
SIDE OATS GRAMA	BOUTELOUA CURTIPENDULA	20	BALTIC SPIKERUSH	JUNCUS BALTICUS	4
WESTERN WHEATGRASS, ARRIBA	PASCOPYRUM SMITHII	60	WESTERN WHEATGRASS, ARRIBA	PASCOPYRUM SMITHII	29
			WOOLY SEDGE	CAREX LANUGINOSA	1
			NEBRASKA SEDGE	CAREX NEBRASCENSIS	1
			SWITCHGRASS	PANICUM VIRGATUM	26
			INDIAN SALTGRASS	DISTICHLIS STRICTA	5
			CREeping SPIKERUSH	ELEOCHARIS PALUSTRIS	1

C. MOW AREA: 3.7 AC

THE MOW AREA IS GENERALLY DESCRIBED AS THE INTERIOR SIDES AND BOTTOM OF THE ENTIRE POND UP TO THE ELEVATION OF 5599. GRASSES SHOULD BE MAINTAINED AT THE HEIGHT OF 4 TO 6 INCHES.

PROJECT NOTES

2.0 GENERAL FACILITY DESCRIPTION

THE FACILITY IS A DETENTION POND BUILT UPSTREAM OF LEMON GULCH. THE WATER ENTERS THE POND VIA A FOREBAY AND DISCHARGES THROUGH OUTLET STRUCTURE. THE POND IS PROVIDED WITH AN ORIFICE FOR LOW AND WEIR IN CASE OF MAJOR EVENTS.

2.1 MAINTENANCE NOTES

A. MAINTENANCE FREQUENCY

ROUTINE MAINTENANCE TASKS, INCLUDING MOWING AND DEBRIS REMOVAL SHOULD BE PERFORMED ON AN AS-NEEDED BASIS. DEBRIS REMOVAL AND SWEEPING SHOULD BE DONE PRIOR TO THE SUMMER STORM SEASON AND FOLLOWING SIGNIFICANT RAINFALL EVENTS. IN ADDITION, THE PROPERTY OWNER SHOULD PERFORM A SITE INSPECTION ON AN ANNUAL BASIS TO EVALUATE THE NEED FOR ADDITIONAL MAINTENANCE, INCLUDING SEDIMENT REMOVAL, EROSION CONTROL, REVEGETATION AND STRUCTURAL REPAIRS. IF ADDITIONAL MAINTENANCE IS REQUIRED, THE PROPERTY OWNER MAY REQUEST ASSISTANCE FROM UDFCD.

B. EQUIPMENTS AND SPECIAL TOOLS REQUIRED

SUBMERSIBLE PUMP/ GENERATOR
LONG-REACH RAKE OR BROOM
SKID STEER
LONG-REACH TRACK EXCAVATOR
TANDEM DUMP TRUCKS

2.2 MAINTENANCE PROCEDURE

A. DEWATERING

THIS POND HAS NO NATURAL BASEFLOW BUT WILL RECEIVE STORM AND IRRIGATION RUNOFF ON A FREQUENT BASIS.

B. SEDIMENT REMOVAL

SEDIMENT MUST BE REMOVED FROM FOREBAY WHEN THEY HAVE REACHED 3/4 CAPACITY. HAND REMOVAL MAY BE NECESSARY IN POND AND FOREBAY. POND IS ACCESSED FROM A MAINTENANCE PATH. LONG REACH EXCAVATOR AND BACKHOE MAY BE USED FOR CLEANING AS NECESSARY.

C. DEBRIS REMOVAL

DEBRIS BUILDUP IS EXPECTED AT THE OUTLET STRUCTURE, THE GRATES OF OUTLET STRUCTURE AND FOREBAY. ALL DEBRIS SHOULD BE COLLECTED AND DISPOSED OFFSITE. A LONG-REACH BROOM OR RAKE WILL BE NECESSARY TO CLEAN THE SCREEN.

D. SITE INSPECTION

THE FOLLOWING ITEMS SHOULD BE INSPECTED A MINIMUM OF ONCE PER YEAR AND MAINTAINED AS NECESSARY:

GENERAL

ACCESS DRIVES
EROSION
VEGETATION
NATIVE WETLANDS AND UPLAND GRASSES
WILLOWS AND OTHER RIPARIAN PLANTS AROUND EDGE OF POND
COTTONWOOD TREES IN MIDDLE ELEVATIONS
PONDEROSA IN UPPER AREAS.

EQUIPMENT AND STRUCTURES

CONCRETE FOREBAY

FOREBAY
SOIL RIP RAP

10-YR OUTLET STRUCTURE

CONCRETE ENTRANCE STRUCTURE
TRASH RACK
ORIFICE PIPE
ORIFICE PLATE

100-YR OUTLET STRUCTURE

CONCRETE STRUCTURE
TRASH RACK
HAND RAIL
OVERFLOW CHANNEL

STAGE (FT)	STORAGE (ACRE-FT)	DISCHARGE (CFS)
0	0.0	0.0
1	0.0	0.3
2	0.5	0.7
3	1.7	1.0
4	3.5	1.3
5	5.6	1.6
6	8.0	38.1
7	10.7	166.6
8	13.8	212.7
9	17.2	583.9

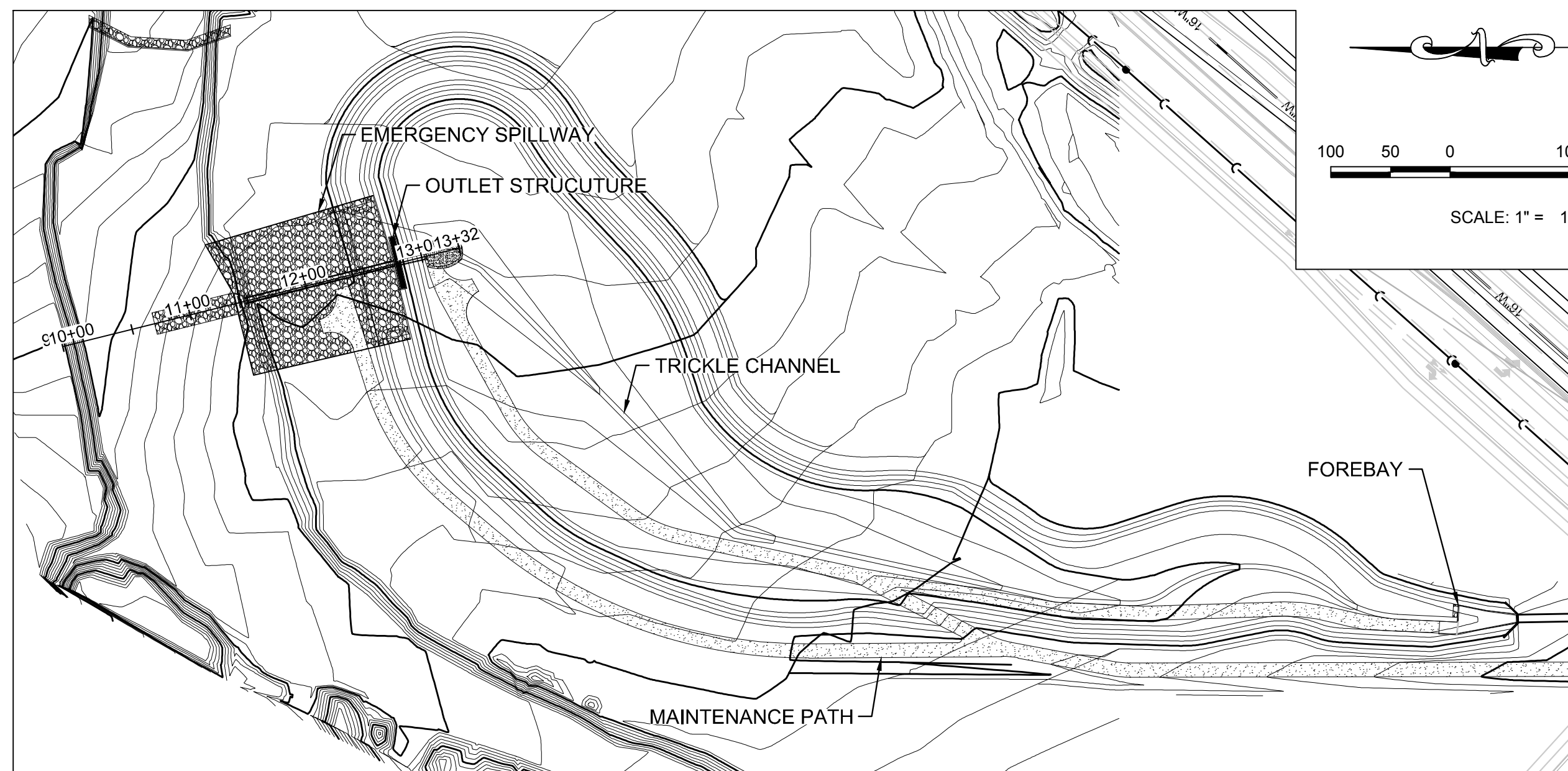
100-YEAR VOLUME VS. DISCHARGE TABLE

C. POST-MAINTENANCE CONSIDERATIONS

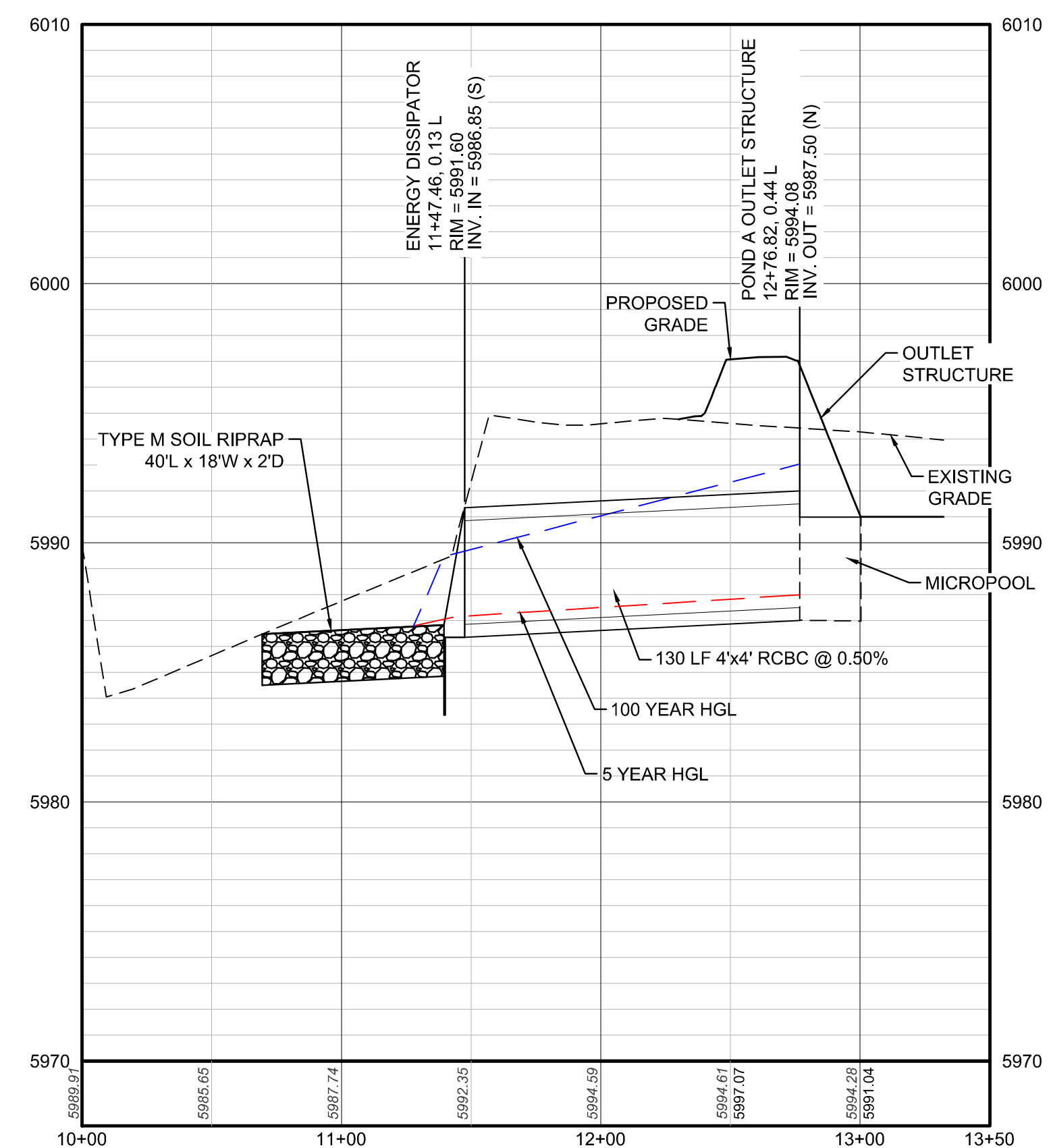
FOLLOWING COMPLETION OF MAINTENANCE ACTIVITIES, ALL DEBRIS, TRASH AND EXCAVATED SEDIMENT MUST BE REMOVED OFFSITE. IF NECESSARY, ADJACENT STREETS MUST BE SWEEPED CLEAN.

TRAILS AT CROWFOOT REGIONAL DETENTION POND A MAINTENANCE SITE PLAN

APRIL 2018 (PROJECT COMPLETED XXXX)



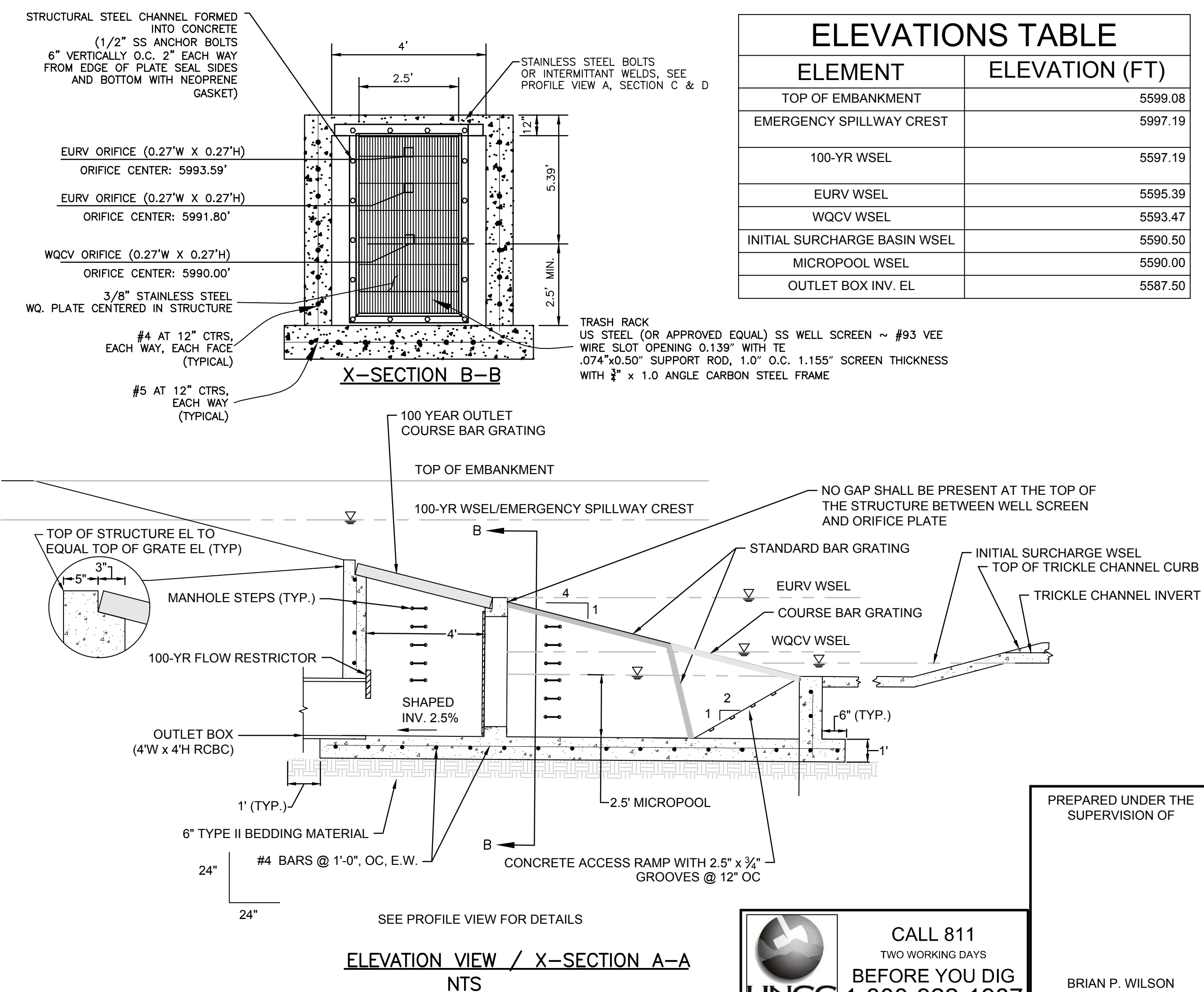
PLAN VIEW
SCALE: 1" = 100'



PROFILE: POND A OUTFALL STA: 10+00.00 TO 13+50.00
HORIZONTAL: 1" = 100'
VERTICAL: 1" = 10'

HYDRAULIC PROFILE

SCALE: 1" = 50'



ELEVATION VIEW / X-SECTION A-A
NTS

ELEVATIONS TABLE	
ELEMENT	ELEVATION (FT)
TOP OF EMBANKMENT	5599.08
EMERGENCY SPILLWAY CREST	5997.19
100-YR WSEL	5597.19
EURV WSEL	5595.39
WQCV WSEL	5593.47
INITIAL SURCHARGE BASIN WSEL	5590.50
MICROPOOL WSEL	5590.00
OUTLET BOX INV. EL.	5587.50

CALL 811
TWO WORKING DAYS
BEFORE YOU DIG
1-800-922-1987

PREPARED UNDER THE SUPERVISION OF
BRIAN P. WILSON
COLORADO P.E. 0050067

10333 E. Dry Creek Rd.
Suite 240
Englewood, CO 80112
Tel: (720) 482-9526
Fax: (720) 482-9546

HR 935 LLC
7363 South Alton Way
CENTENNIAL, CO 80112

TRAILS AT CROWFOOT
FILING # CONSTRUCTION DRAWINGS
MAINTENANCE SITE PLAN

SCALE: AS SHOWN
DRAWN BY: HW
CHECKED BY: JW
DATE: MARCH 2018

SHEET NUMBER: 8130283701

Revisions

No.	Date	Appr.	Date