

July 11, 2025

Gilbert LaForce, PE
El Paso County
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Re: ***Winsome Filing No. 3 PCM Certification Letter
El Paso County, Colorado***

Dear Mr. LaForce:

This letter serves as the certification for Winsome Filing No. 3, El Paso County, CO consistent with El Paso County Engineering Manual ("ECM") Section 5.10.6.B, which states that Engineering Record Drawings shall be accompanied by a certification letter from the Engineer of Record which shall state that facilities constructed provide the required storage volume, meet the required release rates, the stage areas, elevations and outlet dimensions. Winsome Filing No. 3 consists of the following drainage facilities which are included in this certification:

- Full Spectrum Detention Pond 1
- Full Spectrum Detention Pond 2
- Full Spectrum Detention Pond 4
- Water Quality Pond A
- Runoff Reduction Areas
 - RPA #1- 5,254 SF-Southeast side of Culvert #1
 - RPA #2- 1,946 SF-Northeast side of Culvert #1
 - RPA #3- 5,531 SF-Northwest side of Culvert #1
 - RPA #4- 6,177 SF-Southwest side of Culvert #1
 - RPA#5- 11,052 SF-East side of Twinkling Star Cul-de-Sac
 - RPA #6- 2,900 SF-Northwest side of Culvert #2
 - RPA #7- 2,902 SF-Northeast side of Culvert #2
 - RPA #8- 1,793 SF-Southwest side of Culvert #2
 - RPA #9- 1,694 SF-Southeast side of Culvert #2

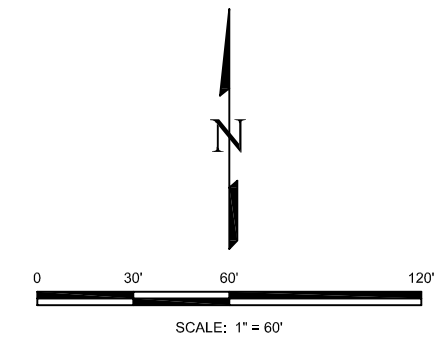
Based upon this information and information gathered during periodic site visits to the site during significant/key phases of the infrastructure installation, *Kimley-Horn & Associates, Inc.* is of the opinion that the work performed under the County Permit, per Section 5.10.6.B of the ECM, have been constructed in general compliance with the approved Construction Plans as filed with the County dated April 28, 2023 and approved by El Paso County on May 31, 2023.

Statement Of Engineer In Responsible Charge:

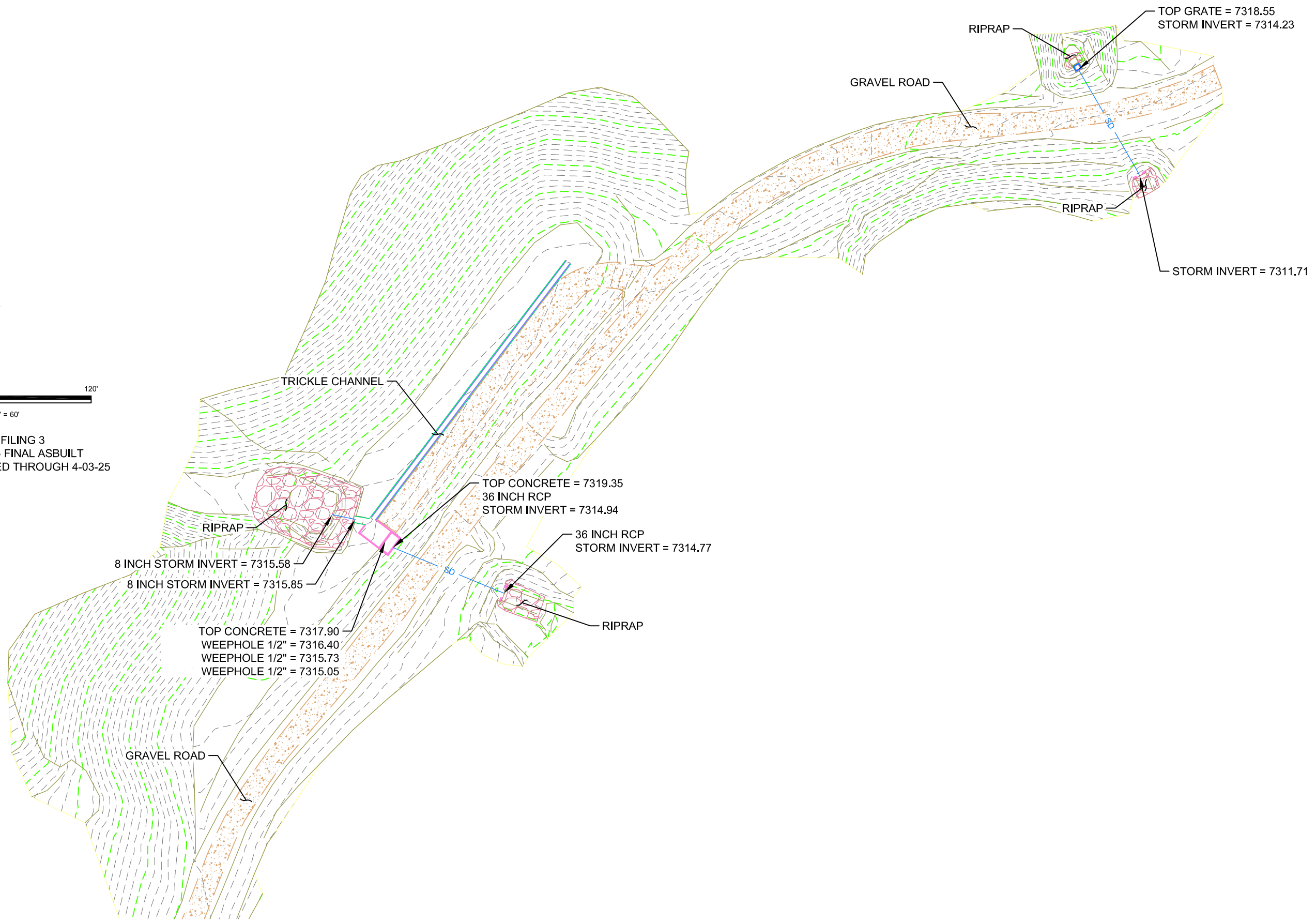
I, Kevin R. Kofford, a registered Professional Engineer in the State of Colorado, in accordance with Sections 5.2 and 5.3 of the Bylaws and Rules of the State Board of Registration for Professional Engineers and Professional Land Surveyors, do hereby certify that I or a person under my responsible charge periodically observed the construction of the above-mentioned project. Based on the on-site field observations and review of pertinent documentation, it is my professional opinion that the required infrastructure improvements have been installed and are in general compliance with the approved Construction Plans as filed with El Paso County.

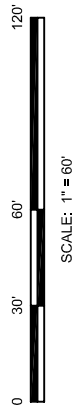


Kevin R. Kofford, P.E.
Colorado No. 57234

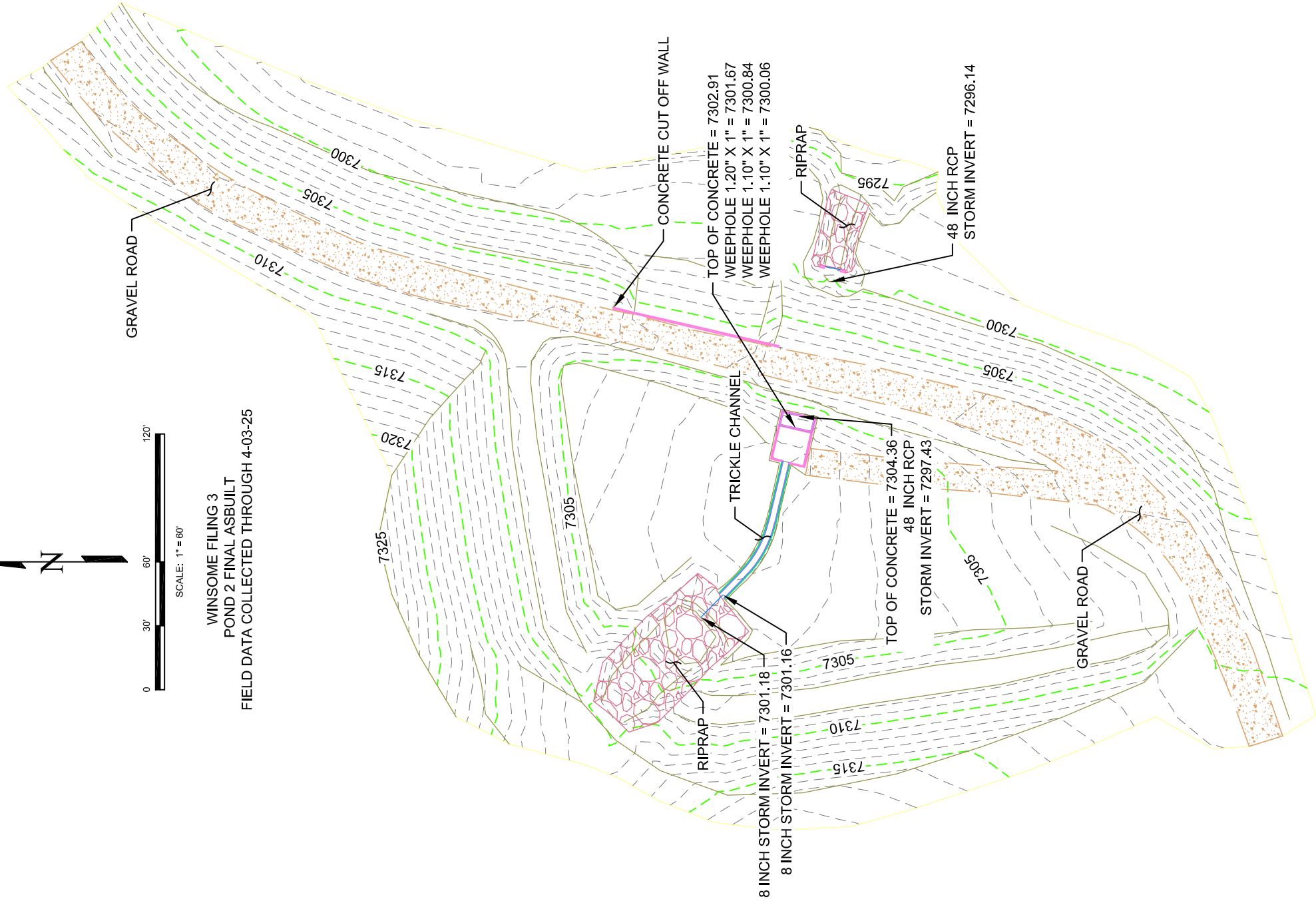


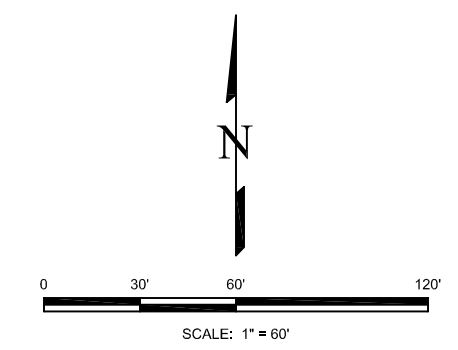
WINSOME FILING 3
POND 1 AND HB5 FINAL ASBUILT
FIELD DATA COLLECTED THROUGH 4-03-25



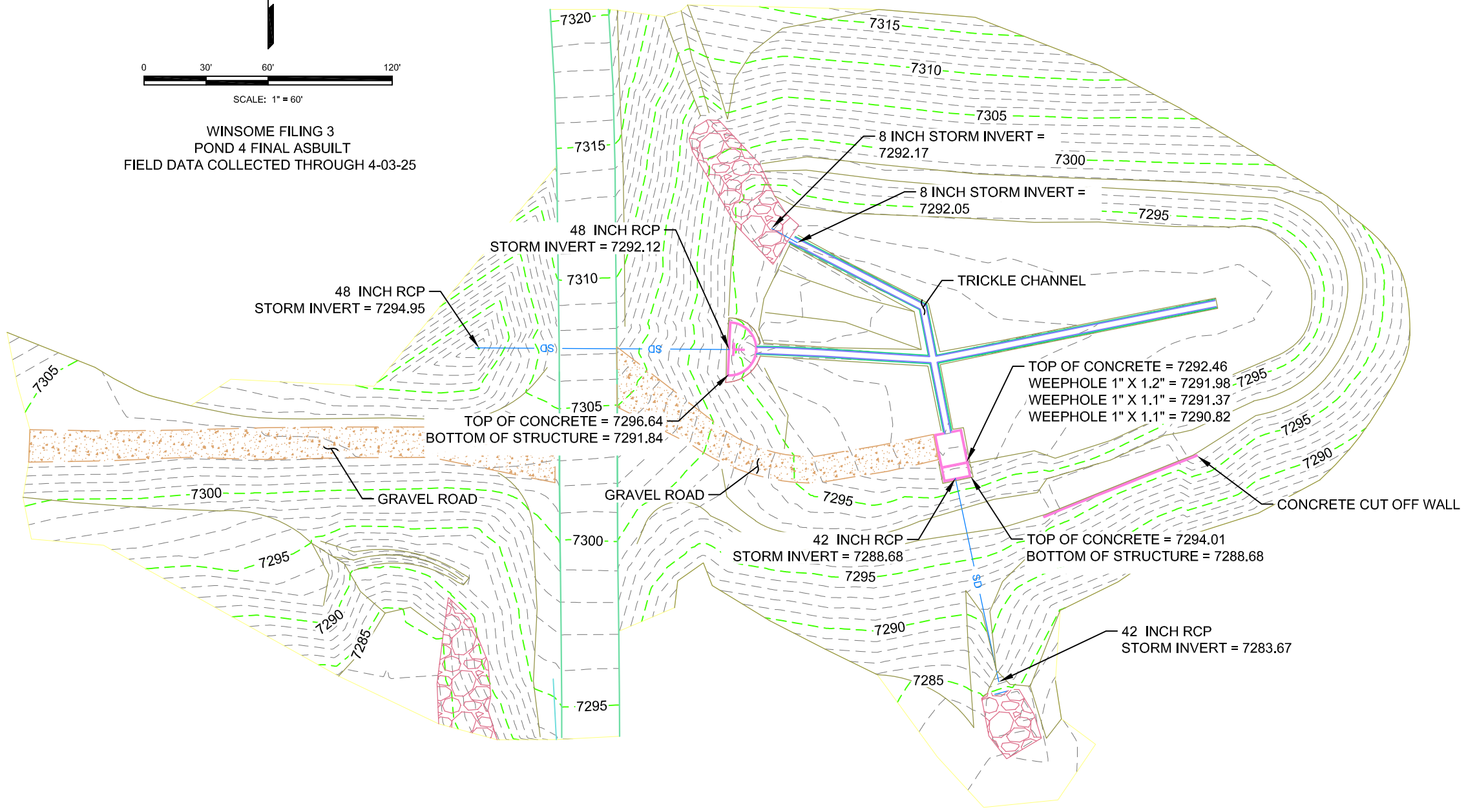


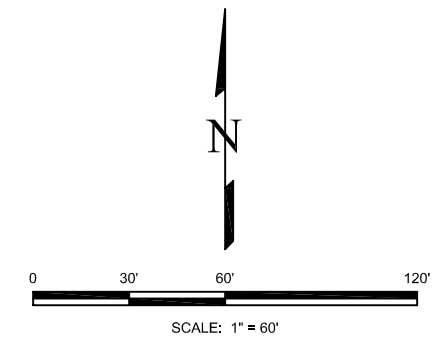
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POND 2 FINAL ASBUILT
FIELD DATA COLLECTED THROUGH 4-03-25



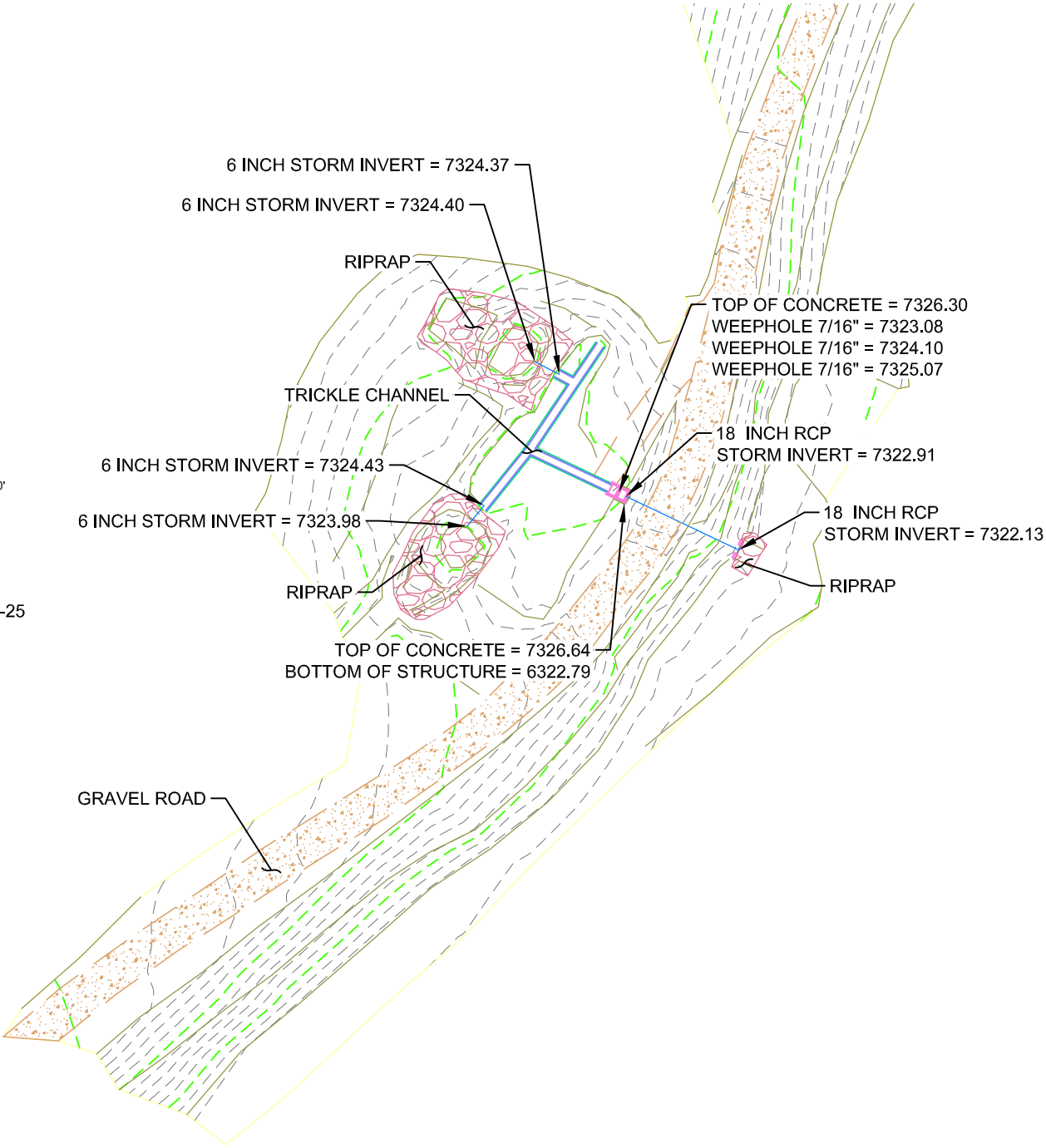


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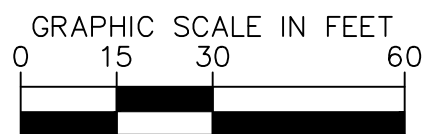
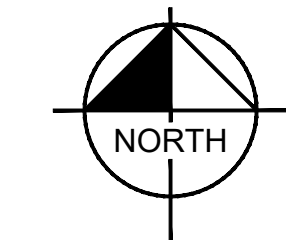




WINSOME FILING 3
WQ POND FINAL ASBUILT
FIELD DATA COLLECTED THROUGH 4-03-25



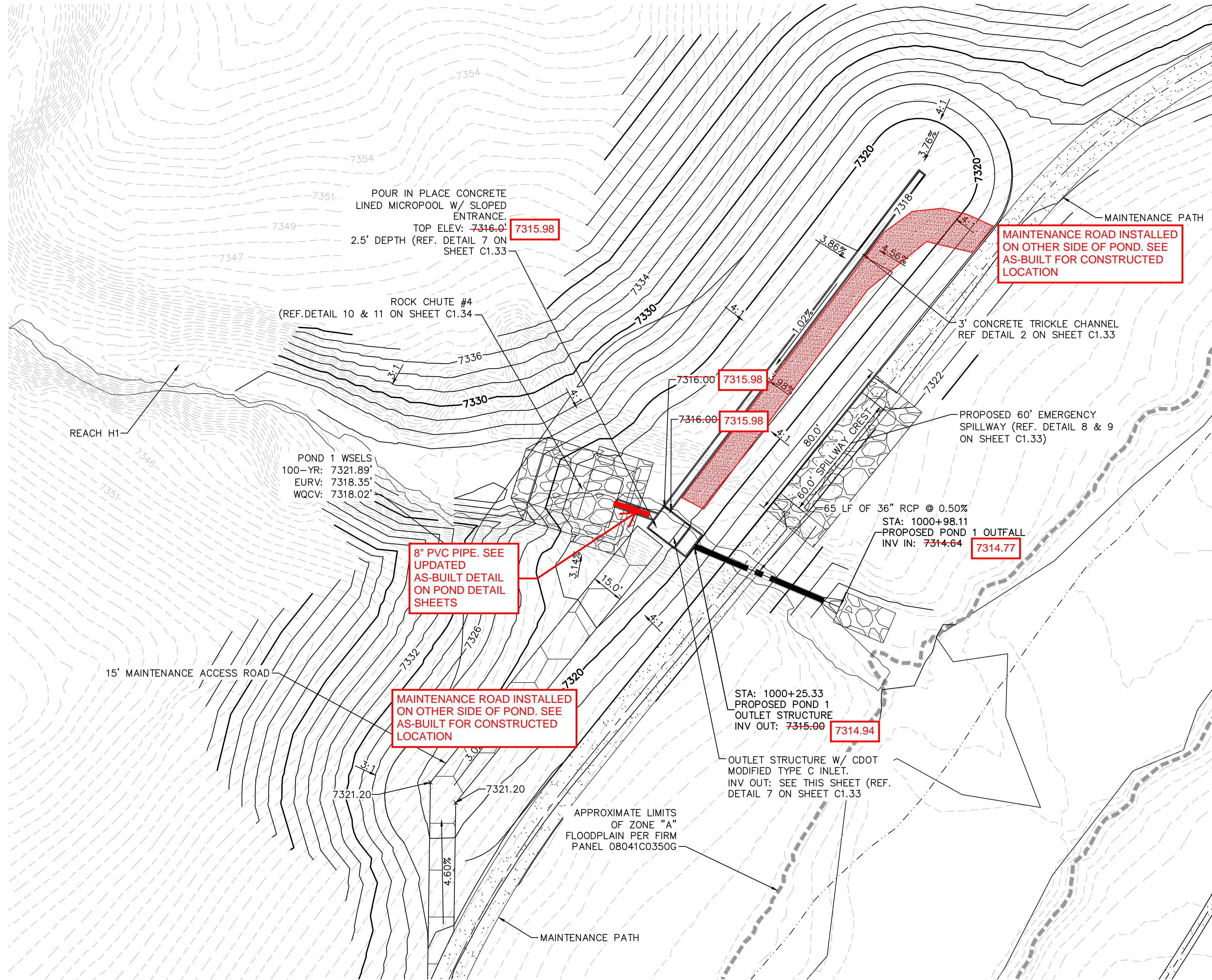
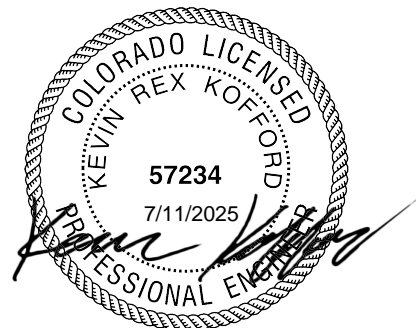
K:\COS_Civil\196106001_Winsome Filing No. 3\CADD\PlanSheets\CDs\196106001_CD_POND_1.dwg Kofford, Kevin 4/28/2023 12:18 PM



Know what's below.
Call before you dig.

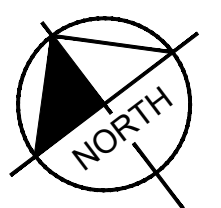
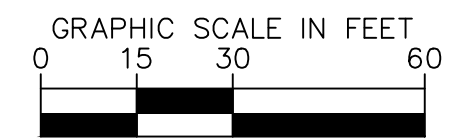
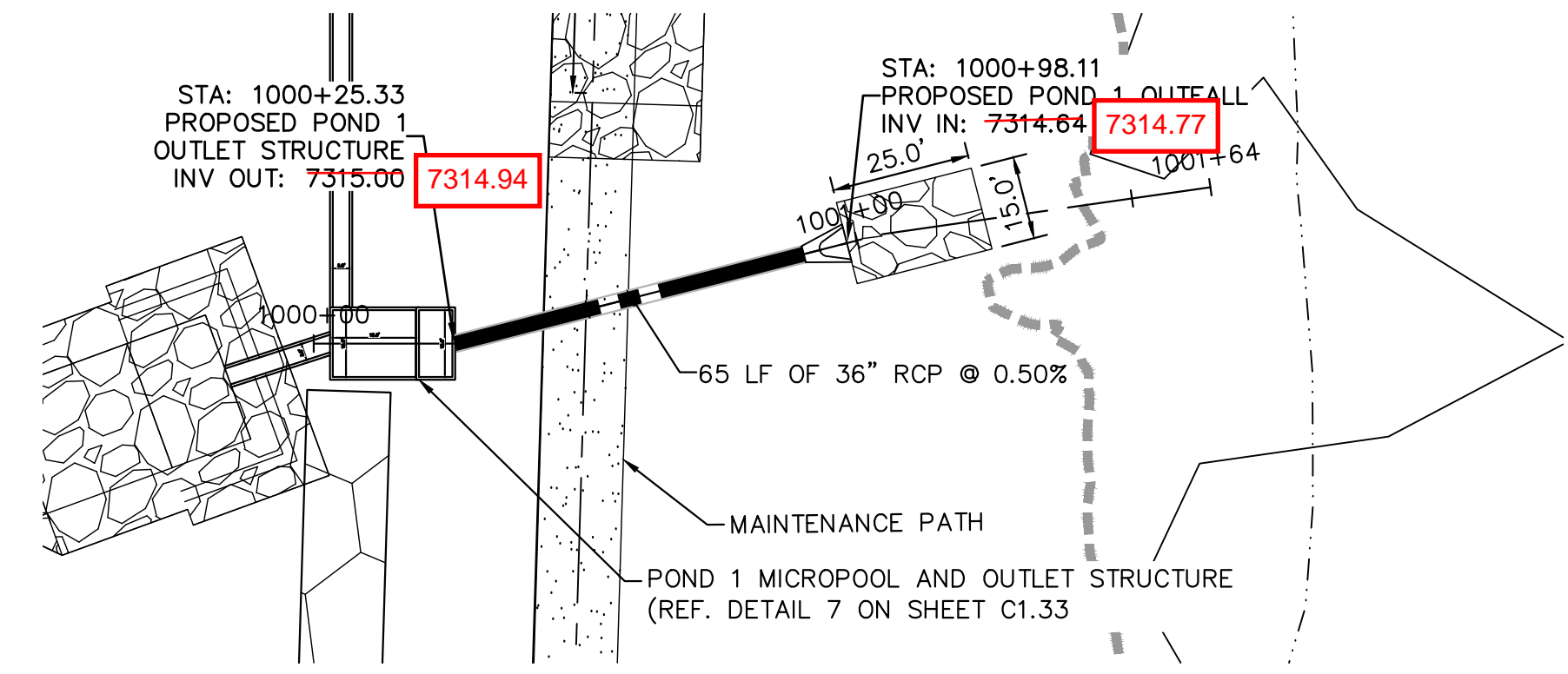


RECORD DRAWING
THESE RECORD DRAWINGS HAVE BEEN PREPARED BY
KIMLEY-HORN AND ASSOCIATES, INC. BASED ON SURVEY
INFORMATION PROVIDED BY EDWARD JAMES
SURVEYING, INC. THESE RECORD DRAWINGS ARE NOT
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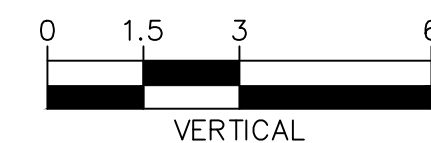
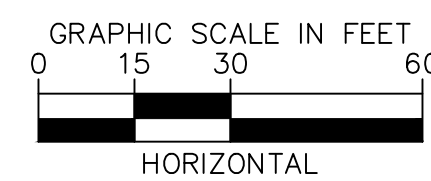
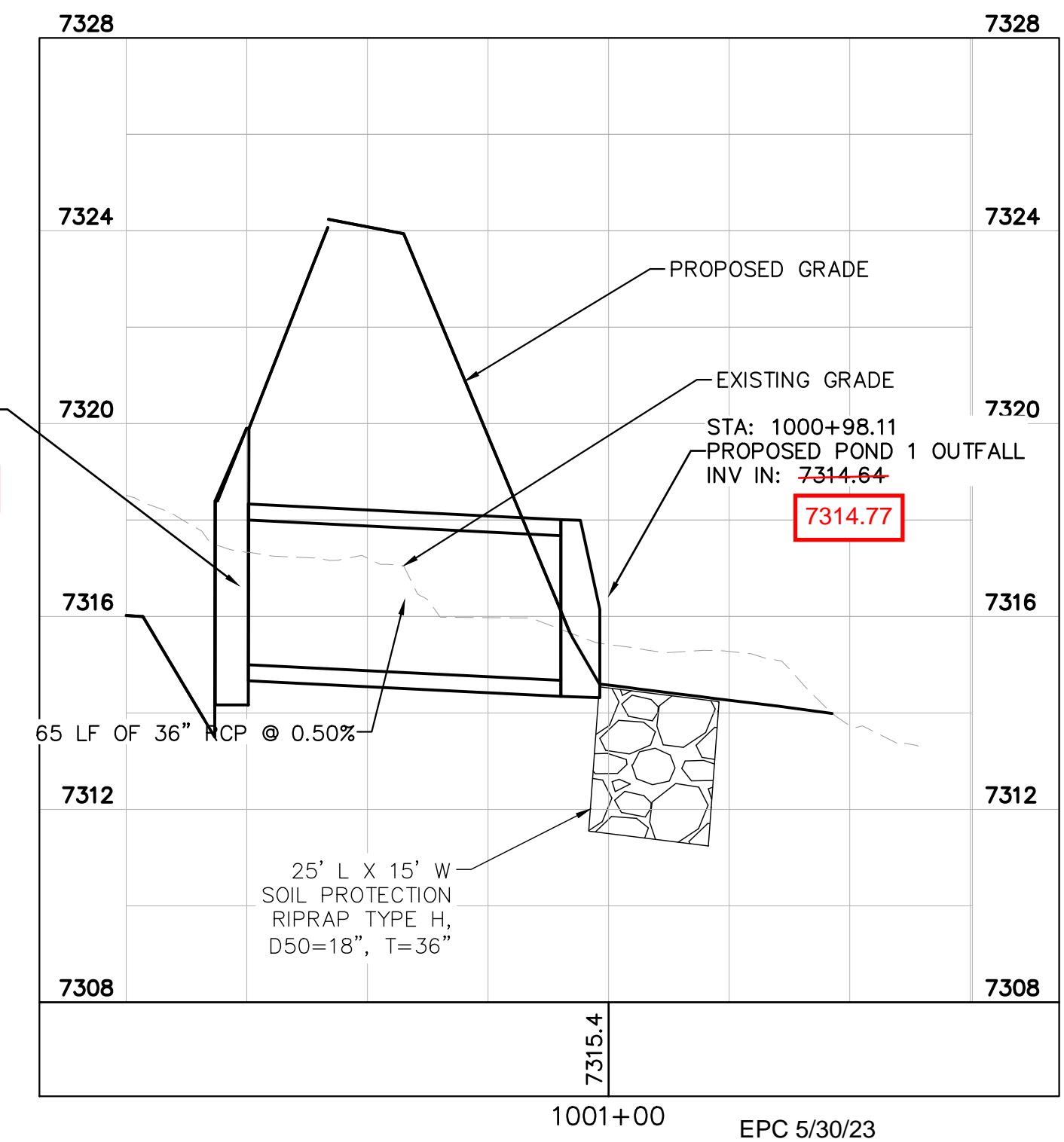


LEGEND

FG	FINISH GRADE
FBT	TOP OF FOREBAY AT FINISHED GRADE
FBB	BOTTOM OF FOREBAY AT FINISHED GRADE
TCT	TOP OF TRICKLE CHANNEL AT FINISHED GRADE
TCB	BOTTOM OF TRICKLE CHANNEL AT FINISHED GRADE
MPT	TOP OF MICROPOOL AT FINISHED GRADE
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GRATE	OUTLET STRUCTURE GRATE ELEVATION
ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE



POND 1 OUTLET PIPE PLAN AND PROFILE

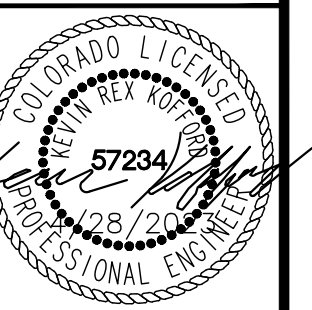


Kimley»Horn

2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: A.J.L.
CHECKED BY: KRK
DATE: 12/16/2021

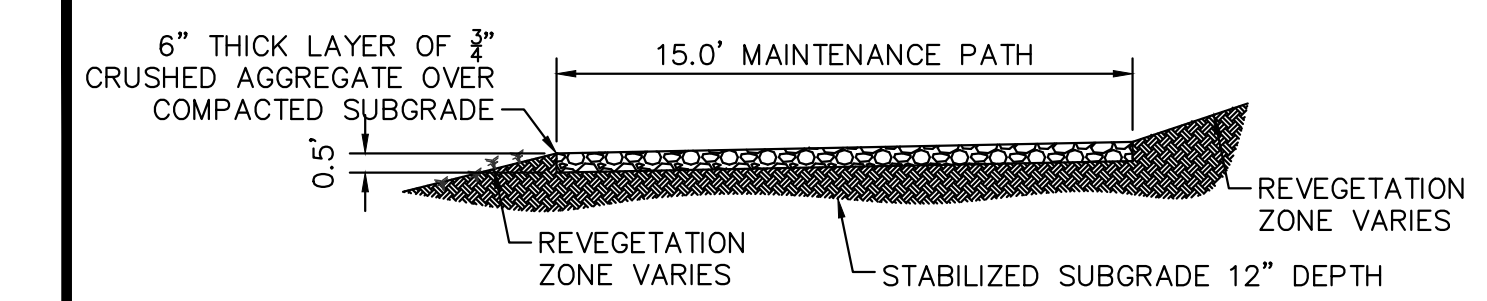
WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
POND 1 OVERVIEW



PROJECT NO.
196106001

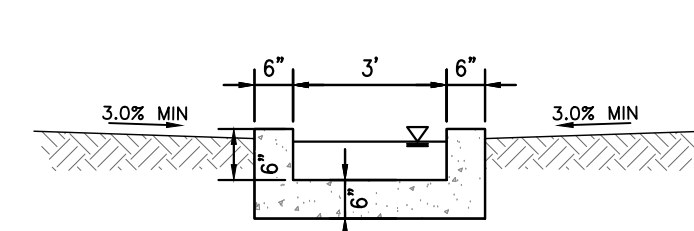
SHEET

C1.32



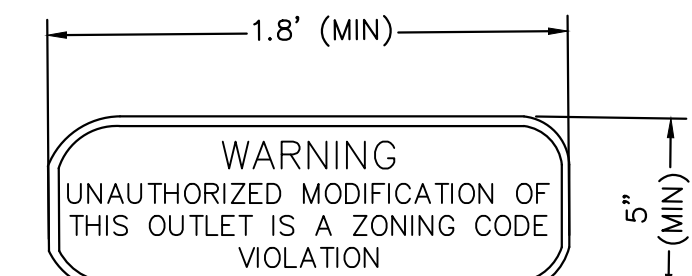
1 MAINTENANCE ROAD

- 1"=5'
- MAINTENANCE PATH NOTES
1. MAINTENANCE PATH SHALL INCLUDE SUBGRADE PREPARATION, GRAVEL BASE, AND COMPACTION.



2 CONCRETE TRICKLE CHANNEL

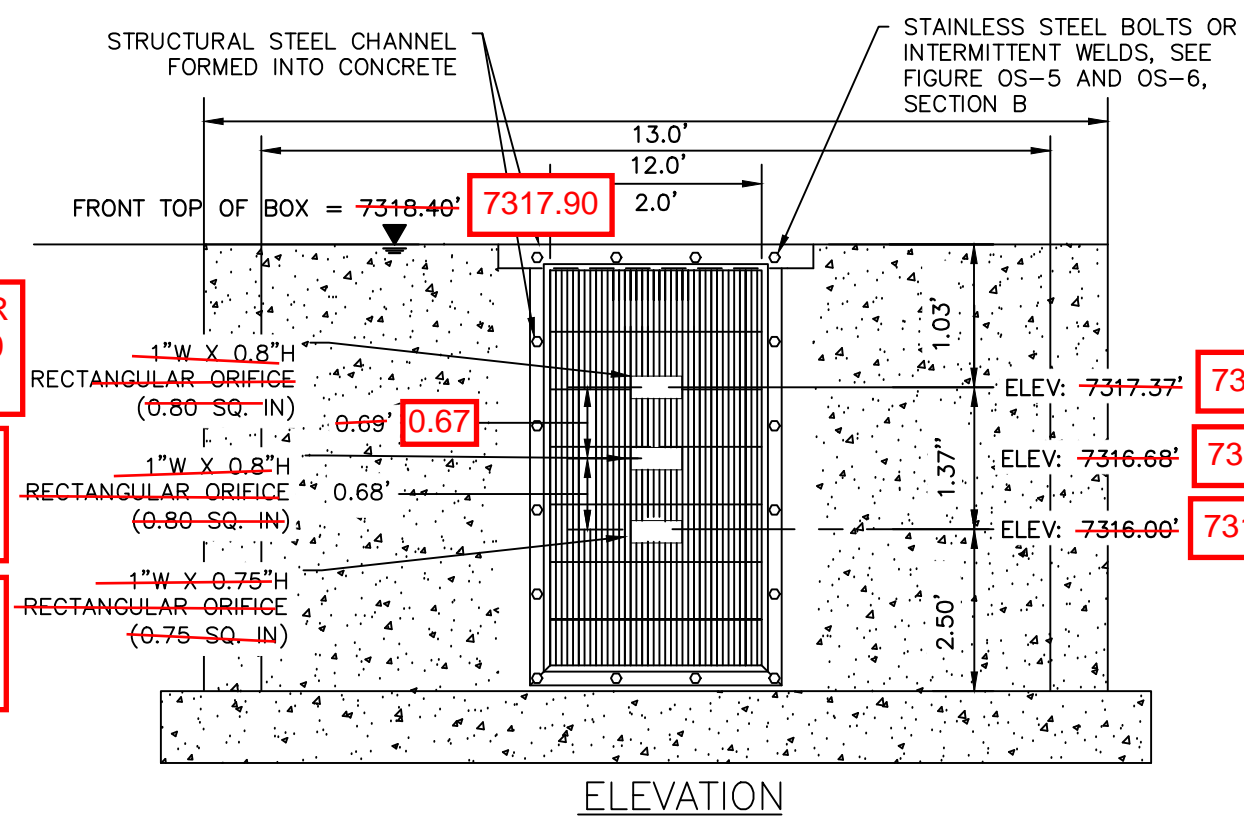
N.T.S.



3 OUTLET SIGNAGE

N.T.S.

- OUTLET SIGNAGE NOTES
1. SIGN SHALL BE A MINIMUM OF 0.75 SQUARE FEET AND SHALL BE ATTACHED TO THE OUTLET OR POSTED NEARBY.



4 ORIFICE PLATE AND TRASH RACK DETAIL

N.T.S.

- 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 A PLATE THICKNESS OF 0.25".

EURV AND WQCV TRASH RACKS

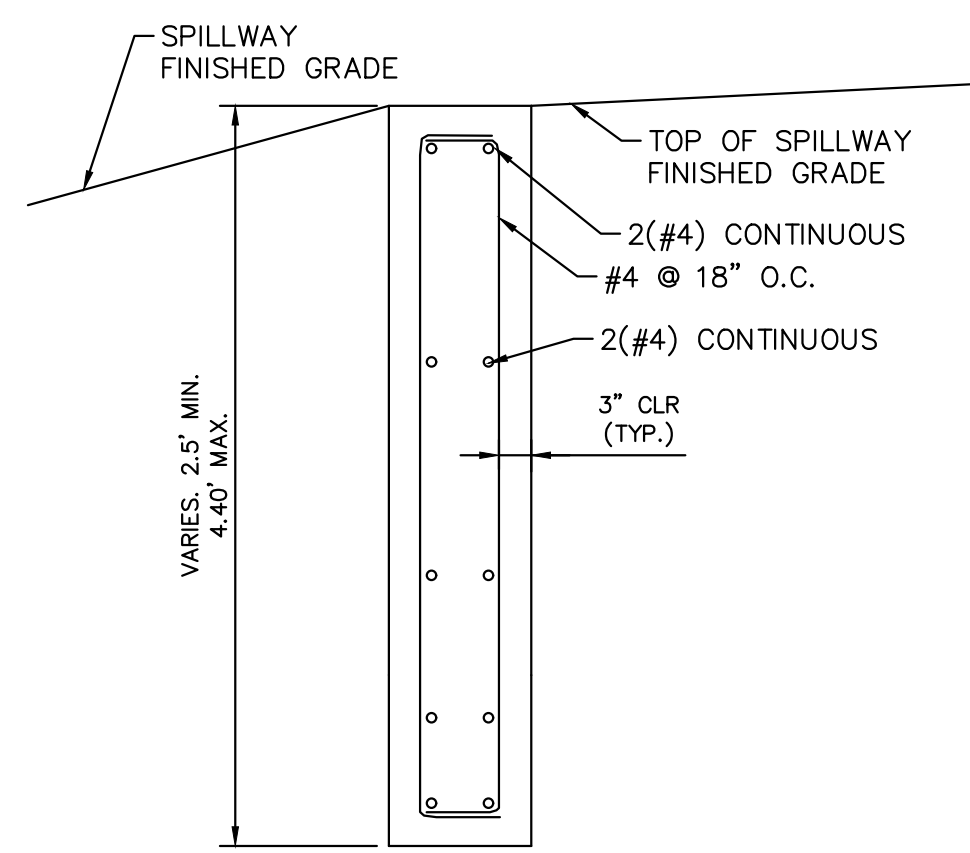
1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS S HARDWARE

GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN OVERFLOW SAFETY GRATES.

1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDE HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.

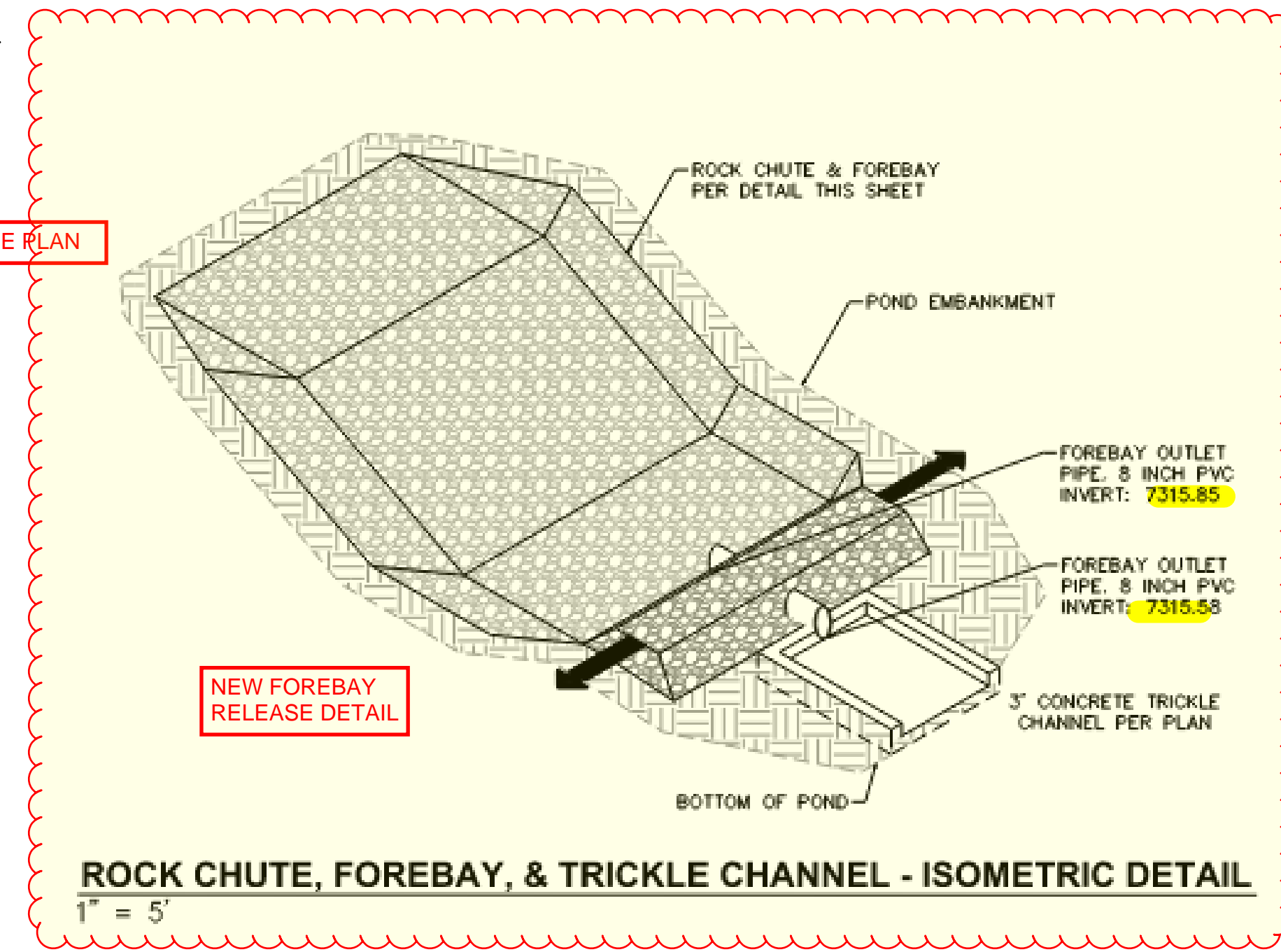
RECORD DRAWING

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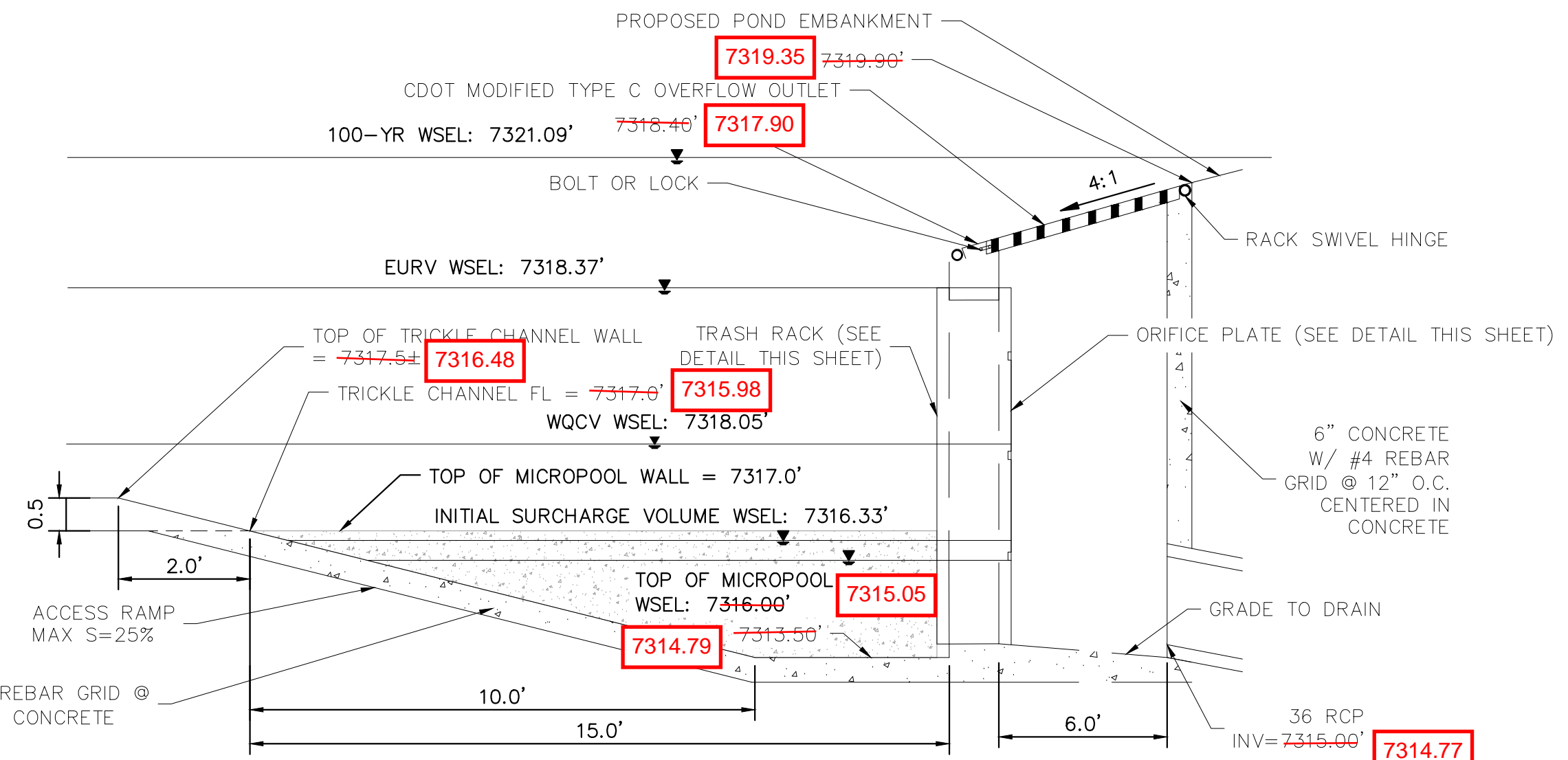
6 SECTION CREST WALL DETAIL

N.T.S.



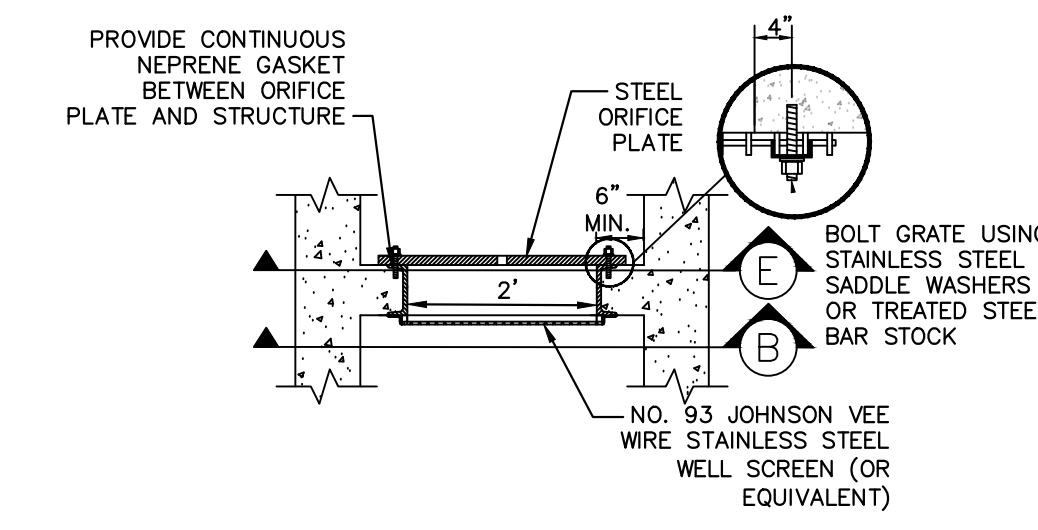
ROCK CHUTE, FOREBAY, & TRICKLE CHANNEL - ISOMETRIC DETAIL

1"=5'



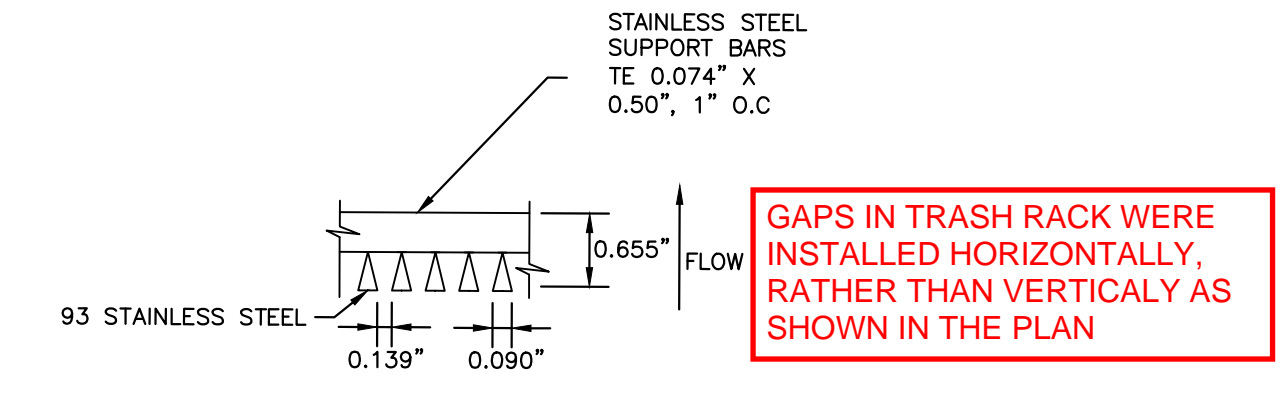
7 OUTLET STRUCTURE DETAIL

N.T.S.



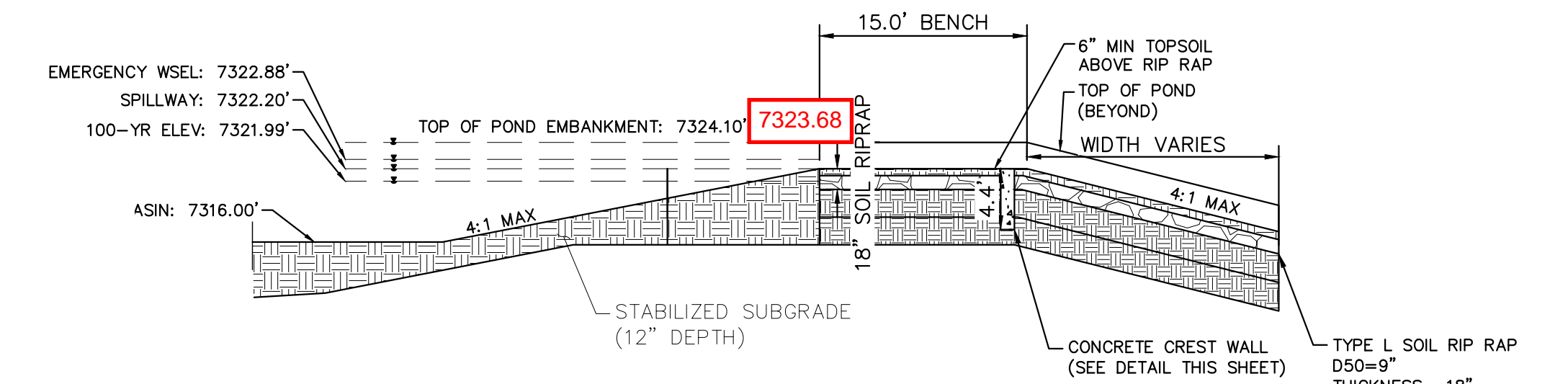
A SECTION A

N.T.S.



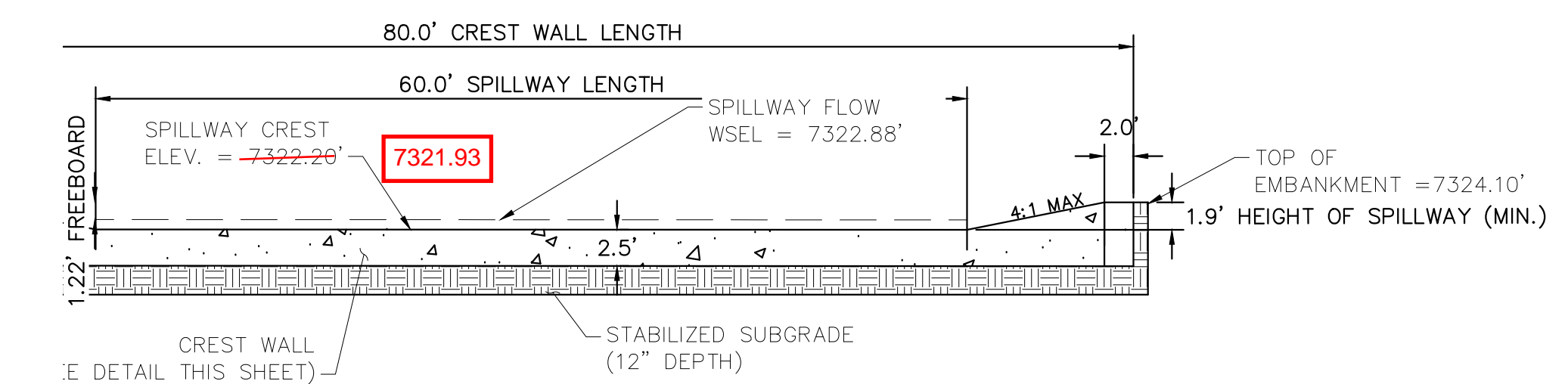
B SECTION B

N.T.S.



8 EMERGENCY SPILLWAY DETAILS

1"=10'



9 EMERGENCY SPILLWAY CREST WALL

1"=10'

EPC 5/30/23

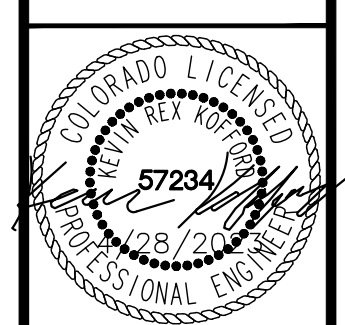
NO.	REVISION	DATE	BY	APPR.
2	COUNTY COMMENTS	KRK 4/28/23	KRK	
1	COUNTY COMMENTS	KRK 3/10/23	KRK	

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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

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POND 1 DETAILS

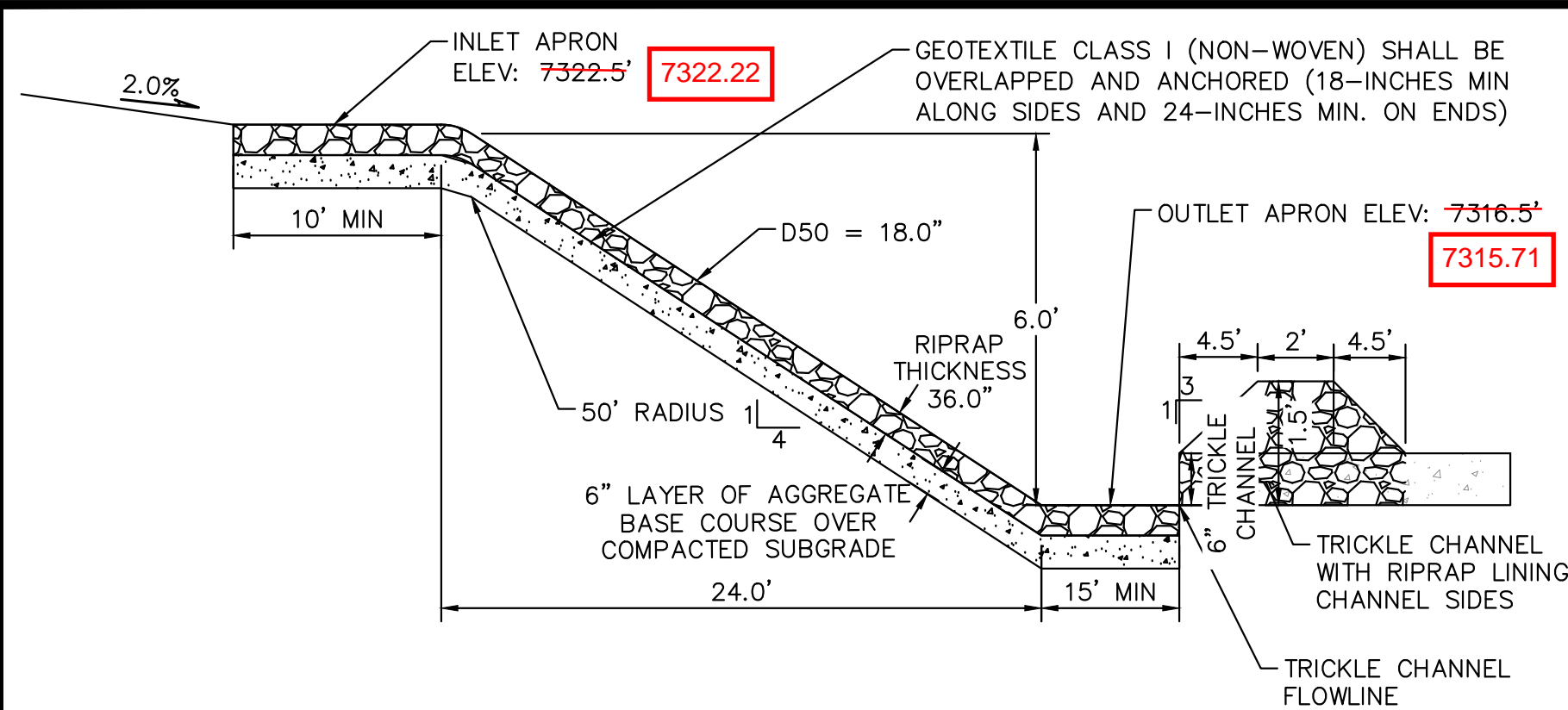


PROJECT NO.
196106001

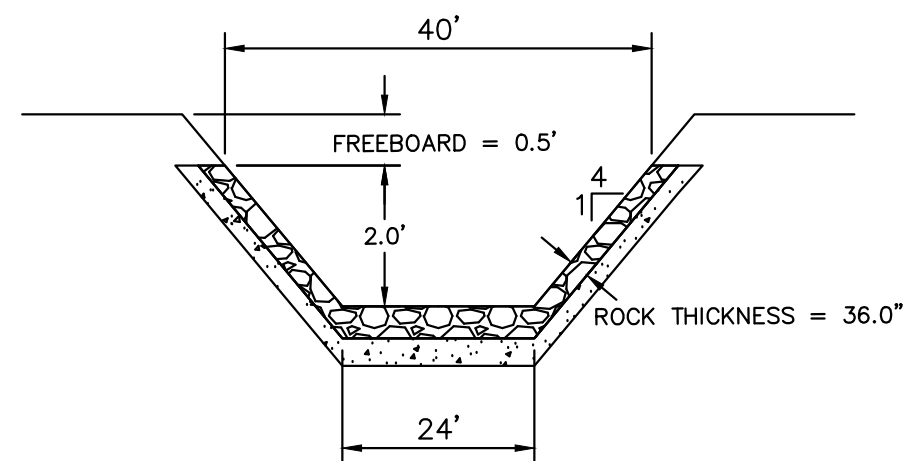
SHEET

C1.33

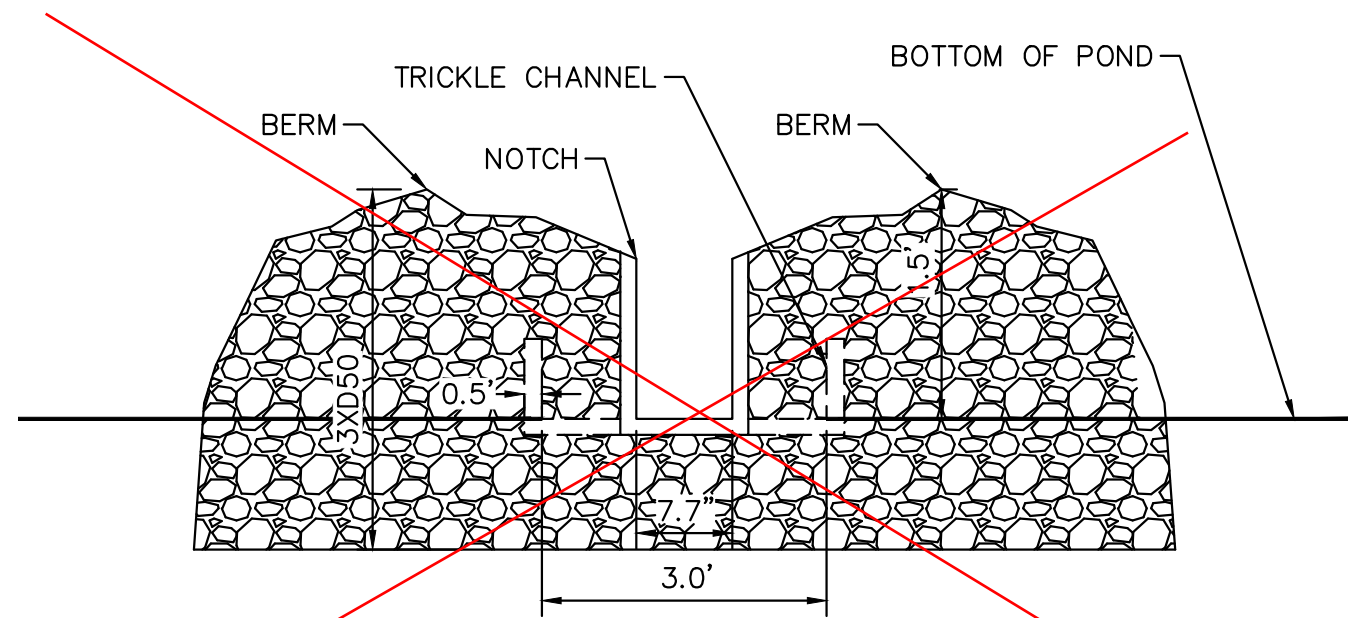
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10 **ROCK CHUTE #4 PROFILE- CROSS SECTION 1**
N.T.S.

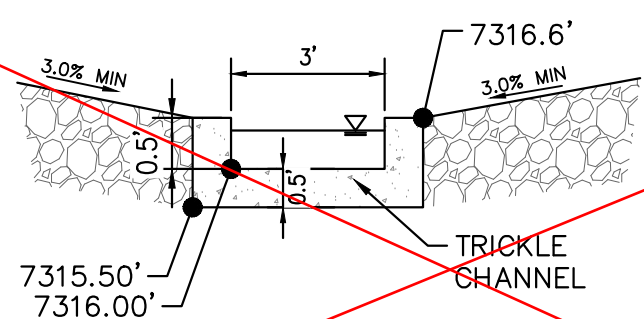


11 **ROCK CHUTE #4 PROFILE- CROSS SECTION 2**
N.T.S.

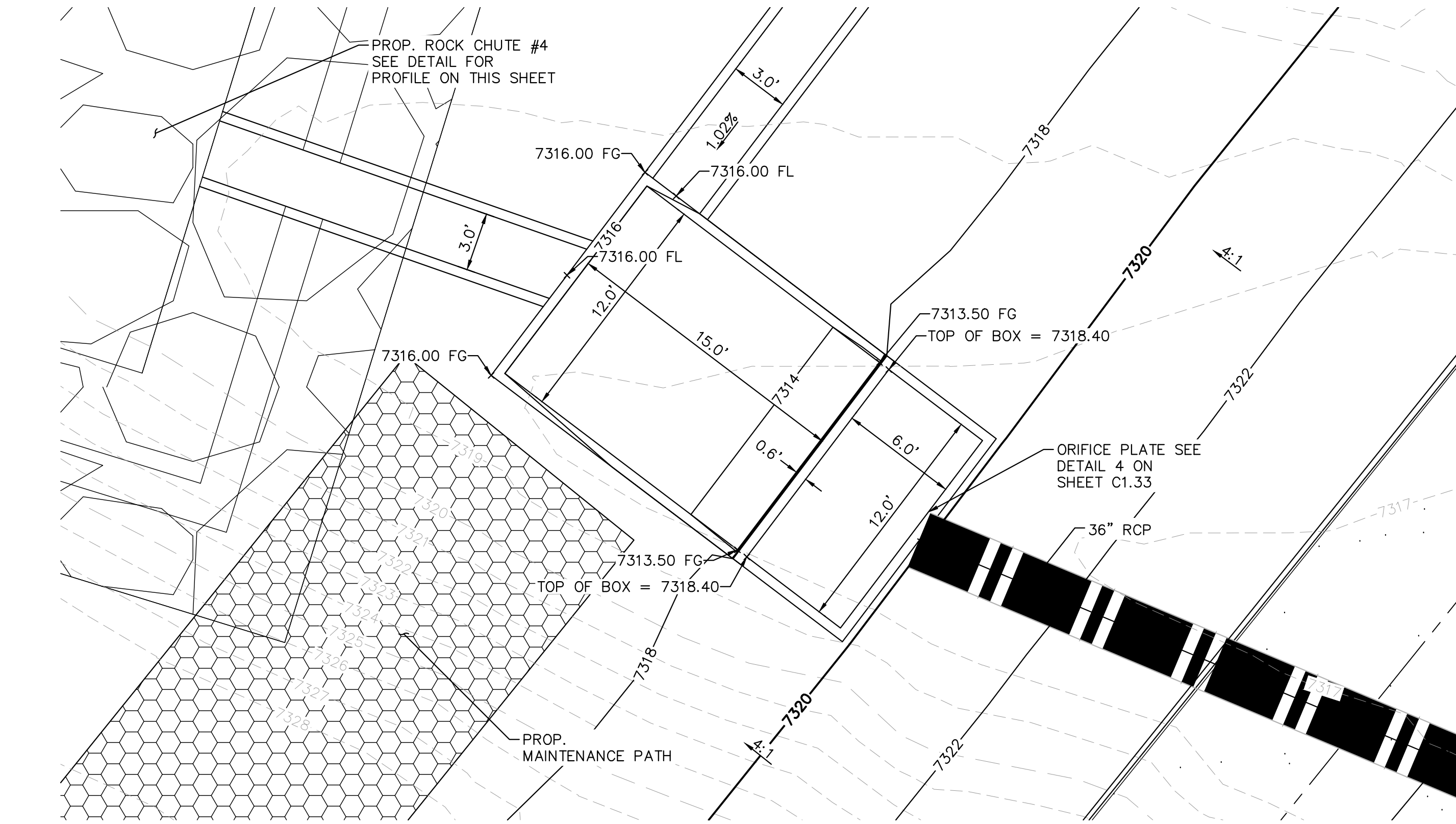


NOTCH REPLACED
WITH PVC PIPE PER
FIELD CHANGE.
VERIFIED WITH EPC
STORMWATER PIOR
TO FIELD CHANGE.
SEE PREVIOUS
SHEET

12 **ROCK CHUTE #4 PROFILE- CROSS SECTION 2**
N.T.S.



13 **ROCK CHUTE TO TRICKLE CHANNEL TRANSITION**
N.T.S.



16 **OUTLET STRUCTURE PLAN VIEW DETAIL**
1"=5'

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
4	Pond 1	107	10	6	24	15	24	18	36	50	1.27	1.50	40
6	Pond 2	110	10	8	32	18	17	18	36	50	1.57	2.00	33
11	Pond 4	26	10	10	40	11	10	9	18	25	0.85	1.50	26
12	WQ Pond	100	11	5	20	20	12	18	36	50	1.81	2.00	28
13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26

15 **STANDARD ROCK CHUTE DIMENSION TABLE**
N.T.S.

1. SEE GRADING PLANS FOR ROCK CHUTE LOCATIONS

RECORD DRAWING
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Know what's below.
Call before you dig.



EPC 5/30/23

Kimley»Horn

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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: A.J.L.
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WINSOME FILING NO. 3
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POND 1 DETAILS



PROJECT NO.
196106001

SHEET

C1.34

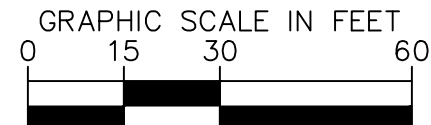
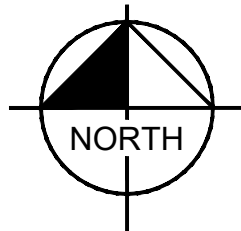
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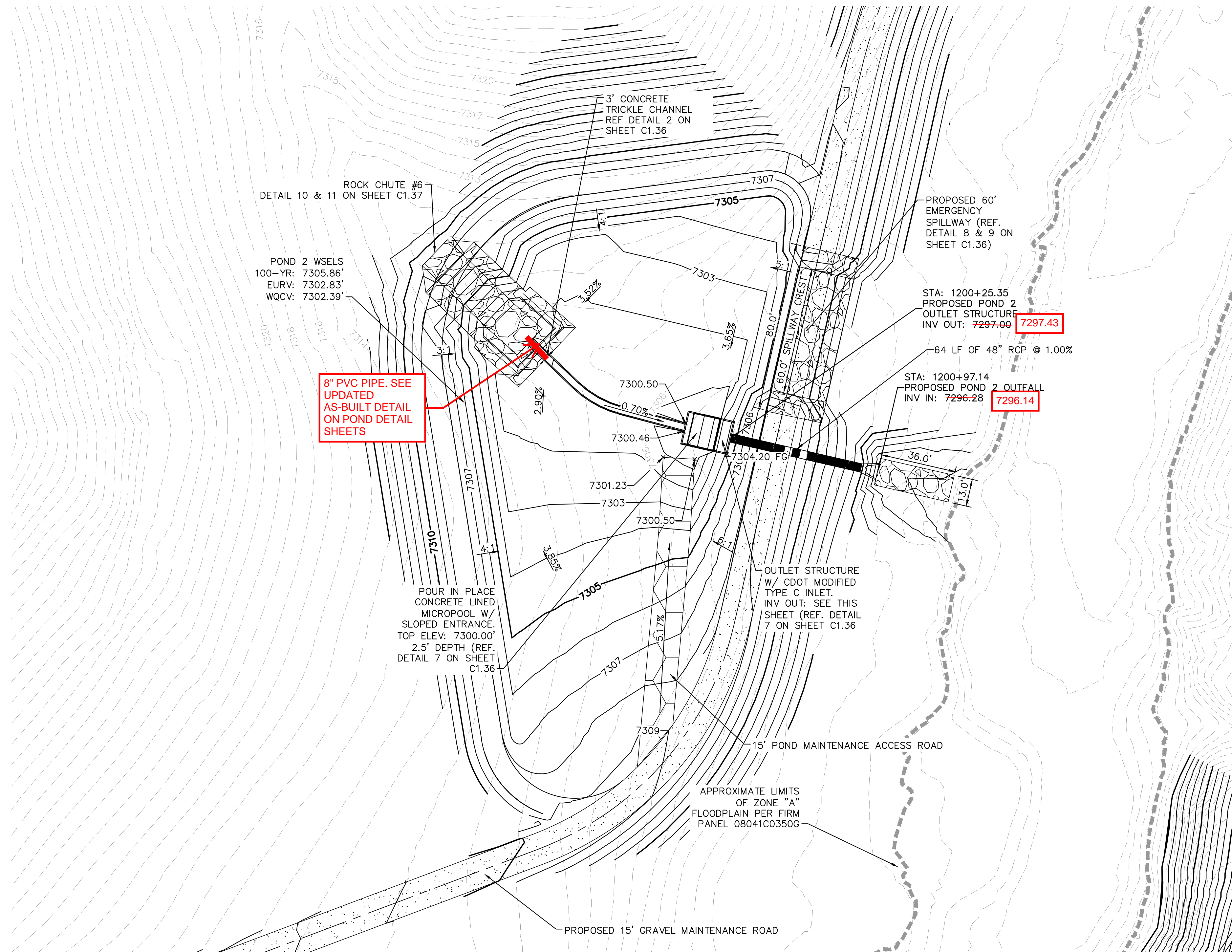
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CALL UTILITY NOTIFICATION
CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE, OR EXCAVATE
FOR THE MARKING OF UNDERGROUND
MEMBER UTILITIES



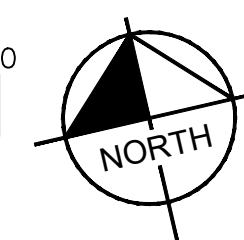
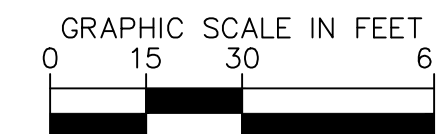
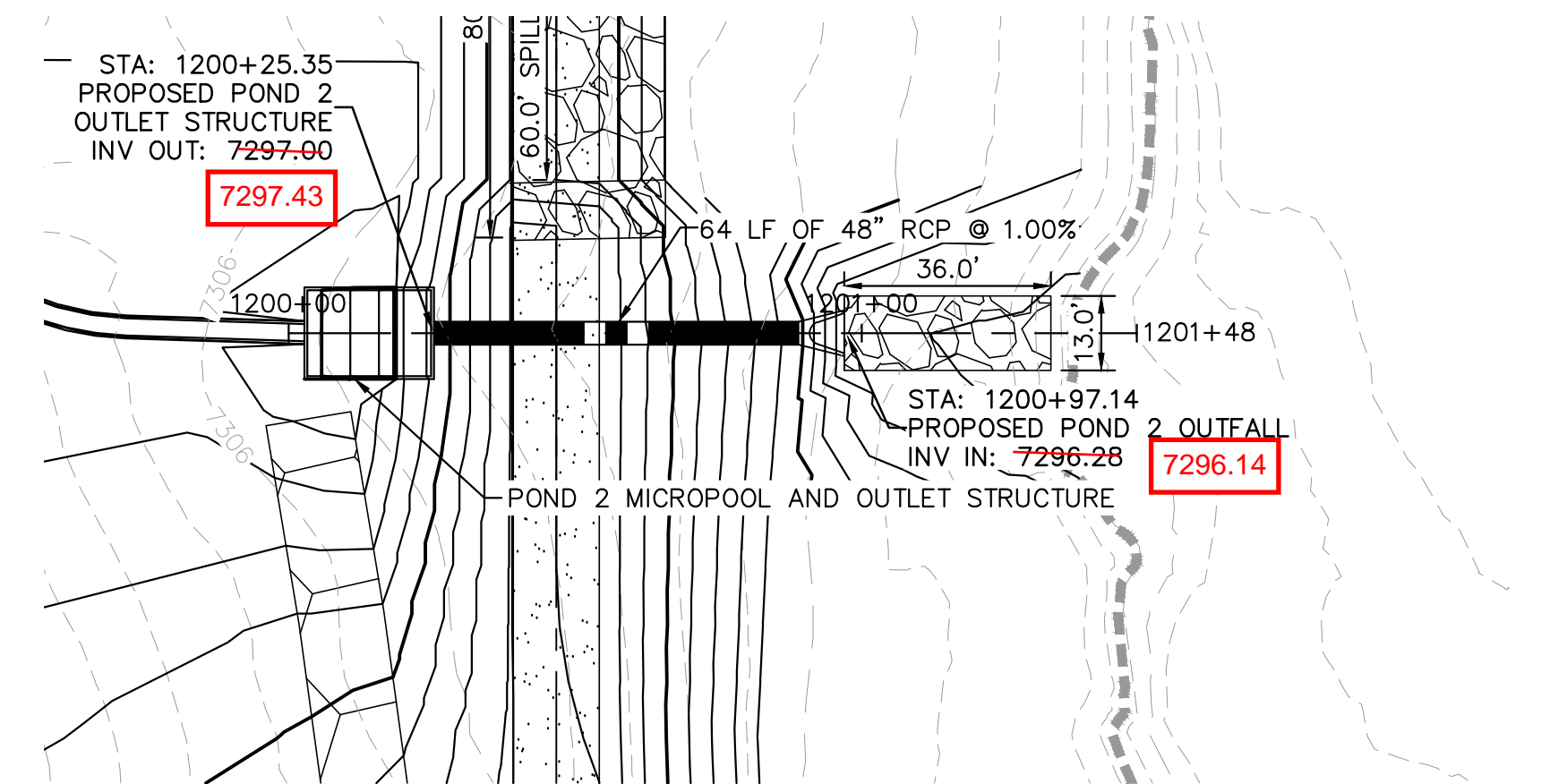
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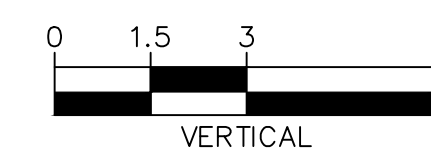
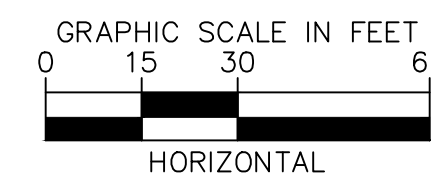
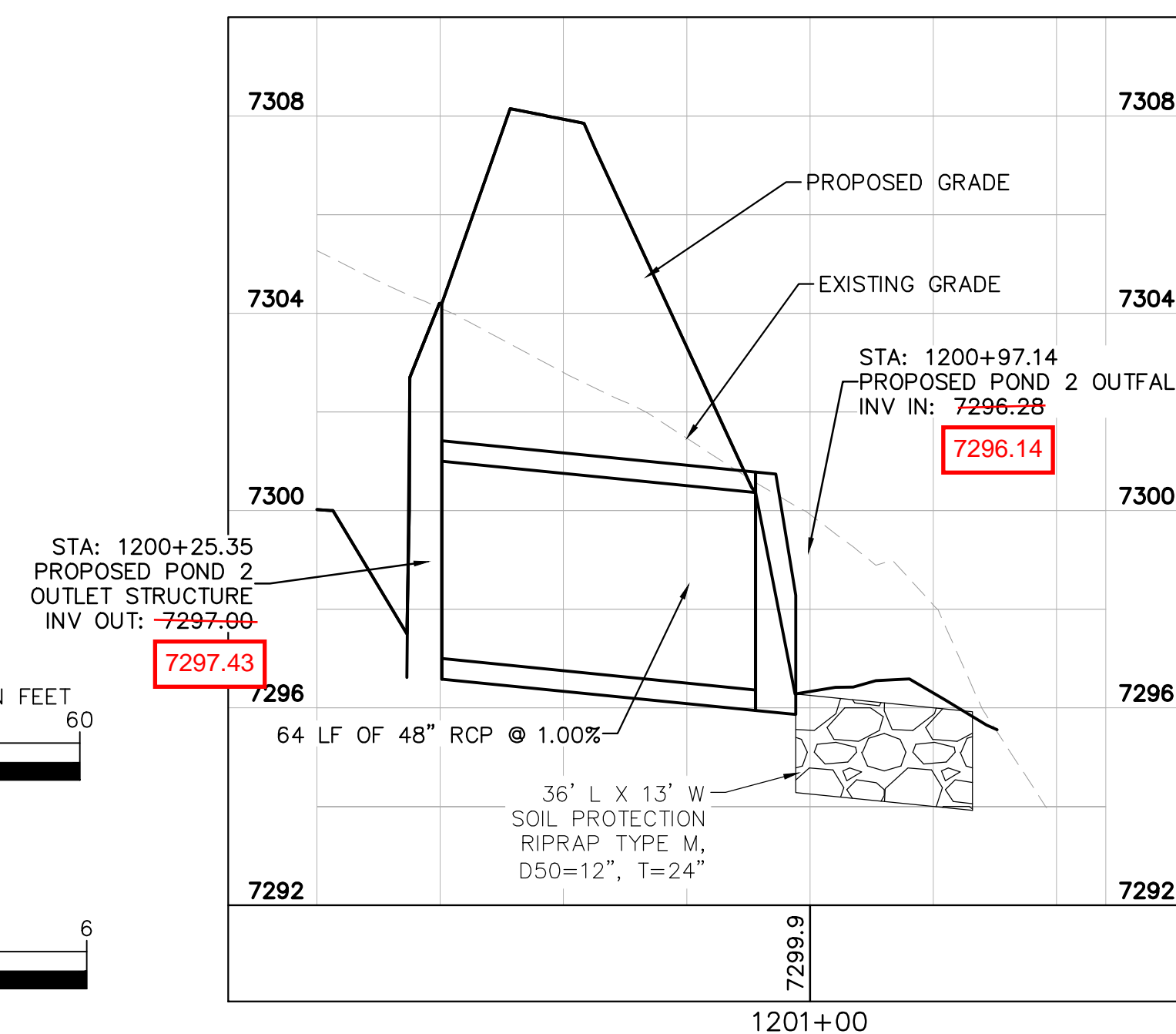
LEGEND

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ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE

----- FLOODPLAIN LIMITS
- - - - - TOP OF POND
- - - - - PROPOSED STORM SEWER

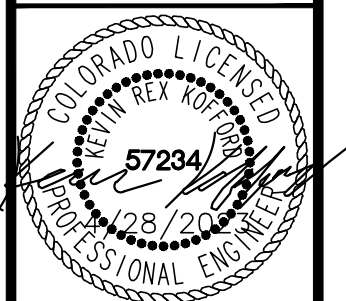


POND 2 OUTLET PIPE PLAN AND PROFILE



EPC 5/30/23

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
POND 2 OVERVIEW



PROJECT NO.
196106001
SHEET

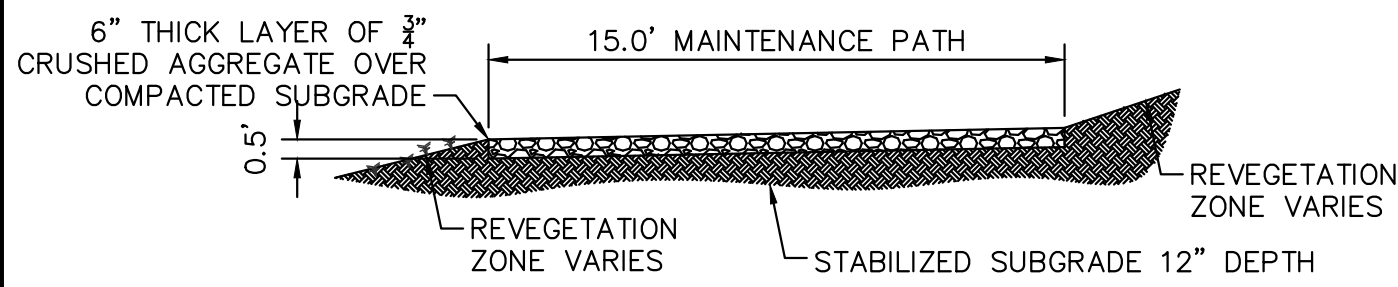
C1.35

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DESIGNED BY: KRK
DRAWN BY: AUL
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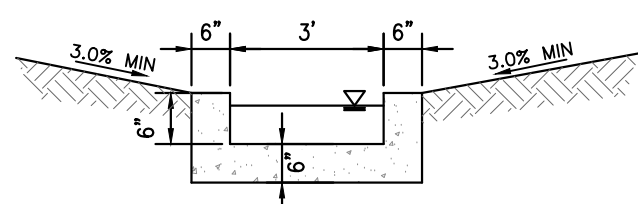
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2	COUNTY COMMENTS	4/28/23	KRK	

K:\COS_Civil\196106001_Winsome Filing No. 3\CADD\PlanSheets\196106001_CD_POND_2-UPDATE.dwg Kofford, Kevin 4/28/2023 12:20 PM



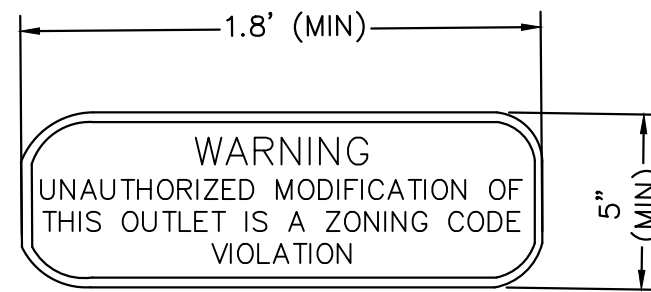
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- 1"=5'
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2 CONCRETE TRICKLE CHANNEL

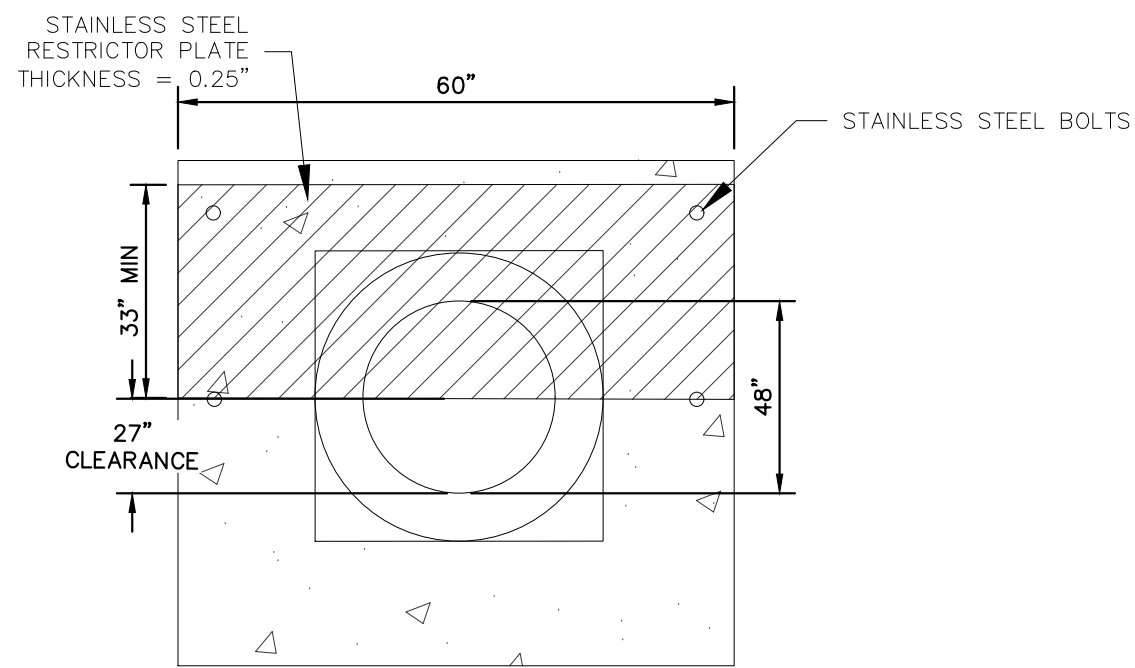
N.T.S.



3 OUTLET SIGNAGE

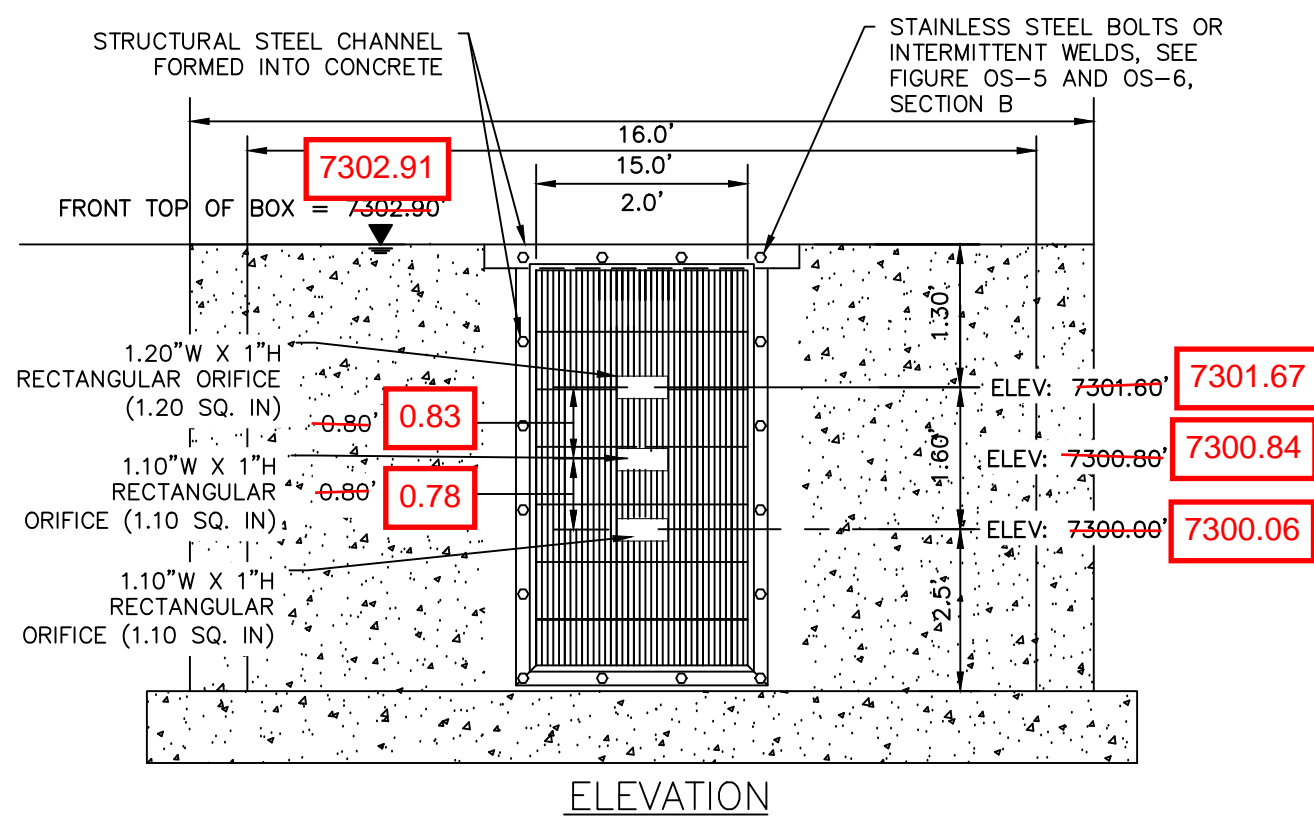
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- OUTLET SIGNAGE NOTES
1. SIGN SHALL BE A MINIMUM OF 0.75 SQUARE FEET AND SHALL BE ATTACHED TO THE OUTLET OR POSTED NEARBY.



5 100-YEAR FLOW RESTRICTOR B

N.T.S.



4 ORIFICE PLATE AND TRASH RACK DETAIL

N.T.S.

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 A PLATE THICKNESS OF 0.25".

EURV AND WQCV TRASH RACKS

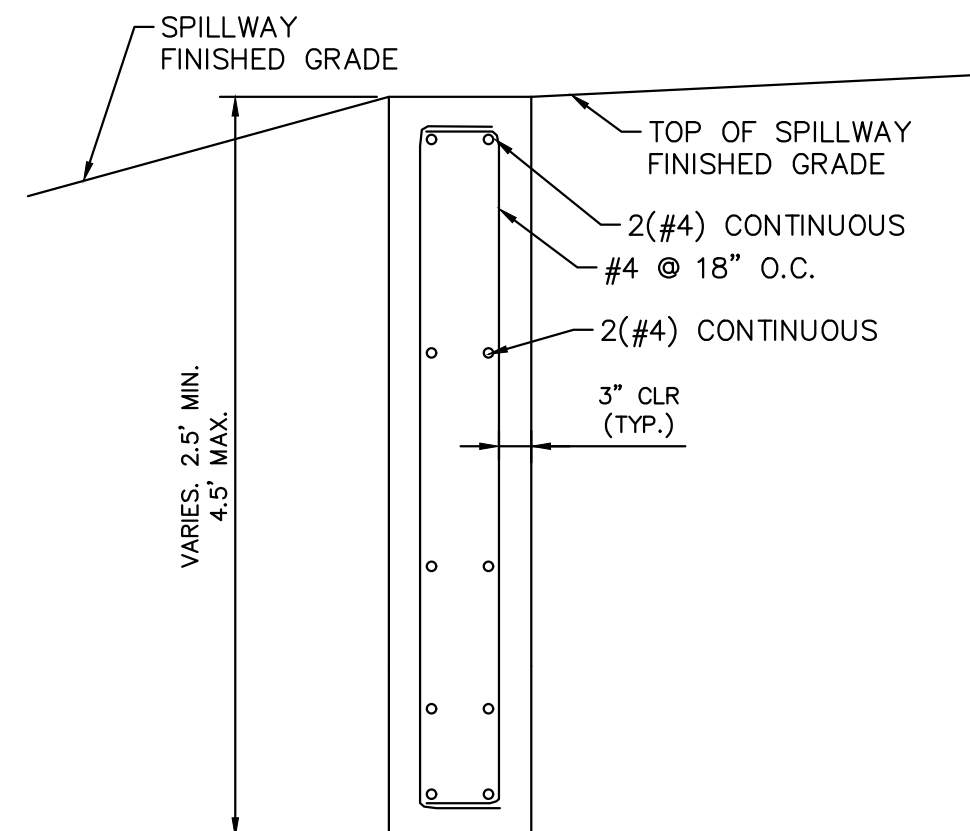
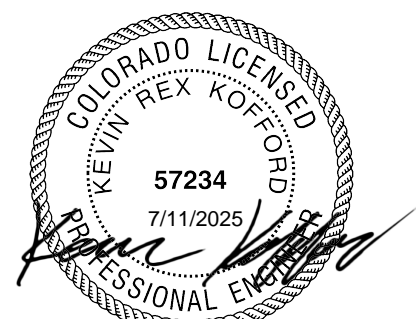
1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. TRASH RACK OPEN AREAS ARE FOR SPECIFIED TRASH RACK MATERIALS. TOTAL TRASH 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.

GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN

1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
3. SAFETY 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 SAFETY GRATES SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

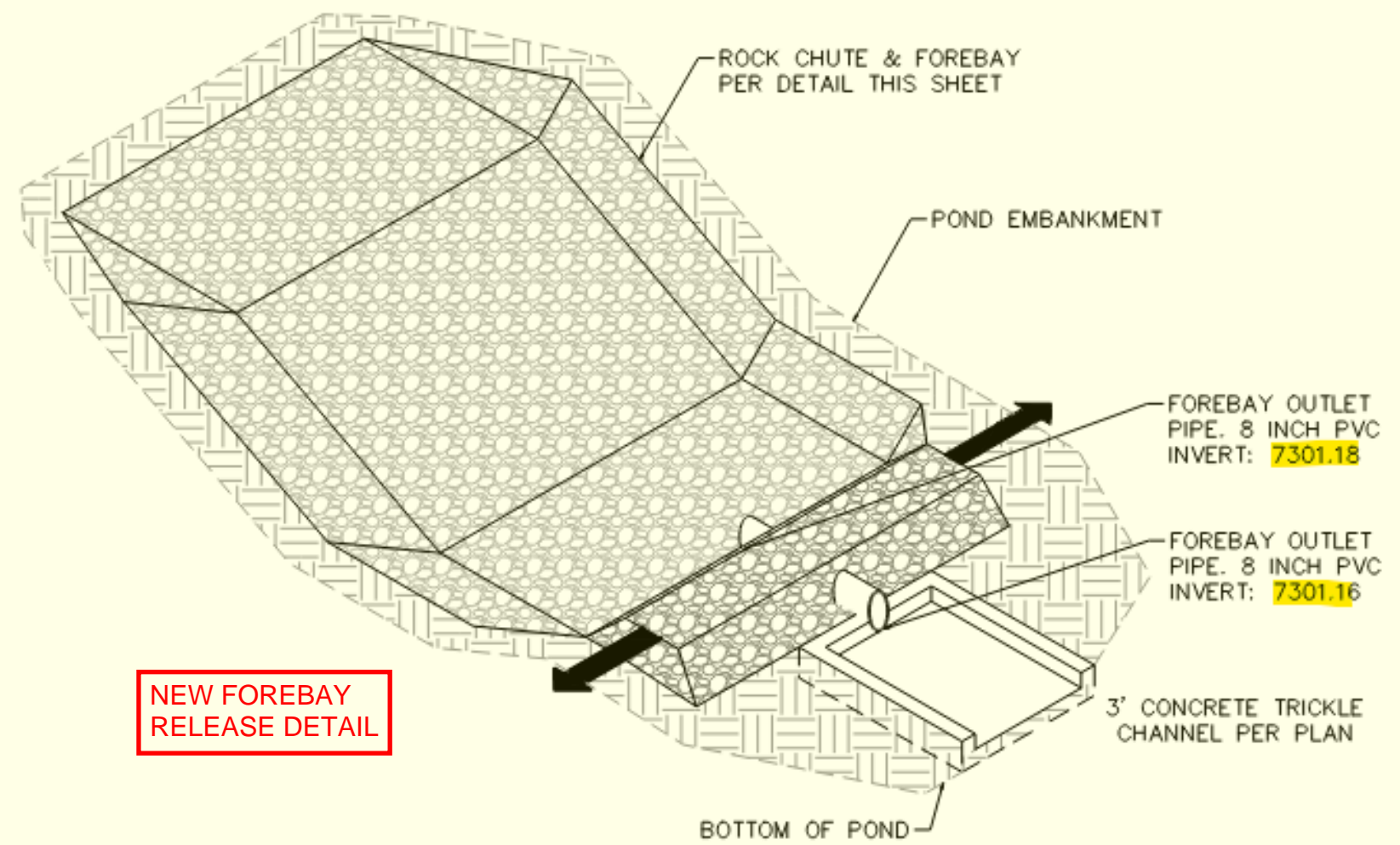
RECORD DRAWING

THESE RECORD DRAWINGS HAVE BEEN PREPARED BY KIMLEY-HORN AND ASSOCIATES, INC. BASED ON SURVEY INFORMATION PROVIDED BY EDWARD JAMES SURVEYING, INC. THESE RECORD DRAWINGS ARE NOT GUARANTEED TO BE "AS-BUILT", BUT RATHER BASED ON THE INFORMATION MADE AVAILABLE.



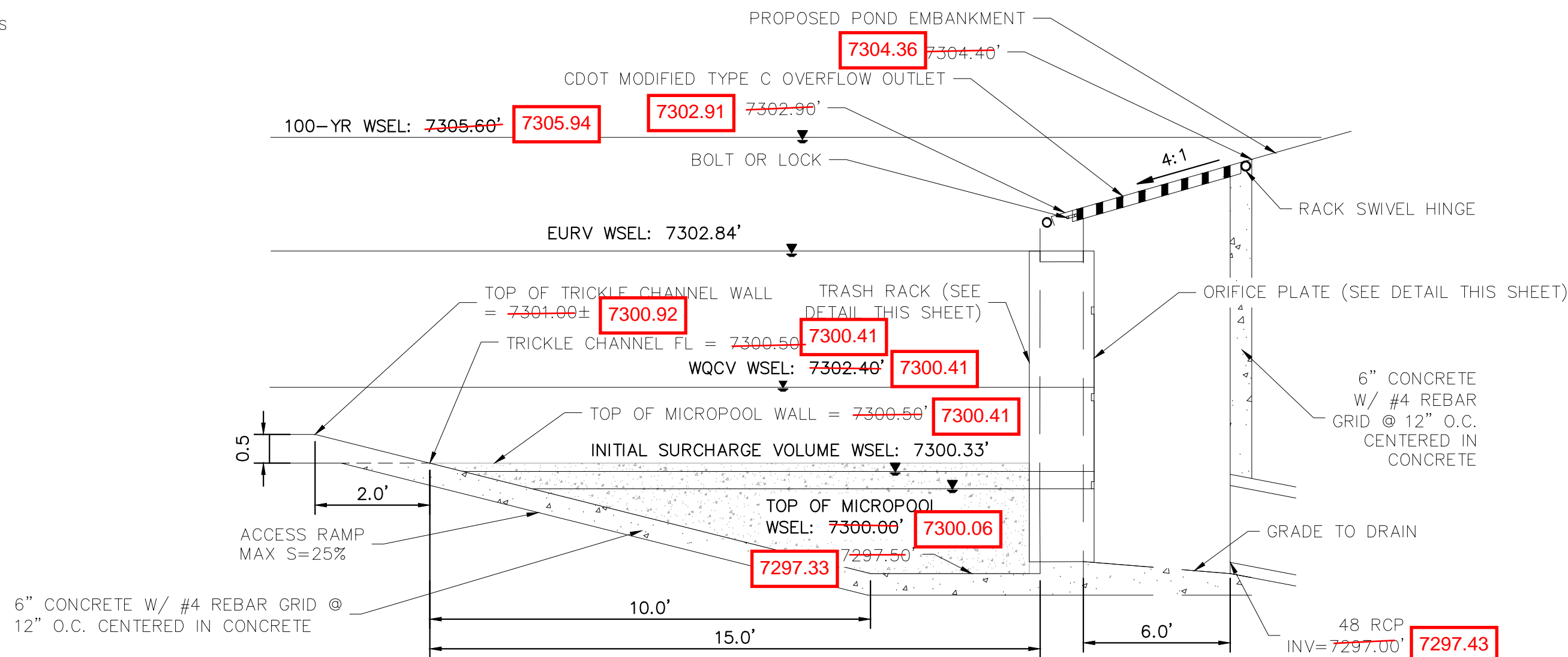
6 SECTION CREST WALL DETAIL

N.T.S.



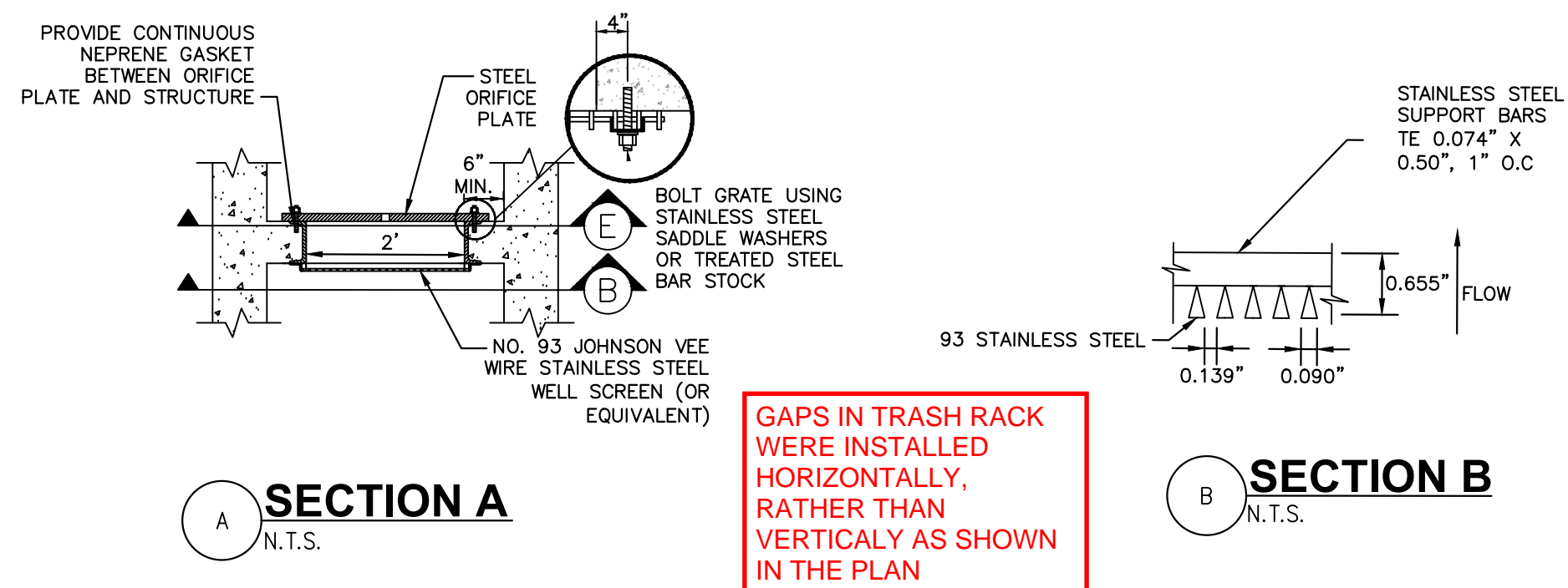
ROCK CHUTE, FOREBAY, & TRICKLE CHANNEL - ISOMETRIC DETAIL

1" = 5'



7 OUTLET STRUCTURE DETAIL

N.T.S.

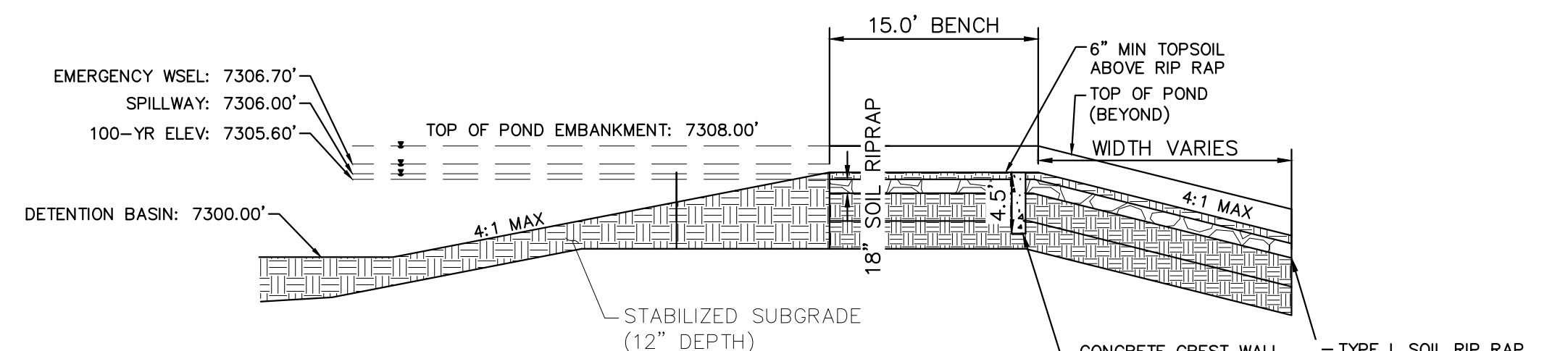


SECTION A

N.T.S.

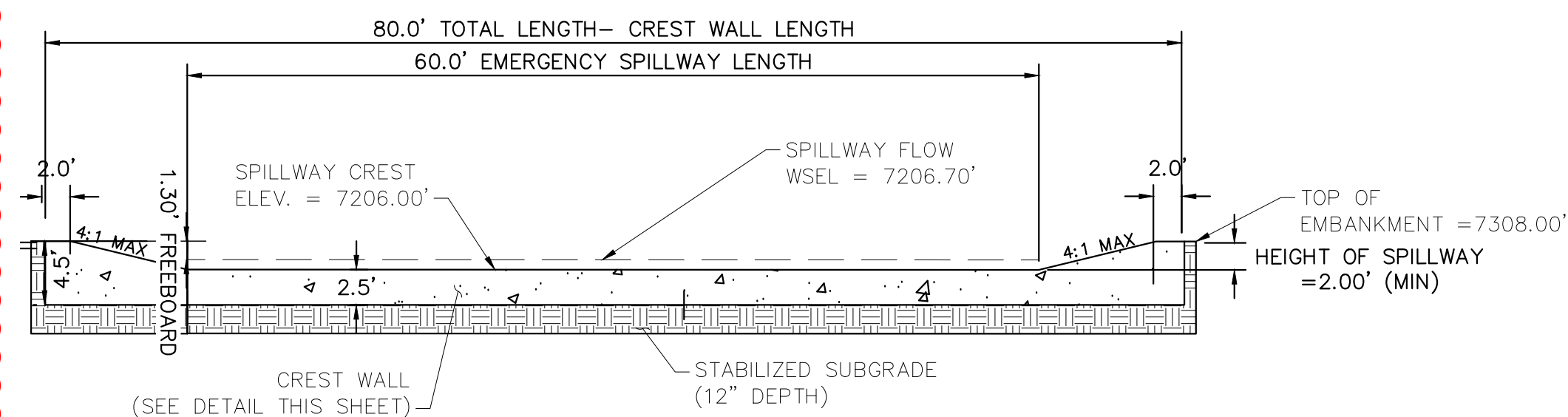
SECTION B

N.T.S.



8 EMERGENCY SPILLWAY DETAILS

1"=10'



9 EMERGENCY SPILLWAY

1"=10'

EPC 5/30/23

NO.	REVISION	DATE	BY	APPR.
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Kimley»Horn

2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: AUL
CHECKED BY: KRK
DATE: 12/16/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
POND 2 DETAILS



PROJECT NO.
196106001

SHEET

C1.36

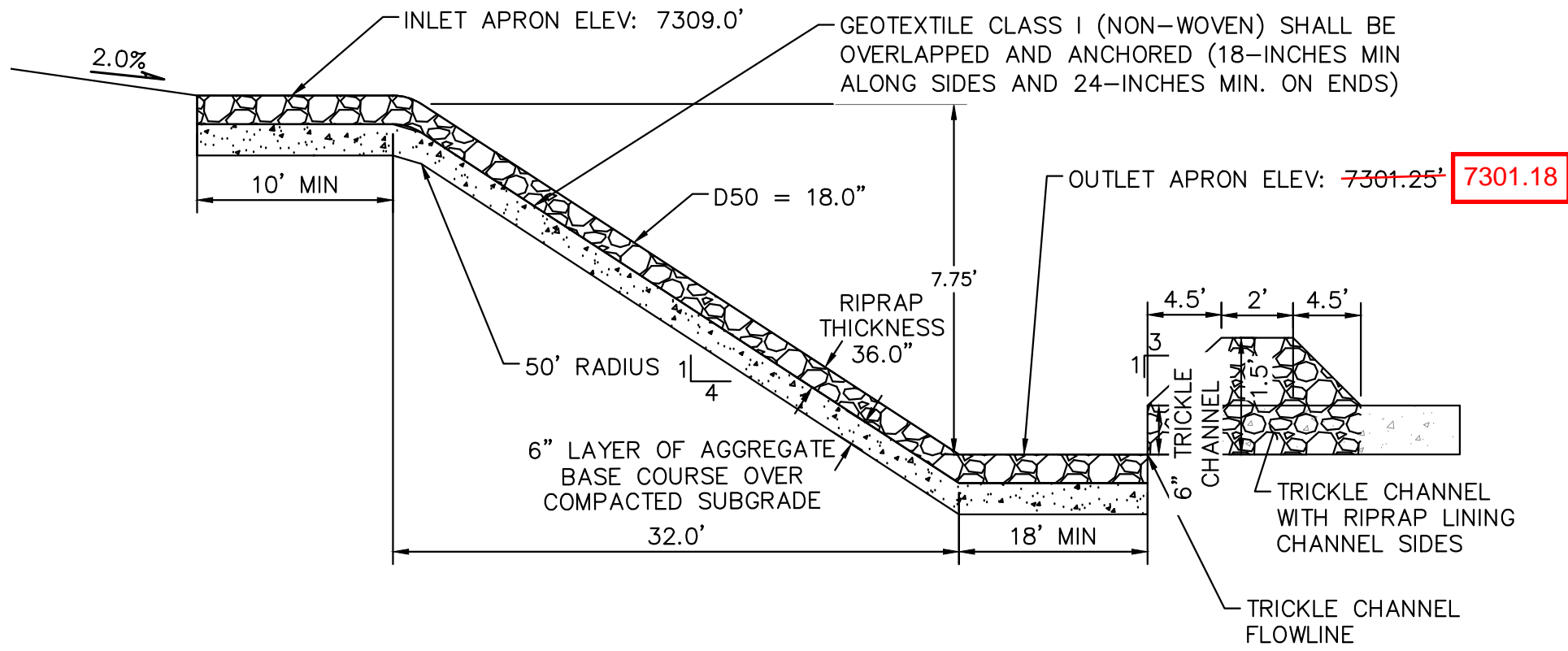
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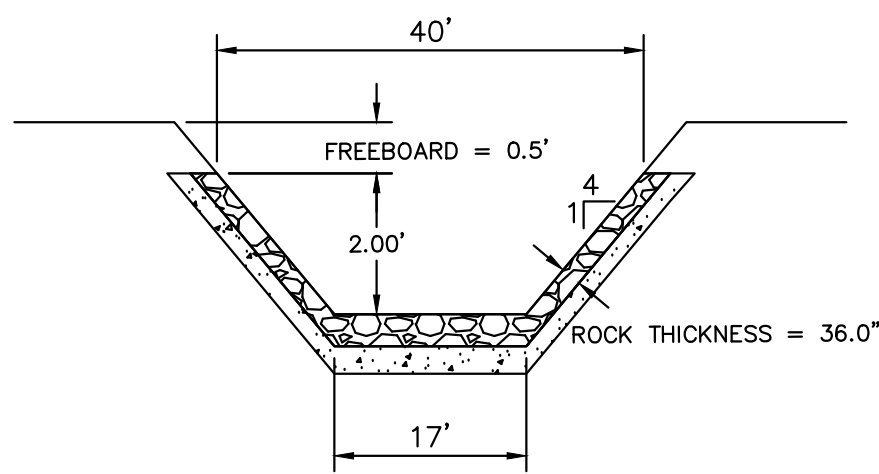
Know what's below.
Call before you dig.



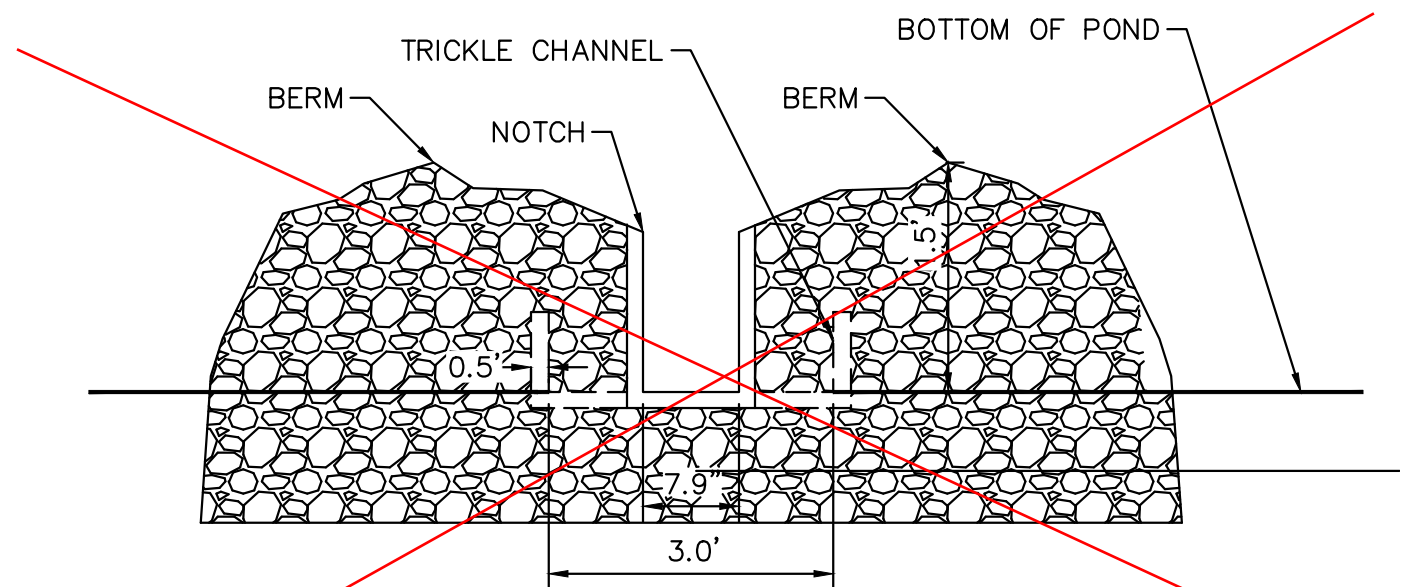
CALL UTILITY NOTIFICATION
CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE, OR EXCAVATE
FOR THE MARKING OF UNDERGROUND
MEMBER UTILITIES



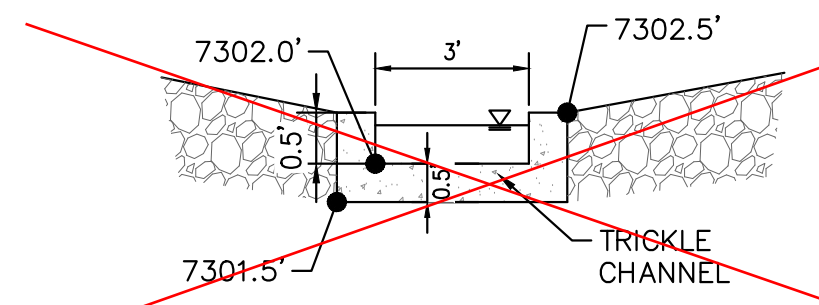
10 **ROCK CHUTE #6 PROFILE- CROSS SECTION 1**
N.T.S.



11 **ROCK CHUTE #6 PROFILE- CROSS SECTION 2**
N.T.S.

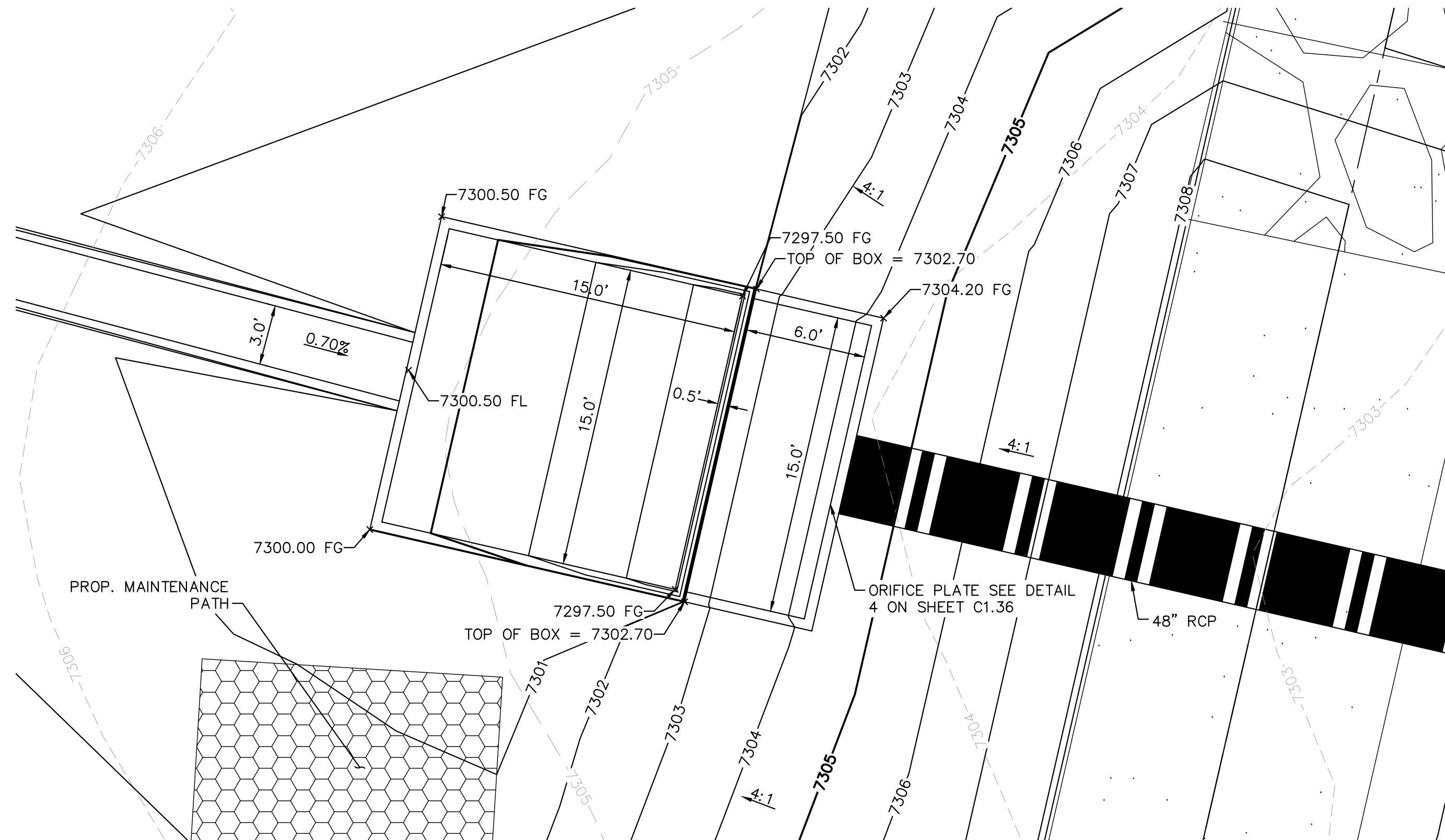


12 **ROCK CHUTE #6 NOTCH PROFILE**
N.T.S.



13 **ROCK CHUTE TO TRICKLE CHANNEL TRANSITION**
N.T.S.

NOTCH REPLACED
WITH PVC PIPE PER
FIELD CHANGE.
VERIFIED WITH EPC
STORMWATER PIROW
TO FIELD CHANGE.
SEE PREVIOUS PAGE



14 **OUTLET STRUCTURE PLAN VIEW DETAIL**
1"=5'

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
4	Pond 1	107	10	6	24	15	24	18	36	50	1.27	1.50	40
6	Pond 2	110	10	8	32	18	17	18	36	50	1.57	2.00	33
11	Pond 4	26	10	10	40	11	10	9	18	25	0.85	1.50	26
12	WQ Pond	100	11	5	20	20	12	18	36	50	1.81	2.00	28
13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26

15 **STANDARD ROCK CHUTE DIMENSION TABLE**
N.T.S.

1. SEE GRADING PLANS FOR ROCK CHUTE LOCATIONS

RECORD DRAWING
THESE RECORD DRAWINGS HAVE BEEN PREPARED BY
KIMLEY-HORN AND ASSOCIATES, INC. BASED ON SURVEY
INFORMATION PROVIDED BY EDWARD JAMES
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PROJECT NO.
196106001

SHEET

C1.37

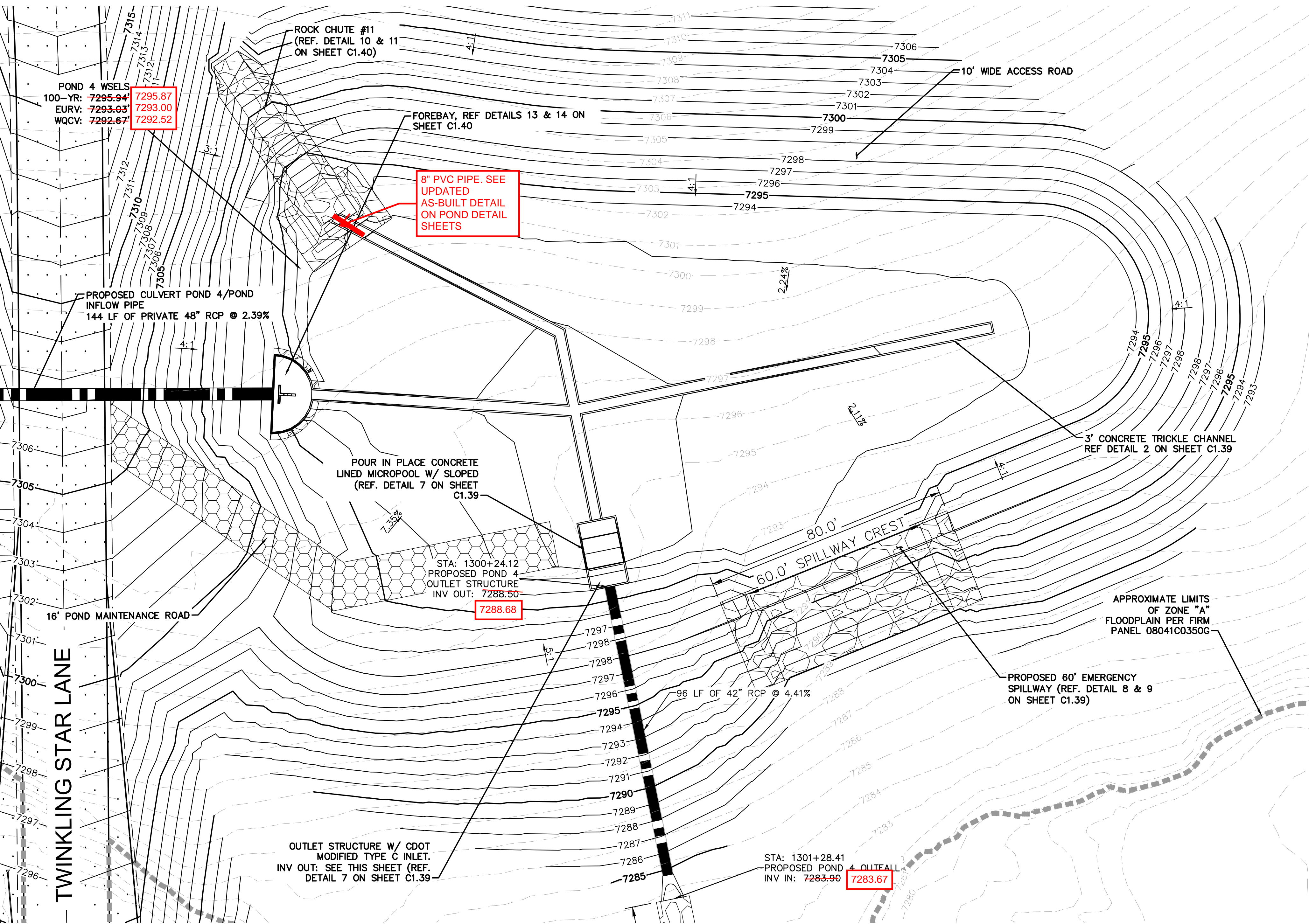
WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
POND 2 DETAILS

DESIGNED BY: KRK
DRAWN BY: A.J.L.
CHECKED BY: KRK
DATE: 12/16/2021

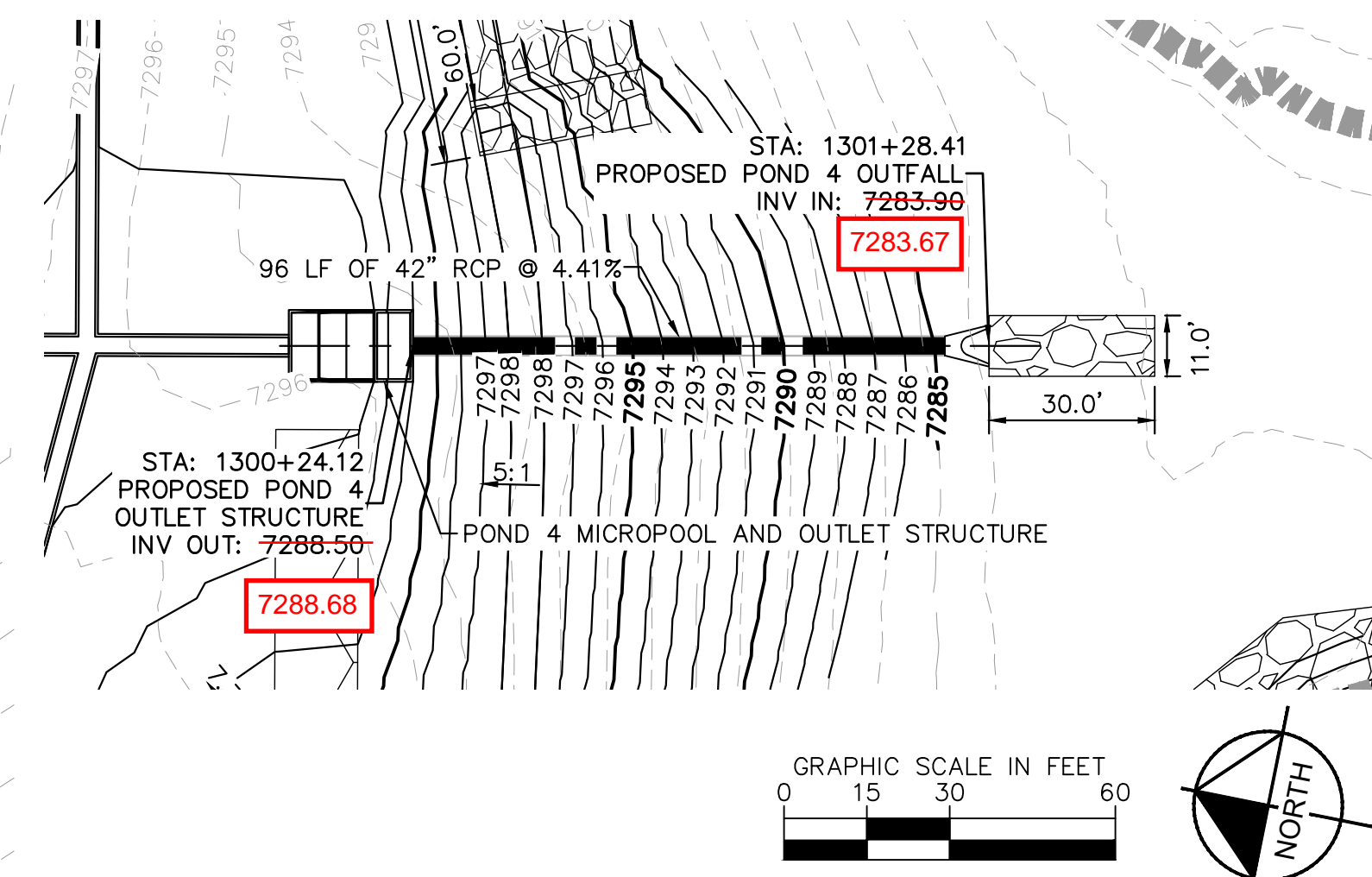
Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

NO.	REVISION	DATE	BY
2	COUNTY COMMENTS	KRK 4/28/23	KRK
1	COUNTY COMMENTS	KRK 3/10/23	KRK

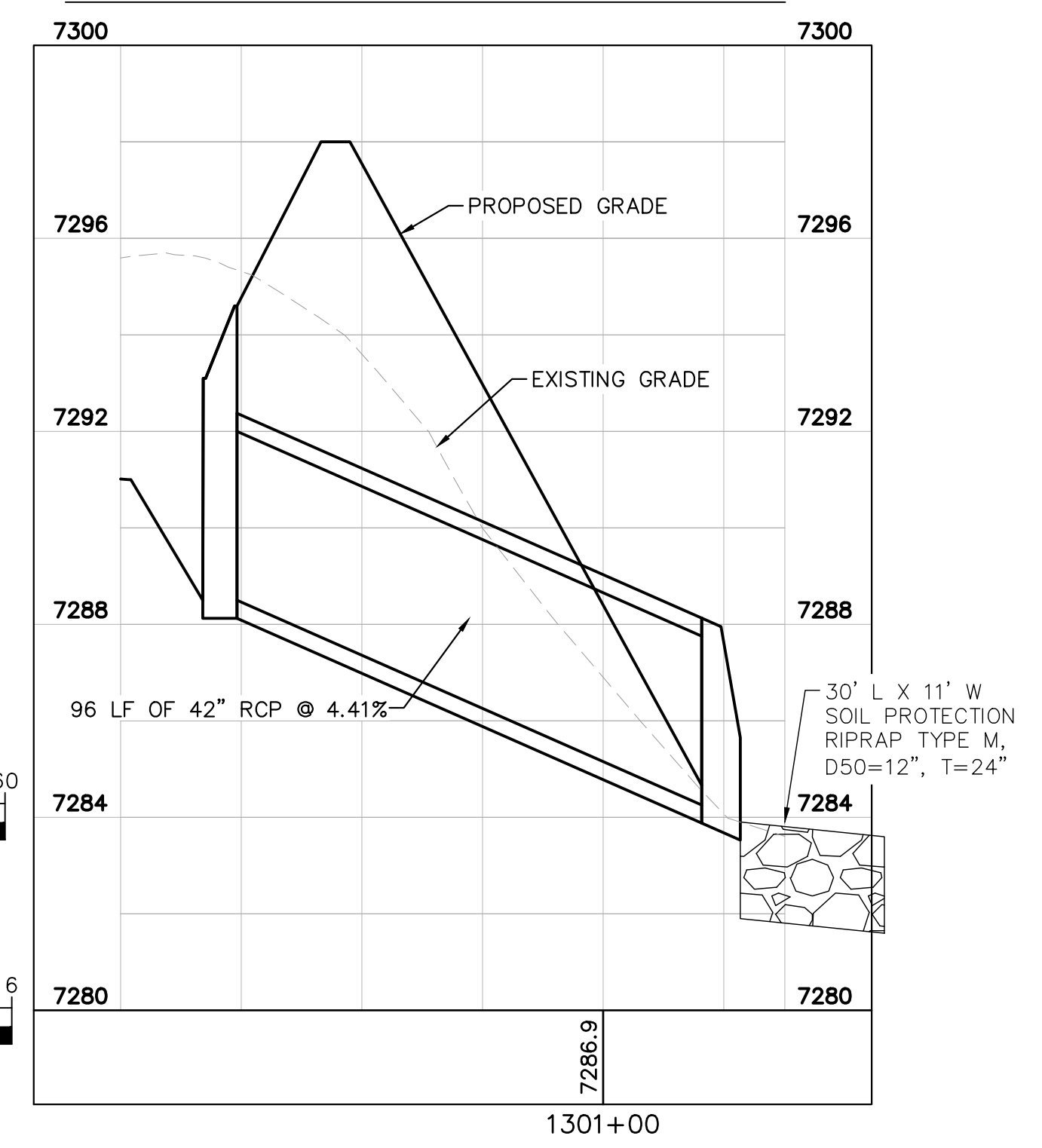
K:\COS_Civil\196106001_Winsome Filing No. 3\CADD\PlanSheets\CDs\196106001_CD_POND_4.dwg Kofford, Kevin 4/28/2023 12:21 PM



LEGEND	
FG	FINISH GRADE
FBT	TOP OF FOREBAY AT FINISHED GRADE
FBB	BOTTOM OF FOREBAY AT FINISHED GRADE
TCT	TOP OF TRICKLE CHANNEL AT FINISHED GRADE
TCB	BOTTOM OF TRICKLE CHANNEL AT FINISHED GRADE
MPT	TOP OF MICROPOOL AT FINISHED GRADE
MPB	BOTTOM OF MICROPOOL AT FINISHED GRADE
GRATE	OUTLET STRUCTURE GRATE ELEVATION
ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE
-----	FLOODPLAIN LIMITS
=====	TOP OF POND
=====	PROPOSED STORM SEWER

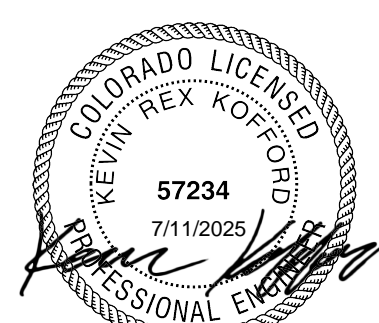


POND 4 OUTLET PIPE PLAN AND PROFILE



RECORD DRAWING

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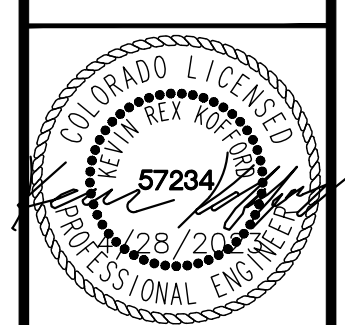
NO.	REVISION	COUNTY COMMENTS	COUNTY COMMENTS	DATE	BY
2				4/28/23	KRK
1				3/10/23	KRK

Kimley»Horn

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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: AUL
CHECKED BY: KRK
DATE: 12/16/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
POND 4 OVERVIEW

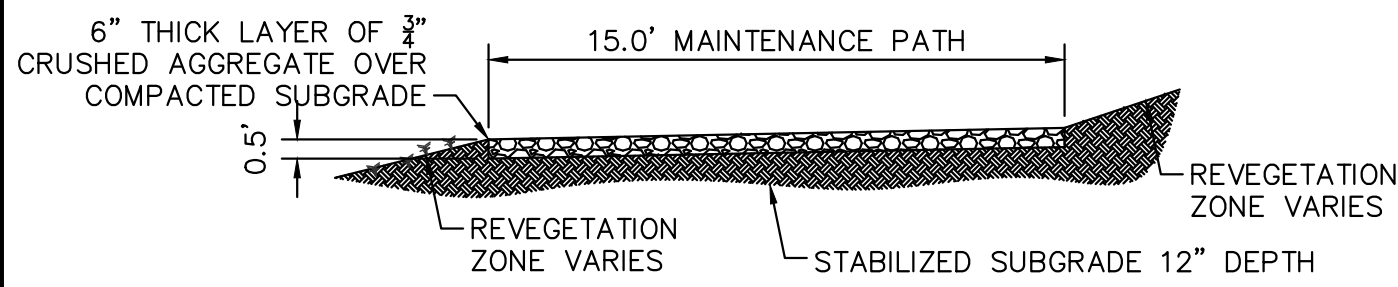


PROJECT NO.
196106001

SHEET

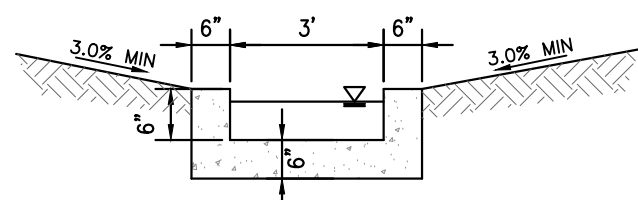
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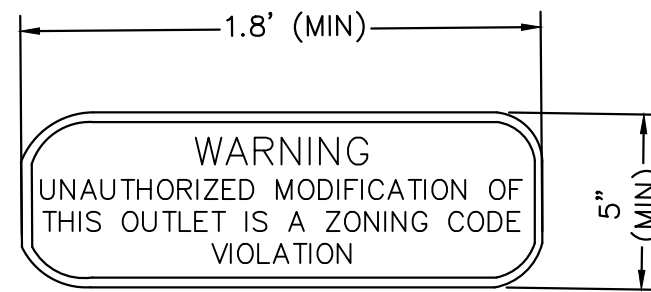
1 MAINTENANCE ROAD

- 1"=5'
- MAINTENANCE PATH NOTES
1. MAINTENANCE PATH SHALL INCLUDE SUBGRADE PREPARATION, GRAVEL BASE, AND COMPACTION.



2 CONCRETE TRICKLE CHANNEL

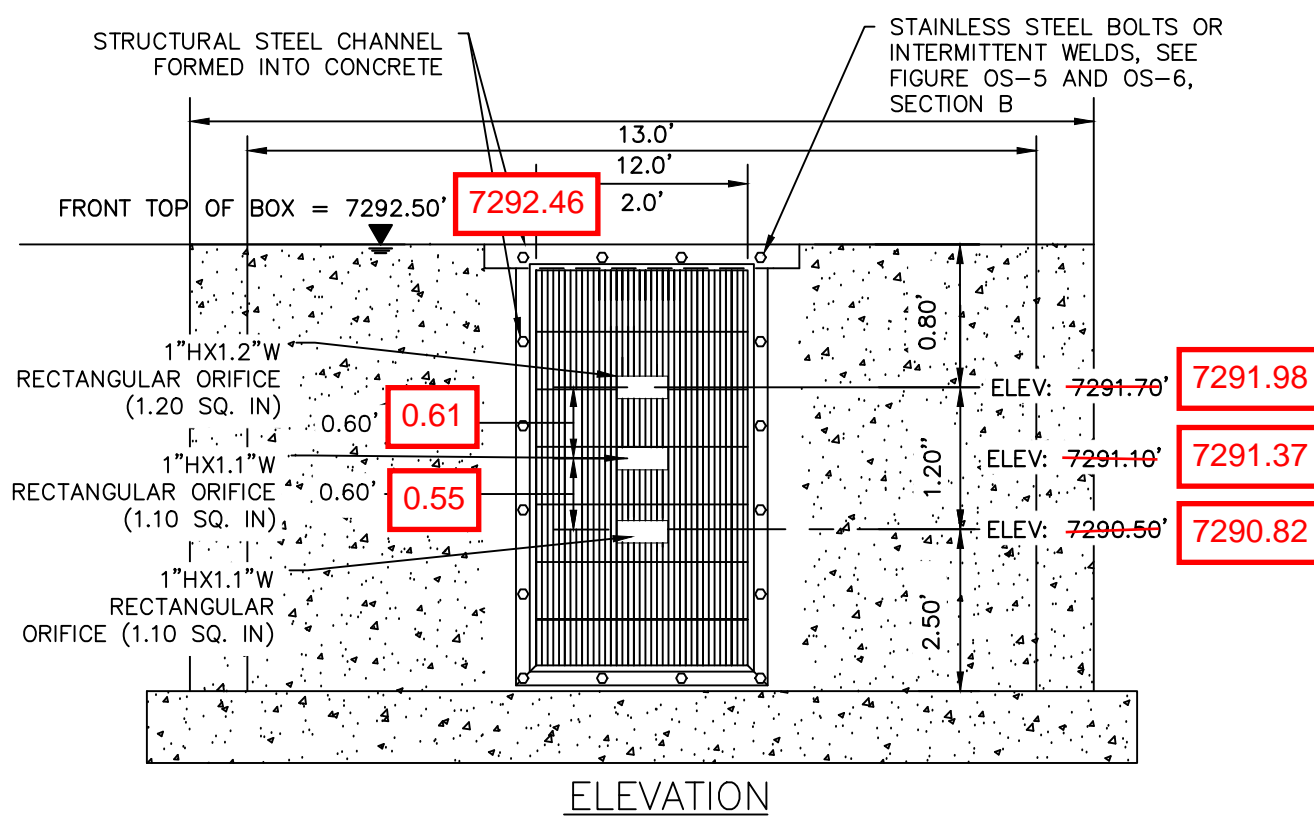
N.T.S.



3 OUTLET SIGNAGE

N.T.S.

- OUTLET SIGNAGE NOTES
1. SIGN SHALL BE A MINIMUM OF 0.75 SQUARE FEET AND SHALL BE ATTACHED TO THE OUTLET OR POSTED NEARBY.



4 ORIFICE PLATE AND TRASH RACK DETAIL

N.T.S.

ORIFICE PLATE NOTES

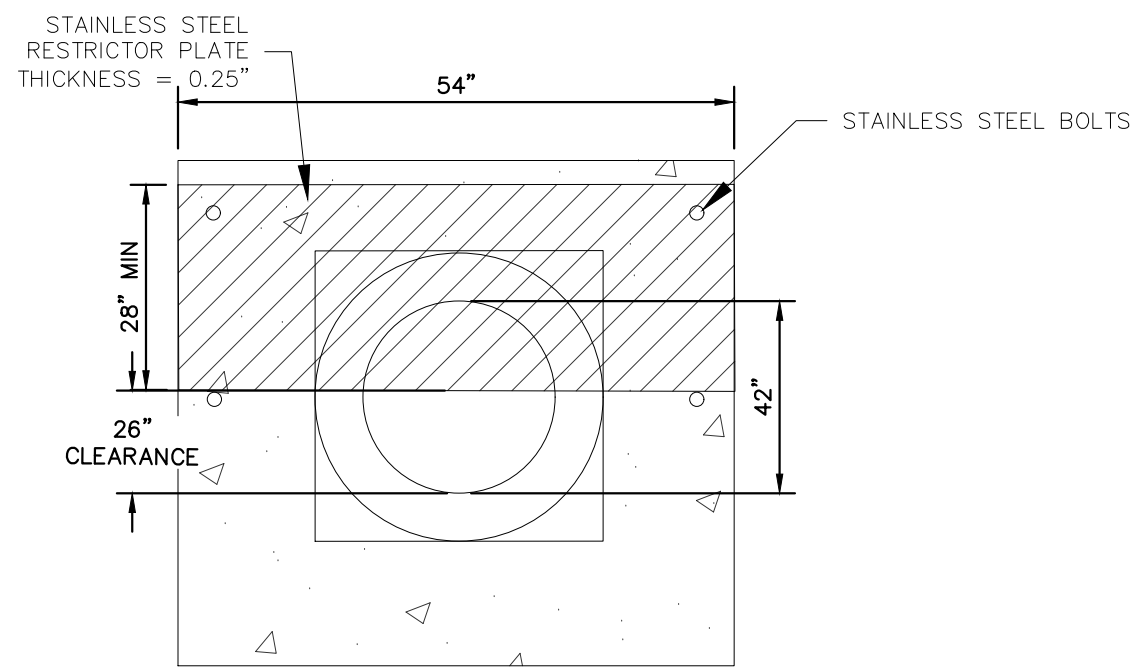
1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER, WITH A PLATE THICKNESS OF 0.25".

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.

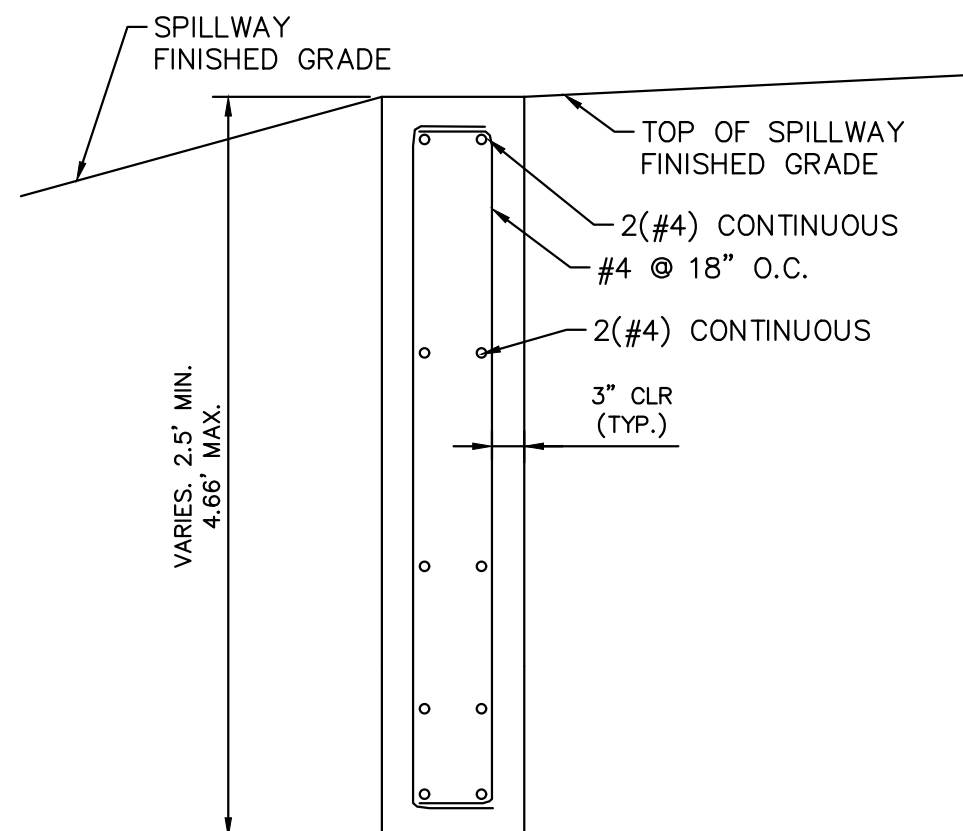
GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN OVERFLOW SAFETY GRATES.

1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
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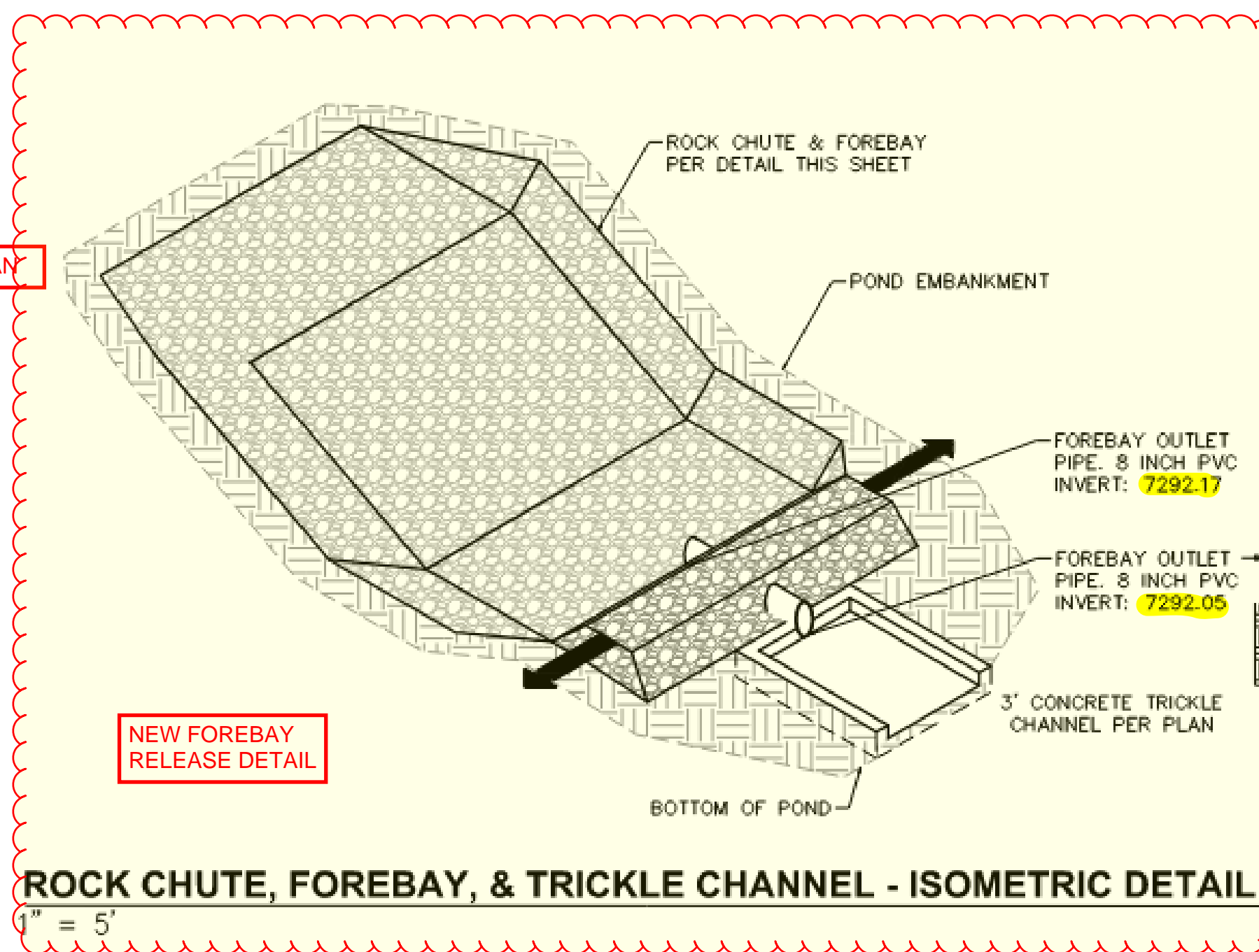
5 100-YEAR FLOW RESTRICTOR B

N.T.S.



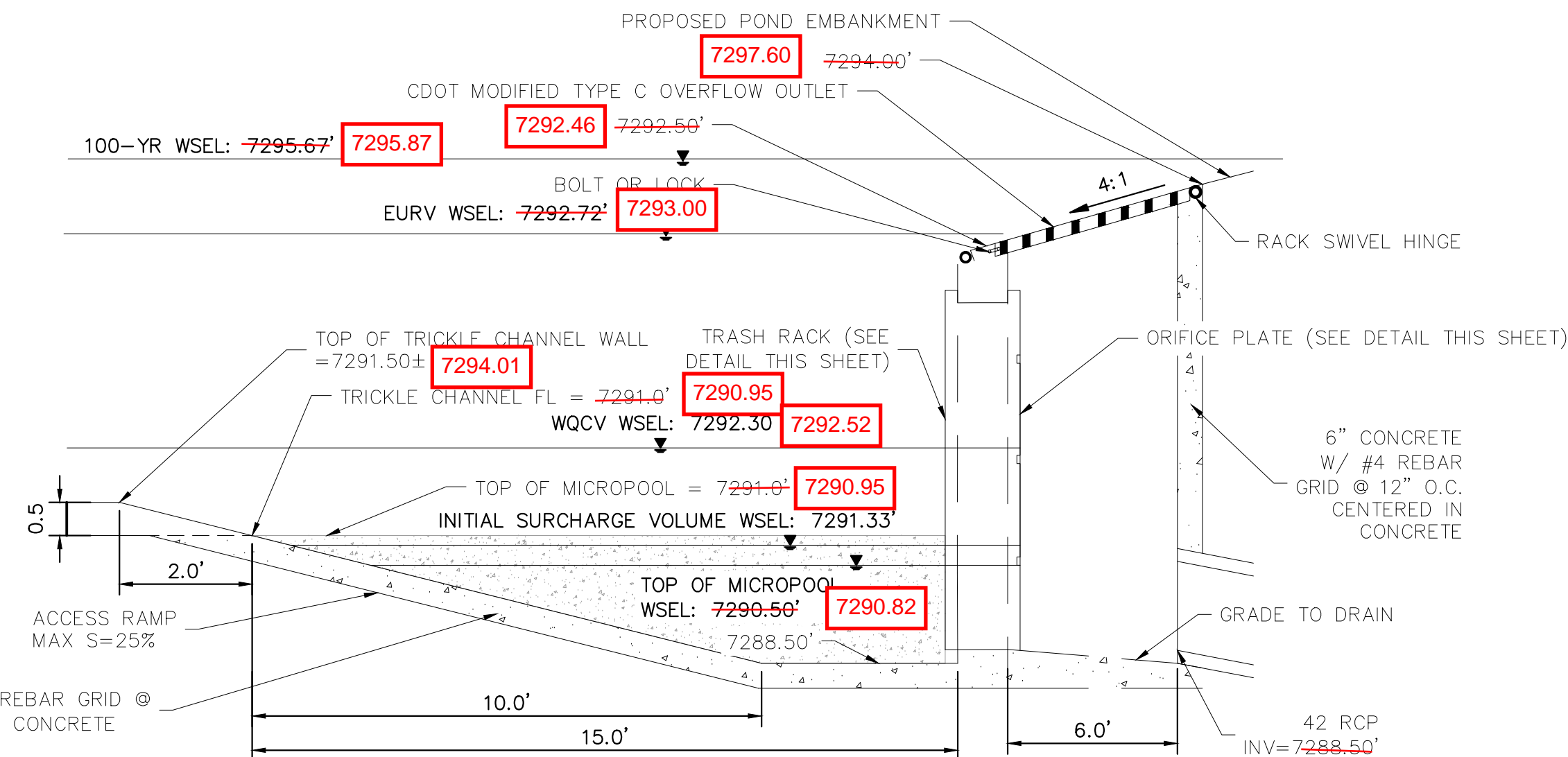
6 SECTION CREST WALL DETAIL

N.T.S.



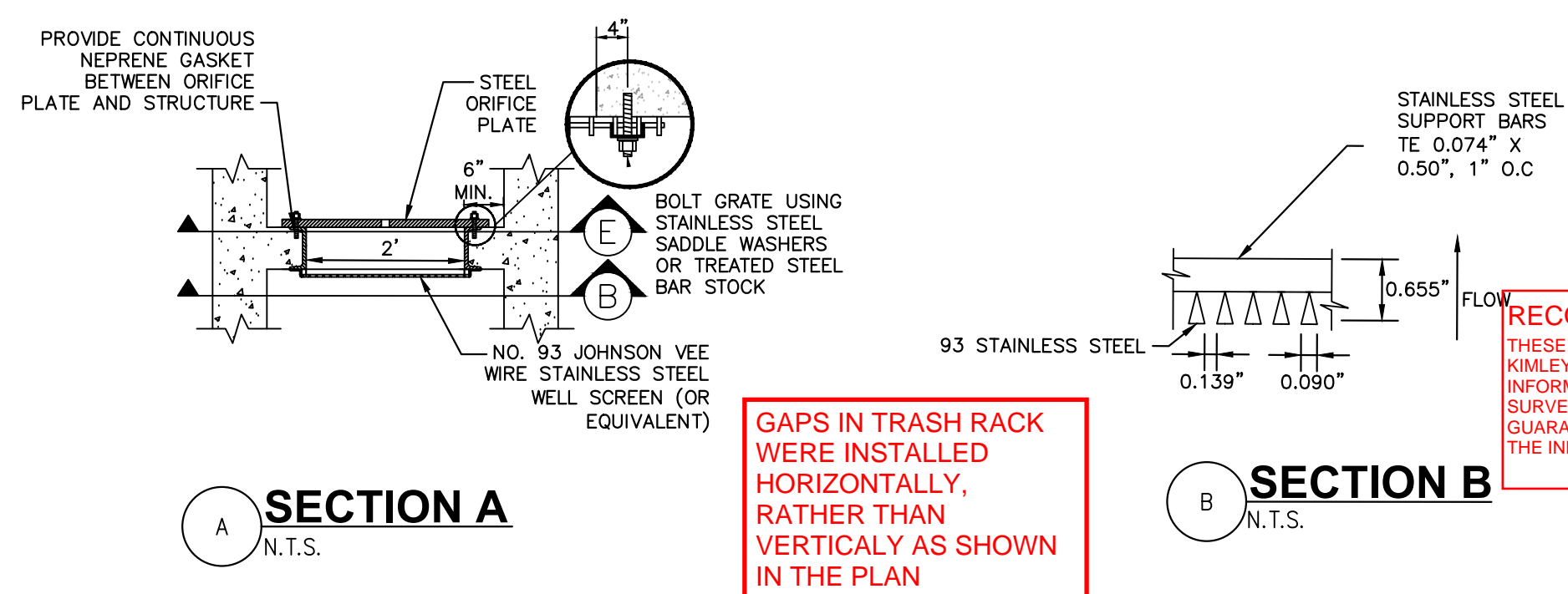
ROCK CHUTE, FOREBAY, & TRICKLE CHANNEL - ISOMETRIC DETAIL

1" = 5'



7 OUTLET STRUCTURE DETAIL

N.T.S.

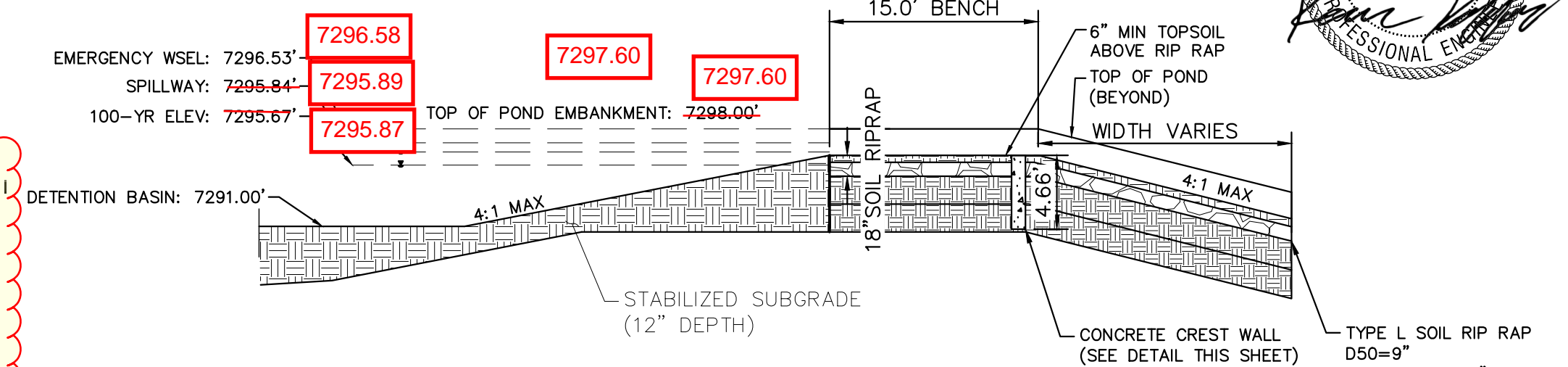


SECTION A

N.T.S.

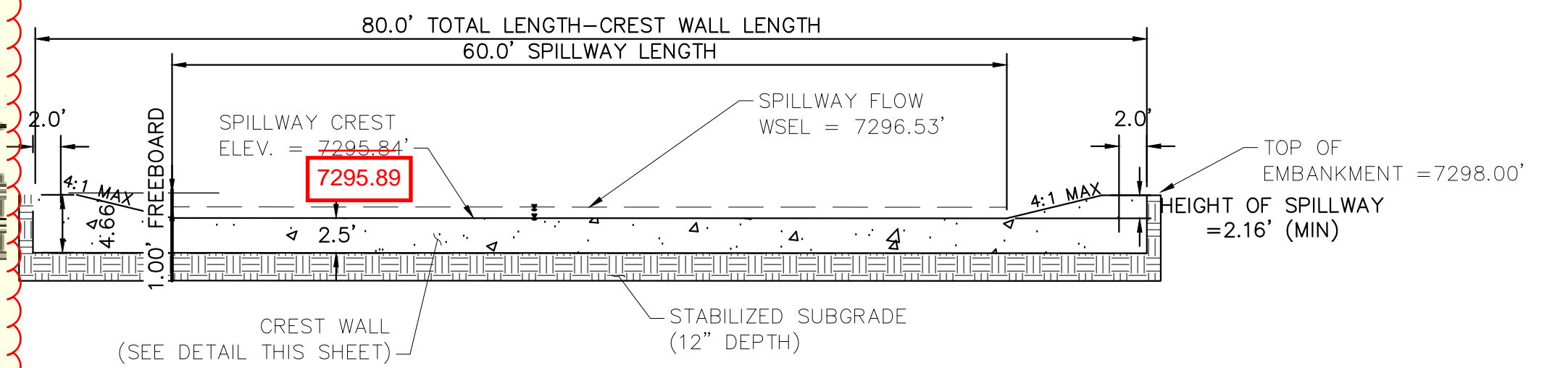
SECTION B

N.T.S.



8 EMERGENCY SPILLWAY DETAILS

1"=10'



9 EMERGENCY SPILLWAY

1"=10'

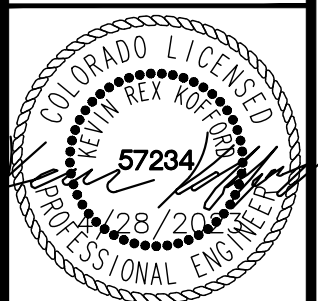
EPC 5/30/23

NO.	REVISION	DATE	BY	APPR.
2	COUNTY COMMENTS	KRK 4/28/23	KRK	
1	COUNTY COMMENTS	KRK 3/10/23	KRK	

Kimley»Horn
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DESIGNED BY: KRK
DRAWN BY: A.J.L.
CHECKED BY: KRK
DATE: 12/16/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
POND 4 DETAILS



PROJECT NO.
196106001

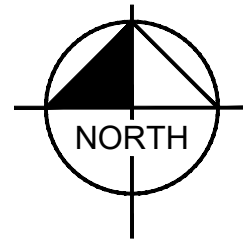
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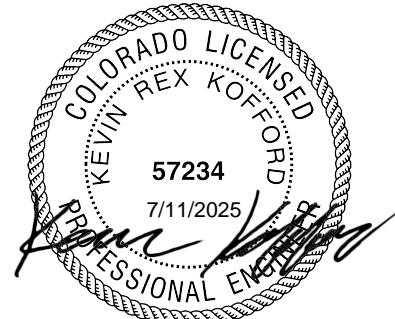


Know what's below.
Call before you dig.



GRAPHIC SCALE IN FEET
0 15 30 60

RECORD DRAWING
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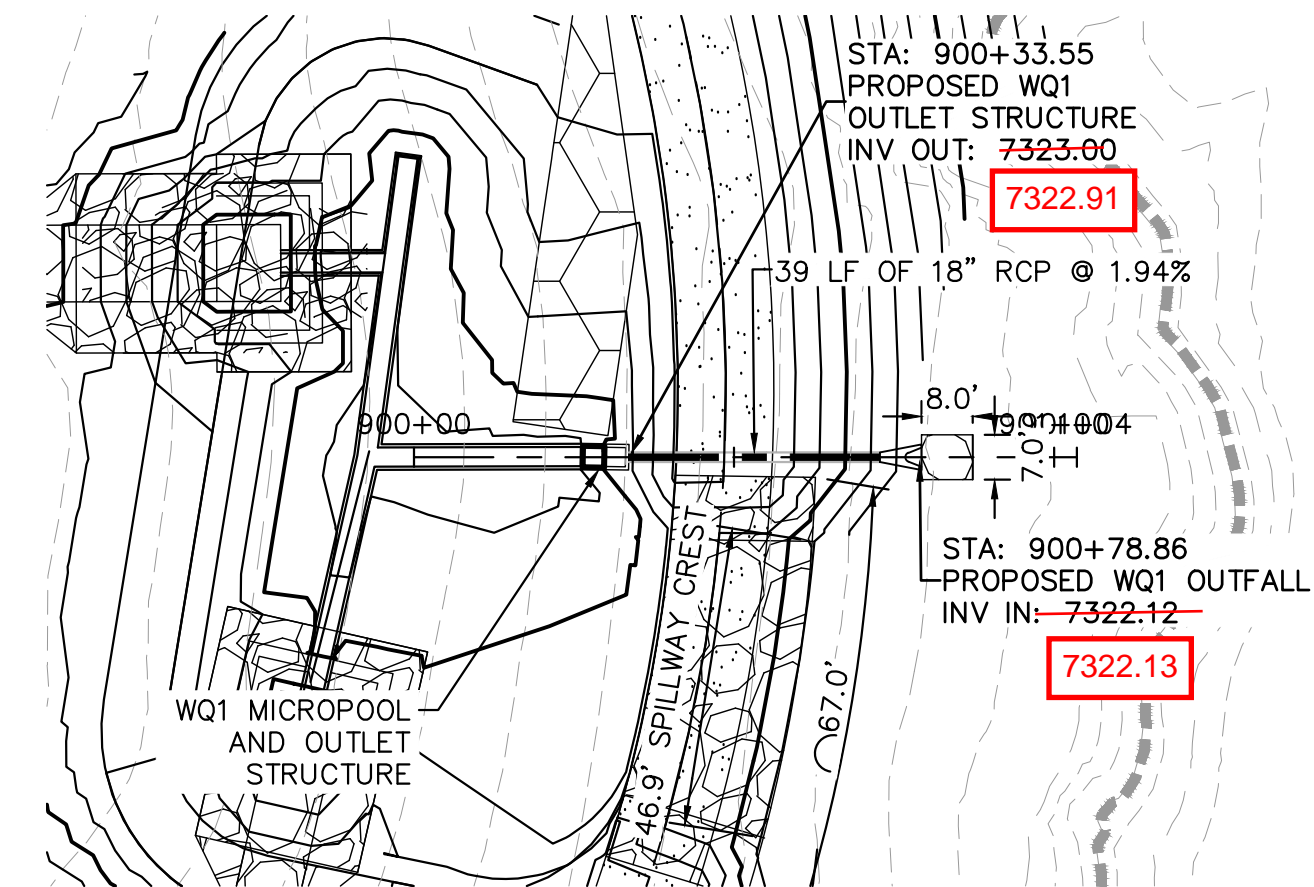
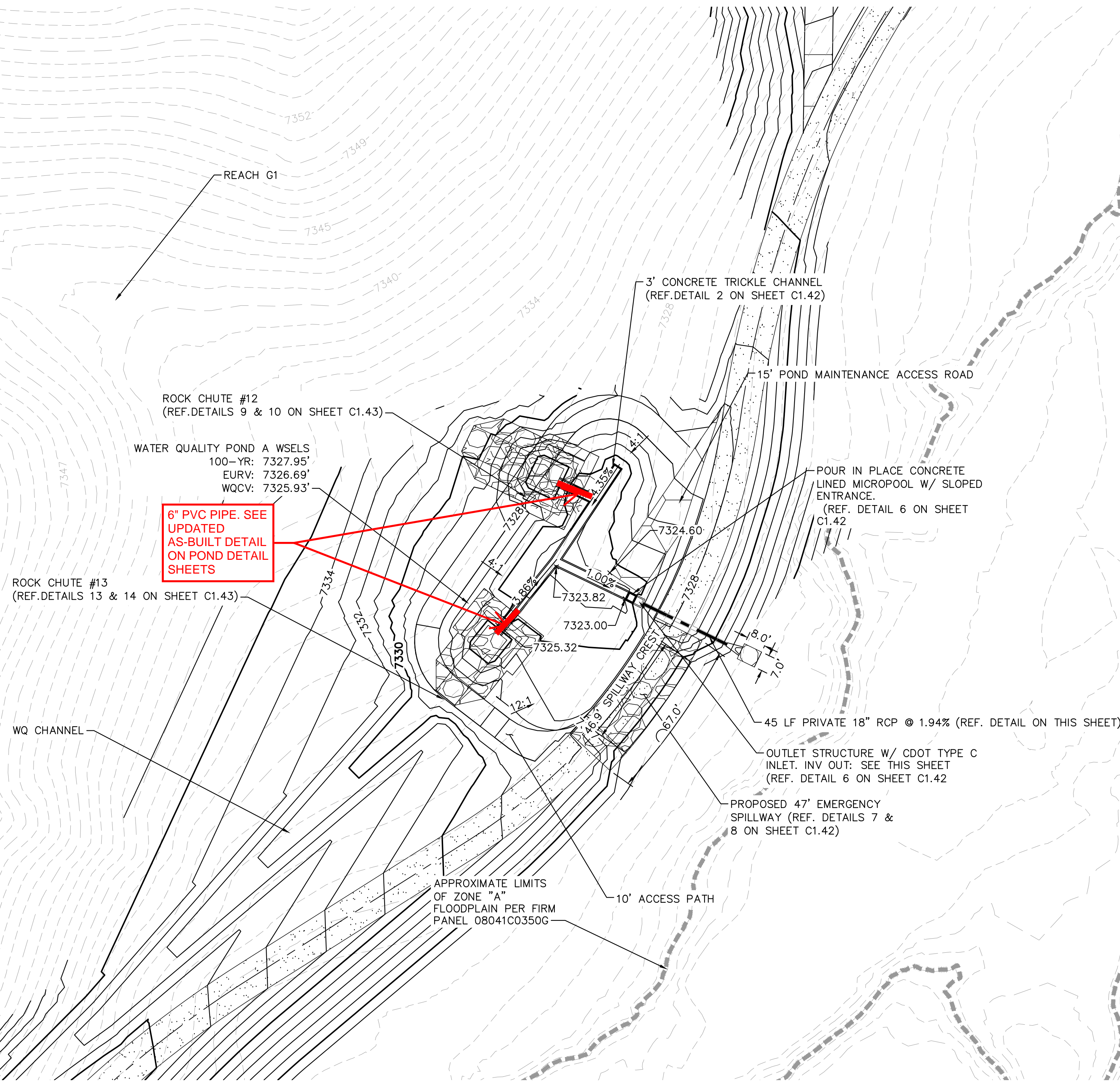
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0 15 30 60
HORIZONTAL

0 1.5 3 6
VERTICAL

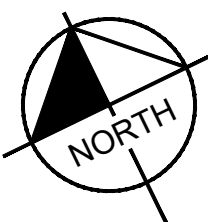
LEGEND

FG	FINISH GRADE
FBT	TOP OF FOREBAY AT FINISHED GRADE
FBB	BOTTOM OF FOREBAY AT FINISHED GRADE
TCT	TOP OF TRICKLE CHANNEL AT FINISHED GRADE
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GRATE	OUTLET STRUCTURE GRATE ELEVATION
ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE

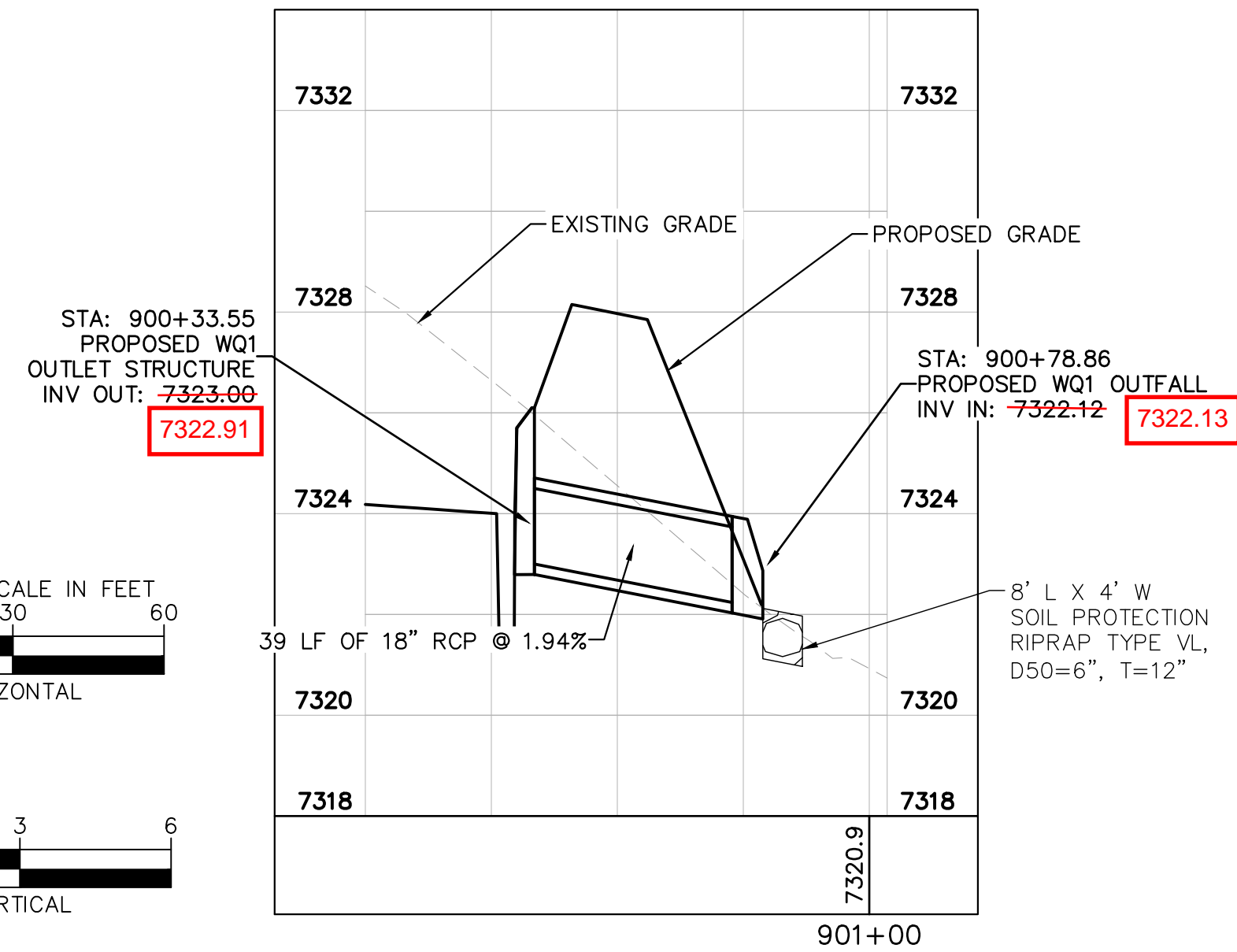
■■■■■■■■■■ FLOODPLAIN LIMITS
■■■■■■■■■■ TOP OF POND
■■■■■■■■■■ PROPOSED STORM SEWER



GRAPHIC SCALE IN FEET
0 15 30 60



WQA POND OUTLET PIPE PLAN AND PROFILE



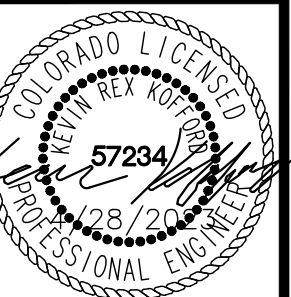
EPC 5/30/23

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Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: A.JL
CHECKED BY: KRK
DATE: 12/16/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
WQ POND A OVERVIEW

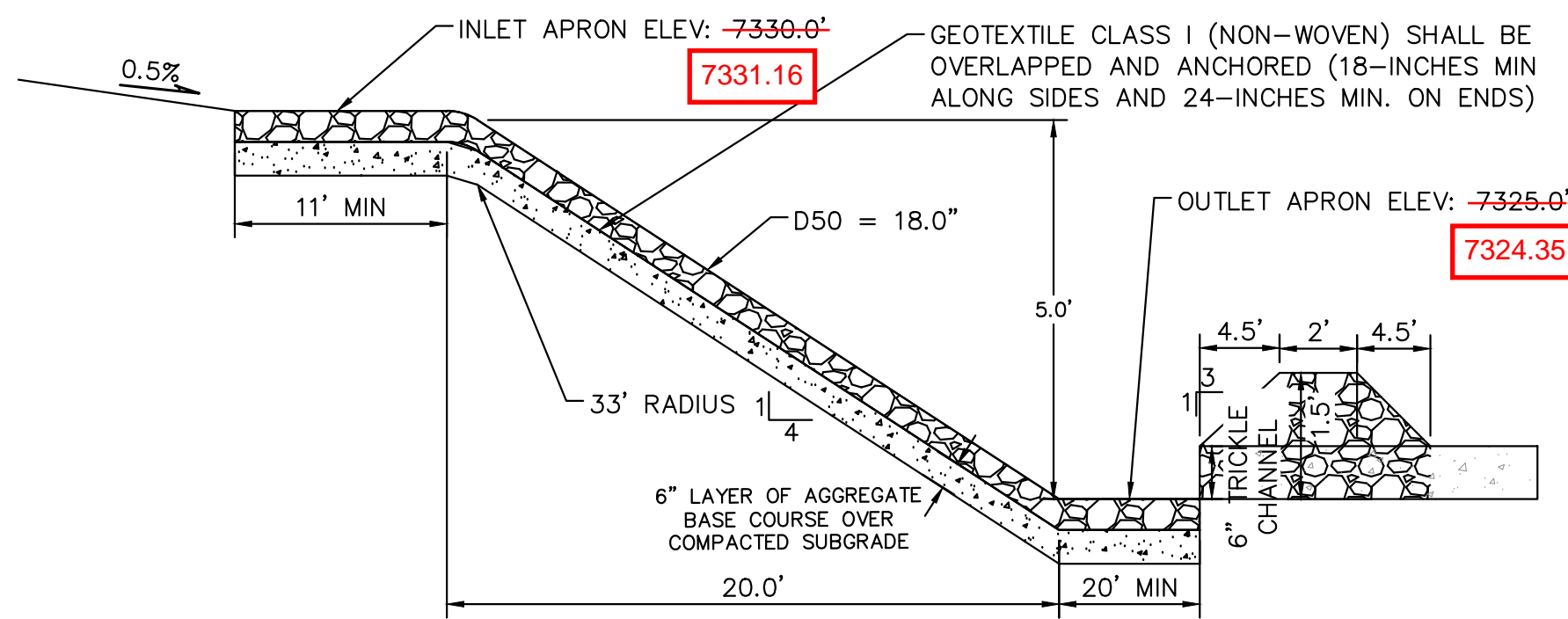


PROJECT NO.
196106001

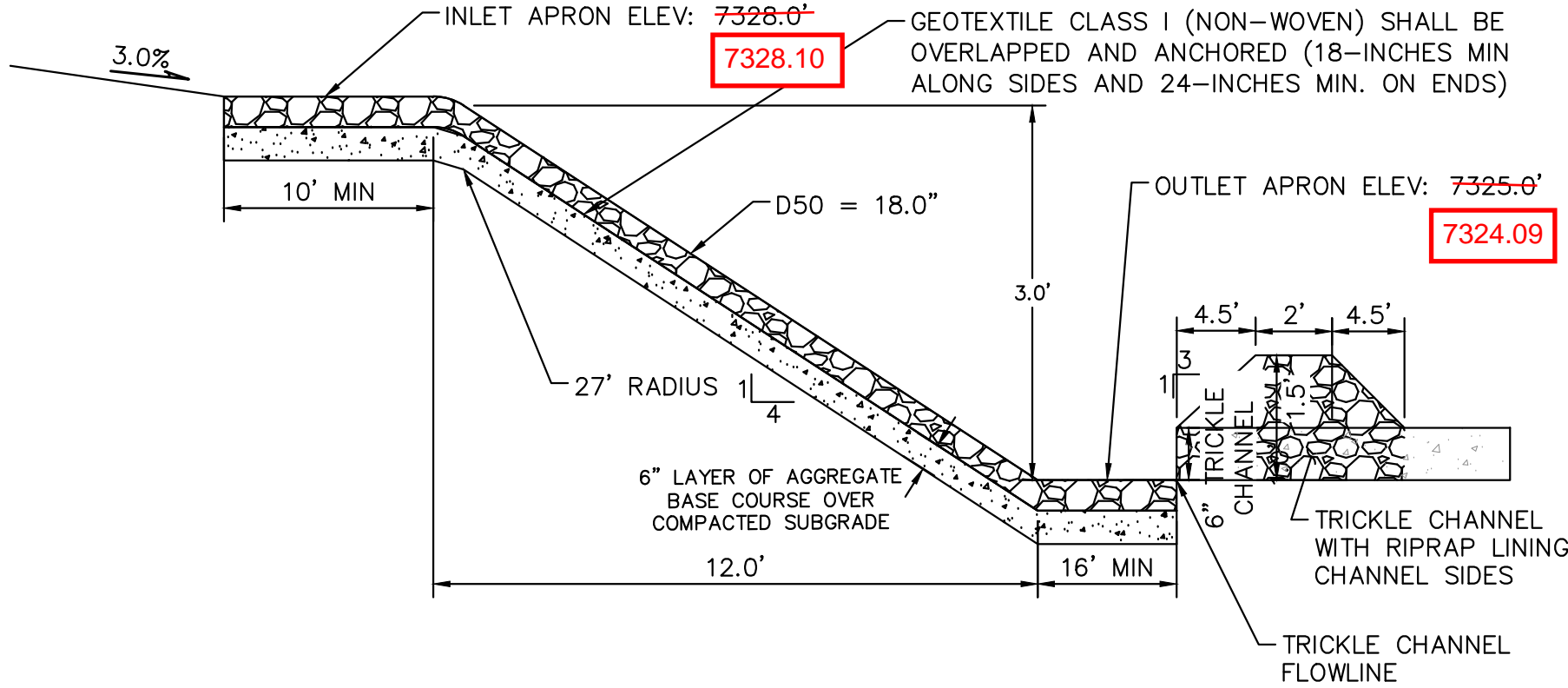
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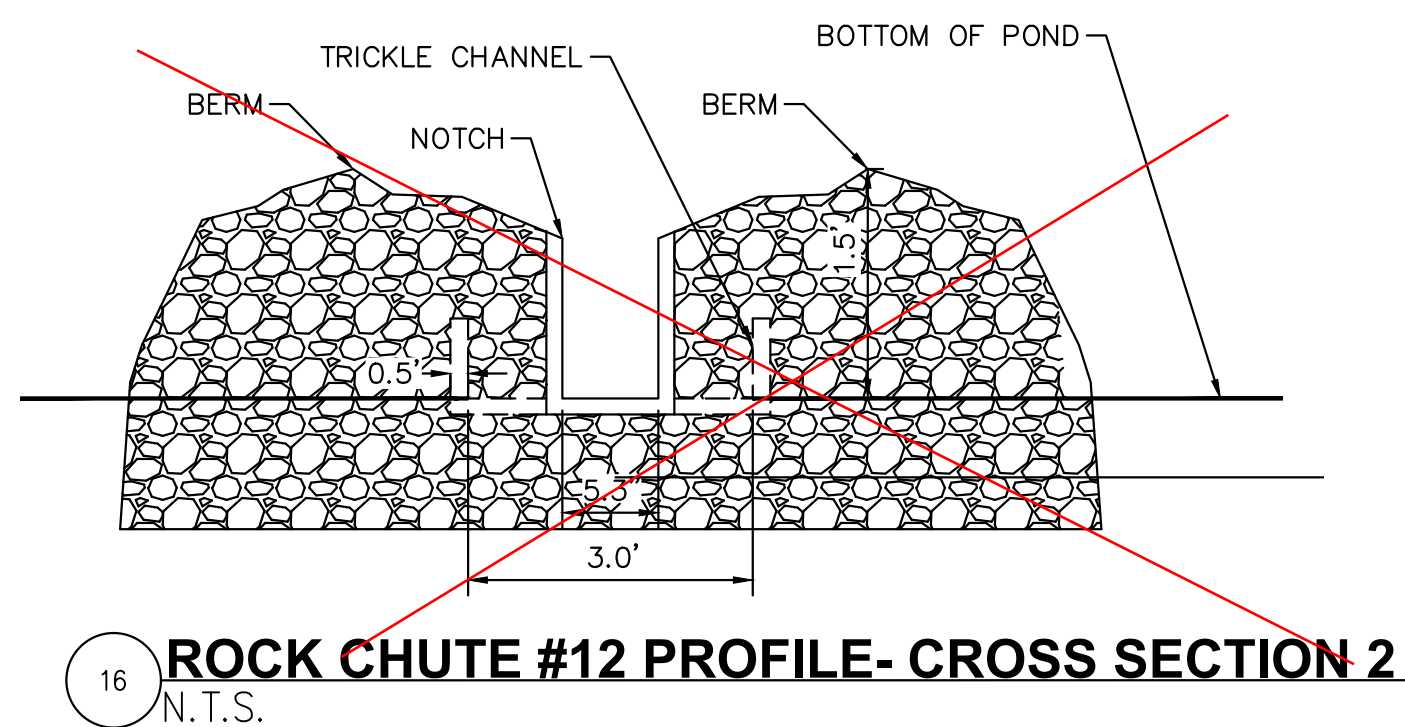
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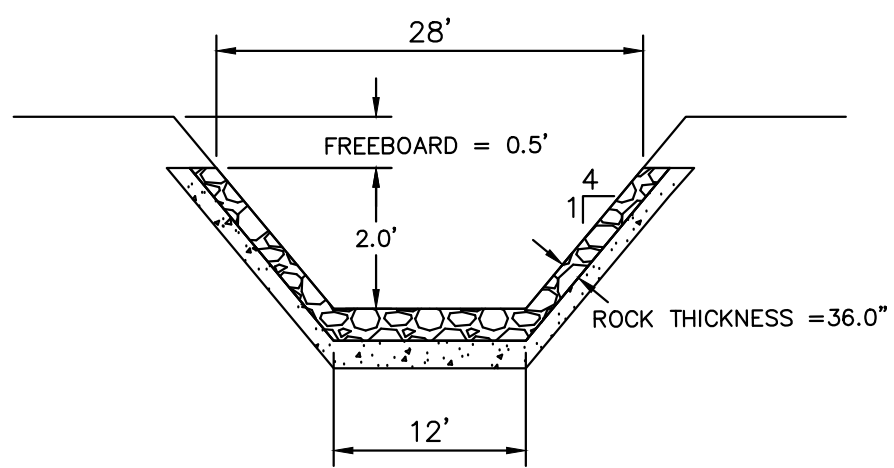
9 **ROCK CHUTE #12 PROFILE- CROSS SECTION 1**
N.T.S.



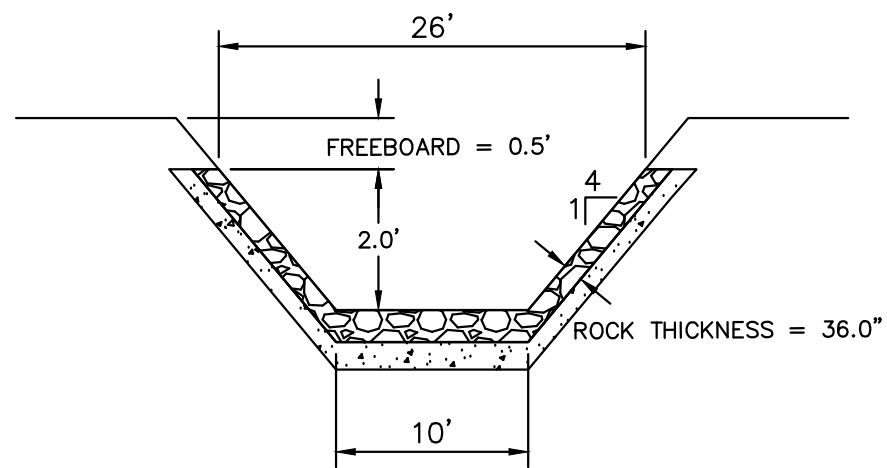
12 **ROCK CHUTE #13 PROFILE- CROSS SECTION 1**
N.T.S.



16 **ROCK CHUTE #12 PROFILE- CROSS SECTION 2**
N.T.S.

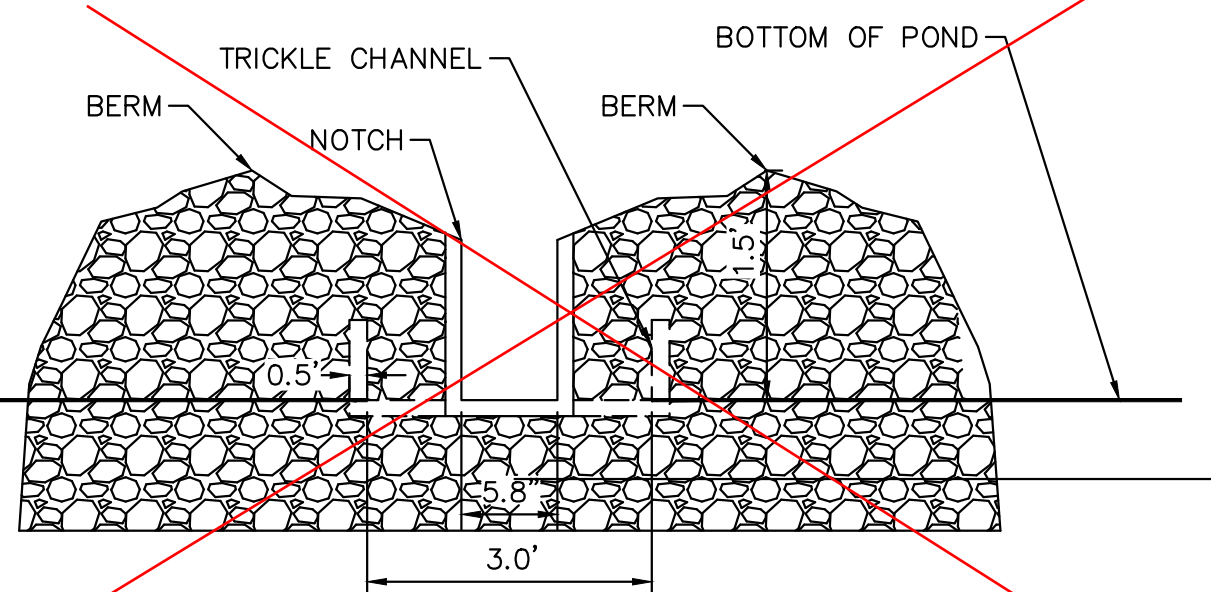


10 **ROCK CHUTE #12 PROFILE- CROSS SECTION 2**
N.T.S.

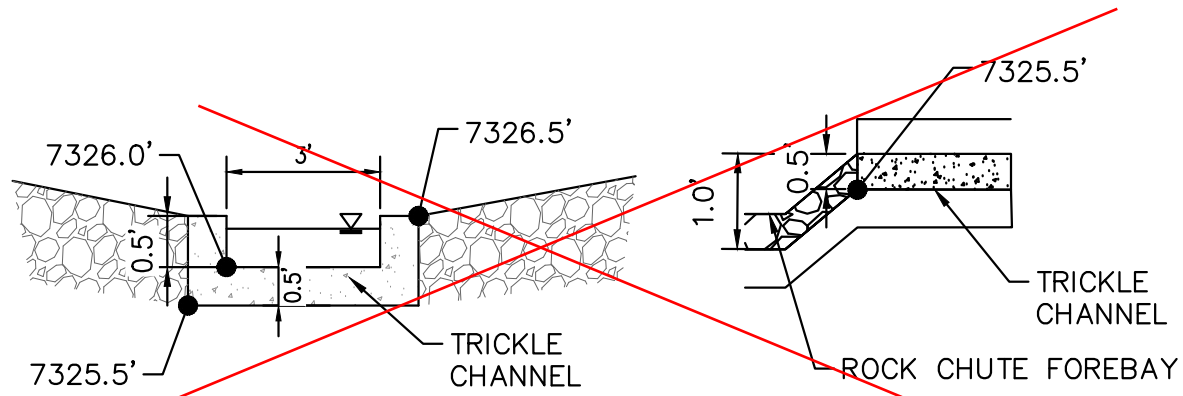


13 **ROCK CHUTE #13 PROFILE- CROSS SECTION 2**
N.T.S.

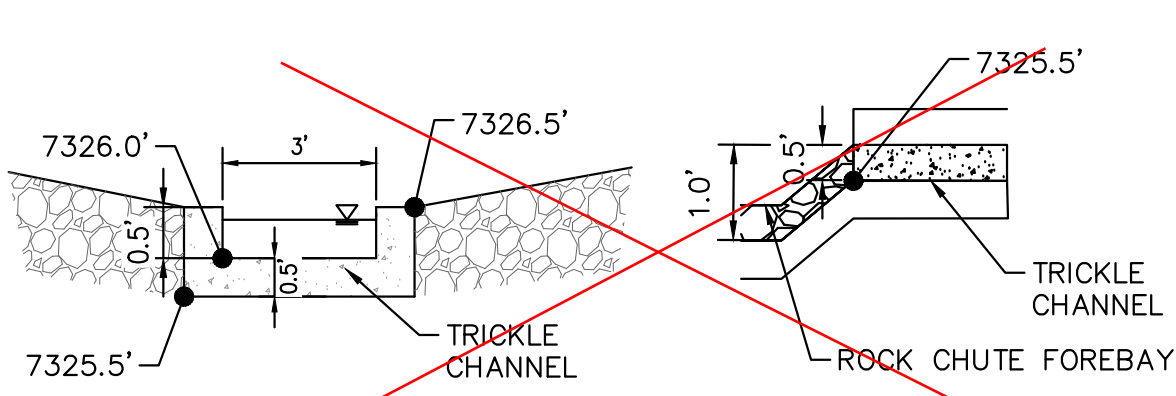
NOTCH REPLACED
WITH PVC PIPE PER
FIELD CHANGE.
VERIFIED WITH EPC
STORMWATER PIOR
TO FIELD CHANGE.
SEE PREVIOUS PAGE



17 **ROCK CHUTE #13 PROFILE- CROSS SECTION 2**
N.T.S.

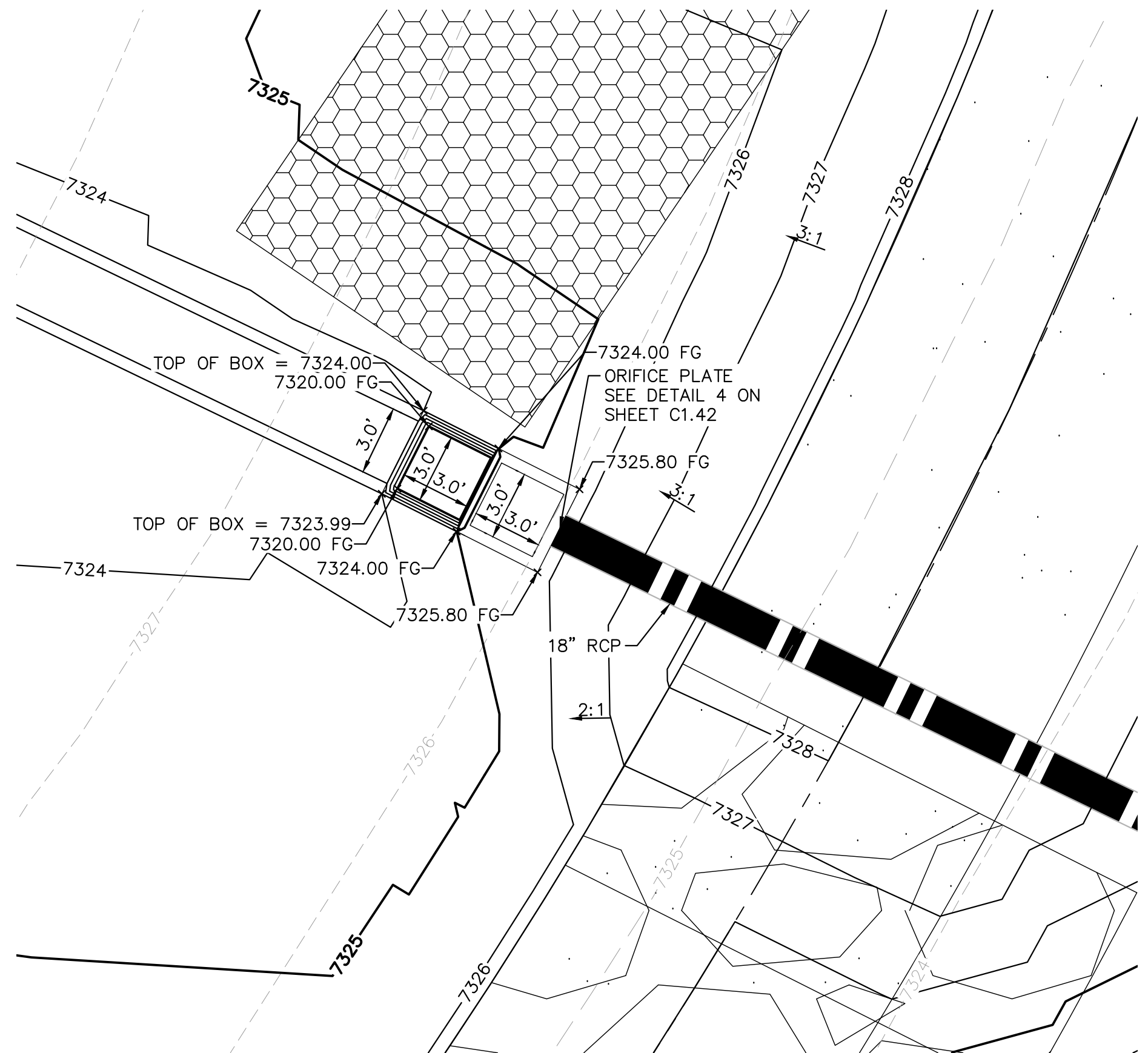


11 **ROCK CHUTE #12 TO TRICKLE CHANNEL TRANSITION**
N.T.S.



14 **ROCK CHUTE #13 TO TRICKLE CHANNEL TRANSITION**
N.T.S.

RECORD DRAWING
THESE RECORD DRAWINGS HAVE BEEN PREPARED BY
KIMLEY-HORN AND ASSOCIATES, INC. BASED ON SURVEY
INFORMATION PROVIDED BY EDWARD JAMES
SURVEYING, INC. THESE RECORD DRAWINGS ARE NOT
GUARANTEED TO BE "AS-BUILT", BUT RATHER BASED ON
THE INFORMATION MADE AVAILABLE.



15 **OUTLET STRUCTURE PLAN VIEW DETAIL**
1"=5'

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
4	Pond 1	107	10	6	24	15	24	18	36	50	1.27	1.50	40
6	Pond 2	110	10	8	32	18	17	18	36	50	1.57	2.00	33
11	Pond 4	26	10	10	40	11	10	9	18	25	0.85	1.50	26
12	WQ Pond	100	11	5	20	20	12	18	36	50	1.81	2.00	28
13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26



Know what's below.
Call before you dig.



CALL UTILITY NOTIFICATION
CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE
BEFORE YOU DIG, GRADE, OR EXCAVATE
FOR THE MARKING OF UNDERGROUND
MEMBER UTILITIES

Kimley»Horn

2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: A.JL
CHECKED BY: KRK
DATE: 12/16/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
WQ POND A DETAILS



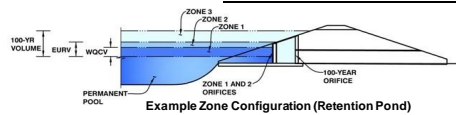
PROJECT NO.
196106001
SHEET

C1.43

EPC 5/30/23

MHFD-Detention, Version 4.06 (July 2022)

Basin ID: _____



Selected BMP Type =	EDB	
Watershed Area =	60.00	acres
Watershed Length =	2.399	ft
Watershed Length to Centroid =	960	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	7.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	6.9%	percent
Percentage Hydrologic Soil Groups C/D =	93.1%	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) =	0.172	acre-feet
Excess Urban Runoff Volume (EURV) =	0.241	acre-feet
2-yr Runoff Volume ($P1 = 1.19$ in.) =	1.063	acre-feet
5-yr Runoff Volume ($P1 = 1.5$ in.) =	2.245	acre-feet
10-yr Runoff Volume ($P1 = 1.75$ in.) =	3.366	acre-feet
25-yr Runoff Volume ($P1 = 2$ in.) =	4.924	acre-feet
50-yr Runoff Volume ($P1 = 2.25$ in.) =	6.155	acre-feet
100-yr Runoff Volume ($P1 = 2.52$ in.) =	7.866	acre-feet
500-yr Runoff Volume ($P1 = 3.14$ in.) =	11.014	acre-feet
Approximate 2-yr Detention Volume =	0.276	acre-feet
Approximate 5-yr Detention Volume =	0.741	acre-feet
Approximate 10-yr Detention Volume =	1.072	acre-feet
Approximate 25-yr Detention Volume =	1.301	acre-feet
Approximate 50-yr Detention Volume =	1.333	acre-feet
Approximate 100-yr Detention Volume =	1.903	acre-feet

Zone 1 Volume (V_{OCV1})	=	0.172	acre-feet
Zone 2 Volume (EVRV - Zone 1)	=	0.069	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2)	=	1.662	acre-feet
Total Detention Basin Volume	=	1.903	acre-feet
Initial Surcharge Volume (A_{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	=	user	H:V
Basin Length-to-Width Ratio (R_{LW})	=	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 ($H_{1,LOOK}$)	=	user	ft
Length of Basin Floor ($L_{1,LOOK}$)	=	user	ft
Width of Basin Floor ($W_{1,LOOK}$)	=	user	ft
Area of Basin Floor ($A_{1,LOOK}$)	=	user	ft ²
Volume of Basin Floor ($V_{1,LOOK}$)	=	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

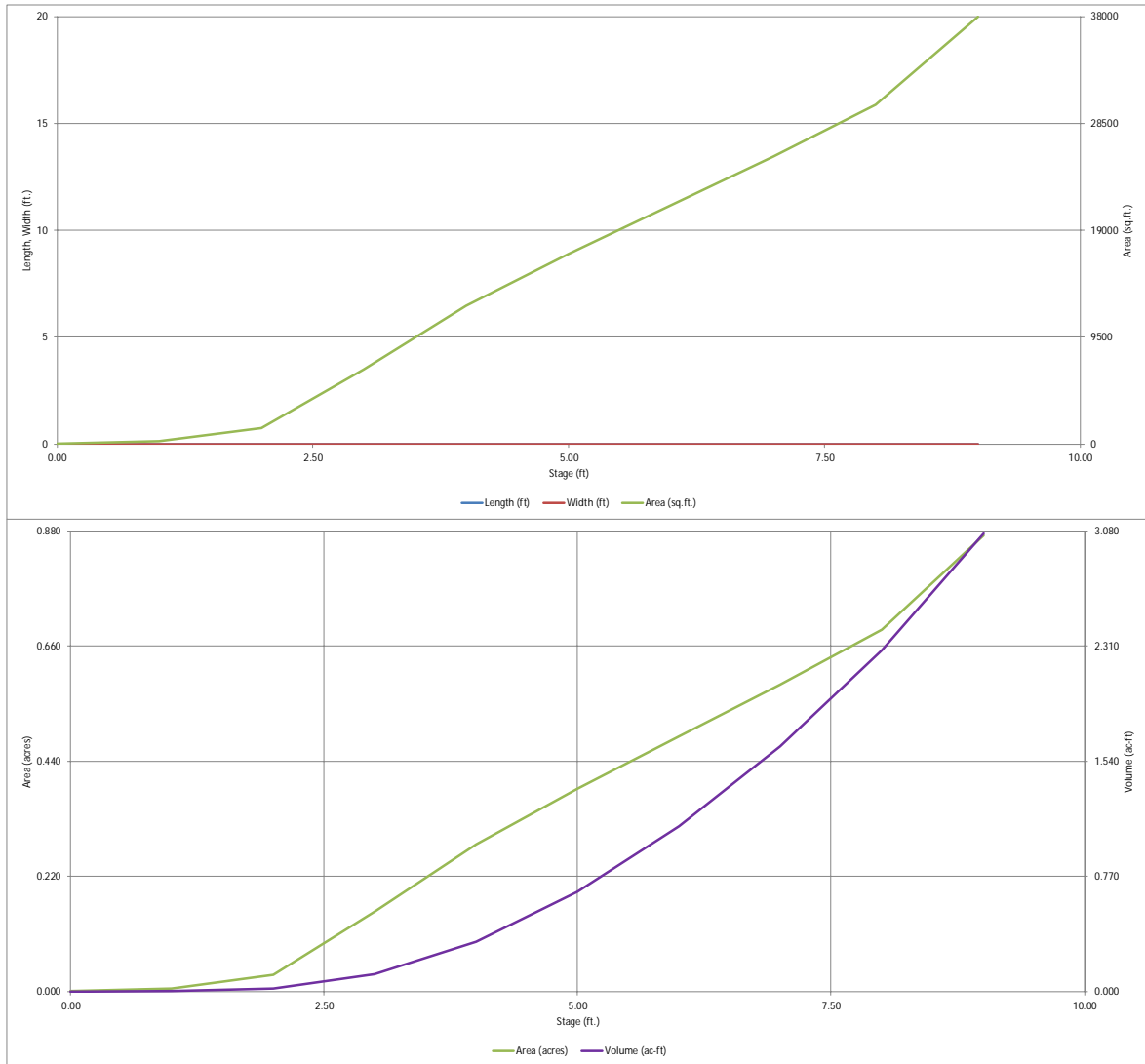
Optional User Overrides

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

MHFD-Detention v4-06 Pond 1- As-Built.xlsm, Basin

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

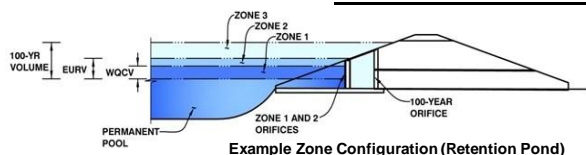


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3- Pond 1- Post Construction

Basin ID:



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.34	0.172	Orifice Plate
Zone 2 (EURV)	3.66	0.069	Orifice Plate
Zone 3 (100-year)	7.43	1.662	Weir&Pipe (Restrict)
Total (all zones)		1.903	

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 ft²
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)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 3.59 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = N/A sq. inches

WQ Orifice Area per Row = N/A 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	0.68	1.35					
Orifice Area (sq. inches)	0.20	0.20	0.20					

	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)

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected
Invert of Vertical Orifice =	N/A	N/A
Depth at top of Zone using Vertical Orifice =	N/A	N/A
Vertical Orifice Diameter =	N/A	N/A

ft (relative to basin bottom at Stage = 0 ft)
ft (relative to basin bottom at Stage = 0 ft)
inches

Vertical Orifice Area = N/A ft²
Vertical Orifice Centroid = N/A feet

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

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected
Overflow Weir Front Edge Height, Ho =	2.85	N/A
Overflow Weir Front Edge Length =	12.00	N/A
Overflow Weir Gate Slope =	4.00	N/A
Horiz. Length of Weir Sides =	6.00	N/A
Overflow Gate Type =	Type C Gate	N/A
Debris Clogging % =	50%	N/A

ft (relative to basin bottom at Stage = 0 ft)
feet
H:V
feet
%
%

Height of Gate Upper Edge, H₁ = 4.35 feet
Overflow Weir Slope Length = 6.18 feet
Gate Open Area / 100-yr Orifice Area = 7.31
Overflow Gate Open Area w/o Debris = 51.65 ft²
Overflow Gate Open Area w/ Debris = 25.83 ft²

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected
Depth to Invert of Outlet Pipe =	0.28	N/A
Outlet Pipe Diameter =	36.00	N/A
Restrictor Plate Height Above Pipe Invert =	36.00	

ft (distance below basin bottom at Stage = 0 ft)
inches
inches

Outlet Orifice Area = 7.07 ft²
Outlet Orifice Centroid = 1.50 feet
Half-Central Angle of Restrictor Plate on Pipe = 3.14 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage = 6.88 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 60.00 feet
Spillway End Slopes = 4.00 H:V
Freeboard above Max Water Surface = 1.00 feet

Spillway Design Flow Depth = 0.68 feet
Stage at Top of Freeboard = 8.56 feet
Basin Area at Top of Freeboard = 0.79 acres
Basin Volume at Top of Freeboard = 2.69 acre-ft

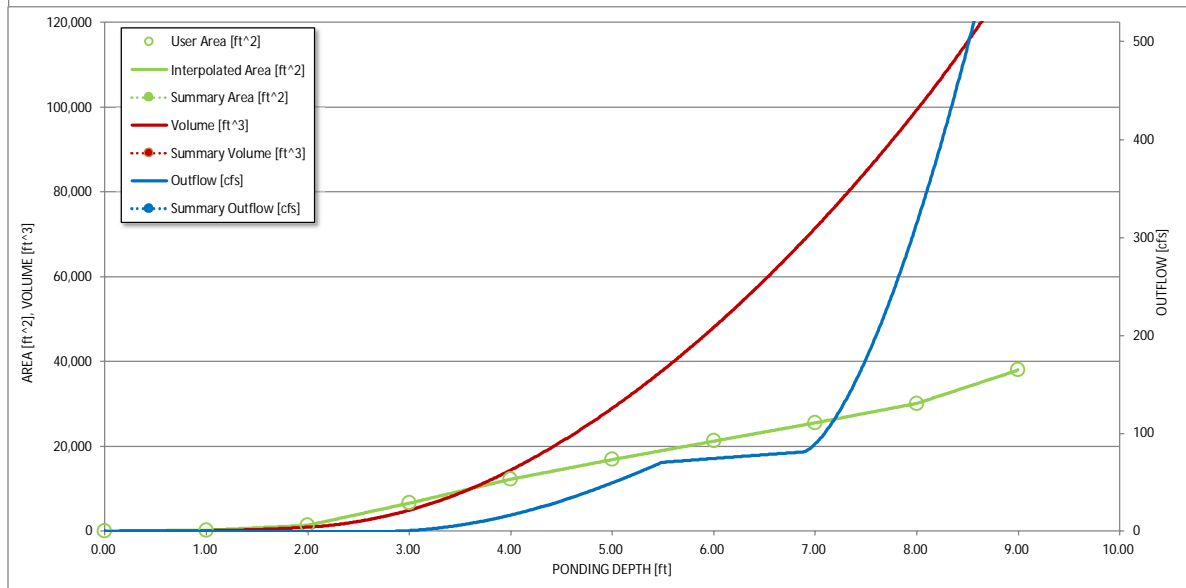
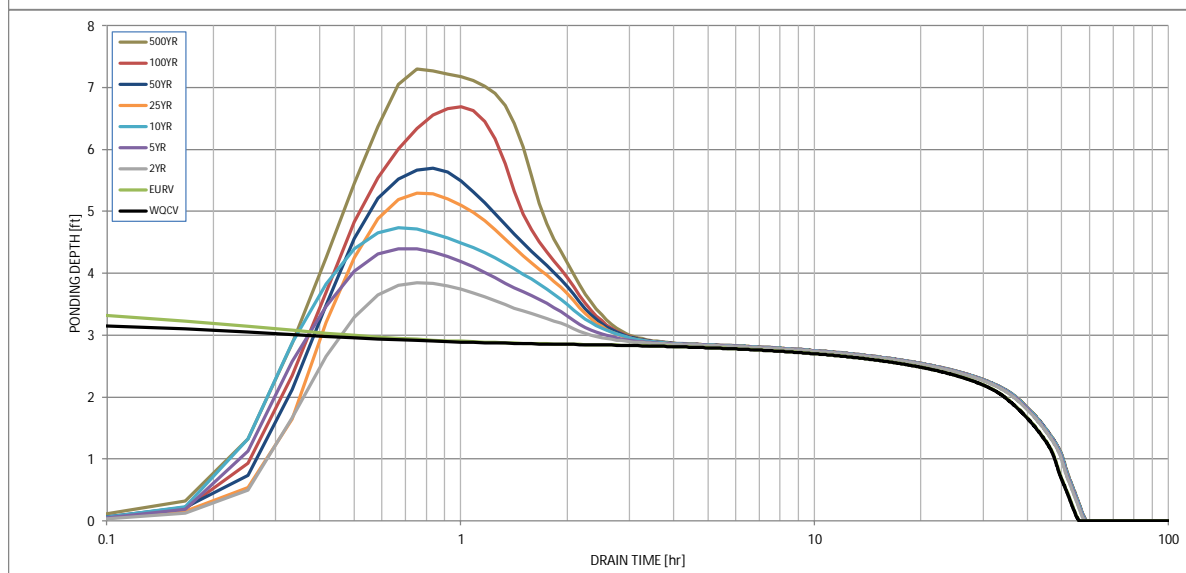
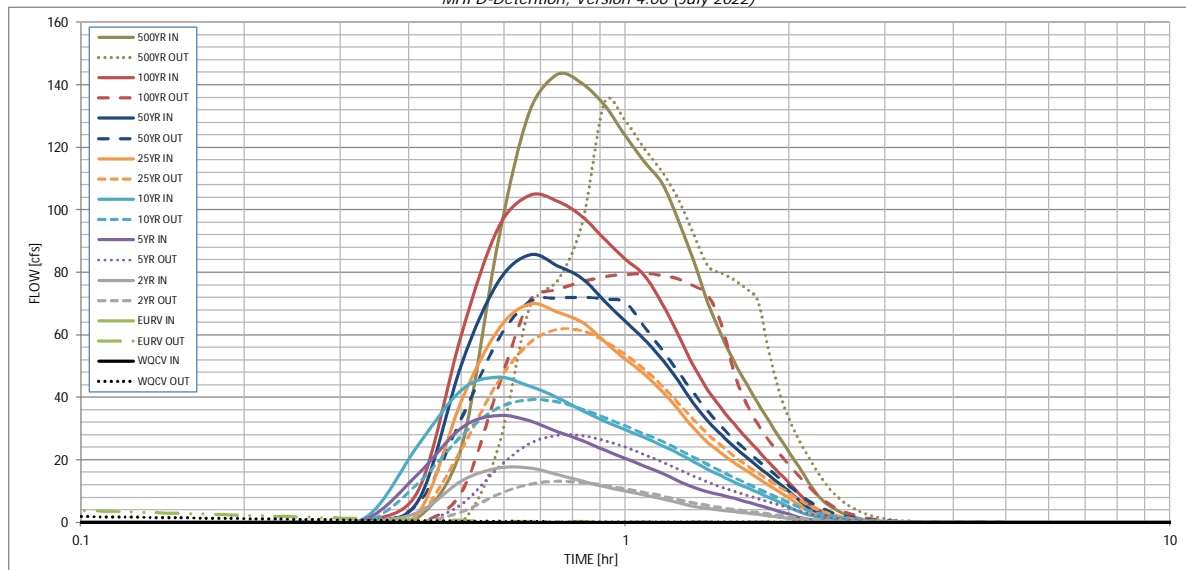
Routed Hydrograph Results

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	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.172	0.241	1.063	2.245	3.366	4.924	6.155	7.866	11.014
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.063	2.245	3.366	4.924	6.155	7.866	11.014
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	14.9	31.4	43.5	66.8	82.6	101.5	140.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.25	0.52	0.73	1.11	1.38	1.69	2.34
Peak Inflow Q (cfs) =	N/A	N/A	17.5	34.3	46.4	69.9	85.7	104.7	143.4
Peak Outflow Q (cfs) =	3.2	7.1	13.2	27.9	39.3	61.8	72.1	79.6	134.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.9	0.9	0.9	0.9	0.8	1.0
Structure Controlling Flow =	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	0.08	0.18	0.26	0.5	0.8	1.2	1.4	1.5	1.6
Max Velocity through Gate 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) =	46	45	32	16	3	3	2	2	2
Time to Drain 99% of Inflow Volume (hours) =	50	49	43	37	31	24	18	11	3
Maximum Ponding Depth (ft) =	3.34	3.66	3.86	4.40	4.73	5.29	5.71	6.69	7.30
Area at Maximum Ponding Depth (acres) =	0.20	0.24	0.26	0.32	0.36	0.42	0.46	0.56	0.62
Maximum Volume Stored (acre-ft) =	0.174	0.243	0.291	0.453	0.565	0.783	0.962	1.464	1.822

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02
	0:15:00	0.00	0.00	0.06	0.10	0.12	0.08	0.10	0.10	0.14
	0:20:00	0.00	0.00	0.23	1.06	1.67	0.23	0.39	0.67	1.58
	0:25:00	0.00	0.00	3.20	15.62	24.87	3.05	6.90	10.32	24.34
	0:30:00	0.00	0.00	13.38	30.35	42.43	39.03	50.84	60.51	89.91
	0:35:00	0.00	0.00	17.37	34.30	46.43	61.69	76.92	94.14	131.53
	0:40:00	0.00	0.00	17.51	32.49	43.63	69.90	85.68	104.70	143.39
	0:45:00	0.00	0.00	15.31	29.16	39.99	67.32	82.23	102.90	140.42
	0:50:00	0.00	0.00	13.26	26.17	35.82	64.04	78.13	97.91	133.39
	0:55:00	0.00	0.00	11.38	23.08	32.38	57.76	70.73	90.50	123.68
	1:00:00	0.00	0.00	10.01	20.46	29.66	52.22	64.26	84.23	115.46
	1:05:00	0.00	0.00	8.83	18.07	27.17	47.46	58.66	79.10	108.58
	1:10:00	0.00	0.00	7.58	15.82	24.68	41.93	52.17	70.10	96.82
	1:15:00	0.00	0.00	6.32	13.34	22.21	36.21	45.44	60.24	83.96
	1:20:00	0.00	0.00	5.17	11.32	19.53	30.22	38.12	50.19	70.48
	1:25:00	0.00	0.00	4.44	9.90	17.06	25.69	32.48	42.48	59.86
	1:30:00	0.00	0.00	3.90	8.75	14.86	22.10	27.97	36.44	51.41
	1:35:00	0.00	0.00	3.45	7.73	12.93	19.14	24.24	31.47	44.41
	1:40:00	0.00	0.00	3.01	6.64	11.18	16.51	20.91	27.08	38.20
	1:45:00	0.00	0.00	2.58	5.59	9.55	14.15	17.92	23.08	32.56
	1:50:00	0.00	0.00	2.15	4.57	8.00	11.92	15.10	19.34	27.29
	1:55:00	0.00	0.00	1.71	3.58	6.47	9.79	12.40	15.84	22.35
	2:00:00	0.00	0.00	1.27	2.61	4.91	7.75	9.83	12.59	17.75
	2:05:00	0.00	0.00	0.82	1.68	3.40	5.67	7.21	9.31	13.11
	2:10:00	0.00	0.00	0.44	1.04	2.43	3.66	4.75	6.24	8.98
	2:15:00	0.00	0.00	0.26	0.71	1.86	2.40	3.20	4.22	6.24
	2:20:00	0.00	0.00	0.17	0.52	1.45	1.62	2.22	2.91	4.42
	2:25:00	0.00	0.00	0.13	0.38	1.13	1.11	1.56	1.99	3.09
	2:30:00	0.00	0.00	0.10	0.28	0.86	0.75	1.08	1.32	2.10
	2:35:00	0.00	0.00	0.08	0.21	0.64	0.51	0.75	0.83	1.38
	2:40:00	0.00	0.00	0.06	0.15	0.46	0.33	0.50	0.48	0.84
	2:45:00	0.00	0.00	0.04	0.11	0.31	0.21	0.32	0.26	0.49
	2:50:00	0.00	0.00	0.03	0.07	0.21	0.14	0.21	0.17	0.32
	2:55:00	0.00	0.00	0.03	0.05	0.14	0.10	0.15	0.12	0.22
	3:00:00	0.00	0.00	0.02	0.04	0.10	0.08	0.11	0.10	0.17
	3:05:00	0.00	0.00	0.02	0.02	0.07	0.06	0.09	0.07	0.13
	3:10:00	0.00	0.00	0.01	0.01	0.05	0.04	0.06	0.06	0.10
	3:15:00	0.00	0.00	0.01	0.01	0.04	0.03	0.05	0.04	0.07
	3:20:00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.03	0.05
	3:25:00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

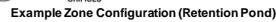
The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

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MHFD-Detention, Version 4.06 (July 2022)

Basin ID: _____

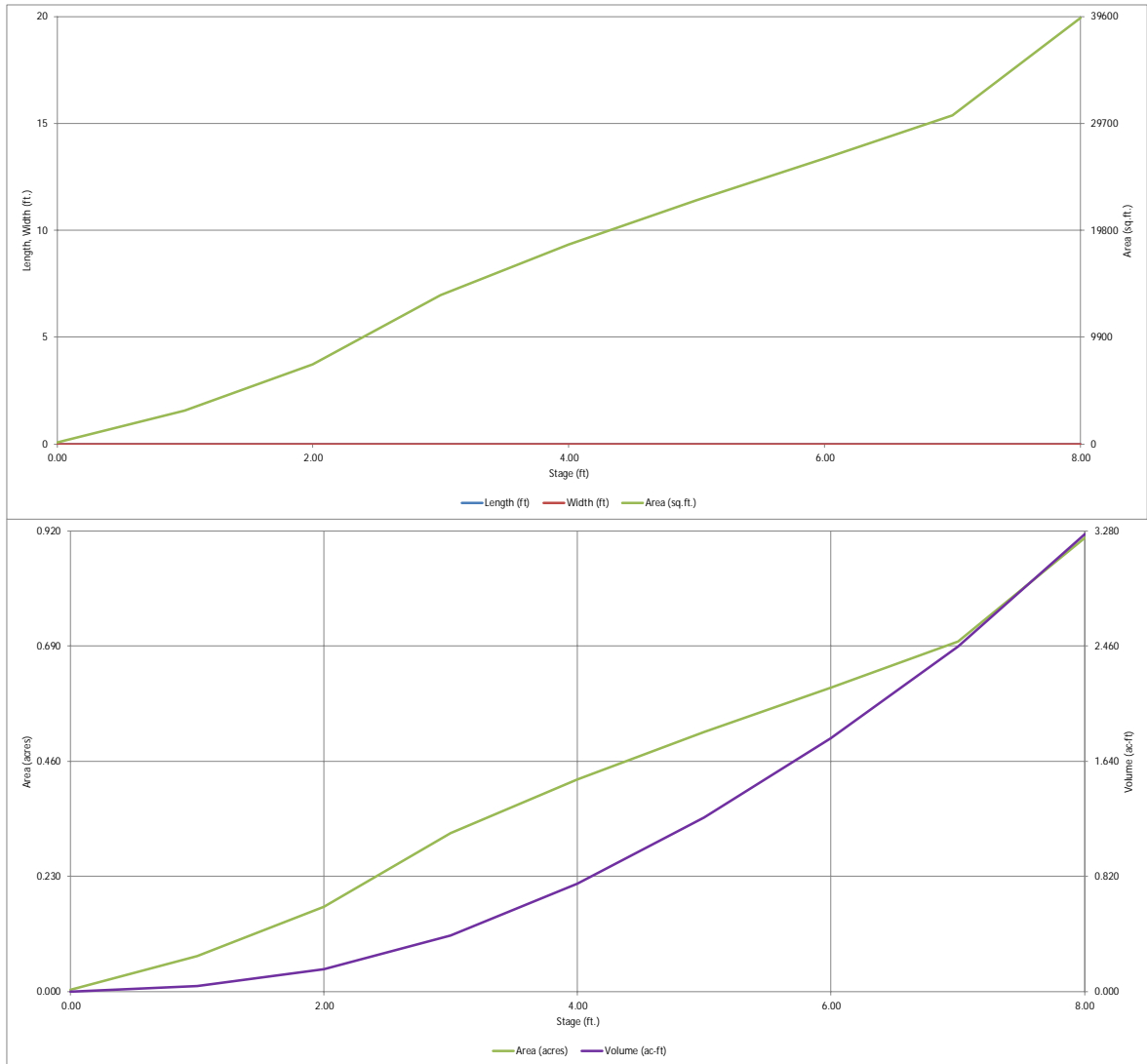


Optional User Overrides

5/23/2025, 8:29 AM

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

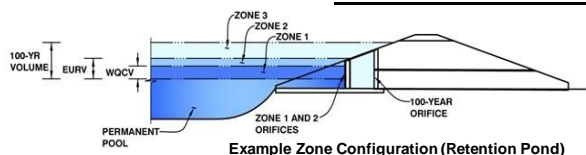


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3- Pond 2-Post Construction

Basin ID:



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WOCV)	2.53	0.267	Orifice Plate
Zone 2 (EURV)	2.95	0.117	Orifice Plate
Zone 3 (100-year)	6.81	1.936	Weir&Pipe (Restrict)
Total (all zones)		2.320	

User Input: Orifice at Underdrain Outlet (typically used to drain WOCV 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 ft²
Underdrain Orifice Centroid = N/A feet

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

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 3.14 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = N/A sq. inches

WO Orifice Area per Row = N/A 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	0.78	1.61					
Orifice Area (sq. inches)	1.10	1.10	1.20					

	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)

Calculated Parameters for Vertical Orifice

	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

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

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

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	2.85	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	15.00	N/A	feet
Overflow Weir Gate Slope =	4.00	N/A	H:V
Horiz. Length of Weir Sides =	6.00	N/A	feet
Overflow Gate Type =	Type C Gate	N/A	
Debris Clogging % =	50%	N/A	%

	Zone 3 Weir	Not Selected	
Height of Gate Upper Edge, H _i =	4.35	N/A	feet
Overflow Weir Slope Length =	6.18	N/A	feet
Gate Open Area / 100-yr Orifice Area =	8.87	N/A	
Overflow Gate Open Area w/o Debris =	64.57	N/A	ft ²
Overflow Gate Open Area w/ Debris =	32.28	N/A	ft ²

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.63	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 =	27.00		inches

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	7.28	N/A	ft ²
Outlet Orifice Centroid =	1.28	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.70	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage =	5.94	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	60.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Spillway Design Flow Depth =	0.70	feet
Stage at Top of Freeboard =	7.64	feet
Basin Area at Top of Freeboard =	0.83	acres
Basin Volume at Top of Freeboard =	2.95	acre-ft

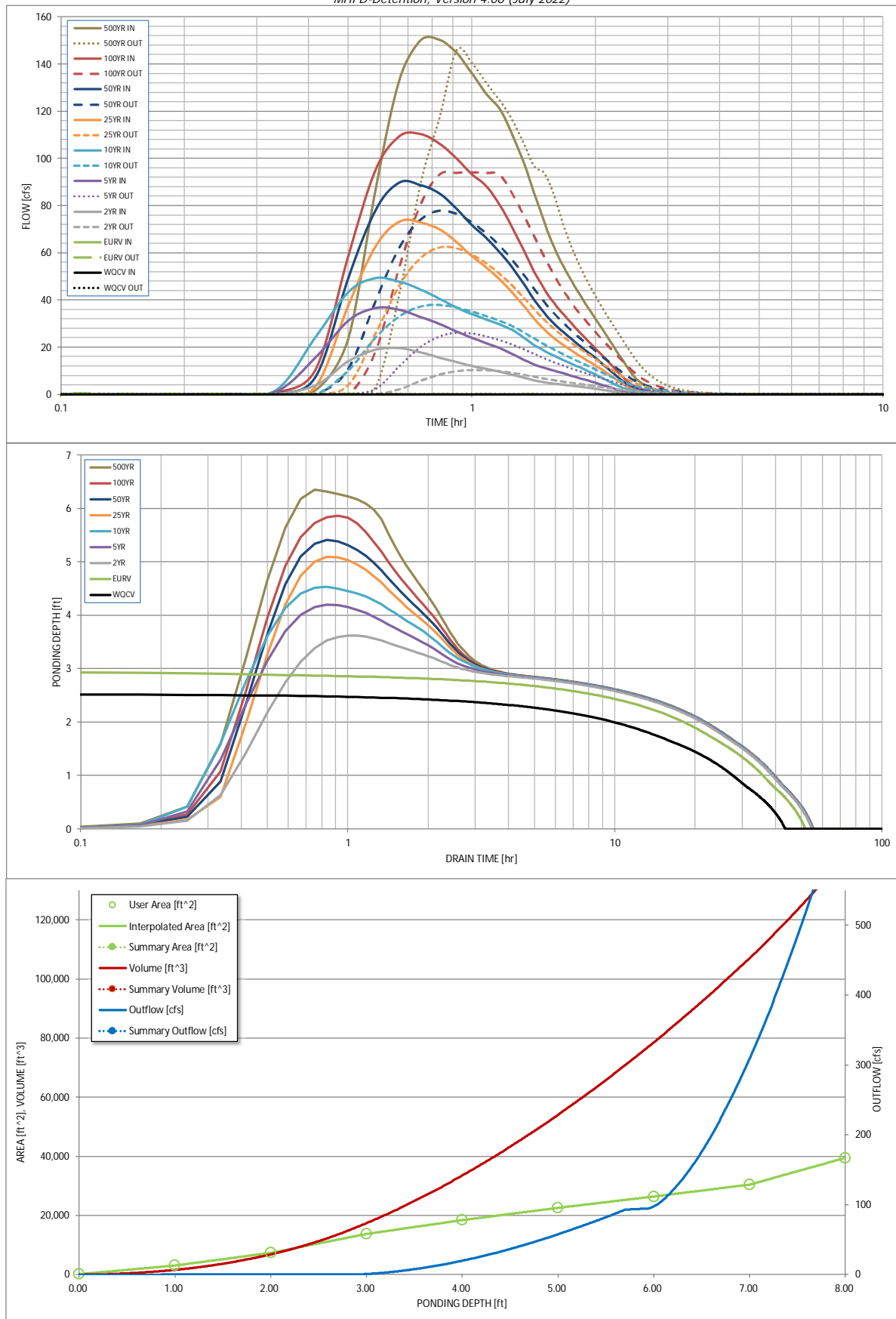
Routed Hydrograph Results

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

	WOCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.267	0.384	1.313	2.686	3.969	5.724	7.125	9.058	12.632
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.313	2.686	3.969	5.724	7.125	9.058	12.632
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	16.1	32.7	45.3	69.8	85.8	107.3	147.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.24	0.48	0.67	1.03	1.26	1.58	2.17
Peak Inflow Q (cfs) =	N/A	N/A	19.6	36.7	49.3	73.4	89.9	110.4	150.3
Peak Outflow Q (cfs) =	0.1	0.5	10.4	26.1	37.9	62.3	77.9	94.2	145.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.8	0.9	0.9	0.9	1.0
Structure Controlling Flow =	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	N/A	0.01	0.16	0.4	0.6	1.0	1.2	1.5	1.5
Max Velocity through Gate 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	44	39	31	26	20	16	11	4
Time to Drain 99% of Inflow Volume (hours) =	41	48	47	42	39	35	33	30	25
Maximum Ponding Depth (ft) =	2.53	2.95	3.62	4.20	4.53	5.10	5.42	5.87	6.35
Area at Maximum Ponding Depth (acres) =	0.25	0.31	0.38	0.44	0.47	0.53	0.55	0.60	0.64
Maximum Volume Stored (acre-ft) =	0.268	0.384	0.617	0.856	1.008	1.288	1.461	1.726	2.022

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03
	0:15:00	0.00	0.00	0.08	0.12	0.15	0.10	0.13	0.13	0.19
	0:20:00	0.00	0.00	0.30	1.23	1.90	0.31	0.50	0.80	1.82
	0:25:00	0.00	0.00	3.94	15.71	24.46	3.45	7.51	10.76	24.03
	0:30:00	0.00	0.00	14.11	31.27	43.51	38.00	49.61	59.01	87.95
	0:35:00	0.00	0.00	18.98	36.68	49.33	63.02	78.48	95.59	133.66
	0:40:00	0.00	0.00	19.65	35.86	47.83	73.41	89.85	109.53	150.06
	0:45:00	0.00	0.00	17.81	32.86	44.47	72.87	88.77	110.38	150.35
	0:50:00	0.00	0.00	15.64	29.98	40.63	70.00	85.19	106.37	144.73
	0:55:00	0.00	0.00	13.70	26.74	36.84	64.56	78.72	99.93	136.06
	1:00:00	0.00	0.00	12.05	23.98	34.06	58.49	71.67	93.22	127.41
	1:05:00	0.00	0.00	10.86	21.73	31.81	53.86	66.28	88.31	120.96
	1:10:00	0.00	0.00	9.62	19.64	29.64	48.68	60.25	80.26	110.52
	1:15:00	0.00	0.00	8.37	17.30	27.44	43.42	54.11	71.13	98.70
	1:20:00	0.00	0.00	7.14	14.84	24.27	37.71	47.09	61.39	85.40
	1:25:00	0.00	0.00	6.00	12.72	20.99	32.12	40.17	52.13	72.71
	1:30:00	0.00	0.00	5.15	11.22	18.43	27.37	34.34	44.46	62.26
	1:35:00	0.00	0.00	4.60	10.09	16.36	23.85	29.98	38.69	54.29
	1:40:00	0.00	0.00	4.13	8.96	14.55	21.00	26.42	34.01	47.75
	1:45:00	0.00	0.00	3.70	7.87	12.90	18.51	23.29	29.86	41.95
	1:50:00	0.00	0.00	3.28	6.84	11.38	16.26	20.47	26.11	36.70
	1:55:00	0.00	0.00	2.83	5.85	9.88	14.17	17.84	22.62	31.81
	2:00:00	0.00	0.00	2.38	4.89	8.33	12.17	15.33	19.35	27.22
	2:05:00	0.00	0.00	1.93	3.94	6.78	10.16	12.79	16.17	22.71
	2:10:00	0.00	0.00	1.48	3.01	5.29	8.18	10.29	13.08	18.33
	2:15:00	0.00	0.00	1.04	2.10	3.89	6.24	7.85	10.05	14.06
	2:20:00	0.00	0.00	0.63	1.33	2.73	4.36	5.52	7.14	10.06
	2:25:00	0.00	0.00	0.34	0.87	2.05	2.79	3.64	4.76	6.89
	2:30:00	0.00	0.00	0.23	0.64	1.61	1.89	2.53	3.28	4.87
	2:35:00	0.00	0.00	0.17	0.48	1.26	1.30	1.79	2.28	3.46
	2:40:00	0.00	0.00	0.13	0.36	0.98	0.90	1.26	1.55	2.41
	2:45:00	0.00	0.00	0.10	0.27	0.75	0.62	0.88	1.02	1.63
	2:50:00	0.00	0.00	0.08	0.20	0.55	0.42	0.61	0.63	1.05
	2:55:00	0.00	0.00	0.06	0.15	0.40	0.28	0.41	0.37	0.64
	3:00:00	0.00	0.00	0.05	0.10	0.27	0.19	0.27	0.22	0.40
	3:05:00	0.00	0.00	0.04	0.07	0.18	0.13	0.19	0.16	0.28
	3:10:00	0.00	0.00	0.03	0.05	0.13	0.10	0.14	0.12	0.21
	3:15:00	0.00	0.00	0.02	0.03	0.09	0.07	0.11	0.09	0.17
	3:20:00	0.00	0.00	0.02	0.02	0.07	0.06	0.08	0.07	0.13
	3:25:00	0.00	0.00	0.01	0.01	0.05	0.04	0.06	0.05	0.09
	3:30:00	0.00	0.00	0.01	0.01	0.03	0.03	0.04	0.04	0.07
	3:35:00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.02	0.04
	3:40:00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.02
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

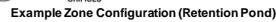
The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

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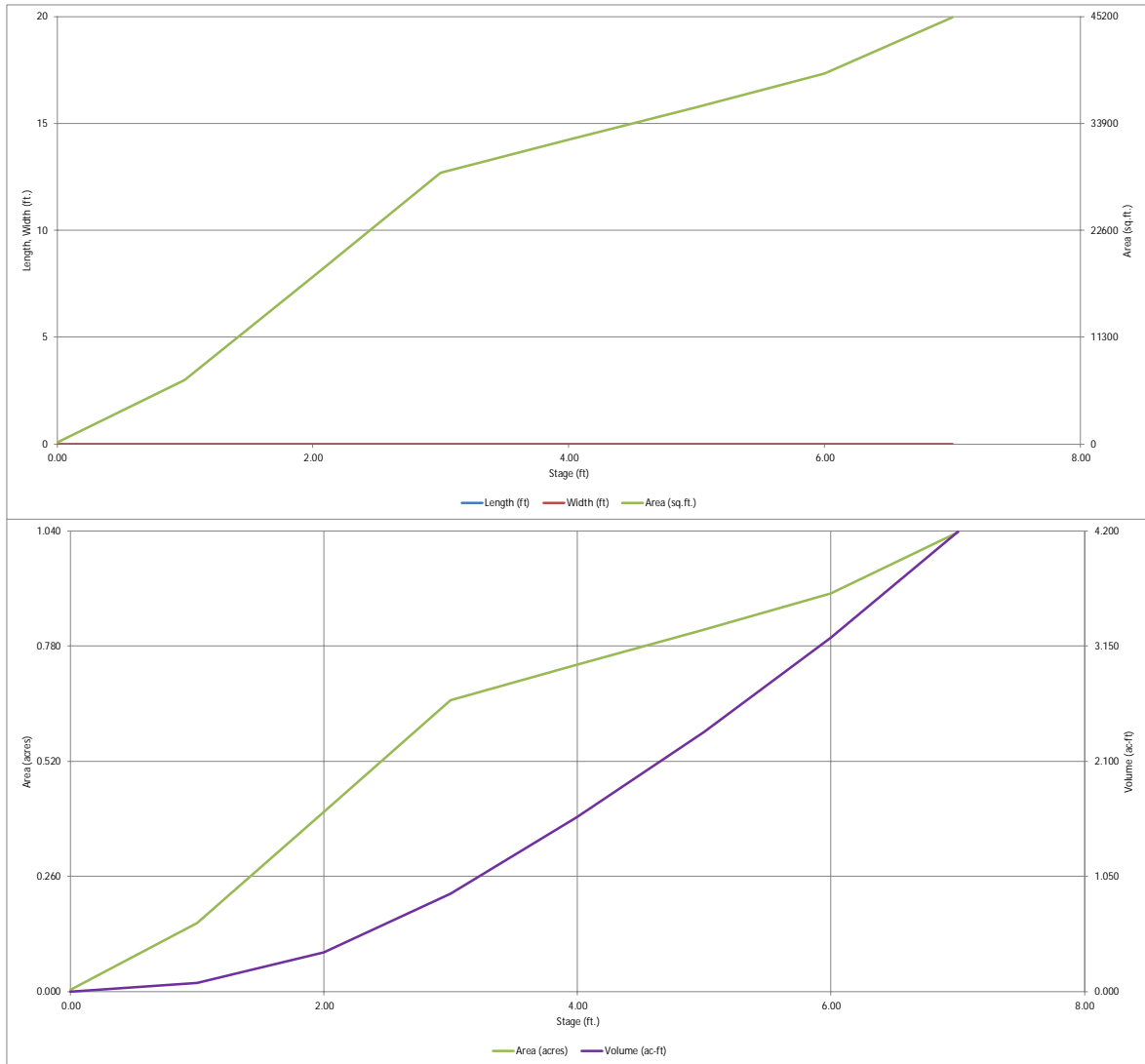
MHFD-Detention, Version 4.06 (July 2022)

Basin ID: _____

[illegible]

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

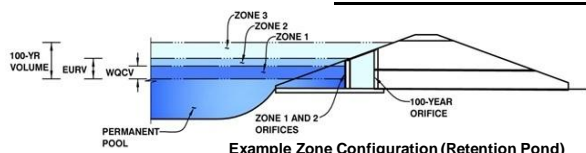


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3-Pond 4-Post Construction

Basin ID:



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.70	0.247	Orifice Plate
Zone 2 (EURV)	2.18	0.186	Orifice Plate
Zone 3 (100-year)	5.24	2.128	Weir&Pipe (Restrict)
Total (all zones)		2.561	

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 ft²
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)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 2.18 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = N/A sq. inches

WQ Orifice Area per Row = N/A 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	0.55	1.16					
Orifice Area (sq. inches)	1.10	1.10	1.20					

	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)

Calculated Parameters for Vertical Orifice

	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

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

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

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	1.64	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	12.00	N/A	feet
Overflow Weir Gate Slope =	4.00	N/A	H:V
Horiz. Length of Weir Sides =	6.00	N/A	feet
Overflow Gate Type =	Type C Gate	N/A	
Debris Clogging % =	50%	N/A	%

	Zone 3 Weir	Not Selected	
Height of Gate Upper Edge, H _i =	3.14	N/A	feet
Overflow Weir Slope Length =	6.18	N/A	feet
Gate Open Area / 100-yr Orifice Area =	8.26	N/A	
Overflow Gate Open Area w/o Debris =	51.65	N/A	ft ²
Overflow Gate Open Area w/ Debris =	25.83	N/A	ft ²

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.14	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	42.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	26.00		inches

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	6.25	N/A	ft ²
Outlet Orifice Centroid =	1.23	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.81	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage =	5.07	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	60.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Spillway Design Flow Depth =	0.69	feet
Stage at Top of Freeboard =	6.76	feet
Basin Area at Top of Freeboard =	1.00	acres
Basin Volume at Top of Freeboard =	3.95	acre-ft

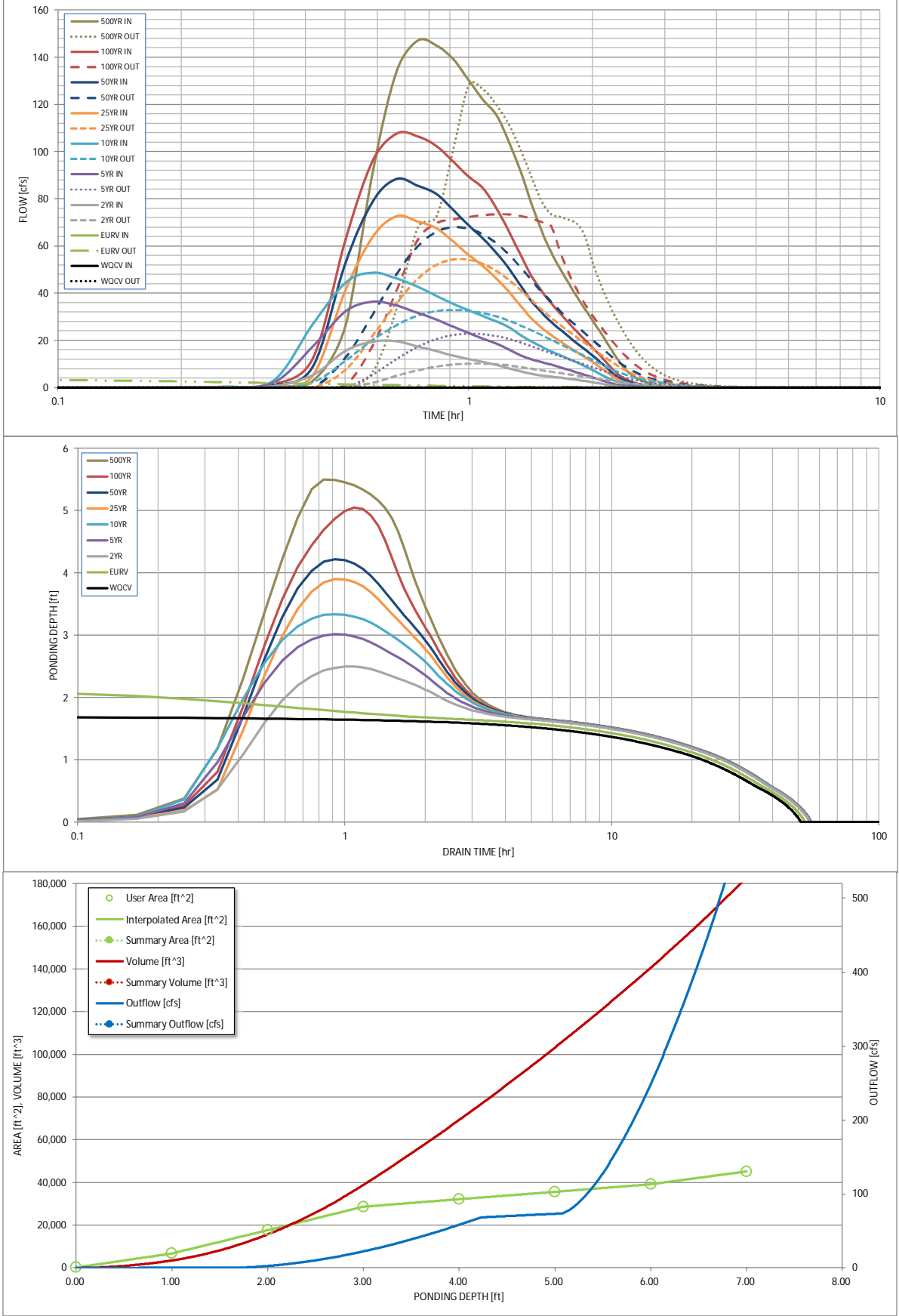
Routed Hydrograph Results

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	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.247	0.433	1.333	2.607	3.819	5.479	6.792	8.600	11.978
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.333	2.607	3.819	5.479	6.792	8.600	11.978
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	14.4	30.4	42.6	65.8	81.6	101.6	140.1
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.22	0.48	0.67	1.03	1.27	1.59	2.19
Peak Inflow Q (cfs) =	N/A	N/A	19.7	36.5	48.8	72.7	88.5	107.7	147.0
Peak Outflow Q (cfs) =	0.2	4.2	10.2	22.9	33.0	54.3	68.1	73.5	128.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.8	0.8	0.8	0.7	0.9
Structure Controlling Flow =	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	0.00	0.09	0.19	0.4	0.6	1.0	1.3	1.4	1.5
Max Velocity through Gate 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) =	45	44	35	27	20	13	9	4	3
Time to Drain 99% of Inflow Volume (hours) =	48	49	45	40	36	32	29	26	20
Maximum Ponding Depth (ft) =	1.70	2.18	2.50	3.02	3.34	3.90	4.22	5.05	5.50
Area at Maximum Ponding Depth (acres) =	0.33	0.45	0.53	0.66	0.69	0.73	0.76	0.82	0.86
Maximum Volume Stored (acre-ft) =	0.250	0.437	0.595	0.899	1.121	1.517	1.755	2.402	2.788

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.06
	0:15:00	0.00	0.00	0.16	0.26	0.32	0.22	0.28	0.26	0.40
	0:20:00	0.00	0.00	0.63	1.98	2.92	0.62	0.98	1.40	2.83
	0:25:00	0.00	0.00	5.29	17.45	26.81	5.08	8.75	12.20	26.33
	0:30:00	0.00	0.00	15.64	32.36	44.49	41.35	52.95	62.61	92.03
	0:35:00	0.00	0.00	19.56	36.48	48.78	64.01	79.13	96.40	134.06
	0:40:00	0.00	0.00	19.67	34.84	46.23	72.65	88.52	107.73	147.03
	0:45:00	0.00	0.00	17.51	31.68	42.86	70.45	85.58	106.61	145.05
	0:50:00	0.00	0.00	15.49	28.89	38.98	67.63	82.09	102.38	139.08
	0:55:00	0.00	0.00	13.61	25.73	35.41	61.81	75.23	95.65	130.15
	1:00:00	0.00	0.00	12.12	23.06	32.68	56.12	68.60	89.28	121.88
	1:05:00	0.00	0.00	10.92	20.75	30.33	51.46	63.17	84.36	115.35
	1:10:00	0.00	0.00	9.60	18.58	28.00	46.12	56.95	75.79	104.20
	1:15:00	0.00	0.00	8.26	16.18	25.65	40.67	50.58	66.39	91.99
	1:20:00	0.00	0.00	6.95	13.77	22.41	34.83	43.42	56.47	78.48
	1:25:00	0.00	0.00	5.88	12.02	19.64	29.43	36.79	47.59	66.51
	1:30:00	0.00	0.00	5.22	10.81	17.39	25.46	31.89	41.00	57.43
	1:35:00	0.00	0.00	4.69	9.76	15.46	22.28	27.94	35.80	50.20
	1:40:00	0.00	0.00	4.22	8.62	13.71	19.58	24.57	31.33	43.95
	1:45:00	0.00	0.00	3.75	7.49	12.10	17.15	21.52	27.31	38.33
	1:50:00	0.00	0.00	3.30	6.42	10.58	14.94	18.75	23.61	33.16
	1:55:00	0.00	0.00	2.80	5.39	9.06	12.82	16.10	20.14	28.29
	2:00:00	0.00	0.00	2.29	4.38	7.45	10.79	13.56	16.89	23.74
	2:05:00	0.00	0.00	1.78	3.36	5.82	8.69	10.93	13.65	19.15
	2:10:00	0.00	0.00	1.27	2.37	4.28	6.60	8.31	10.43	14.60
	2:15:00	0.00	0.00	0.81	1.56	3.08	4.60	5.84	7.38	10.43
	2:20:00	0.00	0.00	0.51	1.08	2.35	3.03	3.94	5.00	7.26
	2:25:00	0.00	0.00	0.37	0.81	1.86	2.10	2.79	3.50	5.19
	2:30:00	0.00	0.00	0.28	0.62	1.47	1.48	2.01	2.46	3.73
	2:35:00	0.00	0.00	0.22	0.48	1.15	1.05	1.45	1.70	2.64
	2:40:00	0.00	0.00	0.17	0.37	0.89	0.74	1.04	1.14	1.82
	2:45:00	0.00	0.00	0.14	0.28	0.67	0.53	0.74	0.74	1.20
	2:50:00	0.00	0.00	0.11	0.21	0.49	0.37	0.52	0.45	0.77
	2:55:00	0.00	0.00	0.08	0.16	0.35	0.26	0.36	0.30	0.51
	3:00:00	0.00	0.00	0.07	0.11	0.25	0.19	0.27	0.22	0.38
	3:05:00	0.00	0.00	0.05	0.08	0.18	0.15	0.20	0.17	0.29
	3:10:00	0.00	0.00	0.04	0.06	0.14	0.11	0.16	0.14	0.23
	3:15:00	0.00	0.00	0.03	0.04	0.10	0.08	0.12	0.11	0.18
	3:20:00	0.00	0.00	0.02	0.02	0.07	0.06	0.09	0.08	0.13
	3:25:00	0.00	0.00	0.01	0.01	0.05	0.04	0.06	0.05	0.09
	3:30:00	0.00	0.00	0.01	0.01	0.03	0.03	0.04	0.03	0.06
	3:35:00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

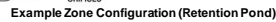
The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

[illegible]

MHFD-Detention, Version 4.06 (July 2022)

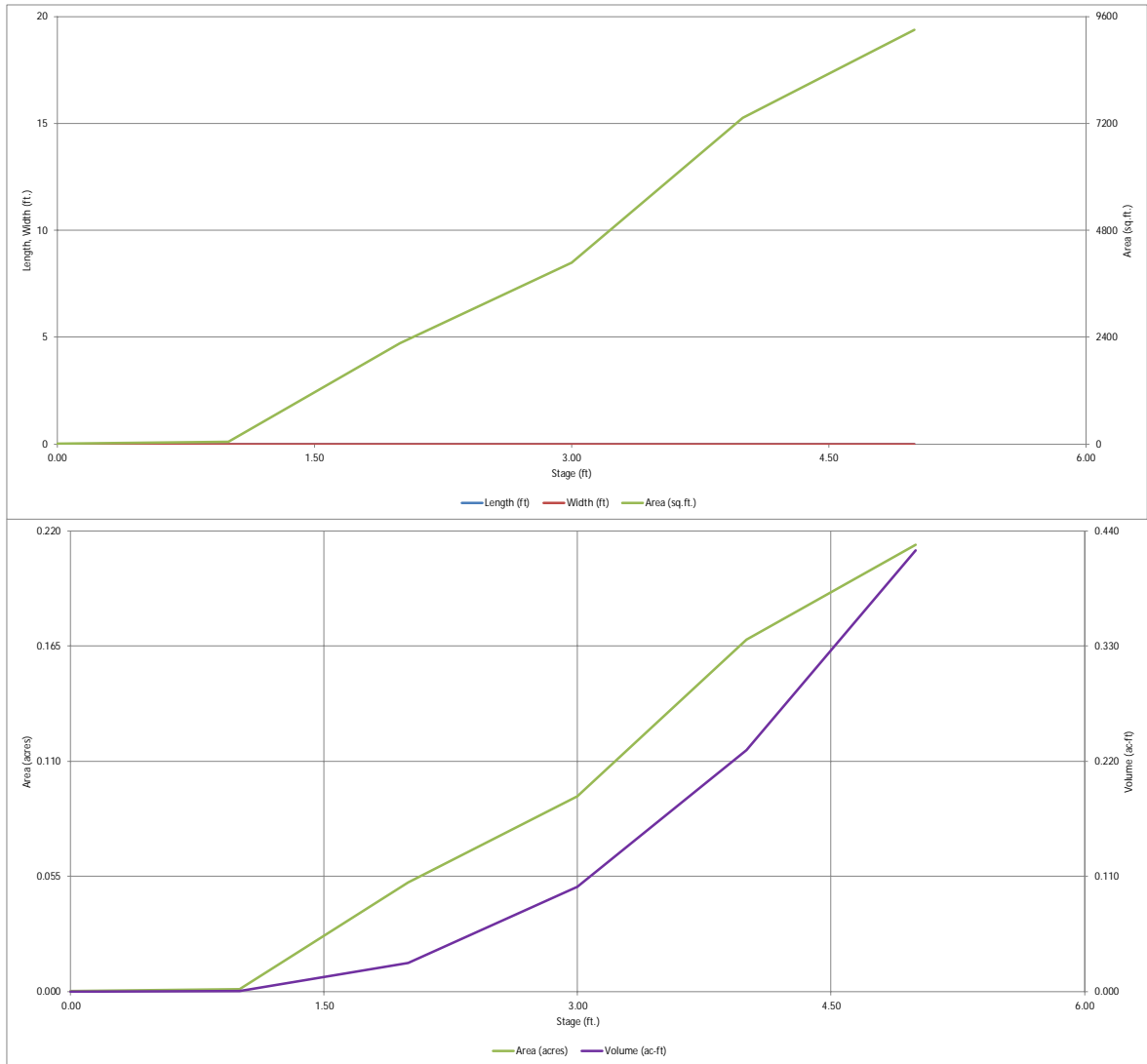
Basin ID: _____



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

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

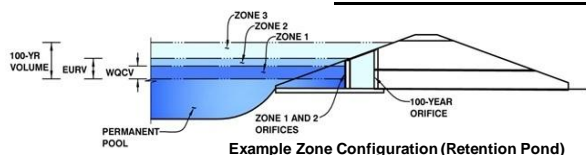


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filing No. 3- WQ Pond A- Post Construction

Basin ID:



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.34	0.047	Orifice Plate
Zone 2 (EURV)	3.36	0.091	Weir&Pipe (Restrict)
Zone 3 (100-year)	#VALUE!	1.607	Not Utilized
Total (all zones)		1.745	

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 ft²
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)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 3.36 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = N/A sq. inches

WQ Orifice Area per Row = N/A 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	1.02	1.99					
Orifice Area (sq. inches)	0.16	0.16	0.16					

	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)

Calculated Parameters for Vertical Orifice

	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

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

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

Calculated Parameters for Overflow Weir

	Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.22	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00	N/A	feet
Overflow Weir Gate Slope =	10.00	N/A	H:V
Horiz. Length of Weir Sides =	3.00	N/A	feet
Overflow Gate Type =	Type C Gate	N/A	
Debris Clogging % =	50%	N/A	%

	Zone 2 Weir	Not Selected	
Height of Gate Upper Edge, H ₁ =	3.52	N/A	feet
Overflow Weir Slope Length =	3.01	N/A	feet
Gate Open Area / 100-yr Orifice Area =	3.56	N/A	
Overflow Gate Open Area w/o Debris =	6.30	N/A	ft ²
Overflow Gate Open Area w/ Debris =	3.15	N/A	ft ²

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 2 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.95	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	18.00		inches

	Zone 2 Restrictor	Not Selected	
Outlet Orifice Area =	1.77	N/A	ft ²
Outlet Orifice Centroid =	0.75	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage =	3.79	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	47.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Spillway Design Flow Depth =	0.99	feet
Stage at Top of Freeboard =	5.78	feet
Basin Area at Top of Freeboard =	0.21	acres
Basin Volume at Top of Freeboard =	0.42	acre-ft

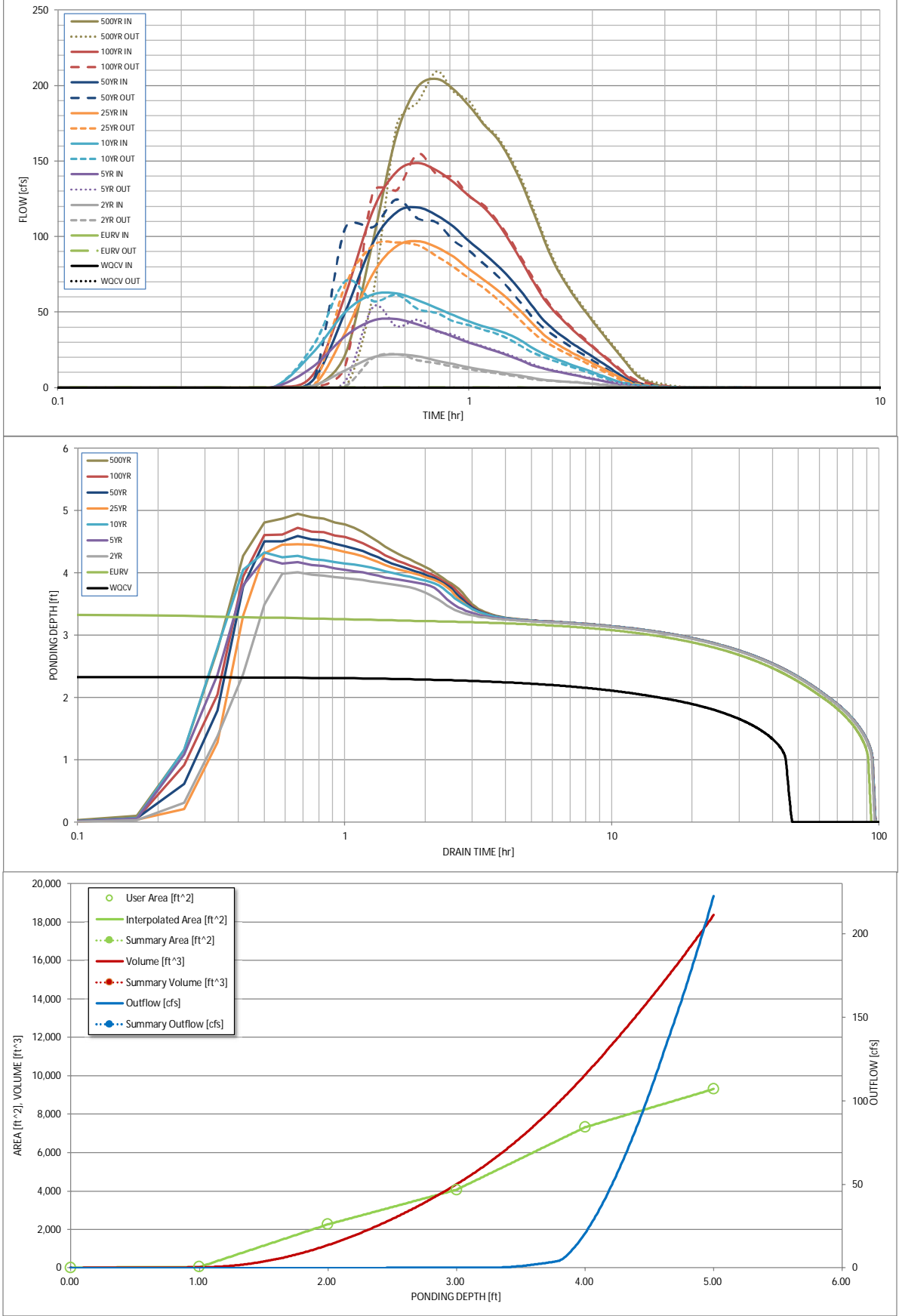
Routed Hydrograph Results

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	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.047	0.138	1.393	3.212	4.950	7.434	9.361	12.096	17.035
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.393	3.212	4.950	7.434	9.361	12.096	17.035
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	22.1	45.3	62.3	97.1	119.4	148.8	204.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.23	0.48	0.66	1.03	1.26	1.57	2.16
Peak Inflow Q (cfs) =	N/A	N/A	22.1	45.3	62.3	97.1	119.4	148.8	204.5
Peak Outflow Q (cfs) =	0.0	0.3	22.2	53.3	70.5	96.2	124.7	154.9	209.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.2	1.1	1.0	1.0	1.0	1.0
Structure Controlling Flow =	Plate	Overflow Weir 1	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Gate 1 (fps) =	N/A	0.05	1.14	1.7	2.0	2.4	2.8	3.0	3.1
Max Velocity through Gate 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) =	44	86	53	19	3	2	1	1	1
Time to Drain 99% of Inflow Volume (hours) =	45	90	78	61	48	32	21	7	3
Maximum Ponding Depth (ft) =	2.34	3.36	4.01	4.23	4.33	4.46	4.59	4.73	4.95
Area at Maximum Ponding Depth (acres) =	0.07	0.12	0.17	0.18	0.18	0.19	0.19	0.20	0.21
Maximum Volume Stored (acre-ft) =	0.047	0.138	0.232	0.270	0.287	0.313	0.338	0.363	0.411

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:15:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	0:20:00	0.00	0.00	0.04	0.29	0.46	0.02	0.09	0.17	0.43
	0:25:00	0.00	0.00	1.33	13.76	22.95	0.85	4.93	8.35	22.30
	0:30:00	0.00	0.00	11.69	34.13	50.21	36.94	50.57	61.72	97.19
	0:35:00	0.00	0.00	20.03	44.44	61.81	75.52	95.92	117.38	167.65
	0:40:00	0.00	0.00	22.12	45.30	62.28	93.71	116.30	143.06	198.90
	0:45:00	0.00	0.00	20.77	41.81	57.92	97.08	119.41	148.83	204.55
	0:50:00	0.00	0.00	17.91	37.82	52.89	93.01	114.25	143.91	197.61
	0:55:00	0.00	0.00	15.56	33.74	47.88	86.67	106.63	135.94	186.72
	1:00:00	0.00	0.00	13.40	29.85	43.82	78.52	97.07	126.91	174.89
	1:05:00	0.00	0.00	11.78	26.74	40.72	71.79	89.25	119.64	165.40
	1:10:00	0.00	0.00	10.42	24.01	37.99	65.00	81.35	109.82	152.67
	1:15:00	0.00	0.00	9.13	21.17	35.27	58.10	73.29	97.88	137.22
	1:20:00	0.00	0.00	7.86	18.16	31.49	50.82	64.37	85.28	120.06
	1:25:00	0.00	0.00	6.59	15.19	26.79	43.48	55.06	72.75	102.40
	1:30:00	0.00	0.00	5.40	12.98	23.13	36.38	46.23	61.29	86.69
	1:35:00	0.00	0.00	4.75	11.50	20.33	31.37	39.95	52.87	74.93
	1:40:00	0.00	0.00	4.24	10.22	17.97	27.49	35.02	46.34	65.69
	1:45:00	0.00	0.00	3.81	9.03	15.84	24.23	30.86	40.71	57.69
	1:50:00	0.00	0.00	3.39	7.90	13.90	21.29	27.10	35.68	50.53
	1:55:00	0.00	0.00	2.95	6.83	12.05	18.65	23.71	31.07	43.96
	2:00:00	0.00	0.00	2.52	5.79	10.24	16.11	20.46	26.75	37.80
	2:05:00	0.00	0.00	2.08	4.75	8.47	13.66	17.32	22.67	31.97
	2:10:00	0.00	0.00	1.65	3.74	6.77	11.31	14.31	18.87	26.52
	2:15:00	0.00	0.00	1.22	2.75	5.15	8.98	11.36	15.11	21.18
	2:20:00	0.00	0.00	0.80	1.76	3.62	6.70	8.48	11.40	15.95
	2:25:00	0.00	0.00	0.39	0.99	2.44	4.43	5.68	7.83	11.07
	2:30:00	0.00	0.00	0.15	0.58	1.77	2.72	3.60	5.10	7.42
	2:35:00	0.00	0.00	0.07	0.38	1.35	1.74	2.39	3.42	5.10
	2:40:00	0.00	0.00	0.04	0.26	1.02	1.13	1.60	2.28	3.49
	2:45:00	0.00	0.00	0.03	0.17	0.77	0.71	1.05	1.47	2.31
	2:50:00	0.00	0.00	0.02	0.12	0.55	0.44	0.67	0.89	1.45
	2:55:00	0.00	0.00	0.02	0.08	0.38	0.26	0.41	0.48	0.82
	3:00:00	0.00	0.00	0.01	0.05	0.24	0.14	0.23	0.21	0.40
	3:05:00	0.00	0.00	0.01	0.03	0.14	0.07	0.12	0.09	0.19
	3:10:00	0.00	0.00	0.01	0.02	0.07	0.04	0.07	0.05	0.10
	3:15:00	0.00	0.00	0.01	0.01	0.04	0.03	0.04	0.03	0.06
	3:20:00	0.00	0.00	0.00	0.01	0.03	0.02	0.03	0.03	0.05
	3:25:00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.04
	3:30:00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.03
	3:35:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

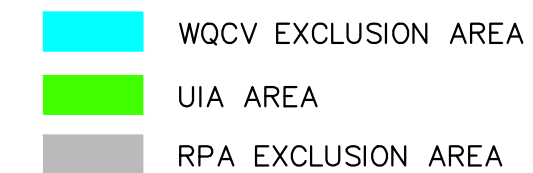
The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

	Steps	Area	Area	Volume	Volume	Total
--	-------	------	------	--------	--------	-------

[illegible]

1. WATER QUALITY CONTROL VOLUME (WQCV) EXCLUSION AREAS SUM TO AN AREA UNDER 1 ACRE. WATER QUALITY IS NOT REQUIRED FOR THESE AREAS UNDER THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL APPENDIX I, SECTION 1.7.C.A
2. ALL RPA AREAS WILL BE WITHIN NO BUILD/DRAINAGE EASEMENTS.



2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
RUNOFF REDUCTION EXHIBIT

PRELIMINARY
FOR REVIEW ONLY
NOT FOR
CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO. 196106001
SHEET

[illegible]

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Sheet 1 of 1

Designer: TOS
 Company: Kimley-Horn
 Date: November 22, 2022
 Project: Winsome Filing No. 3
 Location: El Paso County, CO

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth 0.60 inches
 Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA			
Area ID	1	2	3	4	5 (Basin I2)	6	7	8	9			
Downstream Design Point ID	1	2	3	4	5	6	7	8	9			
Downstream BMP Type	None	None	None	None	None	None	None	None	None			
DCIA (ft ²)	--	--	--	--	--	--	--	--	--			
UIA (ft ²)	4,965	1,772	4,906	6,665	12,523	2,602	2,576	1,617	1,640			
RPA (ft ²)	5,254	1,946	5,531	6,177	11,052	2,900	2,902	1,793	1,694			
SPA (ft ²)	--	--	--	--	--	--	--	--	--			
HSG A (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%			
HSG B (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%			
HSG C/D (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Average Slope of RPA (ft/ft)	0.250	0.250	0.260	0.250	0.030	0.270	0.280	0.270	0.280			
UIA:RPA Interface Width (ft)	326.00	133.00	349.00	465.00	727.00	185.00	185.00	113.00	113.00			

CALCULATED RUNOFF RESULTS

Area ID	1	2	3	4	5 (Basin I2)	6	7	8	9			
UIA:RPA Area (ft ²)	10,219	3,718	10,437	12,842	23,575	5,502	5,478	3,410	3,334			
L / W Ratio	0.10	0.21	0.09	0.06	0.06	0.16	0.16	0.27	0.26			
UIA / Area	0.4859	0.4766	0.4701	0.5190	0.5312	0.4729	0.4702	0.4742	0.4919			
Runoff (in)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Runoff (ft ³)	0	0	0	0	0	0	0	0	0			
Runoff Reduction (ft ³)	207	74	204	278	522	108	107	67	68			

CALCULATED WQCV RESULTS

Area ID	1	2	3	4	5 (Basin I2)	6	7	8	9			
WQCV (ft ³)	207	74	204	278	522	108	107	67	68			
WQCV Reduction (ft ³)	207	74	204	278	522	108	107	67	68			
WQCV Reduction (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Untreated WQCV (ft ³)	0	0	0	0	0	0	0	0	0			

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	1	2	3	4	5	6	7	8	9			
DCIA (ft ²)	0	0	0	0	0	0	0	0	0			
UIA (ft ²)	4,965	1,772	4,906	6,665	12,523	2,602	2,576	1,617	1,640			
RPA (ft ²)	5,254	1,946	5,531	6,177	11,052	2,900	2,902	1,793	1,694			
SPA (ft ²)	0	0	0	0	0	0	0	0	0			
Total Area (ft ²)	10,219	3,718	10,437	12,842	23,575	5,502	5,478	3,410	3,334			
Total Impervious Area (ft ²)	4,965	1,772	4,906	6,665	12,523	2,602	2,576	1,617	1,640			
WQCV (ft ³)	207	74	204	278	522	108	107	67	68			
WQCV Reduction (ft ³)	207	74	204	278	522	108	107	67	68			
WQCV Reduction (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Untreated WQCV (ft ³)	0	0	0	0	0	0	0	0	0			

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft ²)	78,515
Total Impervious Area (ft ²)	39,266
WQCV (ft ³)	1,636
WQCV Reduction (ft ³)	1,636
WQCV Reduction (%)	100%
Untreated WQCV (ft ³)	0