

## Gwen Dall

---

**From:** Elizabeth Steffens  
**Sent:** Wednesday, May 12, 2021 12:48 PM  
**To:** Hunyadi - DNR, John  
**Cc:** Gwen Dall  
**Subject:** NOI - Non-Jurisdictional Dam - WWSD Rolling Hills Water Tank Site Water Quality Structure  
**Attachments:** 102.121\_NOI\_NJ Form w attachments.pdf

John,

Attached is the submittal for a proposed non-jurisdictional structure at the Widefield Water and Sanitation District Rolling Hills Water Tank Site (Address: TBD, Located approx. 2,168 ft southwest of Drennan Road and Mockingbird Lane intersection, Colorado Springs, CO 80908) to serve as a water quality structure and in accordance with Section 37-87-125, C.R.S. I have included the drainage basin plans and sand filter basin sizing calculations in the attachments. Let me know if you have any questions or comments.

Thanks,  
Elizabeth

**Elizabeth Steffens, P.E.**

**JDS-HYDRO CONSULTANTS, INC.**

[5540 Tech Center Dr., Suite 100](#)

[Colorado Springs, CO 80919](#)

Office: 719-227-0072 Ext. 113 | Fax: 719-471-3401 |

Excelling in municipal water and wastewater solutions

[www.jdshydro.com](http://www.jdshydro.com)

[esteffens@jdshydro.com](mailto:esteffens@jdshydro.com)

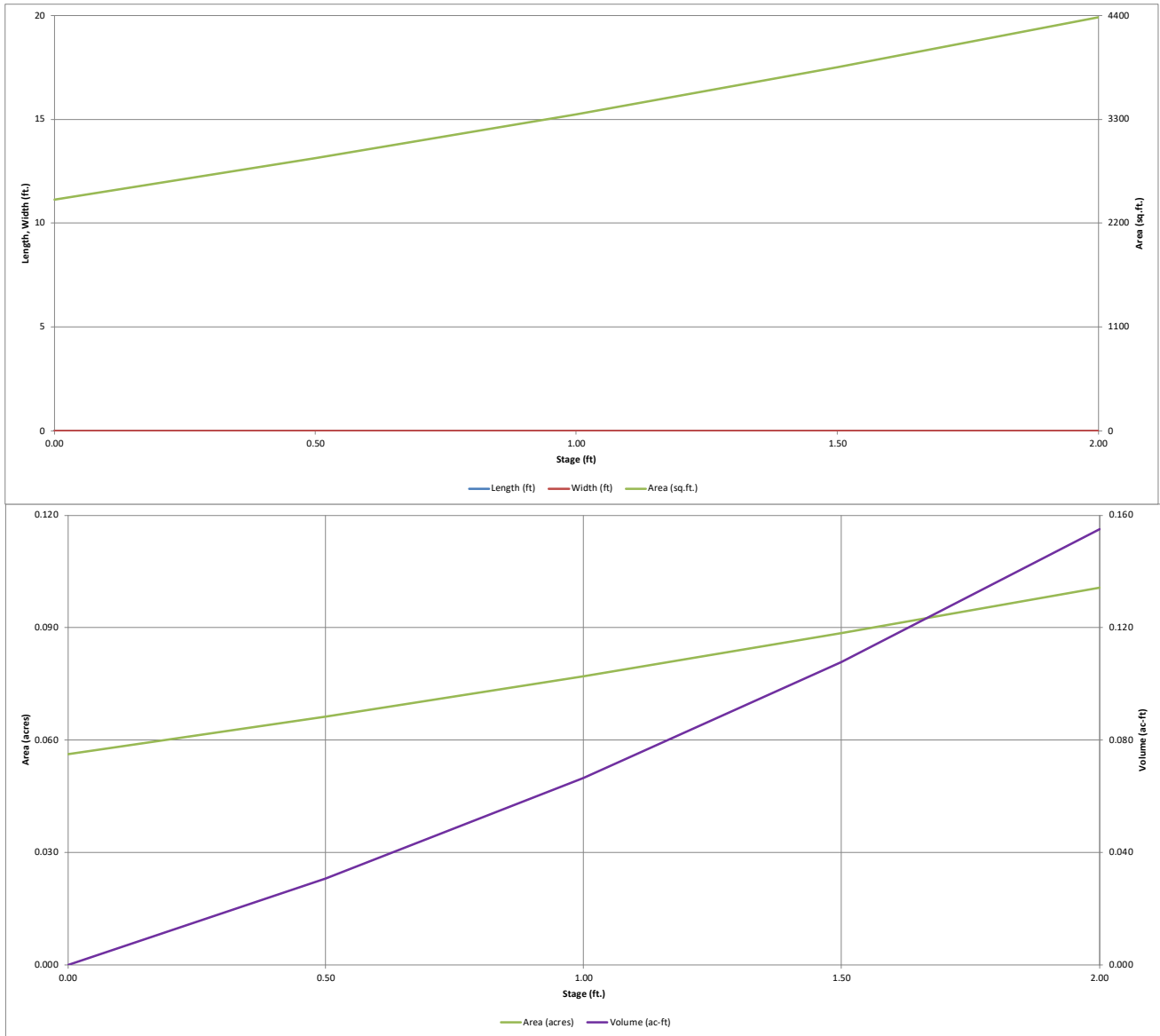


***SFB Sizing  
Calculations***



# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

*MHFD-Detention, Version 4.00 (December 2019)*

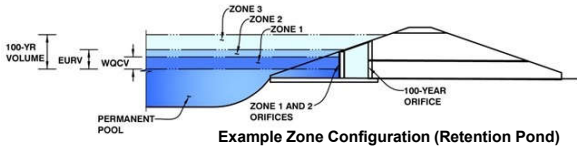


# DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD- Detention, Version 4.00 (December 2019)*

**Project: Widefield Water and Sanitation District - Rolling Hills Tank**

**Basin ID: Subbasin C**



**Example Zone Configuration (Retention Pond)**

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.34	0.020	Filtration Media
Zone 2 (EURV)	0.90	0.039	Circular Orifice
Zone 3 (100-year)	1.73	0.070	Weir&Pipe (Circular)
Total (all zones)		0.128	

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

Underdrain Orifice Invert Depth =	1.83	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	0.35	inches

Underdrain Orifice Area =	0.0	ft <sup>2</sup>
Underdrain Orifice Centroid =	0.01	feet

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

Invert of Lowest Orifice =	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	N/A	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	inches

WQ Orifice Area per Row =	N/A	ft <sup>2</sup>
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft <sup>2</sup>

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

	Row 1 (optional)	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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	0.05	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	0.50	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	1.50	N/A	inches

	Zone 2 Circular	Not Selected	
Vertical Orifice Area =	0.01	N/A	ft <sup>2</sup>
Vertical Orifice Centroid =	0.06	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H <sub>o</sub> =	0.30	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Gate Slope =	3.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Gate Open Area % =	70%	N/A	%, gate open area/total area
Debris Clogging % =	0%	N/A	%

	Zone 3 Weir	Not Selected	
Height of Gate Upper Edge, H <sub>t</sub> =	1.63	N/A	feet
Overflow Weir Slope Length =	4.22	N/A	feet
Grate Open Area / 100-yr Orifice Area =	153.92	N/A	
Overflow Gate Open Area w/o Debris =	11.81	N/A	ft <sup>2</sup>
Overflow Gate Open Area w/ Debris =	11.81	N/A	ft <sup>2</sup>

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

	Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	1.92	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	3.75	N/A	inches

	Zone 3 Circular	Not Selected	
Outlet Orifice Area =	0.08	N/A	ft <sup>2</sup>
Outlet Orifice Centroid =	0.16	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	0.75	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	1.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Spillway Design Flow Depth =	0.36	feet
Stage at Top of Freeboard =	2.11	feet
Basin Area at Top of Freeboard =	0.10	acres
Basin Volume at Top of Freeboard =	0.16	acre-ft

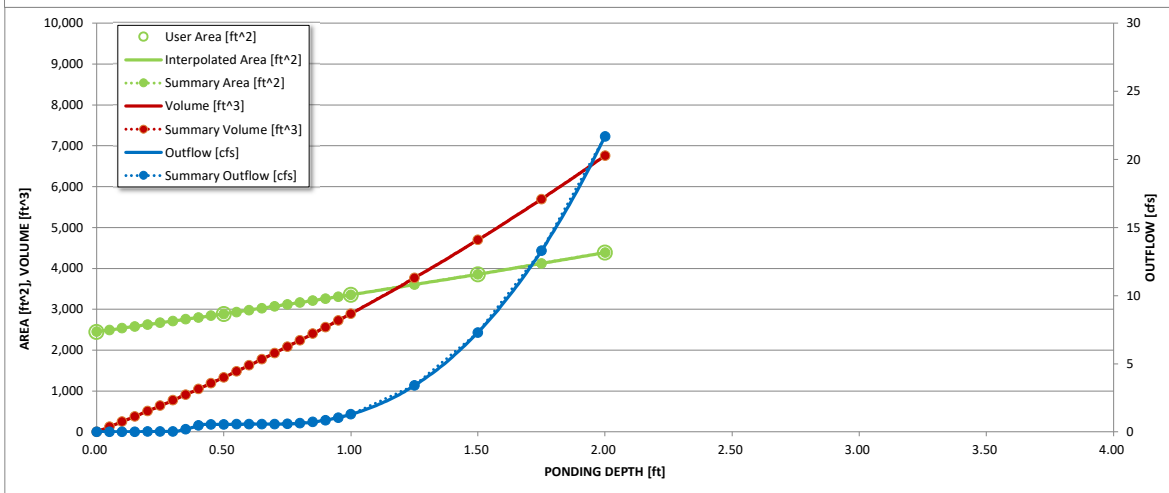
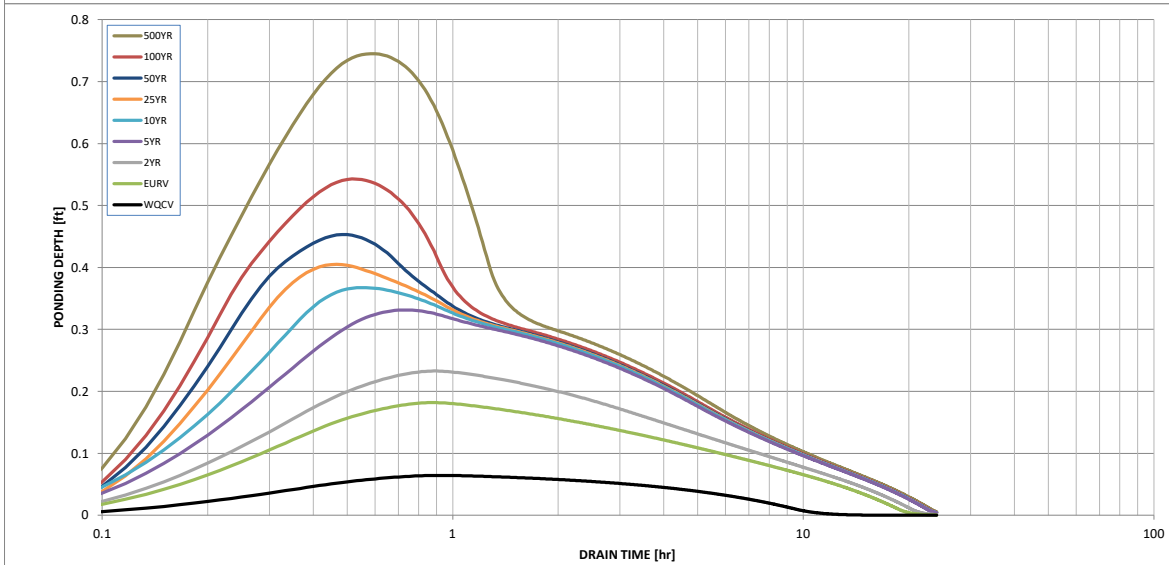
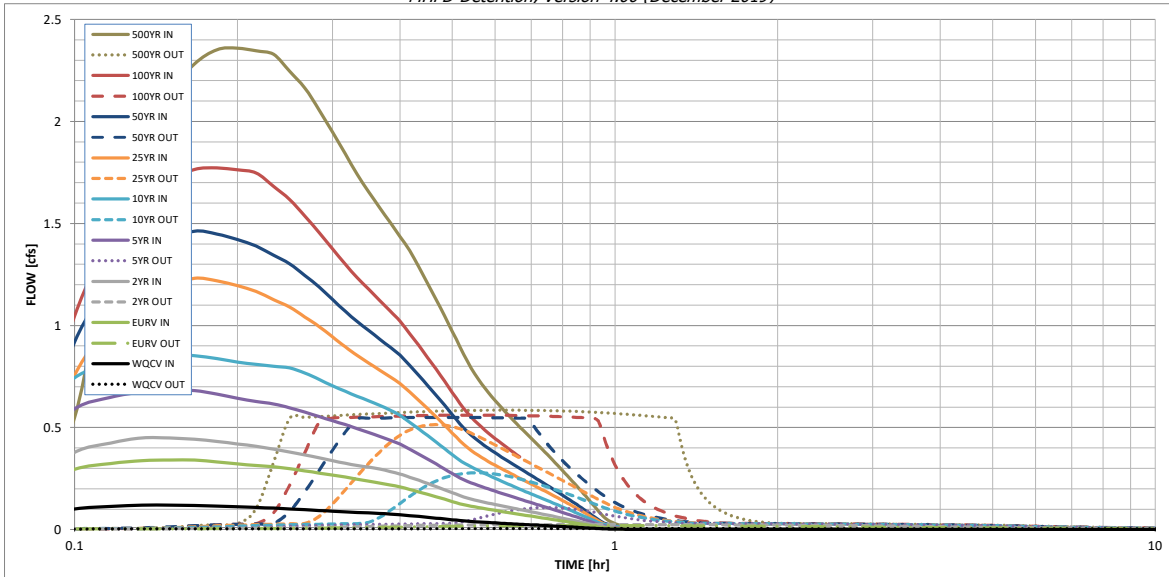
## Routed Hydrograph Results

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 =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.020	0.058	0.075	0.116	0.151	0.195	0.233	0.280	0.376
Inflow Hydrograph Volume (acre-ft) =	0.004	0.012	0.015	0.023	0.030	0.039	0.047	0.056	0.075
CUHP Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.3	0.4	0.7	0.8	1.1	1.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	0.0	0.0							
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.08	0.17	0.24	0.38	0.47	0.62	0.86
Peak Inflow Q (cfs) =	0.1	0.3	0.4	0.7	0.9	1.2	1.5	1.8	2.4
Peak Outflow Q (cfs) =	0.005	0.020	0.0	0.1	0.278	0.5	0.5	0.561	0.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	0.8	0.7	0.5	0.4
Structure Controlling Flow =	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0
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) =	12	19	21	22	22	21	20	20	18
Time to Drain 99% of Inflow Volume (hours) =	14	21	22	24	24	23	23	23	23
Maximum Ponding Depth (ft) =	0.06	0.18	0.23	0.33	0.37	0.41	0.45	0.54	0.75
Area at Maximum Ponding Depth (acres) =	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07
Maximum Volume Stored (acre-ft) =	0.003	0.010	0.013	0.020	0.022	0.024	0.027	0.033	0.047

# DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.00 (December 2019)*



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







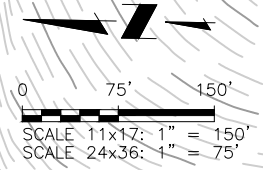
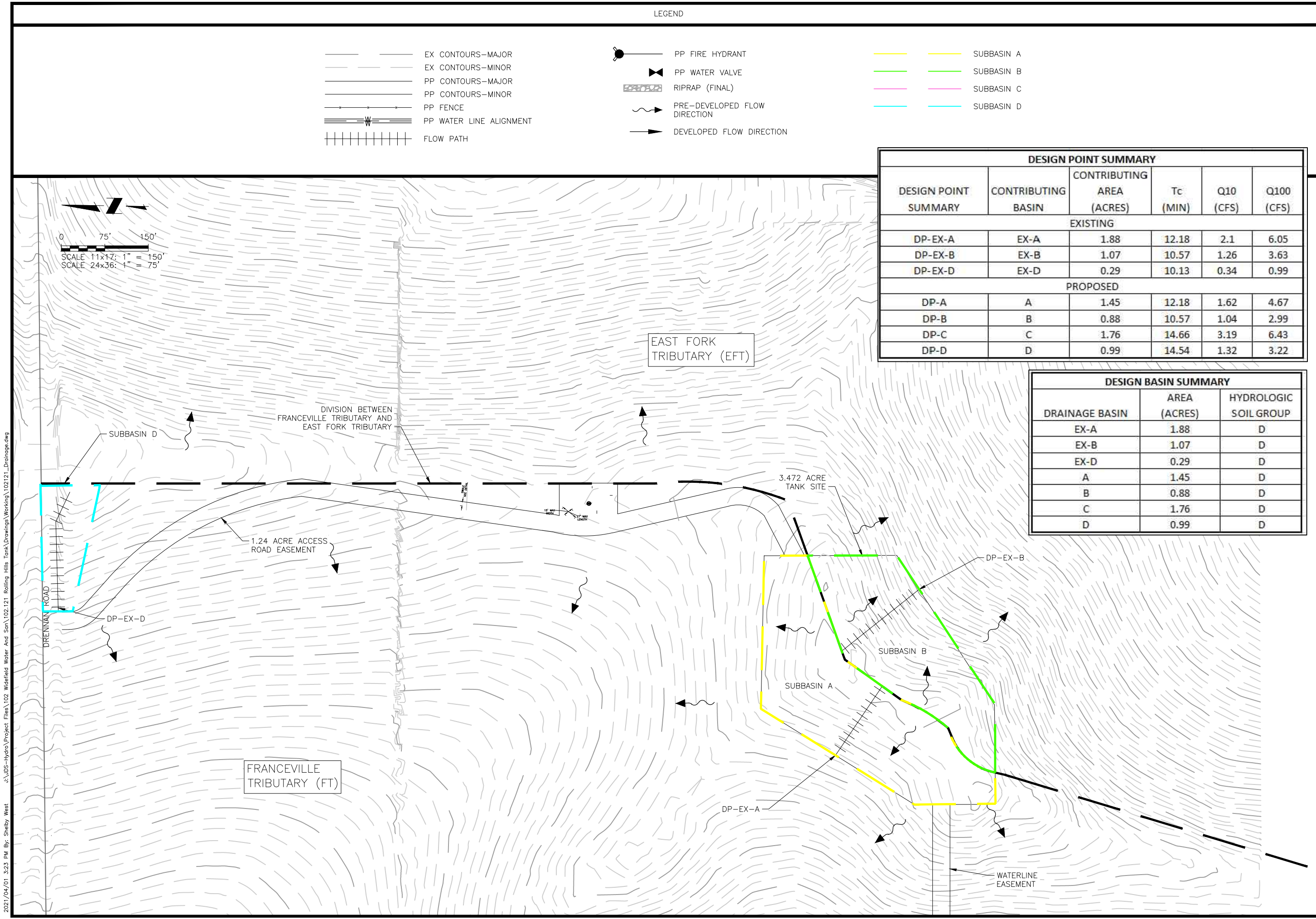
# *Drainage Plans*

LEGEND

- EX CONTOURS-MAJOR
- EX CONTOURS-MINOR
- PP CONTOURS-MAJOR
- PP CONTOURS-MINOR
- PP FENCE
- PP WATER LINE ALIGNMENT
- FLOW PATH
- PP FIRE HYDRANT
- PP WATER VALVE
- RIPRAP (FINAL)
- PRE-DEVELOPED FLOW DIRECTION
- DEVELOPED FLOW DIRECTION
- SUBBASIN A
- SUBBASIN B
- SUBBASIN C
- SUBBASIN D

DESIGN POINT SUMMARY					
DESIGN POINT SUMMARY	CONTRIBUTING BASIN	CONTRIBUTING AREA (ACRES)	Tc (MIN)	Q10 (CFS)	Q100 (CFS)
EXISTING					
DP-EX-A	EX-A	1.88	12.18	2.1	6.05
DP-EX-B	EX-B	1.07	10.57	1.26	3.63
DP-EX-D	EX-D	0.29	10.13	0.34	0.99
PROPOSED					
DP-A	A	1.45	12.18	1.62	4.67
DP-B	B	0.88	10.57	1.04	2.99
DP-C	C	1.76	14.66	3.19	6.43
DP-D	D	0.99	14.54	1.32	3.22

DESIGN BASIN SUMMARY		
DRAINAGE BASIN	AREA (ACRES)	HYDROLOGIC SOIL GROUP
EX-A	1.88	D
EX-B	1.07	D
EX-D	0.29	D
A	1.45	D
B	0.88	D
C	1.76	D
D	0.99	D



**JDS-HYDRO CONSULTANTS, INC.**  
 5540 TECH CENTER DR., SUITE 100  
 COLORADO SPRINGS, COLORADO 80919  
 (719) 227-0072  
DISCLAIMER: THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. ANY ERRORS OR OMISSIONS ARE THE CONTRACTOR'S RESPONSIBILITY. JDS-HYDRO ASSUMES NO LIABILITY FOR UNAUTHORIZED CHANGES AND/OR REVISIONS MADE TO PLANS.

**WIDEFIELD WATER AND SANITATION DISTRICT**  
 ROLLING HILLS 2MG POTABLE WATER TANK AND INLET PIPELINE  
 SITE DEVELOPMENT PLAN  
 EXISTING SITE DRAINAGE

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

**EXHIBIT**

Project No.: 102.121  
 Date: 07/30/20  
 Design: GJD  
 Drawn: SNW  
 Check: JPM

2021/04/01 3:23 PM By: Shelby West J:\JDS-Hydro\Project Files\102 Widefield Water And San\102.121 Rolling Hills Tank Drawings\Working\102121\_Drainage.dwg

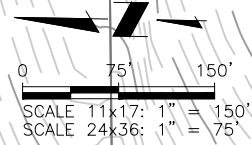
LEGEND

- EX CONTOURS—MAJOR
- - - EX CONTOURS—MINOR
- PP CONTOURS—MAJOR
- - - PP CONTOURS—MINOR
- PP FENCE
- PP WATER LINE ALIGNMENT
- FLOW LINE

- PP FIRE HYDRANT
- ⊕ PP WATER VALVE
- ▨ RIPRAP (FINAL)
- ~ PRE-DEVELOPED FLOW DIRECTION
- DEVELOPED FLOW DIRECTION

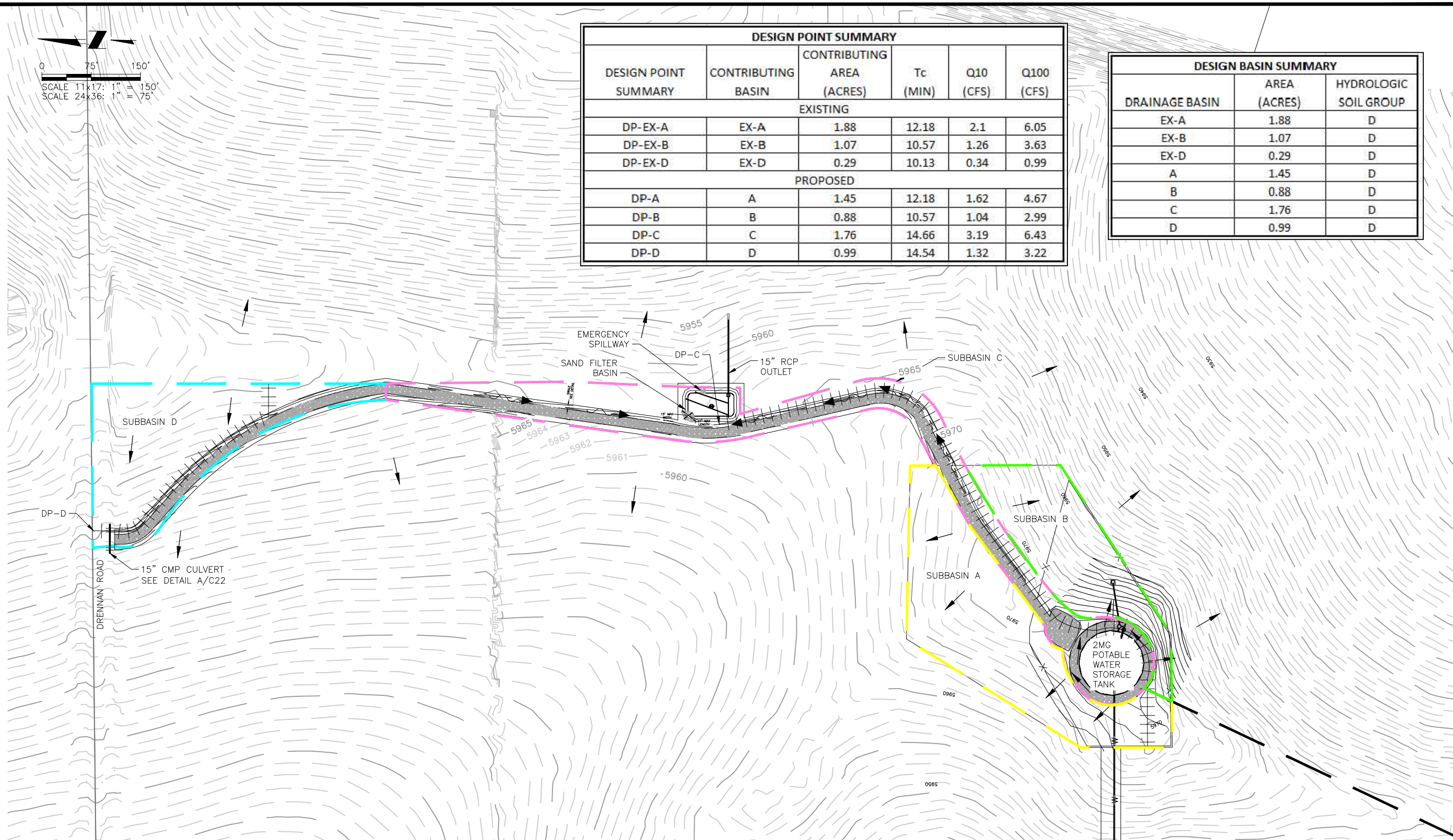
- SUBBASIN A
- SUBBASIN B
- SUBBASIN C
- SUBBASIN D

- ▨ GRAVEL ROAD
- ▨ RIPRAP



DESIGN POINT SUMMARY					
DESIGN POINT SUMMARY	CONTRIBUTING BASIN	CONTRIBUTING AREA (ACRES)	Tc (MIN)	Q10 (CFS)	Q100 (CFS)
EXISTING					
DP-EX-A	EX-A	1.88	12.18	2.1	6.05
DP-EX-B	EX-B	1.07	10.57	1.26	3.63
DP-EX-D	EX-D	0.29	10.13	0.34	0.99
PROPOSED					
DP-A	A	1.45	12.18	1.62	4.67
DP-B	B	0.88	10.57	1.04	2.99
DP-C	C	1.76	14.66	3.19	6.43
DP-D	D	0.99	14.54	1.32	3.22

DESIGN BASIN SUMMARY		
DRAINAGE BASIN	AREA (ACRES)	HYDROLOGIC SOIL GROUP
EX-A	1.88	D
EX-B	1.07	D
EX-D	0.29	D
A	1.45	D
B	0.88	D
C	1.76	D
D	0.99	D



**JDS-HYDRO CONSULTANTS, INC.**  
 5540 TECH CENTER DR., SUITE 100  
 COLORADO SPRINGS, COLORADO 80919  
 (719) 227-0072

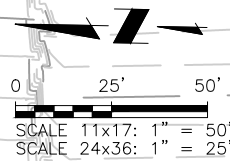
**WIDEFIELD WATER AND SANITATION DISTRICT**  
 ROLLING HILLS 2MG POTABLE WATER TANK AND INLET PIPELINE  
 SITE DEVELOPMENT PLAN  
 PROPOSED SITE DRAINAGE

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

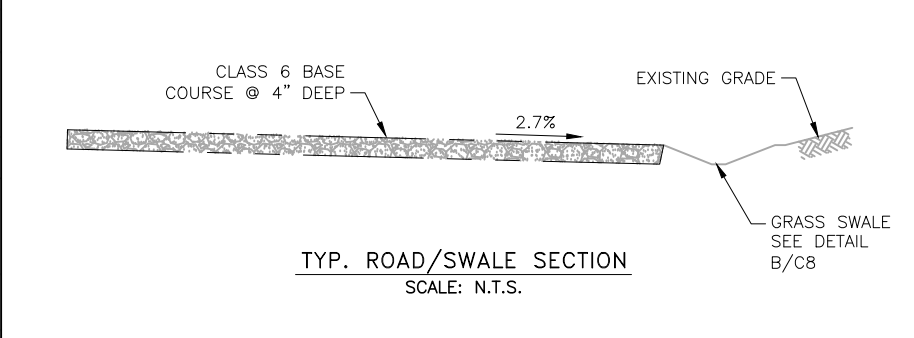
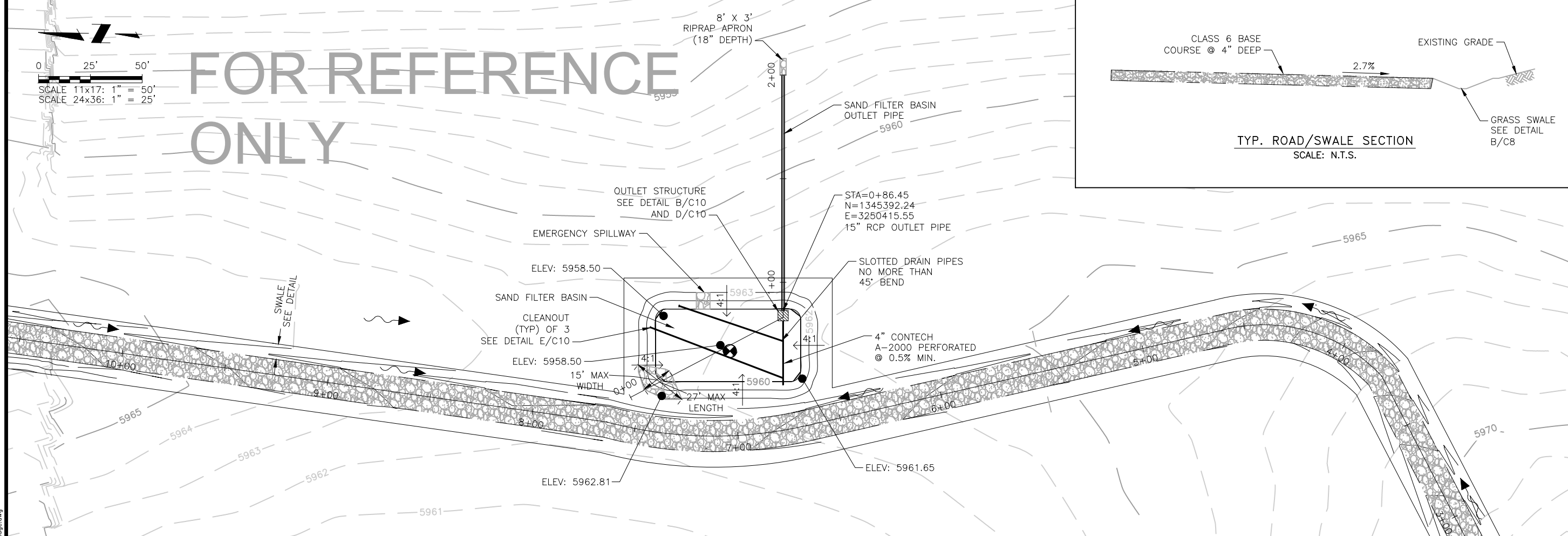
**EXHIBIT**

Project No.: 102.121  
 Date: 07/30/20  
 Design: GJD  
 Drawn: SNW  
 Check: JPM

SHEET --- OF ---



**FOR REFERENCE ONLY**

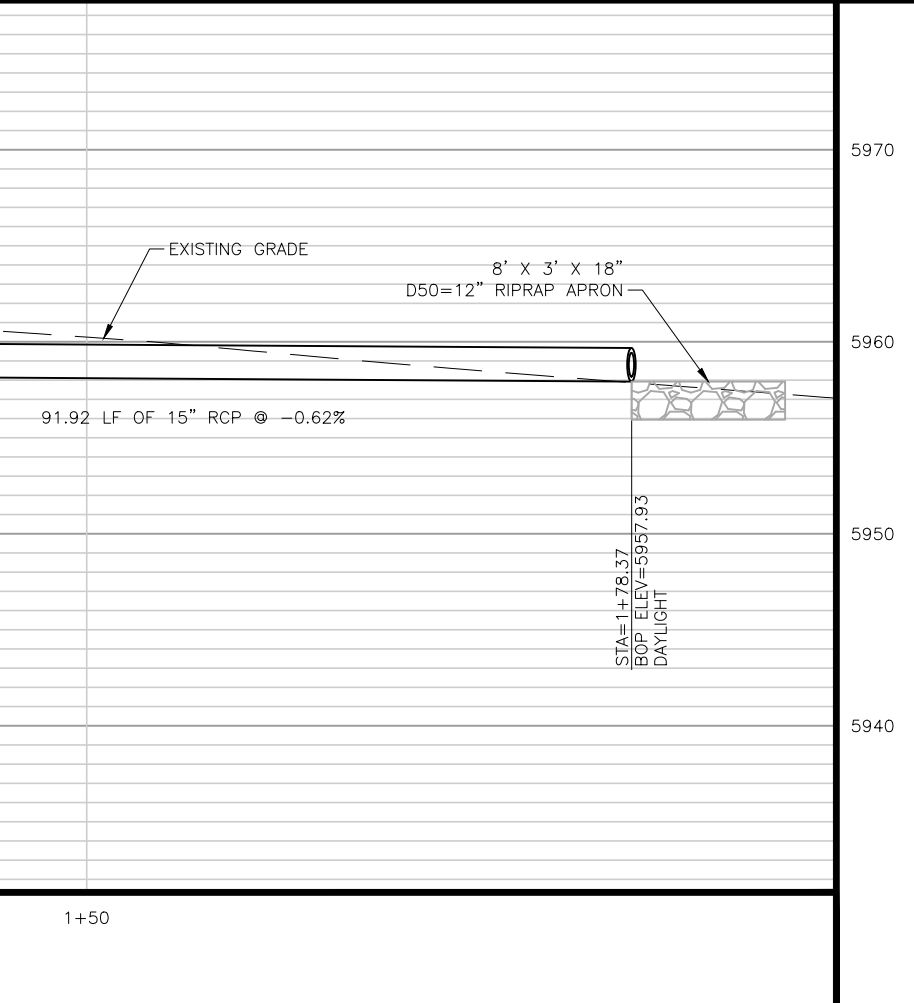
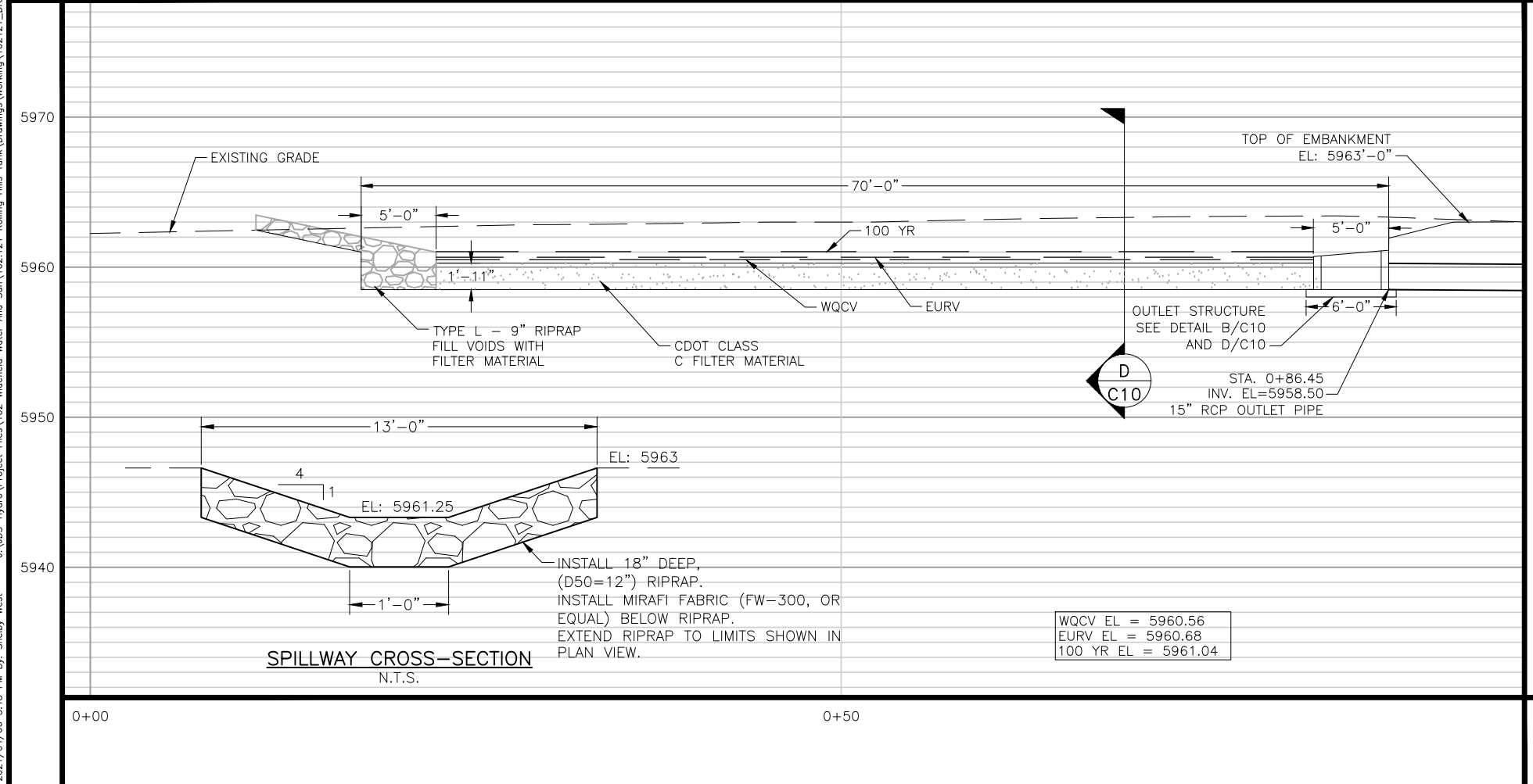


**JDS-HYDRO CONSULTANTS, INC.**  
5540 TECH CENTER DR., SUITE 100  
COLORADO SPRINGS, COLORADO 80919  
(719) 227-0072

DISCLAIMER: THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. ANY ERRORS OR OMISSIONS ARE THE CONTRACTOR'S RESPONSIBILITY. JDS-HYDRO ASSUMES NO LIABILITY FOR UNAUTHORIZED CHANGES AND/OR REVISIONS MADE TO PLANS.

**WIDEFIELD WATER AND SANITATION DISTRICT**  
ROLLING HILLS 2MG POTABLE WATER TANK AND INLET PIPELINE  
DRAINAGE BASIN PLAN & PROFILE

J:\JDS-Hydro\Project Files\102 Widefield Water And San\102.121 Rolling Hills Tank Drawings\Working\102121\_Drainage.dwg  
2021/04/06 3:48 PM By: Shelby West



NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

**EXHIBIT**

Project No.: 102.121  
Date: 07/30/20  
Design: GJD  
Drawn: SNW  
Check: JPM

SHEET --- OF ---

2021/04/06 3:29 PM By: Shelby West J:\JDS-Hydro\Project Files\102 Widfield Water And San\102.121 Rolling Hills Tank\Drawings\Working\102121\_Civil\_Details.dwg

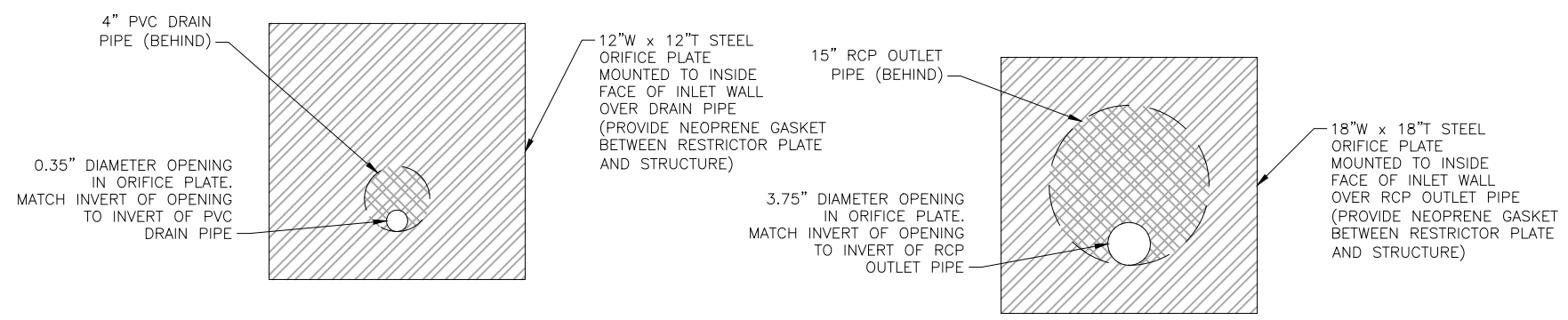
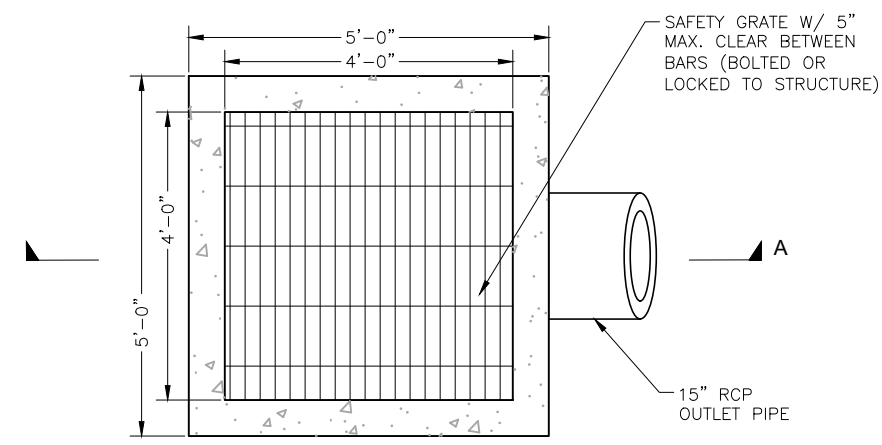
**JDS-HYDRO** CONSULTANTS, INC.  
 5540 TECH CENTER DR., SUITE 100  
 COLORADO SPRINGS, COLORADO 80919  
 (719) 227-0072  
DISCLAIMER: THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO JDS-HYDRO CONSULTANTS, INC. JDS-HYDRO ASSUMES NO LIABILITY FOR UNAUTHORIZED CHANGES AND/OR REVISIONS MADE TO PLANS.

**WIDFIELD WATER AND SANITATION DISTRICT**  
 ROLLING HILLS 2MG POTABLE WATER TANK  
 DRAINAGE BASIN CIVIL DETAILS

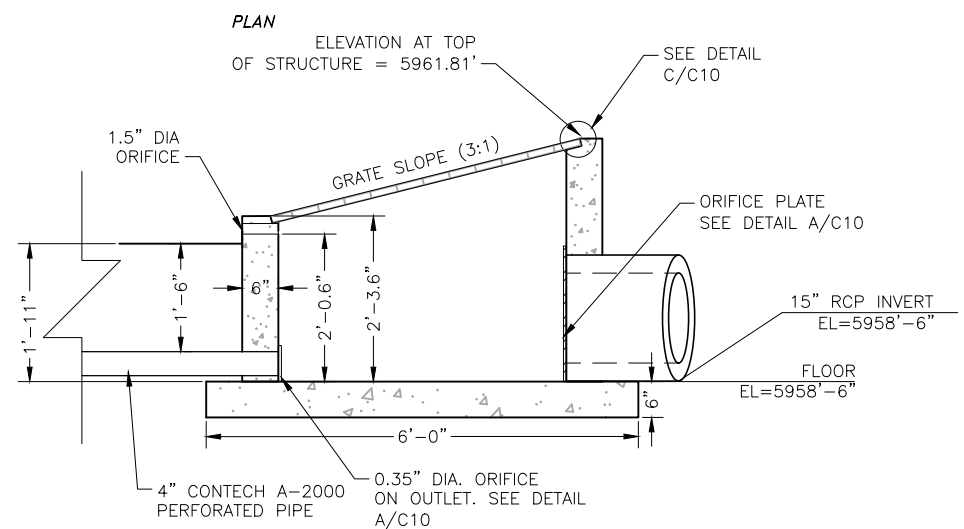
NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

**TO BID**

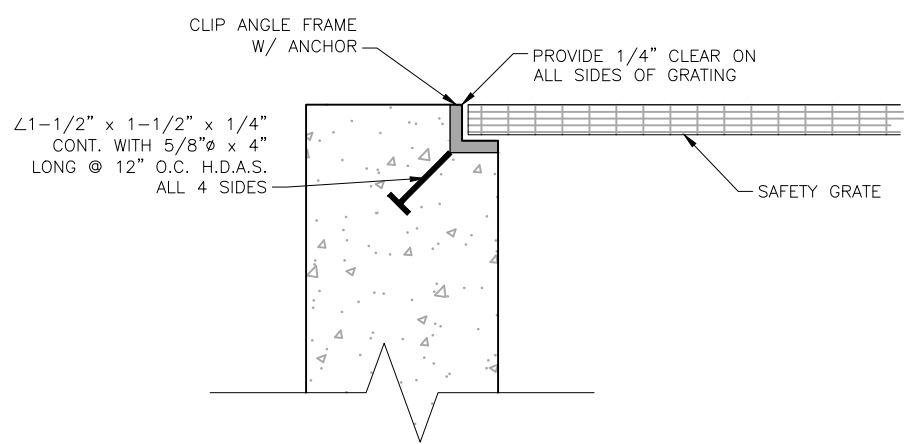
Project No.: 102.121  
 Date: 02/22/21  
 Design: GJD  
 Drawn: SNW  
 Check: JPM



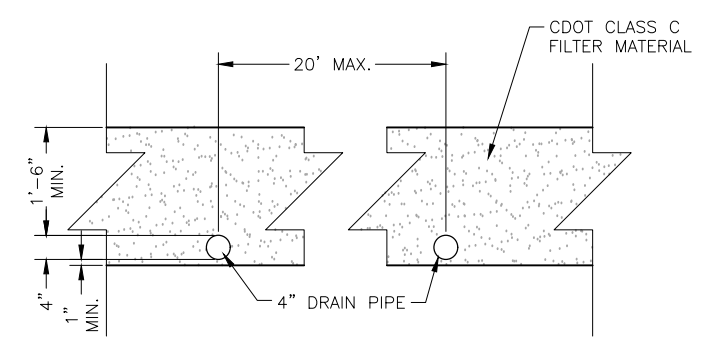
**A** ORIFICE PLATES  
 SCALE: N.T.S.



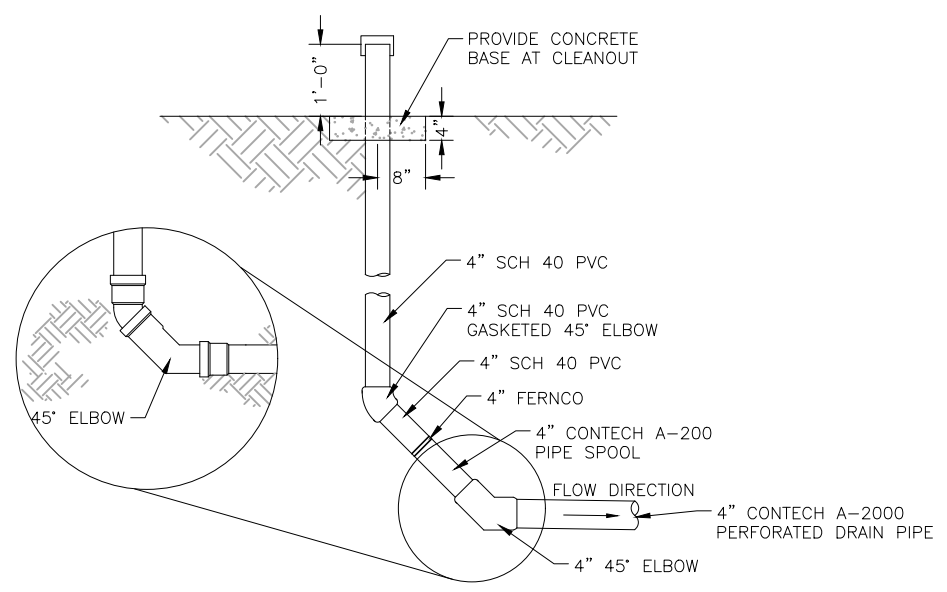
**B** OUTLET STRUCTURE  
 SCALE: 3/8" = 1'-0"



**C** GRATING DETAIL  
 SCALE: N.T.S.



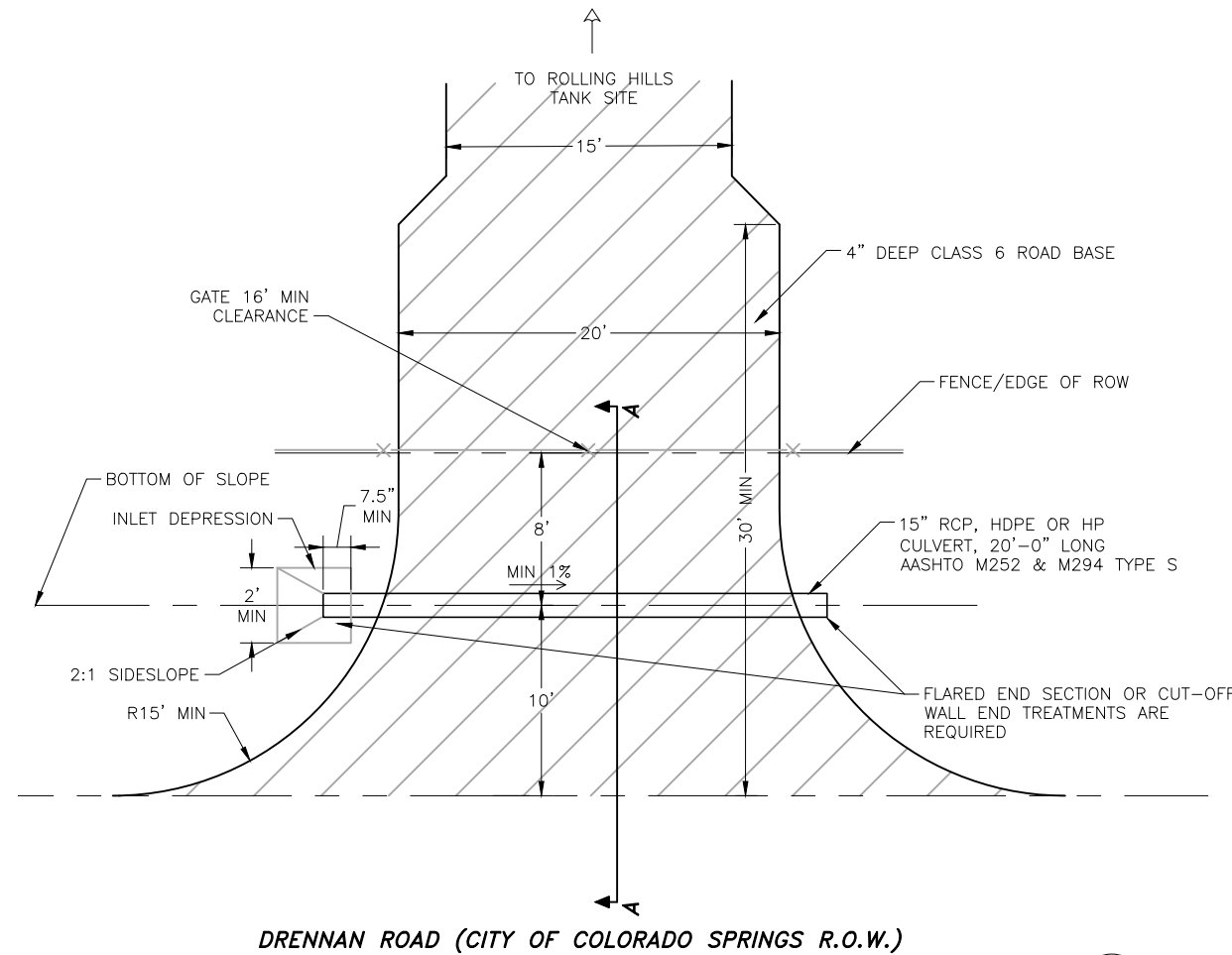
**D** DRAINAGE BASIN SECTION (SEE SHEET C9)  
 SCALE: 3/8" = 1'-0"



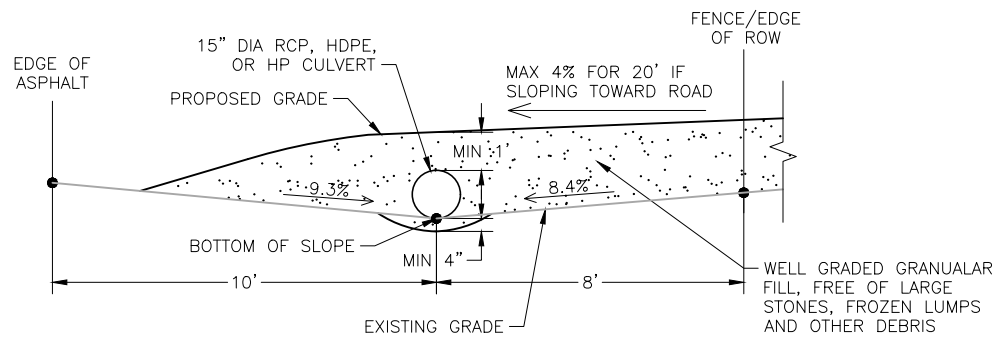
**E** CLEANOUT  
 SCALE: N.T.S.

**FOR REFERENCE ONLY**

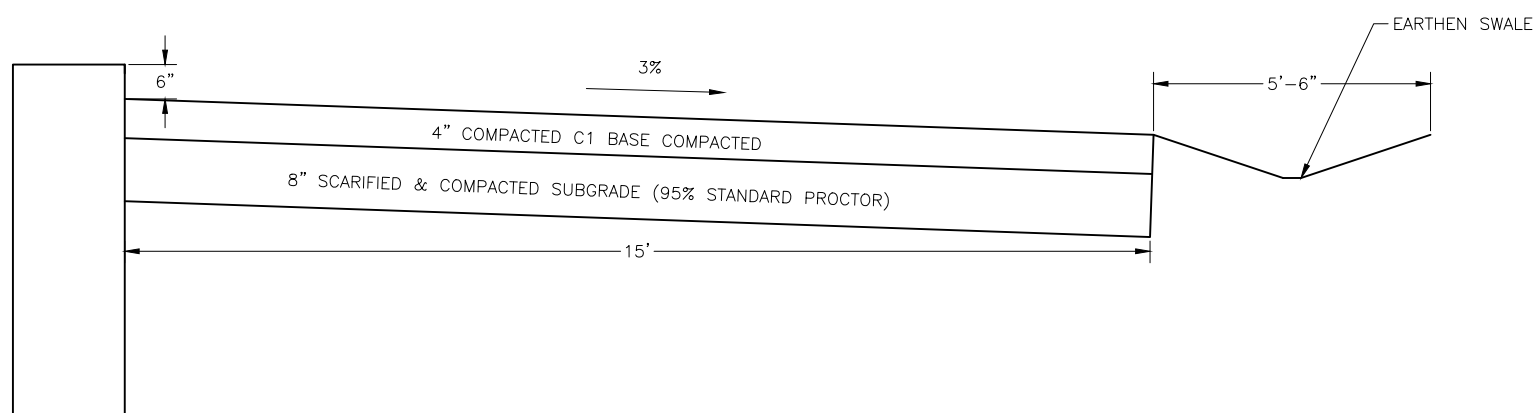
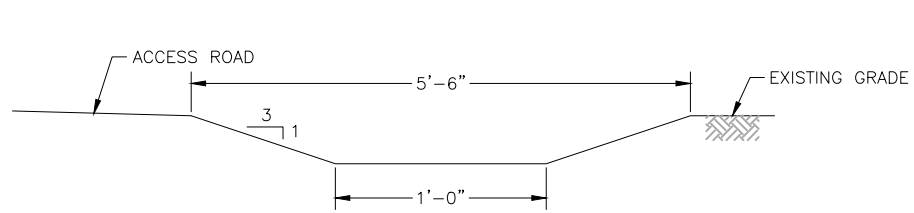
2021/04/01 3:31 PM By: Shelby West j:\JDS-Hydro\Project Files\102 Widefield Water And San\102.121 Rolling Hills Tank\Drawings\Working\102121\_Civil\_Details.dwg



**A** DRIVEWAY ACCESS ROAD  
C8 SCALE: N.T.S.



- NOTES:
1. SURFACE TREATMENT OF DRIVEWAY TO BE CLASS 6 ROAD BASE AT 4" DEEP.
  2. DRAIN PIPE TO BE 15" DIAMETER MINIMUM.
  3. PIPE SLOPE TO BE CONSISTANT WITH FLOW LINE OF DITCH, MINIMUM OF 1%.
  4. BACKFILL TO BE PLACED IN 6" LAYERS, DEPOSITED AND COMPACTED ON ALTERNATING SIDES OF THE PIPE.
  5. MEASUREMENTS ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED PRIOR TO COMMENCING CONSTRUCTION.



FOR REFERENCE ONLY

**JDS-HYDRO** CONSULTANTS, INC.  
5640 TECH CENTER DR., SUITE 100  
COLORADO SPRINGS, COLORADO 80919  
(719) 227-0072

DISCLAIMER: THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. ANY ERRORS OR OMISSIONS SHALL BE REPORTED TO JDS-HYDRO CONSULTANTS, INC. JDS-HYDRO ASSUMES NO LIABILITY FOR UNAUTHORIZED CHANGES AND/OR REVISIONS MADE TO PLANS.

WIDEFIELD WATER AND SANITATION DISTRICT  
ROLLING HILLS 2MG POTABLE WATER TANK  
ACCESS ROAD CIVIL DETAILS

NO.	DESCRIPTION	BY	APP.	DATE
1				
2				
3				
4				
5				
6				
7				

**TO BID**

Project No.: 102.121  
Date: 02/22/21  
Design: GJD  
Drawn: SNW  
Check: JPM

**C8**  
SHEET 11 OF 32