BOIES RANCH PRODUCED WATER PIT

CONSTRUCTION PLANS

Ursa | OPERATING COMPANY LLC

RIO BLANCO COUNTY, COLORADO

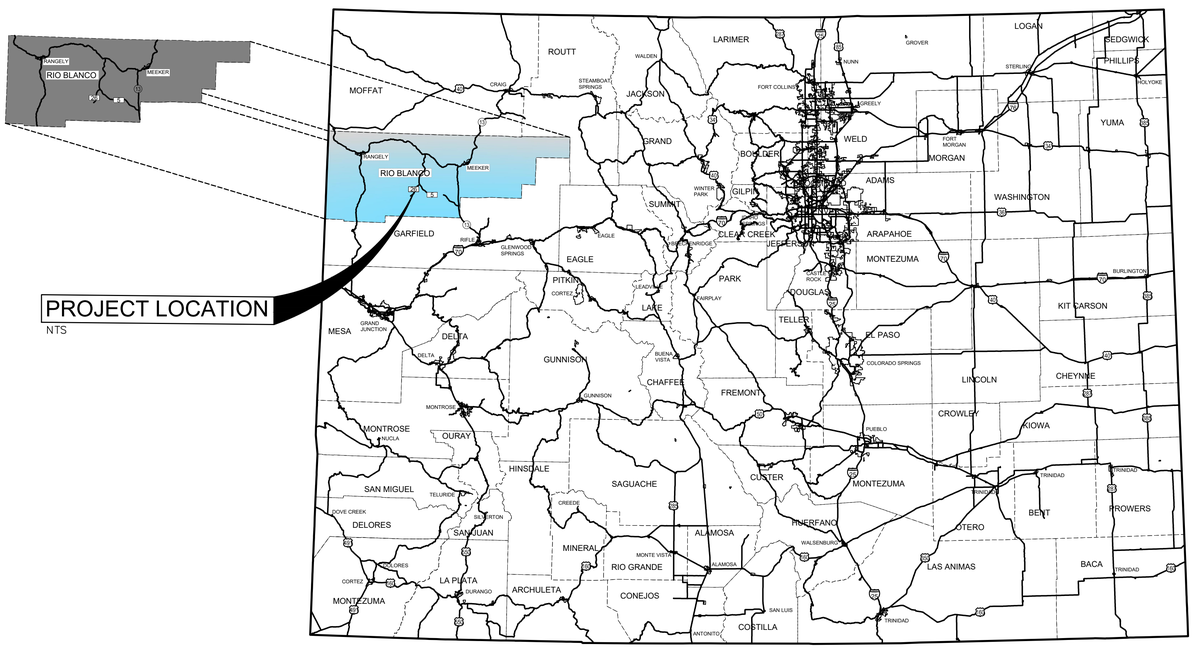
June 2018

PROJECT NUMBER 5D27072

SITE CONTROL

CENTER OF FACILITIES	Lat 39°50'13"	Long 108°24'13"
CENTER OF PRODUCED WATER PIT	Lat 39°15'18"	Long 108°23'57"
CENTER OF CONSTRUCTION±	Lat 39°50'15"	Long 108°24'03"

SECTION 33, TOWNSHIP 2 SOUTH, RANGE 98 WEST, 6th PRINCIPAL MERIDIAN, RIO BLANCO COUNTY, COLORADO



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THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION ON BEHALF OF SOUDER, MILLER & ASSOCIATES.

Heather D. McDaniel 10-6-2018

HEATHER D MCDANIEL, P.E. CO #0051615 DATE
PROJECT MANAGER

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COLORADO 811 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

COLORADO LICENSED Heather D. McDaniel 0051615 PROFESSIONAL ENGINEER 10-6-2018

Rev #	Date	Description	By	Chk'd

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\\DCO10\Projects\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 COVER.dwg 6/6/2018 1:45:27 PM gjf

GENERAL NOTES:

1. SIGNED AND SEALED CONSTRUCTION DRAWINGS ARE PREPARED BASED ON EXISTING SITE CONDITIONS AND REGULATIONS PER THE SEALED DATE ON THE PLANS. DUE TO POSSIBLE CHANGES TO THE SITE, CODES, REGULATIONS, UNDERGROUND UTILITIES, ETC. BETWEEN THE SEALED DATE ON THE PLANS AND DATE OF CONSTRUCTION COMMENCEMENT, THE DESIGN AND RECOMMENDATIONS PROVIDED ARE LIMITED TO THE SEALED DATE ON THE PLANS. IF CHANGES TO ANY SITE CONDITIONS AND/OR REGULATIONS OCCUR BEFORE THE PROJECT CONSTRUCTION DATE, THE OWNER SHALL NOTIFY ENGINEER OF SUCH CHANGES AND OBTAIN THE ENGINEER'S OPINION AS TO THE COMPLETENESS OF THE PLANS AND SPECIFICATIONS. ANY SUCH CHANGE IN FIELD CONDITIONS AND/OR REGULATIONS MAY REQUIRE ADDITIONAL DESIGN SERVICES AND COMMENSURATE FEE INCREASE TO ACCOMMODATE SUCH CHANGES.

2. CLARIFICATIONS AND/OR REQUESTS REGARDING PROJECT INTENT AND MODIFICATIONS SHALL BE SUBMITTED TO THE ENGINEER PRIOR OR DURING CONSTRUCTION IN A FORMAL WRITTEN REQUEST FOR INFORMATION (RFI). THE ENGINEER SHALL NOT BE HELD LIABLE IF RECOMMENDATION(S) ARE ALTERED BY OTHERS.

3. SITE CONDITIONS, EACH SUBCONTRACTOR DOING WORK ON THE PROJECT SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE SAFETY OF ALL PERSONS AND PROPERTY WITHIN THEIR WORK AREAS, DAY AND NIGHT, DURING BOTH WORKING AND NONWORKING HOURS; AND, SHALL PROVIDE ALL BARRICADES, SHORING, FLAG MEN, SIGNS, LIGHTING AND OTHER DEVICES REQUIRED THEREOF.

4. EACH SUBCONTRACTOR SHALL INCLUDE AS A PART OF THE WORK ALL TESTING OF MATERIAL AND WORKMANSHIP REQUIRED BY THE OWNER'S REPRESENTATIVE, REGULATORY AGENCIES, AND UTILITIES HAVING JURISDICTION OVER THE WORK. TESTING SHALL BE COMPLETED BY AN INDEPENDENT LABORATORY APPROVED BY THE OWNER'S REPRESENTATIVE, AGENCY, OR UTILITY REQUIRING SAME. COPIES OF ALL TEST REPORTS SHALL BE PROVIDED TO THE OWNER'S REPRESENTATIVE, ENGINEER, AGENCIES, AND UTILITIES REQUIRING TESTS. MATERIALS AND WORKMANSHIP FOUND DEFICIENT SHALL BE REMOVED. REPAIRED OR OTHERWISE CORRECTED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE, REGULATORY AGENCY, OR UTILITY.

5. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGE DETERMINED TO BE CAUSED BY THE CONSTRUCTION OF THIS PROJECT TO ROADS, FENCES, DRAINAGE'S, DRAINAGE STRUCTURES, UTILITIES, INCLUDING CONDUIT, WIRING, EQUIPMENT, AND FIBER-OPTICS. THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ALL DESTROYED OR DAMAGED SURFACE IMPROVEMENTS WITH IMPROVEMENTS EQUAL TO THOSE REMOVED.

6. CLEARING AND GRUBBING: CONTRACTOR SHALL CLEAR AND GRUB THE SITE WHERE NECESSARY, REMOVING VEGETATION AND OTHER SURFACE MATERIALS WITHIN THE PROJECT BOUNDARY. ALL AREAS WITHIN THE PROJECT SITE SHALL BE CLEARED OF SURFACE VEGETATION HIGHER THAN 3-INCH, AND SMOOTHED WITH DRUM ROLLER WHERE NECESSARY TO CREATE A SAFE WORKING SURFACE. SITE SHALL BE LEFT SMOOTH, SAFE FOR ALL FOOT TRAFFIC, AND SHALL NOT CONTAIN ROCKS, MOUNDS, PROTRUSIONS, TRIP HAZARDS, OR HIGH/LOW SPOTS.

7. STOCKPILING OF TOP SOIL: CONTRACTOR SHALL SEGREGATE AND STOCKPILE ALL TOPSOIL OUTSIDE OF THE CONSTRUCTION AREA WITH APPROPRIATE SEDIMENT CONTROL. TOP SOIL SHALL BE REDISTRIBUTED ON THE OUTSIDE OF CONSTRUCTED BERMS, AND EITHER SEEDED, AND MULCHED OR PROTECTED WITH CONCRETE CLOTH. REFER TO CONSTRUCTION PLANS FOR DETAILS.

8. ALL EXISTING TRAFFIC SIGNS, MILEPOST MARKERS AND DELINEATORS WITHIN CONSTRUCTION LIMITS SHALL BE REMOVED OR OFFSET BY THE CONTRACTOR AS DIRECTED BY THE OWNER'S DESIGNEE. INFORMATION SIGNS ARE TO BE OFFSET, AND ALL OTHERS ARE TO BE REMOVED. THIS WORK WILL BE INCLUDED IN THE UNIT BID PRICE FOR REMOVAL OF STRUCTURES AND OBSTRUCTIONS.

9. THE CONTRACTOR SHALL MAINTAIN REASONABLE ACCESS TO ALL ADJACENT PROPERTIES BY PROVIDING EASY RIDING CONNECTIONS TO TURNOUTS AND DRIVEWAYS AS DETERMINED ACCEPTABLE BY THE OWNER'S REPRESENTATIVE OR DESIGNEE. THIS WORK WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO MEASUREMENT OF PAYMENT WILL BE MADE THEREFORE.

10. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN WHICH SHALL BE APPROVED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE BEFORE COMMENCING WITH THE PROJECT.

11. THE CONTRACTOR IS HEREBY ADVISED THAT UTILITY RELOCATION BY UTILITY COMPANIES WILL BE DONE CONCURRENTLY WITH CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE FOR UTILITY WORK IN CONJUNCTION WITH CONSTRUCTION OPERATIONS AND SHALL COORDINATE THE SCHEDULING OF WORK WITH THE RESPECTIVE UTILITY COMPANIES IN ORDER TO AVOID DELAYS DUE TO UTILITY WORK. THE CONTRACTOR SHALL PROVIDE FOR THESE CONTINGENCIES WHEN BIDDING THE PROJECT. NO CLAIM FOR DELAYS DUE TO UTILITY WORK WILL BE ALLOWED.

12. THERE IS NO CONSTRUCTION CLEAR ZONE FOR THIS PROJECT. THE CONTRACTOR SHALL NOT STORE EQUIPMENT OR MATERIAL OUTSIDE OF THE PROJECT BOUNDARIES ON THIS PROJECT. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.

13. EMERGENCY ACCESS SHALL REMAIN OPEN AT ALL TIMES.

14. THE CONTRACTOR WILL REMOVE AND PROTECT ROAD NAME SIGNS DURING CONSTRUCTION AND REPLACE AS SOON AS POSSIBLE AFTER CONSTRUCTION.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING AND CLEAN UP OF SPILLS ASSOCIATED WITH PROJECT CONSTRUCTION AND SHALL REPORT AND RESPOND TO SPILLS OF HAZARDOUS MATERIAL SUCH AS GASOLINE, DIESEL, MOTOR OILS, SOLVENTS, CHEMICALS, TOXIC AND CORROSIVE SUBSTANCES, AND OTHER MATERIALS WHICH MAY BE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING PAST SPILLS ENCOUNTERED DURING CONSTRUCTION AND OF CURRENT SPILLS NOT ASSOCIATED WITH CONSTRUCTION. REPORTS SHALL BE MADE IMMEDIATELY TO THE ENVIRONMENTAL EMERGENCY SPILL REPORTING LINE AT 1-877-518-5608 AND TO THE OWNER'S REPRESENTATIVE OR DESIGNEE. ANY UNREPORTED SPILLS IDENTIFIED AFTER CONSTRUCTION AND ASSOCIATED WITH PROJECT CONSTRUCTION SHALL BE CLEANED UP BY THE CONTRACTOR IN ACCORDANCE WITH THE CONTRACT. THE CONTRACTOR SHALL BEAR THE FULL COST OF CLEANUP OF SUCH UNREPORTED SPILLS.

16. FINAL PAYMENT OF CONCRETE AND REINFORCING BARS SHALL BE BASED ON PLAN QUANTITIES. IF THE DESIGN IS REVISED DURING CONSTRUCTION OR IF A QUANTITY CHANGE IS REQUIRED DUE TO ERRORS ON THE PLANS, THE PAYMENT SHALL BE BASED ON COMPUTED FIELD QUANTITIES MEASURED TO NEAT LINES.

17. EXISTING FENCE, SIGNS AND OTHER ITEMS OF PRIVATE PROPERTY FOUND TO BE WITHIN THE RIGHT-OF-WAY ARE TO BE REMOVED AND REPLACED AT THE EDGE OF RIGHT-OF-WAY, BY THE CONTRACTOR. THIS WORK WILL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO MEASUREMENT OF PAYMENT WILL BE MADE THEREFORE.

18. THROUGHOUT THE LIFE OF THE PROJECT THE CONTRACTOR SHALL KEEP LOCAL OPERATORS AND LANDOWNERS INFORMED IN TIMELY FASHION AS DETERMINED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE, OF ANY LANE CLOSURES WHICH WILL RESTRICT THE NORMAL FLOW OF TRAFFIC. THERE WILL BE NO DIRECT PAYMENT FOR THIS WORK.

19. THE CONTRACTOR SHALL MAINTAIN UP TO DATE SETS OF AS-BUILT PLANS FOR THE PROJECT. THESE PLANS SHALL BE KEPT CURRENT, WITHIN FIFTEEN (15) DAYS, AT ALL TIMES AND SHALL BE SUBJECT TO REVIEW BY THE OWNER'S REPRESENTATIVE OR DESIGNEE THROUGHOUT THE PROJECT AND WILL BE REVIEWED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE FOR ACCURACY AND COMPLETENESS AT LEAST ONCE EVERY 15 DAYS. THE FINAL AS-BUILT PLANS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE OR DESIGNEE PRIOR TO FINAL PAYMENT.

20. ALL WORK IN THE VICINITY OF LIVE STREAMS, WATER IMPOUNDMENTS, WETLANDS OR IRRIGATION SUPPLIES SHALL BE AFFECTED IN SUCH A MANNER AS TO MINIMIZE VEGETATION REMOVAL, SOIL DISTURBANCE AND EROSION. CROSSINGS OF LIVE STREAMS WITH HEAVY EQUIPMENT SHALL BE MINIMIZED, AS DETERMINED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE. EQUIPMENT REFUELING, MAINTENANCE AND CEMENT DUMPING IN THE VICINITY OF WATER COURSES IS STRICTLY PROHIBITED AND SHALL BE PERFORMED IN PROPER CONTAINMENT AREAS.

21. CONSTRUCT DRIVE PADS AND ROADWAY INTERSECTIONS PER RIO BLANCO COUNTY STANDARDS.

22. TOPOGRAPHY SHOWN ON THESE PLANS IS ACCORDING TO FIELD LOCATION BY RIVER VALLEY SURVEY, INC., DATED BETWEEN APRIL 14, 2018 TO MAY 15, 2018.

23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REMOVALS REQUIRED TO COMPLETE THE PROJECT. ADDITIONAL REMOVALS NOT SHOWN ON THE PLANS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE. THIS WORK WILL BE CONSIDERED AS INCLUDED IN THE CONTRACT PRICE FOR REMOVAL OF STRUCTURES AND OBSTRUCTIONS AND THE CONTRACTOR WILL NOT RECEIVE ADDITIONAL COMPENSATION FOR UNLISTED REMOVALS.

24. UNSUITABLE CONSTRUCTION MATERIALS AND DEBRIS FROM CLEARING AND GRUBBING ARE TO BE PLACED IN AN ENVIRONMENTALLY SUITABLE DISPOSAL SITE.

25. UTILITY LOCATIONS SHOWN WITHIN THE PROJECT BOUNDARY ARE BASED UPON THE BEST AVAILABLE EVIDENCE, BUT THE POSITIONS ARE NOT WARRANTED TO BE ACCURATE. CONTACT UTILITY PROVIDERS BEFORE STARTING ANY EXCAVATION WORK.

26. SHOULD CONFLICTING INFORMATION OR INTERFERENCE PROBLEMS APPEAR IN THE CONSTRUCTION DRAWINGS THE CONTRACTOR SHALL BRING THAT INFORMATION TO THE ATTENTION OF THE ENGINEER IMMEDIATELY PRIOR TO INSTALLATION. FAILURE TO DO SO SHALL NOT BE A BASIS OF EXTRA PAYMENT TO THE CONTRACTOR.

27. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR COMPLYING WITH COLORADO ONE-CALL PROCEDURES. ANY DAMAGE TO EXISTING UTILITIES MUST BE IMMEDIATELY REPORTED TO THE APPROPRIATE UTILITY COMPANY.

28. BLUE STAKE LOCATES SHALL BE FIELD VERIFIED BY THE CONTRACTOR THROUGH POTHOLING AND COORDINATION WITH UTILITY OWNER.

29. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE RESPECTIVE UTILITY COMPANIES PRIOR TO GRADING OR TRENCHING.

30. THE CONTRACTOR SHALL REVIEW AND FOLLOW THE RECOMMENDATIONS PROVIDED IN THE "GEOLOGY AND GEOLOGIC HAZARD EVALUATION" AND "GEOTECHNICAL INVESTIGATION", BOIES RANCH, BR PRODUCED WATER PIT, RIO BLANCO COUNTY, COLORADO", PREPARED BY CTL THOMPSON INCORPORATED, DATED MARCH 29, 2018 AND REVISED APRIL 6, 2018 FOR MOISTURE CONTENT, MAXIMUM COMPACTED LIFT DEPTHS, AND MINIMUM COMPACTION REQUIREMENTS FOR THE PROJECT.

31. THE CONTRACTOR SHALL CONFORM TO ALL REQUIREMENTS SET FORTH BY THE TECHNICAL SPECIFICATIONS LOCATED IN THE PROJECT MANUAL.

32. TRENCHES DEEPER THAN 5' IN DEPTH MUST BE SHORED, SLOPED, OR SHIELDED PER OSHA REGULATIONS.

33. EARTHWORK ESTIMATES ARE BASED ON COMPACTED AND IN-PLACE MATERIAL. CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE REQUIRED MATERIAL AND HAUL ASSETS TO EMPLACE AND REMOVE THE CORRECT VOLUMES USING LOOSE SOIL CORRECTION FACTORS. NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.

34. ALL FILL MATERIAL THAT MEETS THE REQUIREMENTS FOR ENGINEERED FILL OR SELECT IMPORTED GRANULAR FILL SHOULD BE MOISTENED TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT, PLACED IN LOOSE LIFTS OF LESS THAN 8 INCHES MAXIMUM, AND COMPACTED TO A MINIMUM 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR ASTM D698, USING APPROPRIATE EQUIPMENT.

35. BACKFILL MATERIALS TO BE PLACED UNDER CONCRETE SLABS SHALL BE A GRANULAR SOIL. EXPANSIVE TYPE SOILS ARE PROHIBITED AS BACKFILL MATERIALS.

36. THE EARTHWORK HAUL ON THIS PROJECT WILL BE CONSIDERED AS INCLUDED IN THE CONTRACT PRICE FOR UNCLASSIFIED EXCAVATION AND BORROW AS APPLICABLE, AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.

37. THE PROJECT WILL HAVE ALTERATION, VERIFICATION, AND SUBGRADE DENSITY TESTS COMPLETED BY A GEOTECHNICAL ENGINEERING COMPANY TO VERIFY COMPACTION. PROOF ROLLING WILL BE COMPLETED ALONG THE PROJECT SUBGRADE AND ANY SOFT SPOTS WILL BE REMOVED AND RECONSTRUCTED BEFORE THE CONTRACTOR BEGINS WORK.

38. NOTWITHSTANDING THE APPROVAL OF THESE GRADING PLANS, THE CONTRACTOR IS RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO ADJACENT PROPERTY. NO PERSON SHALL EXCAVATE ON LAND SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY SUCH PROPERTY FROM SETTLING, CRACKING, EROSION, SILTING, SCOUR OR OTHER DAMAGE, WHICH MIGHT RESULT FROM THE GRADING DESCRIBED ON THE PLAN.

39. SPECIAL CONDITION: IF ANY ARCHEOLOGICAL RESOURCES ARE DISCOVERED ON THE SITE OF THIS GRADING OPERATION, SUCH OPERATION WILL CEASE IMMEDIATELY, AND THE PERMITTEE WILL NOTIFY THE OWNER'S REPRESENTATIVE.

40. ALL PROJECT LIMITS AND CONSTRUCTION AREAS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION AND/OR GRADING.

41. DURING ROUGH GRADING OPERATIONS AND PRIOR TO THE CONSTRUCTION OF ANY PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO CONTIGUOUS PROPERTIES.

42. NO OBSTRUCTION OF FLOOD PLAINS OR NATURAL WATER COURSES WILL BE PERMITTED.

43. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST CONTINUE TO FUNCTION DURING STORM CONDITIONS. PROTECTIVE MEASURERS AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT CONTIGUOUS PROPERTIES DURING GRADING OPERATIONS.

44. THE FINISHED GRADE SHALL BE SLOPED AWAY FROM ALL EXTERIOR BUILDING WALLS AND FACILITIES TO PROMOTE POSITIVE DRAINAGE AWAY FROM FOUNDATIONS.

45. RIO BLANCO COUNTY SHALL BE NOTIFIED 72 HOURS PRIOR TO COMMENCING ANY WORK IN THE PUBLIC RIGHT OF WAY.

46. ROADWAY SECTION REPLACEMENT SHALL MEET CURRENT RIO BLANCO COUNTY AND UNITED STATES BUREAU OF LAND MANAGEMENT GOLD BOOK STANDARDS FOR DEPTH OR MATCH EXISTING DEPTH, WHICHEVER IS THICKER.

47. RECORD DRAWINGS OR WORK COMPLETED SHALL BE SUBMITTED TO ENGINEER PRIOR TO FINAL ACCEPTANCE OF THE INSTALLATIONS.

48. IN THE EVENT A SERVICE OUTAGE IS REQUIRED, CONTRACTOR WILL NOTIFY ALL AFFECTED PARTIES WHEN AND HOW LONG THEY WILL BE WITHOUT SERVICE.

49. STORM WATER POLLUTION PREVENTION PLANS SHALL BE MANAGED BY THE OWNER. STORM WATER EROSION & SEDIMENTATION CONTROL SHALL BE IMPLEMENTED BY CONTRACTOR AND DOCUMENTED BY THE OWNER TO PROTECT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION AND SEDIMENTATION AS A RESULT OF CONSTRUCTION ACTIVITIES.

50. EROSION & SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED AND SHALL BE KEPT IN PLACE UNTIL EROSION AND SEDIMENTATION POTENTIAL IS MITIGATED. REMOVAL OF SILT AND SEDIMENT IS REQUIRED ONCE SILT AND SEDIMENT HAS REACHED HALF THE HEIGHT OF THE SILT FENCE. EROSION & SEDIMENTATION CONTROL DEVICES SHALL BE CHECKED AND MAINTAINED PER THE OWNERS PERMIT.

51. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD.

52. THE CONTRACTOR SHALL COORDINATE STRUCTURAL DRAWINGS WITH OTHER DRAWINGS FOR INDIVIDUAL ITEMS. DISCREPANCIES UNCOVERED, IF ANY, SHALL BE REPORTED BEFORE PROCEEDING WITH THE WORK SO THAT PROPER ADJUSTMENT CAN BE MADE.

53. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE AND ADEQUATE SHORING FOR ALL PARTS OF THE PROJECT DURING CONSTRUCTION. ALL STRUCTURES SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED FOR STABILITY UNDER FINAL CONFIGURATION.

54. THE OWNER WILL PROVIDE CONSTRUCTION OBSERVERS AND MATERIAL TESTERS TO OBSERVE AND TEST ALL CONTROLLED EARTHWORK. THE CONSTRUCTION OBSERVERS AND MATERIAL TESTERS SHALL PROVIDE CONTINUOUS ON-SITE OBSERVATION AND TESTING DURING CONSTRUCTION OF CONTROLLED EARTHWORK. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION OBSERVERS AND MATERIAL TESTERS AT LEAST TWO WORKING DAYS IN ADVANCE OF ANY FIELD OPERATIONS OF THE CONTROLLED EARTHWORK.

55. CONTRACTOR SHALL COMPLY WITH ANY AND ALL CONDITIONS OF APPROVALS ISSUED BY THE REGULATORY AGENCIES AS DETERMINED BY OWNER.

OWNER

URSA OPERATING COMPANY LLC
792 BUCKHORN DRIVE
RIFLE, COLORADO 81650
(970) 625-9922

CIVIL ENGINEER

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SURFACE OWNER

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ELECTRIC COMPANY

WHITE RIVER ELECTRIC ASSOCIATION, INC.
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MEEKER, COLORADO, 81641
(970) 878-5041

ABBREVIATIONS

BH	BORE HOLE	LF	LINEAR FEET
BLM	BUREAU OF LAND MANAGEMENT	MAX.	MAXIMUM
CDPHE	COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT	ME	MATCH EXISTING
CMP	CORRUGATED METAL	MCC	MECHANICAL CONTROL CENTER
CR	COUNTY ROAD	MIL or MM	MILLIMETER
CU. FT.	CUBIC FEET	MIN.	MINIMUM
CU. YD.	CUBIC YARDS	MW	MONITORING WELL
DIA.	DIAMETER (Ø)	N.T.S.	NOT TO SCALE
ELEV.	ELEVATION	O.C.	ON CENTER
EX	EXISTING	OHE	OVERHEAD ELECTRIC
FEMA	FEDERAL EMERGENCY MANAGEMENT ADMINISTRATION	ROW	RIGHT OF WAY
FT	FEET	SQ. FT.	SQUARE FEET
FG	FINISH GRADE	STA.	STATION
G	GAS LINE	TOE	TOE OF BANK
HDPE	HIGH DENSITY POLYETHYLENE	TOP	TOP OF BANK
HORIZ	HORIZONTAL	TYP	TYPICAL
		w/	WITH

LEGEND

- EXISTING INDEX CONTOURS
- EXISTING INTERMEDIATE CONTOURS
- G — EXISTING NATURAL GAS LINE
- OE — EXISTING OVERHEAD ELECTRIC LINE
- X — EXISTING FENCE
- EXISTING ELECTRIC POLE
- EXISTING BOLLARD PROTECTED STRUCTURE
- PROPOSED INDEX CONTOURS
- PROPOSED INTERMEDIATE CONTOURS
- PROPOSED DRAINAGE PIPE
- PROPOSED WILDLIFE FENCE
- PROPOSED WILDLIFE PEDESTRIAN GATE
- PROPOSED FARM FENCE

Rev #	Date	Description	By	Chk'd

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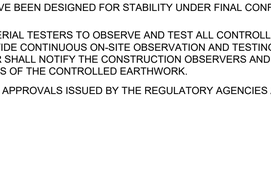
URSA OPERATING COMPANY LLC
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
GENERAL NOTES AND LEGEND



THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018
Scale: Horiz:
Vert:
Project No: 5D27072
Sheet: G101

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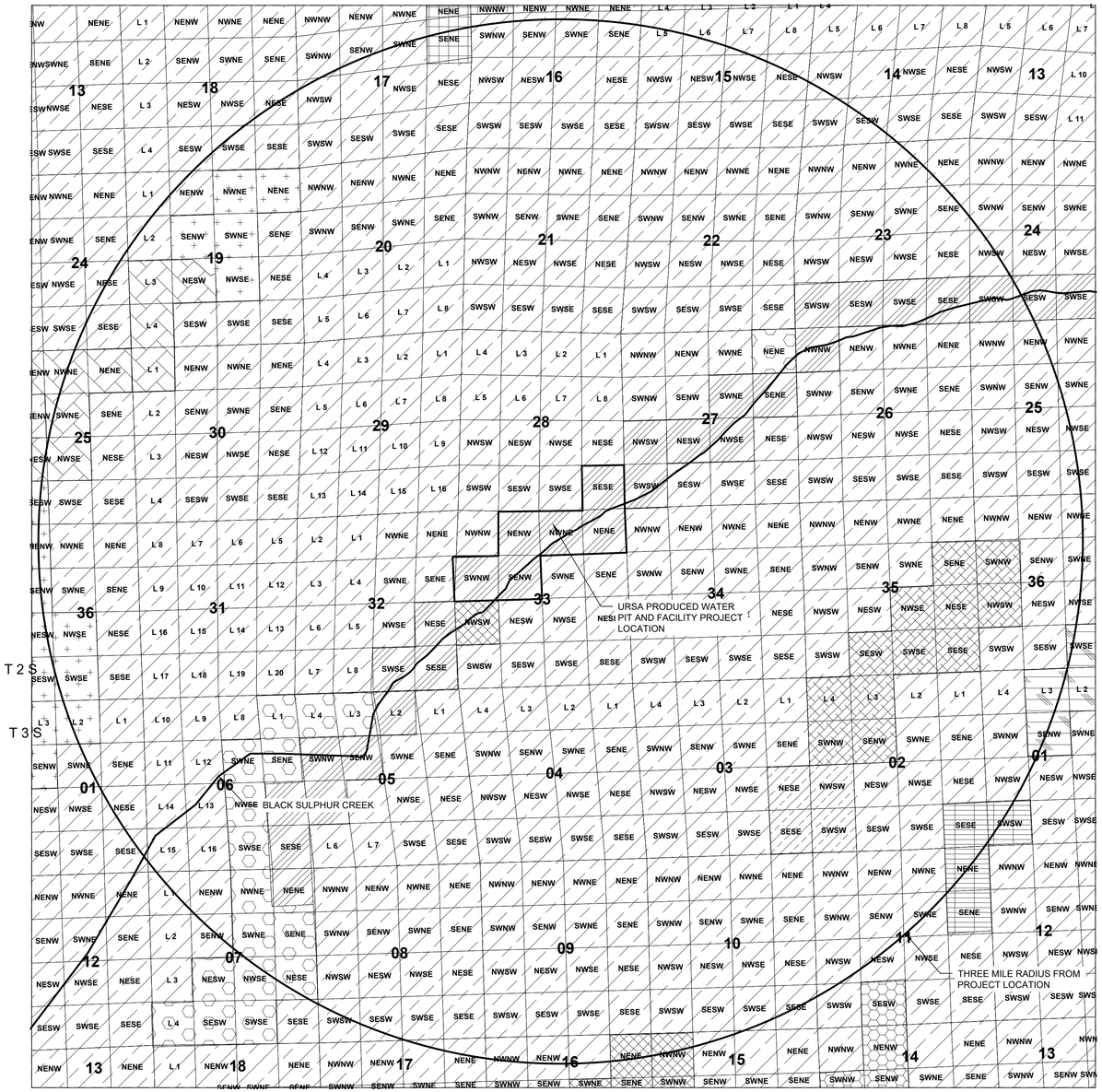

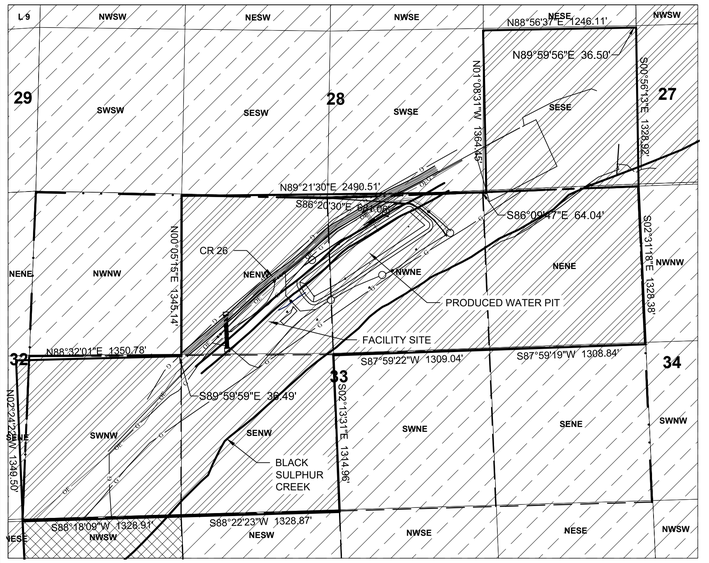

PROPERTY OWNERS WITHIN A THREE MILE RADIUS OF PROJECT

- BUREAU OF LAND MANAGEMENT
- FAWN CREEK, INC.
- LOST CAUSE, LLC
- LOV LAND COMPANY
- MANTLE, TIM, LARUE S. DEAN B. & BROOKE S
- OIL SHALE CORPORATION
- PICEANCE BASIN DISPOSAL, INC.
- SLASH EV RANCH LLLP
- TC LANDCO, LLC
- URSA OPERATING COMPANY LLC
- WHITING OIL & GAS CORPORATION
- WPX ENERGY ROCKY MOUNTAIN, LLC

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URSA OPERATING COMPANY LLC
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
VICINITY MAP

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: G102

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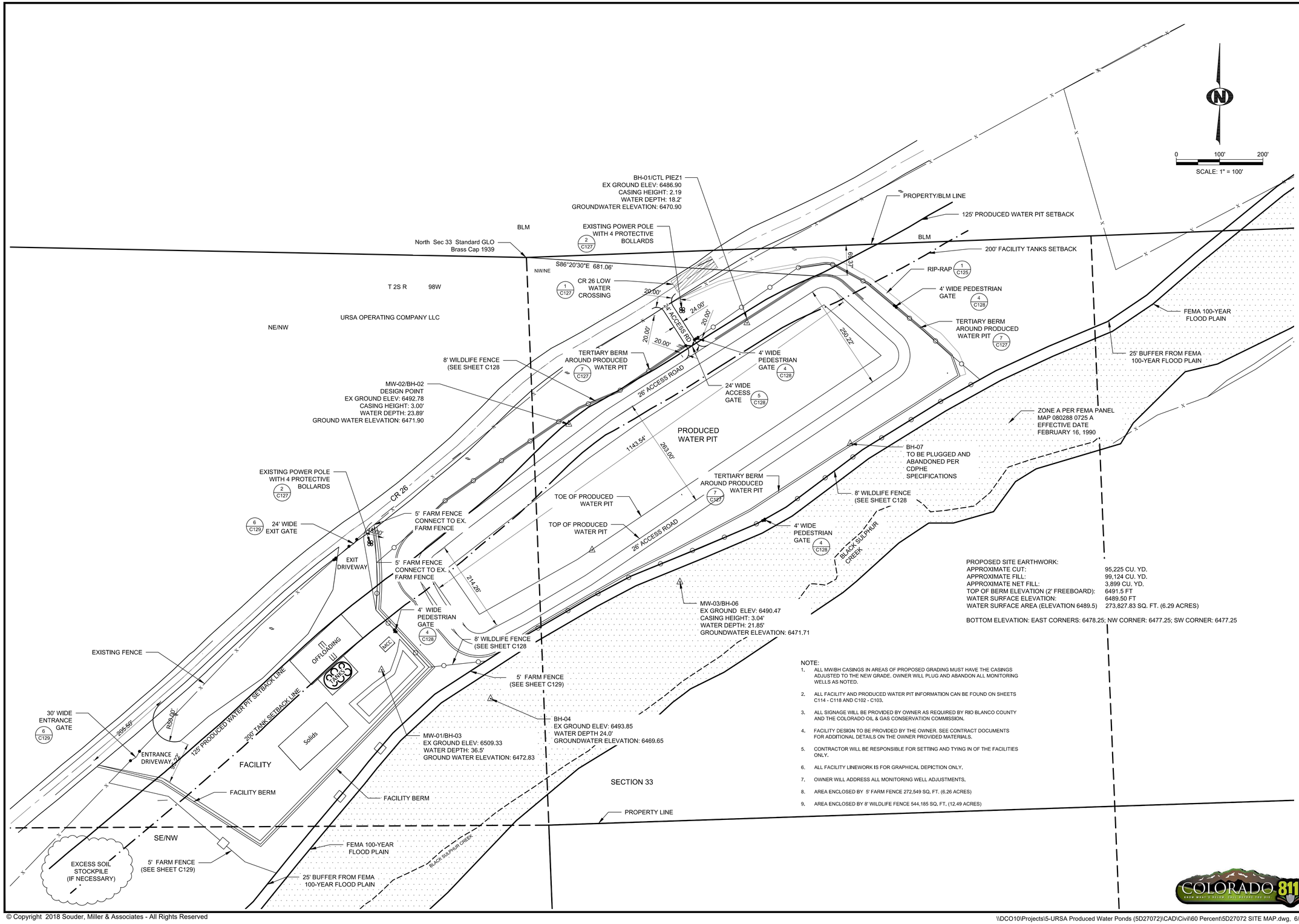

PROPOSED SITE EARTHWORK:

APPROXIMATE CUT:	95,225 CU. YD.
APPROXIMATE FILL:	99,124 CU. YD.
APPROXIMATE NET FILL:	3,899 CU. YD.
TOP OF BERM ELEVATION (2' FREEBOARD):	6491.5 FT
WATER SURFACE ELEVATION:	6489.50 FT
WATER SURFACE AREA (ELEVATION 6489.5)	273,827.83 SQ. FT. (6.29 ACRES)

BOTTOM ELEVATION: EAST CORNERS: 6478.25; NW CORNER: 6477.25; SW CORNER: 6477.25

NOTE:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE. OWNER WILL PLUG AND ABANDON ALL MONITORING WELLS AS NOTED.
2. ALL FACILITY AND PRODUCED WATER PIT INFORMATION CAN BE FOUND ON SHEETS C114 - C118 AND C102 - C103.
3. ALL SIGNAGE WILL BE PROVIDED BY OWNER AS REQUIRED BY RIO BLANCO COUNTY AND THE COLORADO OIL & GAS CONSERVATION COMMISSION.
4. FACILITY DESIGN TO BE PROVIDED BY THE OWNER. SEE CONTRACT DOCUMENTS FOR ADDITIONAL DETAILS ON THE OWNER PROVIDED MATERIALS.
5. CONTRACTOR WILL BE RESPONSIBLE FOR SETTING AND TYING IN OF THE FACILITIES ONLY.
6. ALL FACILITY LINEWORK IS FOR GRAPHICAL DEPICTION ONLY.
7. OWNER WILL ADDRESS ALL MONITORING WELL ADJUSTMENTS.
8. AREA ENCLOSED BY 5' FARM FENCE 272,549 SQ. FT. (6.26 ACRES)
9. AREA ENCLOSED BY 8' WILDLIFE FENCE 544,185 SQ. FT. (12.49 ACRES)

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RIFLE, COLORADO

URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH SITE MAP

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Project No: 5D27072

Sheet: C101

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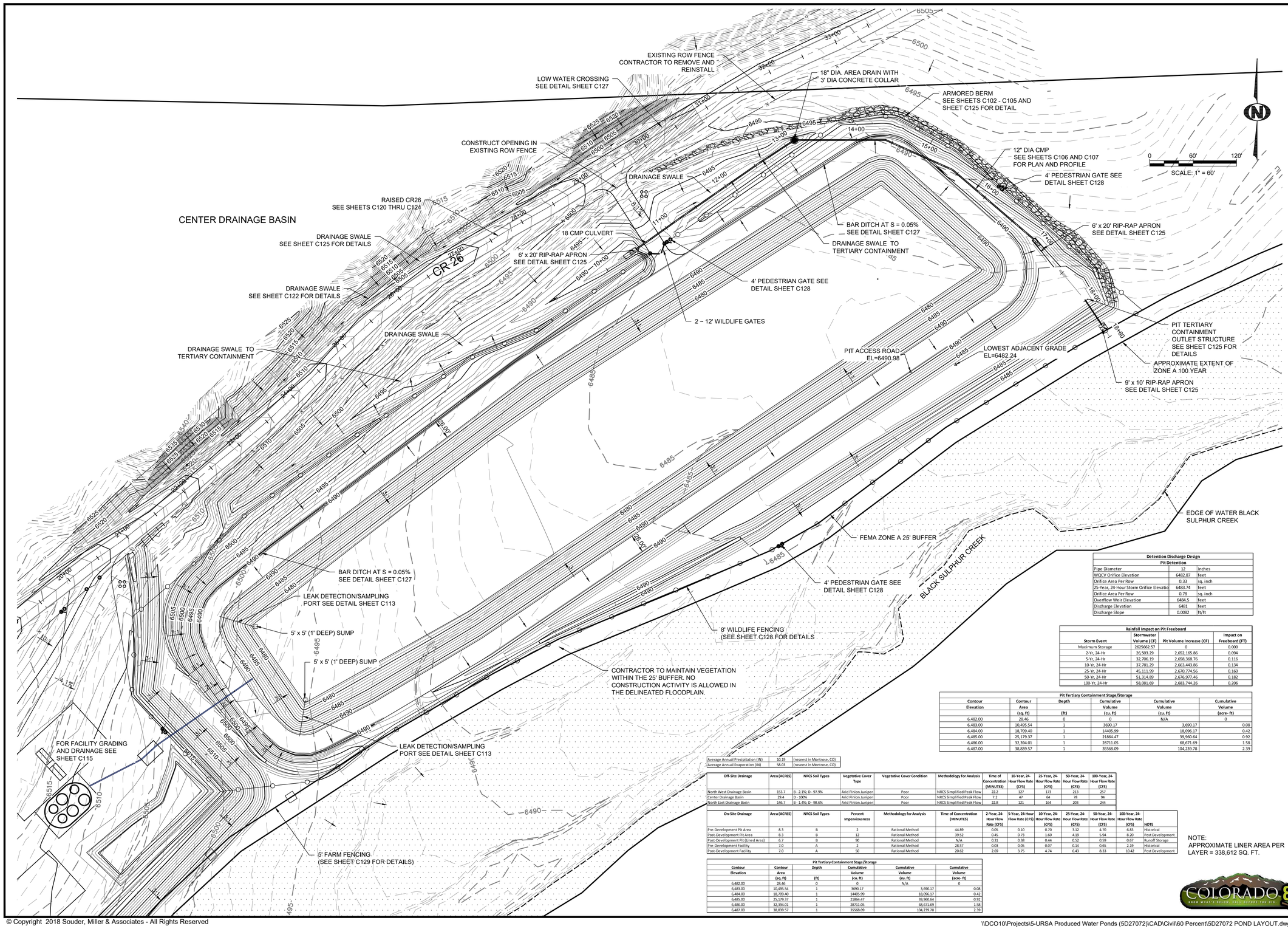
\\DCO10\Projects\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 SITE MAP.dwg, 6/6/2018 3:05:03 PM GJF



Detention Discharge Design		
Pit Detention		
Pipe Diameter	12	inches
WQCV Orifice Elevation	6482.87	feet
Orifice Area Per Row	0.33	sq. inch
25-Year, 24-Hour Storm Orifice Elevatio	6483.74	feet
Orifice Area Per Row	0.78	sq. inch
Overflow Weir Elevation	6484.5	feet
Discharge Elevation	6481	feet
Discharge Slope	0.0082	ft/ft

Rainfall Impact on Pit Freeboard			
Storm Event	Stormwater Volume (CF)	Pit Volume Increase (CF)	Impact on Freeboard (FT)
Maximum Storage	2625662.57	0	0.000
2-Yr, 24-Hr	26,503.29	2,652,165.86	0.094
5-Yr, 24-Hr	32,706.19	2,658,368.76	0.116
10-Yr, 24-Hr	37,781.29	2,663,443.86	0.134
25-Yr, 24-Hr	45,111.99	2,670,774.56	0.160
50-Yr, 24-Hr	51,314.89	2,676,977.46	0.182
100-Yr, 24-Hr	58,081.69	2,683,744.26	0.206

Pit Tertiary Containment Stage/Storage					
Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Cumulative Volume (cu. ft)	Cumulative Volume (cu. ft)	Cumulative Volume (acre- ft)
6,482.00	28.46	0	0	N/A	0
6,483.00	10,495.54	1	3690.17	3,690.17	0.08
6,484.00	18,709.40	1	14405.99	18,096.17	0.42
6,485.00	25,179.37	1	21864.47	39,960.64	0.92
6,486.00	32,394.01	1	28711.05	68,671.69	1.58
6,487.00	38,839.57	1	35568.09	104,239.78	2.39

Average Annual Precipitation (IN)	10.19	(nearest in Montrose, CO)
Average Annual Evaporation (IN)	58.03	(nearest in Montrose, CO)

Off-Site Drainage	Area (ACRES)	NRCS Soil Types	Vegetative Cover Type	Vegetative Cover Condition	Methodology for Analysis	Time of Concentration (MINUTES)	10-Year, 24-Hour Flow Rate (CFS)	25-Year, 24-Hour Flow Rate (CFS)	50-Year, 24-Hour Flow Rate (CFS)	100-Year, 24-Hour Flow Rate (CFS)
North West Drainage Basin	153.7	B - 2.1%; D - 97.9%	Arid Pinion Juniper	Poor	NRCS Simplified Peak Flow	22.2	127	173	211	257
Center Drainage Basin	29.4	D - 100%	Arid Pinion Juniper	Poor	NRCS Simplified Peak Flow	7.2	47	64	78	94
North East Drainage Basin	146.7	B - 1.4%; D - 98.6%	Arid Pinion Juniper	Poor	NRCS Simplified Peak Flow	22.8	121	164	203	244

On-Site Drainage	Area (ACRES)	NRCS Soil Types	Percent Imperviousness	Methodology for Analysis	Time of Concentration (MINUTES)	2-Year, 24-Hour Flow Rate (CFS)	5-Year, 24-Hour Flow Rate (CFS)	10-Year, 24-Hour Flow Rate (CFS)	25-Year, 24-Hour Flow Rate (CFS)	50-Year, 24-Hour Flow Rate (CFS)	100-Year, 24-Hour Flow Rate (CFS)	NOTE
Pre-Development Pit Area	8.3	B	2	Rational Method	44.89	0.05	0.10	0.70	3.12	4.70	6.83	Historical
Post-Development Pit Area	8.3	B	12	Rational Method	39.52	0.45	0.73	1.60	4.19	5.94	8.20	Post Development
Post-Development Pit (Lined Area)	6.7	B	90	Rational Method	N/A	0.31	0.38	0.44	0.52	0.59	0.67	Runoff Storage
Pre-Development Facility	7.0	A	2	Rational Method	28.57	0.03	0.05	0.07	0.14	0.65	2.19	Historical
Post-Development Facility	7.0	A	50	Rational Method	20.62	2.69	3.75	4.74	6.43	8.33	10.42	Post Development

Pit Tertiary Containment Stage/Storage					
Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Cumulative Volume (cu. ft)	Cumulative Volume (N/A ft)	Cumulative Volume (acre- ft)
6,482.00	28.46	0	0	N/A	0
6,483.00	10,495.54	1	3690.17	3,690.17	0.08
6,484.00	18,709.40	1	14405.99	18,096.17	0.42
6,485.00	25,179.37	1	21864.47	39,960.64	0.92
6,486.00	32,394.01	1	28711.05	68,671.69	1.58
6,487.00	38,839.57	1	35568.09	104,239.78	2.39

NOTE:
APPROXIMATE LINER AREA PER LAYER = 338,612 SQ. FT.

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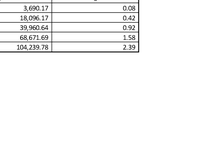
URSA OPERATING COMPANY LLC
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH PRODUCED WATER PIT SITE GRADING AND DRAINAGE PLAN



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Vert:
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Sheet: C102

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NOTE:
ALL WORK TO TIE INTO EXISTING
BEFORE PROPERTY LINE

RAISED CR26
SEE SHEETS C120 THRU C124

INSTALL 4 ~ BOLLARDS AROUND
EXISTING POWER POLE SEE
SHEET C125 FOR DETAIL

CR-26 ROW (24' FROM
EDGE OF ROAD)

FEMA ZONE A 25' OFFSET

APPROXIMATE EXTENT OF
ZONE A 100 YEAR

EDGE OF WATER BLACK
SULPHUR CREEK

BLACK SULPHUR CREEK

8' WILDLIFE FENCING
(SEE SHEET C128 FOR DETAILS

5' FARM FENCING
(SEE SHEET C129 FOR DETAILS)

0 60' 120'
SCALE: 1" = 60'

NOTES:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE. OWNER WILL PLUG AND ABANDON AS NEEDED.
2. SEE SHEET C104 FOR PIT PROFILE
3. SEE SHEET C105 FOR PIT SECTIONS
4. MAINTAIN MINIMUM 10' RADIUS FROM ALL EXISTING POWER POLES.
5. ALL GRADING TO END AT OR BEFORE FEMA ZONE A 25' OFFSET.

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RIFLE, COLORADO
URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
PRODUCED WATER PIT LAYOUT

JEFFREY C. HARRIS
0051615
6-6-2018
PROFESSIONAL ENGINEER

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COLORADO 811
KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

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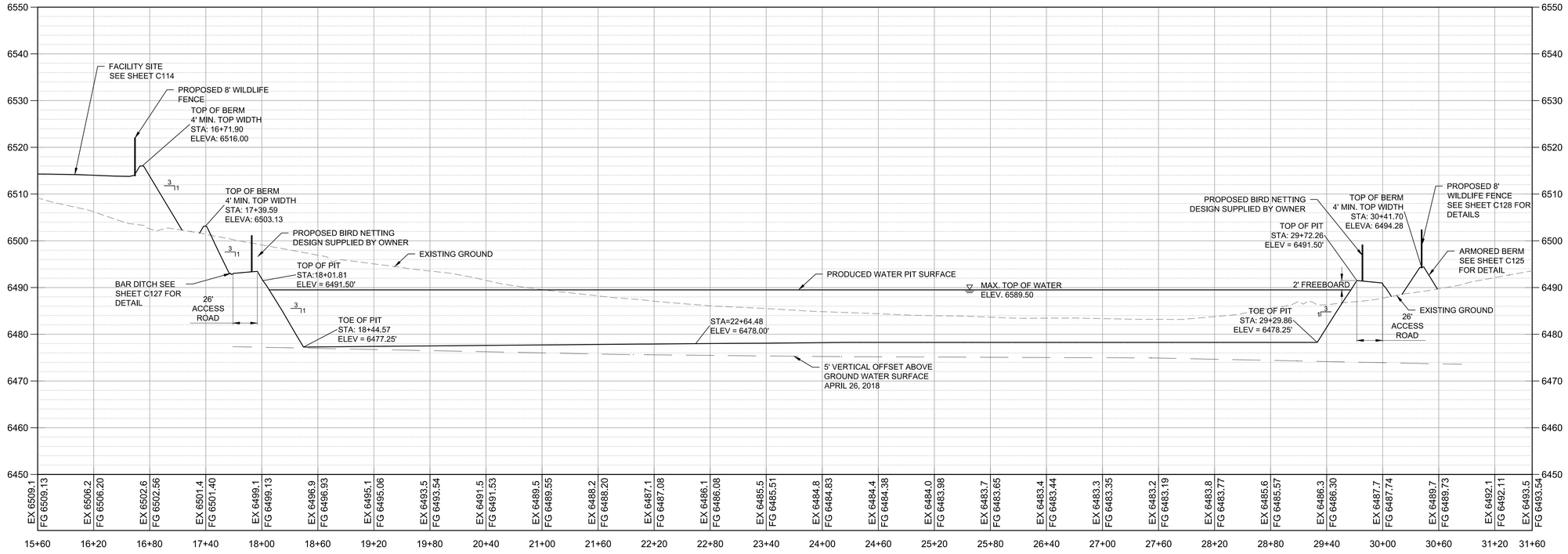
L:\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 POND LAYOUT.dwg, 6/6/2018 12:24:58 PM GJF



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RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
PRODUCED WATER PIT PROFILE

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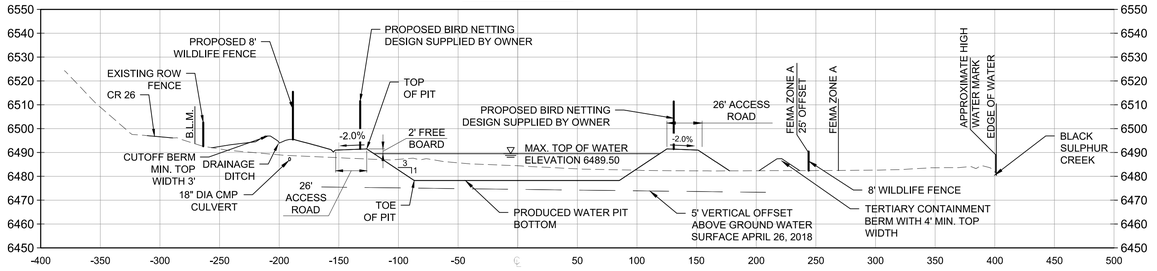
28+50.00



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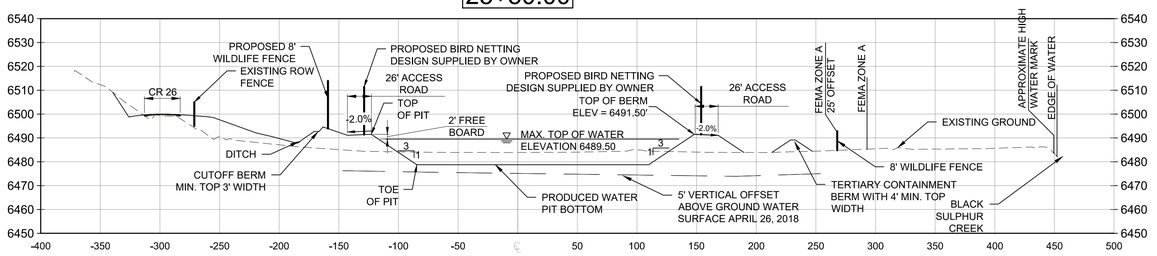

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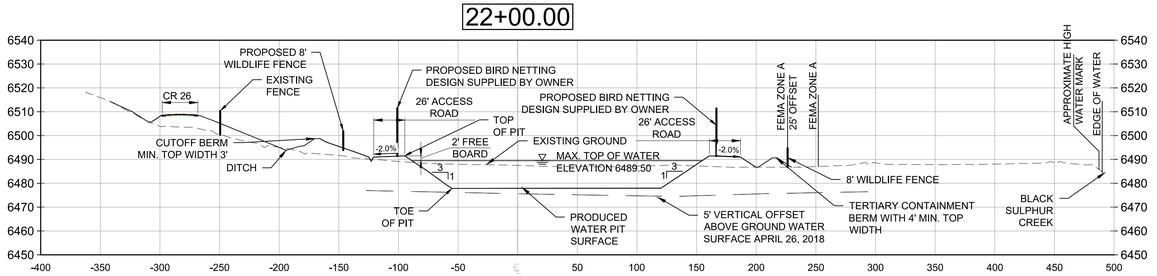

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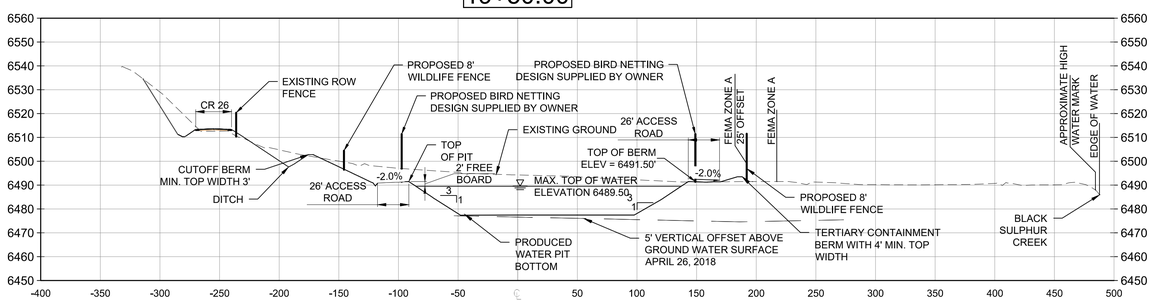

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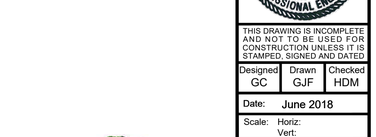
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
PRODUCED WATER PIT CROSS-SECTIONS



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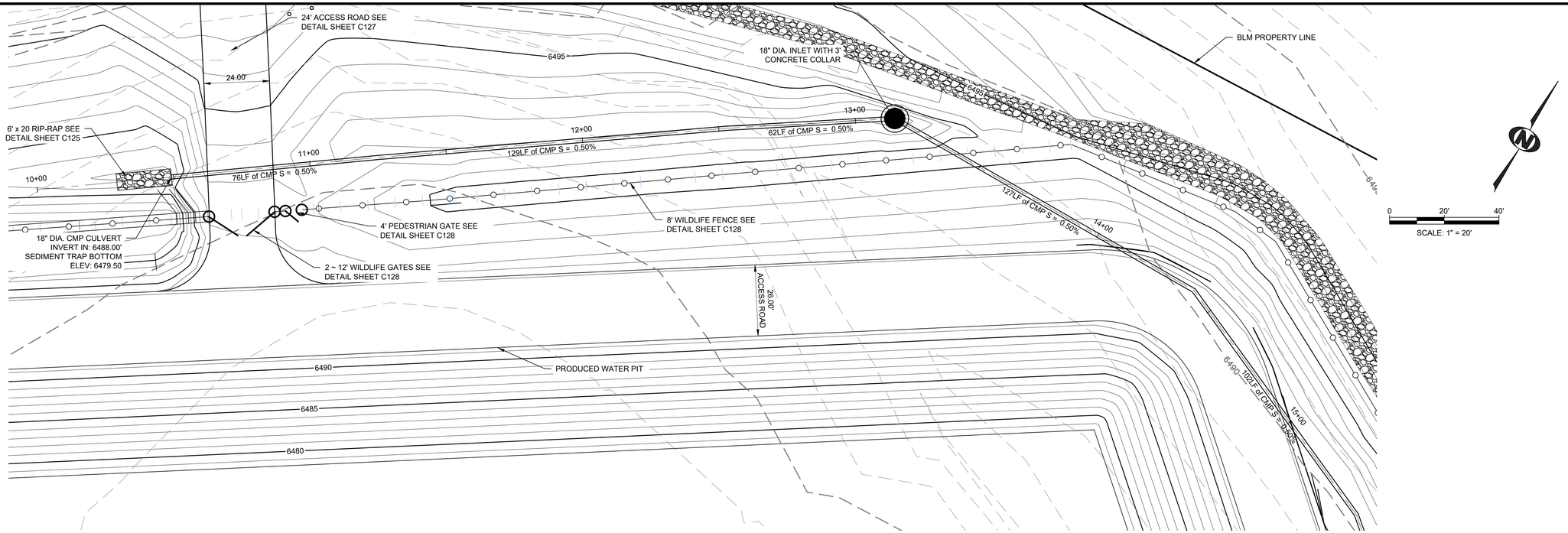
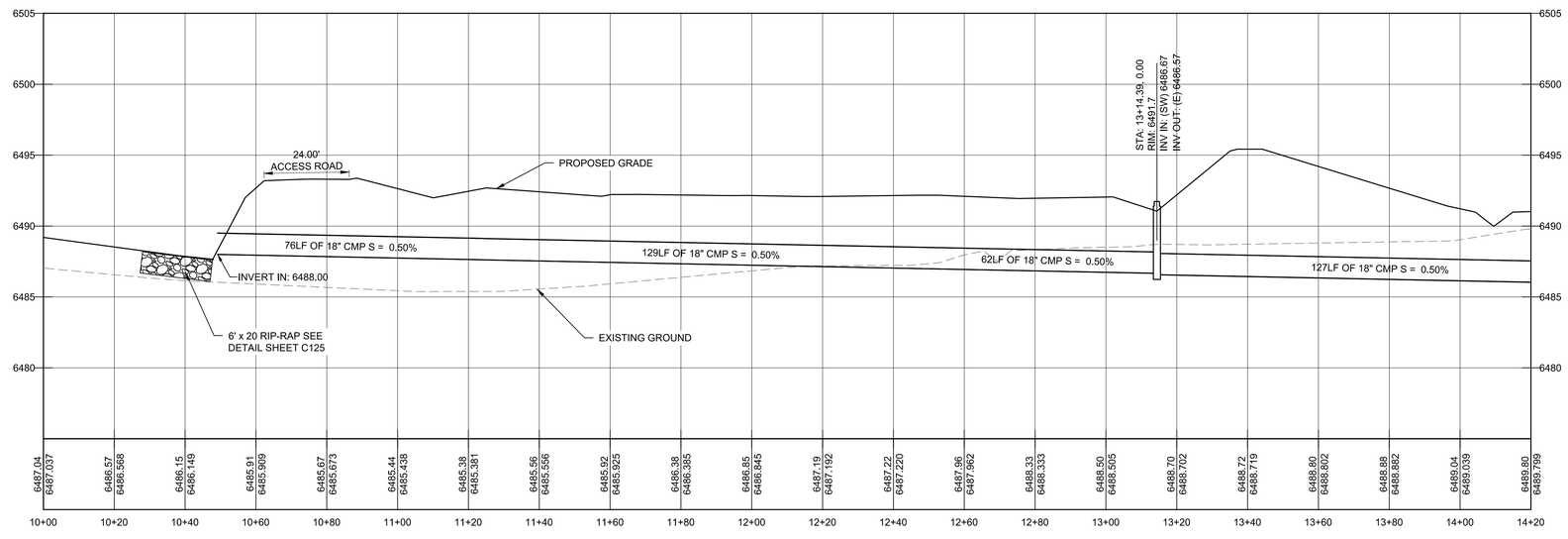
www.wwc1.state.co.us/811.htm



NORTH DRAINAGE PIPE PROFILE



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BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
DRAINAGE PIPE STA 10+00 - STA 14+00

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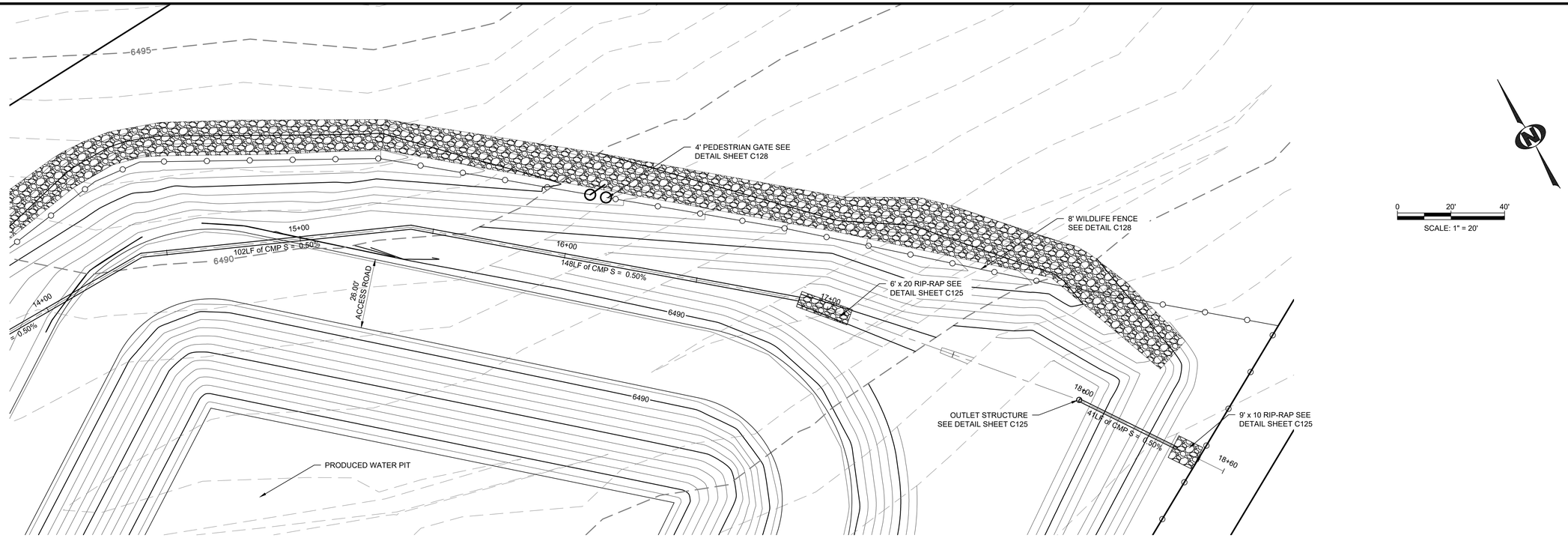
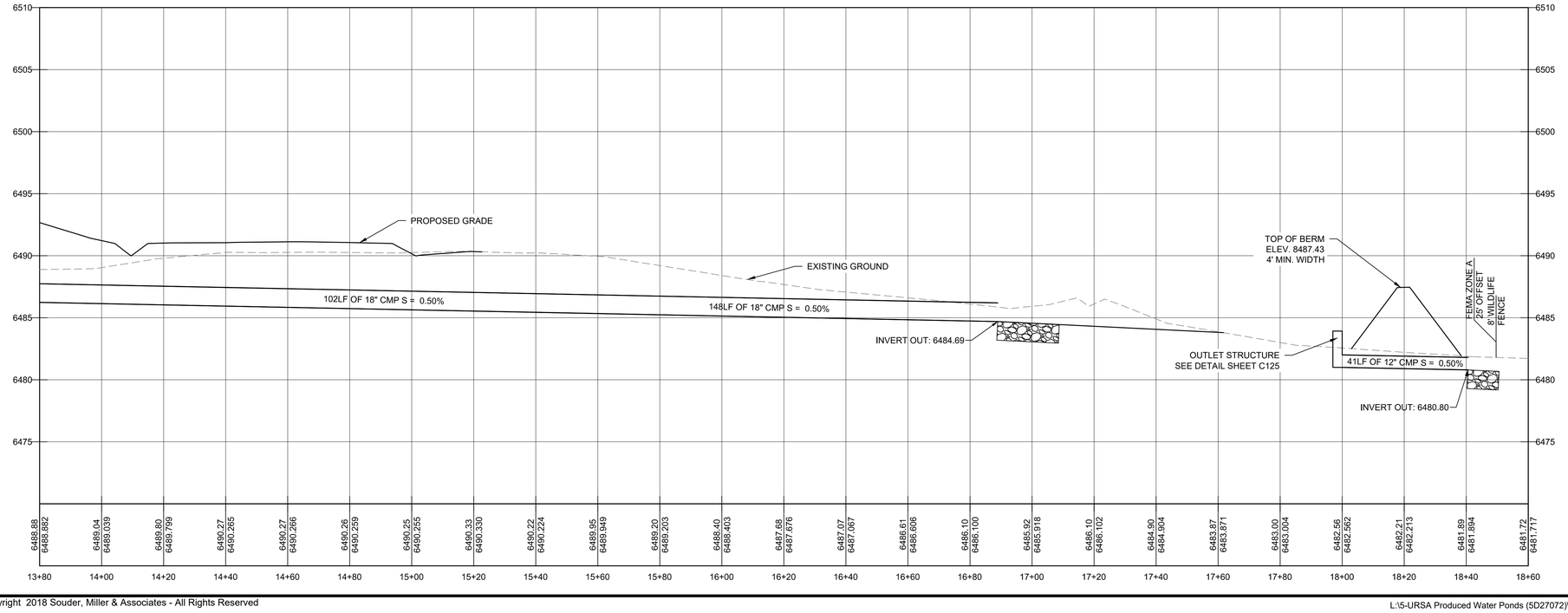


NORTH DRAINAGE PIPE PROFILE



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BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
DRAINAGE PIPE STA 14+00 - STA 18+00

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COLORADO 811

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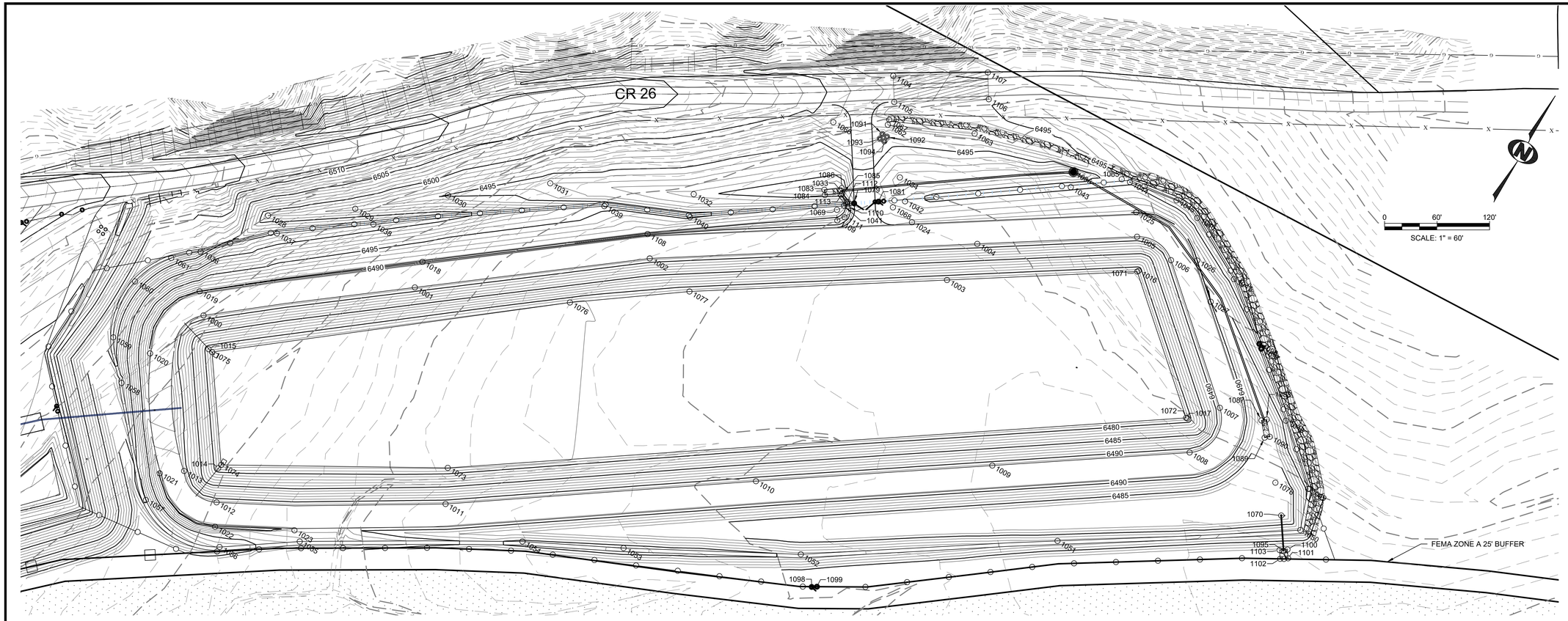

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1000	14478311.43	2370086.14	6499.71	ACCESS ROAD
1001	14478459.90	2370279.26	6492.50	ACCESS ROAD
1002	14478622.80	2370495.09	6486.91	ACCESS ROAD
1003	14478771.31	2370801.61	6483.67	PIT BOTTOM
1004	14478824.37	2370810.89	6484.17	ACCESS ROAD
1005	14478922.73	2370964.98	6488.16	ACCESS ROAD
1006	14478918.96	2371011.92	6489.10	ACCESS ROAD
1007	14478800.57	2371144.70	6486.77	ACCESS ROAD
1008	14478739.04	2371140.43	6483.47	ACCESS ROAD
1009	14478613.41	2370952.57	6482.89	ACCESS ROAD
1010	14478462.85	2370727.65	6484.66	ACCESS ROAD
1011	14478262.96	2370433.48	6488.49	ACCESS ROAD
1012	14478133.79	2370205.95	6494.86	ACCESS ROAD
1013	14478146.25	2370155.90	6496.22	ACCESS ROAD
1014	14478168.41	2370187.99	6495.24	RADIUS
1015	14478280.85	2370110.35	6499.30	RADIUS
1016	14478889.85	2370985.97	6487.11	RADIUS
1017	14478771.46	2371118.75	6484.83	RADIUS
1018	14478489.62	2370272.16	6493.17	SWALE
1019	14478333.10	2370068.40	6502.54	SWALE
1020	14478243.17	2370054.95	6501.74	SWALE
1021	14478129.98	2370133.11	6496.97	SWALE
1022	14478108.73	2370218.44	6494.42	SWALE
1023	14478150.54	2370299.06	6491.80	SWALE
1024	14478808.49	2370733.96	6484.15	SWALE
1025	14478946.52	2370950.22	6488.84	SWALE
1026	14478933.54	2371038.11	6490.43	SWALE
1027	14478900.48	2371075.10	6489.55	SWALE

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1028	14478447.25	2370092.88	6505.09	SWALE
1029	14478503.81	2370175.31	6501.26	SWALE
1030	14478570.05	2370259.42	6497.27	SWALE
1031	14478640.36	2370353.76	6492.35	SWALE
1032	14478711.61	2370501.97	6489.53	SWALE
1033	14478799.30	2370645.37	6486.07	SWALE
1034	14478845.94	2370696.41	6485.69	SWALE
1035	14478950.48	2370865.01	6488.72	SWALE
1036	14478372.82	2370046.85	6506.28	BERM
1037	14478434.53	2370111.83	6502.58	BERM
1038	14478498.76	2370202.05	6497.54	BERM
1039	14478648.69	2370420.30	6489.76	BERM
1040	14478686.72	2370511.29	6488.45	BERM
1041	14478785.97	2370657.29	6485.41	BERM
1042	14478825.32	2370715.18	6484.73	BERM
1043	14478933.96	2370871.09	6488.30	BERM
1044	14478972.86	2370926.64	6489.49	BERM
1045	14478981.32	2370983.18	6491.71	BERM
1046	14478975.82	2371013.81	6492.25	BERM
1047	14478936.12	2371085.15	6492.08	BERM
1048	14478825.57	2371217.49	6486.40	BERM
1049	14478770.71	2371278.35	6484.77	BERM
1050	14478725.44	2371294.36	6482.54	BERM
1051	14478576.00	2371060.24	6482.44	BERM
1052	14478416.05	2370813.87	6484.58	BERM
1053	14478320.97	2370634.83	6486.09	BERM
1054	14478269.69	2370531.00	6487.04	BERM
1055	14478142.44	2370310.60	6491.66	BERM

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1056	14478091.20	2370234.38	6493.92	BERM
1057	14478095.67	2370134.61	6497.07	BERM
1058	14478197.78	2370043.73	6501.30	BERM
1059	14478238.15	2370009.36	6505.30	BERM
1060	14478305.97	2369999.02	6507.07	BERM
1061	14478349.87	2370021.30	6506.49	BERM
1062	14478891.30	2370654.26	6490.03	BERM
1063	14478932.10	2370745.27	6490.62	BERM
1065	14478970.94	2370916.93	6489.41	BERM
1066	14478862.61	2370598.88	6492.49	RADIUS
1067	14478896.98	2370652.80	6490.04	RADIUS
1068	14478812.37	2370706.59	6484.53	RADIUS
1069	14478777.94	2370652.65	6485.39	RADIUS
1070	14478728.98	2371267.18	6482.56	OUTLET STRUCTURE
1071	14478888.38	2370985.01	6487.08	PIT BOTTOM
1072	14478771.38	2371117.13	6484.80	PIT BOTTOM
1073	14478299.95	2370414.99	6488.65	PIT BOTTOM
1074	14478173.43	2370189.10	6495.19	PIT BOTTOM
1075	14478280.08	2370115.42	6499.05	PIT BOTTOM
1076	14478533.64	2370441.33	6487.00	PIT BOTTOM
1077	14478612.82	2370553.32	6485.52	PIT BOTTOM
1078	14478758.19	2371242.51	6483.79	SWALE DAYLIGHT
1079	14478794.16	2370665.93	6485.33	POST
1081	14478809.89	2370689.08	6484.97	POST
1083	14478790.67	2370628.73	6486.52	RIP-RAP
1084	14478785.75	2370632.22	6486.19	RIP-RAP
1085	14478797.34	2370648.52	6485.93	RIP-RAP
1086	14478802.26	2370645.03	6486.15	RIP-RAP

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1087	14478811.88	2371193.20	6485.77	RIP-RAP
1088	14478815.77	2371197.81	6485.95	RIP-RAP
1089	14478796.60	2371206.11	6486.44	RIP-RAP
1090	14478800.49	2371210.72	6486.08	RIP-RAP
1091	14478878.92	2370654.31	6489.78	BOLLARD
1092	14478878.92	2370660.31	6489.08	BOLLARD
1093	14478872.92	2370654.31	6488.74	BOLLARD
1094	14478872.92	2370660.31	6487.94	BOLLARD
1095	14478695.22	2371289.73	6481.88	CULVERT
1096	14478886.70	2371147.23	6489.33	POST
1097	14478882.71	2371152.04	6489.05	POST
1098	14478390.01	2370843.29	6484.79	POST
1099	14478393.23	2370848.30	6484.76	POST
1100	14478698.82	2371292.74	6481.97	RIP-RAP
1101	14478690.51	2371298.29	6481.80	RIP-RAP
1102	14478685.51	2371290.81	6481.80	RIP-RAP
1103	14478693.82	2371285.26	6481.87	RIP-RAP
1104	14478942.92	2370631.70	6500.83	LOW WATER CROSSING
1105	14478917.50	2370647.63	6496.66	LOW WATER CROSSING
1106	14478974.31	2370739.65	6495.86	LOW WATER CROSSING
1107	14479000.20	2370723.38	6496.89	LOW WATER CROSSING
1108	14478645.81	2370479.10	6488.00	BAR DITCH
1109	14478767.53	2370659.14	6484.97	BAR DITCH
1110	14478787.54	2370661.32	6485.33	BAR DITCH
1111	14478774.96	2370664.42	6484.97	BAR DITCH
1112	14478791.65	2370658.53	6485.50	BAR DITCH
1113	14478795.57	2370648.28	6485.89	BAR DITCH

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RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
PRODUCED WATER PIT HORIZONTAL CONTROL PLAN

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C108

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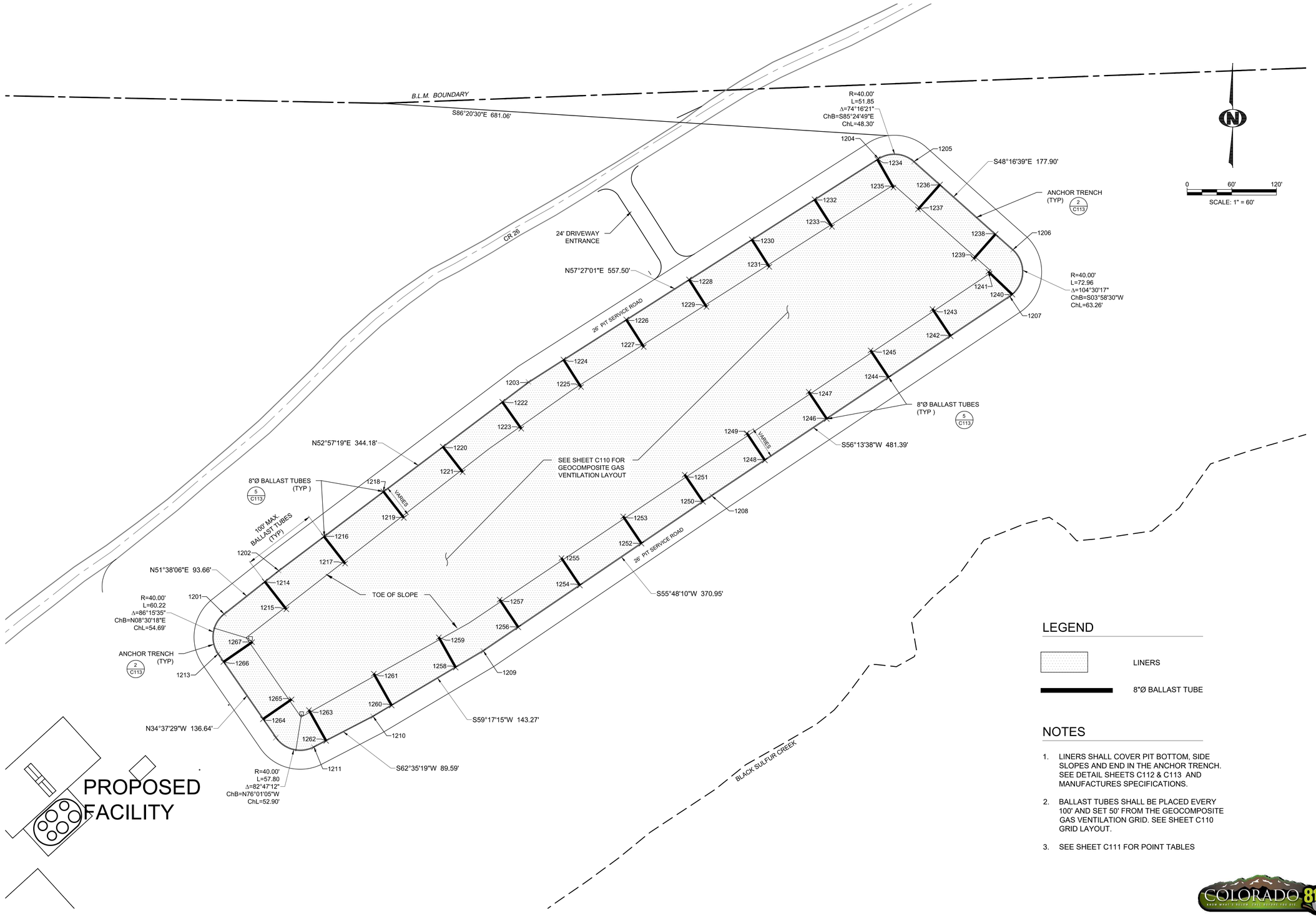
L:\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 POND LAYOUT.dwg, 6/6/2018 12:30:41 PM GJF



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URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
BALLAST TUBES AND ANCHOR TRENCH LAYOUT

COLORADO REGISTERED GREGORY JAMES FLEMING 0051615 6-6-2019 PROFESSIONAL ENGINEER

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Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C109

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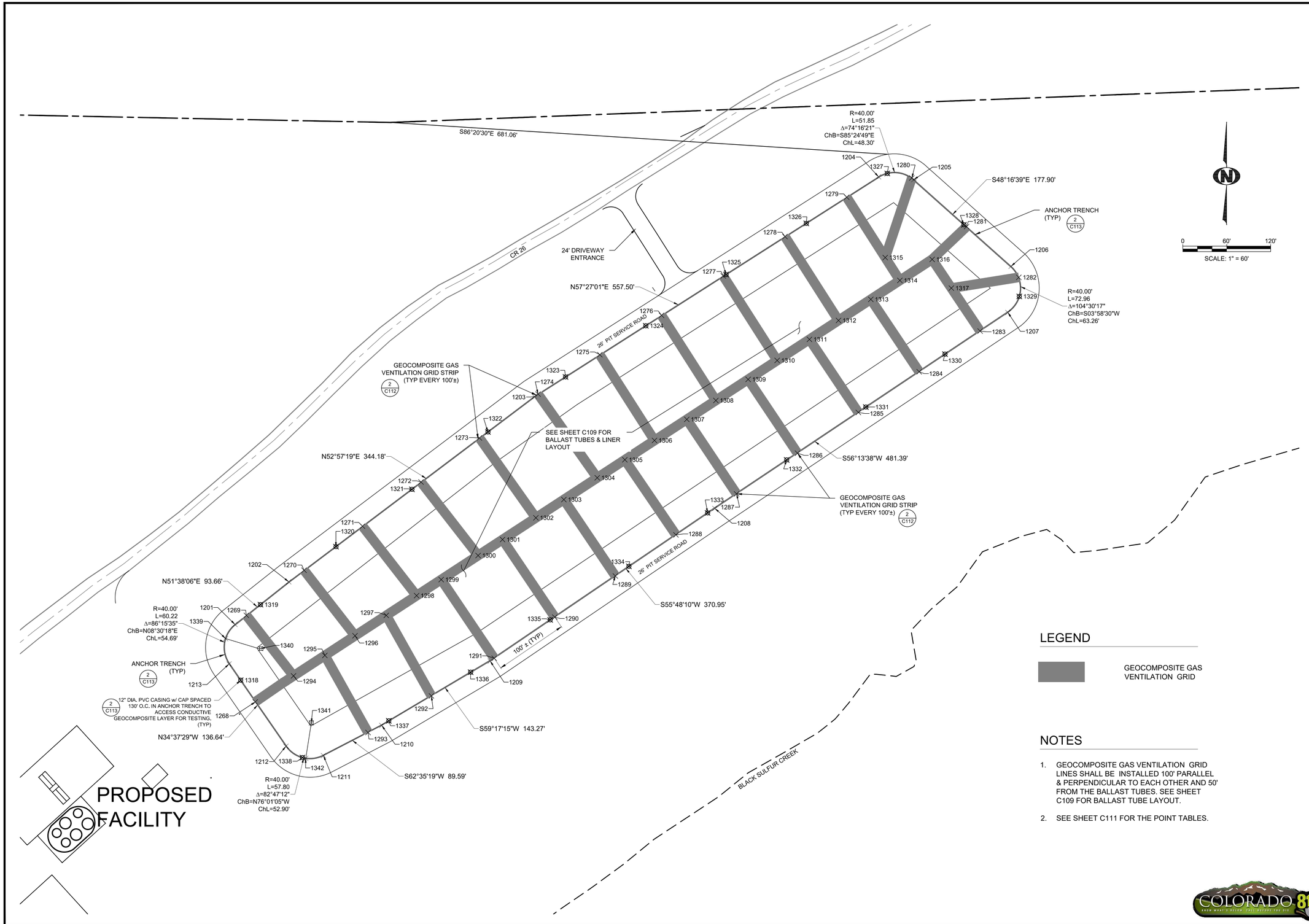
L:\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 POND BALLAST & GRID.dwg, 6/6/2018 12:32:23 PM GJF



LEGEND

GEOCOMPOSITE GAS VENTILATION GRID

NOTES

1. GEOCOMPOSITE GAS VENTILATION GRID LINES SHALL BE INSTALLED 100' PARALLEL & PERPENDICULAR TO EACH OTHER AND 50' FROM THE BALLAST TUBES. SEE SHEET C109 FOR BALLAST TUBE LAYOUT.
2. SEE SHEET C111 FOR THE POINT TABLES.

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RIFLE, COLORADO

URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH GEOCOMPOSITE GAS VENTILATION GRID LAYOUT

COLORADO REGISTERED GEOLOGIST JOHN C. GLAINE PE 0051615 6-6-2018 PROFESSIONAL ENGINEER

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Date: June 2018

Scale: Horiz: Vert:

Project No: 5D27072

Sheet: C110

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Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1201	14478312.22	2370085.52	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1202	14478370.35	2370158.96	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1203	14478623.62	2370494.52	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1204	14478923.57	2370964.45	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1205	14478919.71	2371012.59	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1206	14478801.31	2371145.37	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1207	14478738.21	2371140.98	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1208	14478470.60	2370740.83	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1209	14478262.11	2370434.01	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1210	14478174.15	2370285.94	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1211	14478132.90	2370206.41	6491.48	OUTSIDE EDGE ANCHOR TRENCH
1212	14478145.68	2370155.08	6491.49	OUTSIDE EDGE ANCHOR TRENCH
1213	14478258.13	2370077.44	6491.53	OUTSIDE EDGE ANCHOR TRENCH
1214	14478355.59	2370140.32	6491.48	CL BALLAST TUBE
1215	14478318.25	2370169.38	6477.37	CL BALLAST TUBE
1216	14478416.27	2370219.80	6491.48	CL BALLAST TUBE
1217	14478379.65	2370248.29	6477.54	CL BALLAST TUBE
1218	14478476.52	2370299.62	6491.48	CL BALLAST TUBE
1219	14478441.05	2370327.21	6477.71	CL BALLAST TUBE
1220	14478536.76	2370379.44	6491.48	CL BALLAST TUBE
1221	14478502.45	2370406.13	6477.88	CL BALLAST TUBE
1222	14478597.00	2370459.25	6491.48	CL BALLAST TUBE
1223	14478560.75	2370484.88	6478.07	CL BALLAST TUBE
1224	14478653.65	2370541.57	6491.48	CL BALLAST TUBE
1225	14478616.77	2370565.11	6478.25	CL BALLAST TUBE
1226	14478707.46	2370625.86	6491.48	CL BALLAST TUBE
1227	14478670.58	2370649.40	6478.25	CL BALLAST TUBE
1228	14478761.26	2370710.15	6491.48	CL BALLAST TUBE
1229	14478724.39	2370733.69	6478.25	CL BALLAST TUBE
1230	14478815.06	2370794.45	6491.48	CL BALLAST TUBE
1231	14478778.20	2370817.98	6478.25	CL BALLAST TUBE
1232	14478868.87	2370878.74	6491.48	CL BALLAST TUBE
1233	14478832.01	2370902.27	6478.25	CL BALLAST TUBE
1234	14478922.67	2370963.03	6491.48	CL BALLAST TUBE
1235	14478884.64	2370984.71	6478.25	CL BALLAST TUBE
1236	14478888.78	2371047.27	6491.48	CL BALLAST TUBE

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1237	14478855.41	2371017.72	6478.25	CL BALLAST TUBE
1238	14478822.23	2371121.91	6491.48	CL BALLAST TUBE
1239	14478789.11	2371092.58	6478.25	CL BALLAST TUBE
1240	14478740.84	2371144.49	6491.47	CL BALLAST TUBE
1241	14478771.71	2371112.23	6478.25	CL BALLAST TUBE
1242	14478685.06	2371061.51	6491.48	CL BALLAST TUBE
1243	14478721.51	2371037.14	6478.25	CL BALLAST TUBE
1244	14478629.47	2370978.38	6491.48	CL BALLAST TUBE
1245	14478665.93	2370954.01	6478.25	CL BALLAST TUBE
1246	14478573.88	2370895.26	6491.48	CL BALLAST TUBE
1247	14478610.35	2370870.87	6478.25	CL BALLAST TUBE
1248	14478518.29	2370812.13	6491.48	CL BALLAST TUBE
1249	14478554.77	2370787.74	6478.25	CL BALLAST TUBE
1250	14478462.61	2370729.07	6491.48	CL BALLAST TUBE
1251	14478498.89	2370704.37	6478.25	CL BALLAST TUBE
1252	14478406.41	2370646.35	6491.48	CL BALLAST TUBE
1253	14478442.88	2370621.79	6478.19	CL BALLAST TUBE
1254	14478350.20	2370563.64	6491.48	CL BALLAST TUBE
1255	14478387.01	2370538.85	6478.02	CL BALLAST TUBE
1256	14478294.00	2370480.93	6491.48	CL BALLAST TUBE
1257	14478331.14	2370455.91	6477.84	CL BALLAST TUBE
1258	14478240.01	2370396.81	6491.48	CL BALLAST TUBE
1259	14478280.51	2370374.13	6477.66	CL BALLAST TUBE
1260	14478188.94	2370310.84	6491.48	CL BALLAST TUBE
1261	14478231.65	2370286.91	6477.47	CL BALLAST TUBE
1262	14478141.44	2370222.87	6491.48	CL BALLAST TUBE
1263	14478182.81	2370199.71	6477.28	CL BALLAST TUBE
1264	14478170.61	2370137.87	6491.20	CL BALLAST TUBE
1265	14478197.18	2370176.34	6477.26	CL BALLAST TUBE
1266	14478247.44	2370084.82	6491.31	CL BALLAST TUBE
1267	14478274.00	2370123.27	6477.26	CL BALLAST TUBE
1268	14478206.29	2370113.23	6491.73	CL GEOGRID
1269	14478324.56	2370101.12	6491.48	CL GEOGRID
1270	14478386.15	2370179.90	6491.48	CL GEOGRID
1271	14478446.39	2370259.71	6491.48	CL GEOGRID
1272	14478506.64	2370339.53	6491.48	CL GEOGRID

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1273	14478566.88	2370419.35	6491.48	CL GEOGRID
1274	14478626.75	2370499.42	6491.48	CL GEOGRID
1275	14478680.55	2370583.71	6491.48	CL GEOGRID
1276	14478734.36	2370668.01	6491.48	CL GEOGRID
1277	14478788.16	2370752.30	6491.48	CL GEOGRID
1278	14478841.96	2370836.59	6491.48	CL GEOGRID
1279	14478895.77	2370920.88	6491.48	CL GEOGRID
1280	14478921.94	2371009.85	6491.47	CL GEOGRID
1281	14478855.51	2371084.59	6491.48	CL GEOGRID
1282	14478786.23	2371155.92	6491.48	CL GEOGRID
1283	14478712.85	2371103.07	6491.48	CL GEOGRID
1284	14478657.26	2371019.94	6491.48	CL GEOGRID
1285	14478601.67	2370936.82	6491.48	CL GEOGRID
1286	14478546.08	2370853.69	6491.48	CL GEOGRID
1287	14478490.49	2370770.57	6491.48	CL GEOGRID
1288	14478434.51	2370687.71	6491.48	CL GEOGRID
1289	14478378.30	2370605.00	6491.48	CL GEOGRID
1290	14478322.10	2370522.29	6491.48	CL GEOGRID
1291	14478265.89	2370439.58	6491.48	CL GEOGRID
1292	14478214.48	2370353.82	6491.48	CL GEOGRID
1293	14478164.46	2370267.26	6491.48	CL GEOGRID
1294	14478241.85	2370165.47	6477.29	CL GEOGRID
1295	14478269.78	2370208.27	6477.39	CL GEOGRID
1296	14478296.68	2370249.51	6477.48	CL GEOGRID
1297	14478324.52	2370292.19	6477.57	CL GEOGRID
1298	14478351.50	2370333.54	6477.66	CL GEOGRID
1299	14478373.42	2370367.14	6477.73	CL GEOGRID
1300	14478406.32	2370417.58	6477.83	CL GEOGRID
1301	14478428.07	2370450.91	6477.90	CL GEOGRID
1302	14478457.79	2370496.48	6478.00	CL GEOGRID
1303	14478482.71	2370534.67	6478.08	CL GEOGRID
1304	14478512.44	2370580.24	6478.12	CL GEOGRID
1305	14478537.03	2370617.94	6478.19	CL GEOGRID
1306	14478563.47	2370658.46	6478.25	CL GEOGRID
1307	14478592.23	2370702.55	6478.25	CL GEOGRID
1308	14478618.11	2370742.22	6478.25	CL GEOGRID

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1309	14478646.87	2370786.31	6478.25	CL GEOGRID
1310	14478672.75	2370825.97	6478.25	CL GEOGRID
1311	14478701.52	2370870.07	6478.25	CL GEOGRID
1312	14478727.39	2370909.73	6478.25	CL GEOGRID
1313	14478756.16	2370953.83	6478.25	CL GEOGRID
1314	14478782.03	2370993.49	6478.25	CL GEOGRID
1315	14478813.28	2370973.54	6478.25	CL GEOGRID
1316	14478810.80	2371037.58	6478.25	CL GEOGRID
1317	14478771.52	2371063.85	6478.25	CL GEOGRID
1318	14478235.99	2370093.32	6491.23	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1319	14478339.16	2370120.37	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1320	14478418.39	2370223.44	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1321	14478496.71	2370327.20	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1322	14478575.02	2370430.96	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1323	14478650.14	2370537.00	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1324	14478720.09	2370646.58	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1325	14478790.03	2370756.16	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1326	14478859.97	2370865.74	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1327	14478928.17	2370976.36	6491.47	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1328	14478858.09	2371080.94	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1329	14478760.21	2371156.61	6491.47	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1330	14478681.37	2371055.10	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1331	14478609.10	2370947.03	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1332	14478536.84	2370838.97	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1333	14478464.50	2370730.96	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1334	14478391.44	2370623.44	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1335	14478318.37	2370515.91	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1336	14478246.86	2370407.36	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1337	14478180.47	2370295.59	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1338	14478130.28	2370177.70	6491.49	ACCESS TO CONDUCTIVE GEOCOMP LAYER
1339	14478292.81	2370072.68	6491.49	6" PVC FOR LEAK DETECTION SAMPLING
1340	14478279.08	2370120.43	6477.26	6" PVC FOR LEAK DETECTION SAMPLING
1341	14478177.49	2370189.78	6477.26	6" PVC FOR LEAK DETECTION SAMPLING
1342	14478129.32	2370182.20	6491.48	6" PVC FOR LEAK DETECTION SAMPLING

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URSA OPERATING COMPANY LLC

RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
BALLAST AND GEOGRID HORIZONTAL CONTOL POINT TABLES

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C111

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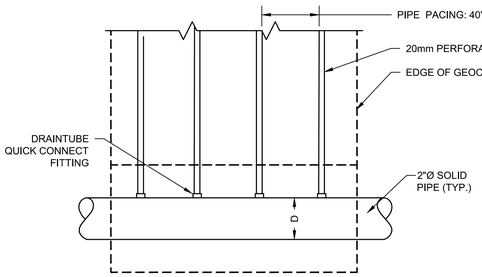
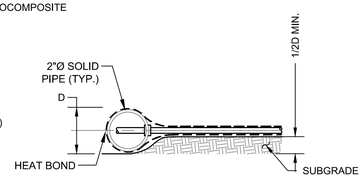


PLAN



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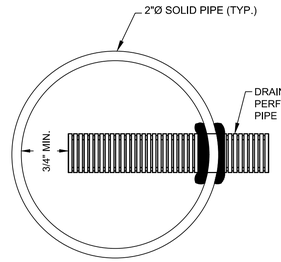
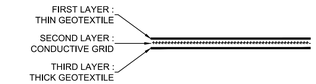


QUICK CONNECT FITTING

BERM VENT SIMPLE CONNECTION TO PIPE

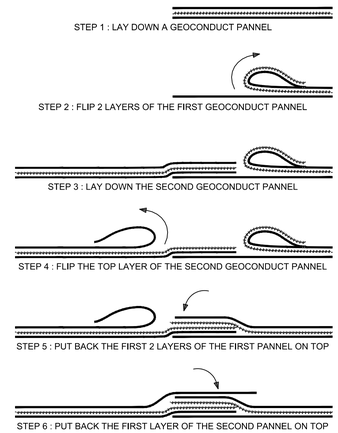
N.T.S.

1 C112



ADJACENT SHEETS OF CONDUCTIVE GEOCOMPOSITE SHALL BE OVERLAPPED AS DESCRIBED BELOW:

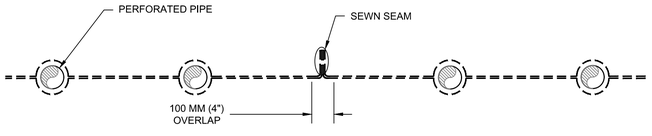
1. ROLLS ARE TO BE ASSEMBLED BY SEWING OF THE SUPERIOR GEOTEXTILE TO 100 MM (4 INCHES) OF EACH OF THE PANEL SIDES OR BY FLAME WELDING OR HOT AIR FLOW ON A 200 MM (8 INCHES) WIDTH. THEN, PARTICULAR ATTENTION MUST BE GIVEN TO WELDS IN ORDER NOT TO DAMAGE THE SUPERIOR LAYER OF THE GEOTEXTILE.
2. THE SUPERIOR GEOTEXTILE LAYERS OF THE ADJACENT ROLLS SHALL BE ROLLED BACK 250 MM (10 INCHES). GEOCONDUCT CONDUCTIVE GEOCOMPOSITE SHALL BE OVERLAPPED SUCH AS THE CONDUCTIVE GRIDS MUST BE IN DIRECT CONTACT ON A MINIMUM OF 200 MM (8 INCHES).



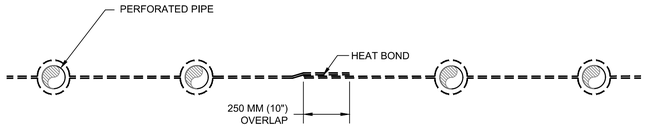
CONDUCTIVE GEOCOMPOSITE DETAILS

N.T.S.

2 C112



SEWN OPTION

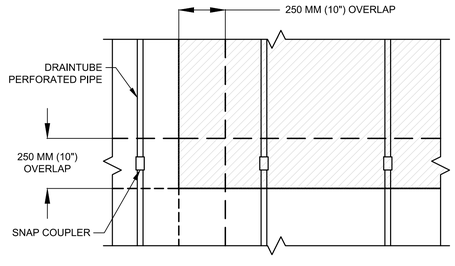


OVERLAP OPTION

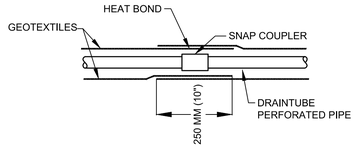
GAS VENTING GEOCOMPOSITE PANEL JOINING OPTIONS FOR SIDE

N.T.S.

3 C112



PLAN WITH SNAP COUPLERS



SECTION VIEW
WITH SNAP COUPLERS

GAS VENTING GEPCOMPOSITE PANEL JOINING OPTIONS FOR END

N.T.S.

4 C112

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BOIES RANCH PRODUCED WATER PIT
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PRODUCED WATER PIT GEOCOMPOSITE DETAILS

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz: N/A
Vert: N/A

Project No: 5D27072

Sheet: C112

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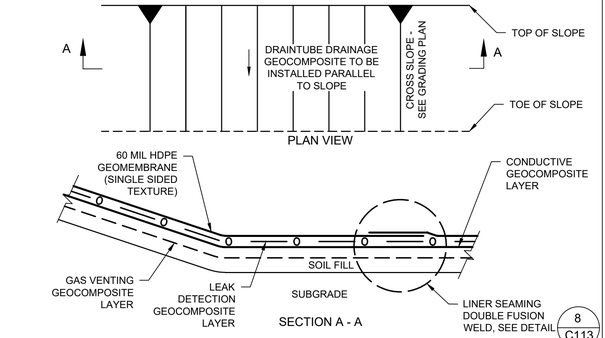

LINER TO LINER SECTION (1 C113)
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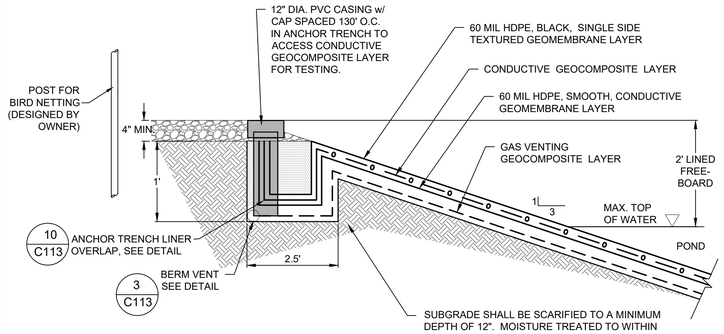

TYPICAL ANCHOR TRENCH DETAIL (2 C113)
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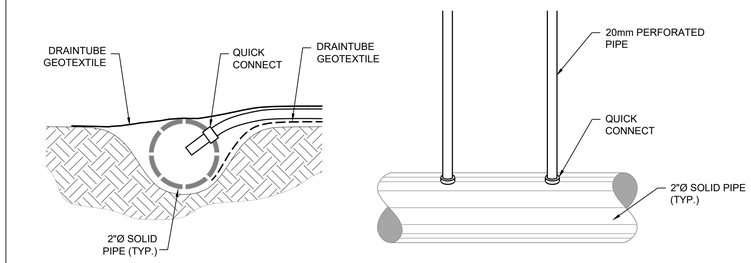
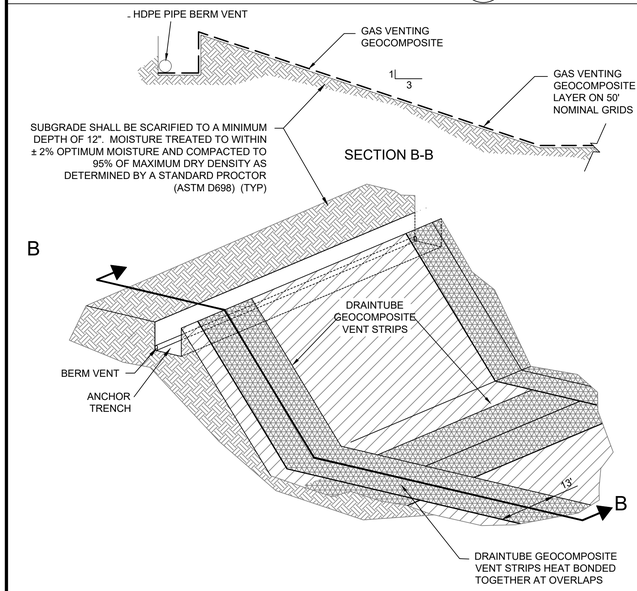


BERM VENT DETAIL (3 C113)
N.T.S.



GEOCOMPOSITE GAS VENTILATION LAYER DETAIL (4 C113)
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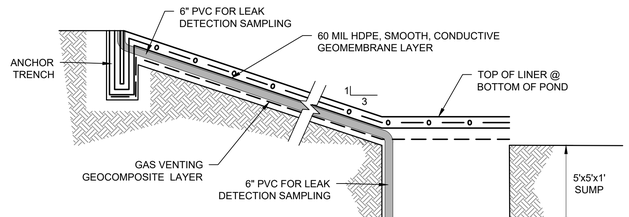

PRODUCED WATER PIT LEAK DETECTION (5 C113)
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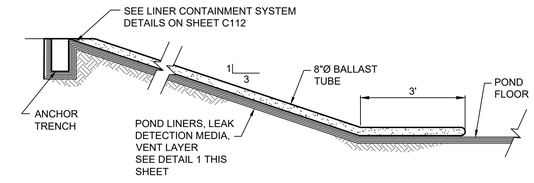
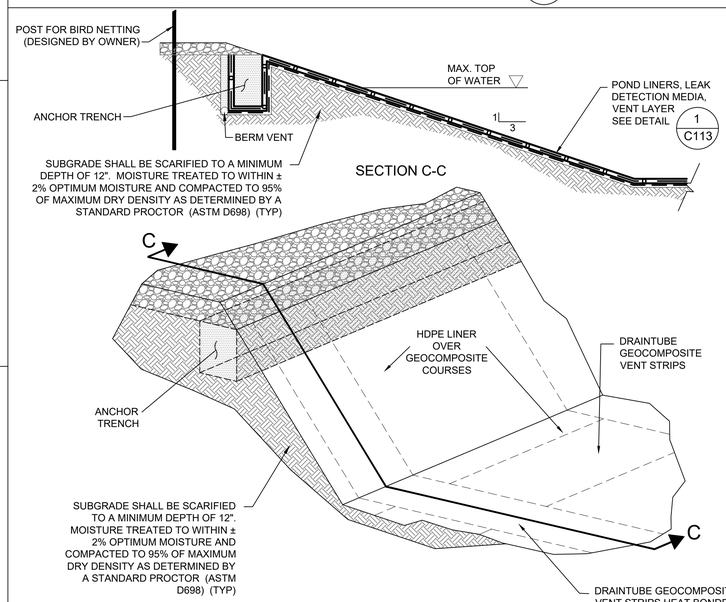
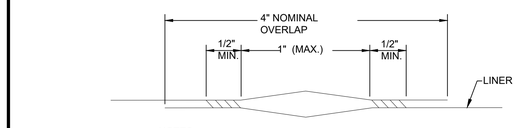


NOTES:
1. BALLAST TUBES TO BE 60-MIL HDPE OR APPROVED EQUAL.
2. FILL 8"Ø BALLAST TUBES WITH SAND. ANCHOR IN LINER TRENCH AND EXTEND SEVERAL FEET ONTO POND FLOOR AS NOTED.

BALLAST TUBE DETAILS (6 C113)
N.T.S.

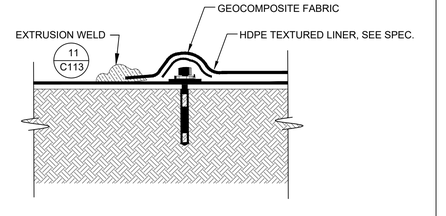


FINISHED GEOCOMPOSITE GAS VENTILATION LAYER WITH GEOMEMBRANE LINER SYSTEM AND BERM VENT DETAIL (7 C113)
N.T.S.

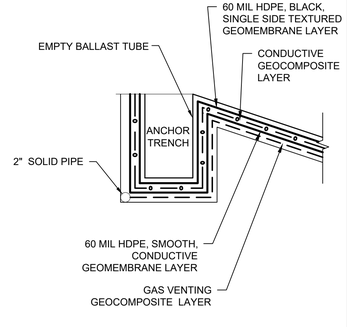


NOTES:
1. LINER SHEETS SHALL BE TACK WELDED TOGETHER AT OVERLAP TO FORM TEMPORARY BOND PRIOR TO WELDING.
2. DOUBLE FUSION WELDING SHALL BE THE PRIMARY SEAMING TECHNIQUE USED.
3. GRINDING NOT TO EXCEED 1/4" PAST "SQUEEZE-OUT" ON EITHER SIDE. PROPER CARE SHOULD BE TAKEN TO INSURE THAT VERY LITTLE MATERIAL IS TAKEN WHEN GRINDING.
4. AIR PRESSURE OR VACUUM TESTING SHALL BE THE NON-DESTRUCTIVE SEAM TEST METHODS FOR DOUBLE FUSION WELDS.
5. SUBGRADE PREPARATION, SELECT FILL (IF REQUIRED) SHALL BE PER LINER MANUFACTURES REQUIREMENTS.

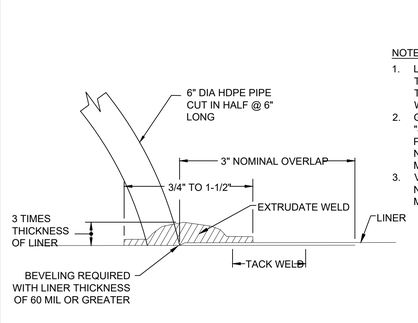
LINER SEAMING DOUBLE FUSION WELD DETAIL (8 C113)
N.T.S.



EXTRUSION WELD AT ANCHOR DETAIL (9 C113)
N.T.S.



ANCHOR TRENCH LINER OVERLAP DETAIL (10 C113)
N.T.S.



NOTES:
1. LINER SHEETS TACK WELDED TOGETHER AT OVERLAP TO FORM TEMPORARY BOND PRIOR TO WELDING.
2. GRINDING NOT TO EXCEED 1/4" PAST "SQUEEZE-OUT" ON EITHER SIDE. PROPER CARE SHOULD BE TAKEN IN NOT REMOVING TOO MUCH MATERIAL WHEN GRINDING.
3. VACUUM TESTING IS THE NON-DESTRUCTIVE SEAM TEST METHOD FOR EXTRUSION WELDS.

EXTRUSION WELD DETAIL (11 C113)
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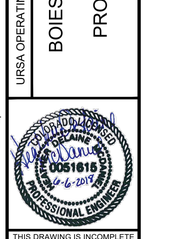

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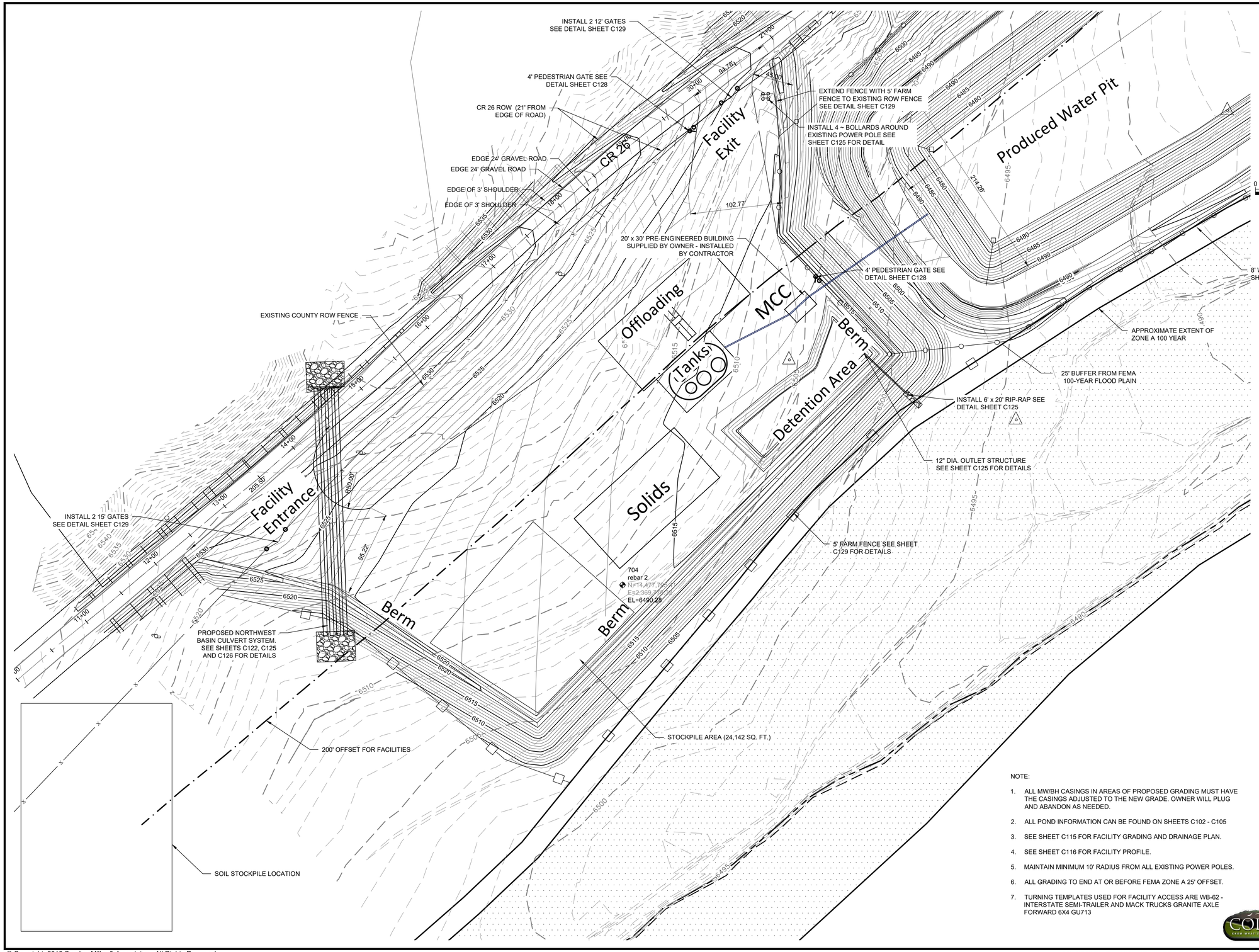
Scale: Horiz: N/A Vert: N/A
Project No: 5D27072
Sheet: C113

COLORADO 811



NOTE:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE. OWNER WILL PLUG AND ABANDON AS NEEDED.
2. ALL POND INFORMATION CAN BE FOUND ON SHEETS C102 - C105
3. SEE SHEET C115 FOR FACILITY GRADING AND DRAINAGE PLAN.
4. SEE SHEET C116 FOR FACILITY PROFILE.
5. MAINTAIN MINIMUM 10' RADIUS FROM ALL EXISTING POWER POLES.
6. ALL GRADING TO END AT OR BEFORE FEMA ZONE A 25' OFFSET.
7. TURNING TEMPLATES USED FOR FACILITY ACCESS ARE WB-62 - INTERSTATE SEMI-TRAILER AND MACK TRUCKS GRANITE AXLE FORWARD 6X4 GU713

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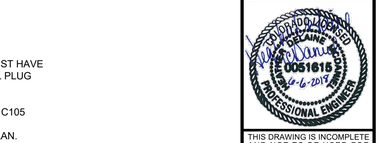
BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
FACILITY SITE PLAN



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Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C114

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Off-Site Drainage	Area (ACRES)	NRCS Soil Types	Vegetative Cover Type	Vegetative Cover Condition	Methodology for Analysis	Time of Concentration (MINUTES)	10-Year, 24-Hour Flow Rate (CFS)	25-Year, 24-Hour Flow Rate (CFS)	50-Year, 24-Hour Flow Rate (CFS)	100-Year, 24-Hour Flow Rate (CFS)
North West Drainage Basin	153.7	B - 2.1%; D - 97.9%	Arid Pinion Juniper	Poor	NRCS Simplified Peak Flow	22.2	127	173	213	257
Center Drainage Basin	29.4	D - 100%	Arid Pinion Juniper	Poor	NRCS Simplified Peak Flow	7.2	47	64	78	94
North East Drainage Basin	146.7	B - 1.4%; D - 98.6%	Arid Pinion Juniper	Poor	NRCS Simplified Peak Flow	22.8	121	164	203	244

On-Site Drainage	Area (ACRES)	NRCS Soil Types	Percent Imperviousness	Methodology for Analysis	Time of Concentration (MINUTES)	2-Year, 24-Hour Flow Rate (CFS)	5-Year, 24-Hour Flow Rate (CFS)	10-Year, 24-Hour Flow Rate (CFS)	25-Year, 24-Hour Flow Rate (CFS)	50-Year, 24-Hour Flow Rate (CFS)	100-Year, 24-Hour Flow Rate (CFS)	NOTE
Pre-Development Pit Area	8.3	B	2	Rational Method	44.89	0.05	0.10	0.70	3.12	4.70	6.83	Historical
Post-Development Pit Area	8.3	B	12	Rational Method	39.52	0.45	0.73	1.60	4.19	5.94	8.20	Post Development
Post-Development Pit (Lined Area)	6.7	B	90	Rational Method	N/A	0.31	0.38	0.44	0.52	0.59	0.67	Runoff Storage
Pre-Development Facility	7.0	A	2	Rational Method	28.57	0.03	0.05	0.07	0.14	0.65	2.19	Historical
Post-Development Facility	7.0	A	50	Rational Method	20.62	2.69	3.75	4.74	6.43	8.33	10.42	Post Development

Facility Detention Pond Stage/Storage					
Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume (cu. ft)	Cumulative Volume (cu. ft)	Cumulative Volume (ac. ft)
6,508.00	6.39	N/A	N/A	-	0.000
6,509.00	1,732.64	1	614.75	614.75	0.014
6,510.00	6,939.55	1	4046.57	4,661.32	0.107
6,511.00	8,301.38	1	7610.3	12,271.62	0.282
6,512.00	9,794.73	1	9037.77	21,309.39	0.489
6,513.00	11,377.69	1	10576.33	31,885.72	0.732

Detention Discharge Design		
Facility Detention		
Pipe Diameter	12	Inches
WQCV Orifice Elevation	6509.24	feet
Orifice Area Per Row	0.33	sq. inch
25-Year, 24-Hour Storm Orifice Elevatio	6510.48	feet
Orifice Area Per Row	0.33	sq. inch
Overflow Weir Elevation	6512	feet
Discharge Elevation	6487	feet
Discharge Slope	0.25	ft/ft

NORTHWEST DRAINAGE BASIN

CENTER DRAINAGE BASIN

URSA ABOVE GROUND PIPE LINE TO BE RELOCATED BY OWNER

CR 26 ROW (21' FROM EDGE OF ROAD)

CR 26

20' x 30' PRE-ENGINEERED BUILDING SUPPLIED BY OWNER - INSTALLED BY CONTRACTOR

TANK BATTERY TO BE INSTALLED ON 4' OF 3/4" MINUS ENGINEERED FILL, SEE NOTE THIS SHEET.

8' WILDLIFE FENCE SEE SHEET C128 FOR DETAILS

12" DIA. OUTLET STRUCTURE SEE SHEET C125 FOR DETAILS

TERTIARY CONTAINMENT BERM

FACILITY DETENTION POND SEE DRAINAGE CALCULATIONS ABOVE

APPROXIMATE EXTENT OF ZONE A 100 YEAR

5' FARM FENCE SEE SHEET C129 FOR DETAILS

FEMA ZONE A 25' BUFFER

704
rebar 2
N=14,477,[illegible]
E=2,36[illegible]
EL=6490.28

PROPOSED NORTHWEST BASIN CULVERT SYSTEM. SEE SHEETS C122, C125 AND C126 FOR DETAILS

STOCKPILE AREA (24,142 SQ. FT.)

SOIL STOCKPILE LOCATION

EDGE OF WATER BLACK SULPHUR CREEK

0 60' 120'

SCALE: 1" = 60'

NOTES:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE UNLESS NOTED TO BE PLUGGED AND ABANDONED.
2. ALL POND INFORMATION CAN BE FOUND ON SHEETS C102 - C105
3. ALL FILL MATERIAL THAT MEETS THE REQUIREMENTS FOR ENGINEERED FILL OR SELECT IMPORTED GRANULAR FILL SHOULD BE MOISTENED TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT, PLACED IN LOOSE LIFTS OF LESS THAN 8 INCHES MAXIMUM, AND COMPACTED TO A MINIMUM 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR ASTM D698, USING APPROPRIATE EQUIPMENT.

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BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
FACILITY SITE GRADING AND DRAINAGE PLAN

REGISTERED PROFESSIONAL ENGINEER
GREGORY C. LAMB
00516[illegible]
6-6-2018

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Vert:

Project No: 5D27072

Sheet: C115

COLORADO 811 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

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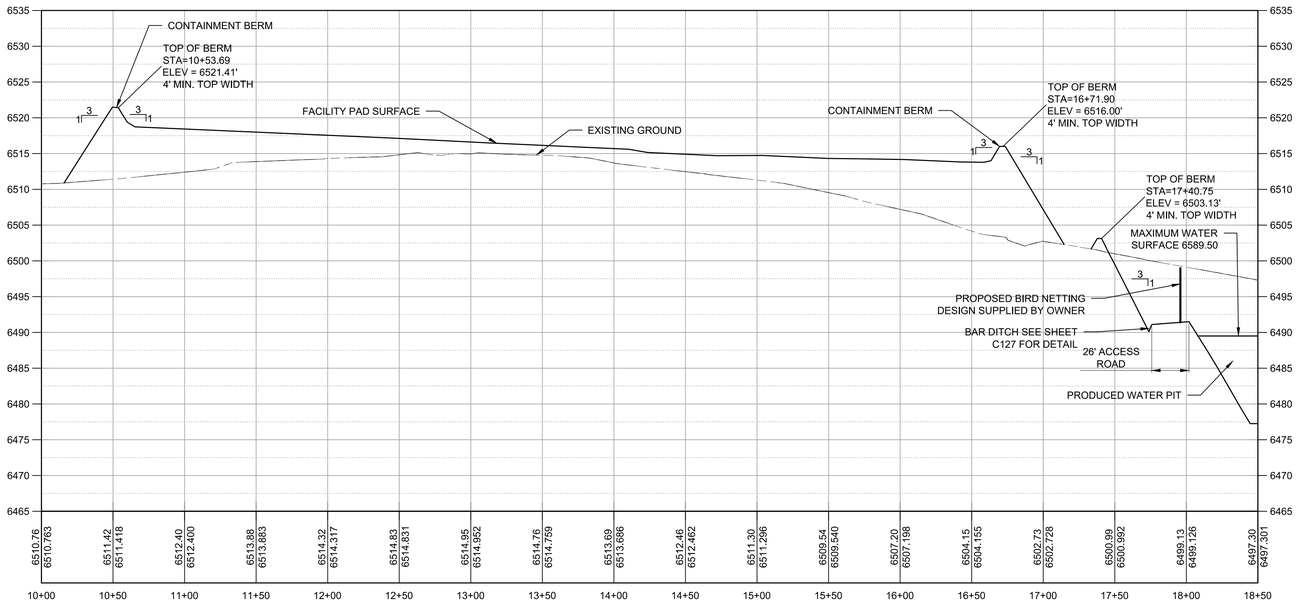

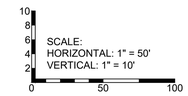

Boies Ranch Produced Water Pit Evaporation Estimate

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR (in/yea r)	YEAR (ft/yr)
GRAND JUNCTION/WALKER	1900-2005	0.00	0.00	4.67	8.53	12.18	15.96	16.53	14.02	10.98	7.05	2.42	0.00	92.34	7.70
GRAND JUNCTION 6ESE	1962-2005	0.00	0.00	0.00	6.60	9.29	11.77	12.01	10.24	7.48	4.65	2.09	0.00	64.13	5.34
GrandJunction (Average)		0.00	0.00	2.34	7.57	10.74	13.87	14.27	12.13	9.23	5.85	2.26	0.00	**78.24**	6.52
Pan/Lake Evaporation Factor	0.7														
Grand Junction, w/ Evaporation Factor		0.00	0.00	1.63	5.30	7.51	9.71	9.99	8.49	6.46	4.10	1.58	0.00	**54.76**	4.56

https://wrcc.dri.edu/Climate/comp_table_show.php?stype=pan_evap_avg

Pit Evaporation Calculations	
Pit Water Surface Area(Sq. Ft.)	273,827.83
Total Pit Evaporation (ft^3/yr)	1,249,670
Total Pit Evaporation (bbl/day)	**609.75**
Pit Volume Calculations	
Pit Volume (ac-ft)	60.27
Pit Volume (bbls)	467,618

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BOIES RANCH PRODUCED WATER PIT
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FACILITY PROFILE

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Scale: Horiz:
Vert:

Project No: 5D27072

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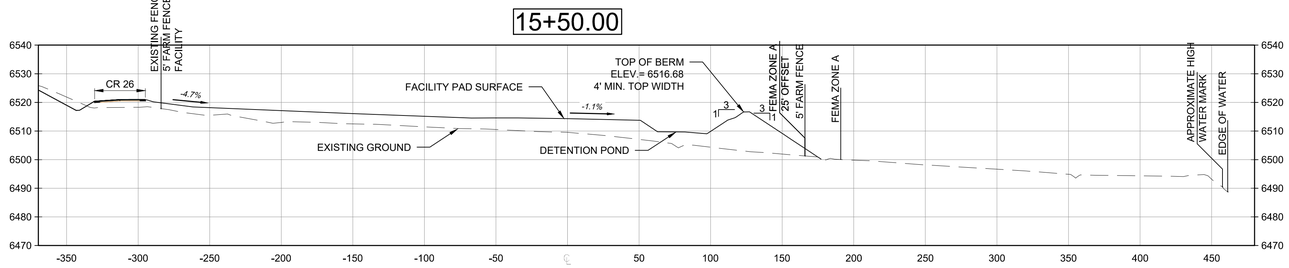
L:\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 FACILITY SITE.dwg, 6/6/2018 2:35:57 PM GJF

15+50.00



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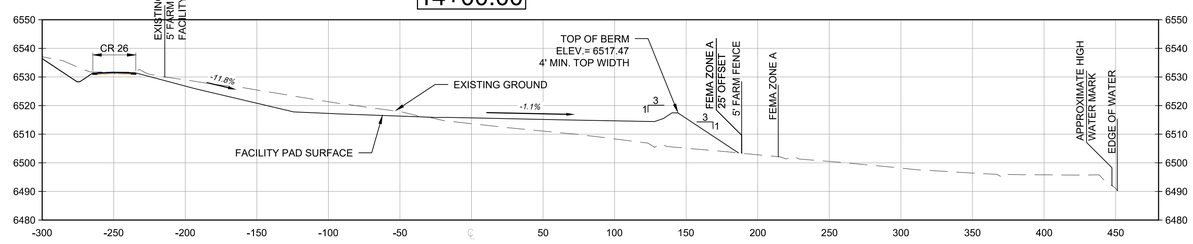

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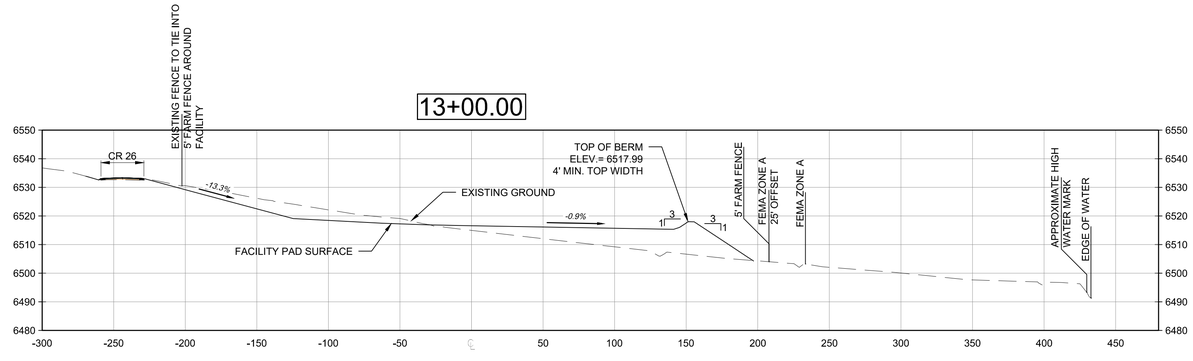

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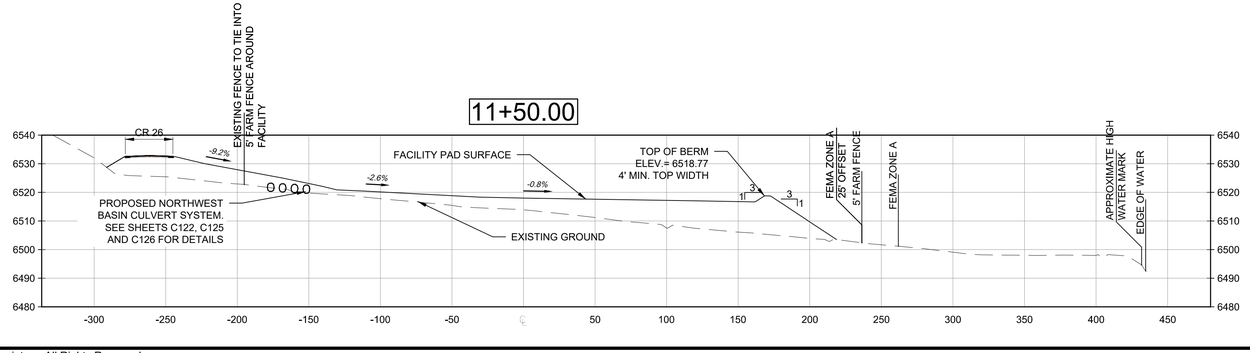

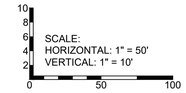

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RIFLE, COLORADO

URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
FACILITY CROSS-SECTIONS

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C117

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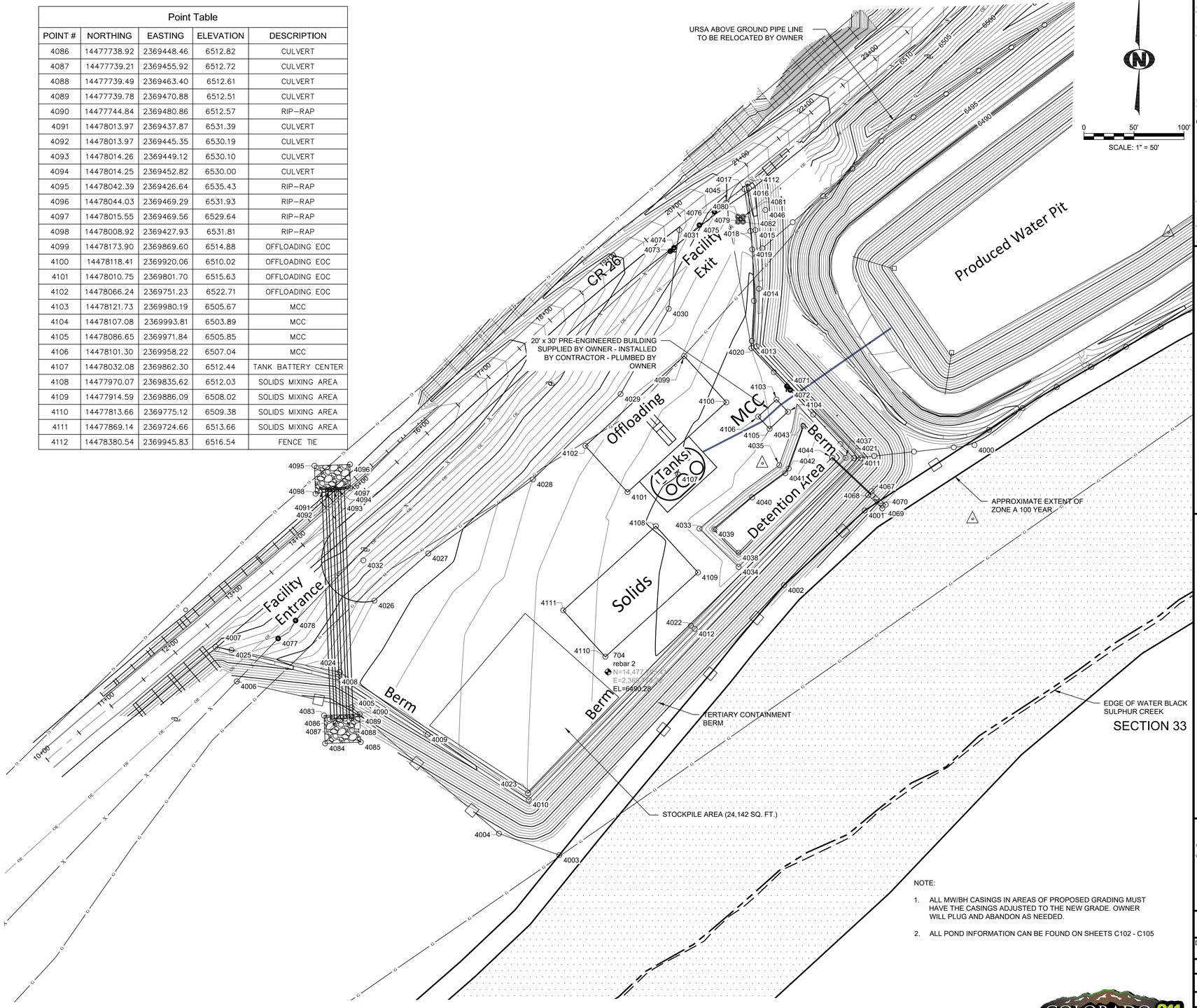
Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
4000	14478067.21	2370217.25	6494.61	FARM FENCE
4001	14477988.82	2370085.83	6498.87	FARM FENCE
4002	14477899.29	2369989.18	6502.36	FARM FENCE
4003	14477575.99	2369720.06	6501.96	FARM FENCE
4004	14477601.80	2369647.72	6504.09	FARM FENCE
4005	14477752.96	2369471.23	6513.14	FARM FENCE
4006	14477784.11	2369333.54	6519.48	FARM FENCE
4007	14477825.58	2369308.11	6523.59	BERM
4008	14477789.50	2369454.79	6515.66	BERM
4009	14477720.39	2369562.16	6510.11	BERM
4010	14477642.37	2369683.39	6504.80	BERM
4011	14478051.51	2370080.83	6499.79	BERM
4012	14477846.94	2369882.11	6505.69	BERM
4013	14478185.55	2369956.31	6508.47	BERM
4014	14478254.46	2369959.13	6509.15	BERM
4015	14478324.65	2369954.79	6510.78	BERM
4016	14478374.94	2369947.14	6515.56	BERM
4017	14478373.89	2369941.63	6516.04	EDGE OF PAD
4018	14478323.53	2369948.88	6511.24	EDGE OF PAD
4019	14478301.53	2369951.01	6510.28	EDGE OF PAD
4020	14478183.43	2369950.09	6508.86	EDGE OF PAD
4021	14478051.61	2370072.55	6500.25	EDGE OF PAD
4022	14477850.84	2369877.53	6506.21	EDGE OF PAD
4023	14477650.08	2369682.51	6505.18	EDGE OF PAD
4024	14477795.08	2369457.19	6515.96	EDGE OF PAD
4025	14477821.67	2369327.24	6522.09	EDGE OF PAD
4026	14477880.89	2369498.48	6520.77	EDGE OF PAD
4027	14477937.40	2369563.02	6523.59	EDGE OF PAD
4028	14478026.11	2369688.38	6523.77	EDGE OF PAD
4029	14478128.36	2369793.36	6519.77	EDGE OF PAD
4030	14478230.44	2369850.93	6517.63	EDGE OF PAD
4031	14478324.76	2369863.84	6519.28	EDGE OF PAD
4032	14477929.06	2369485.32	6524.44	50' RADIUS
4033	14477967.08	2369887.86	6509.48	POND
4034	14477921.18	2369934.79	6505.36	POND
4035	14478043.12	2369983.46	6504.00	POND
4037	14478051.85	2370063.09	6500.69	POND
4038	14477938.14	2369934.62	6504.87	POND
4039	14477966.43	2369905.69	6508.30	POND
4040	14478004.60	2369950.92	6506.45	POND
4041	14478033.41	2369990.52	6504.09	POND
4042	14478039.09	2369994.77	6503.86	POND
4043	14478090.36	2370012.08	6503.25	POND
4044	14478052.19	2370046.60	6501.44	POND
4045	14478357.28	2369919.72	6516.50	DRIVEWAY
4046	14478348.82	2369966.88	6510.74	45' radius
4067	14478011.79	2370093.92	6498.84	RIP-RAP
4068	14478007.42	2370089.81	6498.99	RIP-RAP
4069	14477991.42	2370106.82	6497.82	RIP-RAP
4070	14477995.79	2370110.93	6497.66	RIP-RAP
4071	14478137.67	2369992.68	6505.11	POST
4072	14478133.19	2369996.67	6504.51	POST
4073	14478299.47	2369852.89	6518.72	POST
4074	14478303.46	2369857.37	6518.37	POST
4075	14478330.68	2369887.84	6517.98	POST
4076	14478346.67	2369905.74	6516.96	POST
4077	14477835.46	2369383.18	6521.05	POST
4078	14477857.03	2369404.03	6521.88	POST
4079	14478334.72	2369934.04	6513.60	BOLLARD
4080	14478340.72	2369934.04	6513.96	BOLLARD
4081	14478340.72	2369940.04	6513.43	BOLLARD
4082	14478334.72	2369940.04	6513.04	BOLLARD
4083	14477743.20	2369438.22	6513.17	RIP-RAP
4084	14477709.73	2369439.50	6511.61	RIP-RAP
4085	14477711.37	2369482.19	6511.02	RIP-RAP

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
4086	14477738.92	2369448.46	6512.82	CULVERT
4087	14477739.21	2369455.92	6512.72	CULVERT
4088	14477739.49	2369463.40	6512.61	CULVERT
4089	14477739.78	2369470.88	6512.51	CULVERT
4090	14477744.84	2369480.86	6512.57	RIP-RAP
4091	14478013.97	2369437.87	6531.39	CULVERT
4092	14478013.97	2369445.35	6530.19	CULVERT
4093	14478014.26	2369449.12	6530.10	CULVERT
4094	14478014.25	2369452.82	6530.00	CULVERT
4095	14478042.39	2369426.64	6535.43	RIP-RAP
4096	14478044.03	2369469.29	6531.93	RIP-RAP
4097	14478015.55	2369469.56	6529.64	RIP-RAP
4098	14478008.92	2369427.93	6531.81	RIP-RAP
4099	14478173.90	2369869.60	6514.88	OFFLOADING EOC
4100	14478118.41	2369920.06	6510.02	OFFLOADING EOC
4101	14478010.75	2369801.70	6515.63	OFFLOADING EOC
4102	14478066.24	2369751.23	6522.71	OFFLOADING EOC
4103	14478121.73	2369980.19	6505.67	MCC
4104	14478107.08	2369993.81	6503.89	MCC
4105	14478086.65	2369971.84	6505.85	MCC
4106	14478101.30	2369958.22	6507.04	MCC
4107	14478032.08	2369862.30	6512.44	TANK BATTERY CENTER
4108	14477970.07	2369835.62	6512.03	SOLIDS MIXING AREA
4109	14477914.59	2369886.09	6508.02	SOLIDS MIXING AREA
4110	14477813.66	2369775.12	6509.38	SOLIDS MIXING AREA
4111	14477869.14	2369724.66	6513.66	SOLIDS MIXING AREA
4112	14478380.54	2369945.83	6516.54	FENCE TIE



NOTE:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE. OWNER WILL PLUG AND ABANDON AS NEEDED.
2. ALL POND INFORMATION CAN BE FOUND ON SHEETS C102 - C105

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URSA OPERATING COMPANY LLC
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
FACILITY SITE HORIZONTAL CONTROL PLAN

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C118

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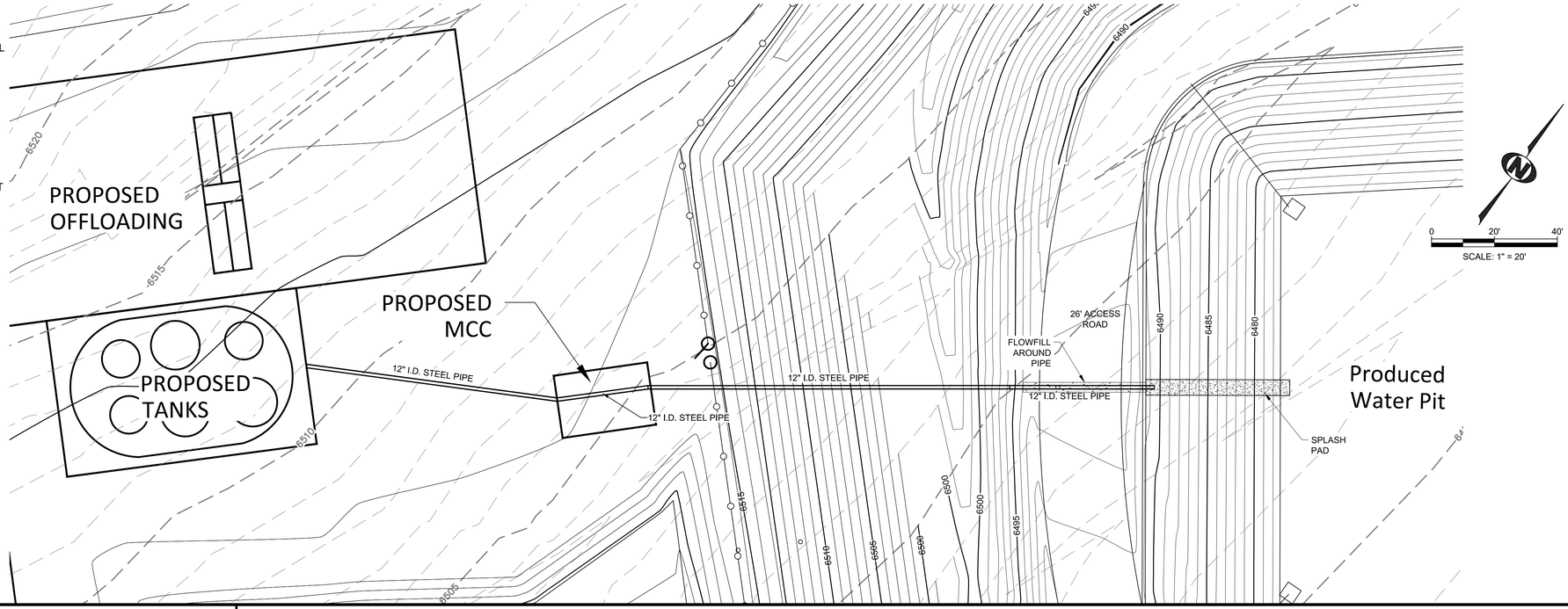
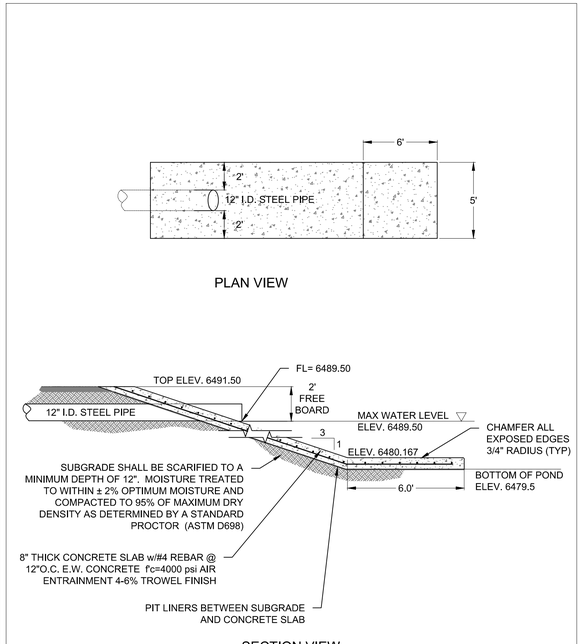
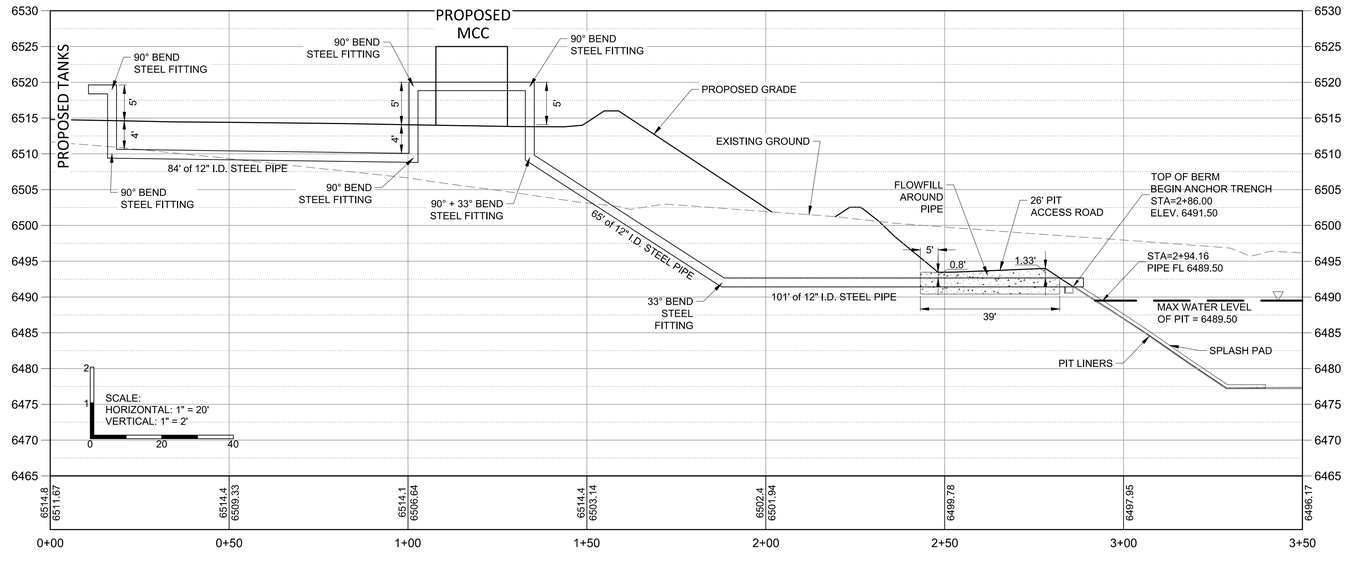
NOTE:

1. OWNER SHALL BE RESPONSIBLE FOR ALL MECHANICAL CONNECTIONS OF THE PIPE PER OWNER PROVIDED FACILITY DRAWINGS.
2. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER ON DELIVERY TO SITE.
3. CONTRACTOR SHALL SET AND PLUMB ALL SUPPLIED EQUIPMENT UNLESS STATED OTHERWISE.
4. CONTRACTOR SHALL INSTALL PIPING TO WITHIN 5' OF THE MCC BUILDING. OWNER SHALL PLUMB EQUIPMENT INSIDE MCC BUILDING.





SPLASH PAD DETAIL FOR POND
N.T.S.



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URSA OPERATING COMPANY LLC
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
PIT INFLOW PIPING AND PROFILE

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018
Scale: Horiz:
Vert:
Project No: 5D27072
Sheet: C119

COLORADO 811
www.WarnCo.com/CO811.html

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\\DCO10\Projects\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 POND INFLOW PIPE P&P.dwg, 6/6/2018 12:43:39 PM TLS

NOTE:
SEE SHEET FOR NEW COUNTY ROAD 26 (CR 26) TYPICAL SECTION AND COMPACTION REQUIREMENTS.

NORTHWEST DRAINAGE BASIN

CENTER DRAINAGE BASIN

SCALE: 1" = 50'

CONCRETE HEADWALL SEE DETAIL SHEET C125

INSTALL 4 ~ 276 LF 27" x 43" ARCH PIPE WITH HEADWALL AND RIP RAP AT INLET AND OUTLET SEE SECTION SHEET C122
INVERT IN: 6529.29'
INVERT OUT: 6512.51'

RIP RAP SEE DETAIL SHEET C125

BEGIN TRAPAZOIDAL BAR DITCH, 2' BOTTOM WIDTH, 3:1 SIDE SLOPES, 3' DEEP

EDGE OF 3' SHOULDER

EDGE 24' GRAVEL ROAD

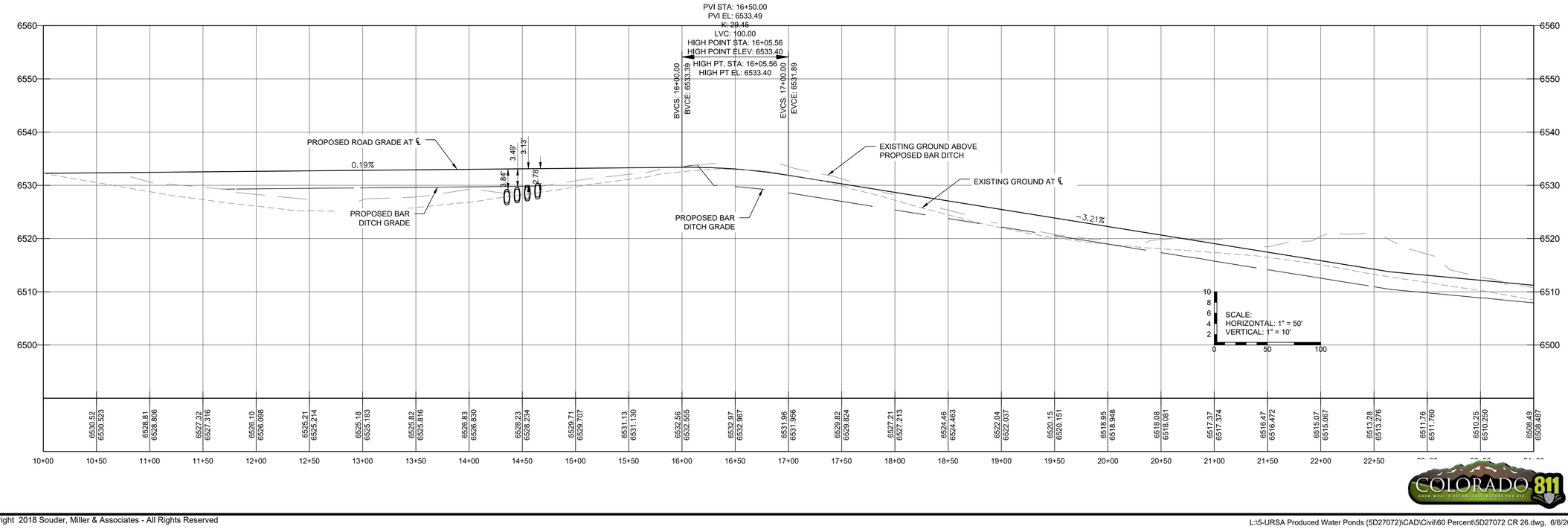
CR 26

EXISTING OVERHEAD POWER LINE CONTRACTOR TO MAINTAIN A MINIMUM OF 13.5' CLEARANCE

MCC

Solids

RIP RAP SEE DETAIL SHEET C125



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Rev #	Date	Description	By	Chk'd

RIFLE, COLORADO

URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
CR 26 PLAN AND PROFILE
STA 10+00 - STA 24+00

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C120

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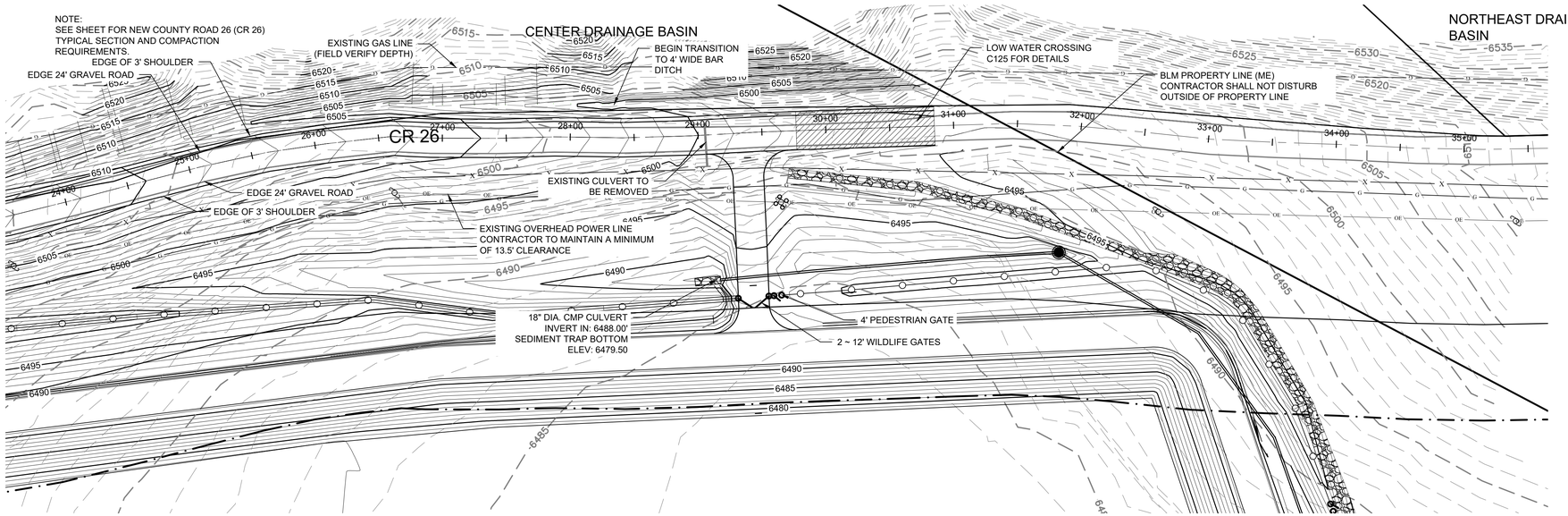
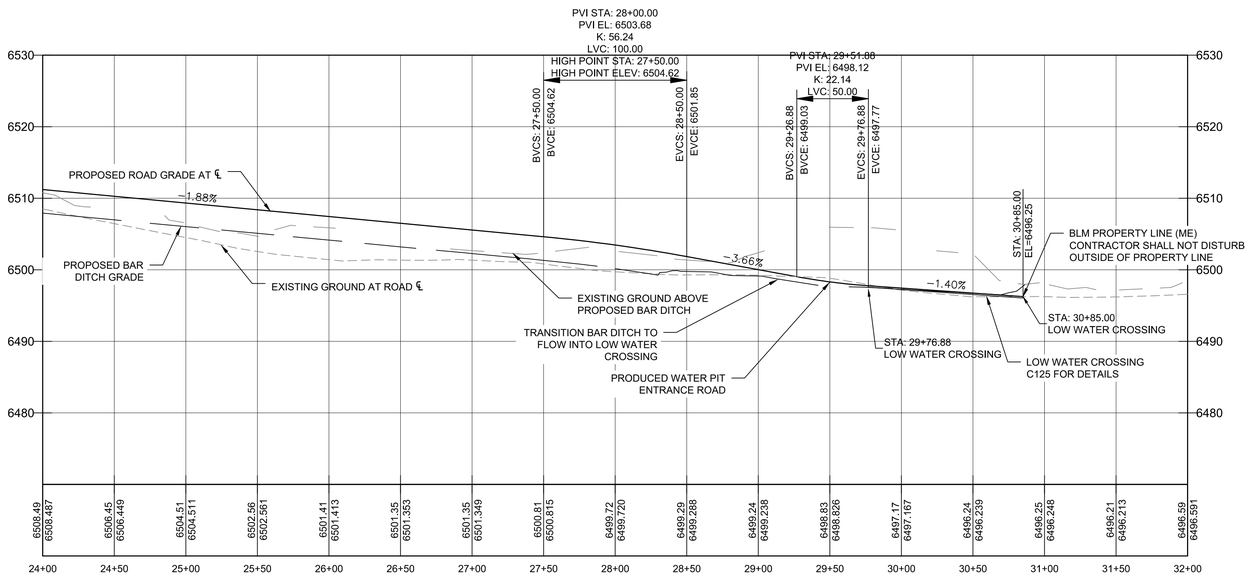
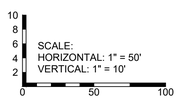
L:\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 CR 26.dwg, 6/6/2018 12:44:53 PM GJF



NOTE: REMOVE EXISTING FENCE, STORE AND REPLACE IN ORIGINAL LOCATION

CR 26 PROFILE





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RIFLE, COLORADO

URSA OPERATING COMPANY LLC

BOISES RANCH PRODUCED WATER PIT
BOIES RANCH
CR 26 PLAN AND PROFILE
STA 24+00 - STA 31+00

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C121

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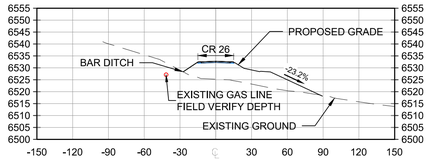
12+50.00



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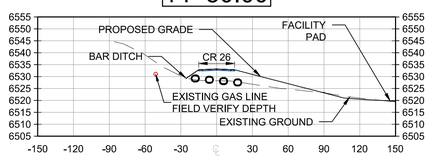

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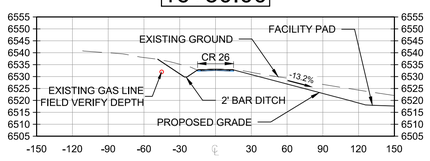

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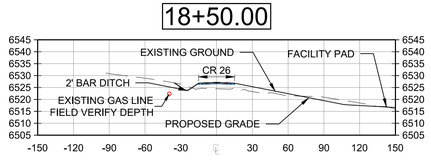
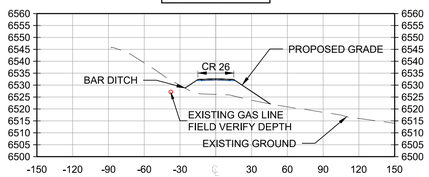


SCALE:
HORIZONTAL: 1" = 30'
VERTICAL: 1" = 15'

12+00.00



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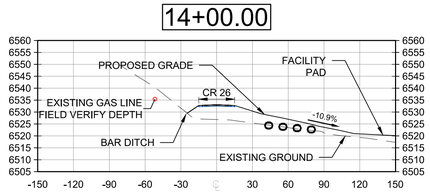

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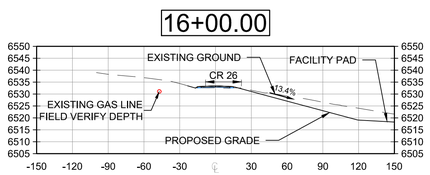

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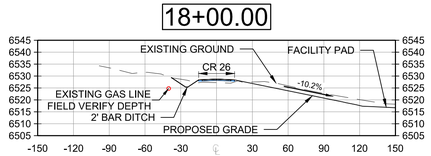

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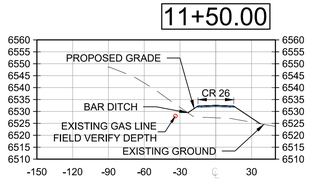

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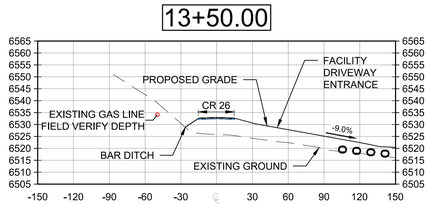

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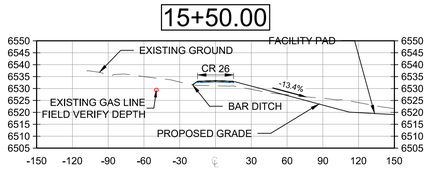

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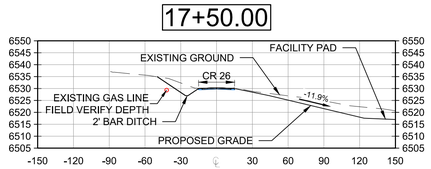

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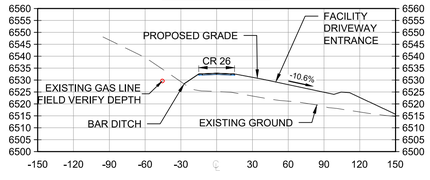

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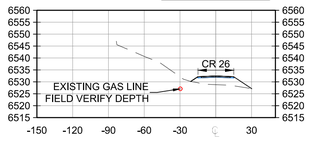

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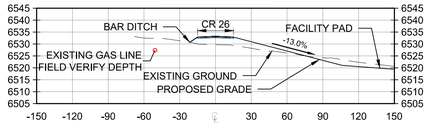

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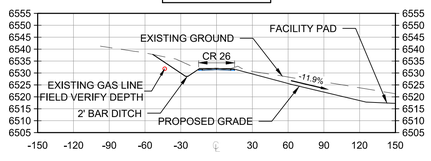

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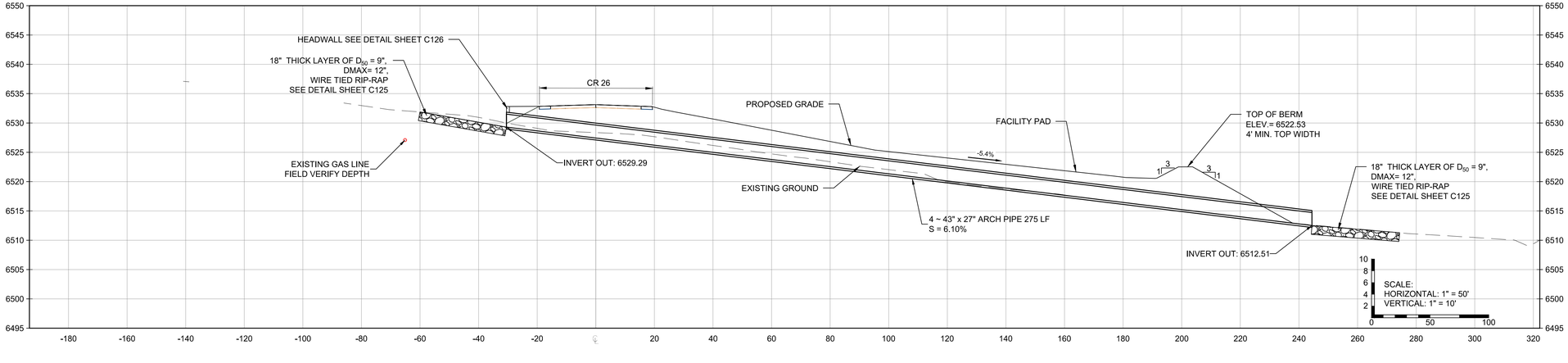

STA. 14+54.71 SKEW 39.12 LT
INSTALL 4-43"x 27" 276 LF CMP ARCH PIPE
INSTALL HEADWALL NORTH
INSTALL 18" THICK LAYER OF D_{50} = 9", DMAX= 12",
WIRE TIED RIP-RAP NORTH AND SOUTH

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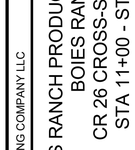
BOIES RANCH
CR 26 CROSS-SECTIONS
STA 11+00 - STA 18+50



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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

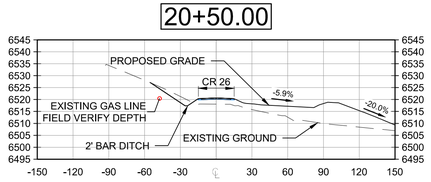
Scale: Horiz:
Vert:

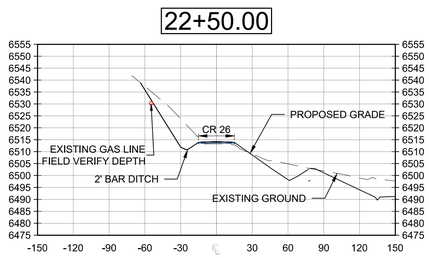
Project No: 5D27072

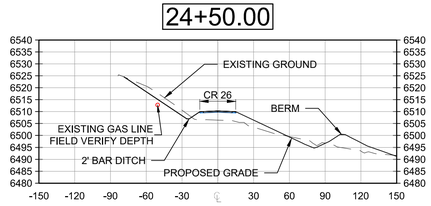
Sheet: C122

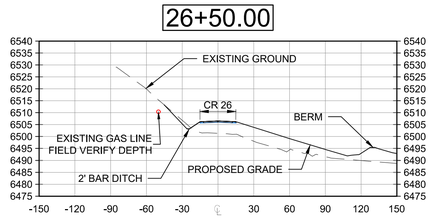
COLORADO 811
KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

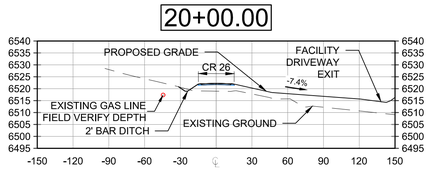
SCALE:
HORIZONTAL: 1" = 30'
VERTICAL: 1" = 15'

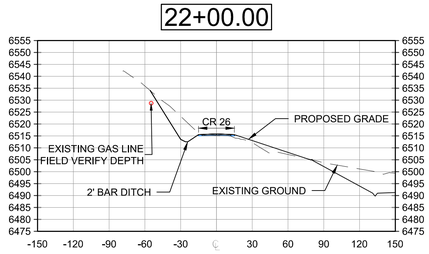


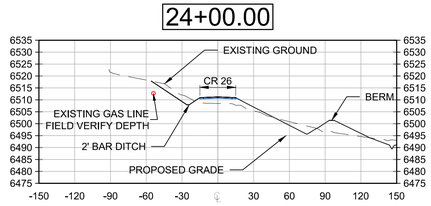


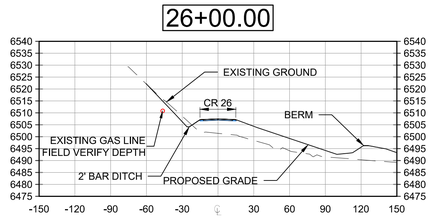


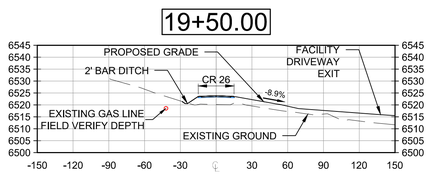


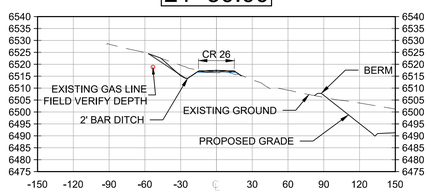


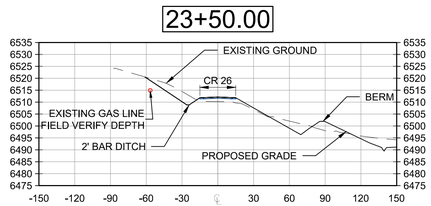


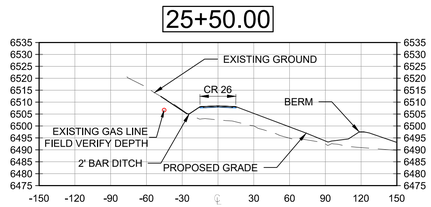


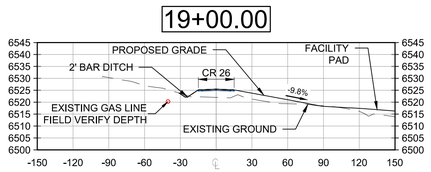


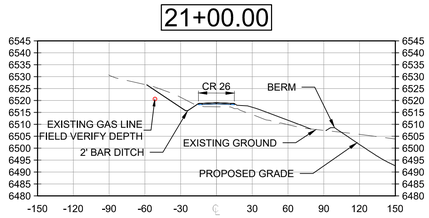


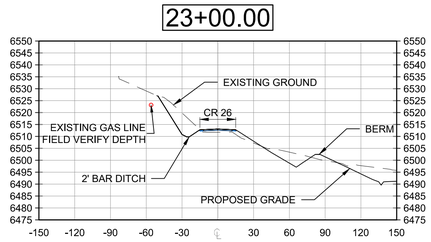


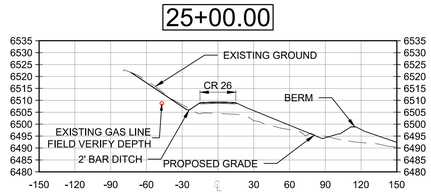












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URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
CR 26 CROSS-SECTION
STA 19+00 - STA 26+50

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C123

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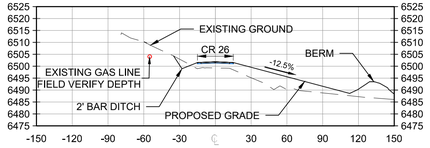
28+50.00



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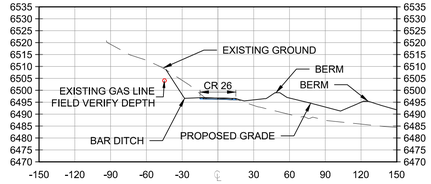

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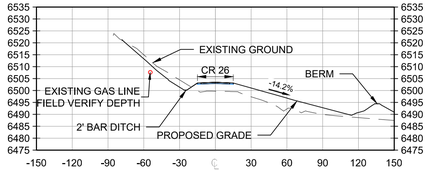

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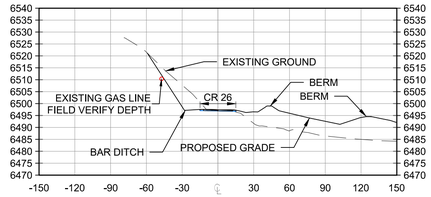

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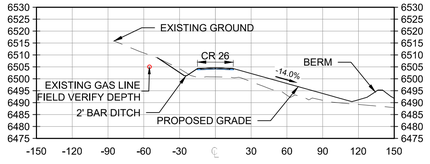

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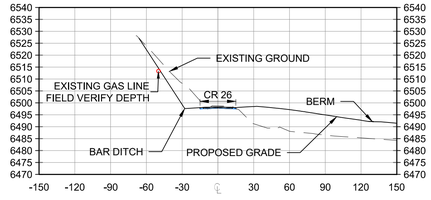

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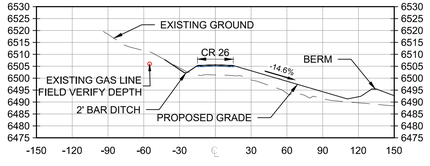

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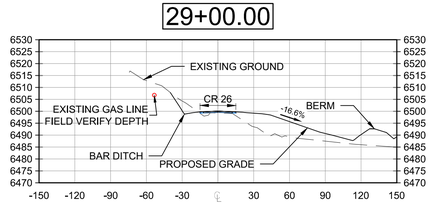

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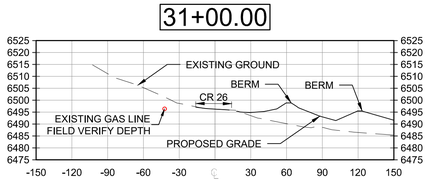

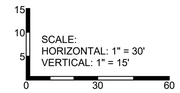

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URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
CR 26 CROSS-SECTIONS
STA 27+00 - STA 31+00

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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018

Scale: Horiz:
Vert:

Project No: 5D27072

Sheet: C124

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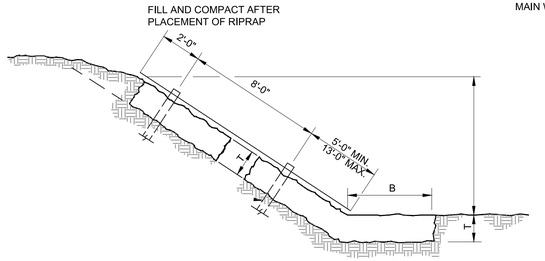
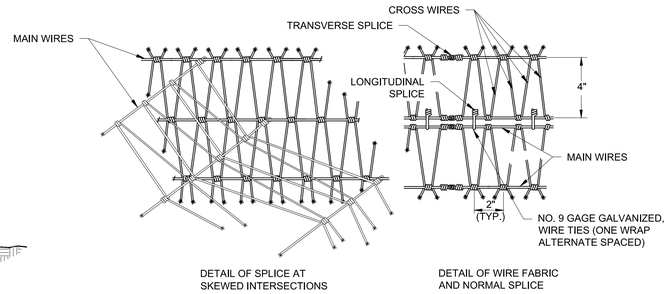
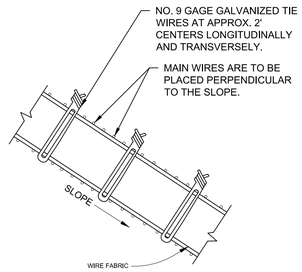
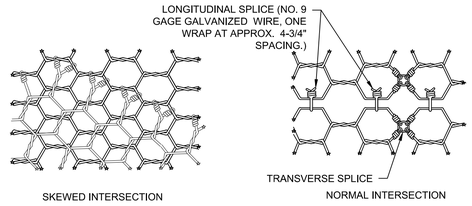




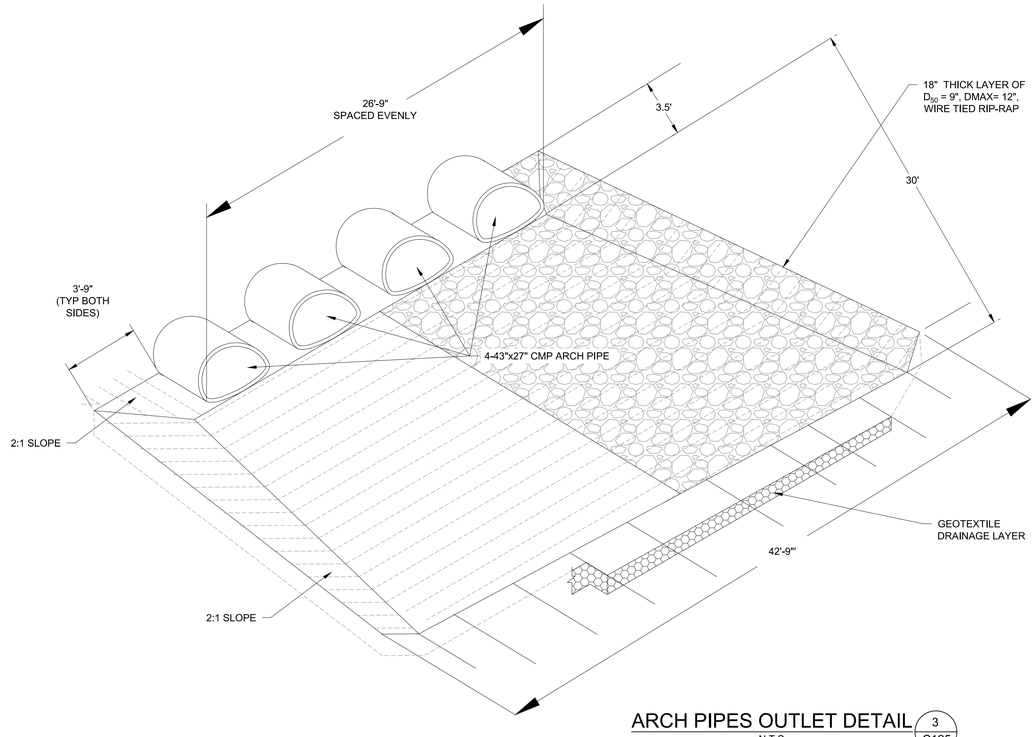
"V" MESH



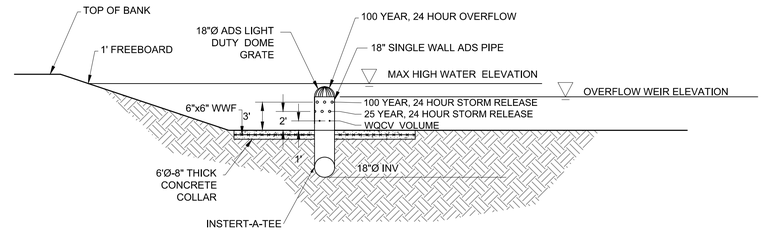
SLOPE	RIPRAP CU. YDS
1 1/2:1	$\frac{T}{27}$(A + B + 1.414V)
1 3/4:1	$\frac{T}{27}$(A + B + 1.803V)
2:1	$\frac{T}{27}$(A + B + 2.016V)
3:1	$\frac{T}{27}$(A + B + 2.236V)
4:1	$\frac{T}{27}$(A + B + 3.162V)



WIRE WRAPPED RIP RAP (1 / C125)
N.T.S.

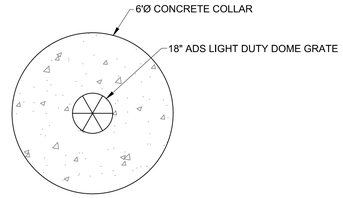


ARCH PIPES OUTLET DETAIL (3 / C125)
N.T.S.



OUTLET STRUCTURE DETAIL ELEVATION
N.T.S.

NOTE:
SEE DESIGN ELEVATIONS BELOW



OUTLET STRUCTURE DETAIL PLAN (2 / C125)
N.T.S.

Detention Discharge Design		
Facility Detention		
Pipe Diameter	12	Inches
WQCV Orifice Elevation	6509.24	feet
Orifice Area Per Row	0.33	sq. inch
25-Year, 24-Hour Storm Orifice Elevation	6510.48	feet
Orifice Area Per Row	0.33	sq. inch
Overflow Weir Elevation	6512	feet
Discharge Elevation	6487	feet
Discharge Slope	0.25	ft/ft
Pit Detention		
Pipe Diameter	12	Inches
WQCV Orifice Elevation	6482.87	feet
Orifice Area Per Row	0.33	sq. inch
25-Year, 24-Hour Storm Orifice Elevation	6483.74	feet
Orifice Area Per Row	0.78	sq. inch
Overflow Weir Elevation	6484.5	feet
Discharge Elevation	6481	feet
Discharge Slope	0.0082	ft/ft

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BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
DRAINAGE DETAILS

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Designed	Drawn	Checked
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Date: June 2018

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Vert: N/A

Project No: 5D27072

Sheet: C125

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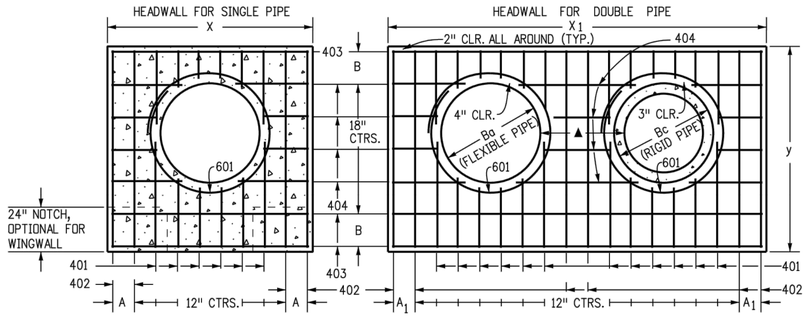
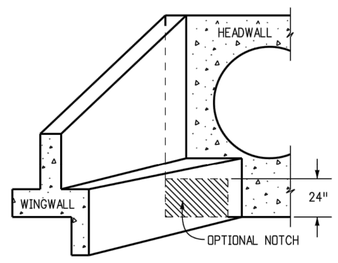
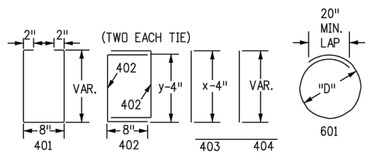


TYPICAL BAR LAYOUT FOR CONCRETE HEADWALLS

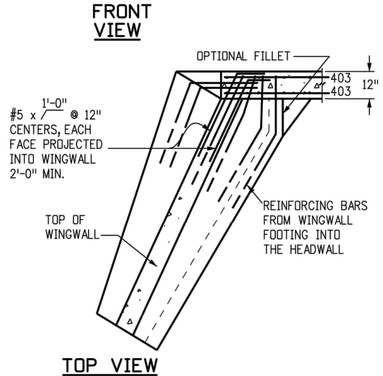


FRONT VIEW



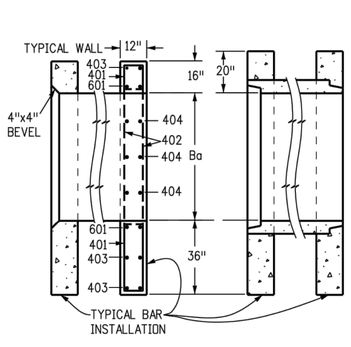
RIGID PIPE = Bc + 6"
"D" = FLEXIBLE PIPE = Ba + 8"
FLEXIBLE ARCH = SPAN + 8"
STRUCTURAL PLATE ARCH = RISE + 8"

BAR BENDING



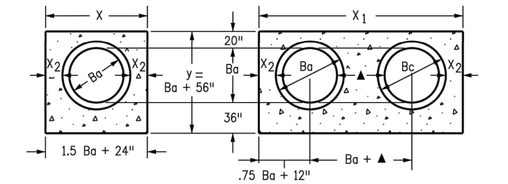
TOP VIEW

WINGWALL CONNECTION



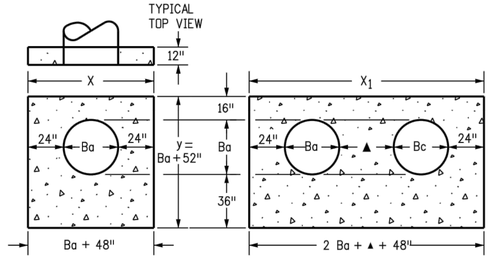
INLET OUTLET ENDS OF FLEXIBLE PIPE

INLET OUTLET ENDS OF RIGID PIPE



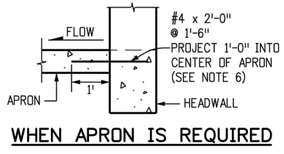
DIMENSIONS									QUANTITIES			
									CONCRETE		STEEL ■	
Ba IN.	Bc IN.	X FT.-IN.	A IN.	X_1 FT.-IN.	A_1 IN.	y FT.-IN.	B IN.	X_2	SGL CU. YD.	DBL CU. YD.	SGL LBS.	DBL LBS.
54	65	8-9	8½	15-6	7	9-2	17	20	2.12	3.55	209	364
60	72	9-6	7	17-0	10	9-8	11	21	2.35	3.99	236	414
66	79	10-3	11½	18-6	7	10-2	14	22	2.60	4.44	249	453
72	86	11-0	10	20-0	10	10-8	17	23	2.85	4.91	270	476
78	93	11-9	8½	21-3	11	11-2	11	24	3.11	5.29	306	527
84	100	12-6	7	22-6	7	11-8	14	25	3.38	5.68	333	572
90	107	13-3	11½	23-9	8½	12-2	17	26	3.66	6.08	335	593
96	114	14-0	10	25-0	10	12-8	11	27	3.94	6.48	379	649
102	121	14-9	8½	26-3	11½	13-2	14	28	4.24	6.89	400	664
108	128	15-6	7	27-6	7	13-8	17	29	4.54	7.30	424	707

HEADWALL FOR RIGID ROUND PIPE



DIMENSIONS								QUANTITIES			
								CONCRETE		STEEL ■	
Ba IN.	X FT.-IN.	A IN.	X_1 FT.-IN.	A_1 IN.	y FT.-IN.	B IN.	X_2	SGL CU. YD.	DBL CU. YD.	SGL LBS.	DBL LBS.
54	8-6	7	15-3	11½	8-10	15	18	2.19	3.81	211	358
60	9-0	10	16-6	7	9-4	18		2.38	4.25	217	396
66	9-6	7	17-9	8½	9-10	12	15	2.58	4.70	252	454
72	10-0	10	19-0	10	10-4	15		2.78	5.17	255	472
78	10-6	7	20-0	10	10-10	18	12	2.98	5.56	276	499
84	11-0	10	21-0	10	11-4	15		3.19	5.95	297	553
90	11-6	7	22-0	10	11-10	15	18	3.40	6.36	317	517
96	12-0	10	23-0	10	12-4	18		3.62	6.79	321	597
102	12-6	7	24-0	10	12-10	12	15	3.84	7.21	364	663
108	13-0	10	25-0	10	13-4	15		4.06	7.63	362	678

HEADWALL FOR FLEXIBLE ROUND PIPE



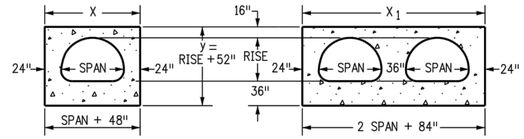
WHEN APRON IS REQUIRED

GENERAL NOTES

1. CONCRETE SHALL BE CLASS B.
2. HEADWALL SHALL BE PERPENDICULAR TO THE PIPE ℄ UNLESS OTHERWISE SHOWN ON THE PLANS. TABULATED DIMENSIONS AND QUANTITIES MUST BE ADJUSTED FOR SKEWED INSTALLATIONS.
3. FOR WINGWALL DETAILS, SEE STANDARD PLAN M-601-20.
4. VOLUME OCCUPIED BY PIPE HAS BEEN DEDUCTED FROM STEEL AND CONCRETE QUANTITIES.
5. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED ¾ IN.
6. ALL REINFORCING BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.

▲ WHEN TWO OR MORE PIPES ARE LAID SIDE BY SIDE, THEY SHALL BE PLACED SO THAT THE ADJACENT PIPES WILL BE ½ INSIDE DIAMETER APART, OR ½ INSIDE SPAN APART, OR 3 FT. APART (INCLUDING WALL THICKNESS), WHICHEVER IS LESS.

■ ADD 0.89 x (X OR X_1) (LB.) WHEN APRON IS REQUIRED.



DIMENSIONS										QUANTITIES			
										CONCRETE		STEEL ■	
EQUIV. Ba IN.	SPAN IN.	RISE IN.	X FT.-IN.	A IN.	X_1 FT.-IN.	A_1 IN.	y FT.-IN.	B IN.		SGL CU. YD.	DBL CU. YD.	SGL LBS.	DBL LBS.
72	81	59	10-9	8½	20-6	7	9-3	17½		2.72	5.10	250	467
78	87	63	11-3	11½	21-6	7	9-7	10½		2.85	5.34	275	531
84	95	67	11-9	8½	22-10	9	9-11	12½		3.08	5.79	290	547
90	103	71	12-7	7½	24-2	11	10-3	15		3.30	6.21	321	591
96	112	75	13-4	12	25-8	8	10-7	16½		3.52	6.65	314	606
102	117	79	13-9	8½	26-6	7	10-11	9½		3.63	6.86	356	672
108	128	83	14-8	8	28-4	12	11-3	11½		3.96	7.51	376	699

HEADWALL FOR FLEXIBLE PIPE ARCH

DIMENSIONS										QUANTITIES			
										CONCRETE		STEEL ■	
EQUIV. Ba IN.	SPAN FT.-IN.	RISE FT.-IN.	X FT.-IN.	A IN.	X_1 FT.-IN.	A_1 IN.	y FT.-IN.	B IN.		SGL CU. YD.	DBL CU. YD.	SGL LBS.	DBL LBS.
66	6-1	4-7	10-1	10½	19-2	11	8-11	15½		2.52	4.70	232	424
75	7-0	5-1	11-0	10	21-0	10	9-5	9½		2.80	5.25	282	509
84	7-11	5-7	11-11	9½	22-10	9	9-11	12½		3.08	5.79	291	540
93	8-10	6-1	12-10	9	24-8	8	10-5	15½		3.36	6.33	309	622
102	9-9	6-7	13-9	8½	26-6	7	10-11	9½		3.63	6.86	379	673
111	10-11	7-1	14-11	9½	28-10	9	11-5	12½		4.05	7.67	377	711
120	11-10	7-7	15-10	9	30-8	8	11-11	15½		4.36	8.28	395	731
132	12-10	8-4	16-10	9	32-8	8	12-8	11		4.75	9.03	441	839
141	14-1	8-9	18-1	10½	35-2	11	13-1	13½		5.17	9.86	448	931
150	15-4	9-3	19-4	12	37-8	8	13-7	16½		5.69	10.88	490	953
159	15-10	9-10	19-10	9	38-8	8	14-2	11		5.89	11.25	534	1019

HEADWALL FOR STRUCTURAL PLATE ARCH

SKEW ANGLE A°	90	85	80	75	70	65	60	55	50	45	40	35	30
FACTOR (cosecA°)	1.000	1.004	1.015	1.035	1.064	1.103	1.155	1.221	1.305	1.414	1.556	1.743	2.000

SKEW FACTOR TABLE

Computer File Information		Sheet Revisions	
Creation Date: 07/04/12 Initials: DD		Date:	Comments
Last Modification Date: 07/04/12 Initials: LTA	R-X		
Full Path: www.coloradodot.info/business/designsupport	R-X		
Drawing File Name: 601000101.dgn	R-X		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	R-X		

Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083
Fax: (303) 757-9820
Project Development Branch DD/LTA

HEADWALL FOR PIPES

Issued By: Project Development Branch July 4, 2012

STANDARD PLAN NO.
M-601-10
Sheet No. 1 of 1

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URSA OPERATING COMPANY LLC
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
CDOT HEADWALL DETAILS

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018
Scale: Horiz: N/A Vert: N/A
Project No: 5D27072
Sheet: C126

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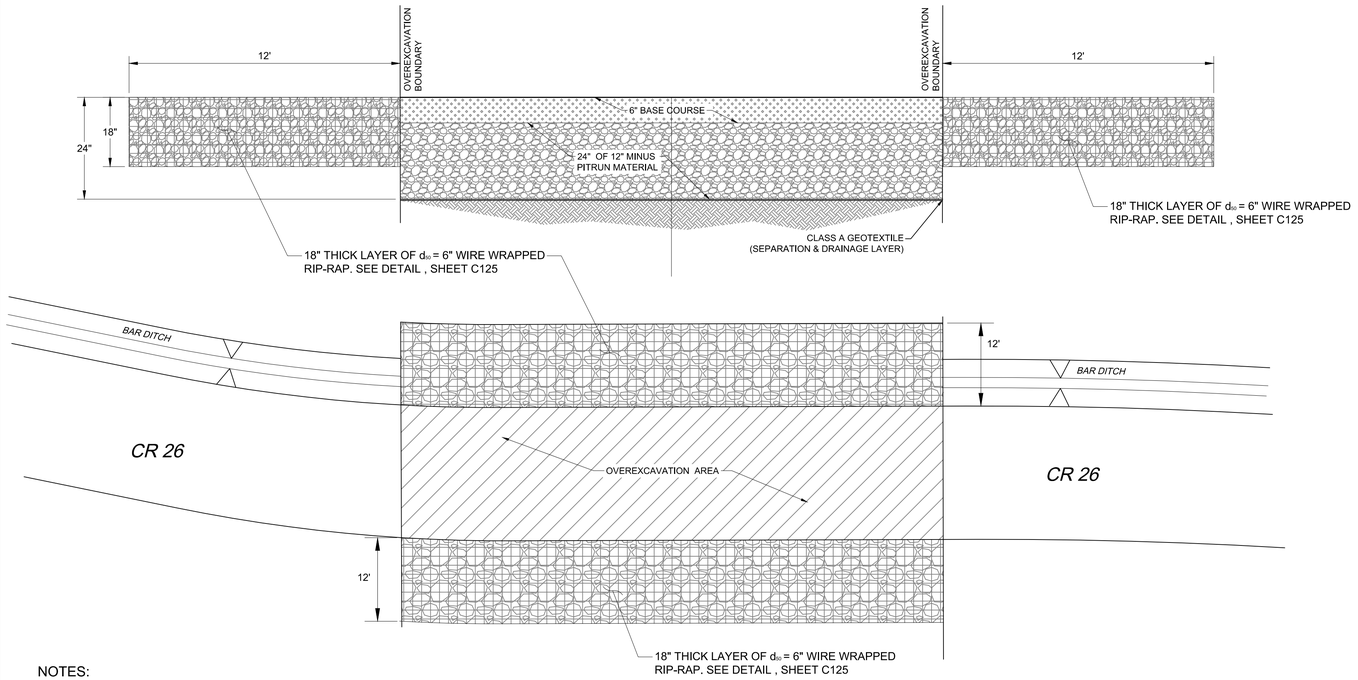
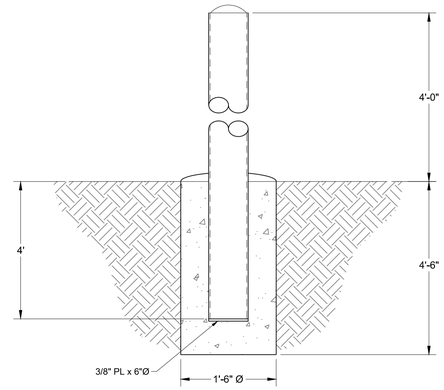
\\DCO10\Projects\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 DETAILS.dwg, 6/6/2018 12:46:59 PM GJF



NOTES:

1. OVEREXCAVATE ROADWAY AREA INDICATED TO A DEPTH OF 24".
2. BACKFILL WITH 12" MINUS PIT RUN MATERIAL TO A DEPTH OF 24" COMPLETE ROADWAY SECTION WITH STANDARD BASE COURSE MATERIAL TO A DEPTH OF 6".
3. ALL COMPACTION SHALL BE MOISTURE TREATED TO WITHIN ±2% OPTIMUM MOISTURE AND COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY STANDARD PROCTOR (ASTM D698)

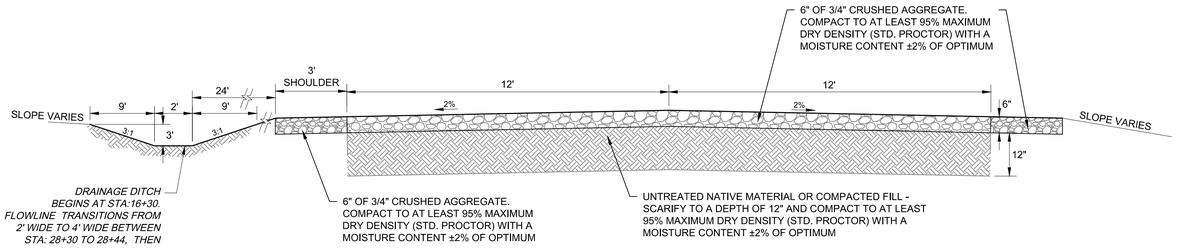
LOW WATER CROSSING (1 / C127)
N.T.S.



BOLLARD DETAIL (2 / C127)

SUBGRADE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 12". MOISTURE TREATED TO WITHIN ± 2% OPTIMUM MOISTURE AND COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY A STANDARD PROCTOR (ASTM D698) (TYP)

PRODUCED WATER PIT ACCESS ROAD SECTION (4 / C127)
N.T.S.



CR 26 CROSS-SECTION (3 / C127)
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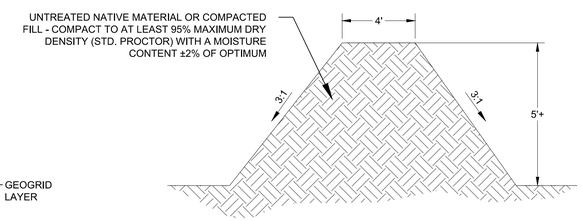

TERTIARY BERM (7 / C127)
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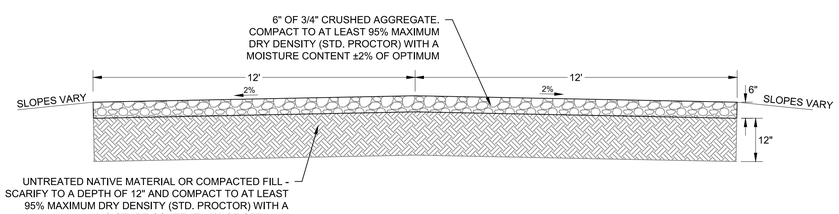

GRAVEL DRIVEWAY TO PIT CROSS-SECTION (5 / C127)
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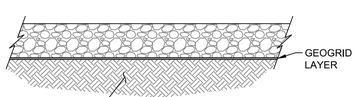

FACILITY GRAVEL DRIVEWAYS & PAVEMENT SECTION (6 / C127)
N.T.S.

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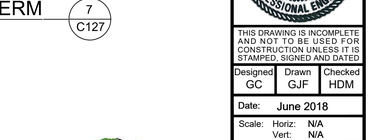
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
ROADWAY & LOW WATER CROSSING DETAILS



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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018
Scale: Horiz: N/A Vert: N/A
Project No: 5D27072
Sheet: C127

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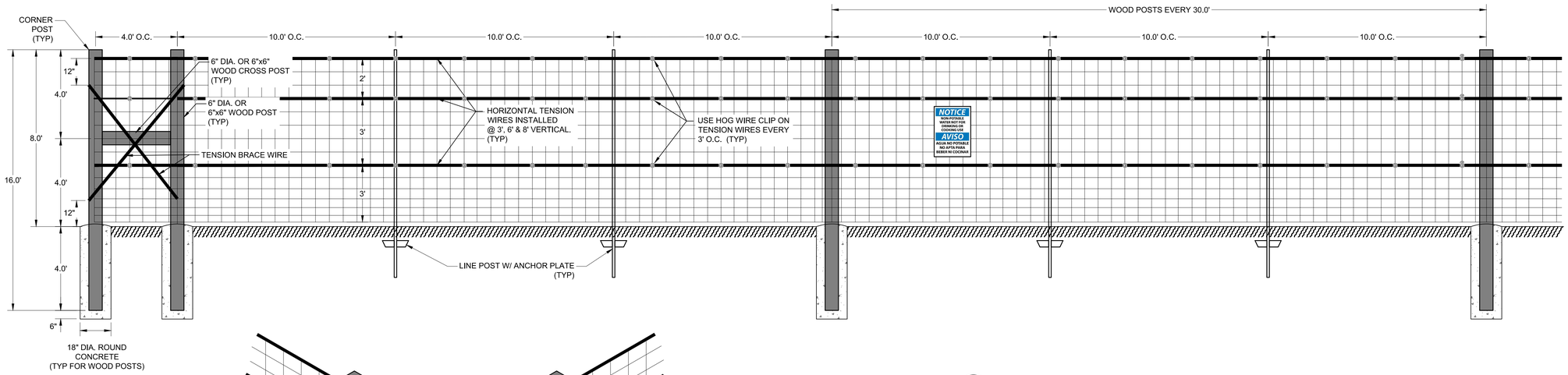

8' HIGH WILDLIFE FENCE 1/C128
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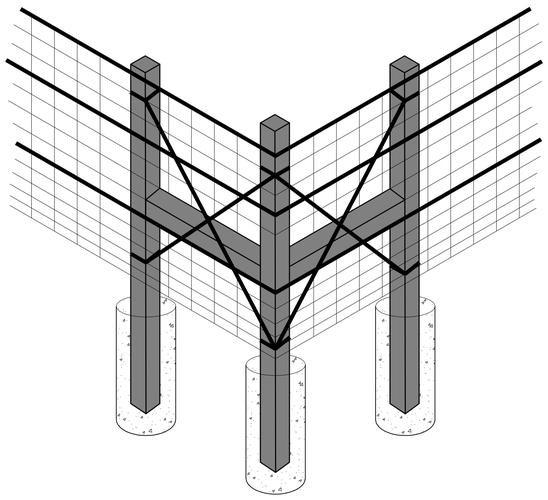
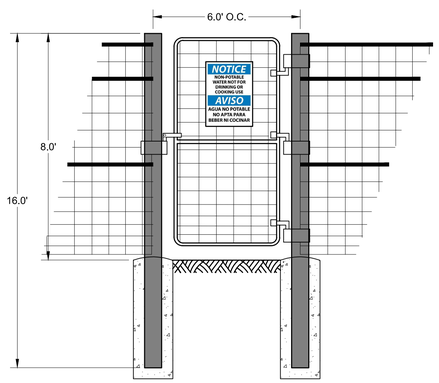


CORNER POST & BRACING 2/C128
N.T.S.

NOTE:
SEE 32 33 10 WILDLIFE & FARM FENCING SPECIFICATION IN THE PROJECT MANUAL FOR MATERIAL SPECIFICATIONS AND INSTALLATION INSTRUCTIONS

WARNING SIGN 3/C128
N.T.S.



PEDESTRIAN GATE 4/C128
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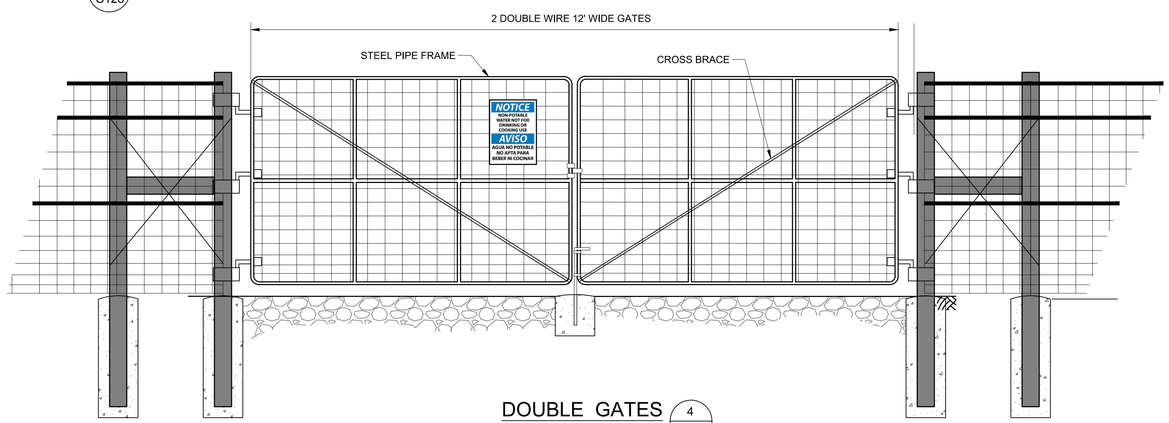

DOUBLE GATES 4/C128
N.T.S.

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L:\5-URSA Produced Water Ponds (5D27072)\CAD\Civil\60 Percent\5D27072 DETAILS.dwg, 6/6/2018 12:47:46 PM GJF

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BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
WILDLIFE FENCE DETAILS

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GC	GJF	HDM

Date: June 2018
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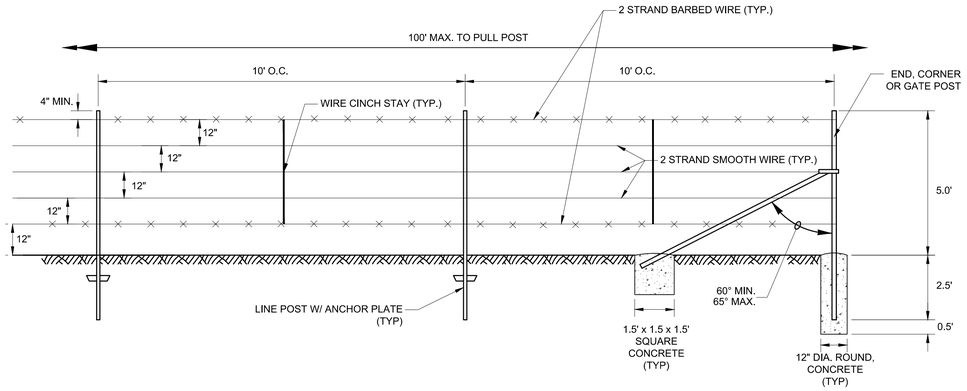
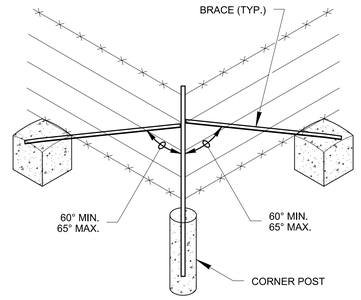
Project No: 5D27072
Sheet: C128



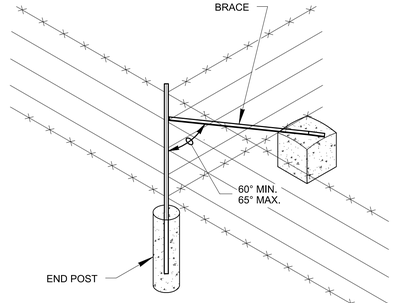
5.0' , 5 WIRE FARM FENCE (1 / C129)

N.T.S.



CORNER BRACING (2 / C129)

N.T.S.

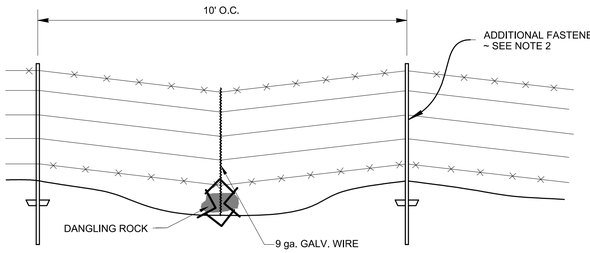


INTERSECTION BRACING (3 / C129)

N.T.S.

NOTES:

1. USE 2 FASTENERS PER WIRE, PER POST. ADDITIONAL FASTENERS ARE REQUIRED WITHIN AND AT THE LIMITS OF ANY SAG CONDITIONS AND ON POSTS THAT MARK THE ANGLE POINT OF ANY SUDDEN CHANGE IN TOPOGRAPHY.
2. FENCING WIRE SHALL CONSIST OF A TOP AND BOTTOM DOUBLE STRAND OF BARBED WIRE AND 2 DOUBLE STRAND SMOOTH WIRES IN BETWEEN.
3. SEE 32 33 10 WILDLIFE & FARM FENCING SPECIFICATION IN THE PROJECT MANUAL FOR MATERIAL SPECIFICATIONS AND INSTALLATION INSTRUCTIONS



GRADE DEPRESSION (SAG) DETAIL (4 / C129)

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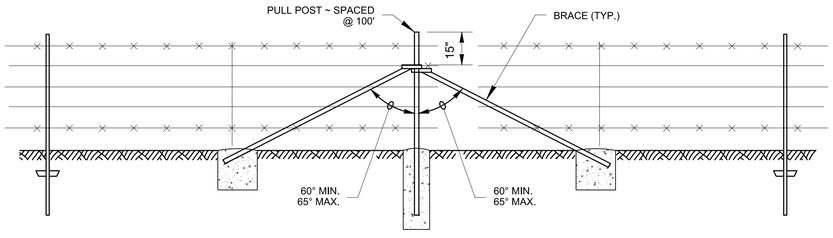

INTERMEDIATE BRACING/PULL POST (5 / C129)

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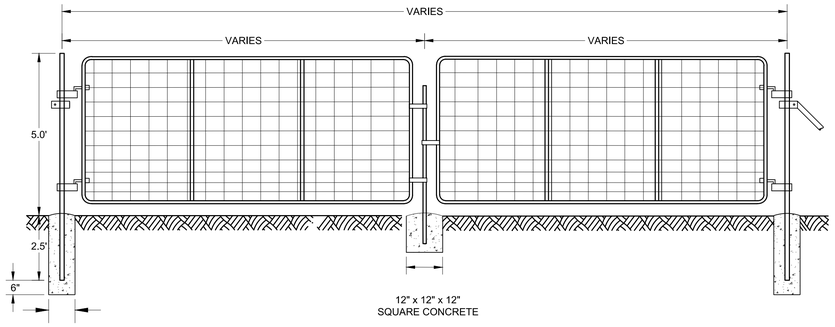


DOUBLE GATE (6 / C129)

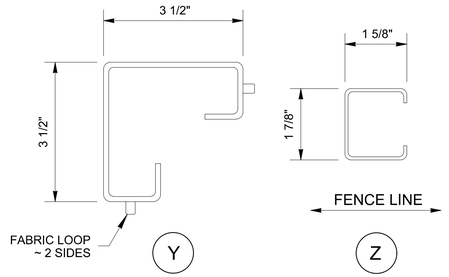
N.T.S.

(SEE SHEET C114 FOR DOUBLE GATE WIDTH)

POST SPECIFICATIONS

POST	PIPE	ROLL FORMED		T-POST
	NOM. SIZE (SCH. 40) I.D.	SECTION	WEIGHT (lb/ft)	WEIGHT (lb/ft)
END, CORNER, OR PULL POST	2" DIAM.	Y	5.10	
LINE OR BRACE POST	2" DIAM.	Z	1.85	1.33

STEEL POSTS AND BRACES



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URSA OPERATING COMPANY LLC

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
FARM FENCE DETAILS

GREGORY CLAINE — 0051615 — 6-6-2018 — PROFESSIONAL ENGINEER

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GC	GJF	HDM

Date: June 2018

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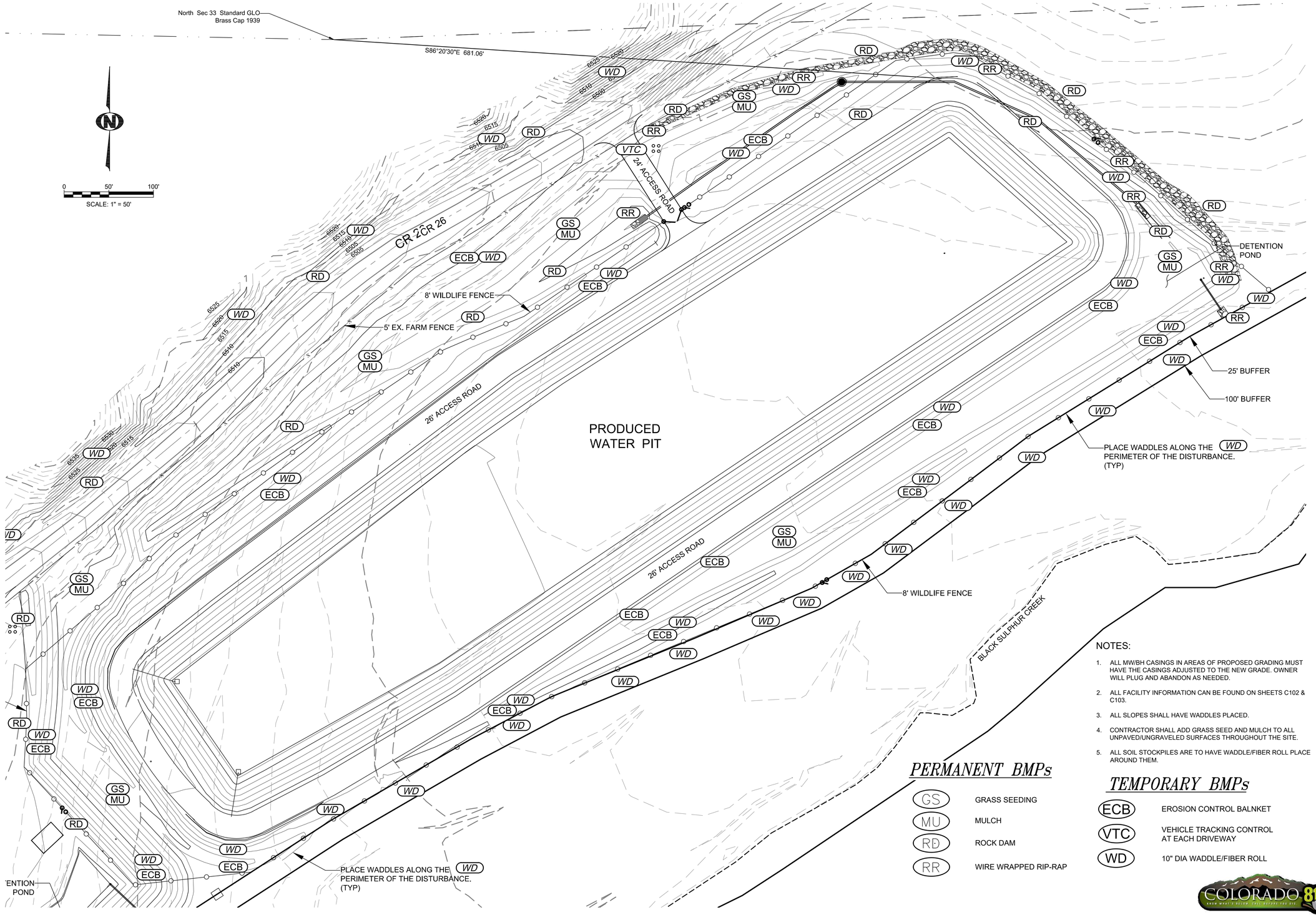
Project No: 5D27072

Sheet: C129



NOTES:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE. OWNER WILL PLUG AND ABANDON AS NEEDED.
2. ALL FACILITY INFORMATION CAN BE FOUND ON SHEETS C102 & C103.
3. ALL SLOPES SHALL HAVE WADDLES PLACED.
4. CONTRACTOR SHALL ADD GRASS SEED AND MULCH TO ALL UNPAVED/UNGRAVELED SURFACES THROUGHOUT THE SITE.
5. ALL SOIL STOCKPILES ARE TO HAVE WADDLE/FIBER ROLL PLACE AROUND THEM.

PERMANENT BMPs

GS	GRASS SEEDING
MU	MULCH
RD	ROCK DAM
RR	WIRE WRAPPED RIP-RAP

TEMPORARY BMPs

ECB	EROSION CONTROL BALNKET
VTC	VEHICLE TRACKING CONTROL AT EACH DRIVEWAY
WD	10" DIA WADDLE/FIBER ROLL

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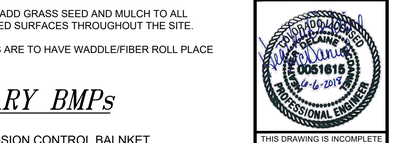
RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
PRODUCED WATER PIT EROSION AND SEDIMENTATION PLAN



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Designed	Drawn	Checked
GC	GJF	HDM

Date: June 2018
Scale: Horiz:
Vert:
Project No: 5D27072
Sheet: C130

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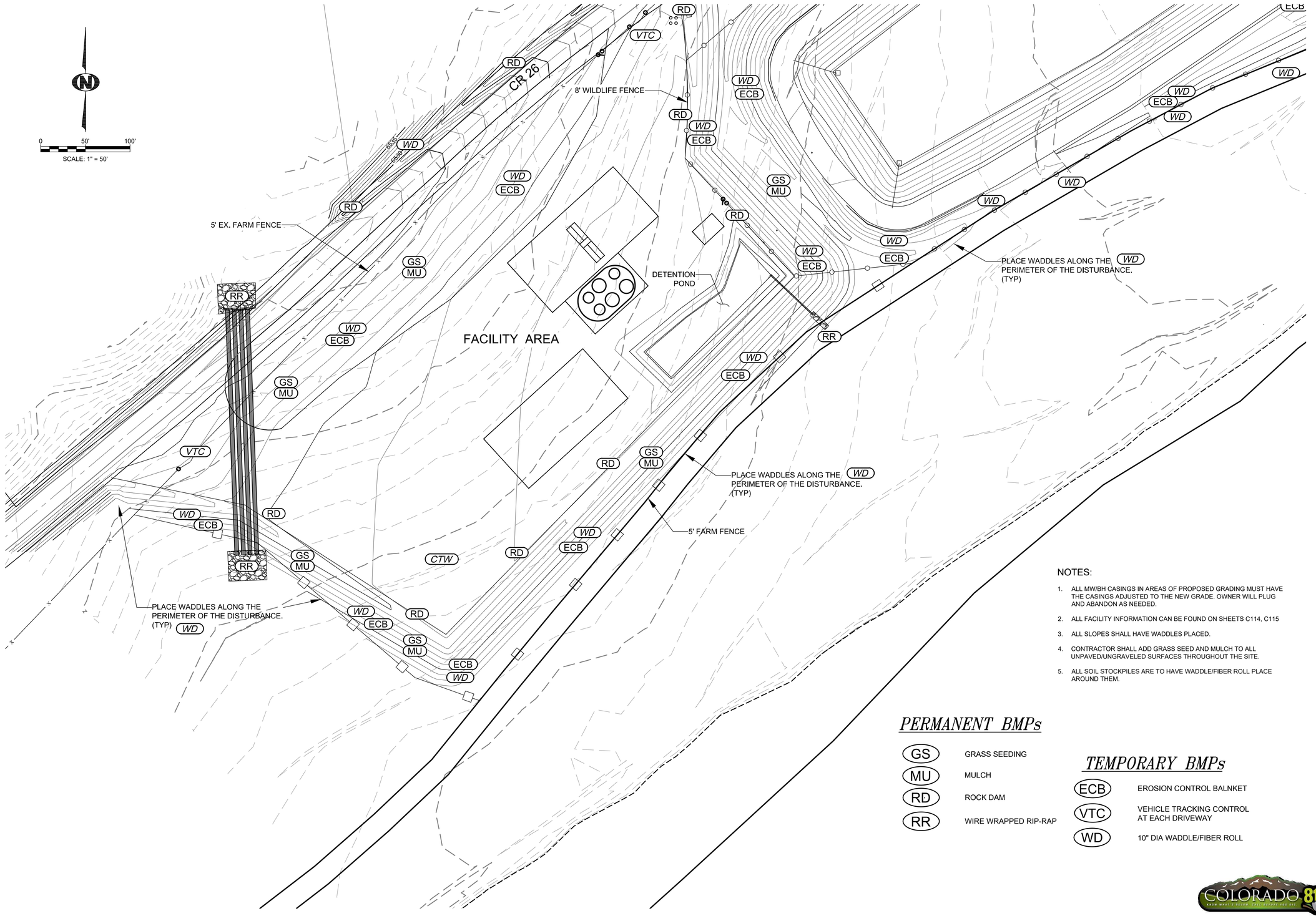

NOTES:

1. ALL MW/BH CASINGS IN AREAS OF PROPOSED GRADING MUST HAVE THE CASINGS ADJUSTED TO THE NEW GRADE. OWNER WILL PLUG AND ABANDON AS NEEDED.
2. ALL FACILITY INFORMATION CAN BE FOUND ON SHEETS C114, C115
3. ALL SLOPES SHALL HAVE WADDLES PLACED.
4. CONTRACTOR SHALL ADD GRASS SEED AND MULCH TO ALL UNPAVED/UNGRAVELED SURFACES THROUGHOUT THE SITE.
5. ALL SOIL STOCKPILES ARE TO HAVE WADDLE/FIBER ROLL PLACE AROUND THEM.

PERMANENT BMPs

GS	GRASS SEEDING
MU	MULCH
RD	ROCK DAM
RR	WIRE WRAPPED RIP-RAP

TEMPORARY BMPs

ECB	EROSION CONTROL BALNKET
VTC	VEHICLE TRACKING CONTROL AT EACH DRIVEWAY
WD	10" DIA WADDLE/FIBER ROLL

Rev #	Date	Description	By	Chk'd

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RIFLE, COLORADO

BOIES RANCH PRODUCED WATER PIT
BOIES RANCH
FACILITY EROSION AND SEDIMENTATION PLAN

REGISTERED PROFESSIONAL ENGINEER
KELLY D. LORRAINE
00516151
6-6-2018
PROFESSIONAL ENGINEER

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Date: June 2018
Scale: Horiz:
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Project No: 5D27072
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COLORADO 811
KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

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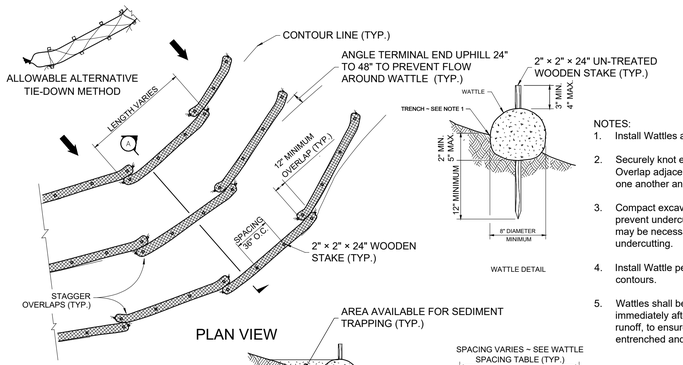
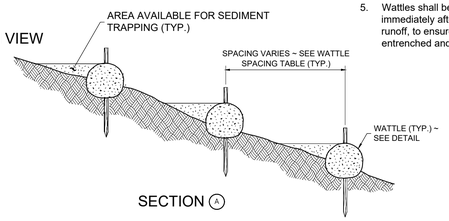


NOTES:

1. Install Wattles along contours.
2. Securely knot each end of Wattle. Overlap adjacent Wattle ends 12" behind one another and securely tie together.
3. Compact excavated soil and trenches to prevent undercutting. Additional staking may be necessary to prevent undercutting.
4. Install Wattle perpendicular to flow along contours.
5. Wattles shall be inspected regularly, and immediately after a rainfall produces runoff, to ensure they remain thoroughly entrenched and in contact with the soil.

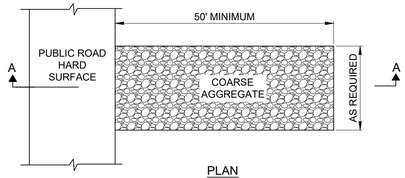
8" DIAMETER WATTLE SPACING TABLE	
SLOPE	MAXIMUM SPACING
1:1	10'
2:1	20'
3:1	30'
4:1	40'

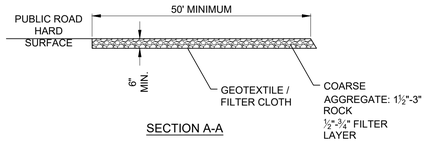


WADDLE INSTALLATION ON SLOPES (WD)

N.T.S.

PURPOSE: TO REDUCE THE AMOUNT OF MUD TRANSPORTED ONTO PUBLIC ROADS BY MOTOR VEHICLES OR RUNOFF.

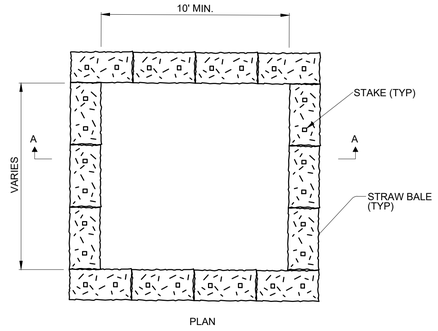


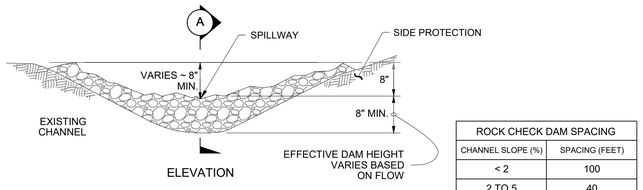


A STONE STABILIZED PAD SHALL BE LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS ON A CONSTRUCTION SITE. GEOTEXTILE SHALL BE PLACED UNDER VEHICLE TRACKING CONTROL PAD.

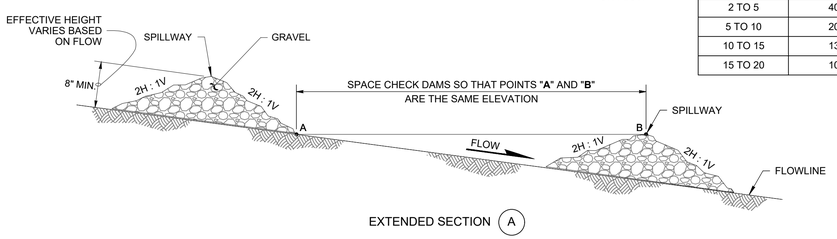
VEHICLE TRACKING CONTROL (VTC)

N.T.S.



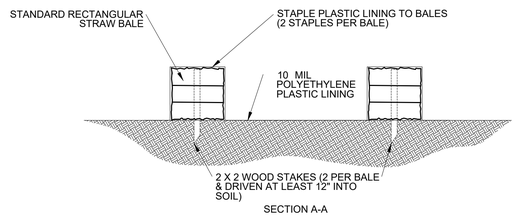


ROCK CHECK DAM SPACING	
CHANNEL SLOPE (%)	SPACING (FEET)
< 2	100
2 TO 5	40
5 TO 10	20
10 TO 15	13
15 TO 20	10



ROCK CHECK DAM (RD)

N.T.S.



CONCRETE TRUCK WASH OUT FACILITY

N.T.S.

GENERAL NOTES

1. SEE SHEETS C130 & C131 FOR SITE SPECIFIC APPLICATION OF EROSION CONTROL.
2. EROSION CONTROL SHALL BE IMPLEMENTED TO PROTECT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION AND SEDIMENTATION AS A RESULT OF CONSTRUCTION ACTIVITIES.
3. THE CONTRACTOR SHALL SET, LOCATE, AND MAINTAIN EROSION CONTROL MEASURES PER THE EROSION CONTROL PLAN, AND THE OWNER'S ASSET STORMWATER MANAGEMENT PLAN. (SWMP)
4. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AND SHALL BE KEPT IN PLACE UNTIL EROSION AND SEDIMENTATION POTENTIAL IS MITIGATED. REMOVAL OF SILT AND SEDIMENT IS REQUIRED PER SWMP.
5. EROSION CONTROL DEVICES SHALL BE CHECKED AFTER EVERY STORM. REPAIRS OR REPLACEMENT TO THE EROSION CONTROL MEASURES SHALL BE MADE AS REQUIRED BY THE OWNERS PERMIT TO MAINTAIN PROPER PROTECTION.
6. SWMP SHALL BE MODIFIED TO CONTROL EROSION AND SEDIMENT. TRANSPORT BY USING ANY MEANS SHOWN ON THIS PLAN OR IMPLEMENTING OTHER CONTROL MEASURES.
7. PERMANENT BEST MANAGEMENT PRACTICES (BMP'S) (I.E. SEEDED, MULCH) MUST BE IMPLEMENTED WITHIN 14 DAYS OF LAST CONSTRUCTION ACTIVITY IN THE AREA, AS REQUIRED PER THE SWMP.
8. THE CONTRACTOR/OWNER SHALL UPDATE OR MODIFY THIS PLAN AS NEEDED TO COMPLY WITH THE APPLICABLE POLLUTANT DISCHARGE ELIMINATION SYSTEM REQUIREMENTS.
9. CONTRACTOR SHALL BE REQUIRED TO HAUL EXCESS CONCRETE AND WASHOUT OFF-SITE TO AN APPROVED/PERMITTED DISPOSAL SITE.
10. CONTRACTOR SHALL SPREAD STOCKPILED TOPSOIL BEFORE PLACING GRASS SEED AT CUT AND FILL LOCATIONS USING OWNER APPROVED MIX.
11. CONTRACTOR SHALL PLACE MULCH IN CONJUNCTION WITH GRASS SEEDING.

NOTE:
1. SEE SHEETS C131 FOR SITE SPECIFIC APPLICATION OF EROSION CONTROL.

TEMPORARY BMPs

VTC	VEHICLE TRACKING CONTROL AT EACH DRIVEWAY
WD	10" DIA WADDLE/FIBER ROLL
CTW	CONCRETE TRUCK WASHOUT FACILITY

PERMANENT BMPs

GS	GRASS SEEDING
MU	MULCH
RD	ROCK CHECK DAM
RR	WIRE WRAPPED RIP RAP (SEE SHEET C125 FOR DETAIL)
CB	CONCRETE BLANKET
ECB	EROSION CONTROL BALNKET

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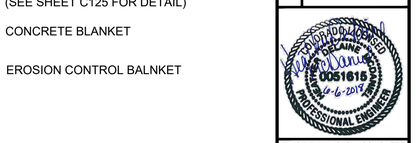
BOIES RANCH
SITE EROSION AND SEDIMENTATION CONTROL DETAILS



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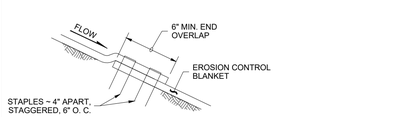
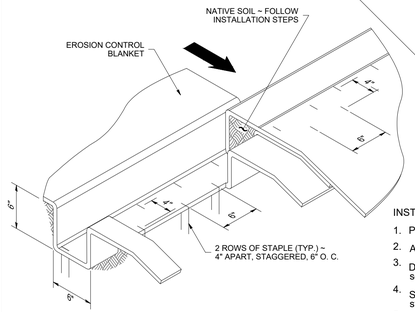


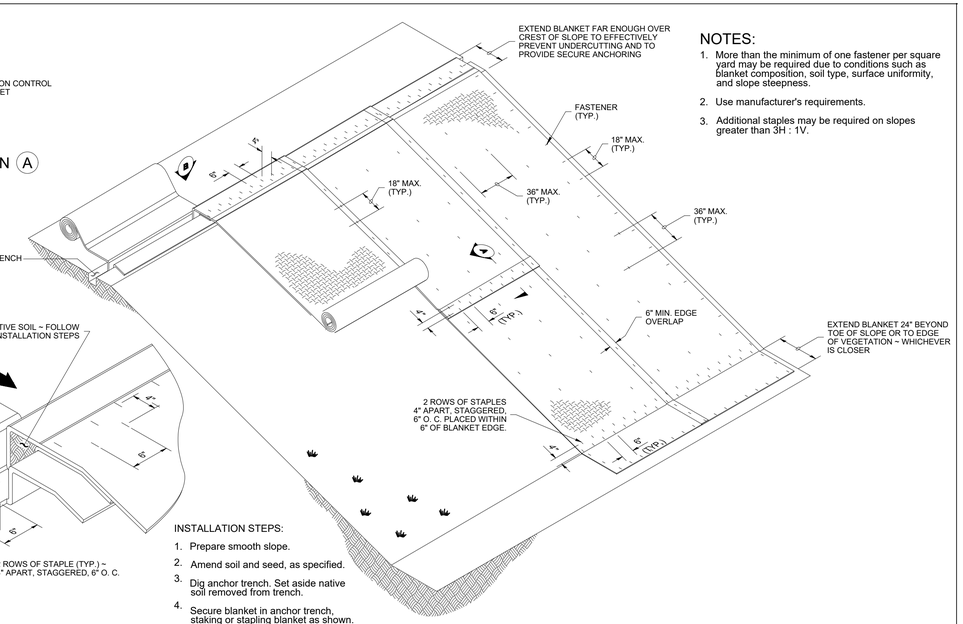
SHINGLE SPLICE ~ SECTION (A)



INITIAL ANCHOR ~ DETAIL (B)

INSTALLATION STEPS:

1. Prepare smooth slope.
2. Amend soil and seed, as specified.
3. Dig anchor trench. Set aside native soil removed from trench.
4. Secure blanket in anchor trench, staking or stapling blanket as shown.
5. Replace native soil previously removed from trench.
6. Roll blanket down the slope in a controlled manner, taking care to remove excess slack, and taking care not to stretch blanket.
7. Stake or staple blanket as shown so there are no gaps between the blanket and the soil. Staple while unrolling blanket to minimize walking on blanket.



ISOMETRIC VIEW

NOTES:

1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and slope steepness.
2. Use manufacturer's requirements.
3. Additional staples may be required on slopes greater than 3H : 1V.

EROSION CONTROL BLANKET (ECB)
N.T.S.

EROSION CONTROL BLANKET (ECB)
N.T.S.

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TEMPORARY BMPs

(ECB)	EROSION CONTROL BALNKET
(VTC)	VEHICLE TRACKING CONTROL AT EACH DRIVEWAY
(WD)	10" DIA WADDLE/FIBER ROLL

PERMANENT BMPs

(GS)	GRASS SEEDING
(MU)	MULCH
(RD)	ROCK DAM
(RR)	WIRE WRAPPED RIP RAP (SEE SHEET C125 FOR DETAIL)

Rev #	Date	Description	By	Chk'd

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RIFLE, COLORADO

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BOIES RANCH
SITE EROSION AND SEDIMENTATION CONTROL DETAILS

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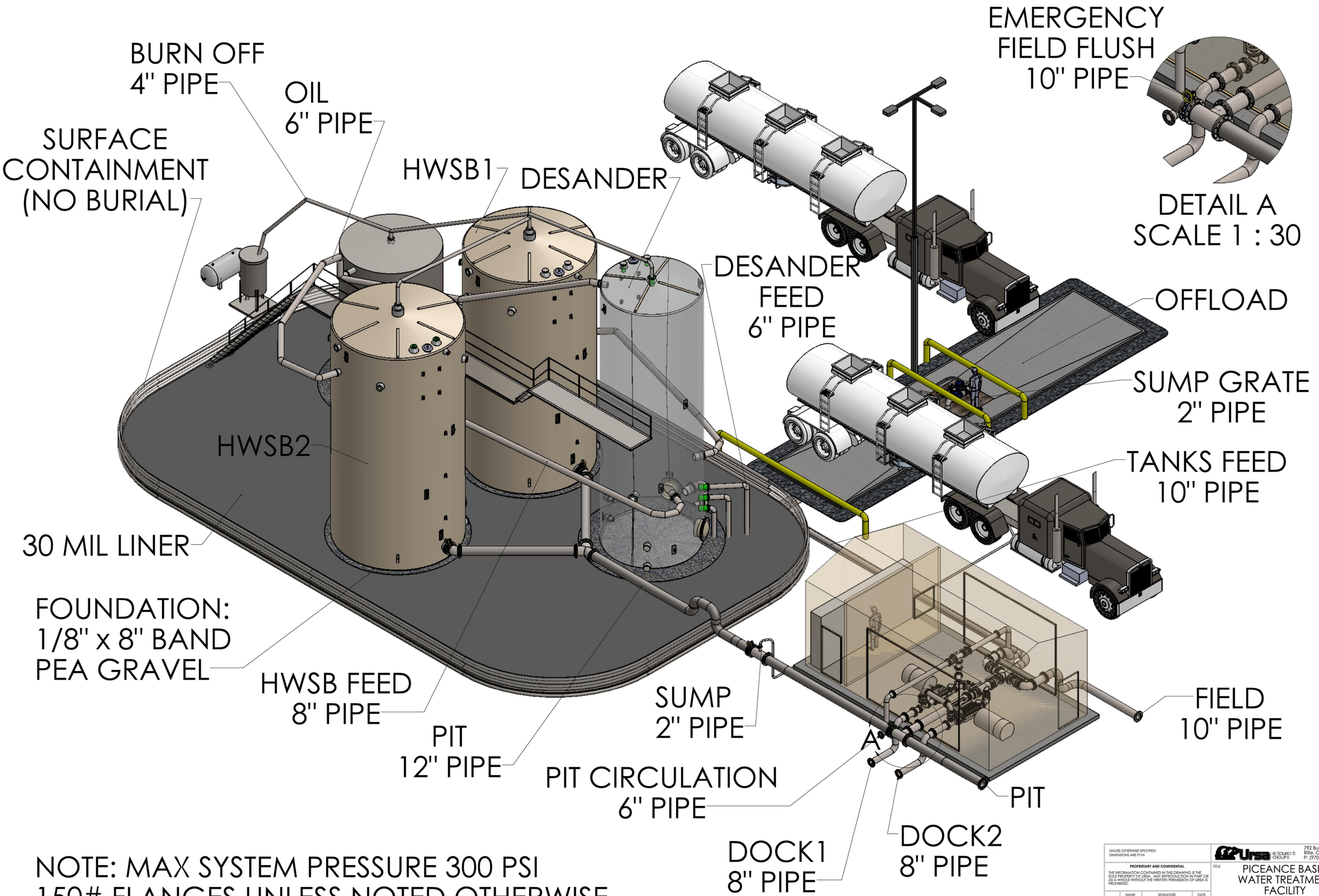

NOTE: MAX SYSTEM PRESSURE 300 PSI
150# FLANGES UNLESS NOTED OTHERWISE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE FT-IN

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	NAME	SIGNATURE	DATE
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ENGL	JRT		06/06/18
CHK'D	DH		06/06/18
APPV'D	MH		06/06/18

URSA ENGINEERS & CONSULTANTS
792 Buckhorn Dr.
Rifle, CO 81650
P: (970) 625-9922

TITLE: PICEANCE BASIN WATER TREATMENT FACILITY

DWG NO. TBD

A1

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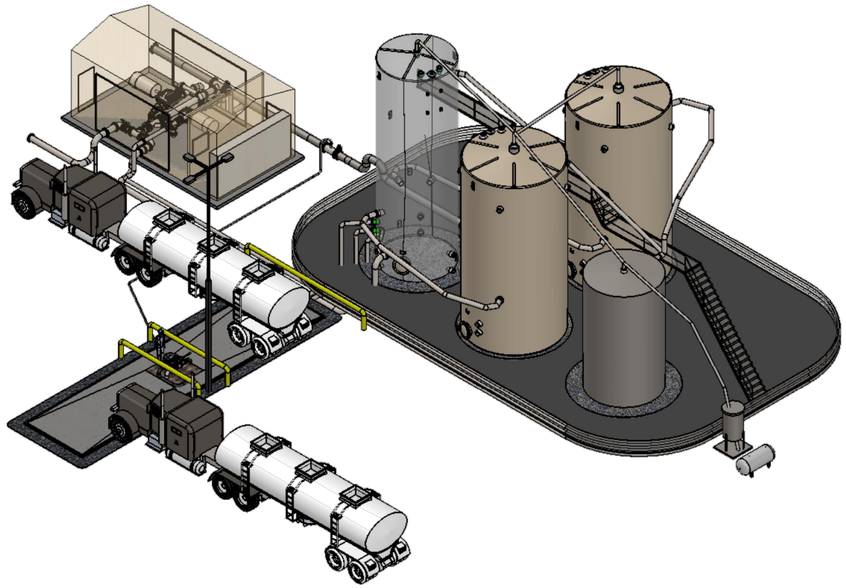
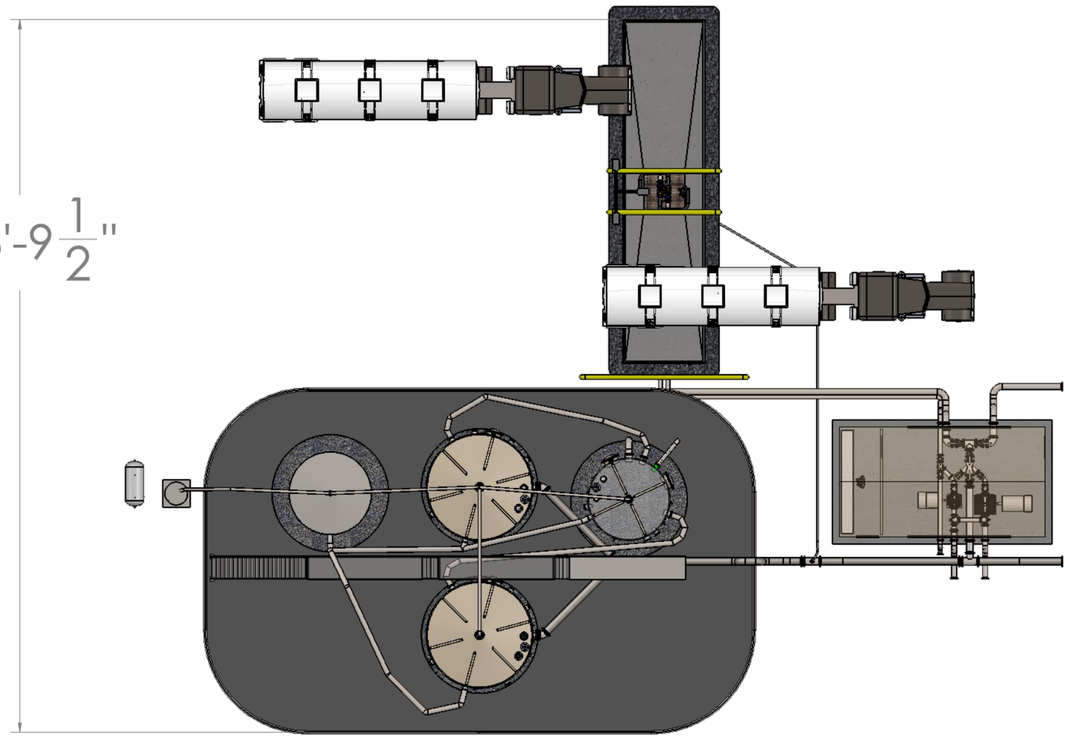
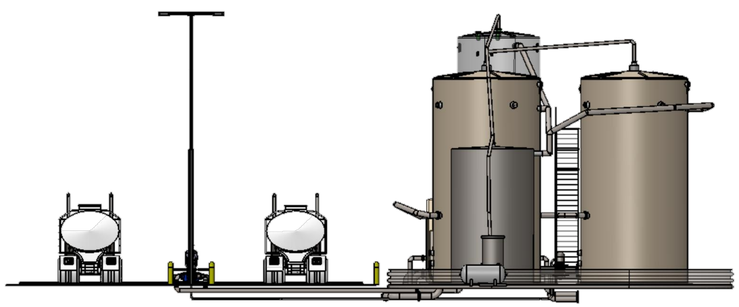
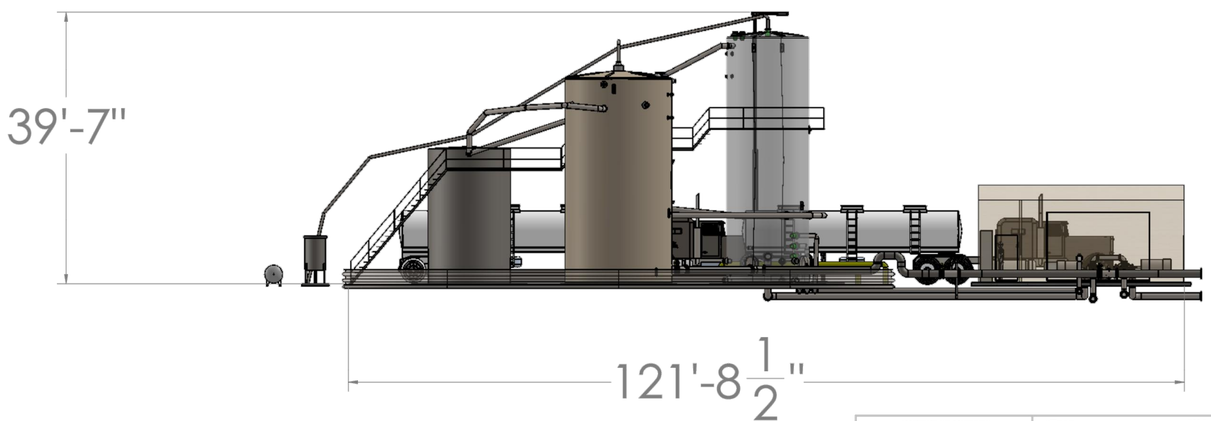
SHEET 1 OF 7









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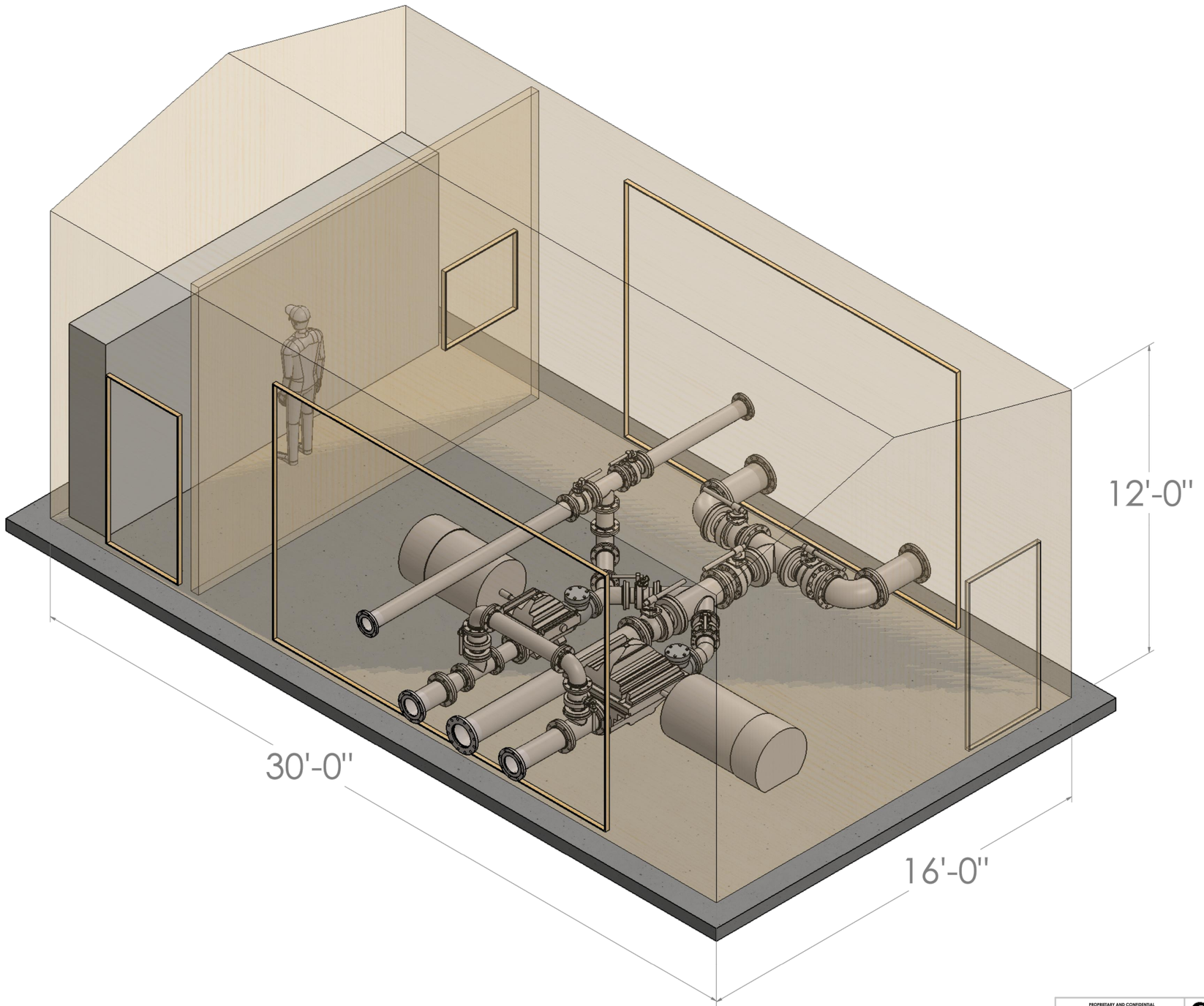

PUMP HOUSE

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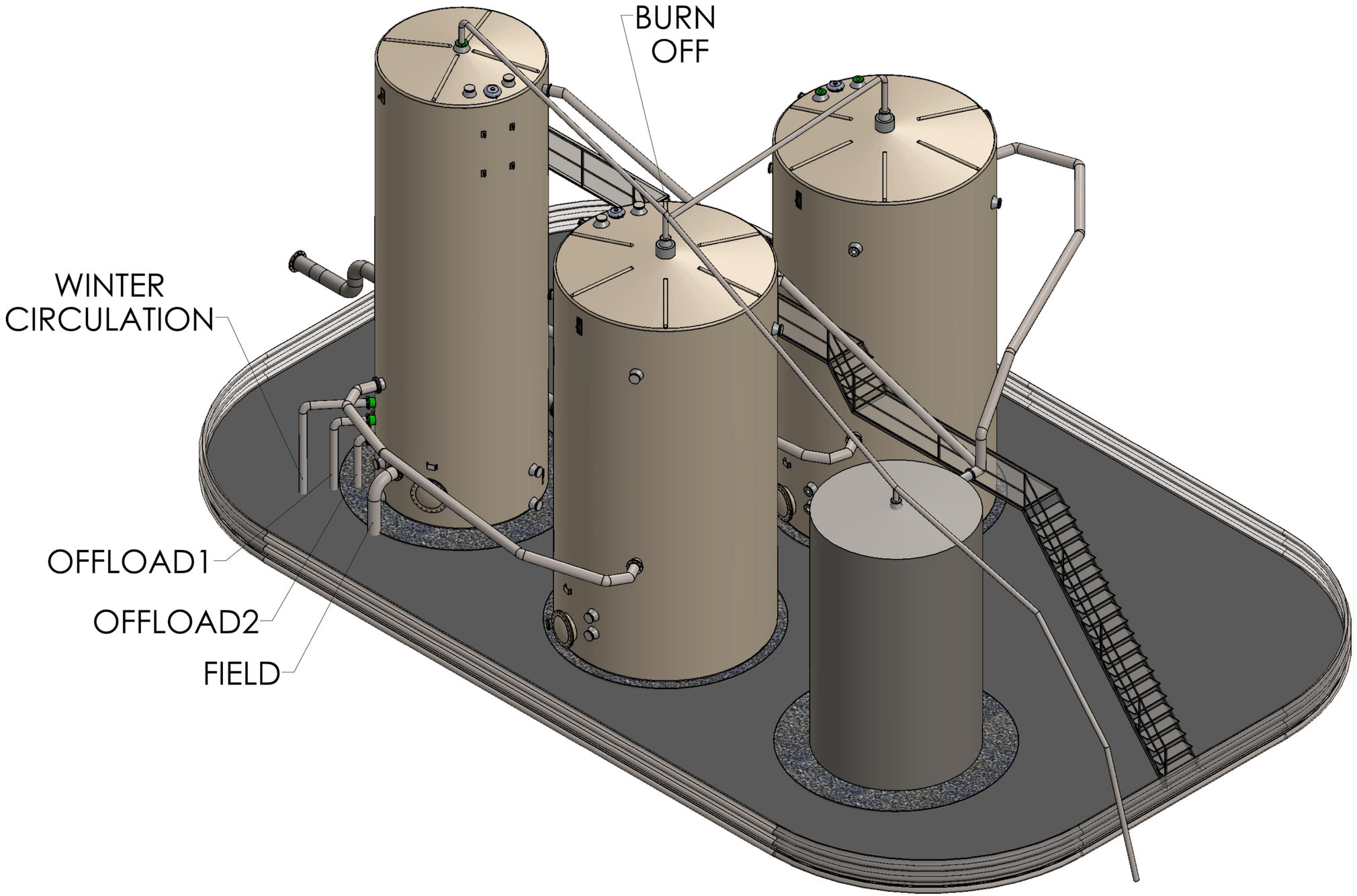

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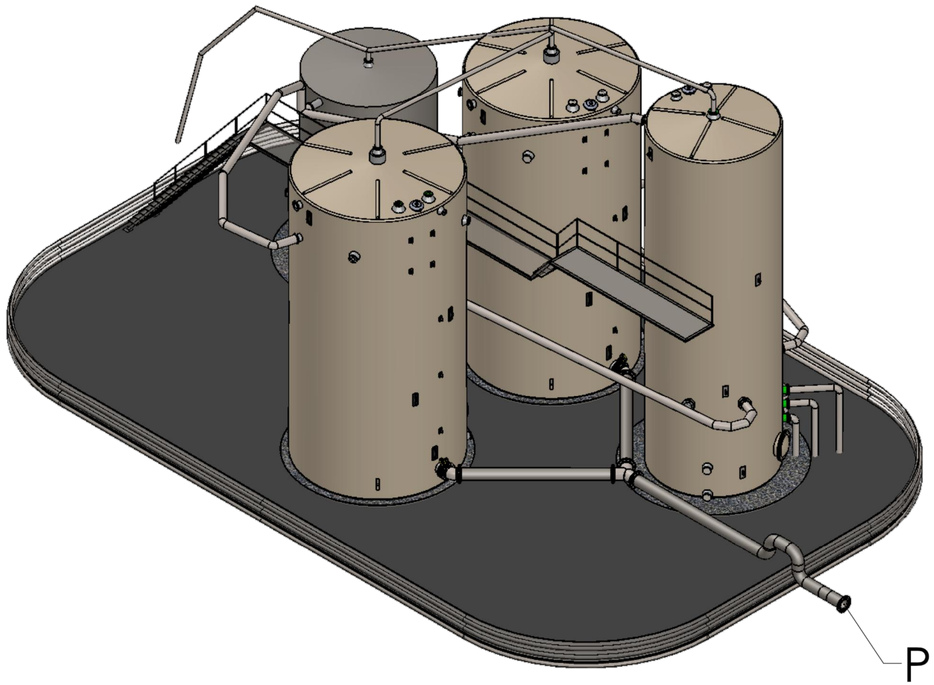

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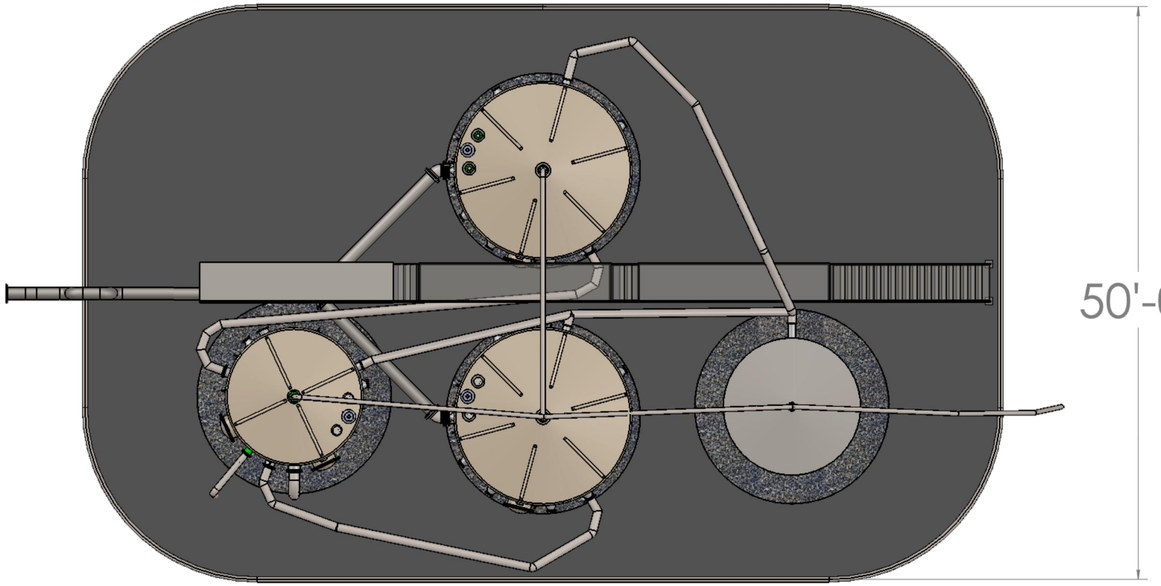

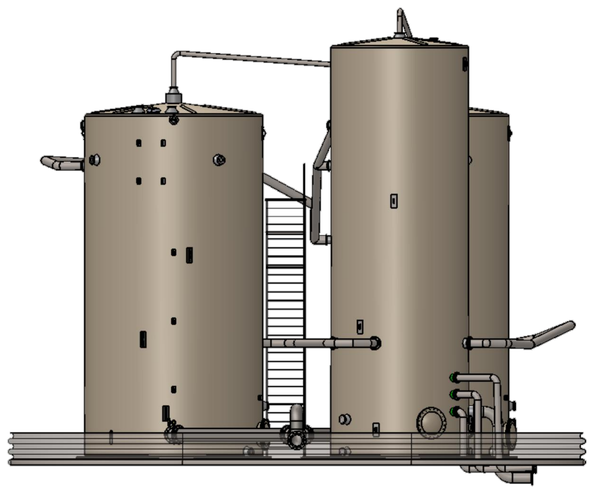

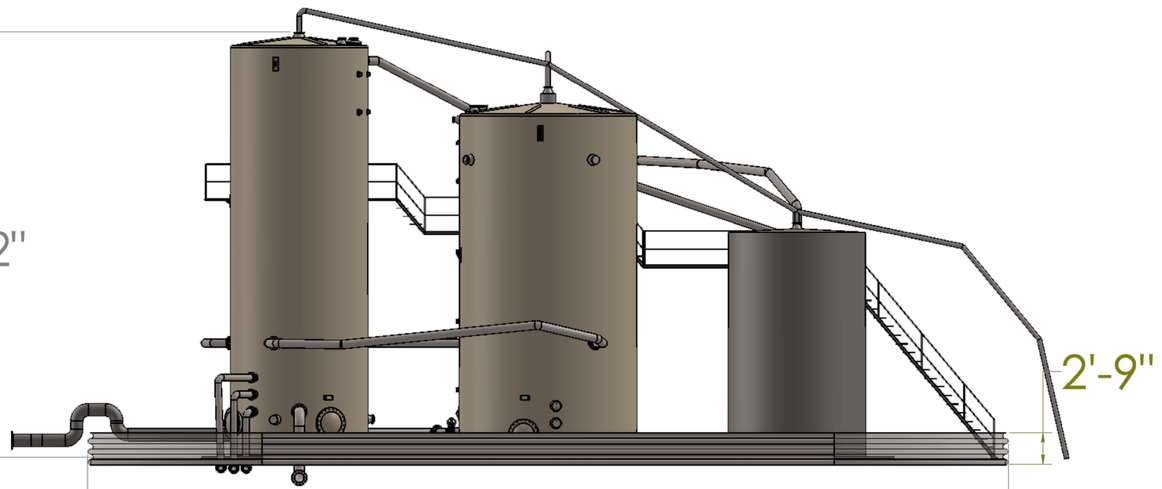

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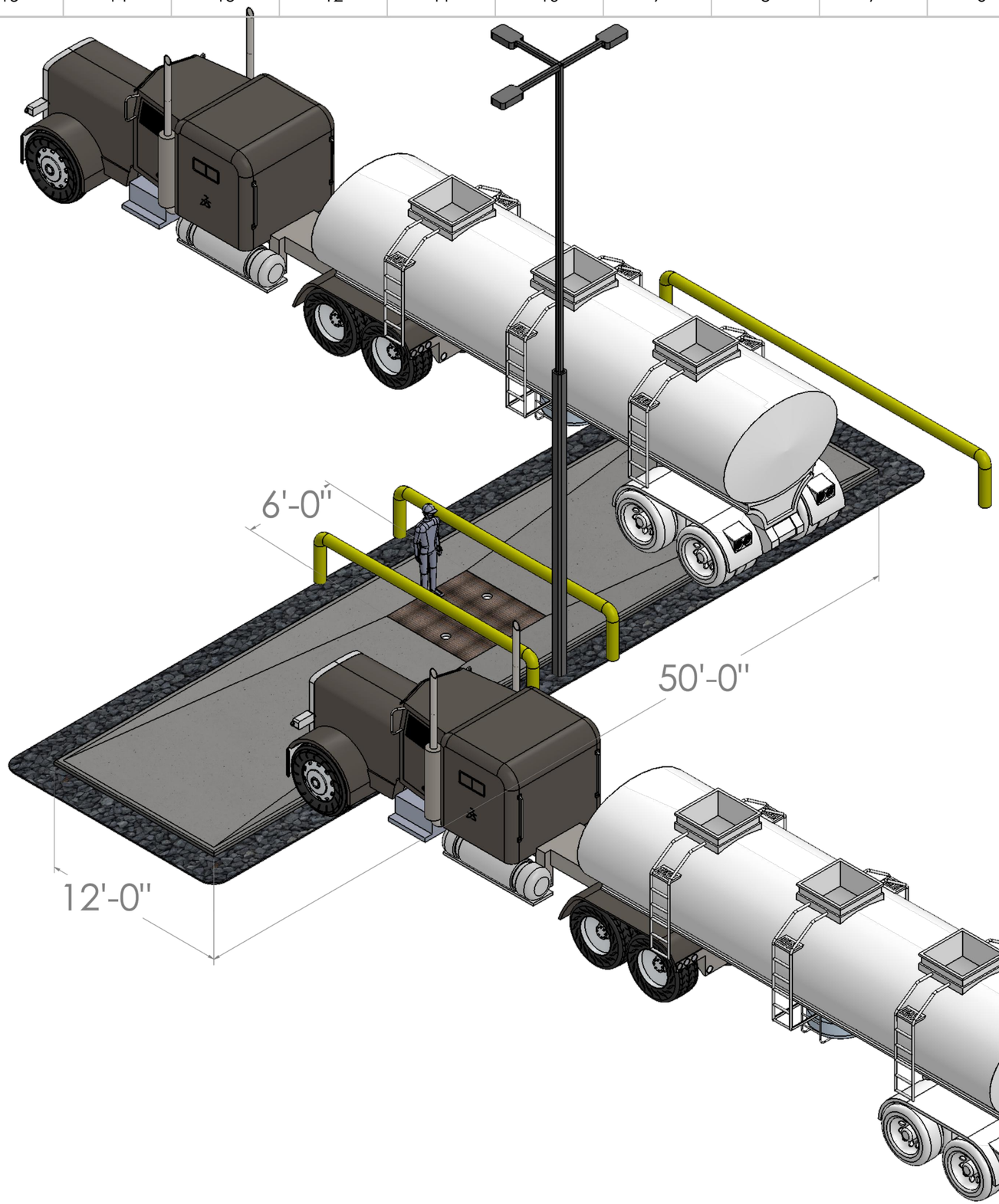

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DO NOT SCALE DRAWING

CLOCKWISE (CW) &
COUNTER-CLOCKWISE (CCW)
INFLUENTS

3X LIGHTS

DROP 1 CW

DROP 2 CW

DROP 3 CW

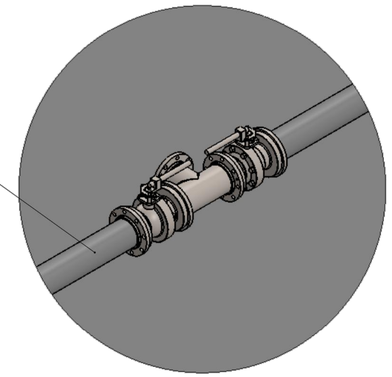
DROP 4 CW

DROP 5 CW

DROP 6 CW

DROP 7 CW

PERIFERAL PIPE
6" PIPE



ΔH = -1FT

DROP 1 CCW

DROP 2 CCW

DROP 3 CCW

DROP 4 CCW

DROP 5 CCW

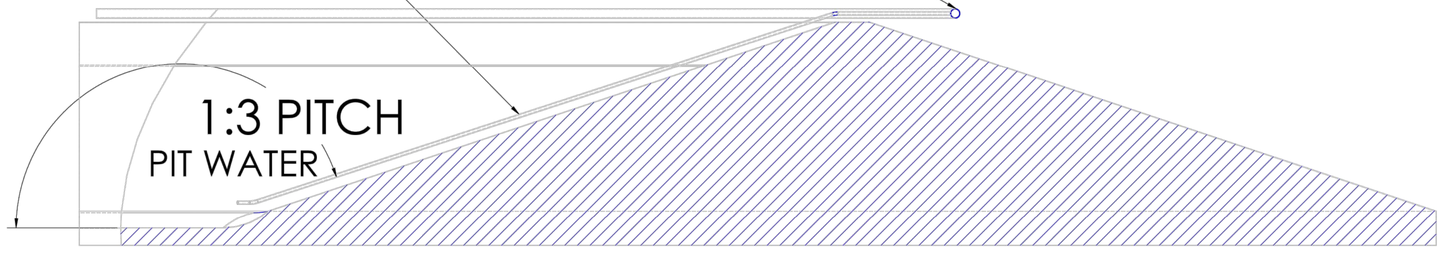
DROP 6 CCW

DROP 7 CCW

DROP LINE
2" PIPE

PERIFERAL
6" PIPE

1:3 PITCH
PIT WATER



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