

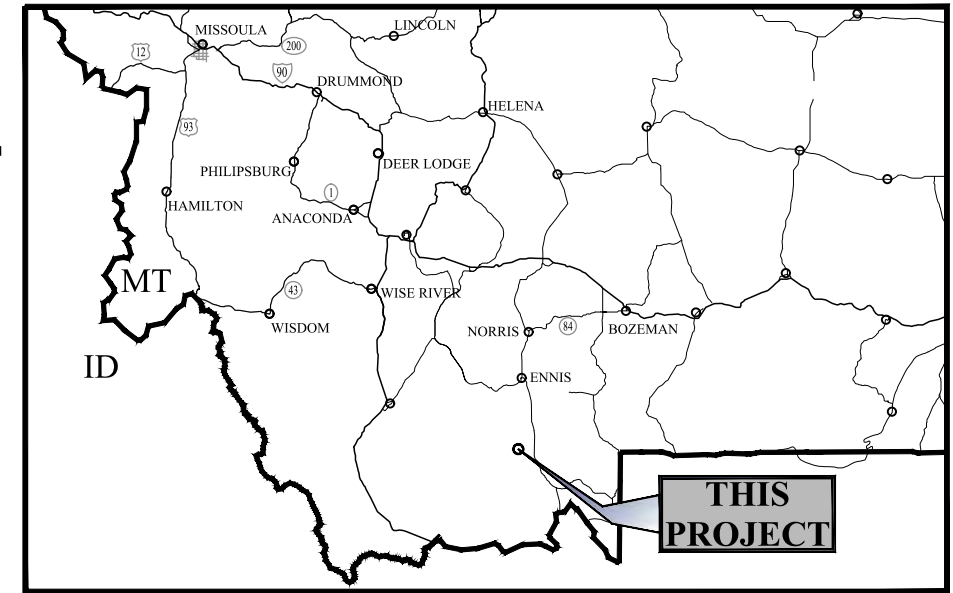


REGION ONE



U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE, REGION ONE
PROPOSED PLANS FOR:
WALL CREEK FISH BARRIER

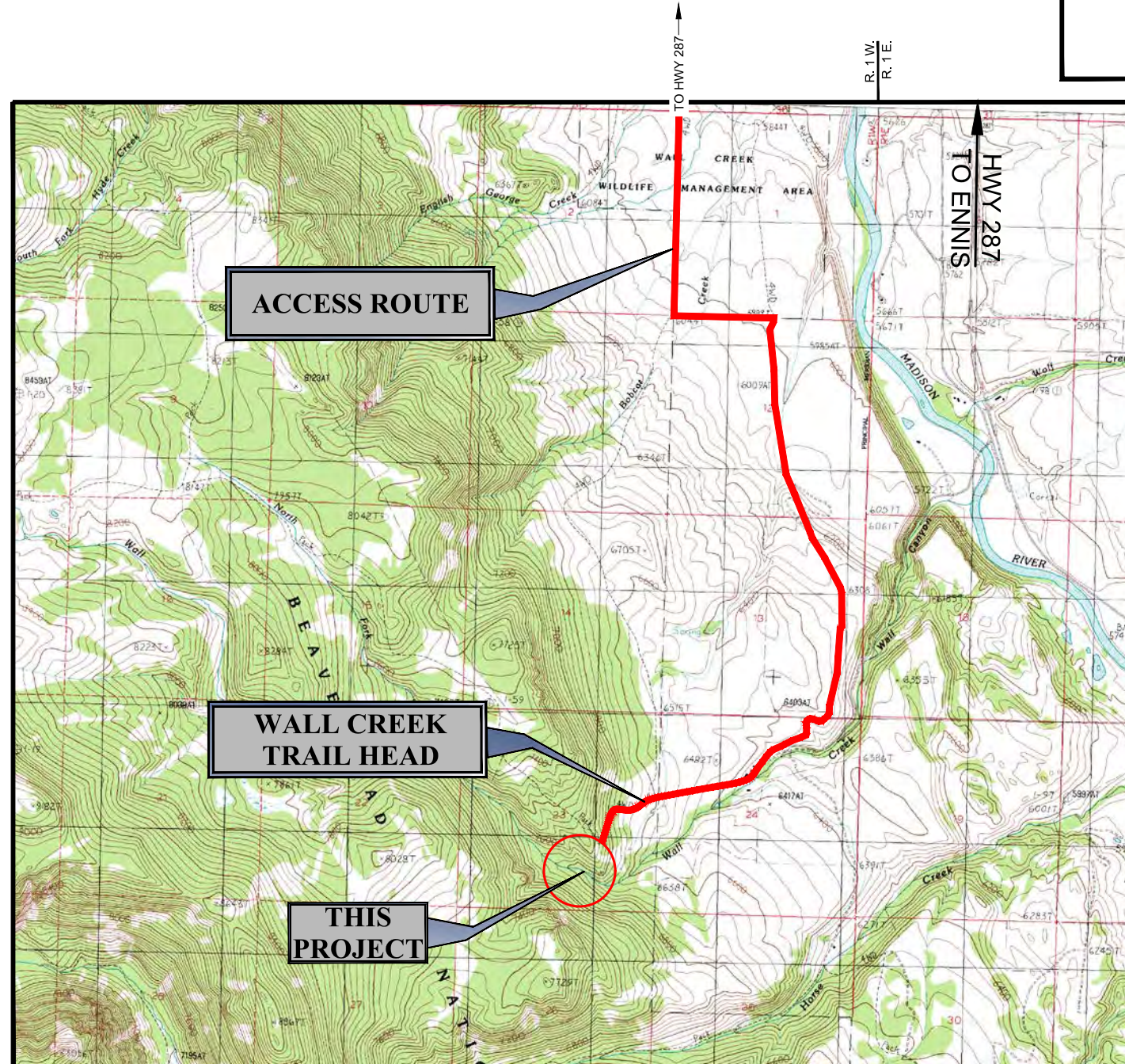
BEAVERHEAD - DEERLODGE NATIONAL FOREST
 MADISON RANGER DISTRICT
 MADISON COUNTY, MONTANA



SOUTH WESTERN MONTANA

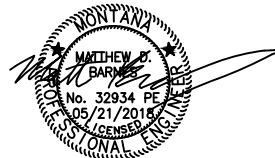
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11	FISH BARRIER STRUCTURAL PLAN
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13	STANDARD DESIGN DETAILS



SEC.23, T.10 S., R. 1 W.
VICINITY MAP

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PROJECT MANAGER: MATTHEW D. BARNES



STRUCTURAL ENGINEER: MICHAEL J. BRENNAN

CONTRACTOR SUPPLIED:
 ALL MATERIALS

GOVERNMENT FURNISHED:
 N/A



engineers • surveyors • planners • scientists
 1 Engineering Place Helena, MT 59602
 Phone: 406.442.3050

R:1105107954 WALL CREEK FISH BARRIER COVER SHEET.DWG PLOTTED BY MATT BARNES ON May/24/2018

GENERAL NOTES

1. **GEOTECHNICAL INVESTIGATION.** A GEOTECHNICAL INVESTIGATION HAS NOT BEEN CONDUCTED AT THE PROJECT SITE.
2. **SPECIFICATIONS.** MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-14 (U.S. CUSTOMARY UNITS) AND THE SUPPLEMENTAL SPECIFICATIONS INCLUDED IN THE CONTRACT.

3. **MATERIAL QUANTITIES.** ESTIMATED QUANTITIES ARE PROVIDED FOR INFORMATION ONLY. CONTRACTOR TO VERIFY QUANTITIES.
4. **DEWATERING AND EROSION CONTROL.** DEWATER AND PROTECT AGAINST SOIL EROSION AND SEDIMENTATION DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 157 AND PROJECT PERMITS. PREPARE AND SUBMIT A DEWATERING AND EROSION CONTROL PLAN TO C.O. FOR APPROVAL. GROUND DISTURBING WORK SHALL NOT COMMENCE UNTIL DEWATERING AND EROSION CONTROL PLAN HAS BEEN APPROVED IN WRITING BY THE C.O.

CONTRACTOR SHOULD ANTICIPATE WATER INFILTRATING INTO EXCAVATIONS AND SHALL REMOVE WATER AS NECESSARY TO COMPLETE THE WORK (INCLUDING BUT NOT LIMITED TO MATERIAL PLACEMENT AND COMPACTION) IN ACCORDANCE WITH ALL CONTRACT REQUIREMENTS.

WITH THE EXCEPTION OF TREE REMOVAL AND DEWATERING SYSTEM SET-UP WORK, ALL WORK (INCLUDING ALL MECHANIZED ACCESS) WITHIN THE STREAM CHANNEL SHALL OCCUR ONLY WHILE THE AREA AFFECTED BY THE WORK IS COMPLETELY DEWATERED. MINIMIZE OPERATION OF EQUIPMENT IN WET AREAS DURING TREE REMOVAL AND DEWATERING SYSTEM SET-UP.

APPROVAL OF THE CONTRACTOR'S DEWATERING AND EROSION CONTROL PLAN BY THE C.O. DOES NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO MEET ALL CONTRACT REQUIREMENTS ASSOCIATED WITH DEWATERING AND EROSION CONTROL. IF THE METHODS IDENTIFIED BY THE CONTRACTOR IN THEIR DEWATERING AND SEDIMENT CONTROL PLAN FAIL TO PROVIDE CONDITIONS UNDER WHICH SPECIFIED CONSTRUCTION RESULTS CAN BE ACHIEVED, OR FAIL TO PROVIDE ENVIRONMENTAL PROTECTION AS PRESCRIBED IN THE CONTRACT OR PROJECT PERMITS, THE CONTRACTOR SHALL RE-EVALUATE AND SUBMIT A REVISED DEWATERING AND EROSION CONTROL PLAN TO THE C.O. PREPARATION OF REVISED PLAN(S) IS INCIDENTAL TO THE WORK.

5. **TEMPORARY ACCESS ROUTES AND STAGING AREA.** THE CONTACTOR SHALL USE THE ROUTES AND STAGING AREA SHOWN ON THE DRAWINGS AND STAKED IN THE FIELD BY THE C.O. ROUTE ADJUSTMENTS MAY BE MADE, SUBJECT TO C.O. APPROVAL. ACCESS THROUGH PRIVATE PROPERTY (KELLY RANCH) MUST ADHERE TO TERMS OF AGREEMENT WITH LANDOWNER. BRIDGE LOAD RATINGS ARE UNKNOWN AND IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ASSESS THE ADEQUACY OF ALL BRIDGES FOR CONSTRUCTION TRAFFIC.

LOGS AND LARGE BOULDERS PREVENTING FREE PASSAGE ALONG ROUTE MAY BE MOVED BY THE CONTRACTOR, BUT SHALL BE REPLACED TO THEIR ORIGINAL POSITION DURING ROUTE REHABILITATION. ROUTE SHALL BE THE MINIMUM WIDTH REQUIRED FOR ONE-LANE TRAVEL TO AND FROM THE BARRIER SITE. STOCKPILE TOPSOIL AND SUBSOIL IN SEPARATE PILES AND IN LOCATIONS WHERE THEY WILL BE READILY ACCESSIBLE FOR USE IN ROUTE REHABILITATION. AVOID IMPACTING STREAMBANKS EXCEPT WHERE THE ROUTE ENTERS OR EXITS THE STREAM CHANNEL. THE PERIMETER OF THE EQUIPMENT/MATERIAL STAGING AREA WILL BE STAKED BY THE C.O.

ALONG THE ACCESS ROUTE AND WITHIN THE STAGING AREA PERIMETER: SALVAGE/STOCKPILE EXISTING TOPSOIL AND BOULDERS AND REPLACE TOPSOIL AND BOULDERS ONCE CONSTRUCTION IS FINISHED IN ACCORDANCE WITH "CLEARING AND GRUBBING" NOTES BELOW. SCARIFY SUBSOIL TO A DEPTH OF 6-8" TO BREAK UP COMPACTION PRIOR TO REPLACING TOPSOIL. RESTORE STREAMBED AREAS TO PRE-PROJECT CONDITION.

6. **SITE WORK AREA.** THE SITE WORK AREA SHALL INCLUDE ALL AREAS WITHIN THE FINAL FOOTPRINT OF THE WORK AS SHOWN. APPROVED LIMITS OF EXCAVATION/BLASTING, AND APPROVED LIMITS OF EXCAVATED MATERIAL STORAGE. IN ADDITION, THE CONTRACTOR MAY UTILIZE THE SEGMENT OF DEWATERED STREAM CHANNEL EXTENDING DOWNSTREAM FROM STRUCTURE.

THE PERIMETER OF THE SITE WORK AREA WILL BE STAKED BY THE C.O. NO GROUND DISTURBANCE SHALL TAKE PLACE OUTSIDE OF THE STAKED SITE WORK AREA UNLESS APPROVED BY THE C.O. ACTIVITIES PRE-APPROVED TO TAKE PLACE OUTSIDE OF THE SITE WORK AREA INCLUDE: 1) DEWATERING SYSTEM SETUP, MAINTENANCE, AND TAKE-DOWN, AND; 2) TREE AND LOG REMOVAL.

THE PERIMETER OF THE SITE WORK AREA AND ALL DRAINAGE PATHS THAT MAY POTENTIALLY DRAIN TO SURFACE WATER SHALL BE SEPARATED FROM THE SURFACE WATER BY SILT FENCE OR OTHER C.O.-APPROVED SEDIMENT BARRIER. SILT FENCE MATERIAL AND INSTALLATION METHODS SHALL BE IN ACCORDANCE WITH THE APPROVED DEWATERING AND SEDIMENT CONTROL PLAN. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL PROVIDE SMOOTH GRADE TRANSITION FROM EXISTING GROUND TO NEW CONSTRUCTION AND REPLACE TOPSOIL AND DUFF ON HILLSLOPE AREAS IN ACCORDANCE WITH "CLEARING AND GRUBBING" NOTES BELOW. RESTORE STREAMBED AREAS TO PRE-PROJECT CONDITION.

7. **CLEARING AND GRUBBING.** CLEARING AND GRUBBING SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 201. TREES SHALL BE REMOVED IN ACCORDANCE WITH SECTION 201 AND THE FOLLOWING NOTES. THIS WORK IS INCLUDED IN PAY ITEM 201-01.

ALL EXISTING TOPSOIL SHALL BE SALVAGED TO A DEPTH OF 1 FT BELOW THE SURFACE FROM ALL AREAS TO BE DISTURBED BY EXCAVATION, BACKFILL, OR MATERIAL/EQUIPMENT STORAGE/OPERATION AND SHALL BE STOCKPILED SEPARATELY FROM OTHER MATERIALS. FOLLOWING CONSTRUCTION, SALVAGED TOPSOIL SHALL BE SPREAD EVENLY OVER ALL DISTURBED SURFACES TO PROVIDE A MINIMUM 4-IN. DEEP TOPSOIL LAYER. ADJACENT DUFF (LIVE AND DEAD VEGETATION MATERIAL) SHALL BE RAKED ONTO THE DISTURBED AREAS. CONSERVING AND REPLACING TOPSOIL AND PLACING DUFF IS INCLUDED IN PAY ITEM 201-01.

BEFORE ALLOWING WATER TO POND UPSTREAM OF THE COMPLETED BARRIER, THE CONTRACTOR SHALL REMOVE ALL TREES AND LOGS LOCATED WITHIN THE UPSTREAM AREA TO BE INUNDATED WITH WATER. THE PERIMETER OF THE INUNDATION AREA WILL BE STAKED BY THE C.O. AT ELEVATION 6698 (IT EXTENDS APPROXIMATELY 40 FT UPSTREAM FROM BARRIER). TREES AND LOGS SHALL BE DISPOSED OF BY PLACING THEM ON THE HILLSLOPES ADJACENT TO THE STREAM CHANNEL, ABOVE ELEVATION 6703, IN LOCATIONS AND POSITIONS SUCH THAT THEY WILL NOT ENTER THE CHANNEL BY SLIDING OR ROLLING. IF NO SUCH LOCATIONS ARE LOCATED, TREES AND LOGS SHALL BE DISPOSED OF ON FLOODPLAIN OR HILLSIDES ADJACENT TO THE CHANNEL DOWNSTREAM FROM THE BARRIER, AS DIRECTED BY THE C.O. LOGS AND TREES WILL BE PLACED IN DISPERSED LOCATIONS, NOT IN CLUMPS OR PILES.

LOGS AND TREES TO BE REMOVED ARE OF VARYING SIZE. TREES SHALL BE CUT, NOT PUSHED OVER. MACHINERY MAY BE OPERATED OUTSIDE OF THE SITE WORK AREA AS NECESSARY TO COMPLETE THE TREE REMOVAL AND DISPOSAL WORK. CONTRACTOR SHALL MINIMIZE DISTURBANCE OUTSIDE OF THE STAKED INUNDATION AREA PERIMETER. REMOVAL AND DISPOSAL OF TREES AND LOGS FROM WITHIN THE INUNDATION AREA WILL BE PAID FOR UNDER PAY ITEM 201-01.

8. **CONTROL POINTS.** EXISTING CONTROL POINTS ARE SHOWN ON THE DRAWINGS. CONTRACTOR SHALL LOCATE LAYOUT POINTS IN ACCORDANCE WITH SECTION 152. SECURE C.O. APPROVAL OF SURVEYED LAYOUT POINTS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. AFTER INSPECTION OF SURVEYED LAYOUT POINTS, THE C.O. MAY ADJUST THE LOCATION OF THE STRUCTURE (IN THE HORIZONTAL PLANE) UP TO 3 FEET TO FACILITATE EFFICIENT CONSTRUCTION AND/OR IMPROVE STRUCTURAL STABILITY OF THE BARRIER.

9. **STRUCTURE EXCAVATION.** COMPLETE STRUCTURE EXCAVATION IN ACCORDANCE WITH SECTION 208. STRUCTURE EXCAVATION INCLUDES BEDROCK EXCAVATION AND BLASTING.

ESTIMATED STRUCTURE EXCAVATION QUANTITY IS FOR INFORMATIONAL PURPOSES ONLY. ESTIMATED QUANTITY IS BASED ON AN ASSUMPTION OF THE EXTENT OF EXISTING BEDROCK AND PRESENCE OF SOIL TYPE C (GRANULAR SOILS) WITH MAXIMUM ALLOWABLE SLOPE ON EXCAVATION WALLS OF 1.5:1 (HORIZONTAL:VERTICAL) AND SOME SHORING OF EXCAVATION WALLS AT WEST ENDS OF CONTAINMENT WALLS IN ACCORDANCE WITH: OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX A - SOIL CLASSIFICATION AND OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX B - SLOPING AND BENCHING. CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES BASED ON THEIR OWN EXCAVATION PLAN.

CONTRACTOR SHALL SUBMIT AN EXCAVATION PLAN TO THE C.O. FOR APPROVAL. PLAN SHALL INCLUDE DRAWINGS AND WRITTEN OUTLINE ILLUSTRATING AND DESCRIBING PROPOSED EXCAVATION LIMITS, METHODS, EQUIPMENT, LOCATION OF STOCKPILES, AND ESTIMATED QUANTITIES AND SHALL COMPLY WITH OSHA EXCAVATION SOIL TYPING AND REQUIREMENTS.

IF BLASTING IS UTILIZED TO REMOVE BEDROCK, BLASTING SHALL BE IN ACCORDANCE WITH SECTION 205. CONTRACTOR SHALL SUBMIT A BLASTING PLAN MEETING THE REQUIREMENTS OF SECTION 205 TO THE C.O. FOR APPROVAL.

IN ACCORDANCE WITH SECTION 208.04. WHEN EXCAVATION IS COMPLETE REQUEST APPROVAL AS TO THE CHARACTER AND SUITABILITY OF THE FOUNDATION MATERIAL (INCLUDING BEDROCK). DO NOT PLACE STRUCTURAL BACKFILL, BEDDING MATERIAL, CONCRETE, OR RIPRAP UNTIL C.O. APPROVAL OF THE FOUNDATION MATERIAL HAS BEEN OBTAINED.

10. **GENERAL BACKFILL.** EXCAVATED MATERIAL RESULTING FROM STRUCTURE EXCAVATION AND BLASTING SHALL BE UTILIZED AS RIPRAP (IF SUITABLE) OR AS GENERAL BACKFILL AROUND AND UPSTREAM OF THE BARRIER. GENERAL FILL SHALL BE INSTALLED IN ACCORDANCE WITH "GENERAL FILL - LAYER PLACEMENT METHOD." (SUBSECTION 204.14).

HAULING, PLACEMENT, AND COMPACTION OF GENERAL FILL IS INCLUDED IN PAY ITEMS 204-31 AND 204-32.

11. **STRUCTURAL BACKFILL.** ALL BACKFILL PLACED WITHIN 4 FEET OF REINFORCED CONCRETE WALLS, SLABS, AND FOOTINGS, AND ALL BACKFILL PLACED BENEATH THE CONCRETE BARRIER STRUCTURE SLAB, FOOTINGS, AND RIPRAP, SHALL BE STRUCTURAL BACKFILL PLACED AND COMPACTION IN ACCORDANCE WITH SECTION 208 AND SUBSECTION 704.04. EXCEPTION: ALL BACKFILL PLACED AGAINST THE UPSTREAM FACE OF THE UPSTREAM WALL SHALL BE STRUCTURAL BACKFILL WITH TOP ELEVATION 6691.75 THAT GRADES AWAY FROM THE WALL IN THE UPSTREAM DIRECTION AT A 2:1 (H:V) SLOPE AS SHOWN ON THE DRAWINGS.

THE CONTRACTOR SHALL FURNISH STRUCTURAL BACKFILL MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 704.04 IN THE QUANTITY REQUIRED TO COMPLETE THE WORK AS SHOWN AND SPECIFIED. MATERIAL FURNISHED BY THE CONTRACTOR SHALL ORIGINATE FROM COMMERCIAL SOURCES MEETING THE REQUIREMENTS OF SUBSECTION 105.02. FURNISHING OF STRUCTURAL BACKFILL SHALL BE INCIDENTAL TO PAY ITEM 208-03. NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING STRUCTURAL BACKFILL MATERIAL.

COMPACTION OF STRUCTURAL BACKFILL SHALL COMPLY WITH SUBSECTION 208.11. SUBSECTION 208.11 REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, DETERMINATION OF OPTIMUM MOISTURE CONTENT AND MAXIMUM DENSITY, ADJUSTMENT OF MOISTURE CONTENT, COMPACTION, AND IN-PLACE TESTING OF DENSITY AND MOISTURE CONTENT. ALL WORK SPECIFIED IN SUBSECTION 208.11 IS INCLUDED IN PAY ITEM 208-03.

12. **REINFORCED CONCRETE.** SEE STRUCTURAL NOTES.

13. **RIPRAP.** ALL SUITABLE MATERIAL GENERATED BY EXCAVATION AND BLASTING SHALL BE UTILIZED AS RIPRAP. IN ADDITION, CONTRACTOR MAY SALVAGE SUITABLE MATERIAL FOR USE AS RIPRAP FROM THE STREAM CHANNEL BED FOR A DISTANCE OF 40 FEET UPSTREAM OF THE UPSTREAM BARRIER WALL. WHEN SALVAGING MATERIAL FOR USE AS RIPRAP DO NOT REMOVE MATERIAL FROM THE BASE OF STEEP STREAMSIDE HILLSLOPES.

INCORPORATE SALVAGED OVER-SIZE BOULDERS INTO RIPRAP AREAS BY OVER- EXCAVATING IN BOULDER LOCATIONS SUCH THAT TOP OF BOULDER DOES NOT PROTRUDE ABOVE THE FINAL SURFACE GRADE SHOWN FOR THE RIPRAP AREA.

SUMMARY OF QUANTITIES

Pay Item	Description	Unit	Quantity
15101	Mobilization	LS	1
15102	Temporary Route Improvements and Restoration	LS	1
15201	Construction Survey and Staking	LS	1
15713	Soil Erosion & Pollution Control (includes diversion & dewatering)	LS	1
20101	Clearing and Grubbing, Disposal Method C	LS	1
20431	General Fill, Layer Placement	LS	1
20432	General Fill, Upstream Placement	LS	1
20701	Earthwork geosynthetics, Type 2A	SY*	85
20801	Structure Excavation	CY*	640
20803	Structural Backfill	CY*	635
20804	Bedding	CY*	20
25101	Placed Riprap, Class 6	CY*	85
25107	Grouted Riprap, Class G	CY*	40
25803	Reinforced Concrete Retaining Wall, Slab, and Footing	CY*	70
62201	Rental Equipment, Excavator	HR	8
62301	General Labor	HR	8

* DENOTES CONTRACT QUANTITY, ESTIMATE OF QUANTITY FOR INFORMATION ONLY.



WALL CREEK FISH BARRIER ESTIMATED QUANTITIES & GENERAL NOTES

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Drawn By:DAH Drawing Checked:DAH

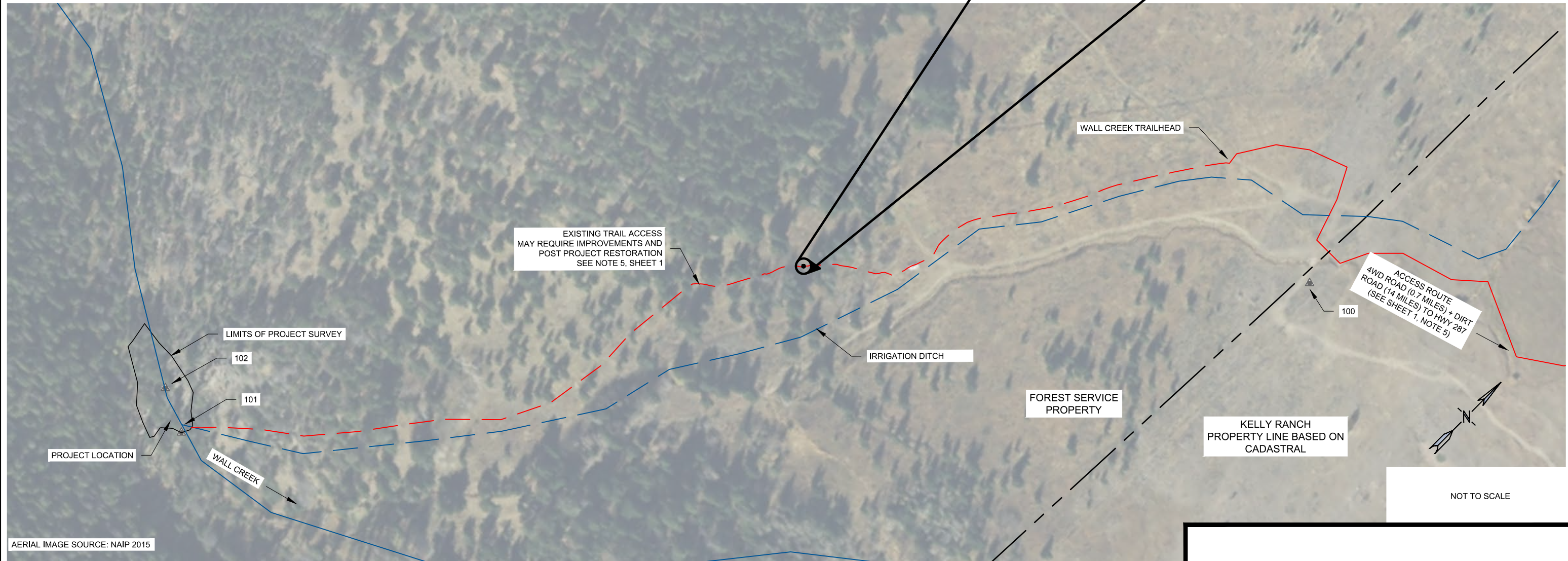
Sheet: 1 of 13

CONTROL TABLE

HORIZONTAL DATUM: MONTANA COORDINATE SYSTEM, NAD83(2011) ZONE 2500				
VERTICAL DATUM: NAVD88		(GEOID 12B)		
UNITS: INTERNATIONAL FEET				
CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	262367.15	1404410.96	6583.19	CP-BASE
101	260509.47	1402988.13	6687.51	CP
102	260550.90	1402900.06	6702.80	CP

SURVEY NOTES:

1. THE CONTROL SURVEY WAS CONDUCTED BY MORRISON-MAIERLE, INC. (MM), ON JUNE 27, 2017 USING GNSS STATIC METHODS OF SURVEY, AND PROCESSED USING THE NATIONAL GEODETIC SURVEY'S ON-LINE POSITIONING USER SERVICE (OPUS).



AERIAL IMAGE SOURCE: NAIP 2015

R:\105107954 WALL CREEK\CAD\SHETS\2 EXISTING SITE & ACCESS PLAN.DWG PLOTTED BY:DAVID A. HALLSTEN ON May/17/2018



WALL CREEK FISH BARRIER LOCATION & ACCESS PLAN

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R:\105107954 WALL CREEK\CAD\SHSHEETS3 EXISTING SITE.DWG PLOTTED BY DAVID A. HALLSTEN ON May/18/2018



NOTES:
 1. BOULDER LOCATIONS, SHAPES, AND SITES ARE APPROXIMATE BASED ON SURVEY AND SITE OBSERVATIONS.



EXISTING SITE: APPROXIMATE STRUCTURE LOCATION



WALL CREEK FISH BARRIER EXISTING SITE

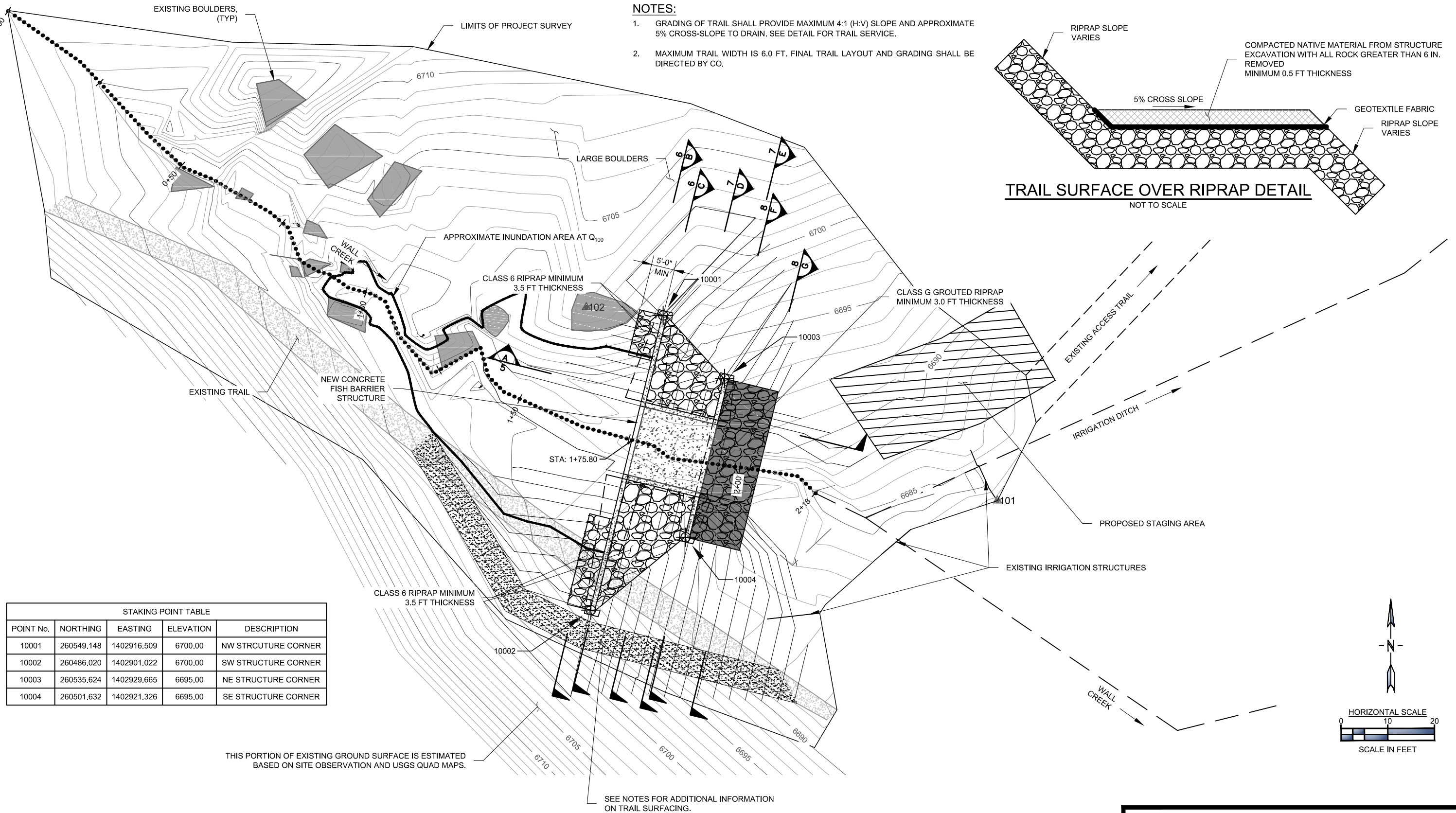
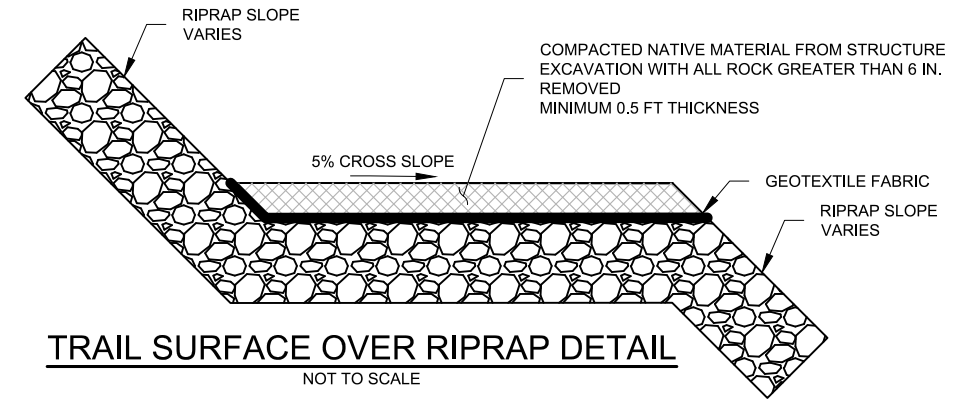
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NOTES:

1. GRADING OF TRAIL SHALL PROVIDE MAXIMUM 4:1 (H:V) SLOPE AND APPROXIMATE 5% CROSS-SLOPE TO DRAIN. SEE DETAIL FOR TRAIL SERVICE.
2. MAXIMUM TRAIL WIDTH IS 6.0 FT. FINAL TRAIL LAYOUT AND GRADING SHALL BE DIRECTED BY CO.



STAKING POINT TABLE				
POINT No.	NORTHING	EASTING	ELEVATION	DESCRIPTION
10001	260549.148	1402916.509	6700.00	NW STRUCTURE CORNER
10002	260486.020	1402901.022	6700.00	SW STRUCTURE CORNER
10003	260535.624	1402929.665	6695.00	NE STRUCTURE CORNER
10004	260501.632	1402921.326	6695.00	SE STRUCTURE CORNER

THIS PORTION OF EXISTING GROUND SURFACE IS ESTIMATED BASED ON SITE OBSERVATION AND USGS QUAD MAPS.

SEE NOTES FOR ADDITIONAL INFORMATION ON TRAIL SURFACING.

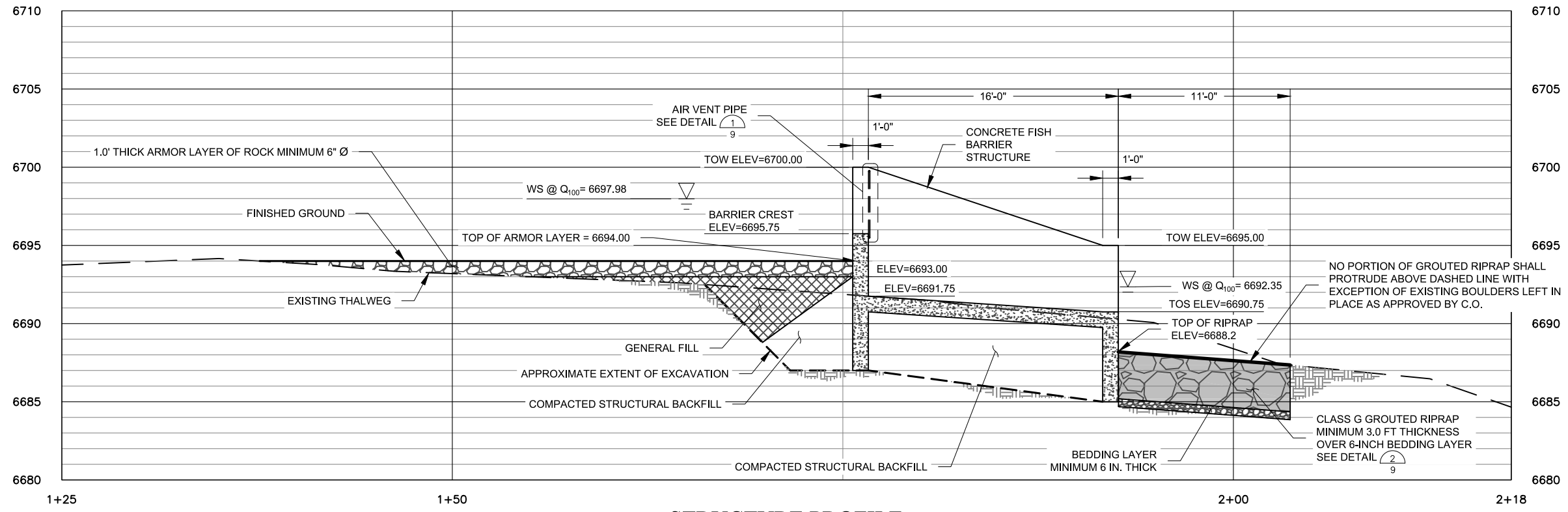


**WALL CREEK FISH BARRIER
PROPOSED SITE PLAN**

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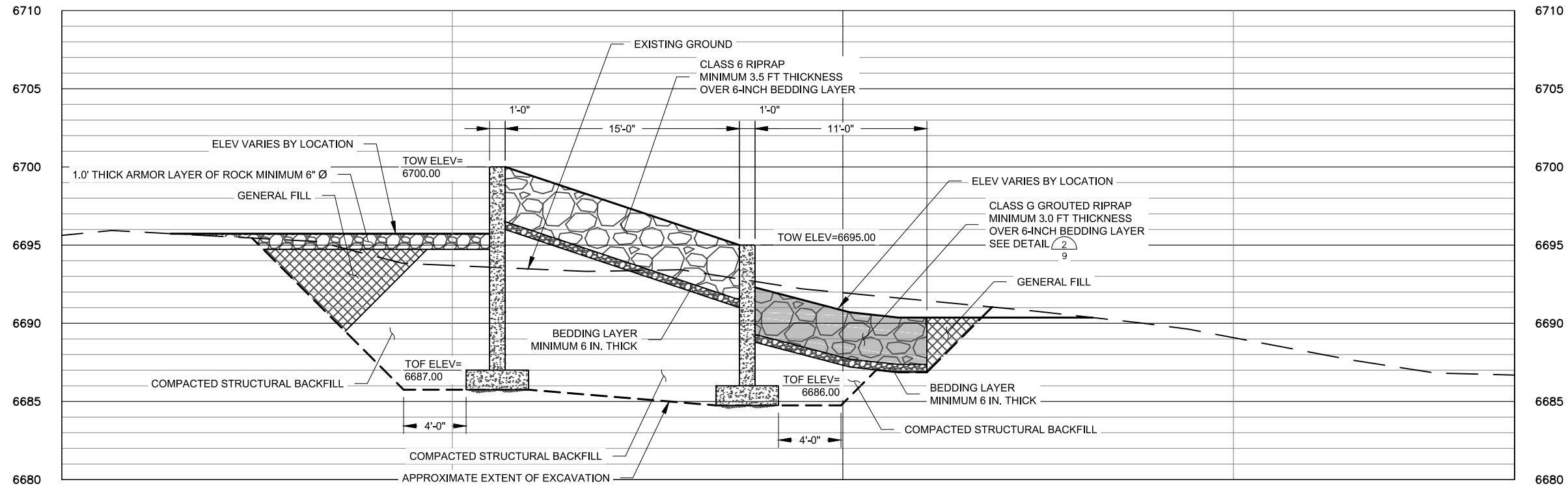
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R:\1105107954 WALL CREEK\ACAD\SHSHEETS\6 STRUCTURE PROFILE & CROSS SECTIONS.DWG PLOTTED BY:DAVID A. HALLSTEN ON:May/18/2018



STRUCTURE PROFILE

SCALE: 1/8"=1'-0"



ABUTMENT SECTION A

SCALE: 1/8"=1'-0"

GENERAL NOTES:

1. SEE STRUCTURAL PLANS FOR WALL, SLAB, AND FOOTER ELEVATIONS.
2. ALL RIPRAP SHALL HAVE VOIDS FILLED WITH SALVAGED TOP SOIL TO MINIMUM 0.5 FT THICK.
3. ALL FILL PLACED WITHIN 4.0' OF CONCRETE SHALL BE COMPACTED STRUCTURAL BACKFILL.

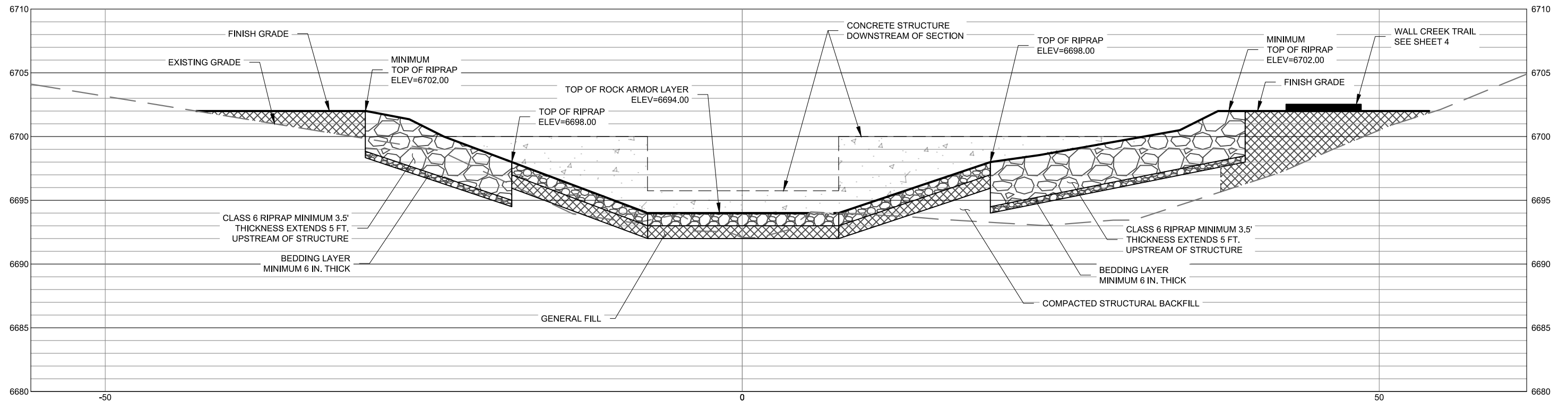


**WALL CREEK FISH BARRIER
STRUCTURE PROFILE**

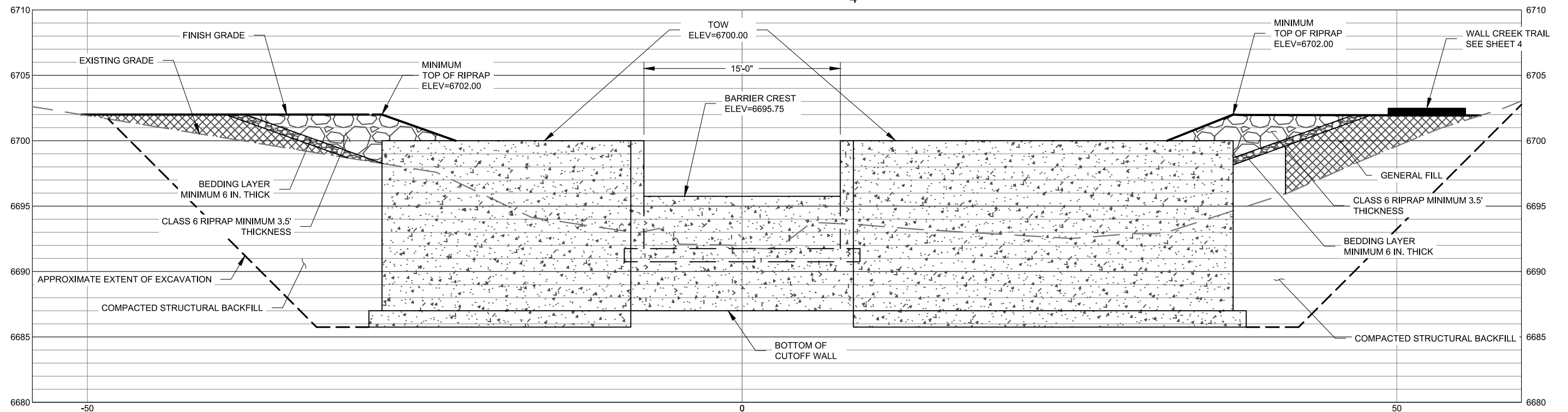
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R:\105107954 WALL CREEK\CAD\SHETS\6 STRUCTURE CROSS SECTIONS.DWG PLOTTED BY:DAVID A. HALLSTEN ON May/18/2018



STA. 1+72
CROSS SECTION
 SCALE: 1/8"=1'-0"
B
4



STA. 1+76
CROSS SECTION
 SCALE: 1/8"=1'-0"
C
4

GENERAL NOTES:

1. SEE STRUCTURAL PLANS FOR WALL, SLAB, AND FOOTER ELEVATIONS.
2. ALL RIPRAP SHALL HAVE VOIDS FILLED WITH SALVAGED TOP SOIL TO MINIMUM 0.5 FT THICK.
3. ALL FILL PLACED WITHIN 4.0' OF CONCRETE SHALL BE COMPACTED STRUCTURAL BACKFILL.

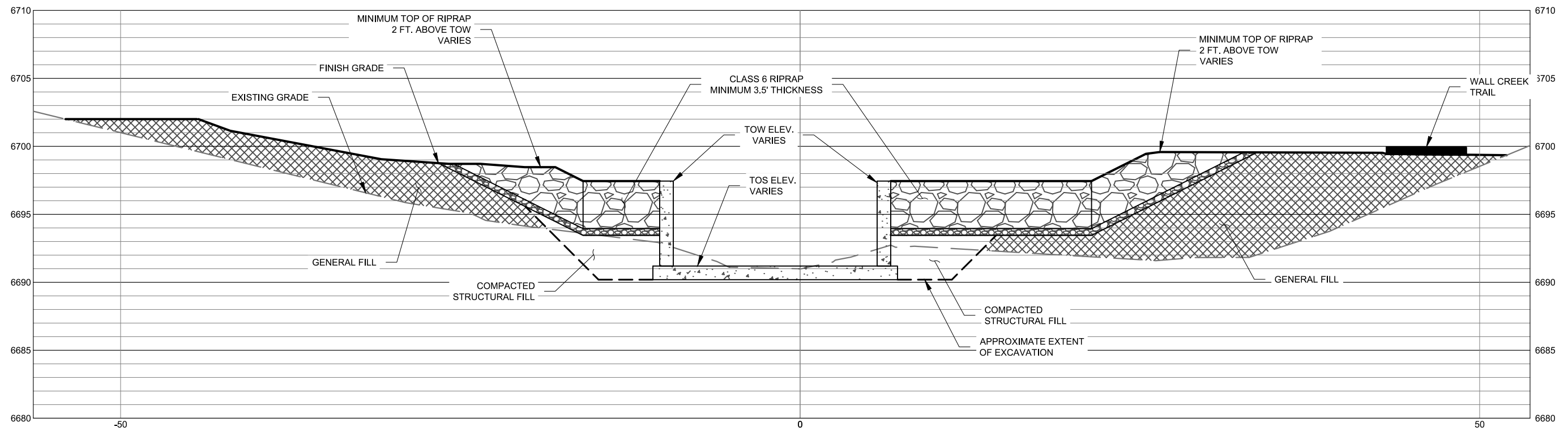


WALL CREEK FISH BARRIER
STRUCTURE CROSS SECTIONS

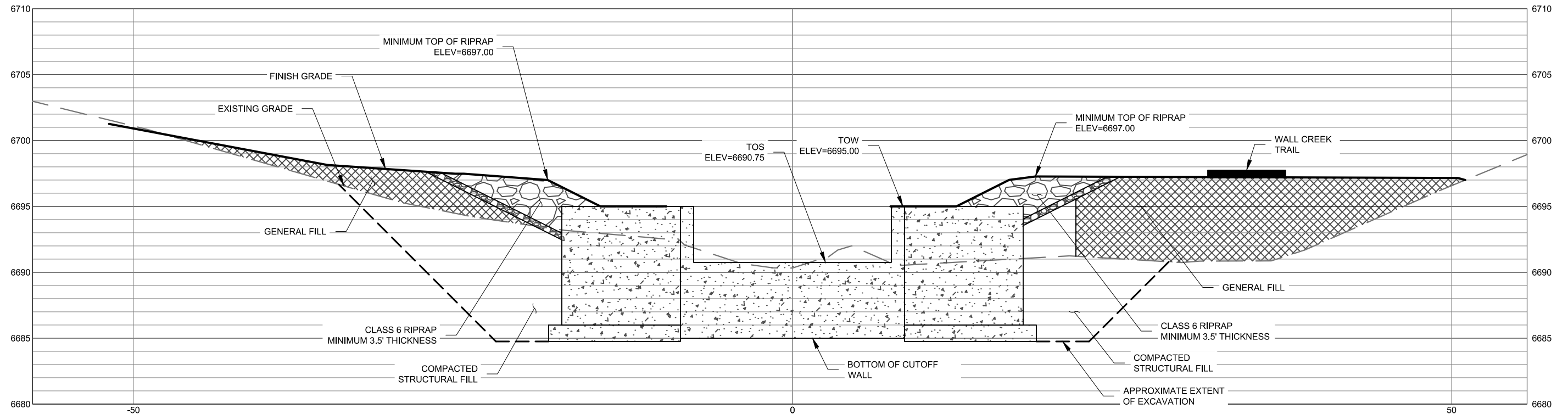
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STA. 1+85
CROSS SECTION D
 SCALE: 1/8"=1'-0" 4



STA. 1+92
CROSS SECTION E
 SCALE: 1/8"=1'-0" 4

GENERAL NOTES:

1. SEE STRUCTURAL PLANS FOR WALL, SLAB, AND FOOTER ELEVATIONS.
2. ALL RIPRAP SHALL HAVE VOIDS FILLED WITH SALVAGED TOP SOIL TO MINIMUM 0.5 FT THICK.
3. ALL FILL PLACED WITHIN 4.0' OF CONCRETE SHALL BE COMPACTED STRUCTURAL BACKFILL.

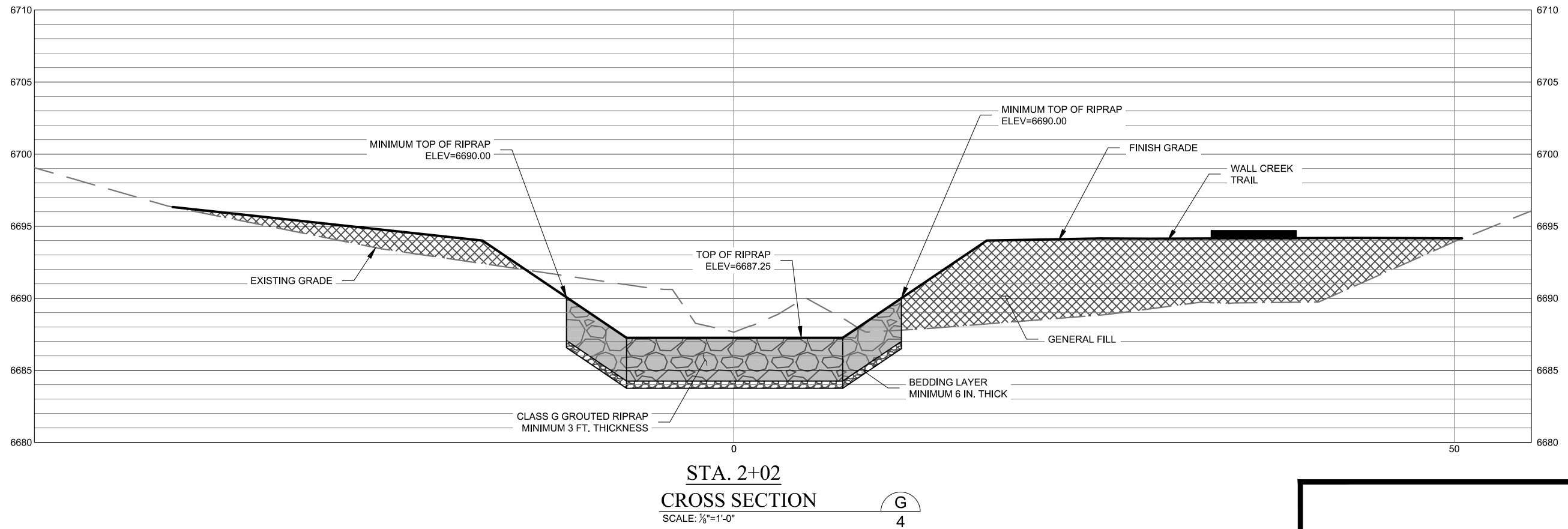
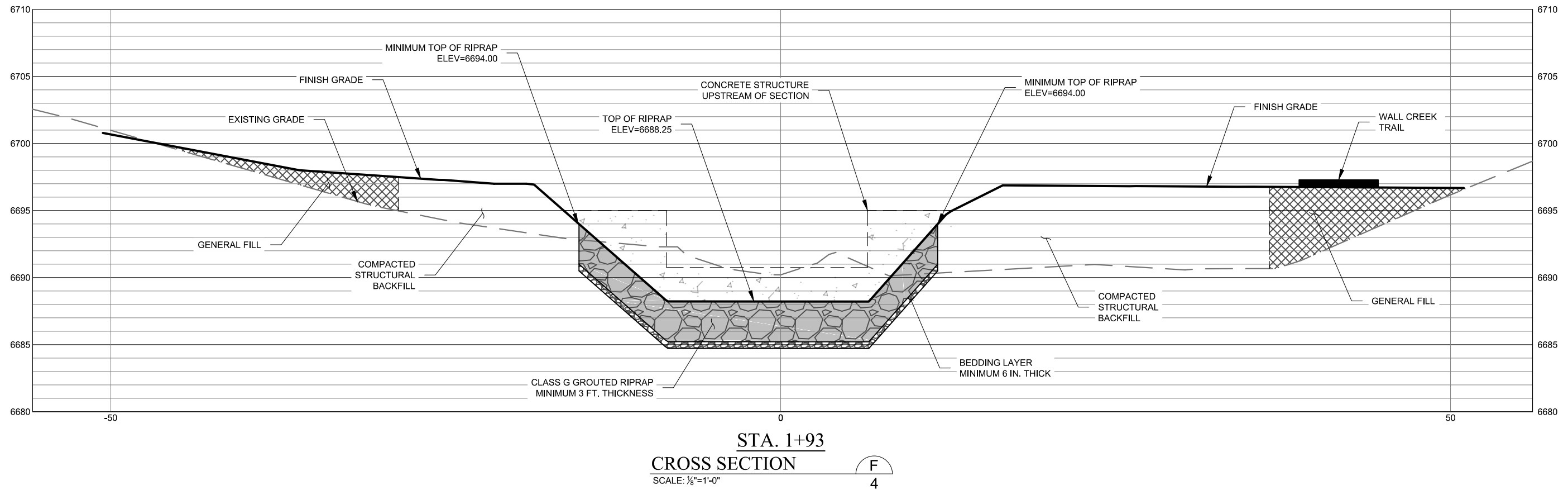


WALL CREEK FISH BARRIER
STRUCTURE CROSS SECTIONS

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Sheet: 7 of 13

R:\105107954 WALL CREEK\CAD\SHSHEETS\8 STRUCTURE CROSS SECTIONS.DWG PLOTTED BY:DAVID A. HALLSTEN ON May/18/2018



GENERAL NOTES:

1. SEE STRUCTURAL PLANS FOR WALL, SLAB, AND FOOTER ELEVATIONS.
2. ALL RIPRAP SHALL HAVE VOIDS FILLED WITH SALVAGED TOP SOIL TO MINIMUM 0.5 FT THICK.
3. ALL FILL PLACED WITHIN 4.0' OF CONCRETE SHALL BE COMPACTED STRUCTURAL BACKFILL.

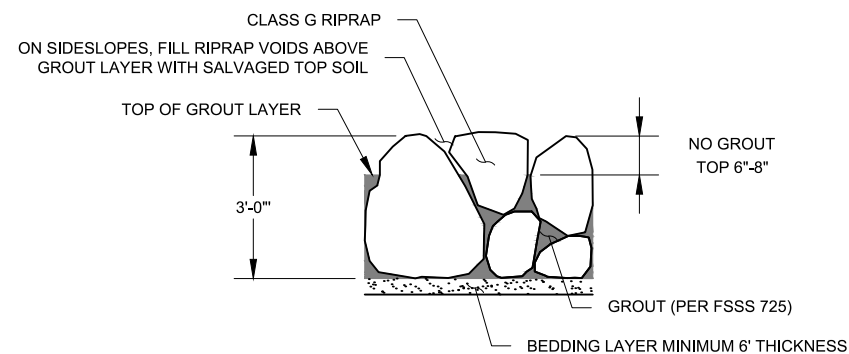


**WALL CREEK FISH BARRIER
STRUCTURE CROSS SECTIONS**

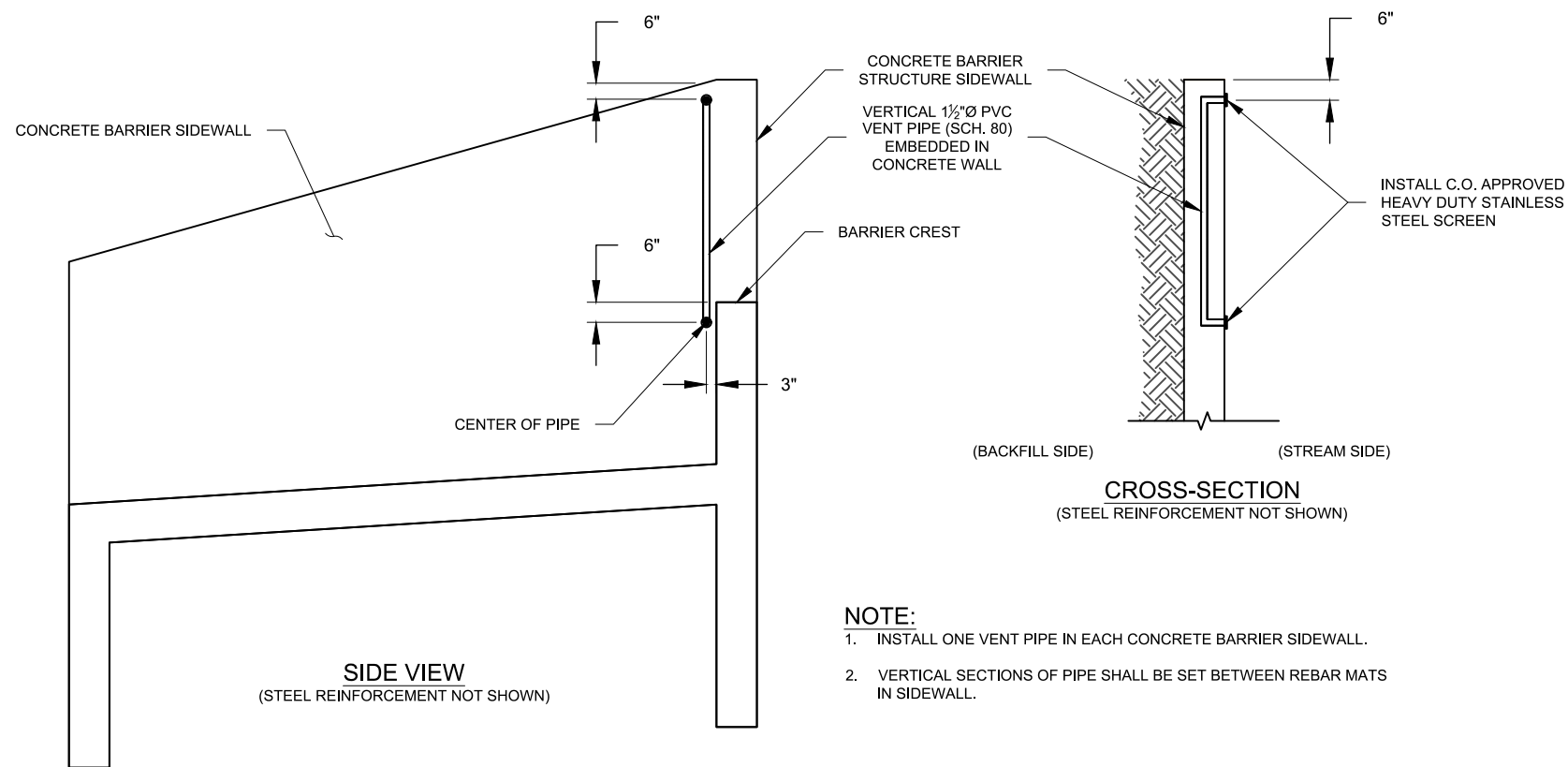
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R:\105107954 WALL CREEK\CAD\DETAILS\DWG PLOTTED BY:DAVID A. HALLSTEN ON May/17/2018



TYPICAL CROSS SECTION THROUGH GROUTED RIPRAP 2/5
SCALE: NOT TO SCALE



- NOTE:**
1. INSTALL ONE VENT PIPE IN EACH CONCRETE BARRIER SIDEWALL.
 2. VERTICAL SECTIONS OF PIPE SHALL BE SET BETWEEN REBAR MATS IN SIDEWALL.

NAPPE VENT PIPE DETAIL 1/5
SCALE: NOT TO SCALE



**WALL CREEK FISH BARRIER
DETAILS**

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STRUCTURAL NOTES

1. **SPECIFICATIONS:** CONSTRUCT THE PROJECT IN ACCORDANCE WITH FEDERAL HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-14) AND APPLICABLE FOREST SERVICE SUPPLEMENTAL SPECIFICATIONS (FSSS).
2. **CONCRETE:** USE CLASS A(AE) OR CLASS D(AE) FOR ALL CAST-IN-PLACE CONCRETE. THE REQUIRED 28-DAY COMPRESSIVE STRENGTH (F'_c) IS 4,000 PSI WITH AN ENTRAINED AIR CONTENT OF 5% +/- 1%. FINISH ALL EXPOSED CONCRETE WITH A CLASS 2-RUBBED FINISH. MAKE ALL CONCRETE IN ACCORDANCE WITH AN APPROVED MIX DESIGN. CHAMFER ALL EXPOSED EDGES OF CONCRETE 3/4" AND FILLET ALL ACUTE ANGLES 3" UNLESS OTHERWISE NOTED.
3. **REINFORCING STEEL:** USE REINFORCING STEEL OF THE DEFORMED TYPE CONFORMING TO AASHTO M31 (ASTM A615) GRADE 60. CUT AND BEND REINFORCING STEEL IN CONFORMANCE WITH ACI 315. LAP SPLICE BARS 2' MINIMUM.
4. **COVER:** CONCRETE COVER OVER REINFORCEMENT SHALL BE 2" CLEAR, EXCEPT FOR CONCRETE PLACED AGAINST AND PERMANENTLY IN CONTACT WITH EARTH SHALL BE 3" CLEAR.
5. **HARDWARE AND STRUCTURAL STEEL:** USE SHAPES, PLATES, AND BARS MEETING THE REQUIREMENTS OF ASTM A36, UNLESS OTHERWISE SPECIFIED IN THESE PLANS. USE HARDWARE MEETING THE REQUIREMENTS OF ASTM A325, EXCEPT AS NOTED ON THE PLANS.
6. **WELDING:** WELD IN ACCORDANCE WITH THE STRUCTURAL WELDING CODE, AWS D1.1. A CERTIFIED WELDER IS REQUIRED.
7. **BEDROCK CONNECTION:** ALL DIRECT CONNECTION BETWEEN STEEL REINFORCED CONCRETE COMPONENTS AND BEDROCK, INCLUDING BUT NOT LIMITED TO SURFACE PREPARATION, DRILLING, HOLE PREPARATION, AND REBAR INSTALLATION/ANCHORING, IS INCLUDED IN PAY ITEM 25803.
8. **CONSTRUCTION JOINTS:** CONSTRUCTION JOINTS IN WALLS AND SLAB MAY BE CONSTRUCTED ONLY AT LOCATIONS APPROVED BY THE C.O. ADJUST BAR LENGTHS AT CONSTRUCTION JOINTS SO THAT ALL BARS THAT CROSS THE JOINT EXTEND AT LEAST 24" INTO ALL ADJACENT WALLS/FOOTINGS.
9. **FOOTING SUBGRADE:** IF FRACTURED BUT HIGHLY DURABLE BEDROCK EXISTS AT FOOTING SUBGRADE LEVEL THEN NO BEDDING IS REQUIRED OVER SUBGRADE MATERIAL EXCEPT AS NEEDED AS A LEVELING COURSE.
10. **CONCRETE CURING:** COMPLY WITH SECTION 525.15. IF BACKFILLING AGAINST CONCRETE IS TO OCCUR WITHIN THE REQUIRED CURING PERIOD THEN THE "LIQUID MEMBRANE CURING COMPOUND METHOD" SHALL BE USED. ALL CONCRETE SHALL BE ALLOWED TO CURE FOR AT LEAST 24 HOURS BEFORE COMMENCING TO STRIP FORMS AND FORM/TIE STEEL FOR SUBSEQUENT ADJACENT POURS.
11. **COMPRESSIVE STRENGTH TEST CYLINDERS:** COMPLY WITH SECTION 552.09(b)(4). CYLINDERS SHALL BE FIELD CURED ON SITE.
12. **BACKFILLING/POURING AGAINST CONCRETE:** NO BACKFILLING OR POURING AGAINST EXISTING CONCRETE (IN A MANNER THAT WILL APPLY A LOAD TO THE EXISTING CONCRETE) SHALL OCCUR UNTIL TEST RESULTS SHOW THAT THE EXISTING CONCRETE HAS ACHIEVED 3,000 PSI OR GREATER COMPRESSIVE STRENGTH. THE CONTRACTOR MAY, AT HIS OWN EXPENSE, COLLECT EXTRA TEST CYLINDERS IN ORDER TO CONDUCT EARLY COMPRESSIVE STRENGTH "BREAK" TESTS TO HASTEN THE CONSTRUCTION PROCESS.
13. **CONCRETE SURFACE FINISH:** PROVIDE CLASS 1 SURFACE FINISH (SUBSECTION 552.16).
14. **CONCRETE PLACEMENT:** COMPLY WITH FSSS SECTION 552. CONTRACTOR SHALL HAVE THE FOLLOWING ON SITE DURING ALL CONCRETE POURS: A CONCRETE HOPPER (MINIMUM 3/4 CUBIC YARD CAPACITY) AND AN EXCAVATOR CAPABLE OF USING THE HOPPER TO DELIVER CONCRETE TO ITS FINAL POSITION. THIS IS REQUIRED EVEN WHEN A CONCRETE PUMP IS USED TO PLACE THE CONCRETE, IN WHICH CASE THE HOPPER AND EXCAVATOR WILL BE A BACKUP CONCRETE PLACEMENT SYSTEM TO BE USED IN CASE OF PUMP FAILURE.

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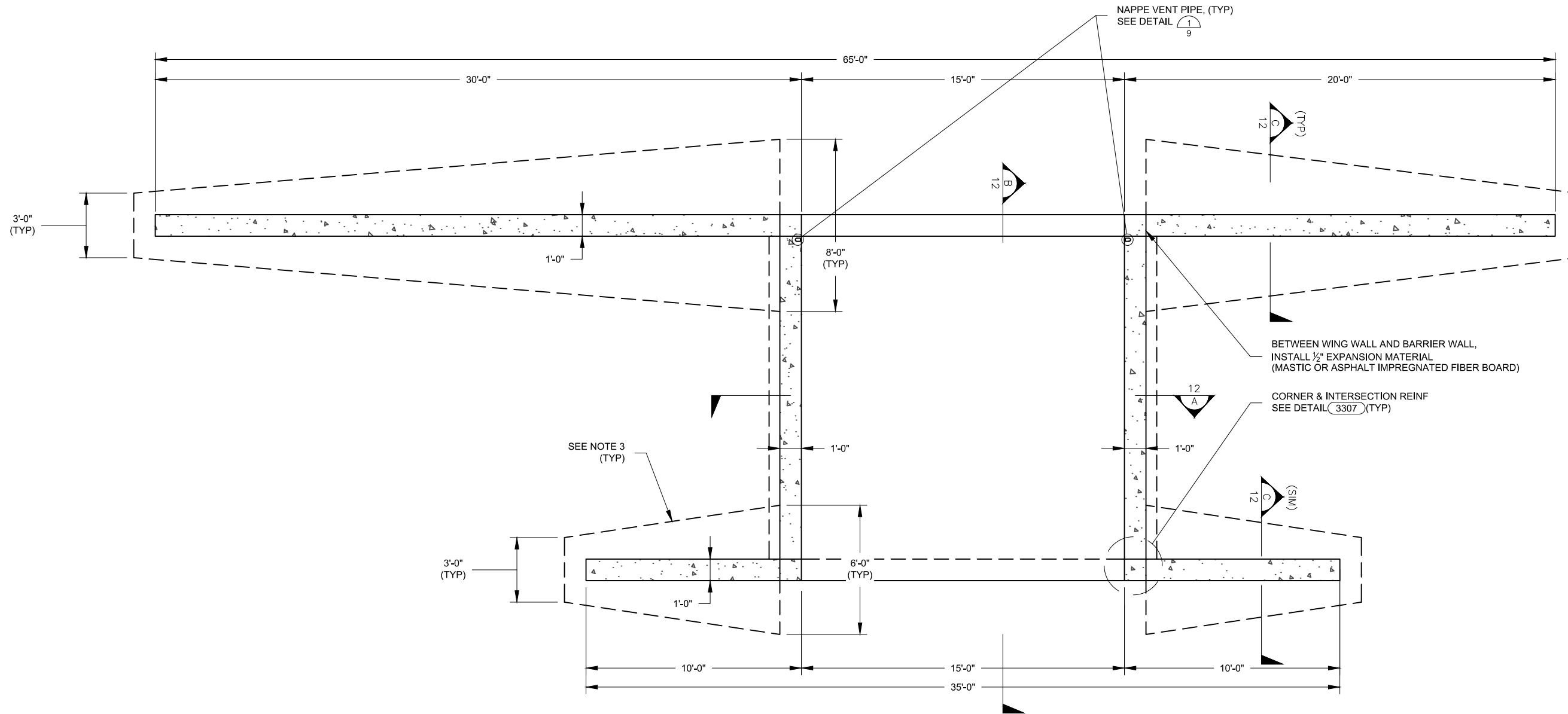


WALL CREEK FISH BARRIER GENERAL STRUCTURAL NOTES & ABBREVIATIONS

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R:\105107954 WALL CREEK\ACAD\SHETS\11 FISH BARRIER STRUCTURAL PLAN.DWG PLOTTED BY:DAVID A. HALLSTEN ON May/18/2018



BETWEEN WING WALL AND BARRIER WALL,
INSTALL 1/2" EXPANSION MATERIAL
(MASTIC OR ASPHALT IMPREGNATED FIBER BOARD)

CORNER & INTERSECTION REINF
SEE DETAIL (3307) (TYP)

SEE NOTE 3
(TYP)

GENERAL NOTES:

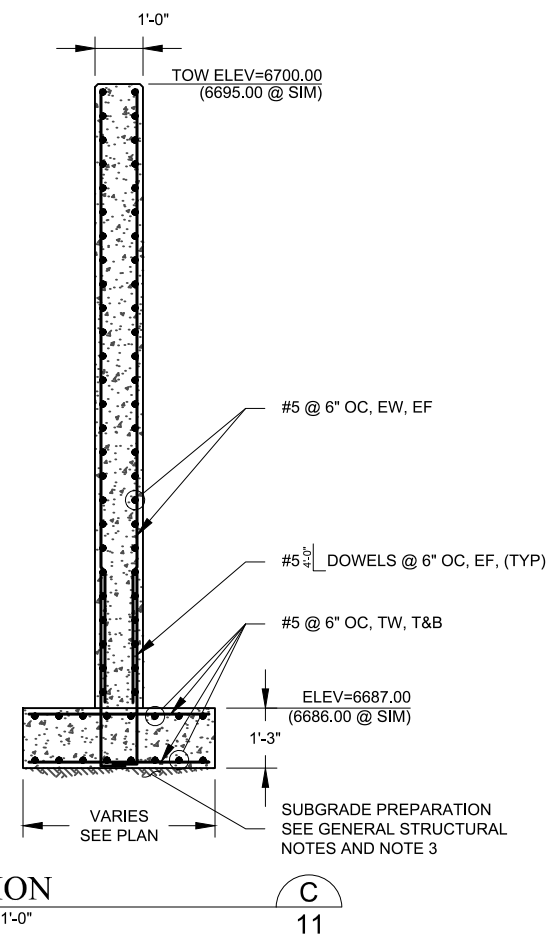
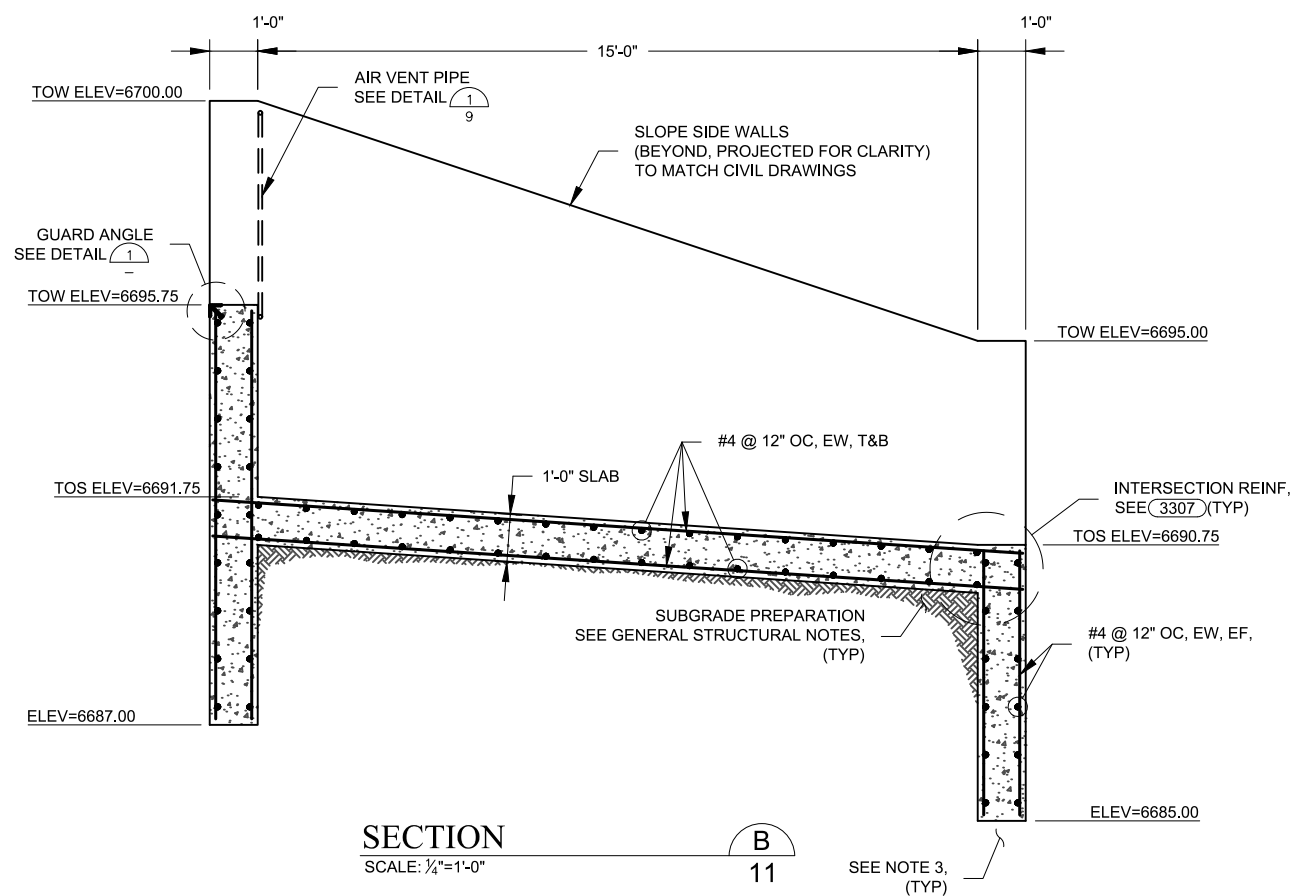
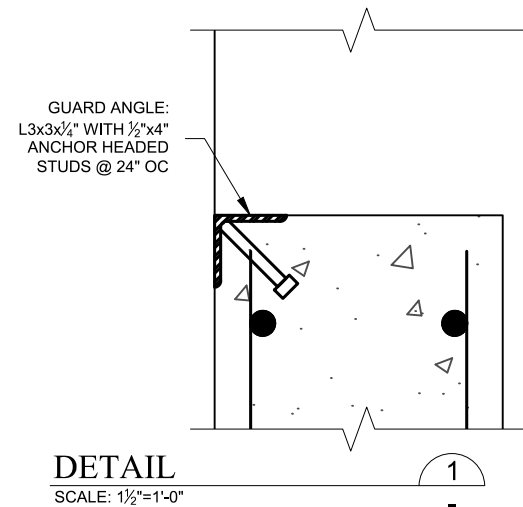
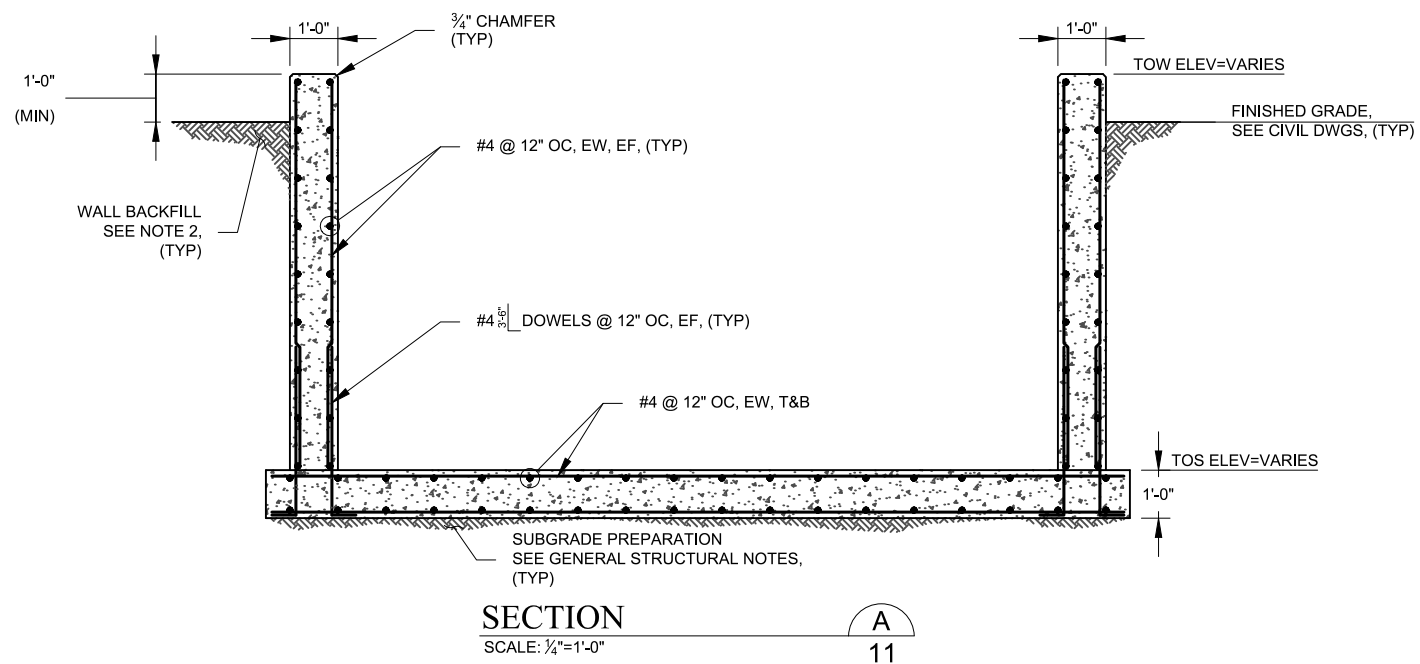
1. SEE DETAIL (3307) FOR CORNER AND INTERSECTION REINFORCEMENT.
2. BACKFILL ON EITHER SIDE OF ALL WALLS IN EQUAL LIFTS UNTIL FINAL GRADE IS REACHED. ONCE SLAB ELEVATION IS REACHED ON EITHER SIDE OF WALL, PLACE SLAB PRIOR TO FINISHING BACKFILL ON OPPOSITE SIDE.
3. WHERE WING WALL FOOTING ENCOUNTERS BEDROCK, TERMINATE FOOTING AND FIELD FIT WALL PER DETAIL (2200).

PLAN
SCALE: 3/8"=1'-0"



WALL CREEK FISH BARRIER	
FISH BARRIER STRUCTURAL PLAN	
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Drawn By: DAH	Drawing Checked: DAH
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GENERAL NOTES:

- SEE DETAIL (3307) FOR CORNER AND INTERSECTION REINFORCEMENT.
- BACKFILL ON EITHER SIDE OF ALL WALLS IN EQUAL LIFTS UNTIL FINAL GRADE IS REACHED. ONCE SLAB ELEVATION IS REACHED ON EITHER SIDE OF WALL, PLACE SLAB PRIOR TO FINISHING BACKFILL ON OPPOSITE SIDE.
- WHERE WING WALL FOOTING ENCOUNTERS BEDROCK, TERMINATE FOOTING AND FIELD FIT WALL PER DETAIL (2200).



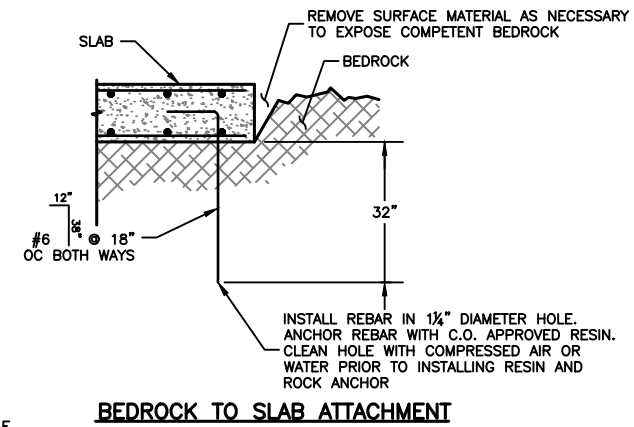
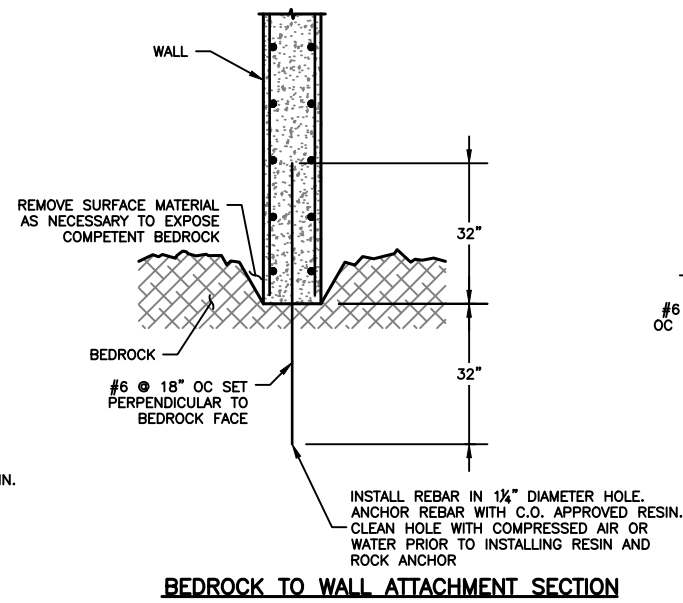
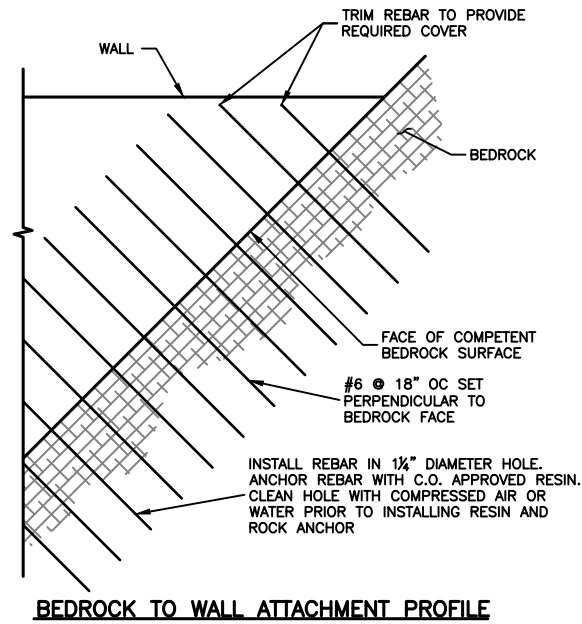
WALL CREEK FISH BARRIER

FISH BARRIER STRUCTURAL SECTIONS & DETAILS

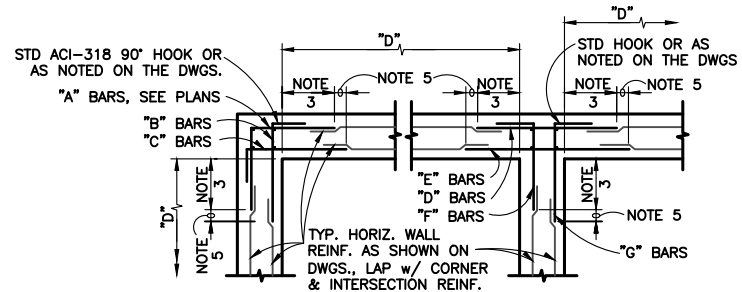
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R:\105107954 WALL CREEK\CAD\SHSHEETS\19 STANDARD DESIGN DETAILS.DWG PLOTTED BY:DAVID A. HALLSTEN ON May/18/2018



DIRECT WALL-TO-BEDROCK CONNECTION DETAILS (2200)
 (APPLIES WHERE BEDROCK IS ENCOUNTERED)
 NTS



CORNER AND INTERSECTION REINFORCING NOTES:

1. TYPICAL HORIZONTAL WALL CORNER AND INTERSECTION REINFORCING LAYOUT IS SHOWN TO AVOID CONGESTION AND PERMIT PROPER PLACEMENT. FOR SIZE AND SPACING SEE PLANS. ALL HORIZONTAL REINFORCING AT CORNERS AND INTERSECTIONS SHALL BE FABRICATED AND INSTALLED WITH SPLICES LOCATED WHERE SHOWN REGARDLESS OF BAR SIZE AND SPACING.
2. WHERE THE CORNER OR INTERSECTION REINFORCING SIZE AND SPACING IS NOT SHOWN, NOTED OR TABULATED ON THE PLANS, THE SIZE AND SPACING SHALL BE THE SAME AS THE WALL HORIZONTAL REINFORCING SHOWN ON THE WALL SECTIONS OR AS NOTED FOR THE REINFORCING BETWEEN THE CORNERS OR INTERSECTIONS.
3. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, THE LENGTH INDICATED AS "NOTE 3" SHALL BE THE LESSER OF D/4, 10 FEET, OR 1.0 TIMES THE HEIGHT OF THE WALL, EXCEPT THAT IN NO CASE SHALL IT BE LESS THAN 2.0 FEET.
4. D = LENGTH OF WALL PARALLEL TO THE BAR LENGTH IN QUESTION
5. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, THE LENGTH INDICATED AS "NOTE 5" SHALL BE EQUAL TO ONE "LAP LENGTH" AS REQUIRED BY THE GENERAL STRUCTURAL NOTES. USE THE LAP LENGTH AS REQUIRED FOR THE SMALLER OF THE TWO REINFORCING BARS BEING SPLICED.
6. UNLESS OTHERWISE NOTED, "B" AND "C" BARS ARE THE SAME SIZE AND SPACING AND, "F" AND "G" BARS ARE THE SAME SIZE AND SPACING.

TYPICAL DOUBLE MAT CORNER & INTERSECTION REINFORCING (3307)
 N.T.S. (SEE PLANS FOR SIZE AND SPACING)



WALL CREEK FISH BARRIER
STANDARD DESIGN DETAILS

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