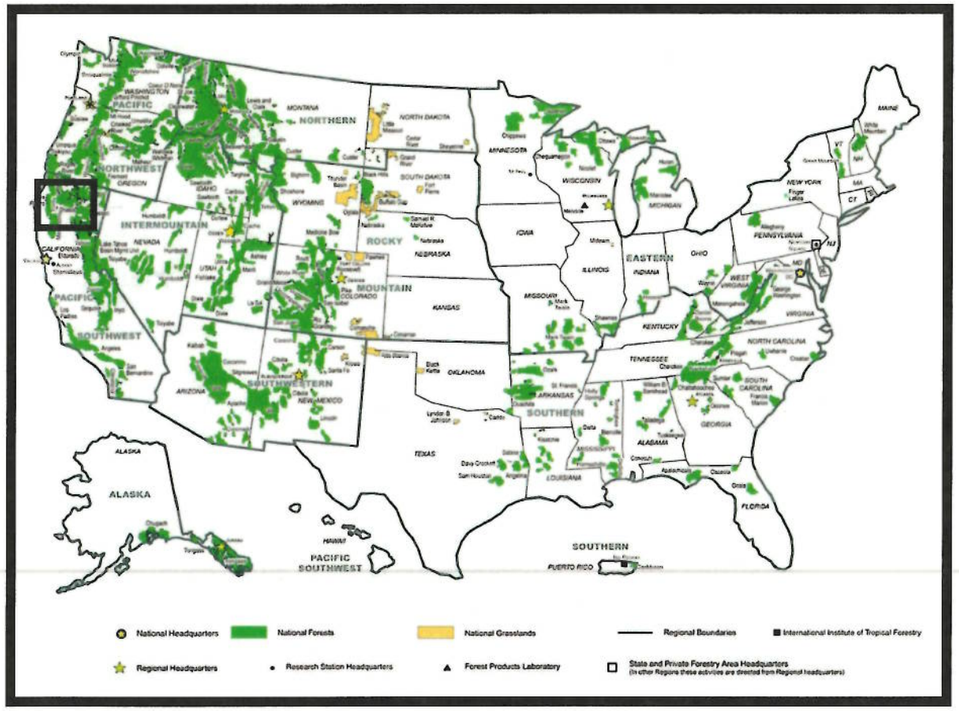
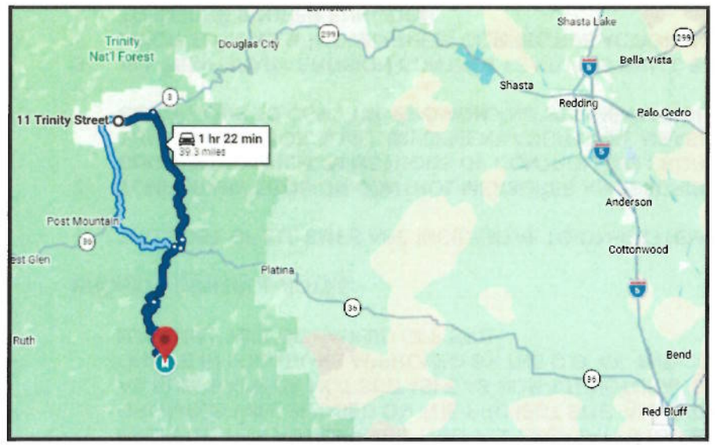
United States Department of Agriculture
Forest Service

CALIFORNIA
TRINITY COUNTY
(R05) PACIFIC SOUTHWEST REGION
SHASTA-TRINITY NATIONAL FOREST
HAYFORK RANGER DISTRICT

DARK CANYON CULVERT REPAIR
DRAWINGS AND EXHIBITS



FOREST LOCATION MAP



PROJECT LOCATION MAP

TRAVEL DIRECTIONS:

FROM THE HAYFORK DISTRICT OFFICE OF THE SHASTA-TRINITY NATIONAL FOREST, LOCATED AT 11 TRINITY STREET IN HAYFORK, CALIFORNIA, TRAVEL EAST ON CA-3 FOR 3.4 MILES, THEN TURN RIGHT ONTO WILDWOOD ROAD (SIGNS FOR RED BLUFF) FOR 16 MILES, THEN TURN RIGHT ONTO CA-36 FOR 0.5 MILES, THEN TURN LEFT ONTO WILD MAD ROAD FOR 19.3 MILES, ARRIVING AT THE PROJECT SITE (40°14'25.5" N, 123°05'02.9" W)

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RECOMMENDED BY:

ANGELICA GALAVIZ-PEREZ — Digitally signed by ANGELICA GALAVIZ-PEREZ Date: 2026.07.24 14:17:31 -07'00'
FOREST ENGINEER — DATE

Troy Boudro — Digitally signed by TROY BOUDRO Date: 2026.07.24 15:19:19 -07'00'
DISTRICT RANGER — DATE

FOREST SUPERVISOR — 7/24/26 DATE

APPROVED:

Shanisha Reese — 7/24/26
DIRECTOR OF ENGINEERING — DATE

SHEET 001 OF 008

7/23/26 11:28 MATTHEWKAUFFMAN C:\USERS\MATTHEWKAUFFMAN\ONEDRIVE - USDA\DESKTOP\CLEAN UP\DARK REPAIR\DARK CANYON DRAWINGS.DWG;

GENERAL NOTES:

1. PUBLIC SAFETY, TRAFFIC CONTROL, AND DUST CONTROL SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH STATE AND COUNTY REQUIREMENTS. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO BE APPROVED BY THE C.O.

2. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE C.O. OF ANY DISCREPANCIES ENCOUNTERED IN THE FIELD OR ERRORS IDENTIFIED IN THE CONTRACT.

3. THE CONTRACTOR SHALL KEEP DETAILED RECORDS AND AS-BUILTS SHOWING ALL MODIFICATIONS MADE TO THESE PLANS. THESE RECORDS AND AS-BUILTS SHALL BE PROVIDED TO THE C.O. UPON PROJECT COMPLETION.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING. STAKING SHALL ADHERE TO SECTION 152 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-24).

5. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING MONUMENTS AND OTHER SURVEY MARKERS. ANY MARKERS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

6. STAGING AREAS FOR EQUIPMENT AND/OR MATERIAL STORAGE WILL BE ALLOWED ONLY WITHIN THE LIMITS OF DISTURBANCE AND IN AREAS APPROVED BY THE C.O.

7. ALL VEGETATION OUTSIDE OF THE AREA TO BE CLEARED FOR CONSTRUCTION SHALL BE PROTECTED. TREES WOUNDED BY CONTRACTOR ACTIVITIES SHALL BE REPAIRED AT THE EXPENSE OF THE CONTRACTOR.

8. THE CONTRACTOR IS RESPONSIBLE FOR RESTROOMS, WATER, AND ELECTRICITY.

9. ALL IMPORTED MATERIAL MUST BE CERTIFIED WEED FREE AND COME FROM A LOCATION APPROVED BY THE C.O.

10. ALL EQUIPMENT SHALL ARRIVE ON SITE WASHED AND FREE OF ALL VISIBLE SOIL, DEBRIS, AND ORGANIC MATTER. ALL EQUIPMENT WILL BE INSPECTED AND APPROVED BY THE C.O. PRIOR TO UNLOADING ON THE PROJECT SITE.

11. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING THE LOCATION OF ANY AND ALL UTILITIES.

12. ORIGINAL STRUCTURAL DRAWINGS FROM THE CONSTRUCTION OF THE MULTI-PLATE CULVERT (FOOTINGS, HEADWALLS, ETC.) ARE AVAILABLE UPON REQUEST.

CONSTRUCTION NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR MATCHING EXISTING INFRASTRUCTURE AND THE SURROUNDING LANDSCAPE WITH SMOOTH TRANSITIONS AND FOR AVOIDING ANY ABRUPT OR APPARENT CHANGES IN GRADE OR CROSS-SLOPE TO THE SATISFACTION OF THE C.O.

2. GRADING ACTIVITIES SHALL BE SCHEDULED TO ENSURE THAT REPEATED GRADING WILL NOT BE REQUIRED AND THAT IMPLEMENTATION OF THE DESIRED LAND USE WILL OCCUR AS SOON AS POSSIBLE AFTER GRADING.

3. ALL EXCAVATED MATERIAL SHALL BE STOCKPILED AT AN APPROVED SITE AND MATERIAL MEETING THE SPECIFICATIONS MAY BE USED AS NON-STRUCTURAL BACKFILL. IT IS ANTICIPATED THAT ALL EXCAVATED MATERIAL FREE OF DEBRIS AND ORGANICS WILL BE USED ON THE PROJECT SITE. ALL EXCAVATED MATERIAL NOT USED AS SUBGRADE OR NOT SUITABLE AS NON-STRUCTURAL BACKFILL WILL BE PLACED ONSITE IN LOCATIONS APPROVED BY THE C.O. AT THE CONTRACTOR'S EXPENSE. NO MATERIAL WILL BE HAULED OFF SITE.

EROSION CONTROL NOTES:

1. THE COST OF ALL BMPS ARE INCIDENTAL TO OTHER ITEMS.

2. TEMPORARY EROSION CONTROL MEASURES AS DESCRIBED IN THESE PLANS ARE SUGGESTED MINIMUM METHODS OF CONTROLLING EROSION DURING CONSTRUCT/ON. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES AS DICTATED BY FIELD CONDITIONS TO CONTROL EROSION AND SEDIMENTATION.

3. ALL TEMPORARY EROSION CONTROL FEATURES SHALL BE INSPECTED DAILY AND PRIOR TO INCLEMENT WEATHER; CORRECTIVE ACTION WILL BE TAKEN AS NECESSARY TO INSURE PROPER FUNCTION.

4. THE AREAS OF SOIL AND VEGETATION DISTURBANCE SHALL BE LIMITED TO THAT REQUIRED FOR CONSTRUCTION PURPOSES. EXCEPT WHERE REQUIRED FOR ACCESS, THERE SHALL BE NO DISTURBANCE IN AREAS TO BE LEFT IN A NATURAL STATE. CONSTRUCTION TRAFFIC SHALL BE LIMITED TO AREAS TO BECOME PERMANENT CIRCULATION OR OTHER DESIGNATED ROUTES APPROVED BY THE C.O.

5. FIBER ROLLS SHALL BE PLACED ALONG THE DOWNSLOPE EDGE OF STAGING AREAS TO PREVENT CONTAMINATED RUNOFF.

6. STOCKPILES SHALL BE LOCATED IN ALREADY DISTURBED AND FLAT AREAS, AND SHALL BE SURROUNDED WITH FIBER ROLLS. IF A STOCKPILE IS INACTIVE FOR 14 DAYS, IT SHALL BE STABILIZED WITH HYDRAULIC MULCH OR PLASTIC.

7. SPILL KITS WITH ABSORBENT PADS SHALL BE ON SITE AT ALL TIMES IN PREPARATION OF EQUIPMENT LEAKS. ALL VEHICLE MAINTENANCE SHALL TAKE PLACE AT LEAST 100 FEET FROM SURFACE WATER AND ON A LEVEL AREA.

United States Department of Agriculture
Forest Service

(R05)
PACIFIC SOUTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
2		
1		

PROJECT NAME

DARK CANYON CULVERT REPAIR

SHASTA-TRINITY NATIONAL FOREST

HAYFORK RANGER DISTRICT

DRAWING TITLE

GENERAL NOTES

DATE 07/21/2026	ARCHIVE NO.
DESIGNER MSK	DRAWING SHEET NO. 02
DRAWN MSK	
CHECKED Sodaro	
PROJECT NO.	SHEET 002 OF 008

7/23/26 11:28 MATTHEWKAUFFMAN C:\USERS\MATTHEWKAUFFMAN\ONEDRIVE - USDA\DESKTOP\CLEAN UP\DARK (REPAIR)\DARK CANYON DRAWINGS.DWG;

PAY ITEM NOTES

1.) PAY ITEM 20401 (ROADWAY EXCAVATION AND EMBANKMENT) INCLUDES ALL WORK NECESSARY TO ACHIEVE ROAD SUBGRADE ELEVATION, EXCEPTING STRUCTURAL BACKFILL. THIS MATERIAL EXISTS ON SITE. EXCESSIVE HAUL/END HAUL ARE NOT ANTICIPATED.

2.) PAY ITEM 20401 SHALL BE PAID BY CONTRACT QUANTITY. A SITE VISIT IS HIGHLY ENCOURAGED PRIOR TO BIDDING.

3.) PAY ITEM 20803 (STRUCTURAL BACKFILL) INCLUDES ALL MATERIAL TO BE PLACED WITHIN 6 FEET TO EITHER SIDE AND A MINIMUM OF 5 FEET ABOVE THE DRAINAGE STRUCTURE. THIS MATERIAL SHALL BE IMPORTED FROM OFF-SITE AND CONFORM TO FP-24 SECTION 704.01.

4.) PAY ITEM 30302 (ROADWAY RECONDITIONING) INCLUDES THE GRADING NECESSARY TO ACHIEVE FINAL DESIGN GRADE, AS WELL ENSURING POSITIVE DRAINAGE OF THE ROADWAY AND THE FUNCTIONING OF ANY AND ALL DRAINAGE STRUCTURES BETWEEN STATIONS 4+50 AND 15+50, INCLUDING DITCHES.

5.) PAY ITEM 60705 (REPAIR DRAINAGE STRUCTURE) INCLUDES CUTTING EXISTING PLATE REMNANT, STRUCTURAL EXCAVATION FOR CLOSURE CONNECTION, CLEANING EXISTING CONCRETE STEM WALL CHANNEL, PREPARING EXISTING CUT EDGES FOR CLOSURE CONNECTION, ALL WORK ASSOCIATED WITH PREPARING THE EXISTING STRUCTURE FOR PLACEMENT OF NEW CULVERT MULTI-PLATE, DELIVERY TO THE SITE OF GOVERNMENT FURNISHED CULVERT PLATES AND CONNECTING HARDWARE, AND INSTALLATION OF NEW MULTI-PLATE STRUCTURE.

6.) CONTRACTOR SHALL REMOVE REMAINING PARTIALLY CUT STEEL CULVERT PLATES AND DISPOSE LEGALLY OFF-SITE. CONTRACTOR SHALL PROVIDE A CLEAN CONCRETE SURFACE TO MATE NEW CULVERT PLATE SECTIONS.

7.) PAY ITEMS 60103 (CLOSURE CONNECTION) AND 60705 (REPAIR DRAINAGE STRUCTURE), INCLUDING ALL MATERIAL SPECIFICATIONS, SHALL BE PERFORMED PER THE GUIDANCE OF THE MANUFACTURER OF THE MULTI-PLATE ARCH SYSTEM USED IN BOTH THE ORIGINAL STRUCTURE AND THE GOVERNMENT SUPPLIED REPAIR MATERIALS (CONTECH ENGINEERED SOLUTIONS).

8.) PROVIDE ENGINEERED CALCULATIONS FOR CLOSURE CONNECTION BETWEEN NEW AND EXISTING PIPE SECTIONS TO BE APPROVED BY THE C.O. HOOK BOLTS ARE PROVIDED AS GOVERNMENT FUNISHED PROPERTY, SEE 'DETAIL A'. ALTERNATE CLOSURE METHODS ARE ACCEPTABLE PER APPROVAL BY THE C.O.

MATERIAL NOTES

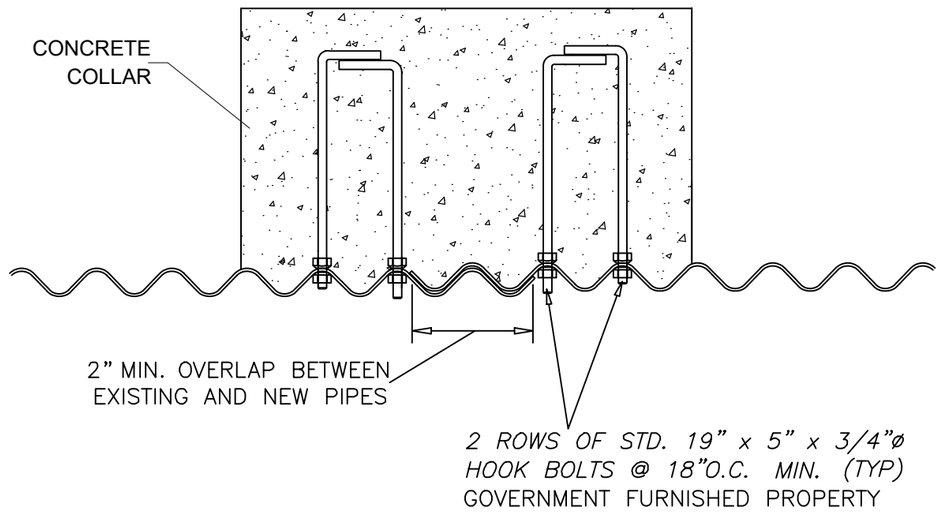
1.) CONCRETE - USE CLASS A(AE) FOR ALL CAST-IN-PLACE CONCRETE WITH F'C = 2500 PSI MINIMUM AT 28 DAYS AND AN ENTRAINED AIR CONTENT PER THE STANDARD SPECIFICATIONS (FP-24). MAKE ALL CONCRETE IN ACCORDANCE WITH A MIX DESIGN APPROVED BY THE C.O. CHAMFER ALL EXPOSED EDGES OF CONCRETE 3/4" AND FILLET ALL ACUTE ANGLES 3" UNLESS OTHERWISE NOTED.

2.) REINFORCING STEEL - USE NON-PRESTRESSED REINFORCING OF THE DEFORMED TYPE CONFORMING TO AASHTO M31 (ASTM A615), GRADE 60. CONCRETE COVER SHALL CONFORM TO AASHTO. CUT AND BEND STEEL IN ACCORDANCE WITH ACI 315.

3.) WELDING - WELD IN ACCORDANCE WITH THE BRIDGE WELDING CODE, AWS D1.5. A CERTIFIED WELDER IS REQUIRED.

SUMMARY OF ESTIMATED QUANTITIES

ITEM NUMBER	DESCRIPTION	PAY UNIT	EST QTY
15101-0000	Mobilization	LS	1
15201-0000	Construction survey and staking	SL	1
20401-0000	Roadway excavation and embankment	LS	1
20803-0000	Structural backfill	CUYD	1700
30101-1000	Aggregate base, Grading C	TON	410
30302-6000	Roadway reconditioning	LF	1100
60103-0000	Closure connection	EACH	2
60705-0000	Repair drainage structure	EACH	1
62510-2000	Seeding, Hydraulic method	ACRE	1
63501-0000	Temporary traffic control	LS	1



DETAIL 'A'
PROVIDED FOR EXAMPLE ONLY

USDA FOREST SERVICE
United States Department of Agriculture
Forest Service
(R05)
PACIFIC SOUTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
4		
3		
2		
1		

PROJECT NAME
DARK CANYON CULVERT REPAIR

SHASTA-TRINITY NATIONAL FOREST

HAYFORK RANGER DISTRICT

DRAWING TITLE
SUMMARY OF ESTIMATED QUANTITIES

DATE 07/21/2026	ARCHIVE NO.
DESIGNER MSK	DRAWING SHEET NO. 03
DRAWN MSK	
CHECKED Sodaro	
PROJECT NO.	SHEET 003 OF 008

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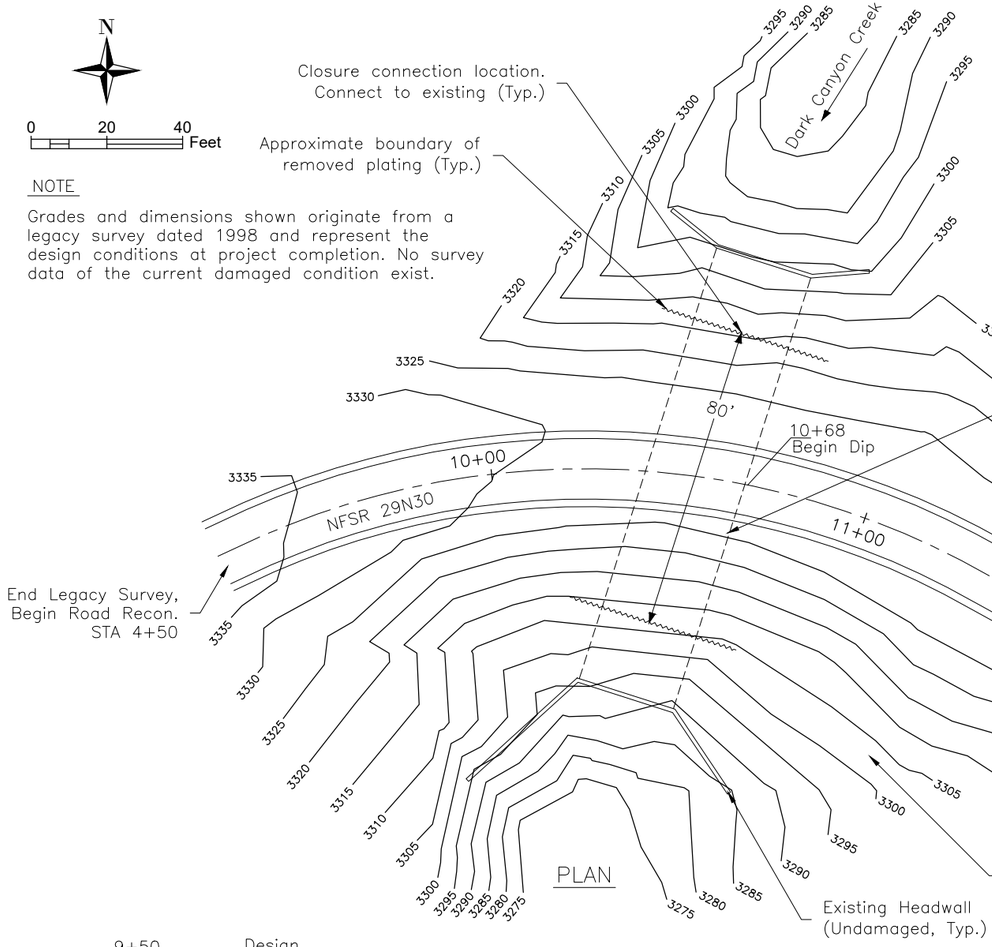


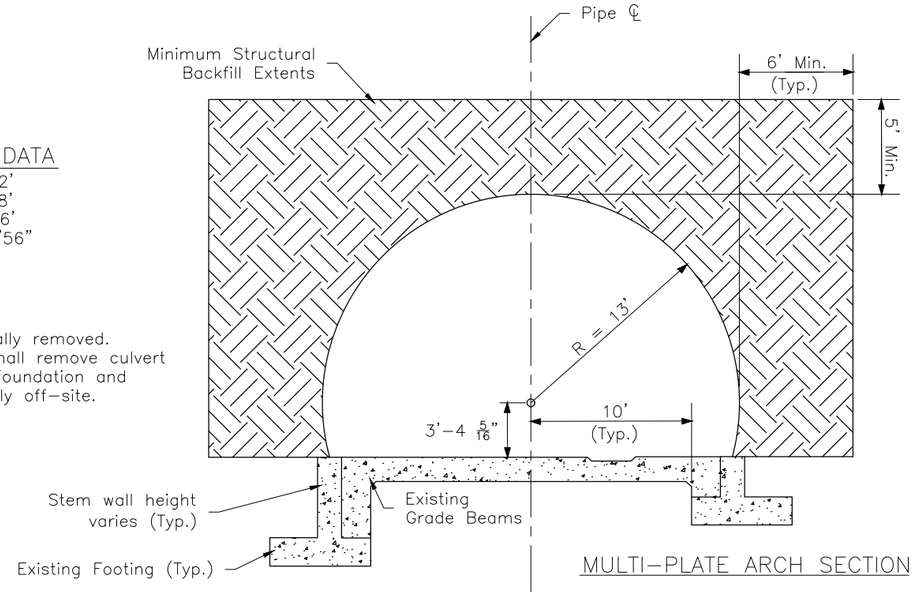
PLAN

NOTE

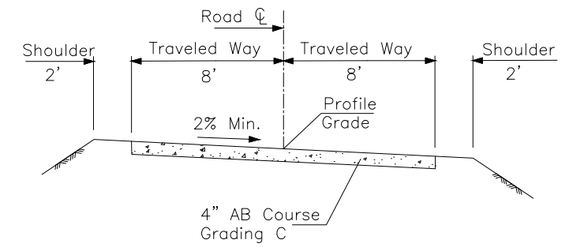
Grades and dimensions shown originate from a legacy survey dated 1998 and represent the design conditions at project completion. No survey data of the current damaged condition exist.

CURVE DATA

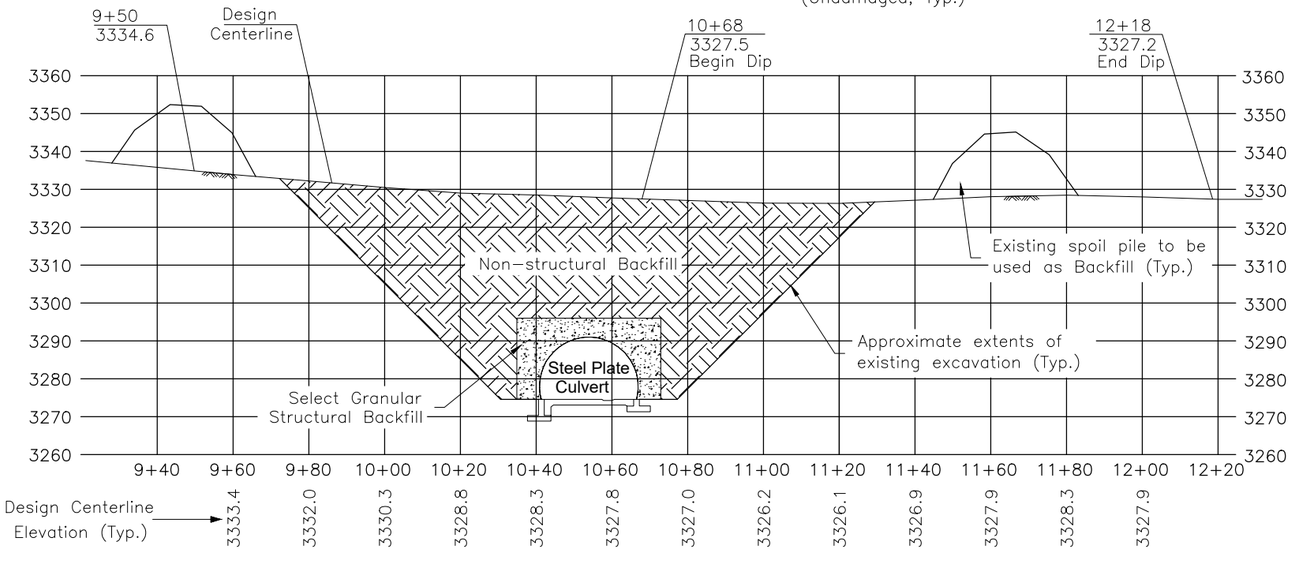
L=210.42'
T=114.48'
R=215.16'
Δ=56°01'56"



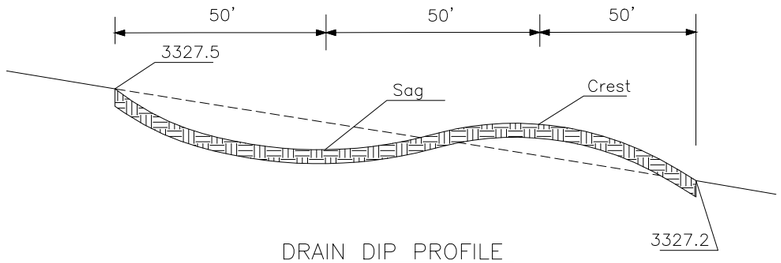
MULTI-PLATE ARCH SECTION



TYPICAL SECTION



NFSR 29N30 CENTERLINE PROFILE



DRAIN DIP PROFILE

NOTES

1.) The drain dip invert shall be smooth and free draining.
2.) The minimum difference in elevation between the sag and crest of the drain dip in 1.0 feet.

USDA FOREST SERVICE

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PACIFIC SOUTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
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3		
2		
1		

PROJECT NAME

DARK CANYON CULVERT REPAIR

SHASTA-TRINITY NATIONAL FOREST

HAYFORK RANGER DISTRICT

DRAWING TITLE

ROAD PLAN AND PROFILE

DATE 07/21/2026	ARCHIVE NO.
DESIGNER MSK	DRAWING SHEET NO. 04
DRAWN MSK	
CHECKED Sodaro	
PROJECT NO.	SHEET 004 OF 008

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CUT EXISTING PIPE SECTION TO CLEAN LINES (TYP.) USE REMOVAL METHODS OTHER THAN TORCH CUT.

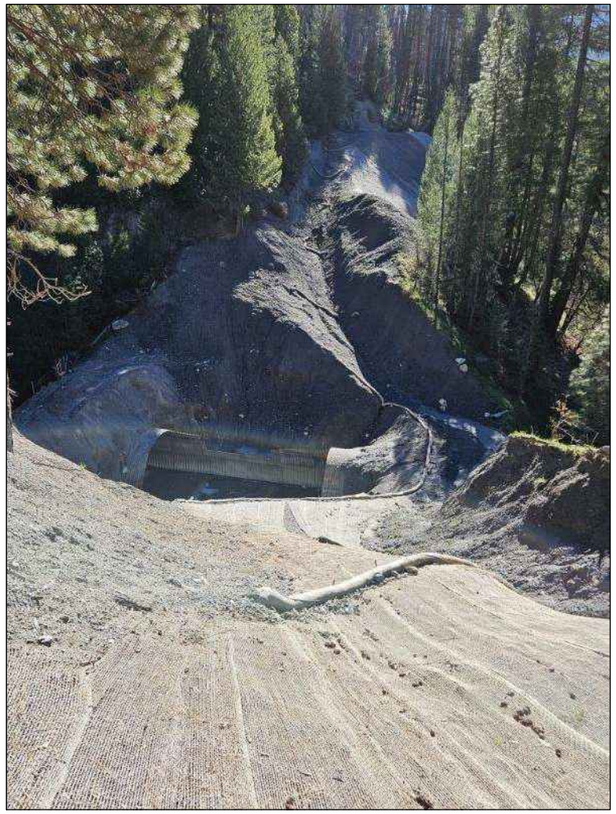
REMOVE STEEL PLATE TO CONCRETE FOUNDATION. USE REMOVAL METHODS OTHER THAN TORCH CUT

CURRENT CONDITION OF CULVERT

INTACT HEADWALL

TYPICAL VIEW OF TOP OF FOUNDATION STEM WALL

CLEAN EXISTING KEYWAY AND INSTALL GOVERNMENT FURNISHED RECEIVING CHANNEL



CURRENT CONDITION OF ROAD
LOOKING EAST

United States Department of Agriculture
Forest Service

(R05)
PACIFIC SOUTHWEST REGION

STAMPS, LOGOS, AND SEALS

NO.	REVISION / ISSUE	DATE
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2		
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PROJECT NAME

DARK CANYON CULVERT REPAIR

SHASTA-TRINITY NATIONAL FOREST

HAYFORK RANGER DISTRICT

DRAWING TITLE

PHOTOS

DATE 07/21/2026	ARCHIVE NO.
DESIGNER MSK	DRAWING SHEET NO. 05
DRAWN MSK	
CHECKED Sodaro	
PROJECT NO.	SHEET 005 OF 008

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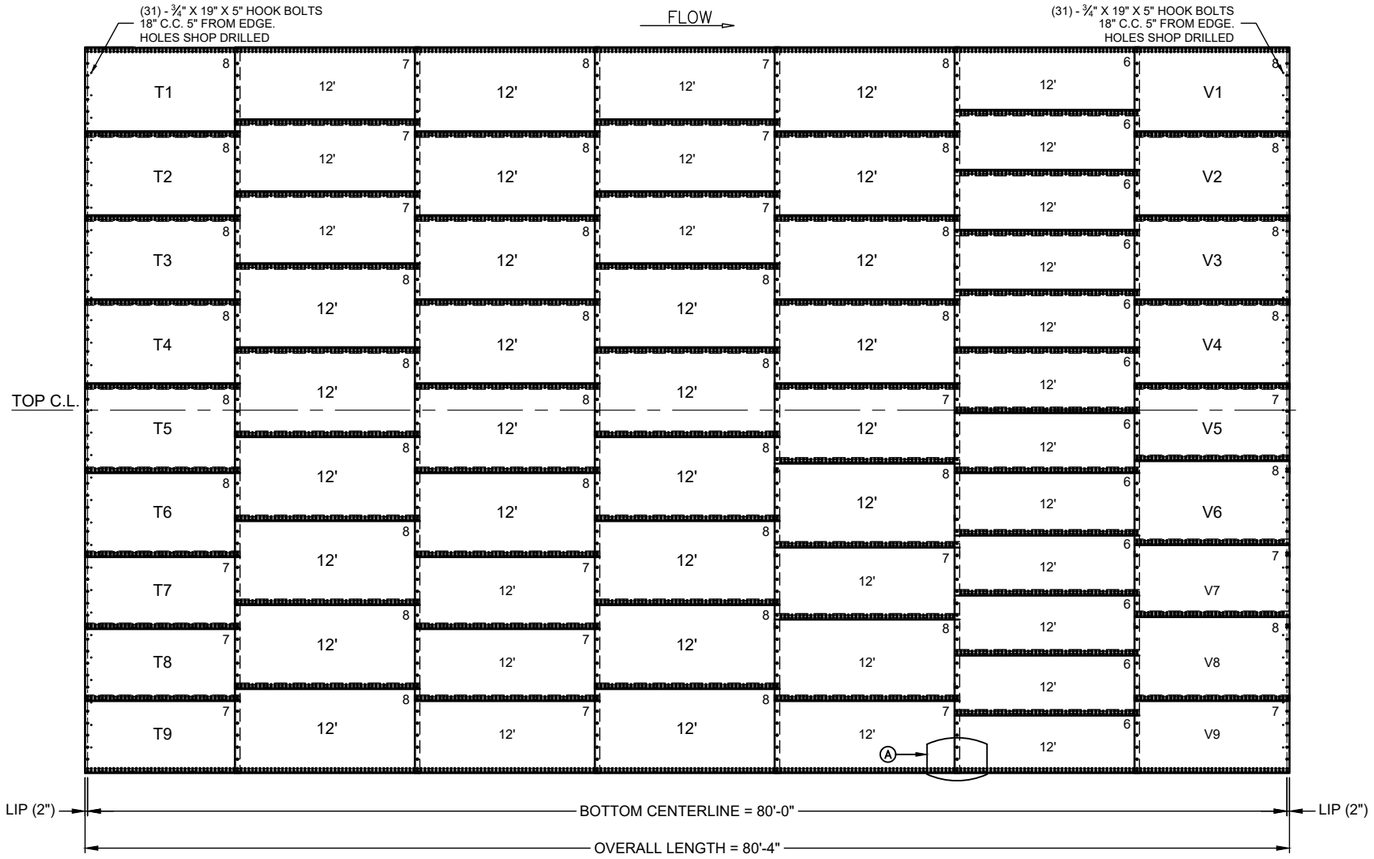


PLATE LAYOUT --- OUTSIDE VIEW

ALL PLATES ARE 5/16" THK (8 BOLTS PER FOOT LONGITUDINAL PUNCHING) AND 156" RADIUS

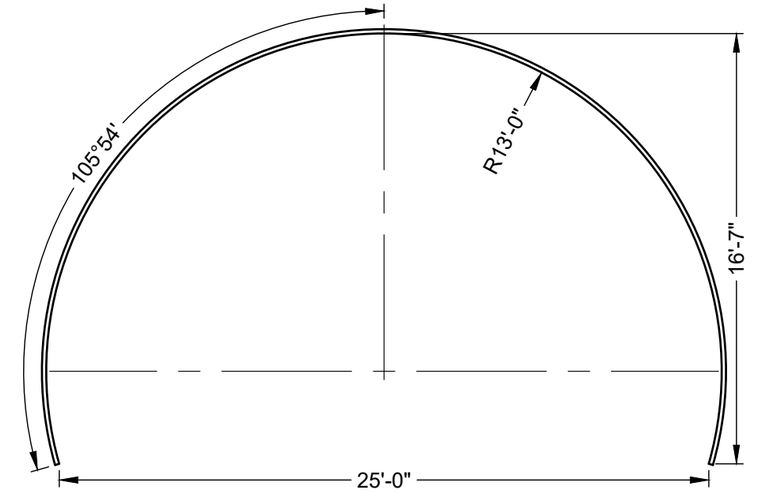


PLATE MAKE-UP: 6 @ 21Pi, 3 @ 18Pi
180 Pi Total

AREA= 356.8 SF

NOTES:

1. ALL DIMENSIONS ARE TO INSIDE OF CORRUGATION CREST, UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.

LOADING: HL–93
MIN HOC: 3.5
MAX HOC: 38.0
HOT–DIP GALVANIZED

IMPORTANT

ASSEMBLY INSTRUCTIONS WILL BE SHIPPED WITH THE STRUCTURE. THEY ARE LOCATED IN THE BRIGHT COLORED BUCKET.

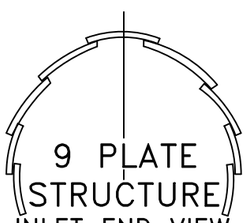
IMPORTANT

WHEN BEGINNING ASSEMBLY, BE CERTAIN PLATES ARE ORIENTED SO BOLT HOLE PATTERN MATCHES THAT SHOWN ON THIS DRAWING AND ASSEMBLY INSTRUCTIONS.

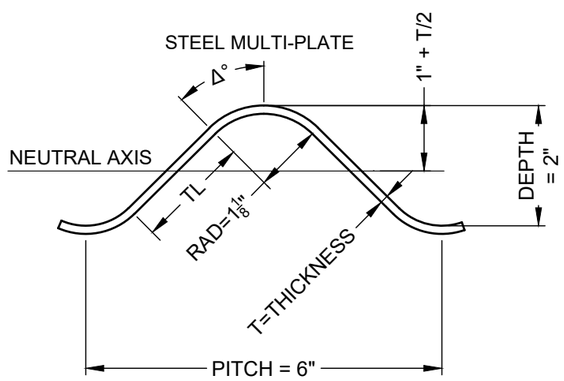
TORQUE NOTE

PLATE LAPS MUST BE PROPERLY MATED IN A TANGENT FASHION USING PROPER ALIGNMENT TECHNIQUES AND ADEQUATE BOLT TORQUE TO SEAT THE CORRUGATION. FOR PLAIN, GALVANIZED PLATES, AN INSTALLATION BOLT TORQUE OF 100–300 ft–lbs IS RECOMMENDED. WHEN SEAM SEALANT TAPE OR ASPHALT (SHOP) COATED PLATES ARE USED, BOLTS SHALL BE INSTALLED AT 150–300 ft–lbs AND RETIGHTENED TO THESE LIMITS AFTER 4 TO 6 HOURS. TORQUE LEVELS ARE FOR INSTALLATION, NOT RESIDUAL, IN–SERVICE REQUIREMENTS.

THE ASSEMBLY BOLTS AND NUTS ARE SPECIALLY DESIGNED WITH ROUNDED OR SPHERICAL THROATS FOR FITTING EITHER THE CREST OR VALLEY OF THE CORRUGATIONS, PROVIDING MAXIMUM BEARING CONTACT AREA WITH THE PLATES WITHOUT THE USE OF WASHERS. NOTE THAT THE BOLTS AND NUTS SHOULD BE INSTALLED SUCH THAT THE ROUNDED PORTION IS IN CONTACT WITH THE PLATES.



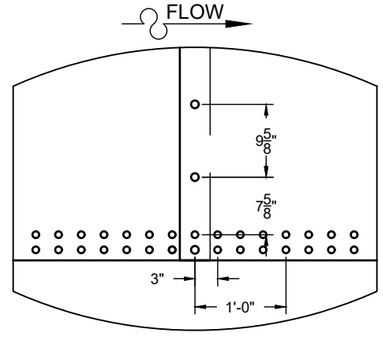
* NOTE PLATE LAPPING



CORRUGATION PROFILE

	INLET	OUTLET
SKEW	90	90
BEVEL	0	0

TYPE STRUCTURE SINGLE RADIUS ARCH
SIZE 180 PI
SPAN = 26'–0"
RISE = 16'–7"
LENGTH @ c_L 80'–0"



CIRCUMFERENTIAL PLATE LAPPING AS SHOWN HERE IS TYPICAL THROUGHOUT STRUCTURE

DETAIL A

IMPORTANT

WHEN BEGINNING ASSEMBLY, BE CERTAIN PLATES ARE ORIENTED SO BOLT HOLE PATTERN MATCHES THAT SHOWN ON THIS DRAWING AND ASSEMBLY INSTRUCTIONS.

PLANT ORDER NO.

DRAWING #: 852880–010–MP–CON–B

SALES ORDER NO.

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MARK	DATE	REVISION DESCRIPTION	BY
B	12/1/2025	MAX COVER UPDATED TO 38'-0"	JEM

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
700 Tech Drive, Winchester, KY 40391
859-744-3339 859-744-9665 FAX

CONTECH STRUCTURAL PLATE

CONTRACT DRAWING

DARK CANYON CREEK CULVERT REPLACEMENT
WILD MAD ROAD
MAD RIVER, CA

PROJECT No.:	SEQ. No.:	DATE:
852880	010	10/9/2025
DESIGNED:		DRAWN: JEM
CHECKED: ED		APPROVED:
SHEET NO.: 1 OF 3		

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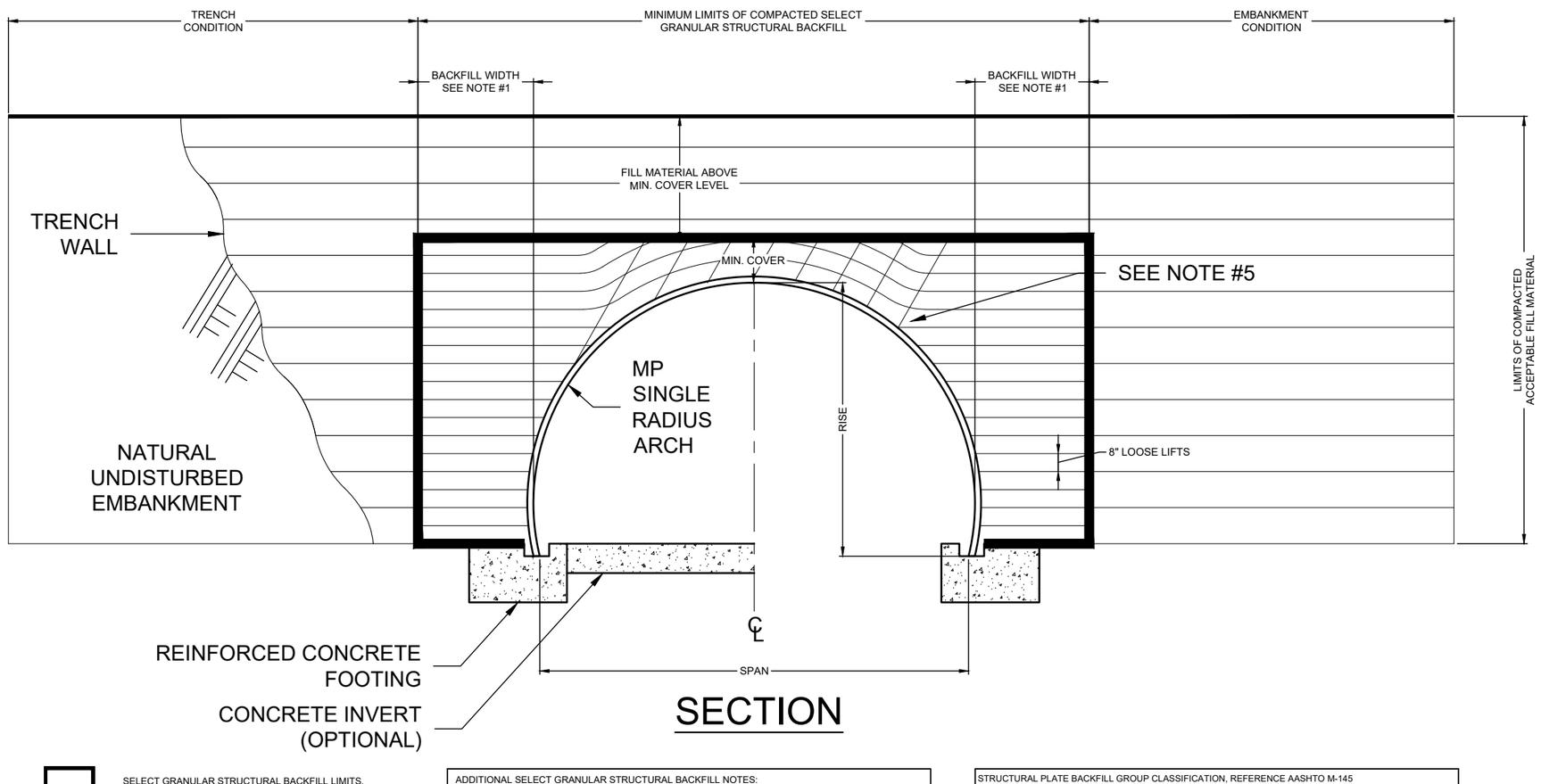

SECTION

SELECT GRANULAR STRUCTURAL BACKFILL LIMITS.

INITIAL LIFTS OVER THE CROWN OF STRUCTURE AS INDICATED BY SHADED AREA TO BE COMPACTED TO REQUIRED DENSITY WITH HAND OPERATED EQUIPMENT OR WITH LIGHTWEIGHT (D-4 OR LIGHTER) EQUIPMENT.

NOTES:

1. TRENCH WIDTH AND/OR SELECT BACKFILL WIDTH SHALL BE DETERMINED BY THE ENGINEER DEPENDING ON SITE SPECIFIC CONDITIONS. TYPICAL BACKFILL WIDTH IS 4 FEET FOR STRUCTURE SPANS 14 FEET AND LESS, AND 6 FEET FOR STRUCTURE SPANS GREATER THAN 14 FEET.
2. ALL SELECT GRANULAR BACKFILL TO BE PLACED IN A BALANCED FASHION IN THIN LIFTS (8" LOOSE TYPICALLY) AND COMPACTED TO 90 PERCENT DENSITY PER AASHTO T-180.
3. COMPLETE AND REGULAR MONITORING OF THE SINGLE RADIUS ARCH STRUCTURE IS NECESSARY DURING THE BACKFILL PROCESS TO AT LEAST THE MINIMUM COVER LEVEL.
4. PREVENT DISTORTION OF SHAPE AS NECESSARY BY VARYING COMPACTION METHODS AND EQUIPMENT.
5. PLACE SELECT GRANULAR BACKFILL IN RADIAL LIFTS AT APPROXIMATELY 75% OF THE RISE OF THE SINGLE RADIUS ARCH STRUCTURE.

ADDITIONAL SELECT GRANULAR STRUCTURAL BACKFILL NOTES:

SATISFACTORY BACKFILL MATERIAL, PROPER PLACEMENT, AND COMPACTION ARE KEY FACTORS IN OBTAINING MAXIMUM STRENGTH AND STABILITY.

THE BACKFILL MATERIAL SHOULD BE FREE OF ROCKS, FROZEN LUMPS, AND FOREIGN MATERIAL THAT COULD CAUSE HARD SPOTS OR DECOMPOSE TO CREATE VOIDS. BACKFILL MATERIAL SHOULD BE WELL GRADED GRANULAR MATERIAL THAT MEETS THE REQUIREMENTS OF AASHTO M-145 FOR SOIL CLASSIFICATIONS A-1, A-2-4, A-2-5 OR A-3 MODIFIED. RECYCLED CONCRETE/SLAG ARE NOT RECOMMENDED FOR STRUCTURAL BACKFILL MATERIAL.
SEE THE STRUCTURAL PLATE BACKFILL GROUP CLASSIFICATION TABLE ON THIS SHEET. BACKFILL MUST BE PLACED SYMMETRICALLY ON EACH SIDE OF THE STRUCTURE IN 8" LOOSE LIFTS. EACH LIFT IS TO BE COMPACTED TO A MINIMUM OF 90% DENSITY PER AASHTO T-180.

A HIGH PERCENTAGE OF SILT OR FINE SAND IN THE NATIVE SOILS SUGGESTS THE NEED FOR A WELL GRADED GRANULAR BACKFILL MATERIAL TO PREVENT SOIL MIGRATION. IF THE PROPOSED BACKFILL IS NOT A WELL GRADED GRANULAR MATERIAL, A NON-WOVEN GEOTEXTILE FILTER FABRIC SHALL BE PLACED BETWEEN THE SELECT BACKFILL AND THE IN SITU MATERIAL.

DURING BACKFILL, ONLY LIGHTWEIGHT TRACKED VEHICLES (D-4 OR LIGHTER) SHOULD BE NEAR THE STRUCTURE AS FILL PROGRESSES ABOVE THE CROWN AND TO THE FINISHED GRADE. THE ENGINEER AND CONTRACTOR ARE CAUTIONED THAT THE MINIMUM COVER MAY NEED TO BE INCREASED TO HANDLE TEMPORARY CONSTRUCTION VEHICLE LOADS (HEAVIER THAN D-4).

STRUCTURAL PLATE BACKFILL GROUP CLASSIFICATION, REFERENCE AASHTO M-145

GROUP CLASSIFICATION	A-1-a	A-1-b	A-2-4	A-2-5	A-3
Sieve Analysis Percent Passing					
No. 10 (2.000 mm)	50 max.	----	----	----	----
No. 40 (0.425 mm)	30 max.	50 max.	----	----	51 max.*
No. 200 (0.075 mm)	15 max.	25 max.	35 max.	35 max.	10 max.
Atterberg Limits for Fraction Passing No. 40 (0.425 mm)					
Liquid Limits	----	----	40 max.	41 min.	----
Plasticity Index	6 max.	6 max.	10 max.	10 max.	Non Plastic
Usual Materials	Stone Fragment, Gravel and Sand		Silty or Clayey Gravel and Sand		Coarse Sand

*Modified from AASHTO M-145.

Fine beach sands, windblown sands, stream deposited sands, etc., exhibiting fine, rounded particles and typically classified by AASHTO M-145 as A-3 Materials should not be used.

Reference the most current version of ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), for comparable soil groups.

	INLET	OUTLET
SKEW	90	90
BEVEL	0	0

TYPE STRUCTURE SINGLE RADIUS ARCH
SIZE 180 PI
SPAN = 26'–0"
RISE = 16'–7"
LENGTH ℄ c_L 80'–0"

PLANT ORDER NO.

DRAWING #: 732721–020–MP–CON–B

SALES ORDER NO.

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MARK	DATE	REVISION DESCRIPTION	BY
B	12/1/2025	MAX COVER UPDATED TO 38'-0"	JEM

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
700 Tech Drive, Winchester, KY 40391
859-744-3339 859-744-9665 FAX

CONTECH STRUCTURAL PLATE

CONTRACT DRAWING

DARK CANYON CREEK CULVERT REPLACEMENT
WILD MAD ROAD
MAD RIVER, CA

PROJECT No.:	SEQ. No.:	DATE:
852880	010	10/9/2025
DESIGNED:	DRAWN: JEM	
CHECKED: ED	APPROVED:	
SHEET NO.: 2 OF 3		

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1.0 STANDARDS AND DEFINITIONS

1.1 STANDARDS - All standards refer to the current ASTM/AASHTO edition unless otherwise noted.

1.1.1 ASTM A761 "Corrugated Steel Structural Plate, Zinc Coated for Field-Bolted Pipe, Pipe-Arches and Arches" (AASHTO Designation M-167).

1.1.2 AASHTO Standard Specification for Highway Bridges - Section 12 Division I - Design, AASHTO LRFD Bridge Design Specifications Section 12.

1.1.3 AASHTO Standard Specification for Highway Bridges - Section 26 Division II - Construction, AASHTO LRFD Bridge Construction Specifications - Section 26. ASTM A807, Standard Practice for Installing Corrugated Steel Structural Plate Pipe.

1.2 DEFINITIONS

1.2.1 Owner - In these specifications the word "Owner" shall mean SHASTA TRINITY NATIONAL FOREST.

1.2.2 Engineer - In these specifications the word "Engineer" shall mean the Engineer of Record or Owner's designated engineering representative.

1.2.3 Manufacturer - In these specifications the word "Manufacturer" shall mean CONTECH ENGINEERED SOLUTIONS 800-338-1122 JASON LEACH.

1.2.4 Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any installation work under the terms of these specifications.

1.2.5 Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.

1.2.6 As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.

2.0 GENERAL CONDITIONS

2.1 Any installation guidance provided herein shall be endorsed by the Engineer; discrepancies herein are governed by the Engineer's plans and specifications.

2.2 The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, grading as shown on the plans and as described therein. This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications. This work is to be accomplished under the observation of the Owner or his designated representative.

2.3 Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

If conditions other than those indicated are discovered by the Contractor, the Owner shall be notified immediately. The material which the Contractor believes to be a changed condition shall not be disturbed so that the owner can investigate the condition.

2.4 The construction shall be performed under the direction of the Engineer.

2.5 All aspects of the structure design and site layout including foundations, backfill, end treatments and necessary scour consideration shall be performed by the Engineer.

3.0 ASSEMBLY AND INSTALLATION

3.1 Bolts and nuts shall conform to the requirements of ASTM A449. The single radius arch structure shall be assembled in accordance with the plate layout drawings provided by the Manufacturer and per the Manufacturer's recommendations.

Bolts shall be tightened using an applied torque of between 100 and 300 ft.-lbs.

3.2 The single radius arch structure shall be installed in accordance with the plans and specifications, the Manufacturer's recommendations, and AASHTO Standard Specification for Highway Bridges - Section 26 Division II - Construction/AASHTO LRFD Bridge Construction Specifications - Section 26.

3.3 Trench excavation shall be made in embankment material that is structurally adequate. The trench width shall be shown on the plans. Poor quality in situ embankment material must be removed and replaced with suitable backfill as directed by the Engineer.

3.4 Bedding preparation is critical to both structure performance and service life. The bed should be constructed to uniform line and grade to avoid distortions that may create undesirable stresses in the structure and/or rapid deterioration of the roadway. The bed should be free of rock formations, protruding stones, frozen lumps, roots, and other foreign matter that may cause unequal settlement.

3.5 The structure shall be assembled in accordance with the Manufacturer's instructions. All plates shall be unloaded and handled with reasonable care. Plates shall not be rolled or dragged over gravel rock and shall be prevented from striking rock or other hard objects during placement in trench or on bedding.

3.6 The structure shall be backfilled using clean well graded granular material that meets the requirements for soil classifications A-1, A-2-4, A-2-5 or A-3 modified per AASHTO M-145. See the structural plate backfill group classification table on this sheet.

Backfill must be placed symmetrically on each side of the structure in 8 inch loose lifts. Each lift shall be compacted to a minimum of 90 percent density per AASHTO T-180.

3.7 If temporary construction vehicles are required to cross the structure, it is the Contractor's responsibility to contact the Engineer to determine the amount of additional minimum cover necessary to handle the specific loading condition.

Normal highway traffic is not allowed to cross the structure until the structure has been backfilled and paved. If the road is unpaved, cover allowance to accommodate rutting shall be as directed by the Engineer.

3.8 If a metal headwall and/or wingwall system is specified, the select granular structural backfill limits shall extend past the deadman anchor system. Contact the Engineer if stiff material or rock is encountered where the wingwalls and deadmen are to be installed.

	INLET	OUTLET
SKEW	90	90
BEVEL	0	0

TYPE STRUCTURE SINGLE RADIUS ARCH
SIZE 180 PI
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RISE = 16'–7"
LENGTH ℄ $_L$ 80'–0"

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