

## FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

(Please fill in the highlighted areas)

\*all sections (IA, IB, IC, etc.) must be addressed or the application will be considered invalid\*

### I. APPLICANT INFORMATION

- A. Applicant Name: Carol Endicott
- B. Mailing Address: 1354 Highway 10 West
- C. City: Livingston State: MT Zip: 59047
- Telephone: (406) 222-3710 E-mail: [cendicott@mt.gov](mailto:cendicott@mt.gov)
- D. Contact Person: Clint Sestrich
- Address if different from Applicant: 5242 Highway 89 South
- City: Livingston State: MT Zip: 59047
- Telephone: (406) 823-6067 E-mail: [csestrich@fs.fed.us](mailto:csestrich@fs.fed.us)
- E. Landowner and/or Lessee Name (if other than Applicant): Custer Gallatin National Forest
- Mailing Address: 10 East Babcock St.
- City: Bozeman State: MT Zip: 59771
- Telephone: (406) 587-6701 E-mail: N/A

### II. PROJECT INFORMATION\*

- A. Project Name: Turkey Creek and Upper Turkey Creek aquatic organism passage
- River, stream, or lake: Turkey Creek
- Location: Township: 5N Range: 11E Section: 21
- Latitude: 46.17588 -110.35285 *within project (decimal degrees)*
- County: Park
- B. Purpose of Project:  
Restore fish passage at perched culvert crossings on Turkey Creek and an unnamed tributary to the Shields River (UNK 4106) adjacent to Turkey Creek.
- C. Brief Project Description:  
\_\_\_\_\_

There is currently a large interagency effort underway to remove brook trout from the upper Shields River drainage upstream from a man-made fish barrier located near the Forest boundary and restore habitat connectivity.

Turkey Creek and Shields River unnamed tributary 4106 provide habitat for native YCT in the upper Shields River drainage secure from brook trout competition. This is attributed to a temporary perched culvert barrier near the mouth of Turkey Creek and a natural bedrock barrier in the lower reach of unnamed tributary 4106. Although only 1.4 and 1.2 miles in length, these tributaries have strategic importance in the overall restoration of YCT in the upper Shields River drainage. Not only do these two streams provide secure headwater refugia from brook trout, but in the event mechanical brook trout removal is not successful in fully eradicating brook trout in the upper Shields River drainage, these streams will provide temporary holding areas for salvaged Yellowstone cutthroat trout, while waters still harboring brook trout are treated with piscicide.

Although secure from brook trout invasion by the barriers, each of these small streams has an additional perched culvert in its middle reach that is fragmenting YCT habitat. Turkey Creek has 0.26 mile of habitat below and one mile of habitat above its perched culvert while unnamed tributary 4106 has 0.41 mile of habitat below and 0.62 mile of habitat above its perched culvert.

By replacing these two perched culverts with aquatic organism passage structures, this project will reconnect 1.26 miles of habitat on Turkey Creek above its temporary fish barrier and reconnect 1.03 miles of habitat on unknown tributary 4106 above its natural barrier. This will greatly improve the potential for these small isolated populations to persist.

Ultimately, once brook trout have been successfully removed from the upper Shields River drainage upstream from the main stem fish barrier, the temporary barrier near the mouth of Turkey Creek will be replaced with an additional AOP structure. The bedrock barrier on unnamed tributary 4106 could also be modified to be passible to YCT.

This project is a small component of a watershed scale effort to conserve and protect Yellowstone cutthroat trout, and to reduce sediment loading to streams. The Custer Gallatin National Forest has invested \$6.5 million in road improvements to reduce sediment loading and provide fish passage. In addition, the Custer Gallatin National Forest constructed a large barrier at the downstream end of the project area that will protect 27 miles of stream habitat for this invaluable population of Yellowstone cutthroat trout.

D. Length of stream or size of lake that will be treated: 120 feet combined

E. Project Budget:

**Grant Request (Dollars): \$ 61,090**

Contribution by Applicant (Dollars): \$ 7,890 (Custer Gallatin National Forest) In-kind \$ 17,360

(salaries of government employees are not considered as matching contributions)

Contribution from other Sources (Dollars): \$ 53,500 In-kind \$

(attach verification - See page 2 budget template)

**Total Project Cost: \$ 139,840**

F. Attach itemized (line item) budget – see template

- G. Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support and fish biologist support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete supplemental questionnaire ([fwp.mt.gov/habitat/futurefisheries/supplement2.doc](http://fwp.mt.gov/habitat/futurefisheries/supplement2.doc)).
- H. Attach land management and maintenance plans that will ensure protection of the reclaimed area.

### III. PROJECT BENEFITS\*

- A. What species of fish will benefit from this project?:

This project is within a larger project area that has been the focus of intensive efforts to protect an imperiled population of Yellowstone cutthroat trout occupying 27 stream miles.

- B. How will the project protect or enhance wild fish habitat?:

The project will eliminate 2 barriers to fish movement. Over the short-term, fish will have access to more habitat within the reaches still protected by barriers. The long-term goal is to eradicate brook trout from the larger project area and provide connectivity throughout the 27 miles of stream that will protect an interconnected population of Yellowstone cutthroat trout in an area resilient to climate change.

- C. Will the project improve fish populations and/or fishing? To what extent?:

The project will protect Yellowstone cutthroat trout and provide anglers with opportunities to fish for native fish in a wild and beautiful setting.

- D. Will the project increase public fishing opportunity for wild fish and, if so, how?:

The project area is within national forest, so the public has free access to fish in the area.

- E. The project agreement includes a 20-year maintenance commitment. Please discuss your ability to meet this commitment.

The Custer Gallatin National Forest will maintain all roads and crossings in the project area as part of their regular operations.

- F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?:

Turkey Creek and an adjacent unnamed tributary to the Shields River (UNK4106) have undersized, perched road culverts that are fragmenting 1.26 mile and 1.03 mile of secure YCT habitat, respectively. By installing, two aquatic organism passage structures (AOPs) this project will fully restore fish passage and increase potential for YCT persistence in these small, isolated tributary stream reaches. By simulating upstream and downstream channel width, gradient, and substrate through the road crossings, these structures are passible to all aquatic organisms under most flow conditions.

G. What public benefits will be realized from this project?:

This project is part of a larger effort to secure a nonhybridized population of Yellowstone cutthroat trout within 27 miles of connected stream within national forest. The Yellowstone cutthroat trout is a Montana native and an important component of our natural heritage. The road system provides access to the Shields River and other fishable waters in the project area, and a campground provides anglers a base to enjoy an extended stay. Cumulatively, Yellowstone cutthroat trout conservation projects such as this one reduce justification for including Yellowstone cutthroat trout for protection under the Endangered Species Act. Listing species puts a burden on tax dollars and reduces the flexibility in land management decisions on private and public lands.

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No

I. Will the project result in the development of commercial recreational use on the site?: (explain):

No

J. Is this project associated with the reclamation of past mining activity?:

No.

**Each approved project sponsor must enter into a written agreement with the Department specifying terms and duration of the project.**

#### IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature:

*Carol Endicott*

Date:

5/31/2017

Sponsor (if applicable):

**\*Highlighted boxes will automatically expand.**

**Mail To: Montana Fish, Wildlife & Parks  
Habitat Protection Bureau  
PO Box 200701  
Helena, MT 59620-0701**

**E-mail To: Michelle McGree  
[mmcgree@mt.gov](mailto:mmcgree@mt.gov)  
(electronic submissions MUST be signed)**

029-2017

Turkey Creek fish passage

**Incomplete or late applications will be rejected and returned to applicant.  
Applications may be rejected if this form is modified.**

**\*\*\*Applications may be submitted at anytime, but must be signed and received by the Future Fisheries Program Officer in Helena before December 1 and June 1 of each year to be considered for the subsequent funding period.\*\*\***

**Attachment F: Budget**

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
<b>Personnel***</b>								
Survey	8	Forest Service Site Survey, Days	\$385.00	\$ 3,080.00		\$ 3,080.00		\$ 3,080.00
Design	8	Forest Service Engineering, Days	\$385.00	\$ 3,080.00		\$ 3,080.00		\$ 3,080.00
Engineering	6	Forest Service Engineering, Days	\$385.00	\$ 2,310.00		\$ 2,310.00		\$ 2,310.00
Permitting	2	Permit Application, Days	\$385.00	\$ 770.00		\$ 770.00		\$ 770.00
Oversight	20	Forest Service COR Admin, Days	\$385.00	\$ 7,700.00		\$ 7,700.00		\$ 7,700.00
				\$ -				\$ -
			Sub-Total	\$ 16,940.00	\$ -	\$ 16,940.00	\$ -	\$ 16,940.00
<b>Travel</b>								
Mileage	2	Site Survey and Plan-in-Hand	\$42.00	\$ 84.00		\$ 84.00		\$ 84.00
Mileage	8	COR Trips @120 miles RT	\$42.00	\$ 336.00		\$ 336.00		\$ 336.00
			Sub-Total	\$ 420.00	\$ -	\$ 420.00	\$ -	\$ 420.00
<b>Construction Materials****</b>								
	2	96" Dia Roaund Culvert, LS	\$32,000.00	\$ 64,000.00	\$ 13,500.00		\$ 50,500.00	\$ 64,000.00
	60	Road Aggregate Replacement	\$40.00	\$ 2,400.00	\$ 2,400.00			\$ 2,400.00
								\$ -
								\$ -
								\$ -
								\$ -
				\$ -				\$ -
			Sub-Total	\$ 66,400.00	\$ 15,900.00	\$ -	\$ 50,500.00	\$ 66,400.00
<b>Equipment and Labor</b>								
	2	Site Work & Govt Furnished RipRap, LS	\$15,000.00	\$ 30,000.00	\$ 30,000.00			\$ 30,000.00
	2	Construction Staking, LS	\$3,000.00	\$ 6,000.00	\$ 3,000.00		\$ 3,000.00	\$ 6,000.00
	2	Structure Excavation, LS	\$5,000.00	\$ 10,000.00	\$ 2,110.00		\$ 7,890.00	\$ 10,000.00
	16	Equipment Rental, Large Dump Truck, HR	\$145.00	\$ 2,320.00	\$ 2,320.00			\$ 2,320.00
	16	Equipment Rental, Hydraulic Excavator, HR	\$110.00	\$ 1,760.00	\$ 1,760.00			\$ 1,760.00
				\$ -				\$ -
			Sub-Total	\$ 50,080.00	\$ 39,190.00	\$ -	\$ 10,890.00	\$ 50,080.00
<b>Mobilization</b>								
	1	Mobilization	\$6,000.00	\$ 6,000.00	\$ 6,000.00			\$ 6,000.00
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
			Sub-Total	\$ 6,000.00	\$ 6,000.00	\$ -	\$ -	\$ 6,000.00
			<b>TOTALS</b>	\$ 139,840.00	\$ 61,090.00	\$ 17,360.00	\$ 61,390.00	\$ 139,840.00



## Attachment G: Project Background and Designs

The upper Shields River watershed has exceptional conservation value for Yellowstone cutthroat trout. It supports nonhybridized Yellowstone cutthroat trout at high elevation and in the northernmost part of its range. This location puts the project within a climate shield, or area likely to remain a cold-water refuge into the future. Fisheries investigations beginning in the 1970s and extending to 2003 found only Yellowstone cutthroat trout within the larger project area. Alarmingly, an extensive fish survey found the beginning of a brook trout invasion in 2009, and brook trout spread rapidly into the project area by 2011. Brook trout are among the greatest threats to cutthroat trout, especially in headwaters streams, and losing this high value, cold-water refugium to an invasive species would be a tragic loss of part of Montana's natural heritage.

Montana Fish, Wildlife & Parks (FWP), the Custer Gallatin National Forest (CGNF), and Dr. Brad Shepard have been collaborating on removing brook trout from this area using electrofishing. Key to this effort was construction of a barrier at the downstream end of the project area (**Figure 1**), a project possible in part because of Future Fisheries Improvement Program funds.



Figure 1. Upper Shields River fish barrier located just upstream from the National Forest Boundary.

During their extensive road rehabilitation project, the Custer Gallatin National Forest purposefully installed perched culverts on Turkey Creek, Scofield Creek, and an unnamed tributary west of Dugout Creek (Figure 2 and Figure 3). The intent of these perched culverts was

to protect these streams from invasion by brook trout until the completion of agency brook trout removal effort. In addition, an unnamed tributary (UNK4106) adjacent to Turkey Creek has a natural bedrock barrier that is preventing brook trout invasion (Figure 2). Unfortunately, Turkey Creek and unnamed tributary 4106 have additional perched culverts that are fragmenting YCT habitat within reaches secure from brook trout invasion by the downstream barriers (Figure 3 and Figure 4).

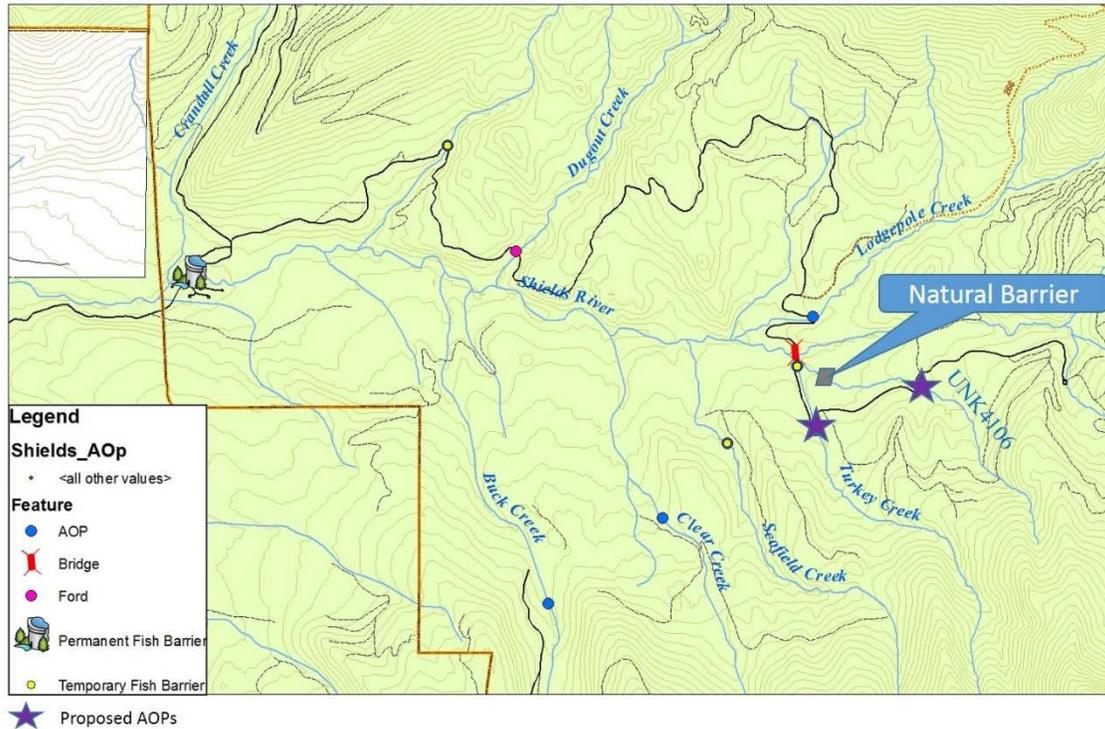


Figure 2. Map of the project area showing locations of two proposed AOP projects (purple stars) relative to human-made and natural barriers.

By replacing these perched culverts with aquatic organism passage structures (AOPs) this project will reconnect 1.26 mile of secure habitat in Turkey Creek and 1.03 mile of secure habitat in unnamed tributary 4106. Moreover, should mechanical removal fail to eradicate brook trout, piscicide will be necessary. With the downstream barriers still in place, these streams will provide habitat to hold salvaged Yellowstone cutthroat trout until piscicide treatment is complete.



Figure 3. Upper perched culvert on Turkey Creek.

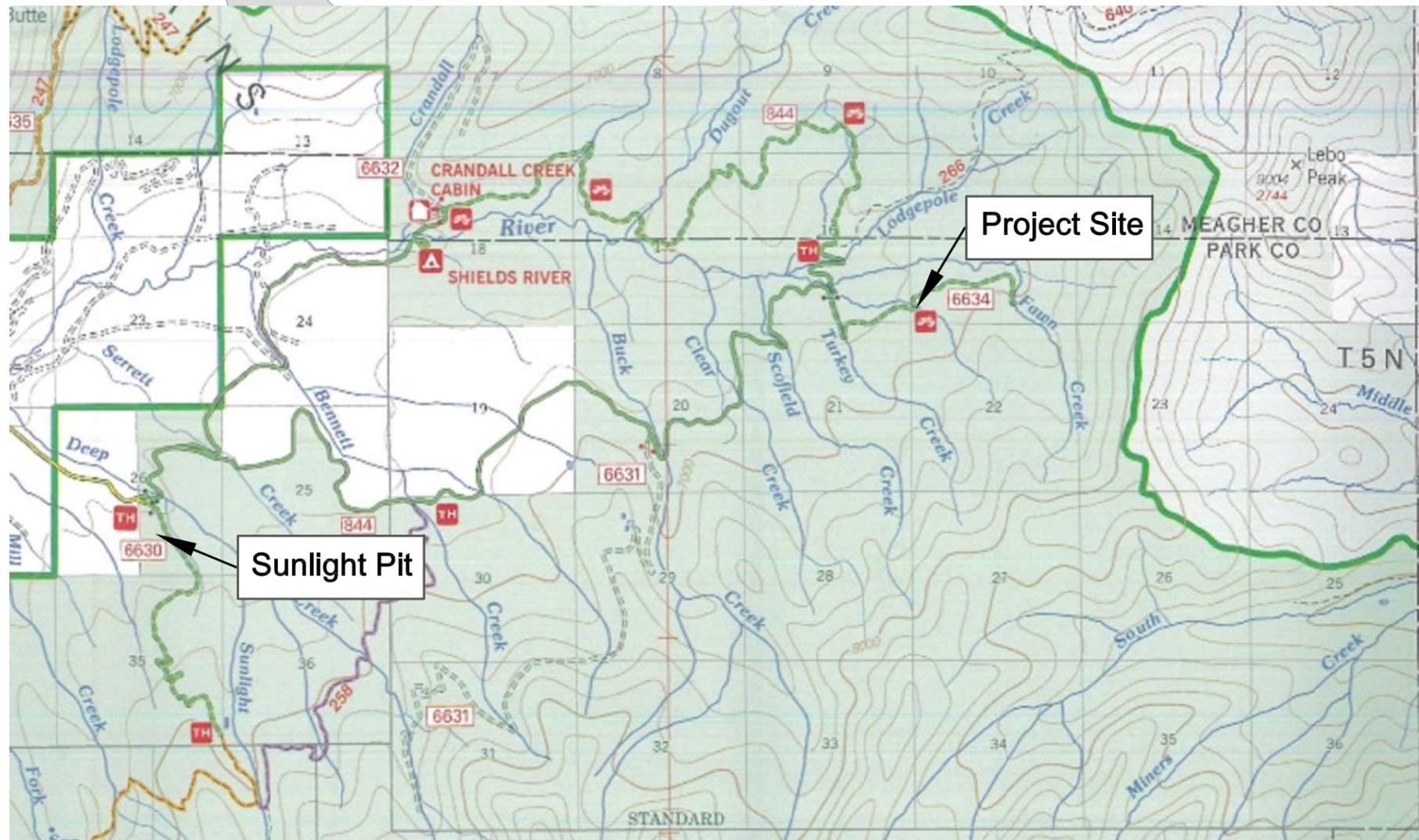
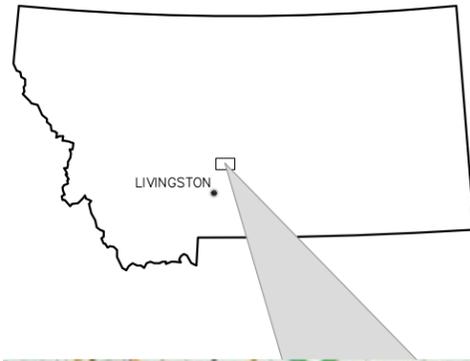


Figure 4. Perched culvert outlet on unnamed Shields River tributary #4106.

Professional engineers with the Custer Gallatin National Forest prepared designs for both AOPs. The following design sheets detail AOP design parameters for the Turkey Creek upper crossing and the unnamed tributary 4106 crossing. A letter of support follows.

# CONSTRUCTION PLANS FOR UNNAMED CREEK UNK4106 AQUATIC ORGANISM PASSAGE (AOP) CULVERT

Custer Gallatin National Forest  
Yellowstone Ranger District



VICINITY MAP

SHEET INDEX

SHEET	TITLE
1	COVER
2	SITE PLAN AND GENERAL NOTES
3	LONGITUDINAL PROFILE AND CULVERT ENDS
4	STREAMBED DETAILS
5	GRADE CONTROL DETAILS
6	ROAD DETAILS

RECOMMENDED

DESIGN ENGINEER _____	DATE _____
DISTRICT RANGER _____	DATE _____

APPROVED

I CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED IN ACCORDANCE WITH THE LAND USE PRESCRIPTIONS FOR THE AREA AND WITH SOUND ENGINEERING PRACTICE AND APPROVE IT FOR CONSTRUCTION.

FOREST ENGINEER _____	DATE _____
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FOREST SUPERVISOR _____	DATE _____
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**NOTE: THIS IS AN EXAMPLE PLAN VIEW. THE TRIBUTARY TO TURKEY CREEK AOP PLAN VIEW WILL BE VERY SIMILAR TO THAT SHOWN BELOW**

**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-03 (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.

WORK WITHIN THE STREAM CHANNEL SHALL OCCUR ONLY WHILE THE CHANNEL IS COMPLETELY DEWATERED.

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. CLEARING AND DISTURBANCE LIMITS.** LIMIT ALL DISTURBANCE TO WITHIN THE DESIGNATED DISTURBANCE LIMITS. CLEARING AND DISTURBANCE LIMITS ARE SHOWN ON THE PLANS AND WILL BE STAKED IN THE FIELD BY THE C.O. ADDITIONAL AREAS FOR STORAGE/STOCKPILING SHALL BE SOLELY AT THE DISCRETION OF THE C.O. AND AS APPROVED AND STAKED BY THE C.O.

- 6. CLEARING AND GRUBBING.** CLEARING AND GRUBBING SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 201. SECURE C.O. APPROVAL PRIOR TO FELLING TREES GREATER THAN 8 INCHES IN DIAMETER. LIMB TREES GREATER THAN 6 INCHES IN DIAMETER. DISPOSE OF TREE LIMBS AND SLASH BY SCATTERING ON FINISHED FILL SLOPES AS DIRECTED BY THE C.O. CLEARING AND GRUBBING WORK IS INCLUDED IN PAY ITEM 201-01.

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, TREES, AND SLASH IS INCLUDED IN PAY ITEM 201-01.

SALVAGE CLEAN EXISTING SURFACE COURSE AGGREGATE FROM ALL AREAS TO BE DISTURBED AND STOCKPILE FOR RE-APPLICATION TO ROAD SURFACE. RE-APPLY ONLY GRAVEL THAT HAS BEEN APPROVED FOR USE BY THE C.O. CONSERVING AND REPLACING SURFACE COURSE AGGREGATE IS INCLUDED IN PAY ITEM 204-01.

- 7. 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.

- 8. TOLERANCES.** CONTROL POINT TOLERANCES SHALL BE AS SHOWN IN SECTION 152. CONSTRUCTION TOLERANCES (X,Y,Z) SHALL BE AS FOLLOWS:

+/- 0.5 FT IN THE HORIZONTAL (X,Y) PLANE  
 +/- 0.1 FT VERTICAL (Z)

DIMENSIONS (E.G., LENGTH, WIDTH, THICKNESS) SHALL BE AS SHOWN ON THE PLANS.

- 9. STRUCTURE EXCAVATION.** COMPLETE STRUCTURE EXCAVATION IN ACCORDANCE WITH SECTION 208. STRUCTURE EXCAVATION INCLUDES BEDROCK EXCAVATION AND BLASTING. COMPLY WITH *OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX A - SOIL CLASSIFICATION AND OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX B - SLOPING AND BENCHING.*

THE 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, SHORING, LOCATION OF STOCKPILES, AND ESTIMATED QUANTITIES AND SHALL COMPLY WITH OSHA EXCAVATION SOIL TYPING AND REQUIREMENTS.

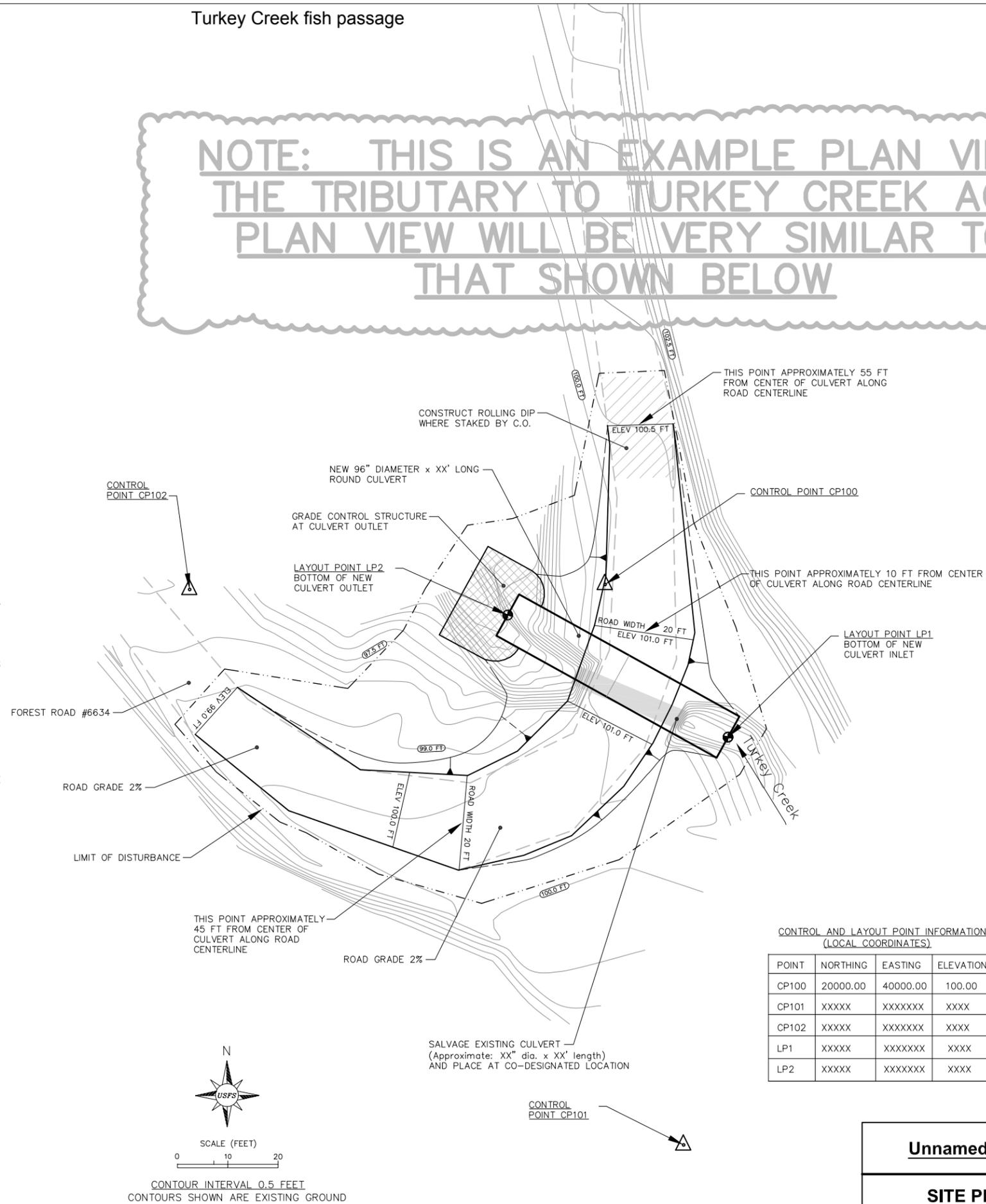
STRUCTURE EXCAVATION QUANTITY SHOWN IS FOR INFORMATIONAL PURPOSES ONLY AND IS BASED ON MAXIMUM ALLOWABLE SLOPE ON EXCAVATION WALLS OF 1.5:1 (HORIZONTAL:VERTICAL). CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES BASED ON THEIR OWN EXCAVATION PLANS.

- 10. STRAW WATTLE SEDIMENT BARRIERS.** INSTALL STRAW WATTLES AS SEDIMENT BARRIERS IN ALL LOCATIONS WHERE DISTURBED SOIL LIES DIRECTLY ADJACENT TO STREAMBANKS OR CHANNEL. INSTALL WATTLES ALONG THE TOPS OF STREAMBANKS AS DIRECTED BY THE C.O. PLACE WATTLES IN A 4-INCH DEEP TRENCH AND STAKE AS SHOWN IN THE DRAWINGS. WATTLES ARE NOT REQUIRED WHERE RIPRAP OR CONSTRUCTED STREAMBANKS LIE ADJACENT TO THE STREAM CHANNEL.

- 11. STRAW WATTLES.** STRAW WATTLES FOR CONSTRUCTED STREAMBANKS AND SEDIMENT BARRIERS SHALL BE 9-INCH DIAMETER AND CERTIFIED WEED-FREE.

- 12. THALWEG.** THE THALWEG IS DEFINED AS THE LOWEST POINT IN THE STREAM CHANNEL CROSS-SECTION.

- 13. ESTIMATED QUANTITIES.** ESTIMATED QUANTITIES ARE SHOWN ON THE BID SCHEDULE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF QUANTITY ESTIMATES.



CONTROL AND LAYOUT POINT INFORMATION (LOCAL COORDINATES)

POINT	NORTHING	EASTING	ELEVATION
CP100	20000.00	40000.00	100.00
CP101	XXXXX	XXXXXXX	XXXX
CP102	XXXXX	XXXXXXX	XXXX
LP1	XXXXX	XXXXXXX	XXXX
LP2	XXXXX	XXXXXXX	XXXX



SCALE (FEET)  
 0 10 20

CONTOUR INTERVAL 0.5 FEET  
 CONTOURS SHOWN ARE EXISTING GROUND

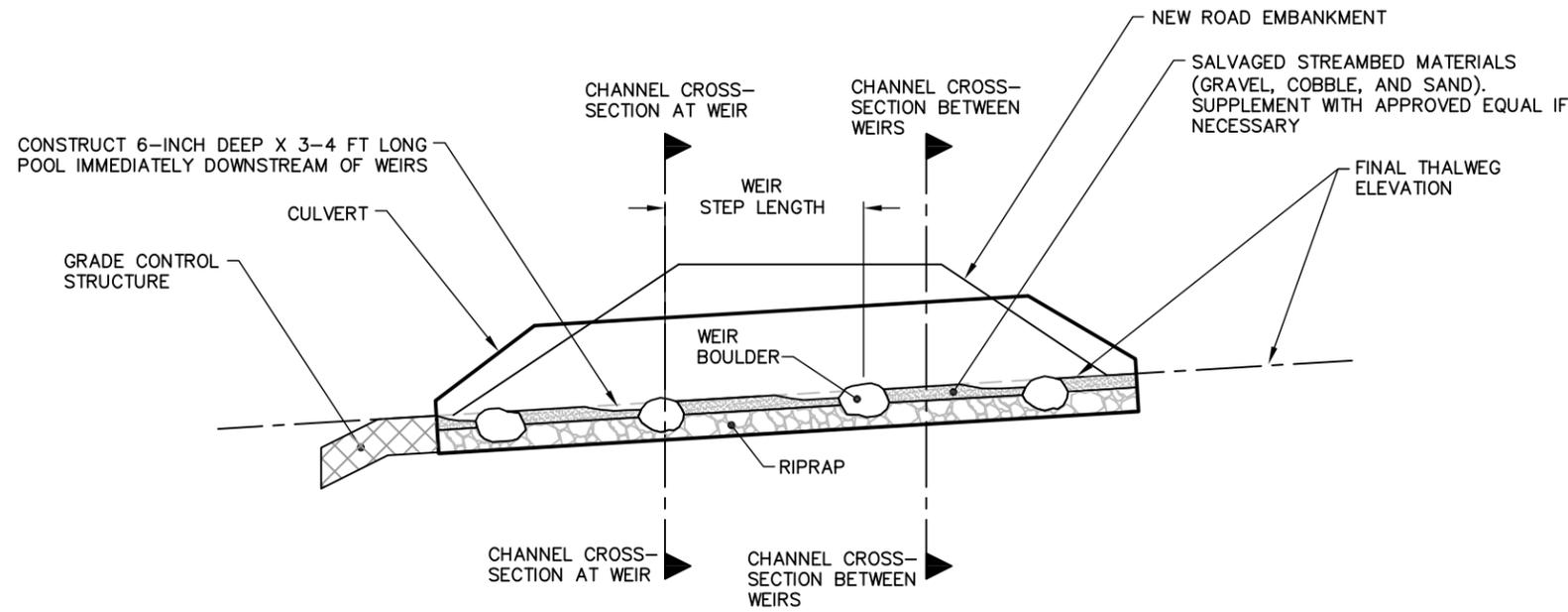
**Unnamed Creek UNK4106 AOP Culvert**

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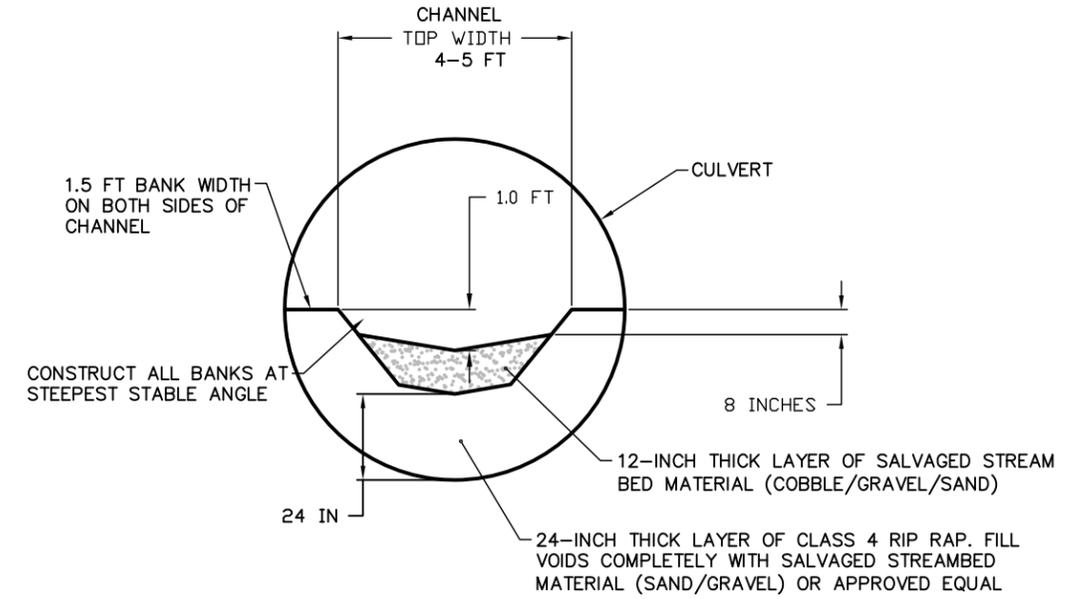
**SITE PLAN AND GENERAL NOTES**

Drawn by: <u>DW</u>	Date: <u>xx/xx/17</u>
Revised: _____	Date: _____

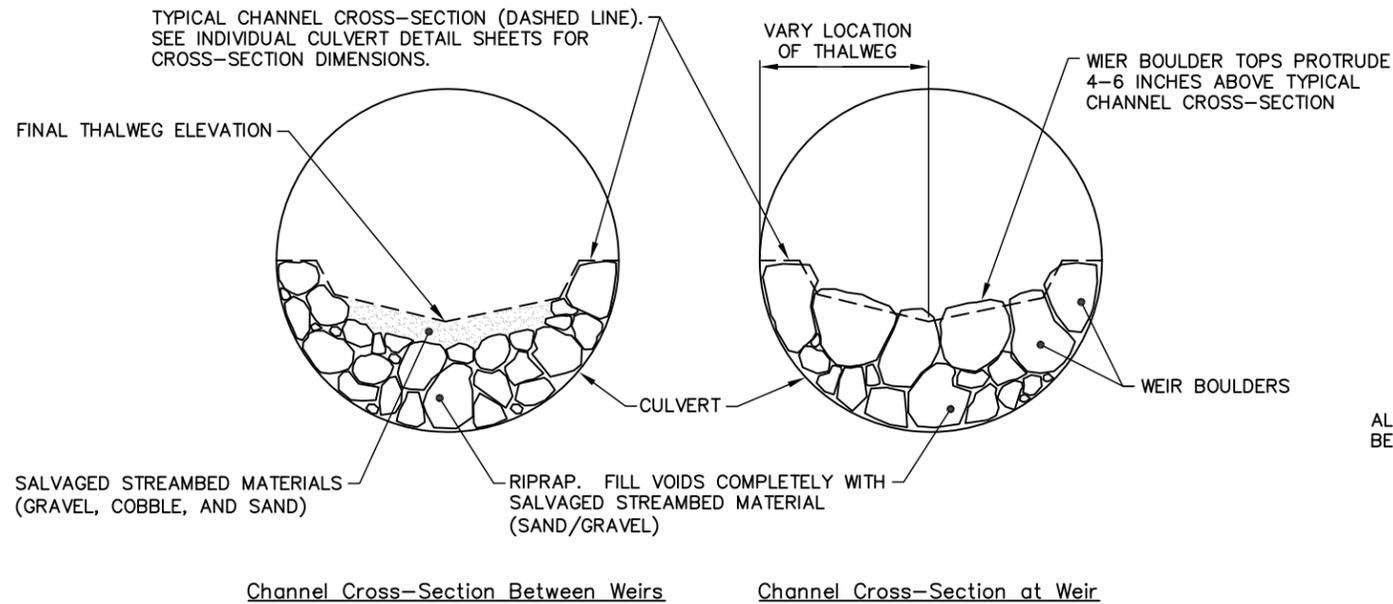
Sheet x of x



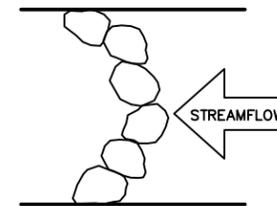
TYPICAL LONGITUDINAL SECTION THROUGH CULVERTS  
NOT TO SCALE



CHANNEL CROSS-SECTION DIMENSIONS AND MATERIALS WITHIN CULVERT  
NOT TO SCALE



TYPICAL CONSTRUCTED CHANNEL CROSS-SECTIONS INSIDE CULVERTS  
NOT TO SCALE



TYPICAL PLAN VIEW OF WEIR  
NOT TO SCALE

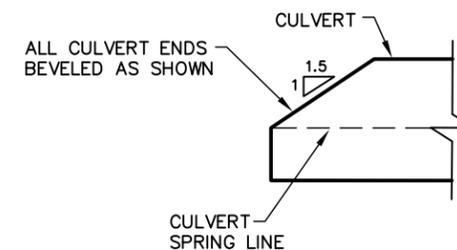
CHANNEL TOP WIDTH, WEIR BOULDER SIZE, GRADE CONTROL RIPRAP SIZE, AND STEP LENGTH

CHANNEL TOP WIDTH	4-5 FT
RIPRAP INSIDE CULVERT	CLASS 3
WEIR BOULDER SIZE*	18-24 IN.*
GRADE CONTROL RIPRAP	CLASS 4
STEP LENGTH RANGE	5-9 FT.
STEP LENGTH AVERAGE	7 FT.

\*THE SIZE SHOWN IS THE "EQUIVALENT DIAMETER" AS DEFINED IN SECTION 101

NOTE: VARY STEP LENGTH WITHIN RANGE SHOWN. ACHIEVE OVERALL AVERAGE AS SHOWN.

MATERIAL SIZES AND WEIR STEP LENGTH  
NOT TO SCALE



DETAIL OF CULVERT BEVELED END  
NOT TO SCALE

**Unnamed Creek UNK4106 AOP Culvert**

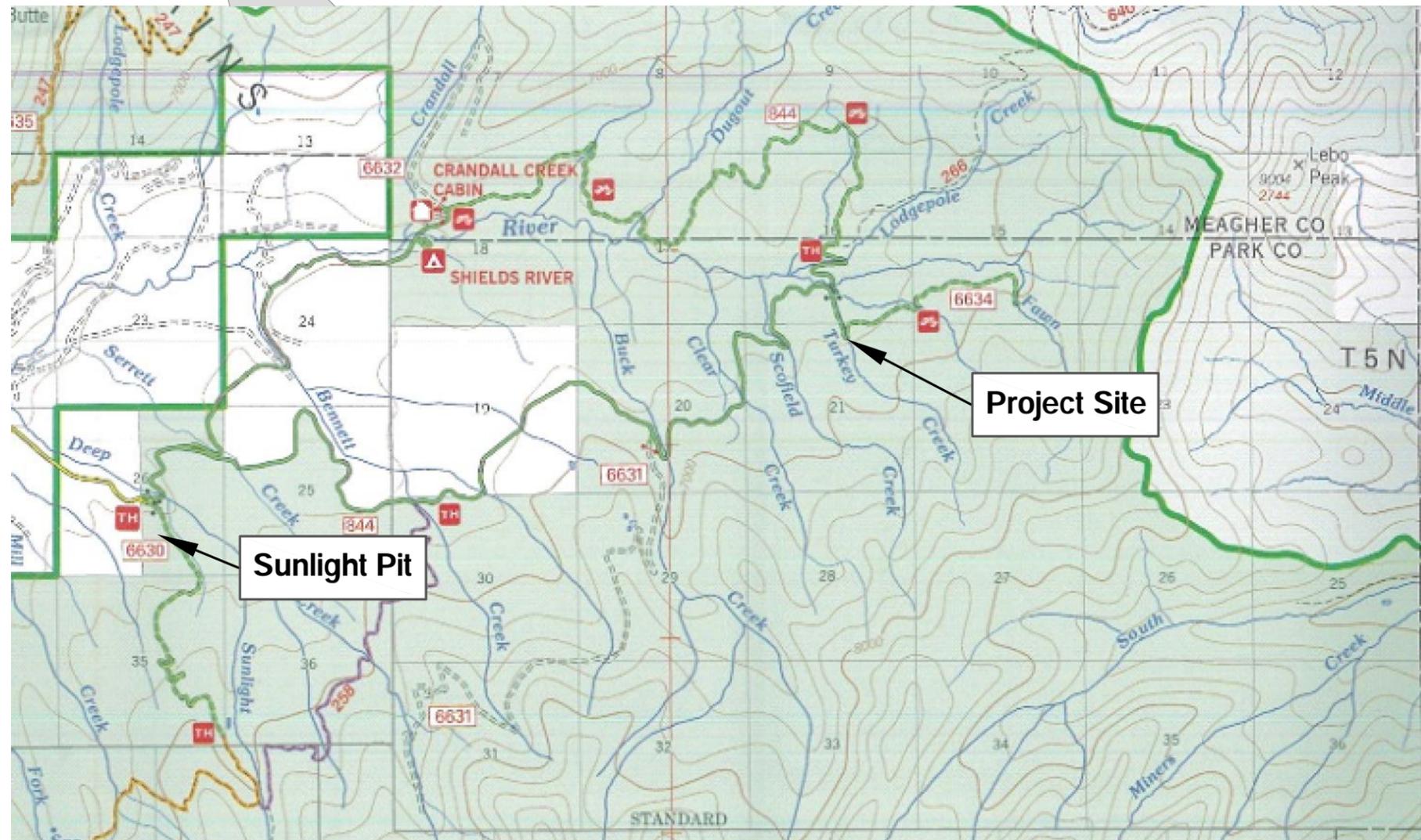
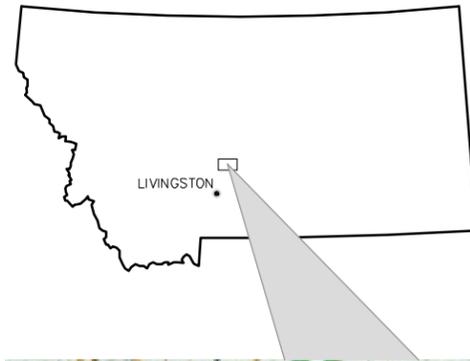
**STREAMBED DETAILS**

Drawn by: DW Date: xx/xx/17  
Revised: \_\_\_ Date: \_\_\_

Sheet x of x

# CONSTRUCTION PLANS FOR UPPER TURKEY CREEK AQUATIC ORGANISM PASSAGE (AOP) CULVERT

Custer Gallatin National Forest  
Yellowstone Ranger District



VICINITY MAP

SHEET INDEX

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RECOMMENDED

DESIGN ENGINEER _____	DATE _____
DISTRICT RANGER _____	DATE _____

APPROVED

I CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED IN ACCORDANCE WITH THE LAND USE PRESCRIPTIONS FOR THE AREA AND WITH SOUND ENGINEERING PRACTICE AND APPROVE IT FOR CONSTRUCTION.

FOREST ENGINEER _____	DATE _____
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FOREST SUPERVISOR _____	DATE _____
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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-03 (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.

WORK WITHIN THE STREAM CHANNEL SHALL OCCUR ONLY WHILE THE CHANNEL IS COMPLETELY DEWATERED.

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. CLEARING AND DISTURBANCE LIMITS.** LIMIT ALL DISTURBANCE TO WITHIN THE DESIGNATED DISTURBANCE LIMITS. CLEARING AND DISTURBANCE LIMITS ARE SHOWN ON THE PLANS AND WILL BE STAKED IN THE FIELD BY THE C.O. ADDITIONAL AREAS FOR STORAGE/STOCKPILING SHALL BE SOLELY AT THE DISCRETION OF THE C.O. AND AS APPROVED AND STAKED BY THE C.O.

- 6. CLEARING AND GRUBBING.** CLEARING AND GRUBBING SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 201. SECURE C.O. APPROVAL PRIOR TO FELLING TREES GREATER THAN 8 INCHES IN DIAMETER. LIMB TREES GREATER THAN 6 INCHES IN DIAMETER. DISPOSE OF TREE LIMBS AND SLASH BY SCATTERING ON FINISHED FILL SLOPES AS DIRECTED BY THE C.O. CLEARING AND GRUBBING WORK IS INCLUDED IN PAY ITEM 201-01.

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, TREES, AND SLASH IS INCLUDED IN PAY ITEM 201-01.

SALVAGE CLEAN EXISTING SURFACE COURSE AGGREGATE FROM ALL AREAS TO BE DISTURBED AND STOCKPILE FOR RE-APPLICATION TO ROAD SURFACE. RE-APPLY ONLY GRAVEL THAT HAS BEEN APPROVED FOR USE BY THE C.O. CONSERVING AND REPLACING SURFACE COURSE AGGREGATE IS INCLUDED IN PAY ITEM 204-01.

- 7. 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.

- 8. TOLERANCES.** CONTROL POINT TOLERANCES SHALL BE AS SHOWN IN SECTION 152. CONSTRUCTION TOLERANCES (X,Y,Z) SHALL BE AS FOLLOWS:

- +/- 0.5 FT IN THE HORIZONTAL (X,Y) PLANE
- +/- 0.1 FT VERTICAL (Z)

DIMENSIONS (E.G., LENGTH, WIDTH, THICKNESS) SHALL BE AS SHOWN ON THE PLANS.

- 9. STRUCTURE EXCAVATION.** COMPLETE STRUCTURE EXCAVATION IN ACCORDANCE WITH SECTION 208. STRUCTURE EXCAVATION INCLUDES BEDROCK EXCAVATION AND BLASTING. COMPLY WITH *OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX A - SOIL CLASSIFICATION AND OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX B - SLOPING AND BENCHING*.

THE 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, SHORING, LOCATION OF STOCKPILES, AND ESTIMATED QUANTITIES AND SHALL COMPLY WITH OSHA EXCAVATION SOIL TYPING AND REQUIREMENTS.

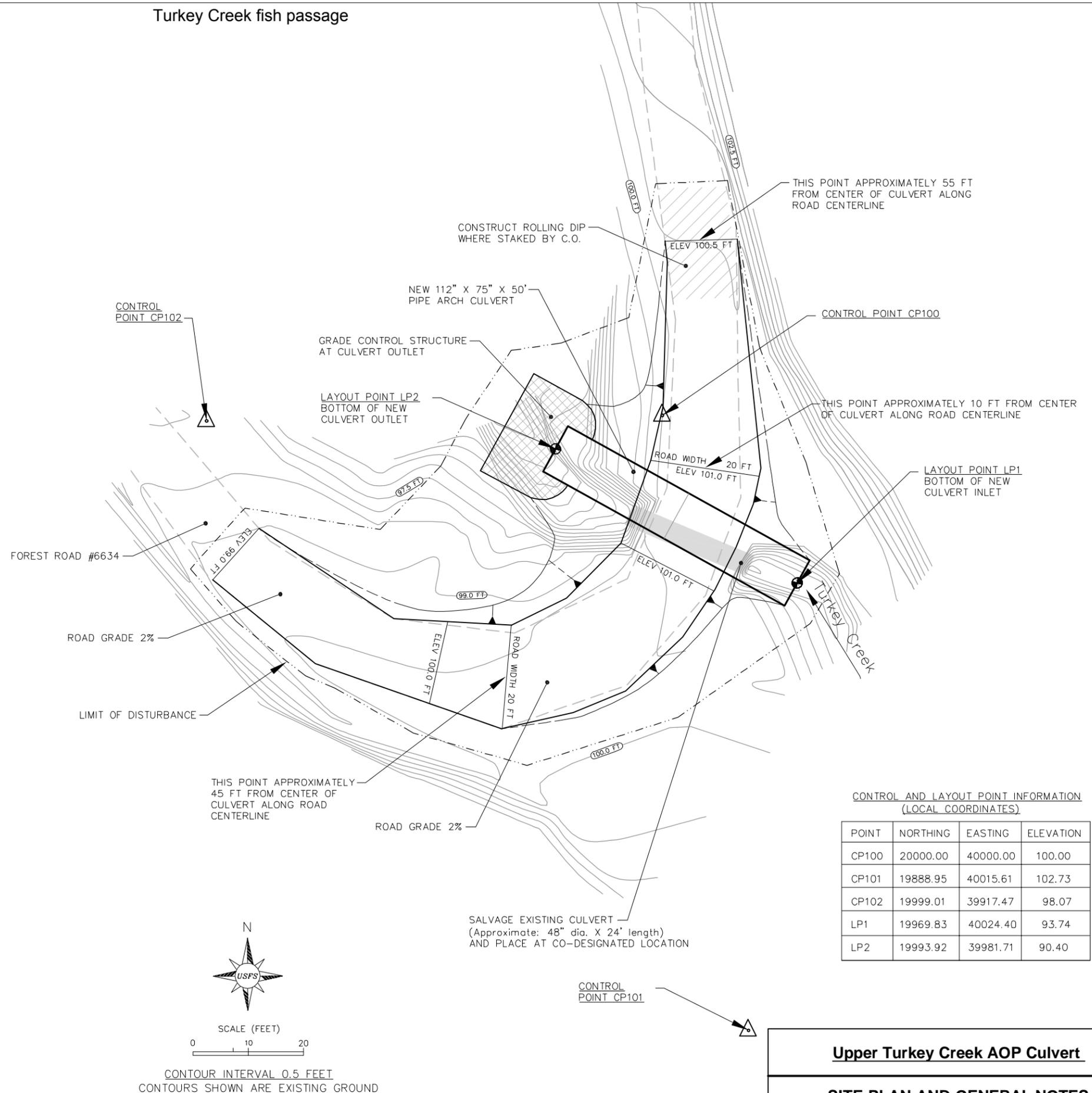
STRUCTURE EXCAVATION QUANTITY SHOWN IS FOR INFORMATIONAL PURPOSES ONLY AND IS BASED ON MAXIMUM ALLOWABLE SLOPE ON EXCAVATION WALLS OF 1.5:1 (HORIZONTAL:VERTICAL). CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES BASED ON THEIR OWN EXCAVATION PLANS.

- 10. STRAW WATTLE SEDIMENT BARRIERS.** INSTALL STRAW WATTLES AS SEDIMENT BARRIERS IN ALL LOCATIONS WHERE DISTURBED SOIL LIES DIRECTLY ADJACENT TO STREAMBANKS OR CHANNEL. INSTALL WATTLES ALONG THE TOPS OF STREAMBANKS AS DIRECTED BY THE C.O. PLACE WATTLES IN A 4-INCH DEEP TRENCH AND STAKE AS SHOWN IN THE DRAWINGS. WATTLES ARE NOT REQUIRED WHERE RIPRAP OR CONSTRUCTED STREAMBANKS LIE ADJACENT TO THE STREAM CHANNEL.

- 11. STRAW WATTLES.** STRAW WATTLES FOR CONSTRUCTED STREAMBANKS AND SEDIMENT BARRIERS SHALL BE 9-INCH DIAMETER AND CERTIFIED WEED-FREE.

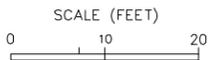
- 12. THALWEG.** THE THALWEG IS DEFINED AS THE LOWEST POINT IN THE STREAM CHANNEL CROSS-SECTION.

- 13. ESTIMATED QUANTITIES.** ESTIMATED QUANTITIES ARE SHOWN ON THE BID SCHEDULE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF QUANTITY ESTIMATES.



CONTROL AND LAYOUT POINT INFORMATION (LOCAL COORDINATES)

POINT	NORTHING	EASTING	ELEVATION
CP100	20000.00	40000.00	100.00
CP101	19888.95	40015.61	102.73
CP102	19999.01	39917.47	98.07
LP1	19969.83	40024.40	93.74
LP2	19993.92	39981.71	90.40



CONTOUR INTERVAL 0.5 FEET  
CONTOURS SHOWN ARE EXISTING GROUND

**Upper Turkey Creek AOP Culvert**

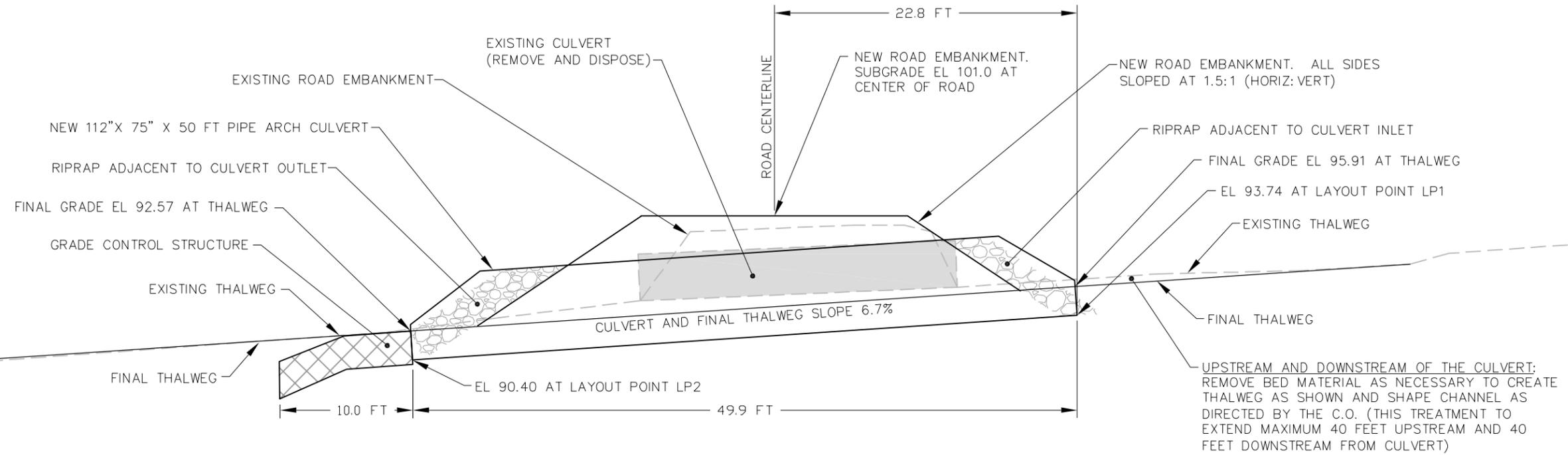
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**SITE PLAN AND GENERAL NOTES**

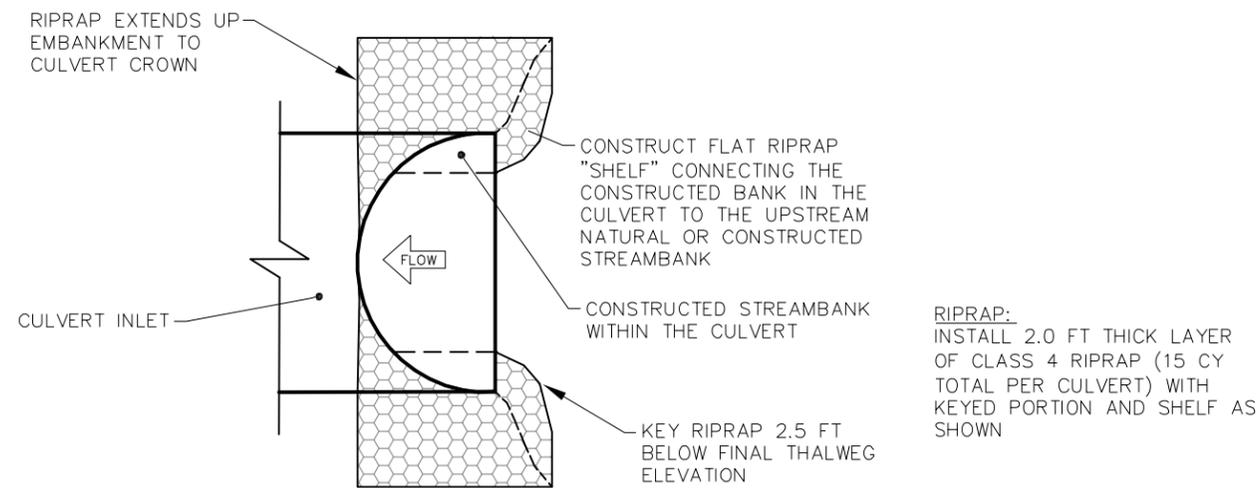
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Drawn by: <u>DW</u> Date: <u>02/08/17</u>	Sheet 2 of 6
Revised: _____ Date: _____	

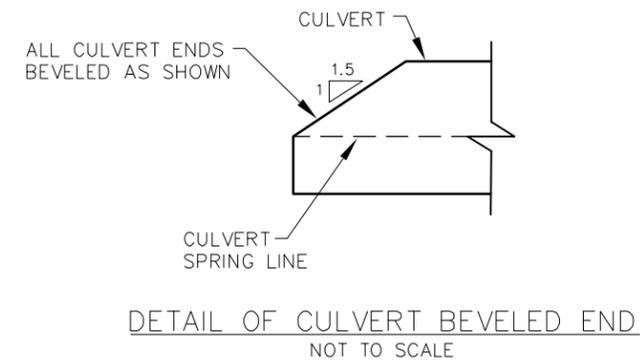
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LONGITUDINAL SECTION THROUGH CULVERT  
NOT TO SCALE

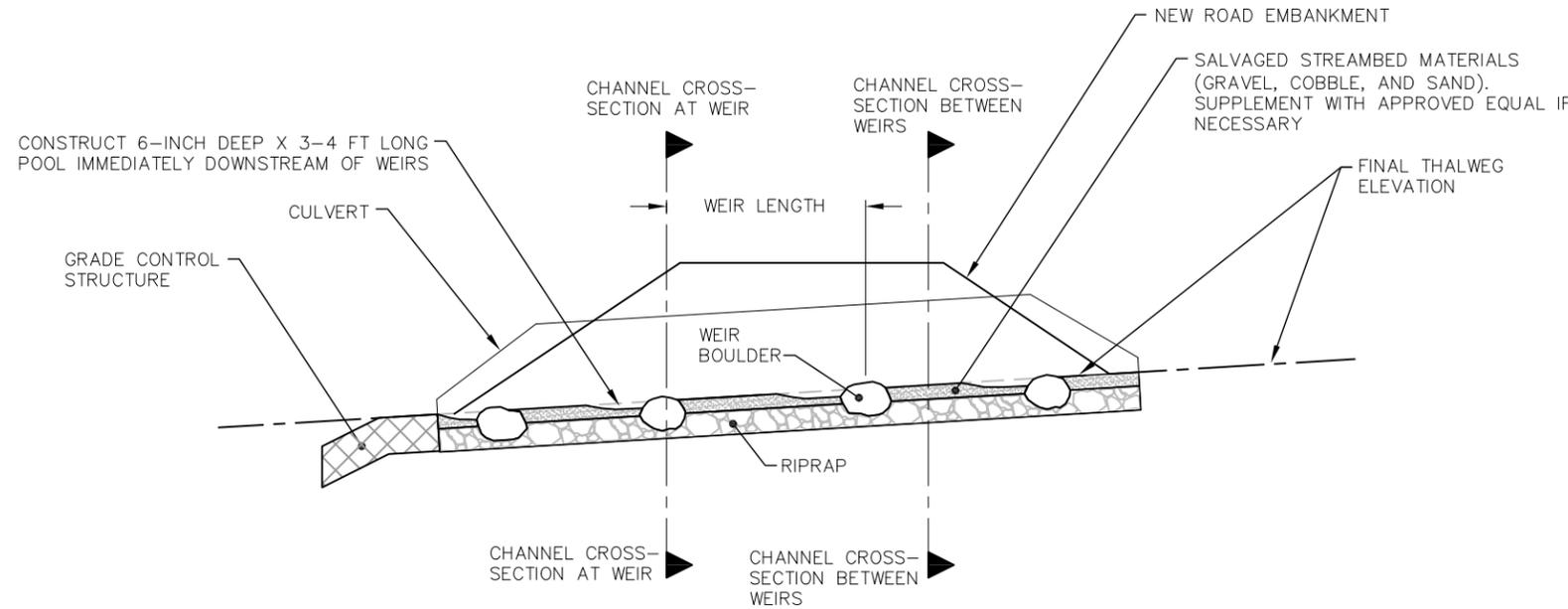


CULVERT INLET RIPRAP PLAN VIEW  
NOT TO SCALE

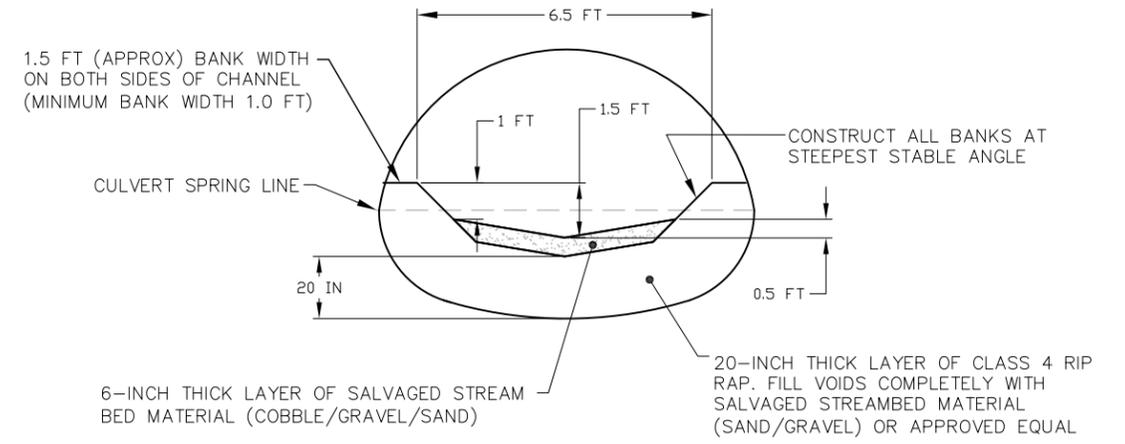


DETAIL OF CULVERT BEVELED END  
NOT TO SCALE

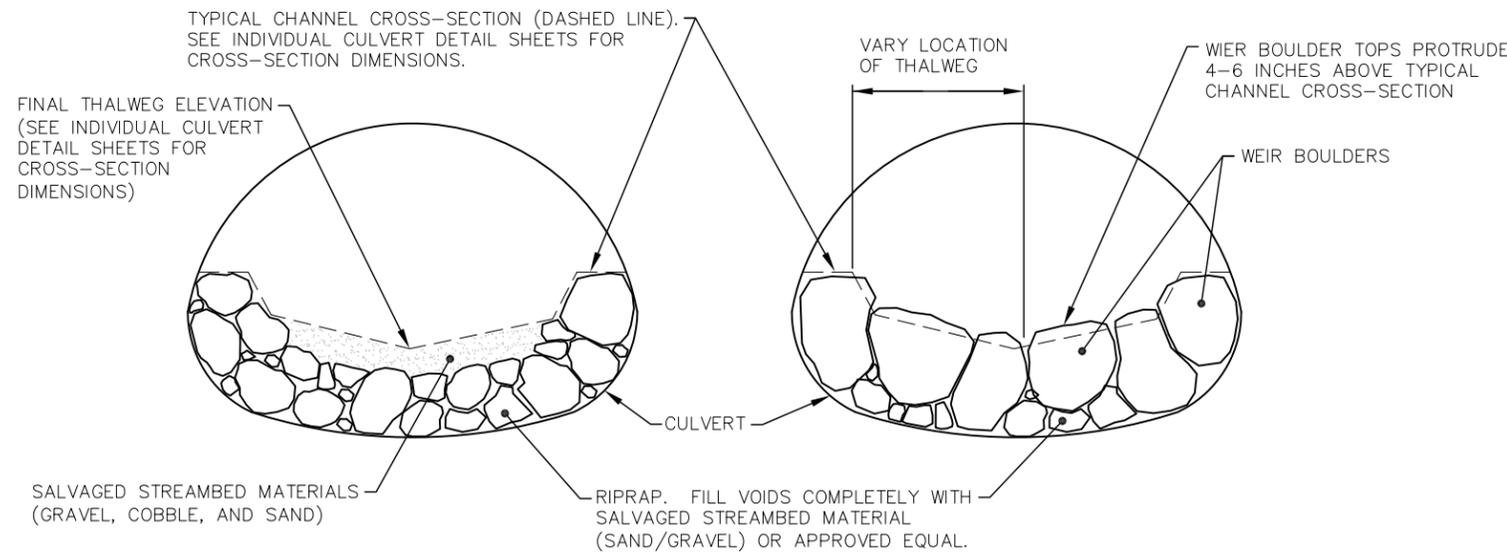
<b>Upper Turkey Creek AOP Culvert</b>		
<b>LONGITUDINAL PROFILE &amp; CULVERT ENDS</b>		
Drawn by: <u>DW</u>	Date: <u>02/07/17</u>	Sheet 3 of 6
Revised: _____	Date: _____	



TYPICAL LONGITUDINAL SECTION THROUGH CULVERTS  
NOT TO SCALE



CHANNEL CROSS-SECTION DIMENSIONS AND MATERIALS WITHIN CULVERT  
NOT TO SCALE



Channel Cross-Section Between Weirs

Channel Cross-Section at Weir

CONSTRUCTED CHANNEL CROSS-SECTIONS INSIDE CULVERTS  
NOT TO SCALE

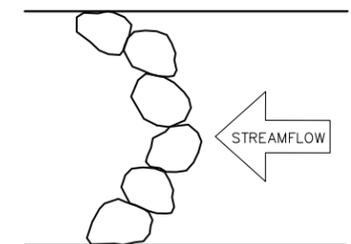
CHANNEL TOP WIDTH, WEIR BOULDER SIZE, GRADE CONTROL RIPRAP SIZE, AND STEP LENGTH

CHANNEL TOP WIDTH	6.5 FT
RIPRAP INSIDE CULVERT	CLASS 4
WEIR BOULDER SIZE*	26-32 IN.*
STEP LENGTH RANGE	7-11 FT.
STEP LENGTH AVERAGE	9 FT.
GRADE CONTROL RIPRAP	CLASS 5

\*THE SIZE SHOWN IS THE "EQUIVALENT DIAMETER" AS DEFINED IN SECTION 101

NOTE: VARY STEP LENGTH WITHIN RANGE SHOWN. ACHIEVE OVERALL AVERAGE AS SHOWN.

MATERIAL SIZES AND WEIR STEP LENGTH

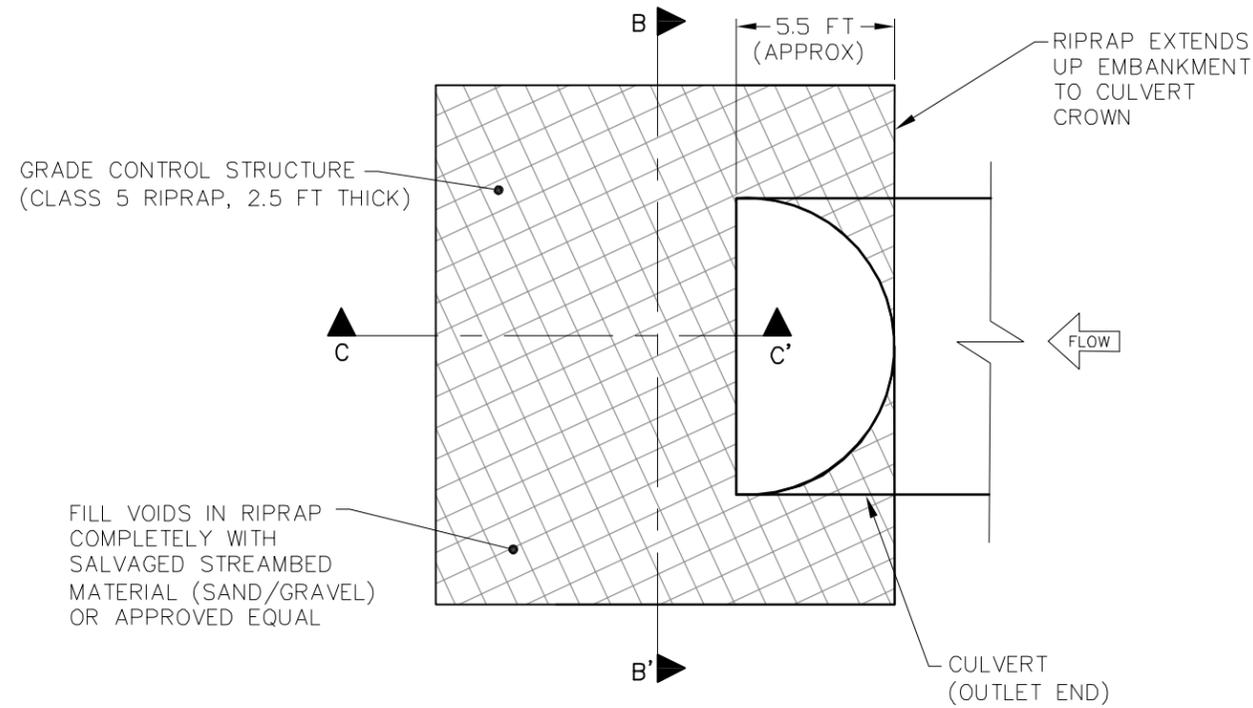


TYPICAL PLAN VIEW OF WEIR  
NOT TO SCALE

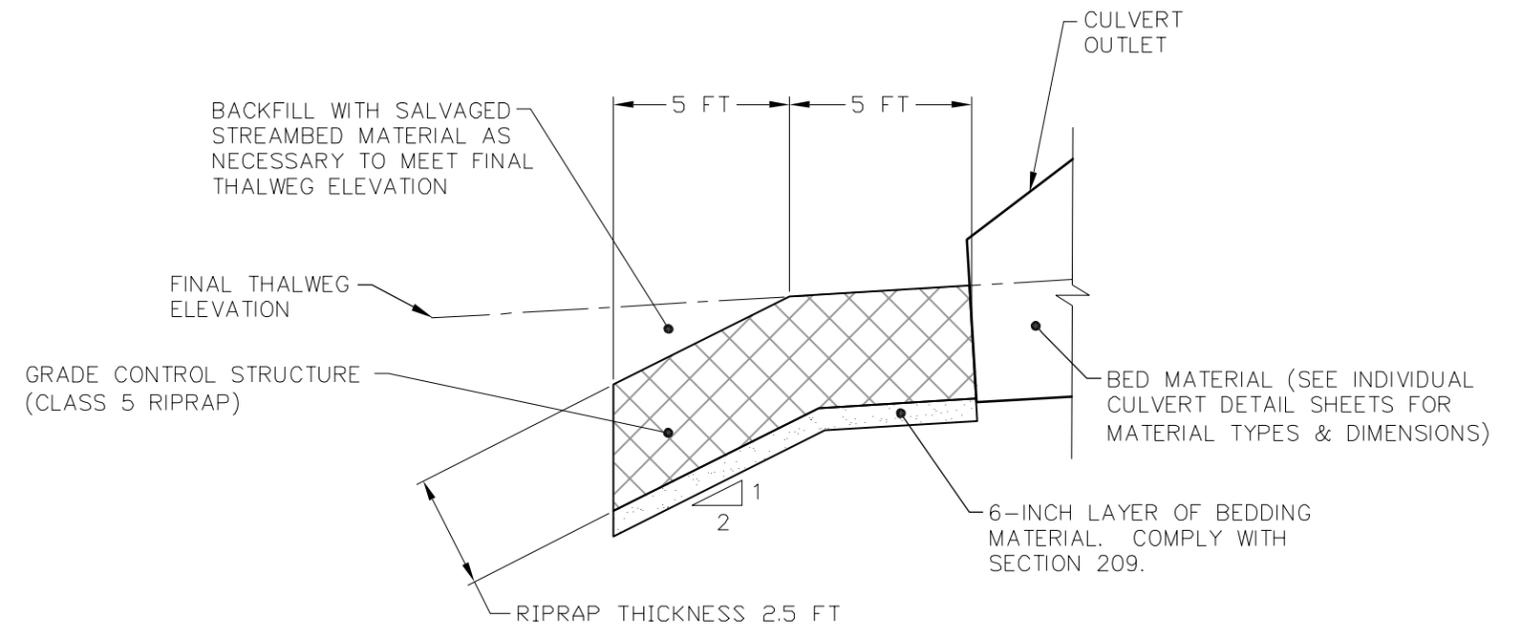
**Upper Turkey Creek AOP Culvert**

**STREAMBED DETAILS**

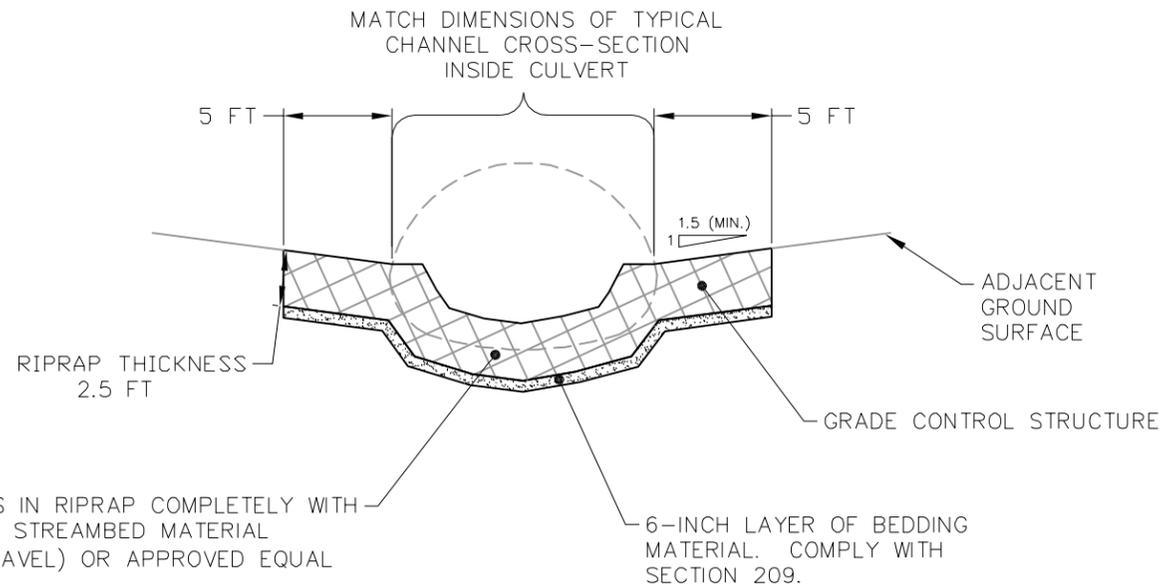
Drawn by: DW Date: 02/07/17  
Revised: \_\_\_ Date: \_\_\_



GRADE CONTROL STRUCTURE PLAN VIEW  
NOT TO SCALE



SECTION C-C' THROUGH GRADE CONTROL STRUCTURE AT THALWEG  
NOT TO SCALE

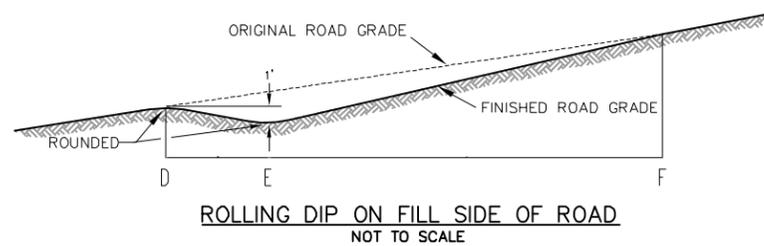
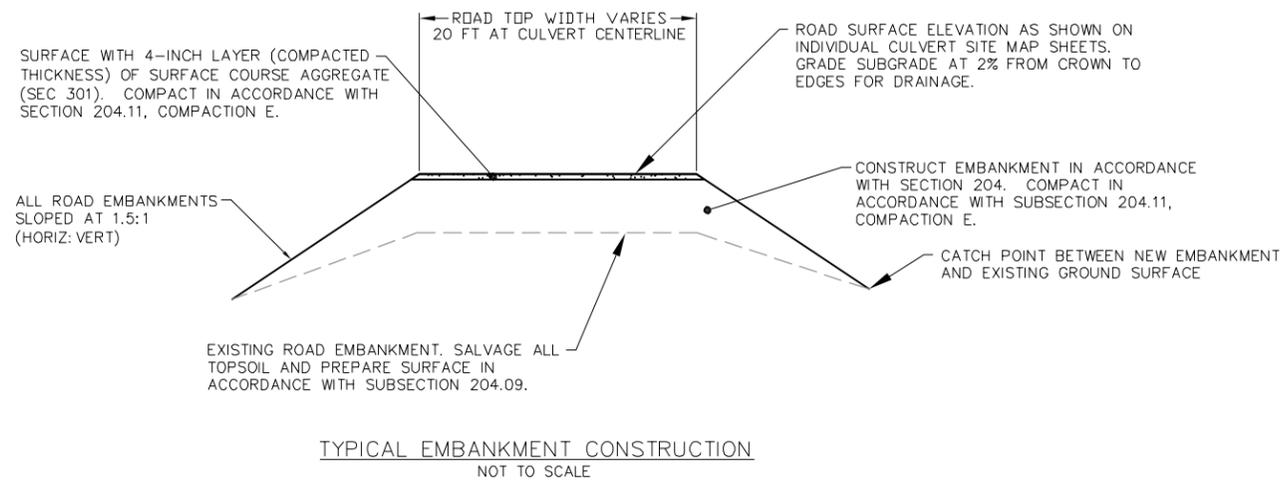
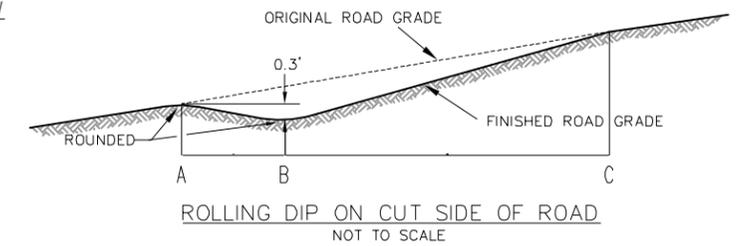
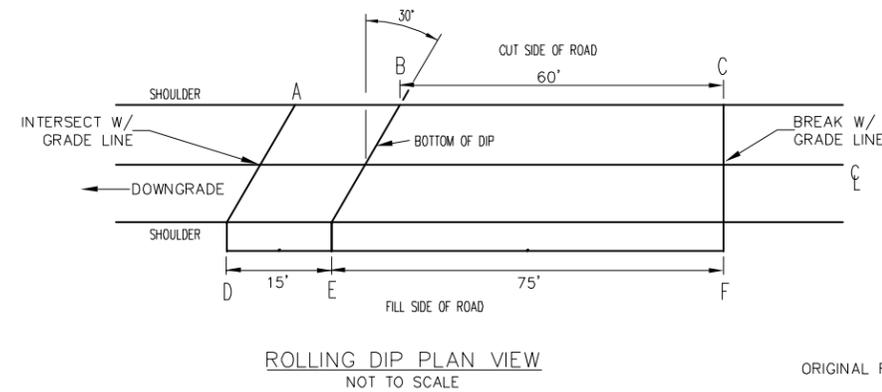
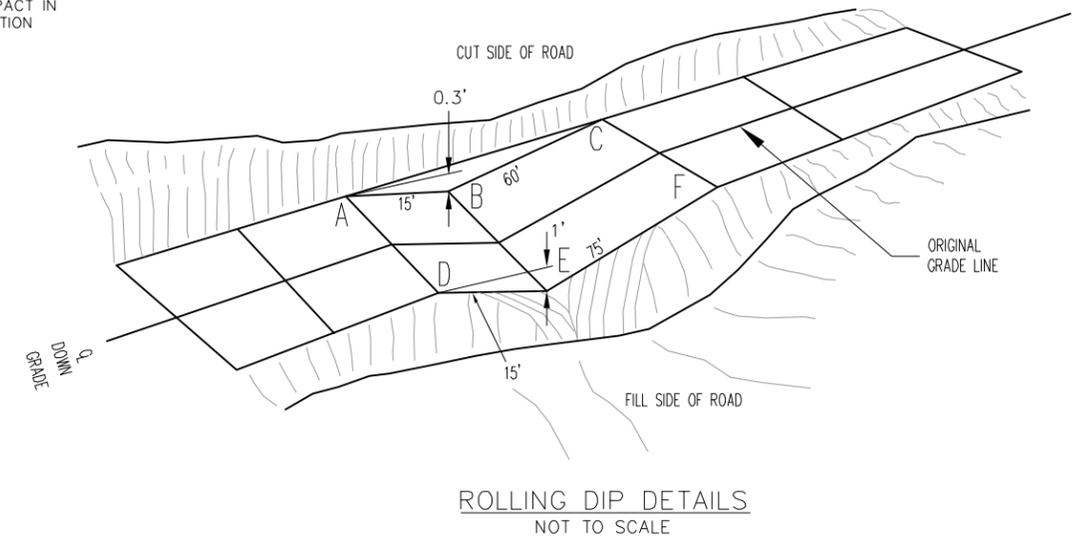
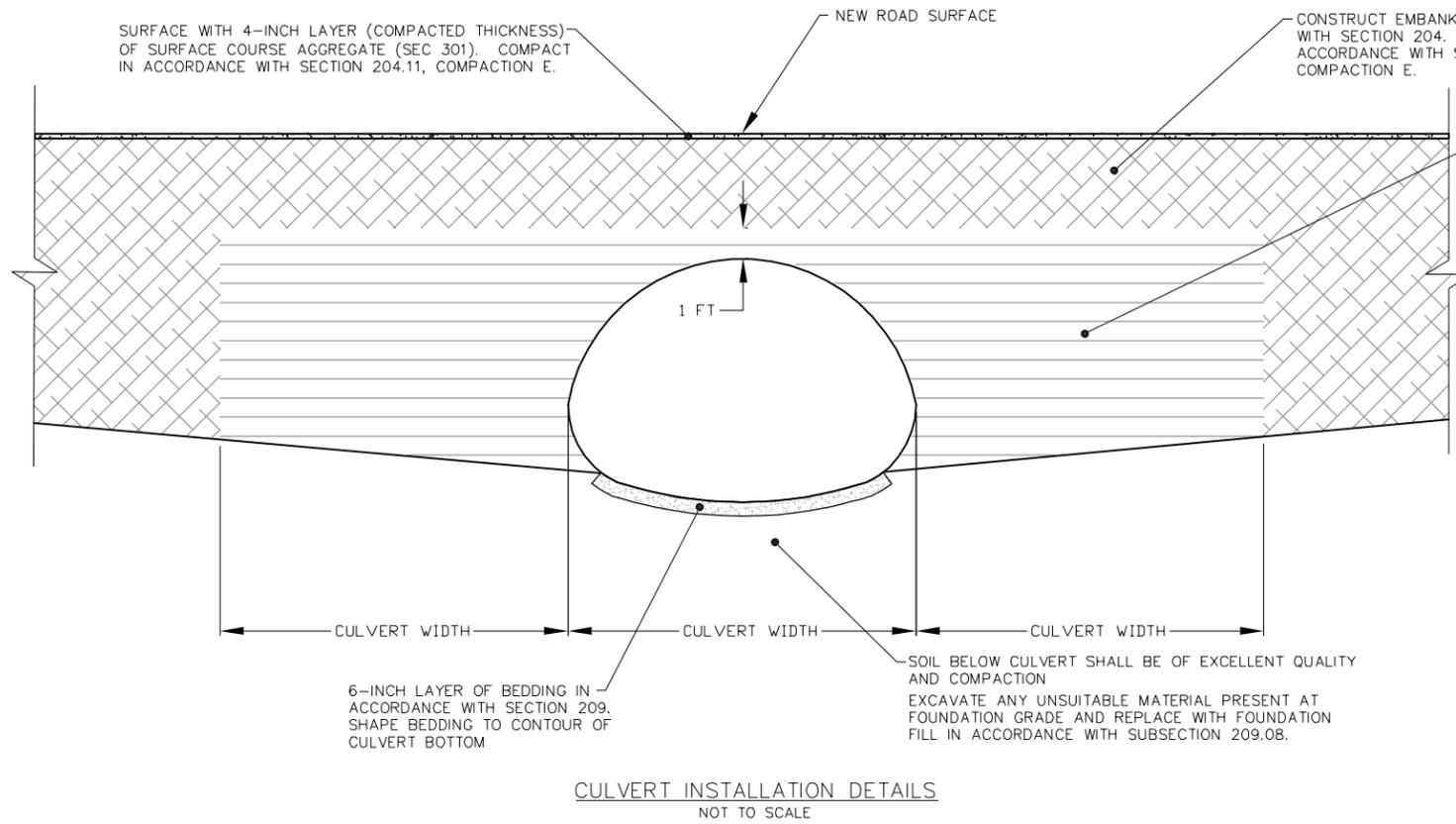


SECTION B-B' CROSS-SECTION THROUGH GRADE CONTROL STRUCTURE  
NOT TO SCALE

**Upper Turkey Creek AOP Culvert**

**GRADE CONTROL DETAILS**

Drawn by: DW Date: 02/07/17  
Revised: \_\_\_\_\_ Date: \_\_\_\_\_



<b>Upper Turkey Creek AOP Culvert</b>		
<b>ROAD DETAILS</b>		
Drawn by: <u>DW</u>	Date: <u>02/07/17</u>	Sheet 6 of 6
Revised: _____	Date: _____	



United States  
Department of  
Agriculture

Forest  
Service

Custer Gallatin National Forest

Yellowstone Ranger District  
Livingston Office  
5242 Highway 89 South  
Livingston, MT 59047

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File Code: 2600

Date: May 25, 2017

## Future Fisheries Improvement Program

Dear selection committee,

The Yellowstone Ranger District of the Custer Gallatin National Forest (CGNF) expresses its support of the Turkey Creek Aquatic Organism Passage Project proposed by the Montana Department of Fish, Wildlife, and Parks (MFWP).

The CGNF values Yellowstone cutthroat trout (YCT) which are a Montana species of special concern and a Forest Service Region 1 sensitive species. Because the species has declined drastically in its distribution from historic levels, the Forest is committed to fulfilling obligations to state and interstate YCT conservation agreements, to which it is signatory.

The Shields River drainage in the Crazy Mountain range has long been a stronghold for YCT and is strategically important for the range-wide conservation of the species. It's location at the northern extent of the species range along with high elevation habitat, may provide critical refugia from a changing climate. Despite extensive efforts by the Forest Service to restore habitat conditions through watershed improvements (6.5 million dollars invested), YCT in the upper Shields are now threatened with extirpation via displacement by nonnative brook trout which are rapidly expanding into most headwater tributaries.

To address this threat, MFWP and the CGNF are working cooperatively to remove brook trout in and restore connectivity to 27 miles of headwater habitat secured above a mainstem concrete fish barrier. Turkey Creek and an unnamed tributary to the Shields River adjacent to Turkey Creek have strategic importance in this restoration effort because they both have barriers in their lower reaches excluding brook trout. In the event that a piscicide treatment is warranted to remove brook trout in the mainstem Shields River, both of these tributary streams could be used to temporarily hold salvaged fish. The only issue is that both of these streams have perched culverts in their middle reaches that are fragmenting YCT habitat. By replacing these culverts with Aquatic Organism Passage culverts this project would maximize the amount of connected habitat needed to preserve existing YCT populations and to facilitate any future YCT salvage efforts.

For these reasons we fully support this project and are appreciative of your consideration.

Sincerely,

ALEX SIENKIEWICZ

District Ranger

