# **NORTH FORK INDIAN CREEK CULVERT REPLACEMENTS AQUATIC ORGANISM PASSAGE**

**PROGRAMMATIC BIOLOGICAL OPINION** 

# **PROJECT PARTNERS**



# **PROJECT DESCRIPTION**

THE SIUSLAW WATERSHED COUNCIL, IN PARTNERSHIP WITH USFS, INTENDS TO PROVIDE VOLITIONAL FISH PASSAGE ON TWO UNNAMED TRIBUTARIES TO NF INDIAN CREEK ALONG USFS ROAD 2116. EXISTING CULVERTS AT THESE CROSSINGS ARE UNDERSIZED AND PERCHED, POSING A BARRIER TO FISH PASSAGE. THESE DRAWINGS PRESENT CULVERT REPLACEMENTS USING A STREAM-SIMULATION DESIGN METHODOLOGY, BASED ON DESIGN CRITERIA FROM THE ARBO II PROGRAMMATIC BIOLOGICAL OPINION.

# SPATIAL REFERENCE

SURVEY CONTROL USED FOR THE PROJECT IS PROVIDED ON DRAWING 2.0 AND COORDINATES CORRESPOND TO THE TOP CENTER OF CONTROL MARKERS.

LIDAR, GPS RTK, AND TOTAL STATION:

HORIZONTAL PROJECTION: OREGON STATE PLANE SOUTH HORIZ DATUM: NAD83 UNITS: INTL FT VERT DATUM: NAVD88 UNITS: INTL FT

COVER SHEET AND NOTES

BMP DETAILS

SURVEY DATE: APRIL 2022 LIDAR COLLECTED: 2009-2012

# **STANDARD OF PRACTICE**

RDG WORKS EXCLUSIVELY IN THE RIVER ENVIRONMENT AND EMPLOYS THE MOST CURRENT AND ACCEPTED PRACTICES AVAILABLE FOR PLANNING AND DESIGN OF FISH PASSAGE. RESTORATION, AND CHANNEL ENHANCEMENT PROJECTS. THE ANALYSIS FOR THE FISH PASSAGE DESIGN RELIED ON CURRENT FISH PASSAGE CRITERIA FROM ODFW. NMFS/NOAA, AND CRITERIA IN THE ARBO II PROGRAMMATIC. ALL WORK WAS PERFORMED OR DIRECTED BY A REGISTERED PROFESSIONAL CIVIL ENGINEER WITH PAST EXPERIENCE IN FISH PASSAGE DESIGN.

### **REUSE OF DRAWINGS**

THESE DRAWINGS. THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, ARE THE PROPERTY OF RIVER DESIGN GROUP, INC. (RDG) AND ARE NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF RDG. LIKEWISE, THESE DRAWINGS MAY NOT BE ALTERED OR MODIFIED WITHOUT AUTHORIZATION OF RDG. DRAWING DUPLICATION IS ALLOWED IF THE ORIGINAL CONTENT IS NOT MODIFIED.

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DESIGNED BY





# **CROSS-SECTION SHEET REFERENCE**

10

6.1







	TRIB 1 - SCHEDULE OF ITEMS						
*ITEM NUMBER	DESCRIPTION	PAY UNIT	ESTIMATED QUANTITY	REMARKS			
15101A	MOBILIZATION	LUMP SUM	ALL	FIRE PROTECTION & EQUIPMENT CLEANING INDIRECT TO PAY ITEM			
15201A	CONSTRUCTION SURVEY AND STAKING, METHOD 1, TOLERANCE A	LUMP SUM	ALL				
15713A	SOIL EROSION AND POLLUTION CONTROL	LUMP SUM	ALL	INCLUDES EROSION CONTROL PLAN, PREP, INSTALLATION, & REMOVAL			
15761A	DEWATERING STRUCTURE	EACH	1	INCLUDES DEWATERING PLAN, PREP, INSTALLATION, & REMOVAL			
20158A	CLEARING AND GRUBBING	LUMP SUM	ALL	DISPOSE OF EXCESS MATERIAL AT THE DESIGNATED DISPOSAL AREA. INCLUDES CLEARING ANY DANGER/HAZARDOUS TREES			
20301A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS, DISPOSAL METHOD (a)	LUMP SUM	ALL	DISPOSE OF EXISTING CULVERT LEGALLY OFF OF GOVERNMENT LAND			
20417A	EMBANKMENT CONSTRUCTION, COMPACTION PLACEMENT METHOD (a)	CUBIC YARD	300	GENERAL BACKFILL SEE SHEET 3.1			
20858A	STRUCTURE EXCAVATION	CUBIC YARD	850				
20859A	STRUCTURE BACKFILL	CUBIC YARD	155	PAYMENT FOR BACKFILL MATERIAL. CRUSHED AGGREGATE CONFORMING TO SECTION 703.16 IS ACCEPTABLE STRUCTURAL B			
25101A	PLACED RIPRAP, CLASS 3, ACCEPTANCE METHOD A	CUBIC YARD	80	COMMERCIAL SOURCE FOR ALL RIPRAP			
30201A	AGGREGATE BASE, METHOD N/A	CUBIC YARD	24	ROADWAY BASE COURSE FROM COMMERCIAL SOURCE			
30207A	AGGREGATE SURFACE COURSE, METHOD 1	CUBIC YARD	16	CRUSHED 1 1/2" MINUS AGGREGATE CONFORMING TO SECTION 703.06 IS ACCEPTABLE. FROM COMMERCIAL SOURCE			
60301A	142" X 91" GALVANIZED CORRUGATED STEEL PLATE ARCH	FOOT	50	GALVANIZED STEEL 5" X 1" CORRUGATIONS, TWO PIECES AT 25' LENGTH EACH, INC. 120" DIMPLE BAND 16 GA 24" WIDE, 120" NE			
62552A	SEEDING AND MULCHING, DRY METHOD	LUMP SUM	ALL	CERTIFIED WEED FREE STRAW FROM COMMERCIAL SOURCE			
63501A	TEMPORARY TRAFFIC CONTROL	LUMP SUM	ALL	SEE SHEET 1.2 AND SUPPLEMENTAL SPECIFICATIONS			
64801A	PLACED STREAMBED SIMULATION ROCK, BED CLASS 10, METHOD N/A	LUMP SUM	ALL	CONTRACTOR TO FURNISH AND PLACE SIMULATED STREAMBED ROCK MATRIX CONFORMING TO USFS FP-14 CLASS 10 AND TA NOTE SHEET 3.1. COMMERCIAL SOURCE FOR ALL STREAMBED MATERIALS			
64805A	PLACED CHANNEL ROCK, CLASS CR-4, METHOD N/A	CUBIC YARD	30	CHANNEL ROCK (BOULDERS) FOR BOULDER RIB CONSTRUCTION AND HABITAT BOULDERS. COMMERCIAL SOURCE FOR ALL C			

	TRIB 2 - SCHEDULE OF ITEMS						
*ITEM NUMBER	DESCRIPTION	PAY UNIT	ESTIMATED QUANTITY	REMARKS			
15101B	MOBILIZATION	LUMP SUM	ALL	FIRE PROTECTION & EQUIPMENT CLEANING INDIRECT TO PAY ITEM			
15201B	CONSTRUCTION SURVEY AND STAKING, METHOD 1, TOLERANCE A	LUMP SUM	ALL				
15713B	SOIL EROSION AND POLLUTION CONTROL	LUMP SUM	ALL	INCLUDES EROSION CONTROL PLAN, PREP, INSTALLATION, & REMOVAL			
15761B	DEWATERING STRUCTURE	EACH	1	INCLUDES DEWATERING PLAN, PREP, INSTALLATION, & REMOVAL			
20158B	CLEARING AND GRUBBING	LUMP SUM	ALL	DISPOSE OF EXCESS MATERIAL AT THE DESIGNATED DISPOSAL AREA. INCLUDES CLEARING OF ANY DANGER/HAZARDOUS TR			
20301B	REMOVAL OF STRUCTURES AND OBSTRUCTIONS, DISPOSAL METHOD (a)	LUMP SUM	ALL	DISPOSE OF EXISTING CONCRETE PIPE CULVERT LEGALLY OFF OF GOVERNMENT LAND			
20858B	STRUCTURE EXCAVATION	CUBIC YARD	300	PAYMENT FOR MATERIAL EXCAVATED FOR PLACEMENT OF CONCRETE FOOTINGS. BEDROCK MAY NEED TO BE REMOVED WH			
20859B	STRUCTURE BACKFILL	CUBIC YARD	151	PAYMENT FOR BACKFILL MATERIAL. CRUSHED AGGREGATE CONFORMING TO SECTION 703.16 IS ACCEPTABLE STRUCTURAL I			
25101B	PLACED RIPRAP, CLASS 3, ACCEPTANCE METHOD A	CUBIC YARD	25	COMMERCIAL SOURCE FOR ALL RIPRAP			
30201B	AGGREGATE BASE, METHOD N/A	CUBIC YARD	20	ROADWAY BASE COURSE FROM COMMERCIAL SOURCE			
30207B	AGGREGATE SURFACE COURSE, METHOD 1	CUBIC YARD	10	CRUSHED 1 1/2" MINUS AGGREGATE CONFORMING TO SECTION 703.06 IS ACCEPTABLE. FROM COMMERCIAL SOURCE			
55201B	STRUCTURAL CONCRETE, CLASS A(AE), TYPE I	LUMP SUM	ALL	REINFORCING STEEL, CONCRETE TESTING, ALL COSTS ASSOCIATED WITH FOOTING CONSTRUCTION (EXCLUDING EXCAVATION)			
57101B	12' SPAN X 6 FT RISE X 16' CLEAR (ROAD WIDTH) PRECAST CONCRETE BOX CULVERT W/ PRECAST FOOTINGS, 4 PRECAST WINGWALLS	EACH	1	PRECAST BOX CULVERT, FOOTINGS, AND WINGWALLS, FURNISHED AND INSTALLED. SEE SHEETS 5.0 - 5.4.			
62552B	SEEDING AND MULCHING, DRY METHOD	LUMP SUM	ALL	CERTIFIED WEED FREE STRAW FROM COMMERCIAL SOURCE			
63501B	TEMPORARY TRAFFIC CONTROL	LUMP SUM	ALL	SEE SHEET 1.2 AND SUPPLEMENTAL SPECIFICATIONS			
64801B	PLACED STREAMBED SIMULATION ROCK, BED CLASS 8, METHOD N/A	LUMP SUM	ALL	CONTRACTOR TO FURNISH AND PLACE SIMULATED STREAMBED ROCK MATRIX CONFORMING TO USFS FP-14 CLASS 8 AND TA NOTE SHEET 5.3 COMMERCIAL SOURCE FOR ALL STREAMBED MATERIALS.			
64805B	PLACED CHANNEL ROCK, CLASS CR-4 AND CR-5, METHOD N/A	CUBIC YARDS	25	CHANNEL ROCK (BOULDERS) FOR BOULDER RIB CONSTRUCTION AND HABITAT BOULDERS. COMMERCIAL SOURCE FOR ALL C			

\*FIRST 3 NUMBERS OF ITEM NUMBER INDICATE APPLICABLE SPECIFICATION IN FS-14 & SUPPLEMENTAL SPECIFICATIONS

### GENERAL NOTES:

- WATER FOR FIRE PREVENTION & SUPPRESSION REQUIREMENTS UNDER THE 1) CONTRACT, AS WELL AS FOR USE WITH CONSTRUCTION ACTIVITIES MAY BE OBTAINED FROM DESIGNATED WATER SOURCE.
- DESIGN DOES NOT INCLUDE EXCAVATION FOR EQUIPMENT ACCESS TO THE 2) BOTTOM OF THE EXCAVATION AREAS, ALL EXCAVATION AND OTHER WORK FOR ACCESS IS INDIRECT TO 20858.
- PRIOR TO DIGGING, CALL "DIG SAFELY OREGON" 1-800-332-2344, LOCATING AND 3) PROTECTION OF ALL UTILITIES (PUBLIC & PRIVATE) IS THE RESPONSIBILITY OF THE CONTRACTOR.
- CONTRACTING OFFICER APPROVAL IS REQUIRED PRIOR TO THE PLACEMENT OF 4) THE FOLLOWING ITEMS: BEDDING OR LEVELING COURSE OF ANY STRUCTURE, SIMULATED STREAMBED CONSTRUCTION, STREAM FLOW THROUGH TEMPORARY BYPASS OR OVER NEWLY CONSTRUCTED STREAMBED, CRUSHED AGGREGATE BASE, AND CONCRETE.
- 5) REMOVE ALL PROJECT RELATED REFUSE FROM FEDERAL LAND PRIOR TO FINAL ACCEPTANCE.
- REPAIR ANY DAMAGE TO THE EXISTING ROAD SYSTEM DUE TO CONTRACTOR'S 6) OPERATIONS, INSIDE OR OUTSIDE THE PROJECT BOUNDARY, AT THE CONTRACTOR'S EXPENSE, PRIOR TO FINAL ACCEPTANCE.
- CONFINE CONSTRUCTION EQUIPMENT TO THE ROADWAY, UNLESS OTHERWISE 7)
- SHOWN ON THE PLANS OR APPROVED BY THE CONTRACTING OFFICER.

8) STORING OF ALL EQUIPMENT ON GOVERNMENT LANDS WILL BE AT THE

CONTRACTOR'S RISK AND AT DESIGNATED STAGING AREAS.

9) DEPTHS OF SOIL AND AGGREGATE ARE GIVEN AS FINAL COMPACTED DEPTHS. 10) PLACE ALL RIPRAP BY MACHINE OR HAND; DO NOT SIDE CAST OR END DUMP.

11) CONSTRUCTION TOLERANCE IS 'A' UNLESS OTHERWISE NOTED ON THE DRAWINGS.

ACKFILL

EOPRENE GASKET 24" WIDE

ABLE ON SHEET 3.1. INCLUDES STREAMBED SEALING, SEE

HANNEL ROCKS.

REES.

HEN EXCAVATION FOR FOOTERS BACKFILL

ON) ARE INCIDENTAL TO THIS ITEM

ABLE ON SHEET 3.1. INCLUDES STREAMBED SEALING, SEE

CHANNEL ROCKS.

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СНК	CS				
DESCRIPTION	90% DESIGN				
ВΥ	RB/CS				
DATE	5/18/23 F	L			
NO.	0				
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### **CONTROL NETWORK**

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	940032.71	4043503.42	457.69	set cap
3	939862.88	4043376.27	449.95	set cap
4	938429.67	4043244.49	431.84	set cap
5	938385.01	4043368.79	442.43	set cap

NOTE:

EXISTING CONDITION INFORMATION IS NOT A LAND SURVEY AND IS PRIMARILY A TOPOGRAPHIC ANALYSIS FOR RESTORATION DESIGN PURPOSES.

COORDINATE SYSTEM: OREGON STATE PLANE SOUTH HORIZ DATUM: NAD83 VERT DATUM: NAVD88 UNITS: INTERNATIONAL FEET

# SITE ACCESS AND STAGING NOTES

- ACCESS TO SITE IS FROM NF-2116. PROTECT PAVEMENT FROM TRACKED EQUIPMENT AND/OR REPLACE DAMAGED PAVEMENT TO ORIGINAL CONDITIONS AFTER CONSTRUCTION.
- UTILIZE THE DESIGNATED STAGING AREA TO THE EXTENT POSSIBLE FOR MATERIAL STOCKPILING AND EQUIPMENT STAGING. ADDITIONAL STAGING AND STOCKPILE LOCATION ALONG NF-2116.
- (3) INSTALL 48 INCH "ROAD CLOSED" SIGN WITH 18 INCH "500 FEET" RIDER PER ODOT AND MUTCD STANDARDS ALONG NF-2116. CONTRACTOR SHALL REMOVE SIGN AT PROJECT COMPLETION. SIGN TO BE INSTALLED ON 4" X 6" WOOD POST PER TEMPORARY SIGN PLACEMENT ODOT STANDARD DETAIL TM821 AND WOOD POST SIGN SUPPORTS STANDARD DETAILS TM 670, TM671.
- CONTRACTOR TO SUBMIT TRAFFIC CONTROL PLAN FOR ANY ACTIVITIES OCCURING IN (4) THE ROADWAY, AT A MINIMUM, PLAN SHOULD INCLUDE SIGNAGE SHOWN ON THIS SHEET, AND ANY ADDITIONAL SIGNAGE OR TRAFFIC CONTROL MEASURES REQUIRED TO MEET PROVISIONS IN FHWA MUTCD.







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				AIJ IING PLAN	OFILE	<b>CONTREPLACEMENT</b>	OR
AM REACH	0.14 SQ. MILES   0.085 FT/FT   13 cfs   24 cfs   31 cfs   40 cfs   JULY 1 - SEPTE	RISTICS			AND PRO	RTH FORK INDIAN CREEK C	INDIOLA,
			■ H	SS		ž	
			DESCRIPTION	90% DESIGN			
			DATE BY	5/18/23 RB/C\$			
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Drawing 4 of 18







# **CULVERT CONSTRUCTION NOTES**

MATERIAL MUST BE FIRM AND UNYIELDING. IF ORGANIC MATTER OR DELETERIOUS MATERIAL IS ENCOUNTERED, OVEREXCAVATE TO COMPETENT MATERIAL AND FILL WITH 3" - 0 GRANULAR STRUCTURE MATERIAL GRADATION, PLACEMENT, AND COMPACTION PER USFS SPECIAL CONTRACT

USFS SPECIAL CONTRACT REQUIREMENTS FOR NF INDIAN CREEK CULVERT REPLACEMENT. MINIMUM COMPACTED THICKNESS 12". TOP SURFACE OF LEVELING PAD TO BE SMOOTHLY GRADED TO CRADLE PIPE WITHOUT LEAVING VOIDS BETWEEN PIPE AND BEDDING, OR PERCHING PIPE ABOVE BEDDING, SURFACE OF LEVELING PAD MUST SUPPORT PIPE AT DESIGN ELEVATIONS PER DRAWING 3.0. BED PIPE SYMMETRICALLY IN 6 INCH LIFTS, EACH SIDE OF CULVERT. COMPACT EACH LIFT TO 90% RELATIVE DENSITY PRIOR TO PLACEMENT OF SUBSEQUENT LIFT. BED PIPE TO SPRINGLINE, WITH CAREFUL ATTENTION TO PLACE AND COMPACT

SELECT BACKFILL SHALL BE A 3/4" - 0 AGGREGATE. MATERIAL GRADATION, PLACEMENT AND COMPACTION PER

GENERAL BACKFILL TO BE ROAD EMBANKMENT FILL PER USFS SPECIAL CONTRACT REQUIREMENTS FOR NF

# SIMULATED STREAMBED NOTES

THE DESIGN INTENT IS TO SIMULATE A NATURAL STREAMBED THROUGH THE CROSSING. SPECIFIED ROCK AND

STREAMBED SHALL CONFORM TO THE STREAMBED MATRIX ROCK GRADATION SPECIFIED BELOW. ROCK MUST BE CLEAN AND FREE OF FINES. PLACE LARGER HABITAT BOULDERS AS AVAILABLE TO ADD CHANNEL COMPLEXITY.

AFTER ROCK IS PLACED, NATURAL GRAVELS WITH FINE SEDIMENT (SAND OR FINER) IS ADDED TO SEAL THE STREAMBED. FINE GRAVELS AND SAND ARE TO BE WASHED INTO THE STREAMBED WITH PRESSURIZED WATER TO WORK FINES INTO VOIDS AND SEAL SUBSTRATE, GRAVEL AND SAND TO BE ADDED UNTIL THE STREAMBED IS

CONSTRUCT STREAMBED IN 1' THICK LIFTS, FULLY SEALING EACH LIFT ACCORDING TO SEALING NOTES ABOVE. ALTERNATIVELY, FINES MAY BE FULLY MIXED INTO CLEAN STREAMBED MATRIX ROCK PRIOR TO PLACEMENT AS SINGLE FULL-THICKNESS LIFT. AFTER PLACEMENT OF MIXED SEDIMENT, FULLY WASH AND SEAL STREAMBED



TYPICAL FISH PASSAGE CULVERT





AVERAGE BANKFUL 2-YEAR FI 10-YEAR F 25-YEAR 50-YEAR

			33 ne
AM REACH	CHARACTERISTICS		n Aven DR 973
E AREA	0.16 SQ. MILES	GR G	s, (
REACH SLOPE	0.041 FT/FT	Ā z	alli
L WIDTH	7.5 FT	9	2 2
LOW	15 cfs	E E	S O
LOW	22 cfs	¥ 1	311
LOW	——— 35 cfs	<u> </u>	
LOW	40 cfs	~	ē
FLOW	——— 46 cfs	$\mathbf{\lambda}$	ent 37

- JULY 1 - SEPTEMBER 15

100-YEAR FLOW











LL MATERIAL	EST. VOLUME
REMOVAL	300 CY
(3/4" MINUS CRUSHED ROC	K) 16 CY
	135 CY
USHED ROCK)	20 CY
MINUS CRUSHED ROCK)	10 CY
	25 CY
MATERIAL	70 CY
	30 CY



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Drawing 10 of 18



# **CONSTRUCTION NOTES**

PREPARE SUB EX TO LINES AND GRADES THIS SHEET. ENGINEER TO INSPECT SUBGRADE PRIOR TO PLACEMENT OF BASE COURSE.

PLACE BASE COURSE MATERIAL TO SPECIFIED THICKNESS. THOROUGHLY

PLACE PRE-CAST STRIP FOOTINGS PER MANUFACTURERS GUIDANCE, FP-14

PLACE AND JOIN PRE-CAST BOX CULVERT SECTIONS AND WINGWALLS PER MANUFACTURERS GUIDANCE, FP-14 AND SECTION 571

PLACE SELECT BACKFILL MEETING MANUFACTURES SPECIFICATIONS AROUND CULVERT AND WINGWALLS. COMPACT TO 90% RELATIVE DENSITY.

RE-SURFACE ROAD AND SHOULDERS PER DETAIL 3 ON DRAWING 5.0.

PLACE CLASS ALONG ABUTMENT SLOPES PER LINES ON DRAWING 5.0.

# **GENERAL NOTES - BOX CULVERT**

DESIGN: "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS" 2017, 8TH EDITION CONSTRUCTION: "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS", (FP-14), 2014 WITH SUPPLEMENTAL

DEAD LOAD: CONCRETE AT 150 PCF, STEEL AT 490 PCF, EARTH PRESSURE AT AN EQUIVALENT FLUID PRESSURE WEIGHT OF 36 PCF, EARTH AT 120 PCF, ASPHALT AT 140

LOAD RATE STRUCTURE IN ACCORDANCE WITH THE "MANUAL FOR BRIDGE EVALUATION", CURRENT EDITION WITH INTERIMS, USING LRFR METHODOLOGY (CH. 6A) RATE FOR THE FOLLOWING VEHICLES AND CONFIGURATIONS USING THE DESIGNATED LOAD MODIFICATION FACTORS: HL-93 (VEHICLE + LANE OR TANDEM AXLES + LANE); TYPE 3, TYPE 3S2, TYPE 3-3, SPECIAL HAUL VEHICLES SU4 THROUGH SU7; EMERGENCY VEHICLES EV2 AND EV3: AND OREGON SPECIAL PERMIT VEHICLES OR-STP-3. 4A AND 4B. RATE THE HL-93 FOR INVENTORY AND OPERATING, AND RATE ALL OTHER VEHICLES FOR THE SAFE LOAD CAPACITY. LOAD RATING CALCULATIONS AND REPORT SHALL BE STAMPED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF OREGON. PAYMENT FOR LOAD RATING REPORT IS INDIRECT TO PAY ITEM 57103.

CONCRETE: PRECAST REINFORCED CONCRETE SHALL BE AIR ENTRAINED CLASS A(AE WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4500 PSI. PRESTRESSED CONCRETE SHALL BE CLASS P(AE) WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH AND A RELEASE STRENGTH AS SPECIFIED BY THE MANUFACTURER

CAST-IN-PLACE CONCRETE SHALL BE AIR ENTRAINED CLASS A(AE) WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4500 PSI. CHAMFER ALL EXPOSED EDGES & FILLET ALL RE-ENTRANT ANGLES <sup>3</sup>/<sub>4</sub> UNLESS OTHERWISE NOTED. CLASS 1, ORDINARY FINISH

REINFORCED STEEL: REINFORCING STEEL SHALL CONFORM TO AASHTO M31 GRADE 60. CONCRETE SHALL BE 2" COVER MINIMUM, UNLESS OTHERWISE NOTED. STRUCTURAL STEEL: CONFORM TO AASHTO M183 (ASTM A36). HOT DIP GALVANIZE ALL EXPOSED STRUCTURAL STEEL AFTER FABRICATION ACCORDING TO AASHTO M111.

HOT DIP GALVANIZE ALL EXPOSED STEEL FASTENERS, BOLTS AND NUTS, AND PRESTRESSING STEEL: FURNISH 7-WIRE LOW RELAXATION STRAND FOR

PRESTRESSED CONCRETE CONFORMING TO AASHTO M203, GRADE 270. ASPHALT: 1.5 INCHES MINIMUM AT CURBS IS THE STANDARD.

THE PRESUMPTIVE BEARING CAPACITY AT THE PROPOSED BOTTOM OF BRIDGE FOOTING ELEVATION IS 3000 POUNDS PER SQUARE FOOT.

MAXIMUM ANTICIPATED SCOUR ELEVATION IS APPROXIMATELY N/A

THIS BRIDGE IS DESIGNED TO PASS A 100-YEAR FLOOD OF 45 CFS WITH AN APPROXIMATE FREEBOARD OF 2 FEET. HIGH WATER DEPTH IS APPROXIMATELY 447

MANUFACTURER CERTIFICATION BY PCI OR NPCA IS REQUIRED. ALTERNATIVELY, MANUFACTURER MAY SUBMIT A QUALITY CONTROL PLAN FOR APPROVAL. PRECAST BOX CULVERT WITH DIMENSIONS 16' INSIDE CONCRETE CURB TO INSIDE CONCRETE CURB AND 12' CLEAR SPAN (INSIDE FACE OF ABUTMENT TO INSIDE FACE OF

SHOP DRAWINGS AND DESIGN CALCULATIONS FOR PRECAST COMPONENTS SHALL BE STAMPED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF OREGON. SUBMIT SHOP DRAWINGS INCLUDING REBAR LOCATIONS TO THE CO FOR REVIEW PRIOR TO BEGINNING CONSTRUCTION OF BRIDGE COMPONENTS. ONCE CONSTRUCTION IS COMPLETE, PROVIDE A PLAN SET INDICATING THE AS-BUILT CONDITION. AS-BUILT DRAWINGS ARE THE RESPONSIBILITY OF THE CONTRACTOR.



Drawing 11 of 18





- (1)STREAMBED PLACEMENT. RIB BOULDERS TO BE MINIMUM 1' DIA., QTY 30.
- 2 DRAWING ### FOR CHANNEL SHAPING.
- 3 ENGINEER GUIDANCE. 2' TO 3' DIA., QTY 10.
- (4)CONTIGUOUS BOULDERS AT CULVERT WALL

# SIMULATED STREAMBED NOTES

THE DESIGN INTENT IS TO SIMULATE A NATURAL STREAMBED THROUGH THE CROSSING. SPECIFIED ROCK AND SEDIMENT IS TO PLACED WITHIN BOX CULVERT TO FORM THE DESIGN STREAM CHANNEL.

STREAMBED SHALL CONFORM TO THE STREAMBED MATRIX ROCK GRADATION SPECIFIED BELOW. ROCK MUST BE CLEAN AND FREE OF FINES. PLACE LARGER HABITAT BOULDERS AS AVAILABLE TO ADD CHANNEL COMPLEXITY.

AFTER ROCK IS PLACED, NATURAL GRAVELS WITH FINE SEDIMENT (SAND OR FINER) IS ADDED TO SEAL THE STREAMBED. FINE GRAVELS AND SAND ARE TO BE WASHED INTO THE STREAMBED WITH PRESSURIZED WATER TO WORK FINES INTO VOIDS AND SEAL SUBSTRATE. GRAVEL AND SAND TO BE ADDED UNTIL THE STREAMBED IS VISIBLY SEALED AND WASH WATER FLOWS ON TOP OF STREAMBED.

CONSTRUCT STREAMBED IN 1' THICK LIFTS, FULLY SEALING EACH LIFT ACCORDING TO SEALING NOTES ABOVE. ALTERNATIVELY, FINES MAY BE FULLY MIXED INTO CLEAN STREAMBED MATRIX ROCK PRIOR TO PLACEMENT AS SINGLE FULL-THICKNESS LIFT. AFTER PLACEMENT OF MIXED SEDIMENT, FULLY WASH AND SEAL STREAMBED ACCORDING TO THESE NOTES, ADDING FINES AS NEEDED.

# STREAMBED MATRIX **ROUND ROCK GRADATION USFS FP-14 CLASS 8**

PERCENT PASSING BY WEIGHT	AVERAGE PARTICLE SIZE (INCHES)					
100	22					
84	8					
50	3					
30	1					
10	No. 10					
VOLUME = 70 CY						
VOLUME = 70 CY						

\*\*TOTAL SITE NEAT LINE VOLUME. INCLUDES ALL STREAMBED INSIDE AND OUTSIDE OF CULVERT\*\*

# BOULDERS

DIAMETER (IN)	MINIMUM COUNT (#)
CR4 = 20"-26"	30
CR5 = 26"-36"	15
EST. QTY = 2	5 CY

\*\*TOTAL SITE QUANTITIES. INCLUDES ALL STREAMBED INSIDE AND OUTSIDE OF CULVERT\*\*

# **CONSTRUCTION NOTES**

CONSTRUCT BOULDER RIBS PER PLAN AND PROFILE DRAWING 5.2 AND OVERVIEW THIS SHEET. STACK BOULDERS AS NEEDED WITH 50% MINIMUM BURIAL OF EXPOSED BOULDERS. RIBS MAY BE CONSTRUCTED CONCURRENTLY WITH

CONSTRUCT STREAMBED, MINIMUM 2' THICK, IN 1' MAXIMUM LIFTS IF WASHING IN ALL FINES. FULL THICKNESS LIFT MAY BE USED IF STREAMBED MATRIX IS PRE-MIXED WITH SEALING FINES. UTILIZE STREAMBED TEMPLATE AND SECTIONS

PLACE HABITAT BOULDER NEAR SURFACE OF STREAMBED AND ALONG CULVERT WALLS, MINIMUM 50% BURIAL, TO ADD HYDRAULIC COMPLEXITY PER FIELD

		フロト	RIVER DESIGN GROUP	236 Wisconsin Avenue 311 SW Jefferson Avenue	Wniterisn, MT 59937 Corvallis, UK 97333 406.862.4927 541.738.2920
TDIDIITADY 2 CTDEAMDED	I NIDULANI 2 - JINEAMDED	DETAIL C	VEIAILO	NORTH FORK INDIAN CREEK CULVERT REPLACEMENTS	INDIOLA, OR
СНК	CS				
DESCRIPTION	90% DESIGN				
BΥ	RB/CS				
DATE	5/18/23 F				
v	0				
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# **CONSTRUCTION NOTES**

CONSTRUCTION ACCESS ALONG FIELD MARGIN, DESIGNATED LOCATIONS. LIMIT DISTURBANCE IN RIPARIAN ZONE DURING ACCESS. DISTRIBUTE SLASH OVER ACCESS ROUTES DURING EGRESS AND CLEANUP.

CONSTRUCT LARGE WOOD TYPE L STRUCTURE PER SCHEDULE THIS SHEET AND DETAIL ON SHEET 5.6. LOCATIONS FLAGGED IN FIELD. COORDINATE WITH ON-SITE REPRESENTATIVE DURING WOOD PLACEMENT, AT LEAST ONE WEEK PRIOR TO START OF WORK.

STRUCTURE SCHEDULE							
URE	LOGS WITH ROOT WADS	LOGS	LOCATION				
	2	2	RB & LB				
	3	3	RB & LB				
	2	2	RB & LB				
	2	2	RB				
	2	2	RB				
	2	2	LB				
	13	13					



### **GENERAL NOTES**

REMOVE BLACKBERRY OR INVASIVE PLANTS IN BROAD SWATH AROUND ALL LARGE WOOD HABITAT STRUCTURES AND WORK AREAS. VEGETATION SCHEDULED FOR REMOVAL WILL BE FLAGGED PRIOR TO CONSTRUCTION AND SHOULD BE REMOVED FOR OFFSITE DISPOSAL..

ALL WOOD MEMBERS SHALL HAVE BROKEN ENDS PROJECTING INTO CHANNEL. BREAK OR ROUGHEN ENDS OF MEMBERS WITH EXCAVATOR PRIOR TO PLACEMENT.

FINAL LOCATION/ORIENTATION OF LOGS AT THE DIRECTION OF PROJECT ENGINEER.

# **CONSTRUCTION NOTES**

WEAVE LARGE WOOD MEMBER THROUGH SOLID STABLE VEGETATION AND PROJECT INTO CHANNEL.

2 PLACE LOCKING MEMBER ACROSS LARGE WOOD MEMBERS WITHIN STABLE VEGETATION TO CREATE INTERLOCKING STRUCTURE.

### **MATERIAL SCHEDULE PER STRUCTURE**

ITEM	QUANTITY	DIA. (IN)	LENGTH (FT)	ROOTWAD (Y/N)
LARGE WOOD MEMBER	VARIES	18+	35+	YES - 4' DIA MIN
LOCKING MEMBER	1	18+	35+	OPTIONAL
WHOLE TREE	VARIES	±10	15-20	YES - 2' DIA MIN



		フロヒ	RIVER DESIGN GROUP	236 Wisconsin Avenue 311 SW Jefferson Avenue	Whitefish, MT 59937 Corvallis, UK 97333 406.862.4927 541.738.2920
	LARGE WOOD DEIAIL			NORTH FORK INDIAN CREEK CULVERT REPLACEMENTS	INDIOLA, OR
СНК	CS				
DESCRIPTION	<b>90% DESIGN</b>				
BΥ	CS/RB				
DATE	5/18/23				
No	0				
P -	ROJ R	ECT	NU 22-0	MBE 85	R
<b>5.6</b>					
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### **GENERAL NOTES**

ALL EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.

### SITE RECLAMATION NOTES

ALL DAMAGED OR DISTURBED STREAMBANKS ARE TO BE RESTORED TO A NATURAL SLOPE PATTERN AND PROFILE SUITABLE FOR ESTABLISHMENT OF PERMANENT WOODY VEGETATION.

TEMPORARY ACCESS ROUTES AND OTHER AREAS DISTURBED DURING CONSTRUCTION WILL BE REHABILITATED TO SIMILAR OR BETTER THAN PRE-WORK CONDITIONS. AT A MINIMUM SITE RECLAMATION ACTIVITIES SHALL RESULT IN PLANT DISTRIBUTION AND DENSITY THAT MATCH PRE-PROJECT CONDITIONS.

SHORT-TERM STABILIZATION MEASURES WILL BE IMPLEMENTED UNTIL PERMANENT EROSION CONTROL MEASURES (PLANT RESTORATION) ARE EFFECTIVE

### **GENERAL FISH SALVAGE NOTES**

THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT ENGINEER AND USFS TO REMOVE FISH FROM ISOLATED AREAS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR CONTROL OF WATER AS SHOWN ON THIS SHEET, INCLUDING, BUT NOT LIMITED TO: REDUCING WATER DEPTHS, PLACING ISOLATION BERMS, BULK BAGS, AND TURBIDITY CURTAIN, AS WELL AS COORDINATING SCHEDULE WITH ENGINEER.

USFS WILL PERFORM FISH SALVAGE AND WILL BE RESPONSIBLE FOR OBTAINING SCIENTIFIC TAKE PERMIT FOR SALVAGE.

# **BMP NOTES**

- D PRESERVE AND PROTECT EXISTING VEGETATION TO THE FULLEST EXTENT POSSIBLE. ALL VEGETATION TO BE REMOVED WILL BE DESIGNATED BY PROJECT ENGINEER
- ISOLATE WORK AREAS BY USE OF SAND BAGS (DETAIL 2, DRAWING 6.1) AND ROUTING FLOW TROUGH GRAVITY PIPE PLACED AROUND WORK AREA AS SHOWN THIS SHEET.
- (3) INSTALL SILT FENCE PER DETAIL 3. DRAWING 6.1.
- (4) PLACE STRAW BALES IN CHANNEL DOWNSTREAM OF WORK SITE.
- DESIGNATE DETOUR ON ALTERNATE ROUTES ON NEARBY FOREST SERVICE ROADS. ISOLATE PROJECT AREA FROM PUBLIC ACCESS WITH CONSTRUCTION FENCING (DETAIL 1, DRAWING 6.1) AND SIGNAGE.

### **EQUIPMENT AND MATERIAL STAGING**

UTILIZE THE EXISTING ROAD AND IMMEDIATE VICINITY TO THE FULLEST EXTENT POSSIBLE AS SHOWN DRAWING 1.2 FOR MATERIAL STOCKPILING AND STAGING.

ANY AREAS OFF OF ROADWAY THAT ARE DISTURBED DUE TO STOCKPILING AND STAGING MUST BE RESTORED TO PRE-PROJECT CONDITIONS, SEE EROSION CONTROL NOTES FOR DETAILS.

### **EROSION CONTROL SEEDING**

ALL DISTURBED AREAS SHALL BE BROADCAST SEEDED WITH AN "EROSION CONTROL" SEED MIX AND COVERED WITH STERILE STRAW. AREAS SHALL BE BROADCAST SEEDED WITH A SEED MIX CONTAINING NATIVE SEED (BLUE WILD RYE 15 PLS LBS/ACRE) AND STERILE CEREAL RYES. THIS SHALL BE ACCOMPLISHED WITH A HAND/BROADCAST SEEDING METHOD AND THE SEED SHALL BE RAKED ONE QUARTER INCH INTO THE SOIL AND COVERED WITH STERILE STRAW. THE MINIMUM APPLICATION RATE WILL BE THE GREATER OF THE MANUFACTURE'S RATE OR 30 PLS LBS/ACRE. CONTRACTOR WILL PROVIDE SEED MIX CONSTITUENTS TO PROJECT ENGINEER FOR APPROVAL.

# **EROSION CONTROL NOTES**

CONTRACTOR TO SUBMIT EROSION CONTROL PLAN TO PROJECT ENGINEER FOR APPROVAL PRIOR TO COMMENCING CONSTRUCTION. AT A MINIMUM, EROSION CONTROL MEASURES SHOWN ON THIS SHEET SHALL BE INCORPORATED INTO PLAN AND SHALL BE INSPECTED WEEKLY BY PROJECT ENGINEER. BASED ON INSPECTIONS, WORK CREWS SHALL MOBILIZE IMMEDIATELY TO MAKE REPAIRS OR INSTALL ADDITIONAL MEASURES IF NECESSARY.

CONTRACTOR SHALL PREPARE AND HAVE ON-SITE A SPILL CONTAINMENT AND CONTROL PLAN WITH NOTIFICATION PROCEDURES, AND SPECIFIC CLEANUP AND DISPOSAL INSTRUCTIONS FOR ALL PRODUCTS USED ON-SITE. THE PLAN MUST INCLUDE 24-HOUR EMERGENCY CONTACT NUMBERS FOR THE CONTRACTOR.

CONTRACTOR SHALL HAVE AN EMERGENCY SUPPLY OF SEDIMENT CONTROL MATERIALS ON HAND (SILT FENCE, STRAW BALES, WATTLES, ETC...), AN OIL ABSORBING FLOATING BOOM, AND A SPILL KIT.

EXCAVATED AREAS SHALL BE PROTECTED FROM EROSION BY PLACING A PROTECTIVE COVER OVER THE MATERIAL (SUCH AS PLASTIC) AND PROVIDING STRAW MULCH OVER EXCAVATED SLOPES AND DISTURBED AREAS. HAY BALES SHALL BE PLACED DOWNSTREAM OF WORK AREA IN THE STREAM TO MITIGATE ANY INCREASE IN TURBIDITY.

DUST CONTROL: ALL HEAVY USE AREAS ARE TO BE MAINTAINED IN A CONDITION THAT MINIMIZES DUST ON THE PROJECT SITE. CONTRACTOR SHALL HAVE ACCESS TO A WATER TRUCK OR SIMILAR EQUIPMENT FOR DUST MANAGEMENT IF REQUIRED. ENGINEER WILL NOTIFY CONTRACT TO MOBILIZE DUST CONTROL ACTIVITIES (INCLUDING WATERING) IF CONDITIONS REQUIRE.

ALL EQUIPMENT TO REMAIN WITHIN THE BOUNDS OF THE CONSTRUCTION AREA.

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ANACEMENT BBACTICES	INANAGEMENI PRACIICED	(BMD'C)		TH FORK INDIAN CREEK CULVERT REPLACEMENTS	INDIOLA, OR
				NOR <sup>-</sup>	
				NOR <sup>-</sup>	
	90% DESIGN CS DE3			NOR	
	RB/C\$ 90% DESIGN CS DEV			NOR	
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