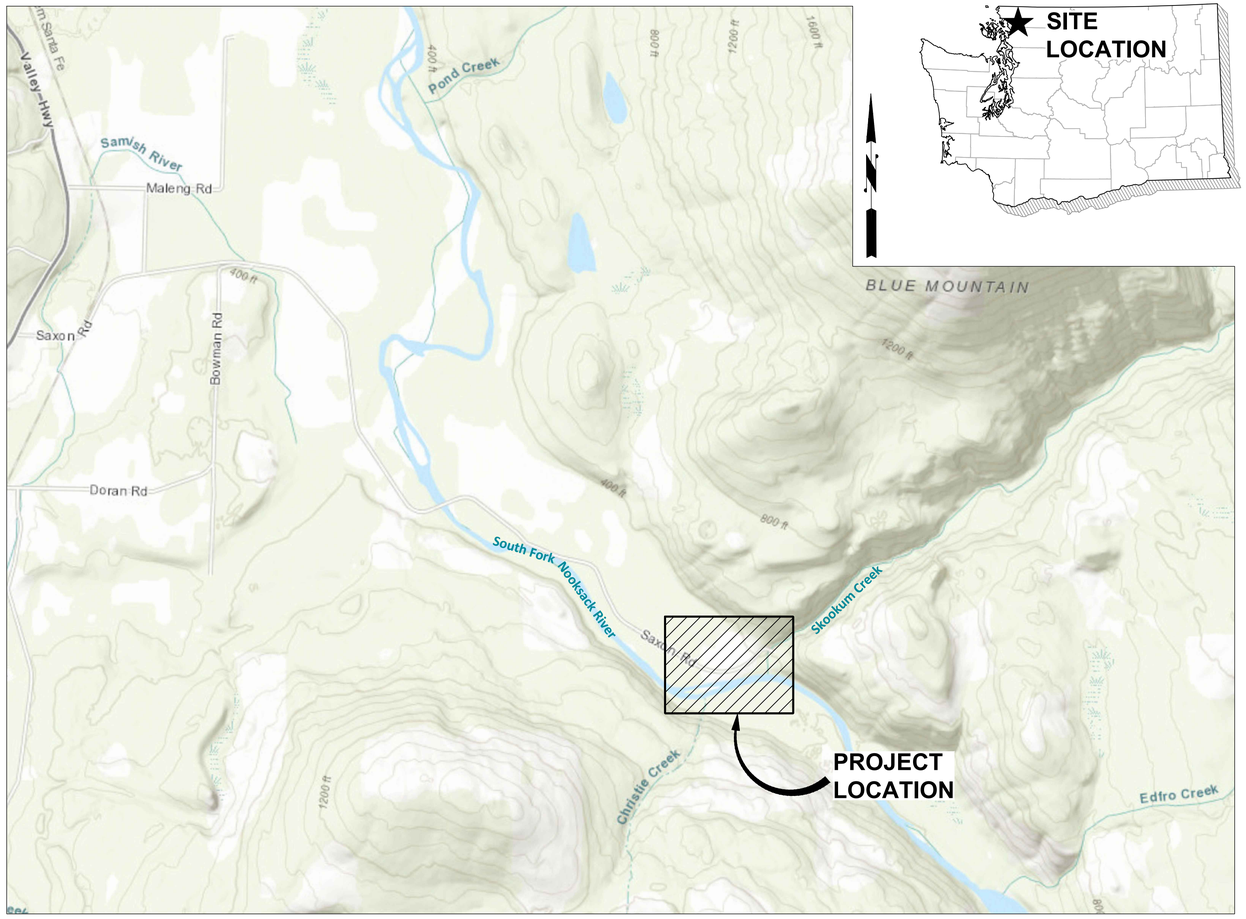
SOUTH FORK NOOKSACK RIVER
SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT
PHASE 1 ADAPTIVE MANAGEMENT

WHATCOM COUNTY, WASHINGTON



VICINITY MAP
SCALE: 1"=1/4 MILE

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CONTACT: ALEX LEVELL
PHONE: (360) 410-1988
EMAIL: alexl@lummi-nsn.gov

ENGINEER:

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LUMMI NATION
TREATY OF 1855

IAN R. MOSTRENKO
STATE OF WASHINGTON
36069
REGISTERED PROFESSIONAL ENGINEER
DRAFT

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT
PHASE 1 ADAPTIVE MANAGEMENT

COVER SHEET

DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: G0.01
SHEET NO: 1 OF 19

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ABBREVIATIONS

APPROX	APPPROXIMATE
AVG	AVERAGE
BLDG	BUILDING
BMP	BEST MANAGEMENT PRACTICE
CB	CATCH BASIN
CG	CLEAR AND GRUB
C/L, CL	CENTERLINE
CONC	CONCRETE
CONST	CONSTRUCT, CONSTRUCTION
CP	CONTROL POINT
DIA	DIAMETER
DR	DRIVE
DWG	DRAWING
E	EAST, EASTING
EA	EACH
EG	EXISTING GROUND
EL	ELEVATION
ELS	ENGINEERED LOG STRUCTURE
EX	EXISTING
FG	FINISHED GROUND
FT	FEET/FOOT
IN	INCH/INCHES
LB	LEFT BANK
LT	LEFT
MAX	MAXIMUM
MIN	MINIMUM
N	NORTH/NORTHING
NA	NOT APPLICABLE
NTS	NOT TO SCALE
OC	ON CENTER
OHW	ORDINARY HIGH WATER
QTY	QUANTITY
RD	ROAD
REF	REFERENCE
RT	RIGHT
S	SOUTH, SLOPE
SPEC	SPECIFICATION
STA	STATION
STD	STANDARD
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL
W	WEST, WATER
WSE	WATER SURFACE ELEVATION

1 / C3.01 — REFERENCE NUMBER; SHEET WHERE REFERENCE APPEARS

DETAIL (PROFILE) — SCALE: NTS — 1 (A) / C3.01 — REFERENCE NUMBER (LETTER); SHEET WHERE REFERENCE APPEARS

A / C2.01 — REFERENCE LETTER; SHEET WHERE REFERENCE APPEARS

A — SECTION SHOWN ON SAME SHEET

"-" INDICATES THAT THE DETAIL IS SHOWN ON THE SAME SHEET OR IS A TYPICAL DETAIL

"VAR" SPECIFIES THAT DETAIL/SECTION WAS TAKEN FROM VARIOUS DRAWINGS

DETAIL/SECTION REFERENCING

LEGEND - EXISTING

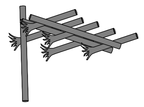
- PARCEL LINE (APPROX)
- ORDINARY HIGH WATER (OHW)
- FLOW DIRECTION
- EDGE OF PAVEMENT
- GUARDRAIL
- FENCE
- GRAVEL
- OVERHEAD POWER LINE (OP)
- UTILITY POLE (PP)
- TREE

ELSs FROM PHASE 1 PROJECT

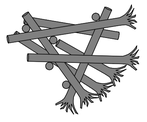
LEGEND - PROPOSED

- PROJECT LIMITS
- CLEAR AND GRUB LIMITS (CG)
- HAUL ROUTE
- THALWEG
- ACCESS ROAD
- CONSTRUCTION STAGING AREA
- STABILIZED CONSTRUCTION ENTRANCE
- SILT FENCE, STRAW WATTLES, OR EQUIVALENT (SF)
- BULK BAG ISOLATION
- TREE REMOVAL
- TREE PROTECTION
- FILL LINE
- CUT LINE
- EMBANKMENT
- TOPSOIL TYPE B
- STREAMBED MATERIAL
- PRECAST CONCRETE (FOR VAULT AND CONCRETE BLOCKS)
- EMERGENCY WEIR
- EMERGENCY FISHWAY VAULT
- TYPE 2 STREAMBED BOULDER

HATCHERY CHANNEL BED ELS



HATCHERY BANK ELS



RIVER BANK ELS

LEGEND - FUTURE PHASE

- PROJECT LIMITS
- CLEAR AND GRUB LIMITS (CG)
- SILT FENCE, STRAW WATTLES, OR EQUIVALENT (SF)
- BULK BAG ISOLATION

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LUMMI NATION TREATY OF 1855

DRAFT

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

ABBREVIATIONS AND LEGEND

DATE:	OCT 2024
PROJECT NO:	14-05790-000
DRAWING NO:	G0.02
SHEET NO:	2 OF 19

GENERAL CONSTRUCTION NOTES:

1. PHOTOGRAPHS DOCUMENTING EXISTING CONDITIONS SHALL BE TAKEN BY THE CONTRACTOR AND SUBMITTED TO THE OWNER 5 WORKING DAYS PRIOR TO THE CONTRACTOR INITIATING WORK.
2. PROJECT CULTURAL RESOURCES ASSESSMENT SHALL BE COMPLETED BY THE OWNER PRIOR TO CONSTRUCTION.
3. ENGINEER IS DEFINED AS THE OWNER'S ENGINEER. LUMMI NATION IS DEFINED AS THE OWNER.
4. PRIOR TO INITIATING CONSTRUCTION ACTIVITIES THE ENGINEER SHALL STAKE THE LOCATIONS OF EACH ELS INCLUDING LENGTHS, WIDTHS, ORIENTATION AND ELEVATIONS. PRIOR TO INITIATING CONSTRUCTION ACTIVITIES THE CONTRACTOR SHALL STAKE FOR APPROVAL BY THE ENGINEER TEMPORARY CONSTRUCTION ACCESS PATHS, TEMPORARY WATER CROSSINGS, TEMPORARY BRIDGE LOCATIONS, TEMPORARY FLOW DIVERSION MEASURES, AND ALL GRADING/EXCAVATION EXTENTS.
5. THE CONTRACTOR SHALL STAKE CLEARING LIMITS FOR APPROVAL BY THE ENGINEER AT LEAST 5 WORKING DAYS PRIOR TO COMMENCING CLEARING ACTIVITIES. CLEARING LIMITS FOR CONSTRUCTION SHALL BE LIMITED TO THE AREA REQUIRED FOR SAFE EQUIPMENT OPERATION AND TO MINIMIZE THE AREA OF DISTURBANCE. CLEARING LIMITS SHALL NOT BE EXPANDED UNLESS APPROVED BY THE ENGINEER.
6. TREES AND BRUSH NOT SHOWN ON THE DRAWINGS WILL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES. THE ENGINEER SHALL IDENTIFY AND FLAG ALL TREES TO BE PROTECTED FROM DAMAGE PRIOR TO CONSTRUCTION. FOLLOWING CLEARING OF ALLOWED VEGETATION, THE CONTRACTOR SHALL STOCKPILE ALL TREES AND BRUSH IDENTIFIED BY THE ENGINEER, PRIOR TO AND DURING CONSTRUCTION ACTIVITIES, FOR USE AS RACKING AND SLASH MATERIALS IN THE ELJ STRUCTURES, FOR USE IN AREAS AS SHOWN ON THE DRAWINGS, AND AS DESIGNATED BY THE ENGINEER TO CREATE ROUGH FINISHED GRADED SURFACES. CERTAIN VEGETATION MAY BE FLAGGED BY THE ENGINEER OR THE OWNER FOR SALVAGE, AND CARE SHOULD BE TAKEN TO PROTECT THOSE PLANTS FROM DEHYDRATION.
7. ALTERATION OR DISTURBANCE OF THE CHANNEL, FLOODPLAIN, AND ANY BANK AND FLOODPLAIN VEGETATION SHALL BE MINIMIZED TO THAT NECESSARY TO CONSTRUCT THE PROJECT. THE CONTRACTOR SHALL KEEP DISTURBED AREAS WITHIN THE PROJECT CONSTRUCTION LIMITS SHOWN ON THE DRAWINGS, AND SHALL NOT EXTEND THESE LIMITS UNLESS APPROVED BY THE ENGINEER.
8. THE CONTRACTOR SHALL PROVIDE 24 HOURS ADVANCE NOTICE TO THE OWNER OR ENGINEER PRIOR TO ANY REQUIRED INSPECTION.
9. CONSTRUCTION MATERIAL AND EQUIPMENT STAGING AREAS SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. CONSTRUCTION MATERIALS AND EQUIPMENT SHALL NOT BE STORED OUTSIDE OF IDENTIFIED STAGING AREAS, UNLESS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL PROTECT ALL CONSTRUCTION MATERIALS AND EQUIPMENT FROM DAMAGE AT ALL TIMES.
10. NO EQUIPMENT SHALL BE STORED OVERNIGHT BELOW THE ORDINARY HIGH WATER (OHW) LINE.
11. EQUIPMENT USED FOR THIS PROJECT SHALL BE FREE OF EXTERNAL PETROLEUM-BASED PRODUCTS WHILE WORKING NEAR ANY SURFACE WATER OR WETLANDS. ACCUMULATION OF SOILS OR DEBRIS SHALL BE REMOVED FROM THE DRIVE MECHANISMS (WHEELS, TRACKS, TIRES, ETC.) AND UNDERCARRIAGE OF EQUIPMENT PRIOR TO ITS WORKING BELOW THE OHW LINE.
12. ALL EQUIPMENT OPERATING IN AREAS OTHER THAN EXISTING UNIMPROVED ACCESS ROADS SHALL USE ONLY BIODEGRADABLE, VEGETABLE BASED HYDRAULIC FLUIDS OR APPROVED OTHER.
13. EQUIPMENT SHALL BE CHECKED AT THE BEGINNING OF EACH WORK SHIFT FOR LEAKS, AND ANY NECESSARY REPAIRS SHALL BE COMPLETED PRIOR TO COMMENCING WORK ACTIVITIES.
14. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT NO PETROLEUM PRODUCTS, HYDRAULIC FLUID, SEDIMENTS, SEDIMENT-LADEN WATER, CHEMICALS, OR ANY OTHER TOXIC OR DELETERIOUS MATERIALS ARE ALLOWED TO ENTER OR LEACH INTO THE RIVER, WETLANDS OR THE PROJECT SITE FROM EQUIPMENT OR SUPPLIES USED DURING CONSTRUCTION.
15. CONTRACTOR SHALL LIMIT MACHINERY MOVEMENT TO THE PROJECT CONSTRUCTION LIMITS DEFINED ON THE DRAWINGS OR IDENTIFIED AS ACCEPTABLE BY THE ENGINEER.
16. IF AT ANY TIME, AS A RESULT OF PROJECT ACTIVITIES, FISH ARE OBSERVED IN DISTRESS, A FISH KILL OCCURS, OR WATER QUALITY PROBLEMS DEVELOP (INCLUDING EQUIPMENT LEAKS OR SPILLS), OPERATIONS SHALL CEASE AND THE OWNER SHALL BE NOTIFIED IMMEDIATELY BY THE CONTRACTOR. THE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND THE WASHINGTON STATE DEPARTMENT OF ECOLOGY SHALL BE CONTACTED IMMEDIATELY BY THE OWNER. WORK SHALL NOT RESUME UNTIL FURTHER APPROVAL BY THE OWNER.
17. EROSION AND SEDIMENT CONTROL METHODS SHALL BE USED TO PREVENT SILT-LADEN WATER FROM ENTERING THE STREAM. MINIMUM EROSION AND SEDIMENT CONTROL METHODS ARE SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER 5 WORKING DAYS PRIOR TO CONSTRUCTION, A TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) PLAN ADDRESSING SITE SPECIFIC EROSION AND SEDIMENT CONTROL TECHNIQUES AND METHODS.
18. IF HIGH FLOW CONDITIONS THAT MAY CAUSE SILTATION, EROSION OR A DANGEROUS WORK ENVIRONMENT ARE ENCOUNTERED DURING CONSTRUCTION, WORK SHALL STOP UNTIL THE FLOW SUBSIDES.
19. LOGS SHALL BE DECKED IN THE STAGING AREA SHOWN ON THE PLANS FOR INSPECTION BY THE ENGINEER AND ORGANIZED BY LOG TYPE, DIAMETER AND LENGTH. LOG TYPE IDENTIFICATION SHALL BE PAINTED ON ALL LOGS IN A PLACE VISIBLE FOR INSPECTION PRIOR TO PLACEMENT WITH LEAD-FREE, BLAZE-ORANGE SURVEY MARKING PAINT.

GENERAL ELS STRUCTURE CONSTRUCTION SEQUENCING:

1. STAKE AND CONSTRUCT ACCESS TO WORK AREA, STAKE CLEARING LIMITS, INSTALL TESC MEASURES, THEN COMPLETE NECESSARY CLEARING.
2. PREPARE STAGING AREAS AT LOCATIONS SHOWN ON PLANS AND IMPORT CONSTRUCTION MATERIAL AS NEEDED FOR CONSTRUCTION TO WORK AREA.
3. VERIFY LOCATION OF EACH ELS STRUCTURE AND CLEARLY STAKE ELS EXCAVATION LIMITS .
4. IF NEEDED, THE CONTRACTOR SHALL INSTALL FISH BLOCK NETS AND THE OWNER SHALL CONDUCT FISH REMOVAL (SEINING) PRIOR TO ANY EXCAVATION, GRADING, OR CONSTRUCTION OF INSTREAM STRUCTURES. SEE REQUIREMENTS ON WATER MANAGEMENT DETAILS.
5. IF NEEDED, CONTRACTOR SHALL INSTALL OR CONSTRUCT A FLOW DIVERSION MEASURE TO ISOLATE AND DIVERT FLOW AROUND THE ACTIVE WORK AREA. SEE REQUIREMENTS ON WATER MANAGEMENT DETAILS.
6. DEWATER ISOLATED WORK AREA AS REQUIRED. PUMP WATER FROM ACTIVE WORK AREA TO UPLAND AREA FOR INFILTRATION. ENGINEER OR OWNER SHALL APPROVE OF ALL INFILTRATION AREAS PRIOR TO USE.
7. INSTALL ELSs PER THE STRUCTURE DETAILS. NATIVE EXCAVATED ALLUVIUM MATERIAL WILL BE ADDED TO THE STRUCTURES PER THE ENGINEERS DESIGNATION. ALL SUBGRADE ELEVATIONS SHALL BE CONFIRMED AND VERIFIED WITH THE ENGINEER PRIOR TO LOG AND BACKFILL PLACEMENT.
8. REMOVE ALL MATERIALS FROM STAGING AREA WHEN ELS CONSTRUCTION IS COMPLETE.
9. REMOVE ALL DEWATERING AND FLOW DIVERSION MEASURES.
10. REMOVE ALL TESC MEASURES.

GENERAL WORK SEQUENCE NOTES:

1. THIS WORK SEQUENCE IS PRESENTED FOR A GENERAL UNDERSTANDING OF THE PROJECT AND ITS CONSTRAINTS IN RELATION TO CONSTRUCTION AND SITE RESTORATION. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING A DETAILED WORK SEQUENCE AND PHASING PLAN, WHICH SHALL INCLUDE CONSTRUCTION OF TEMPORARY FACILITIES, CONSTRUCTION OF THE DESIGN FEATURES INCLUDED ON THESE PLANS AND AS DESCRIBED IN THE SPECIFICATIONS, REMOVAL OF ALL TEMPORARY FACILITIES, AND RESTORATION AND STABILIZATION OF THE SITE.
2. THE CONSTRUCTION SEQUENCE DETAILED IN THE DRAWINGS SHALL NOT BE ALTERED BY THE CONTRACTOR UNLESS APPROVED IN ADVANCE BY THE ENGINEER. THE CONTRACTOR SHALL SUBMIT A DETAILED WORK SEQUENCE AND PHASING PLAN FOR APPROVAL BY THE ENGINEER 5 WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE PLAN SHALL INCLUDE ALL WORK SHOWN ON THESE PLANS AND AS DESCRIBED IN THE SPECIFICATION; MOBILIZATION AND DEMOBILIZATION; ALL WORK NEEDED TO CONSTRUCT, MAINTAIN, AND REMOVE TEMPORARY FACILITIES; AND SITE RESTORATION AND STABILIZATION.
3. IN GENERAL, THE WORK SHALL BE SEQUENCED AND PERFORMED IN A MANNER THAT MINIMIZES IMPACTS TO THE RIVER, EXISTING VEGETATION, AQUATIC LIFE, THE WORK SITE, AND INFRASTRUCTURE.
4. THE CONTRACTOR MAY DECIDE HOW TO SEQUENCE THE WORK. HOWEVER THIS PROJECT WILL BE CONSTRAINED BY AN IN-WATER WORK WINDOW SET FORTH IN THE PROJECT HPA PERMIT AND THE SECTION 404 PERMIT, OUTSIDE OF WHICH NO IN-WATER WORK MAY OCCUR.

SURVEY NOTES:

1. BASIS OF BEARINGS IS THE WASHINGTON STATE PLANE COORDINATE SYSTEM, NORTH ZONE, NAD 83/91.
2. ELEVATIONS ARE BASED ON 2017 LIDAR (NAVD88)
3. ELEVATIONS ARE APPROXIMATE AND MAY VARY.

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LUMMI NATION
TREATY OF 1855

IAN B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER

DRAFT

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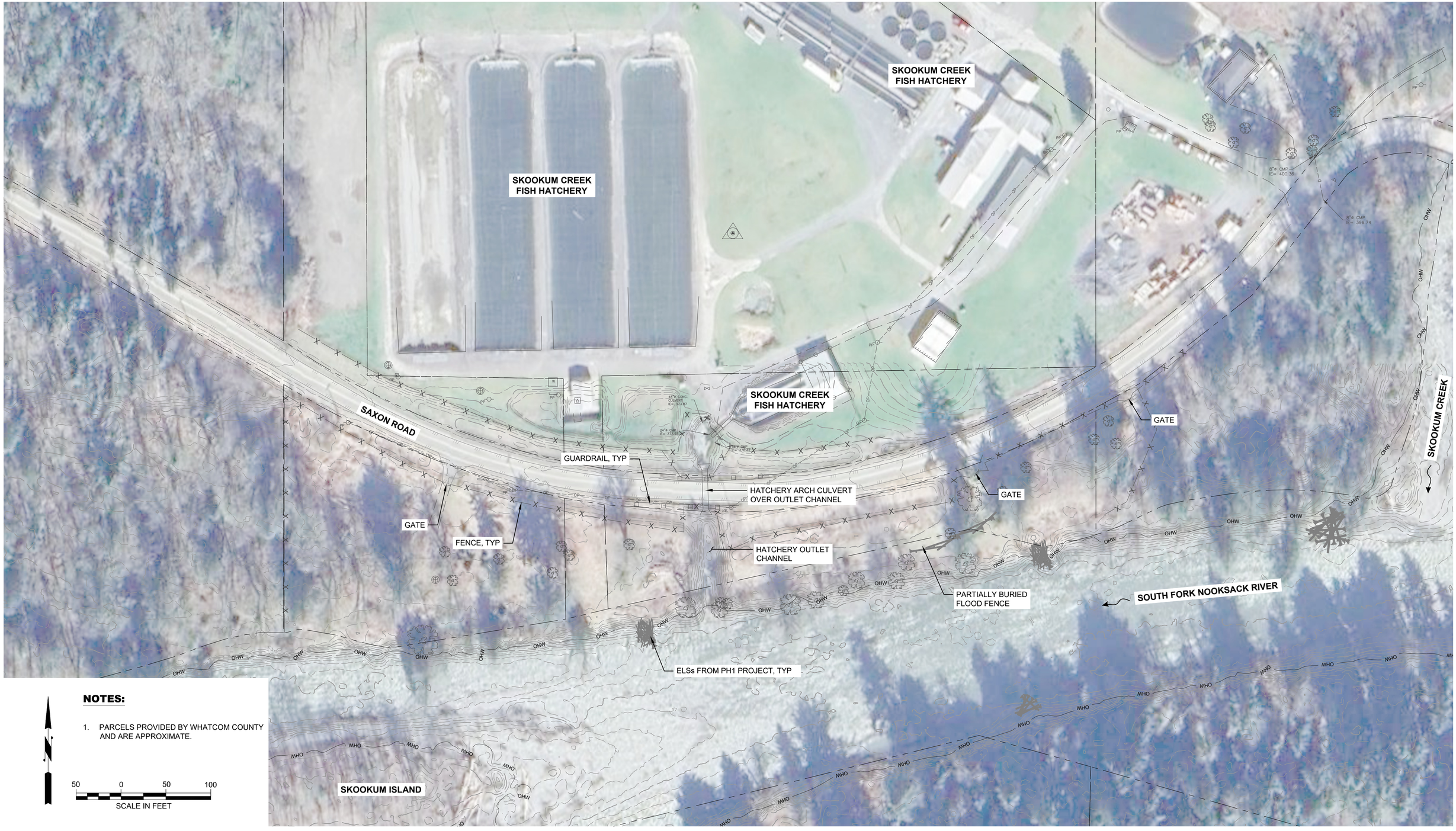
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

NOTES

DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: G0.03
SHEET NO: 3 OF 19



NOTES:

1. PARCELS PROVIDED BY WHATCOM COUNTY AND ARE APPROXIMATE.

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PHASE 1 ADAPTIVE MANAGEMENT

EXISTING CONDITIONS

DATE: OCT 2024
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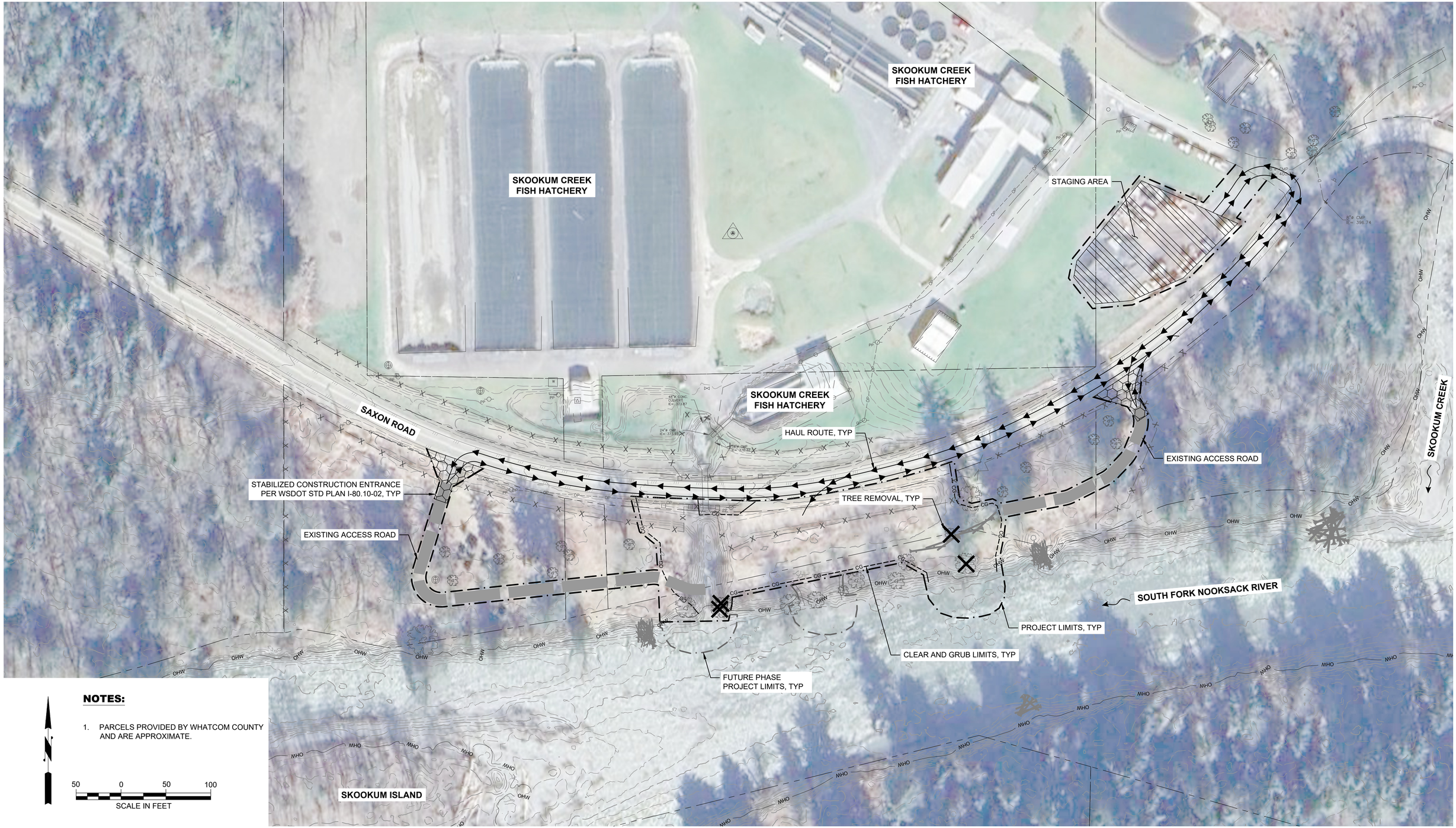
SHEET NO: 4 OF 19



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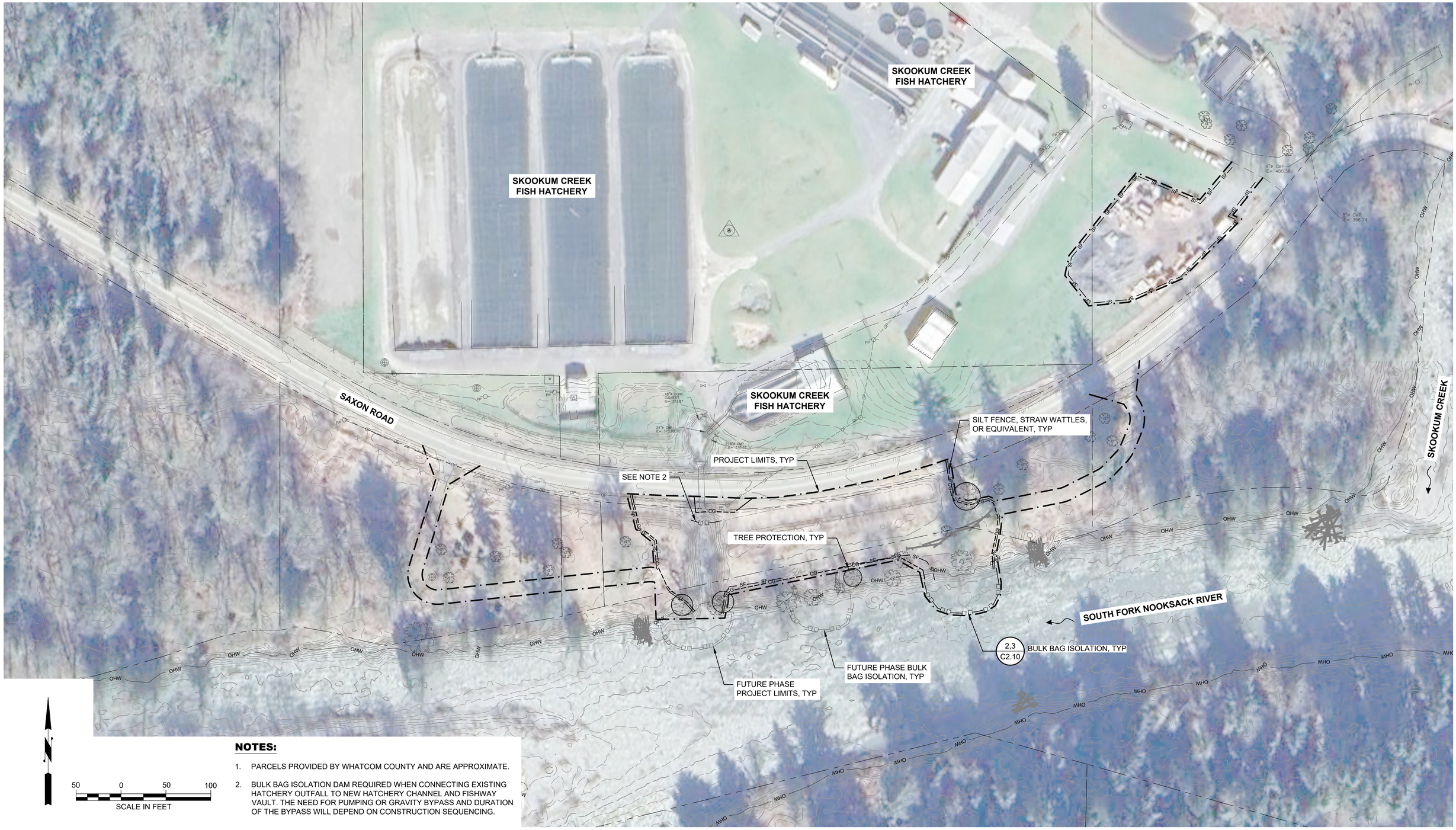
DESIGNED: T. FOULK	DRAWN: E. MARSHALL	PROJECT NO: 14-05790-000	
DESIGNED: B. SCOTT	CHECKED: B. SCOTT	DRAWING NO: C1.01	
SCALE: AS NOTED	APPROVED: M. EWBANK	SHEET NO: 5 OF 19	

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT
SITE PREPARATION, ACCESS ROADS, AND STAGING AREA



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SCALE IN FEET

NOTES:

1. PARCELS PROVIDED BY WHATCOM COUNTY AND ARE APPROXIMATE.
2. BULK BAG ISOLATION DAM REQUIRED WHEN CONNECTING EXISTING HATCHERY OUTFALL TO NEW HATCHERY CHANNEL AND FISHWAY VAULT. THE NEED FOR PUMPING OR GRAVITY BYPASS AND DURATION OF THE BYPASS WILL DEPEND ON CONSTRUCTION SEQUENCING.

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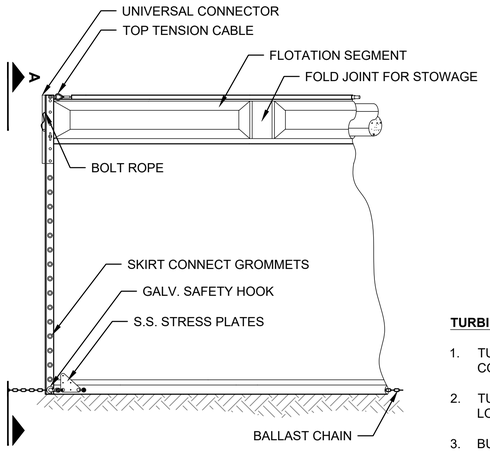
DESIGNED: T. FOULK	DRAWN: E. MARSHALL	PROJECT NO: 14-05790-000	
DESIGNED: B. SCOTT	CHECKED: B. SCOTT	DRAWING NO: C2.01	
SCALE: AS NOTED	APPROVED: M. EWBANK	SHEET NO: 6	OF 19

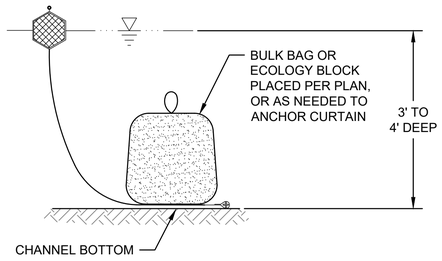
SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

TESC AND WATER MANAGEMENT PLAN



ELEVATION



SECTION A

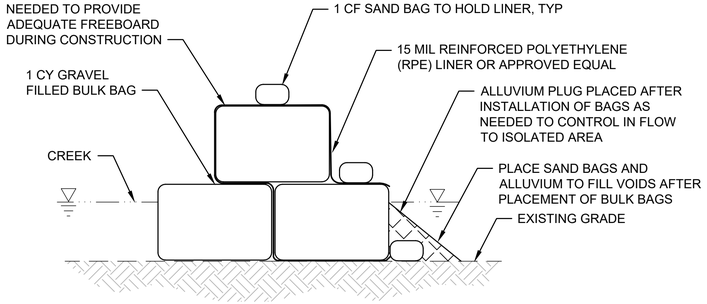
TURBIDITY CURTAIN NOTES:

1. TURBIDITY CURTAIN SHALL BE 12-FOOT-DEEP PERMEATEX SILT CONTAINMENT BOOM-MODEL SCB 12-100 OR APPROVED EQUAL.
2. TURBIDITY CURTAIN TO BE STABILIZED BOTH TRANSVERSELY AND LONGITUDINALLY AS APPROVED BY THE ENGINEER.
3. BULK BAGS SHALL HAVE POLY BAG LINERS.
4. MATERIAL USED TO FILL BULK BAGS SHALL BE PIT RUN.
5. BULK BAGS SHALL HAVE 4 LONG HANDLES AT CORNERS FOR CENTER LIFT.

DETAIL - FAST WATER TURBIDITY CURTAIN

SCALE: NTS

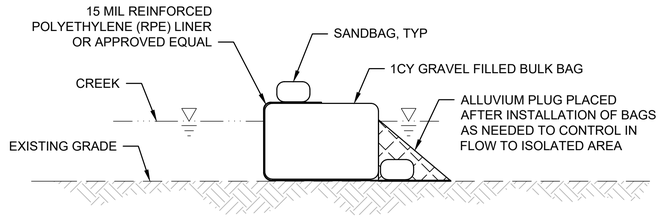
1 / -



DETAIL - TYPICAL BULK BAG ISOLATION

SCALE: NTS

2 / -



DETAIL - TYPICAL SINGLE BULK BAG ISOLATION

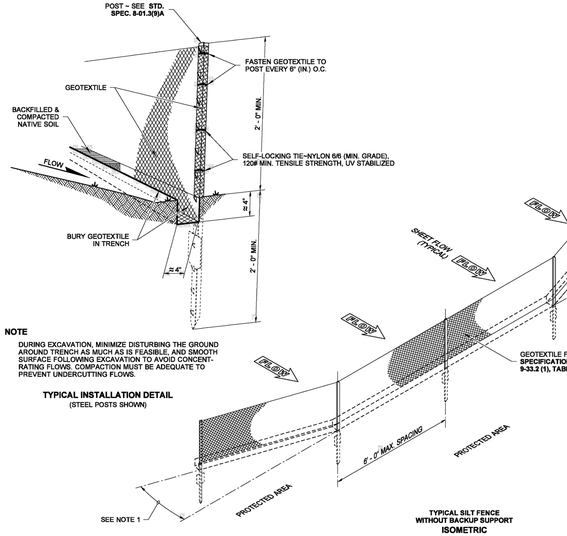
SCALE: NTS

3 / -

BULK BAG NOTES:

1. PLACE/REMOVE ALLUVIUM AS LAST/FIRST STEP OF BULK BAG ISOLATION SYSTEM INSTALLATION/REMOVAL.
2. ONLY INSTALL SINGLE BULK BAG ISOLATION WHERE WATER SURFACE EXPECTED TO BE LESS THAN 2 FT.
3. TRANSITION LINER FROM EXTERIOR (UPSTREAM END) OF ISOLATION TO INTERIOR OF ISOLATION APPROXIMATELY 1/2 THE LENGTH OF THE ISLOLATION WHERE RIVER WATER INFILTRATION INTO THE WORK AREA TRANSITIONS TO EXFILTRATION.
4. TRANSITION ISOLATION HEIGHT INTO BANKS USING SAND BAGS.

DRAWN BY: BILL BERENS



NOTE

DURING EXCAVATION, MINIMIZE DISTURBING THE GROUND AROUND TRENCH AS MUCH AS IS FEASIBLE, AND SMOOTH SURFACE FOLLOWING EXCAVATION TO AVOID CONCENTRATING FLOWS. COMPACTION MUST BE ADEQUATE TO PREVENT UNDERCUTTING FLOWS.

TYPICAL INSTALLATION DETAIL
(STEEL POSTS SHOWN)

TYPICAL SILT FENCE WITHOUT BACKUP SUPPORT ISOMETRIC
(STEEL POSTS SHOWN)

SPLICED FENCE SECTIONS SHALL BE CLOSE ENOUGH TOGETHER TO PREVENT SILT LADEN WATER FROM ESCAPING THROUGH THE FENCE AT THE OVERLAP.

SPLICE DETAIL
(WOOD POSTS SHOWN)

NOTES

1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
2. Perform maintenance in accordance with **Standard Specifications 8-01.3(9)A and 8-01.3(15).**
3. Splices shall never be placed in low spots or sump locations. If splices are located in low or sump areas, the fence may need to be reinstalled unless the Project Engineer approves the installation.
4. Install silt fencing parallel to mapped contour lines.

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
SANDRA L. SALISBURY
CERTIFICATE NO. 000860
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC/PLOTTER COPY. THE ORIGINAL, SIGNED BY THE ENGINEER AND SEALED, IS ON FILE IN THE OFFICE OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

SILT FENCE

STANDARD PLAN I-30.15-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pasco Bakotich III 3/22/13
STATE DESIGN ENGINEER — DATE

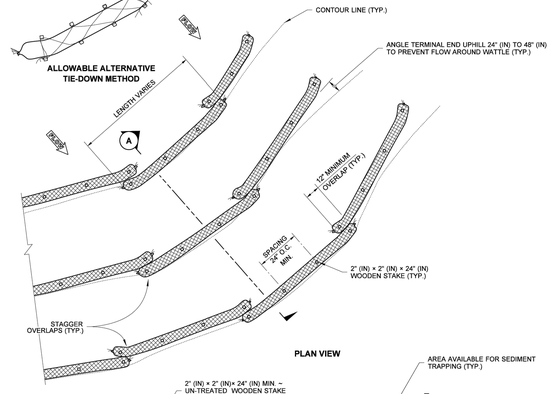
Washington State Department of Transportation

DETAIL - SILT FENCE

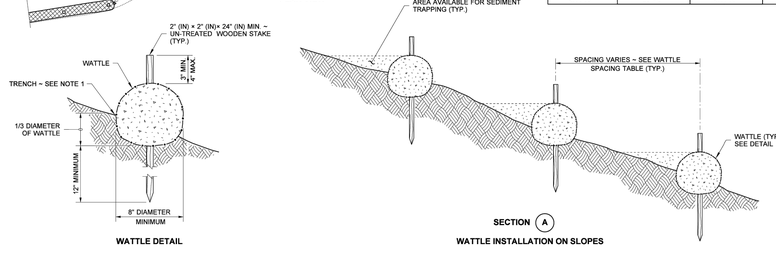
SCALE: NTS

4 / -

DRAWN BY: FERN LIDDELL



PLAN VIEW



WATTLE DETAIL

SECTION A

WATTLE INSTALLATION ON SLOPES

NOTES

1. Wattles shall be in accordance with **Standard Specification, Section 9-14.5(5).** Install Wattles along contours. Installation shall be in accordance with **Standard Specification, Section 8-01.3(10).**
2. Securely knot each end of Wattle. Overlap adjacent Wattle ends 12" (in) behind one another and securely tie together.
3. Compact excavated soil and trenches to prevent undercutting. Additional staking may be necessary to prevent undercutting.
4. Install Wattle perpendicular to flow along contours.
5. Wattles shall be inspected regularly, and immediately after a rainfall produces runoff, to ensure they remain thoroughly entrenched and in contact with the soil.
6. Perform maintenance in accordance with **Standard Specification, Section 8-01.3(15).**
7. Refer to **Standard Specification, Section 8-01.3(16)** for removal.

WATTLE SPACING TABLE

TEMPORARY		PERMANENT	
8" - 10" OR 10" - 12" DIAM.		10" - 12" DIAM.	
SLOPE	MAX. SPACING	SLOPE	MAX. SPACING
1H : 1V	5' - 0"	-	-
2H : 1V	10' - 0"	2H : 1V	5' - 0"
3H : 1V	15' - 0"	3H : 1V	10' - 0"
4H : 1V	20' - 0"	4H : 1V	15' - 0"

STATE OF WASHINGTON JULI DEE HARTWIG 22322 EXP 08/31/2020 LANDSCAPE ARCHITECT
Hartwig, Juli Jun 4 2019 8:05 AM

WATTLE INSTALLATION ON SLOPE

STANDARD PLAN I-30.30-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Jun 5, 2019 7:11 AM
STATE DESIGN ENGINEER

Washington State Department of Transportation

DETAIL - STRAW WATTLES

SCALE: NTS

5 / -

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LUMMI NATION TREATY OF 1855

IAN M. MOSTRENKO STATE OF WASHINGTON 36069 REGISTERED PROFESSIONAL ENGINEER — DRAFT

DESIGNED:	DRAWN:
I. MOSTRENKO	M. McCARTHY
DESIGNED:	DRAWN:
T. FOULK	E. MARSHALL
DESIGNED:	CHECKED:
B. SCOTT	B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

TESC AND WATER MANAGEMENT DETAILS

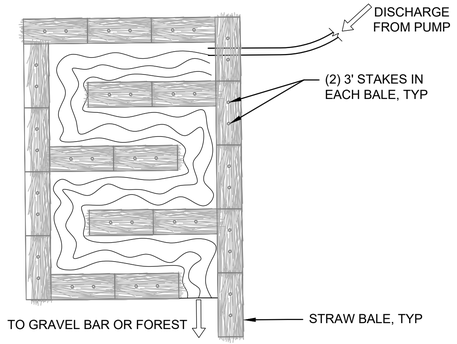
DATE: OCT 2024

PROJECT NO: 14-05790-000

DRAWING NO: C2.10

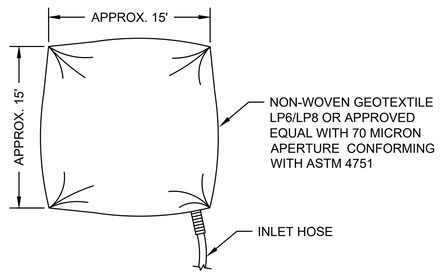
SHEET NO: 7 OF 19

O:\proj\Y2014\14-05790-000\CAD\Sheet\Ph1 AMTESC-Water mgmnt.dwg | 10/15/2024 12:43 PM | Eric Marshall



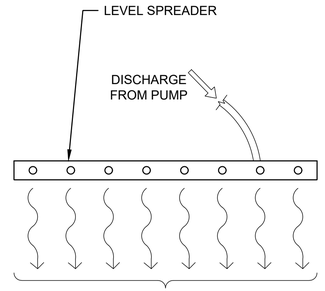
DETAIL - ENERGY DISSIPATER 1/-

SCALE: NTS



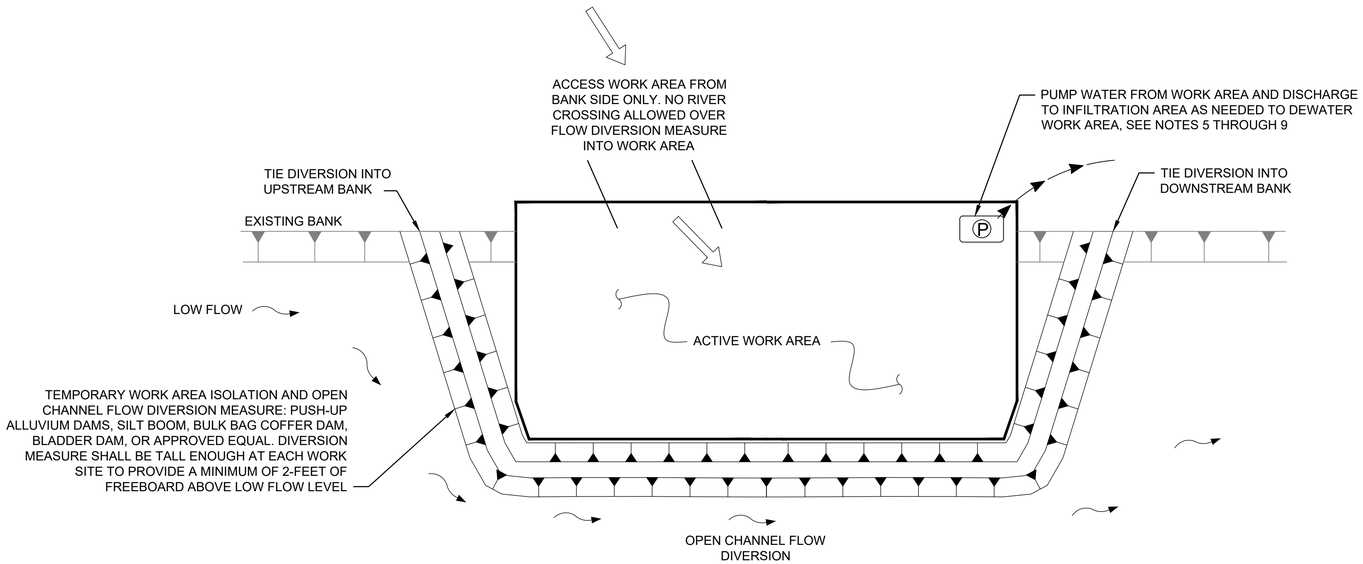
DETAIL - SILT BAG 2/-

SCALE: NTS



DETAIL - LEVEL SPREADER 3/-

SCALE: NTS



DETAIL - WORK AREA ISOLATION SCHEMATIC 4/-

SCALE: NTS

WATER MANAGEMENT NOTES:

1. WATER MANAGEMENT METHODS SHALL BE USED TO DIVERT FLOW AND ISOLATE WORK AREAS AS NECESSARY TO COMPLETE CONSTRUCTION OF ELS STRUCTURES AND TO AVOID IMPACTS TO WATER QUALITY. DIVERSION AND ISOLATION MEANS MAY INCLUDE PUSH-UP DAMS USING NATIVE ALLUVIUM FROM ACTIVE WORK AREAS, SILT BOOMS, BULK BAGS, BLADDER DAMS, OR APPROVED EQUAL AS NECESSARY TO ALLOW CONSTRUCTION WHILE PREVENTING IMPACTS TO WATER QUALITY. COMBINATION OF DIVERSION AND ISOLATION MEASURES MAY BE USED AS NECESSARY.
2. SMALL FLOW BY-PASS CHANNELS MAY BE CONSTRUCTED AS NEEDED TO ROUTE FLOW AROUND THE WORK AREA ISOLATION MEASURE AND/OR THE WORK AREA. IF NECESSARY, BEFORE CONSTRUCTING THE BY-PASS CHANNEL THE OWNER SHALL INSTALL FISH EXCLUSION NETS AND COMPLETE ALL FISH REMOVAL BEFORE THE CONTRACTOR CONSTRUCTS AND ACTIVATES THE BY-PASS CHANNEL. COORDINATE WITH THE ENGINEER BEFORE CONSTRUCTING BY-PASS CHANNELS TO VERIFY AND APPROVE CHANNEL SIZE, ALIGNMENT AND SLOPE. BY-PASS CHANNELS MAY BE CONSTRUCTED WITHIN THE MAIN ACTIVE (NON-VEGETATED) CHANNEL, GRAVEL BARS, AND THE FLOODPLAIN NEAR THE ELS. FOLLOWING COMPLETION OF ELS CONTRACTOR SHALL RESTORE THE AREA IMPACTED BY THE BY-PASS CHANNEL CONSTRUCTION, BACKFILL THE BY-PASS CHANNEL WITH ALLUVIUM, AND RESTORE FLOW IN THE MAIN CHANNEL TO ITS ORIGINAL ALIGNMENT. LENGTH OF BY-PASS CHANNEL NEEDED WILL VARY AT EACH WORK AREA. CONTRACTOR SHALL DETERMINE THE LENGTH OF BY-PASS CHANNEL NEEDED FOR EACH WORK AREA.
3. CONTRACTOR SHALL CONSTRUCT TEMPORARY FLOW DIVERSION MEASURES STARTING AT UPSTREAM END OF WORK AREA TO DIRECT WATER AWAY FROM WORK AREA. LENGTH OF FLOW DIVERSION MEASURES NEEDED WILL VARY AT EACH WORK AREA. CONTRACTOR SHALL DETERMINE THE LENGTH OF FLOW DIVERSION MEASURES NEEDED FOR EACH WORK AREA.
4. CONSTRUCTION WITHIN THE ISOLATED WORK AREA MAY NOT COMMENCE UNTIL THE OWNER HAS COMPLETED ALL FISH EXCLUSION ACTIVITIES. ALL TEMPORARY FISH EXCLUSION NETS INSTALLED BY THE OWNER MUST REMAIN IN PLACE DURING REMOVAL OF FLOW DIVERSION AND OTHER TESC MEASURES. THE OWNER SHALL BE RESPONSIBLE FOR REMOVING FISH EXCLUSION NETS.
5. GROUND WATER ENCOUNTERED DURING ELS EXCAVATIONS MAY BE PUMPED AS NECESSARY TO INFILTRATION AREAS TO ALLOW CONSTRUCTION AND INSPECTION OF ELS STRUCTURES, AND TO FACILITATE THE REMOVAL OF SEDIMENT AND TURBIDITY FROM THE WATER. INFILTRATION AREAS ARE NOT SHOWN ON THE PLANS. ALL INFILTRATION AREAS PROPOSED BY THE CONTRACTOR SHALL BE APPROVED BY THE ENGINEER OR OWNER BEFORE THEIR USE. ANY DISCHARGE OF WATER RETURNING TO THE RIVER (DUE TO DEWATERING ACTIVITIES) SHALL NOT EXCEED THE WATER QUALITY REQUIREMENTS SET FORTH IN THE PROJECT PERMITS.
6. GROUND WATER MAY BE PUMPED TO INFILTRATION AREAS AND DISCHARGED THROUGH AN ENERGY DISSIPATOR, LEVEL SPREADER, SILT BAGS, OR OTHER AS APPROVED BY THE ENGINEER. WATER DISCHARGED OR INFILTRATED SHALL NOT CAUSE EROSION OR RESULT IN TURBIDITY IMPACTS TO THE RIVER.
7. GROUND WATER MAY NOT BE PUMPED DIRECTLY TO WETLANDS OR NEW OR EXISTING CHANNELS WITHOUT PRIOR APPROVAL FROM THE ENGINEER. WATER SHALL BE DISCHARGED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS AND PERMITS
8. THE ENGINEER SHALL BE NOTIFIED 24 HOURS IN ADVANCE OF ANY WATER PUMPING ACTIVITIES.
9. CONSTRUCTION DEWATERING SHALL BE MAINTAINED 24 HOURS PER DAY DURING CONSTRUCTION AND MONITORED BY THE CONTRACTOR DURING NON-WORKING HOURS.

SHORING NOTES:

1. CONTRACTOR SHALL DESIGN ALL REQUIRED SHORING AND ALL FLOW AND WATER EXCLUSION STRUCTURES AND SYSTEMS. HYDROSTATIC PRESSURES SHALL BE ADDED TO LATERAL PRESSURES DUE TO EARTH, SURCHARGES AND SPECIAL PRESSURES. SPECIAL PRESSURES MAY INCLUDE BUT ARE NOT LIMITED TO HYDROSTATIC PRESSURES RESULTING FROM BACKWATER CONDITIONS, TEMPORARY SHORING SEEPAGE, MACHINERY SURCHARGE AND FLUCTUATING GROUNDWATER.
2. OTHER SURCHARGES SHALL BE DETERMINED BY THE CONTRACTOR ON THE BASIS OF CONSTRUCTION TRAFFIC, EQUIPMENT STORAGE, SPOILS HANDLING, WORK SEQUENCE AND OTHER FACTORS.
3. ALL TEMPORARY SHORING SYSTEMS SHALL BE DESIGNED BY A LICENSED PROFESSIONAL ENGINEER WITH A MINIMUM FACTOR OF SAFETY OF 1.4 (FS = 1.4).

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LUMMI NATION TREATY OF 1855

IAN R. MOSTRENKO STATE OF WASHINGTON 36069 REGISTERED PROFESSIONAL ENGINEER DRAFT

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

WATER MANAGMENT NOTES AND WORK AREA ISOLATION

DATE: OCT 2024

PROJECT NO: 14-05790-000

DRAWING NO: C2.11

SHEET NO: 8 OF 19

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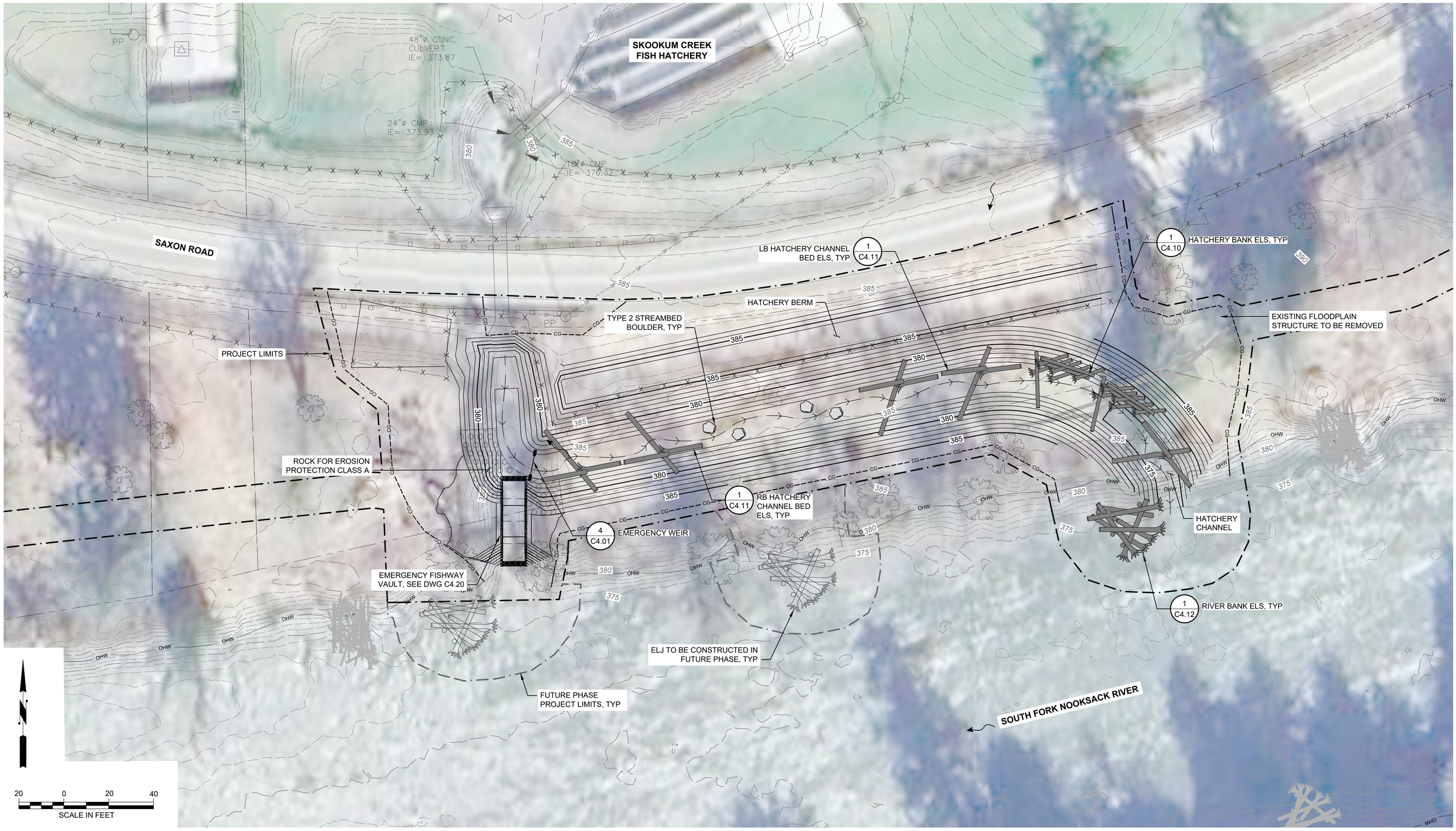

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DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

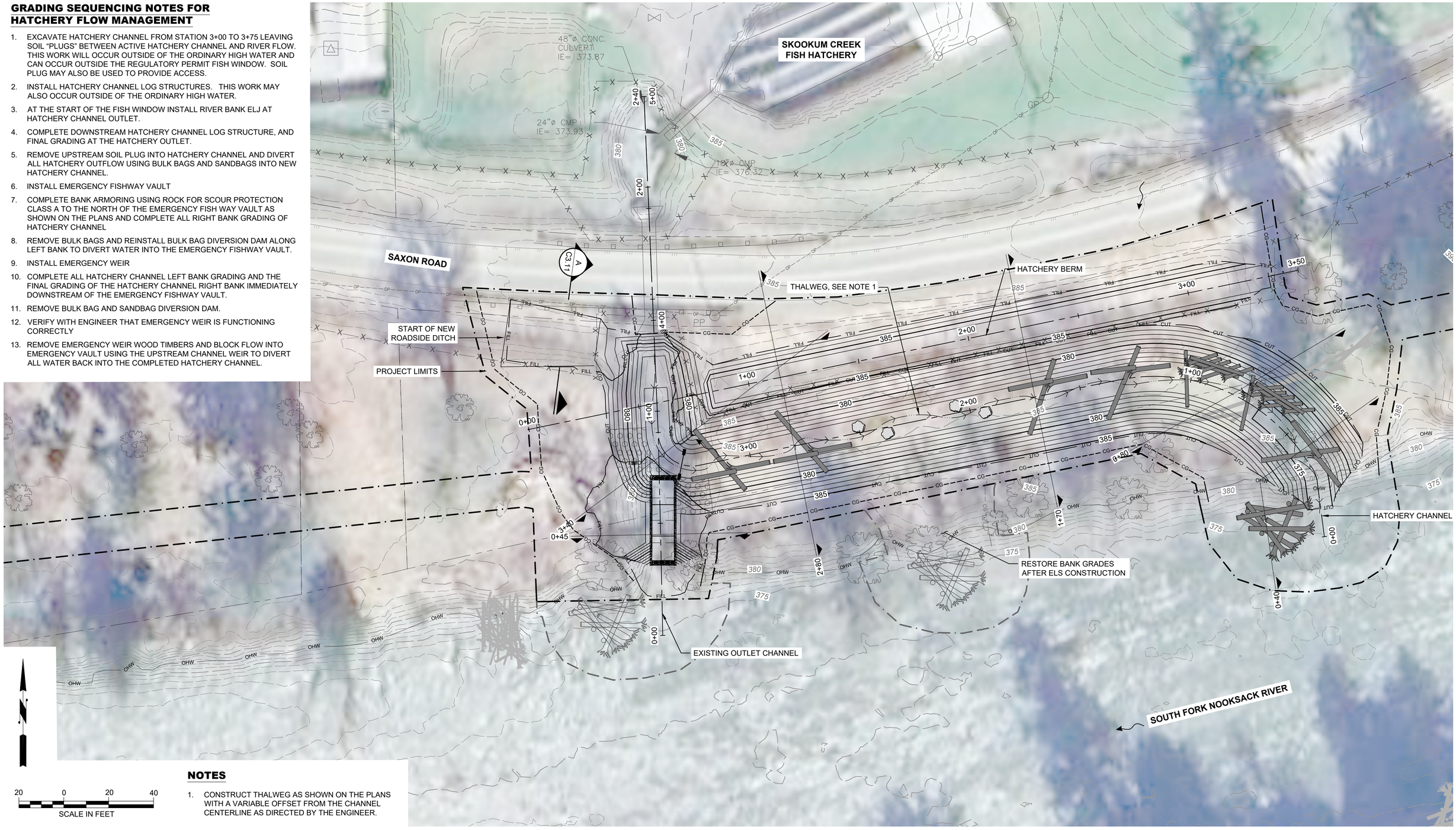
PHASE 1 ADAPTIVE MANAGEMENT

SITE PLAN

DATE:	OCT 2024
PROJECT NO:	14-05790-000
DRAWING NO:	C3.01
SHEET NO:	9 OF 19

GRADING SEQUENCING NOTES FOR HATCHERY FLOW MANAGEMENT

1. EXCAVATE HATCHERY CHANNEL FROM STATION 3+00 TO 3+75 LEAVING SOIL "PLUGS" BETWEEN ACTIVE HATCHERY CHANNEL AND RIVER FLOW. THIS WORK WILL OCCUR OUTSIDE OF THE ORDINARY HIGH WATER AND CAN OCCUR OUTSIDE THE REGULATORY PERMIT FISH WINDOW. SOIL PLUG MAY ALSO BE USED TO PROVIDE ACCESS.
2. INSTALL HATCHERY CHANNEL LOG STRUCTURES. THIS WORK MAY ALSO OCCUR OUTSIDE OF THE ORDINARY HIGH WATER.
3. AT THE START OF THE FISH WINDOW INSTALL RIVER BANK ELJ AT HATCHERY CHANNEL OUTLET.
4. COMPLETE DOWNSTREAM HATCHERY CHANNEL LOG STRUCTURE, AND FINAL GRADING AT THE HATCHERY OUTLET.
5. REMOVE UPSTREAM SOIL PLUG INTO HATCHERY CHANNEL AND DIVERT ALL HATCHERY OUTFLOW USING BULK BAGS AND SANDBAGS INTO NEW HATCHERY CHANNEL.
6. INSTALL EMERGENCY FISHWAY VAULT
7. COMPLETE BANK ARMORING USING ROCK FOR SCOUR PROTECTION CLASS A TO THE NORTH OF THE EMERGENCY FISH WAY VAULT AS SHOWN ON THE PLANS AND COMPLETE ALL RIGHT BANK GRADING OF HATCHERY CHANNEL
8. REMOVE BULK BAGS AND REINSTALL BULK BAG DIVERSION DAM ALONG LEFT BANK TO DIVERT WATER INTO THE EMERGENCY FISHWAY VAULT.
9. INSTALL EMERGENCY WEIR
10. COMPLETE ALL HATCHERY CHANNEL LEFT BANK GRADING AND THE FINAL GRADING OF THE HATCHERY CHANNEL RIGHT BANK IMMEDIATELY DOWNSTREAM OF THE EMERGENCY FISHWAY VAULT.
11. REMOVE BULK BAG AND SANDBAG DIVERSION DAM.
12. VERIFY WITH ENGINEER THAT EMERGENCY WEIR IS FUNCTIONING CORRECTLY
13. REMOVE EMERGENCY WEIR WOOD TIMBERS AND BLOCK FLOW INTO EMERGENCY VAULT USING THE UPSTREAM CHANNEL WEIR TO DIVERT ALL WATER BACK INTO THE COMPLETED HATCHERY CHANNEL.



20 0 20 40
SCALE IN FEET

NOTES

1. CONSTRUCT THALWEG AS SHOWN ON THE PLANS WITH A VARIABLE OFFSET FROM THE CHANNEL CENTERLINE AS DIRECTED BY THE ENGINEER.

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DRAFT

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DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

GRADING PLAN

DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: C3.02
SHEET NO: 10 OF 19

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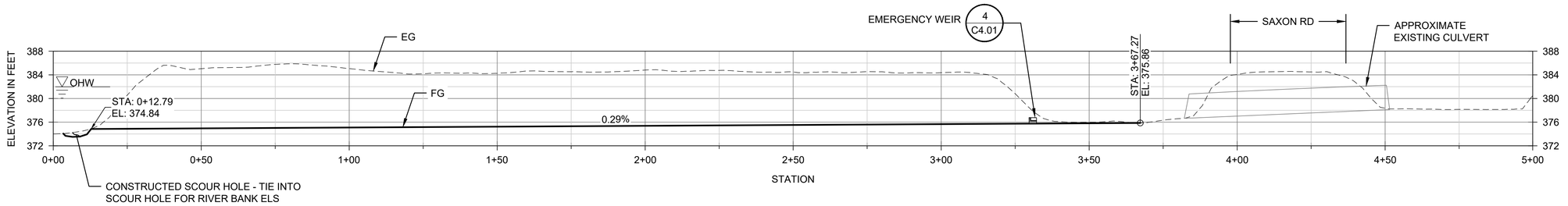
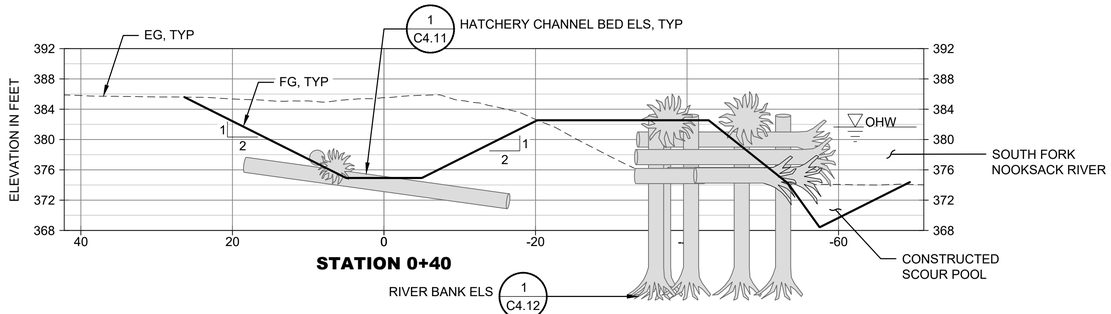


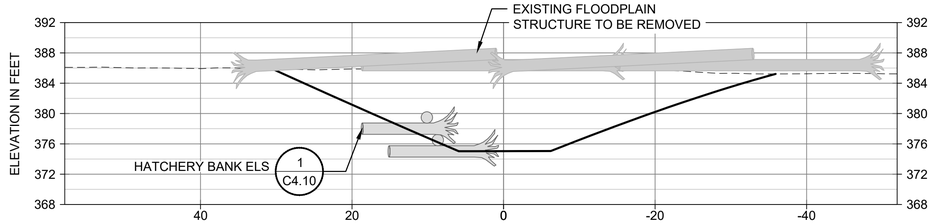
PROFILE - HATCHERY CHANNEL

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=10'

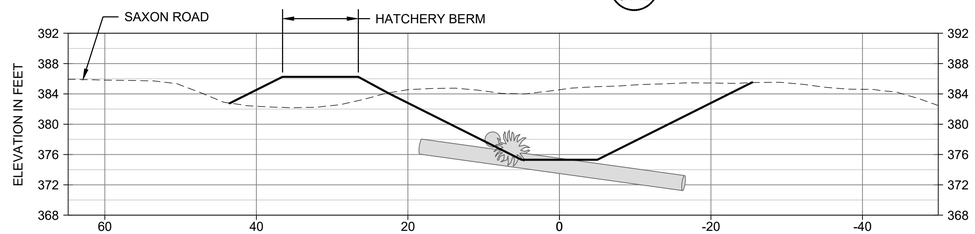
HORIZONTAL SCALE IN FEET
20 0 20 40
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 2



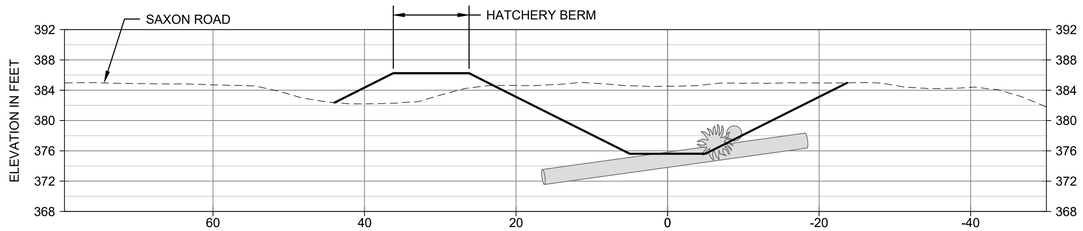
STATION 0+40



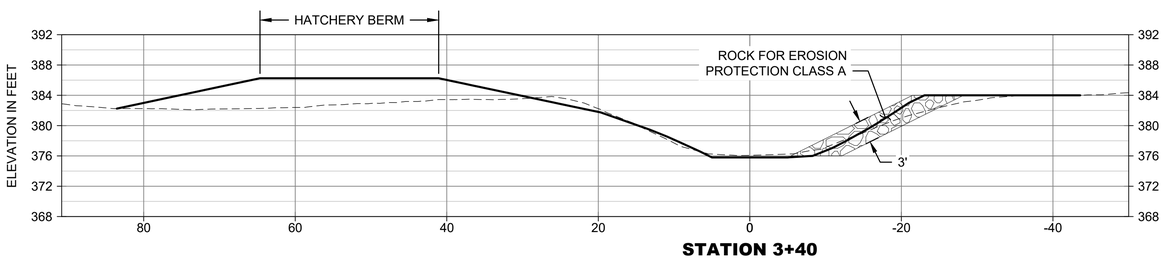
STATION 0+80



STATION 1+70



STATION 2+80



STATION 3+40

SECTIONS - HATCHERY CHANNEL

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

HORIZONTAL SCALE IN FEET
10 0 10 20
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 1

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LUMMI NATION
TREATY OF 1855

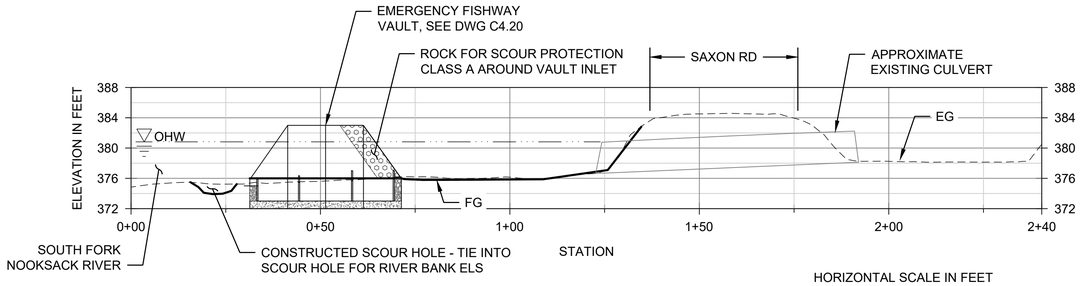
DRAFT
IAN R. MOSTRENKO
STATE OF WASHINGTON
36069
REGISTERED
PROFESSIONAL ENGINEER

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT
PHASE 1 ADAPTIVE MANAGEMENT

PROFILES AND SECTIONS 1

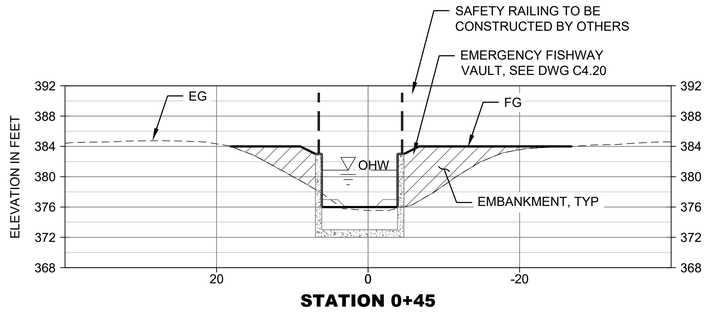
DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: C3.10
SHEET NO: 11 OF 19



PROFILE - EXISTING OUTLET CHANNEL

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=10'

HORIZONTAL SCALE IN FEET
20 0 20 40
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 2

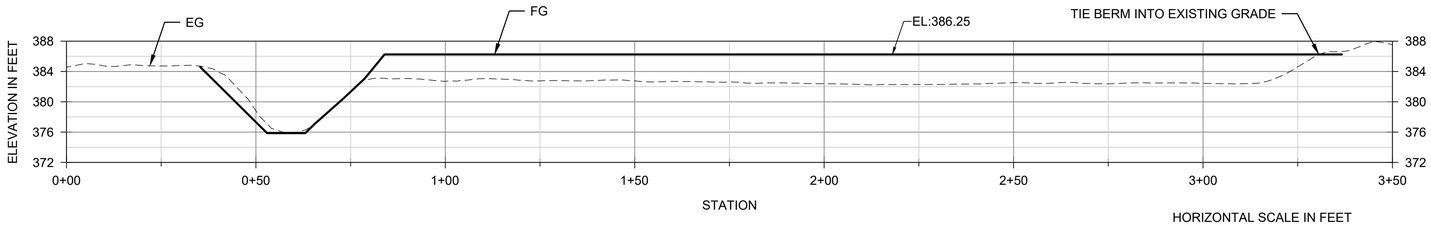


STATION 0+45

SECTION - EXISTING OUTLET CHANNEL

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

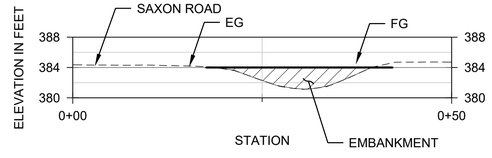
HORIZONTAL SCALE IN FEET
10 0 10 20
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 1



PROFILE - HATCHERY BERM

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=10'

HORIZONTAL SCALE IN FEET
20 0 20 40
10 0 10 20
VERTICAL SCALE IN FEET
VERTICAL EXAGGERATION X 2



SECTION - ROADSIDE DITCH

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

A
C3.02

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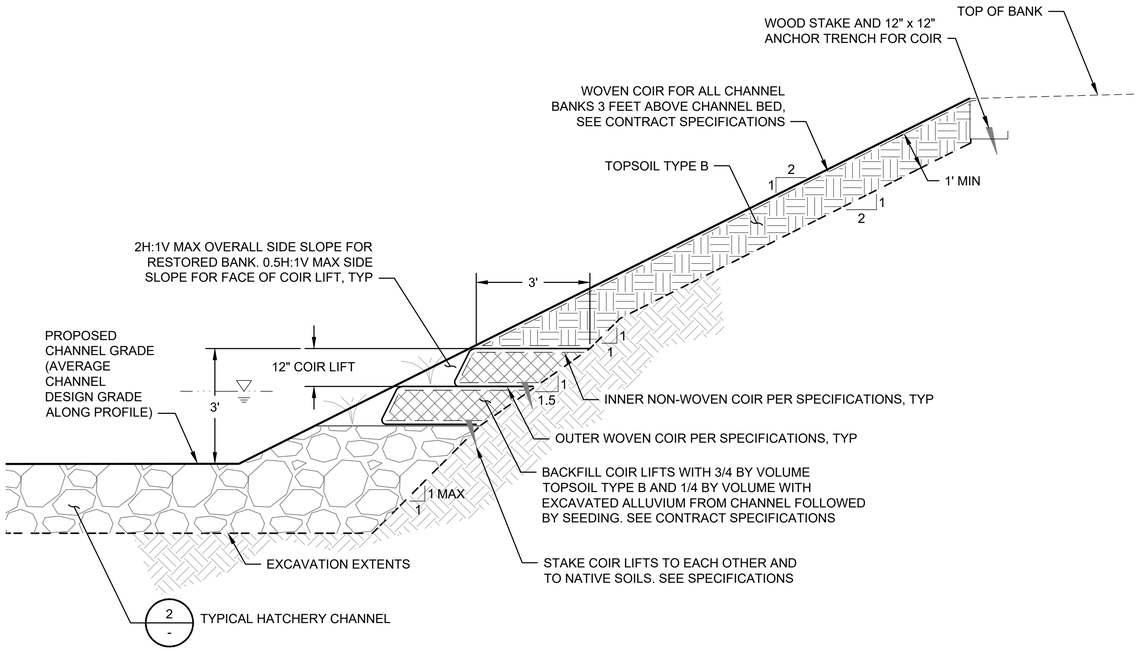
SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

PROFILES AND SECTIONS 2

DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: C3.11
SHEET NO: 12 OF 19



COIR WRAP PREPARATION

(SEE SPECIFICATIONS)

STEP 1
- OVEREXCAVATE TO PLACE COIR WRAP SOIL LIFTS
- PROTECT SUBGRADE FROM FOOT TRAFFIC AND CONSTRUCTION ACTIVITIES THAT COULD CAUSE SOIL DISTURBANCE OR BANK SETTLEMENT PRIOR TO COIR PLACEMENT

STEP 2
- PLACE OUTER WOVEN COIR FOR THE BOTTOM OF THE LIFT
- PLACE INNER NON-WOVEN COIR
- STAKE COIR FABRIC TO NATIVE SOIL BELOW LIFT

STEP 3
- INSTALL FORM (IF CONTRACTOR CHOOSES) TO HOLD COIR WRAP AND SOIL TO DESIGN DIMENSIONS
- PLACE 12" HIGH LAYER OF SOIL COMPOSED OF TOPSOIL TYPE B AMENDED WITH ALLUVIUM AND COMPACT PER SPECIFICATIONS

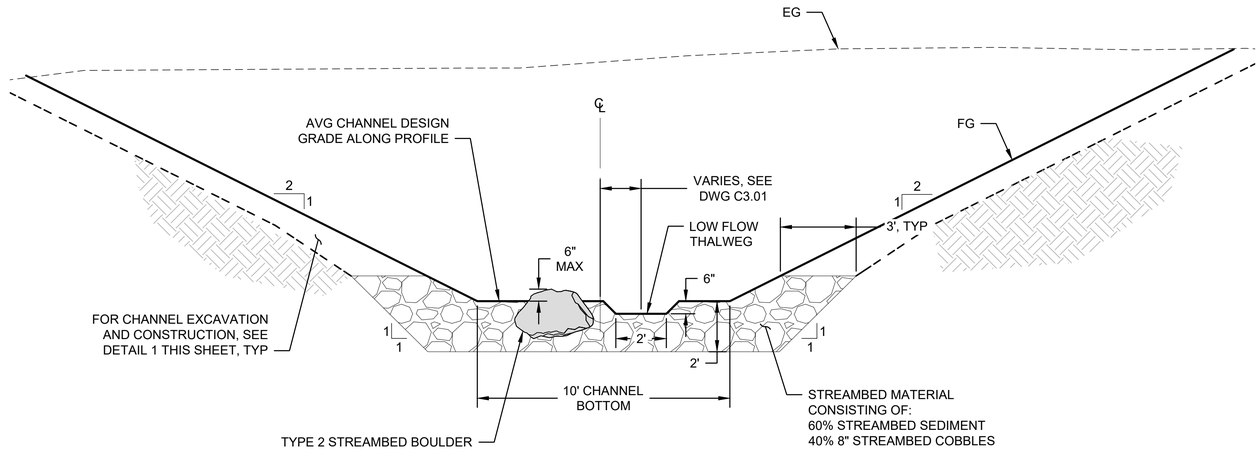
STEP 4
- PLACE SEED MIX PER PLANTING PLAN AND SPECIFICATIONS

STEP 5
- WRAP OUTER WOVEN COIR AND INNER NON-WOVEN COIR AROUND SOIL LIFT TO ENCASE THE LIFT

STEP 6
- STAKE PER DETAIL

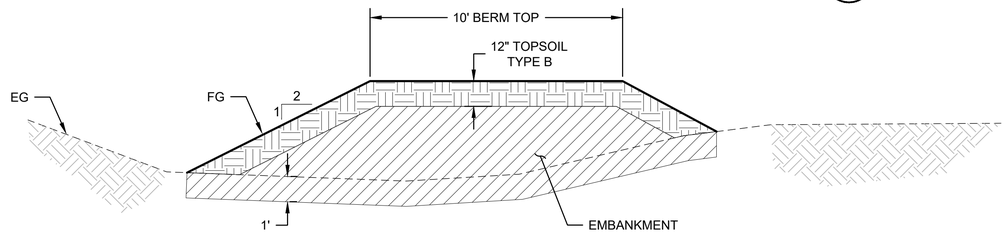
DETAIL - HATCHERY CHANNEL BANK SLOPE RESTORATION — 1

SCALE: NTS



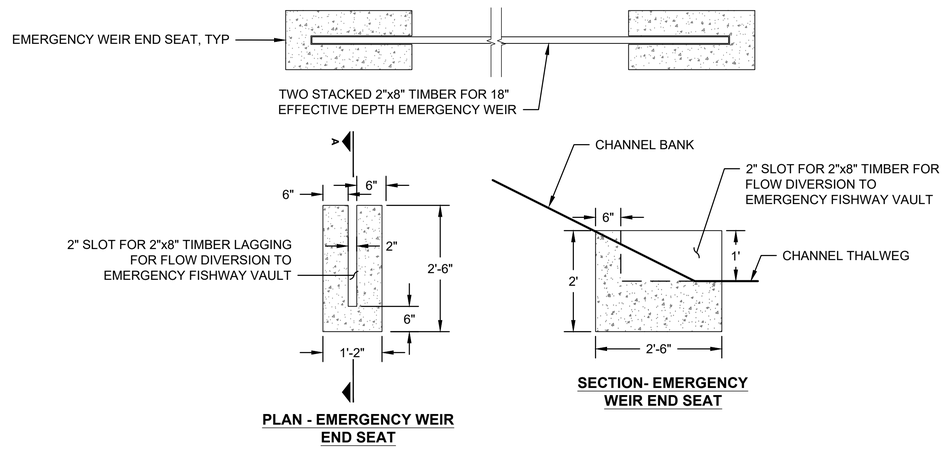
DETAIL - TYPICAL HATCHERY CHANNEL — 2

SCALE: NTS



DETAIL - TYPICAL HATCHERY CHANNEL BERM — 3

SCALE: NTS



DETAIL - EMERGENCY WEIR — 4

SCALE: NTS

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LUMMI NATION TREATY OF 1855

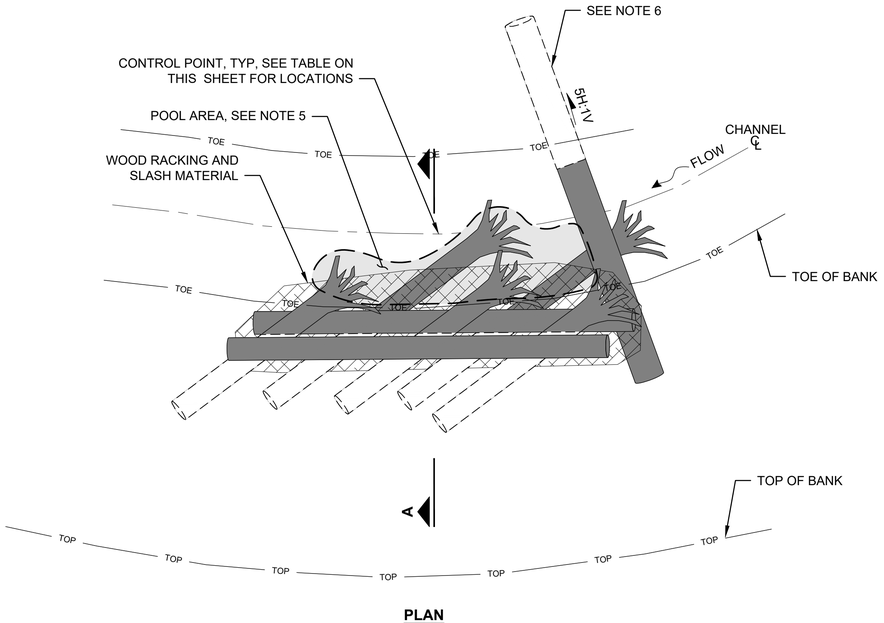
IAN B. MOSTRENKO — STATE OF WASHINGTON — 36069 — REGISTERED PROFESSIONAL ENGINEER — DRAFT

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY	DATE: OCT 2024	
DESIGNED: T. FOULK	DRAWN: E. MARSHALL	PROJECT NO: 14-05790-000	
DESIGNED: B. SCOTT	CHECKED: B. SCOTT	DRAWING NO: C4.01	
SCALE: AS NOTED	APPROVED: M. EWBANK	SHEET NO: 13 OF 19	

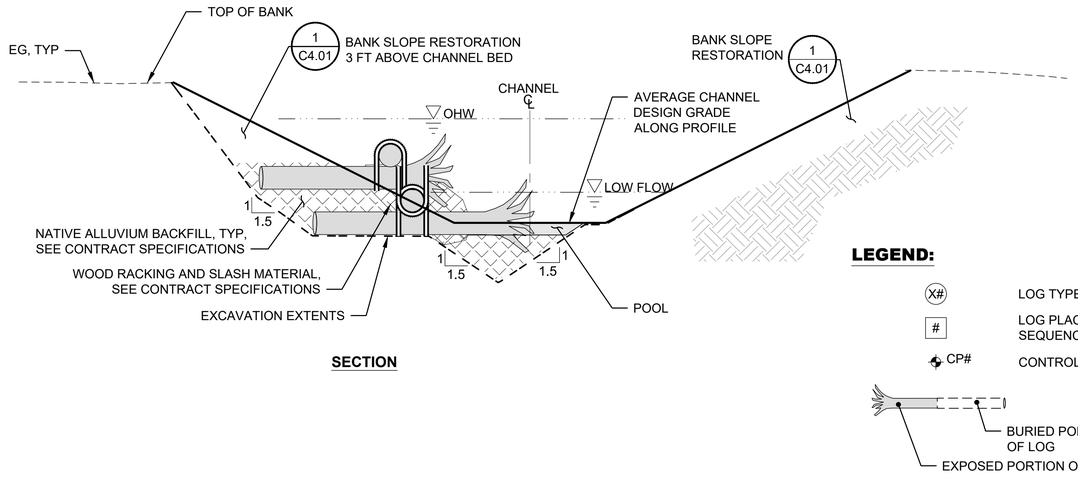
SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

SITE DETAILS



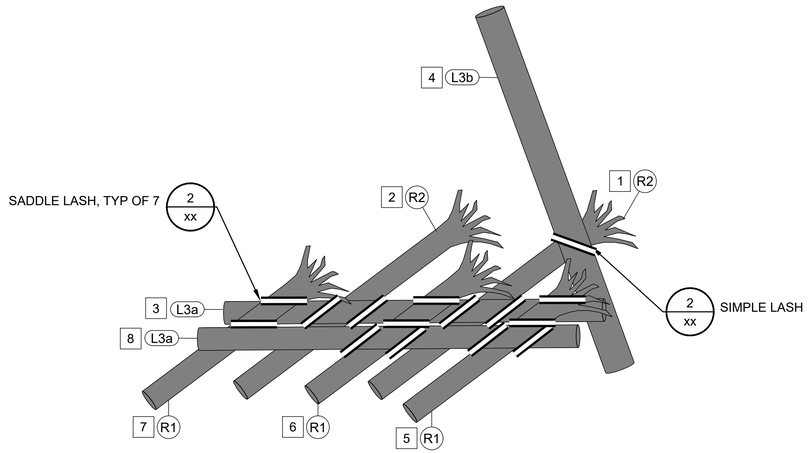
PLAN



SECTION

LEGEND:

- X# — LOG TYPE ID
- # — LOG PLACEMENT SEQUENCING ORDER
- CP# — CONTROL POINT
- BURIED PORTION OF LOG
- EXPOSED PORTION OF LOG



LOG LAYERING AND LASHING

LOG SCHEDULE - HATCHERY CHANNEL BANK ELS:

LOG TYPE	MIN DIA (IN)	LENGTH (FT)	ROOTWAD (YES/NO)	TOTAL QTY PER STRUCTURE
R1	18	15	YES	3
R2	18	20	YES	2
L3a	18	25	NO	2
L3b	24	25	NO	1

NOTES:

1. STRUCTURE LOCATION AND LOG ORIENTATION AND DEPTH SHOWN IS APPROXIMATE AND WILL VARY FOR EACH STRUCTURE BASED ON SITE SPECIFIC CONDITIONS. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL FLAG STRUCTURE CONTROL POINT LOCATIONS. THE PROJECT REPRESENTATIVE SHALL THEN MAKE ANY NECESSARY FIELD ADJUSTMENTS TO LOG LOCATIONS, ORIENTATIONS AND DEPTHS. CONTRACTOR SHALL VERIFY FINAL STRUCTURE LOCATION AND EXCAVATION EXTENTS WITH PROJECT REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE CONTRACT SPECIFICATIONS.
2. LOGS SHALL BE PLACED AT THE LOCATIONS, ELEVATIONS, DEPTHS AND ORIENTATIONS SPECIFIED ON THE DRAWINGS OR AS DESIGNATED BY THE PROJECT REPRESENTATIVE.
3. CONTRACTOR SHALL BACKFILL ALL EXCAVATIONS AS SHOWN. SEE CONTRACT SPECIFICATIONS FOR COMPACTION REQUIREMENTS.
4. BURIED PORTION OF LOGS SHOWN ON PLAN VIEW ONLY.
5. EXCAVATE SCOUR POOL 1 FOOT BELOW AVERAGE CHANNEL DESIGN GRADES. LOCATION AND DIMENSIONS TO BE ADJUSTED IN THE FIELD AS DESIGNATED BY THE PROJECT REPRESENTATIVE.
6. LOWER 10 FEET OF LOG TO BE BURIED BELOW CHANNEL BED AND TOE IN APPROXIMATE POSITION SHOWN, AS DIRECTED BY THE PROJECT REPRESENTATIVE.

DETAIL - HATCHERY CHANNEL BANK ELS

SCALE: NTS

1 / -

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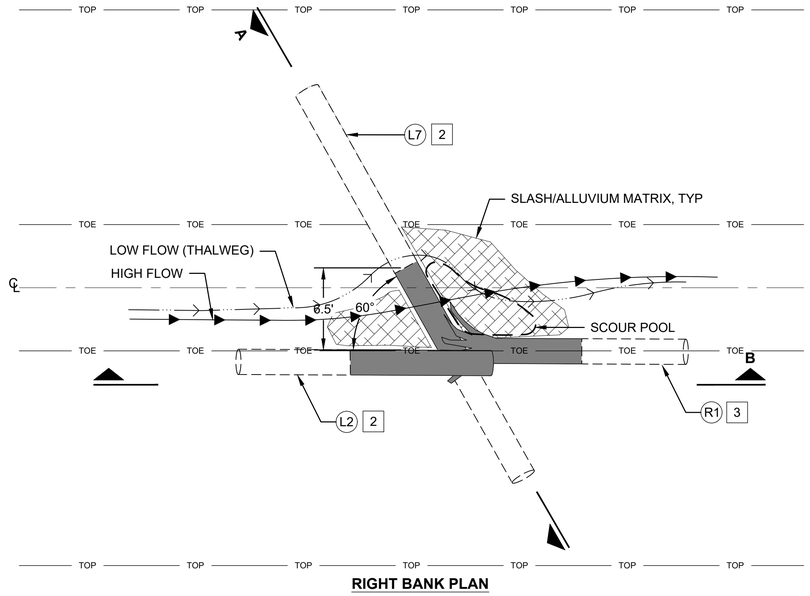
DRAFT — I A.R. MOSTRENKO STATE OF WASHINGTON 36069 REGISTERED PROFESSIONAL ENGINEER

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY	DATE: OCT 2024	
DESIGNED: T. FOULK	DRAWN: E. MARSHALL	PROJECT NO: 14-05790-000	
DESIGNED: B. SCOTT	CHECKED: B. SCOTT	DRAWING NO: C4.10	
SCALE: AS NOTED	APPROVED: M. EWBANK	SHEET NO: 14 OF 19	

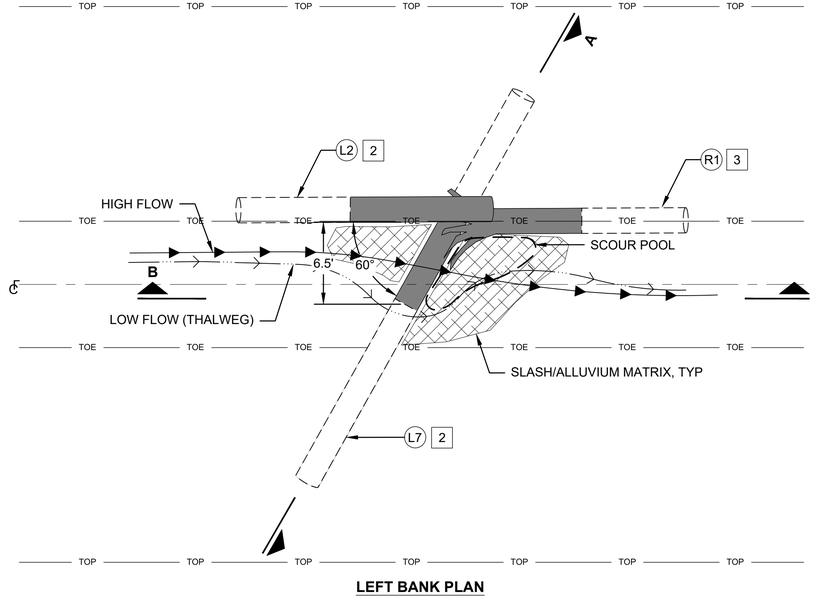
SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

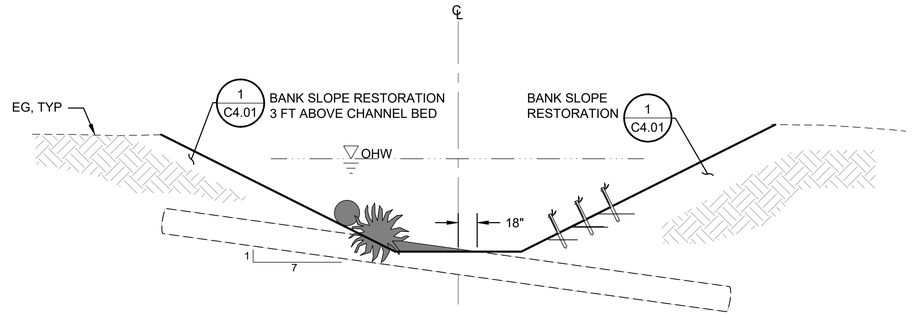
HATCHERY CHANNEL BANK ELS DETAILS



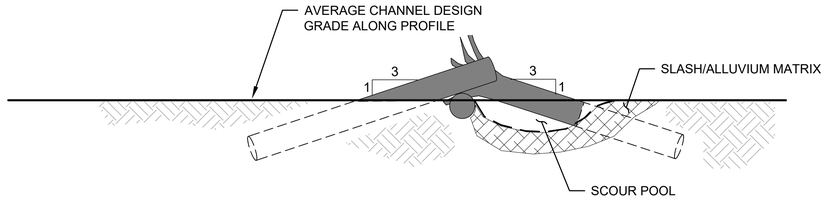
RIGHT BANK PLAN



LEFT BANK PLAN



SECTION A

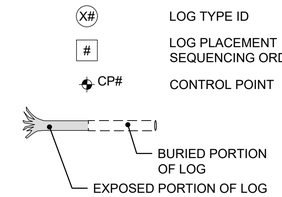


SECTION B

LOG SCHEDULE - HATCHERY CHANNEL BED ELS:

LOG ID #	DIAMETER (IN)	LENGTH (FT)	ROOTWAD	QTY/ STRUCT
L2	24	20	NO	1
L7	24	45	NO	1
R1	24	15	YES	1
SLASH	-	-		1 CY

LEGEND:



DETAIL - HATCHERY CHANNEL BED ELS

SCALE: NTS

1
-

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TREATY OF 1855

IAN R. MOSTRENKO
STATE OF WASHINGTON
36069
REGISTERED PROFESSIONAL ENGINEER
DRAFT

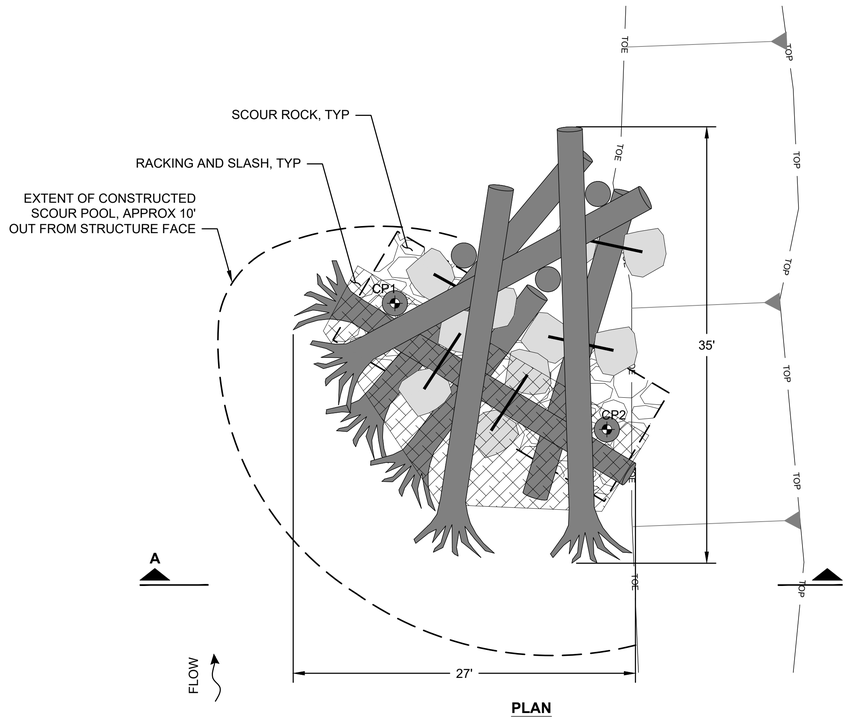
DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

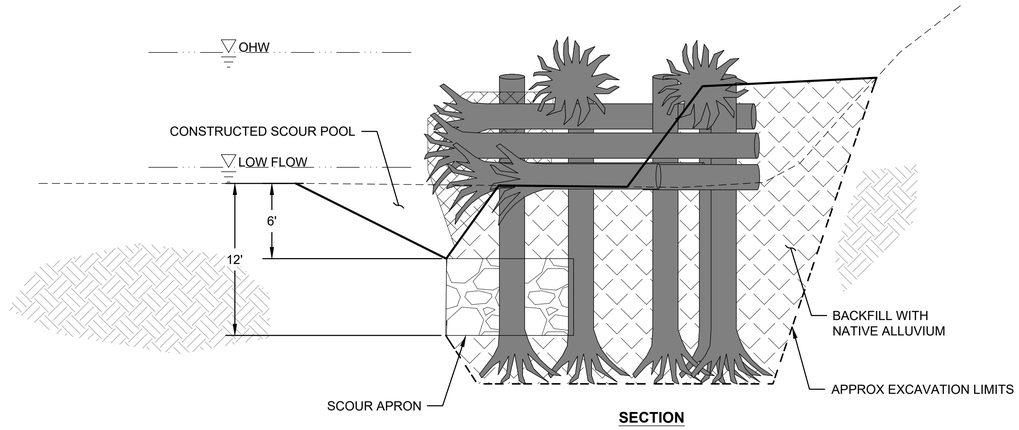
PHASE 1 ADAPTIVE MANAGEMENT

HATCHERY CHANNEL BED ELS DETAILS

DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: C4.11
SHEET NO: 15 OF 19



PLAN



SECTION

DETAIL - RIVER BANK ELS

SCALE: NTS

1
-

GENERAL NOTES:

1. UP TO 3 PILE LOCATIONS PER TYPE 3 ELS SHALL BE STAKED BY ENGINEER.
2. EXCAVATION SPOILS SHALL BE STOCKPILED TO ALLOW LOG LAYER PLACEMENT AND CONSTRUCTION ACCESS.
3. LOG MATERIALS SHALL BE PLACED AT THE LOCATIONS AND ELEVATIONS SPECIFIED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER OR OWNER.
4. TRIM LOGS AS REQUIRED.
5. TOE OF BANK VARIES PER EACH TYPE 3 ELS.
6. SLASH AND RACKING TO FILL VOIDS BETWEEN LOG LAYERS. SEQUENCING OF SLASH PLACEMENT MAY NEED TO BE MODIFIED FOR LASHING. SUBSEQUENT LOG LAYERS SHALL COMPRESS SLASH AND RACKING PLACED IN PREVIOUS LAYERS.
7. RACKING PLACEMENT SHALL BE COORDINATED WITH LOG LAYER PLACEMENT AND SLASH PLACEMENT TO ENSURE LOG MEMBERS EXTEND THROUGH AND BIND RACKING MEMBERS AND RACKING MEMBERS EXTEND THROUGH AND BIND SLASH MATERIAL.
8. PLACE BALLAST ROCKS AS LOW WITHIN THE ELS AS POSSIBLE AND ENSURE CHAIN BETWEEN BALLAST ROCKS HAS NO SLACK.
9. AUGMENT OR DELETE ROCK QUANTITIES AS NEEDED TO MAINTAIN AN ELS ROCK BALLAST OF 20 TONS MINIMUM.
10. ENGINEER SHALL STAKE 2 VERTICAL LOG LOCATIONS FOR TYPE 3 ELS BASED ON APPROX 10' TO THE RELATIVE DEPTH TO THE ADJACENT CHANNEL BOTTOM, DEPTH SHALL NOT EXCEED 15' BELOW BASE FLOW WATER SURFACE. CONTRACTOR SHALL MARK DEPTH OF BURIAL LOCATION ON ALL VERTICAL LOGS PRIOR TO PLACEMENT WITH BLAZE ORANGE MARKING PAINT.
11. CONTRACTOR SHALL EXPECT FIELD FITTING
12. RACKING, SLASH, AND LASHINGS ONLY SHOWN IN LAYERS WHERE PLACEMENT OCCURS FOR CLARITY.
13. ALL LOG TO LOG LASHING SHALL BE 3/8"Ø GRADE 43 NATURAL FINISH CHAIN UNLESS OTHERWISE SPECIFIED IN LAYER PLAN. BOULDER TO LOG LASHING SHALL BE 3/8"Ø GRADE 43 NATURAL FINISH CHAIN. SEE SHEET XXXX FOR LASHING TYPES AND CONDITIONS.
14. ALL CONNECTING HARDWARE SHALL HAVE A RATED BREAKING LOAD LIMIT OF EQUAL OR GREATER STRENGTH THAN CHAIN. SHACKLES SHALL BE SAFETY SHACKLES AND THREADS SHALL BE MARRED TO PREVENT REMOVAL OF SHACKLES.

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IAN B. MOSTRENKO
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36069
REGISTERED PROFESSIONAL ENGINEER

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DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

RIVER BANK ELS DETAILS

DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: C4.12
SHEET NO: 16 OF 19

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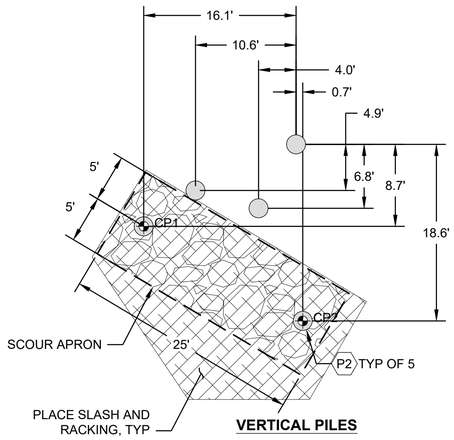
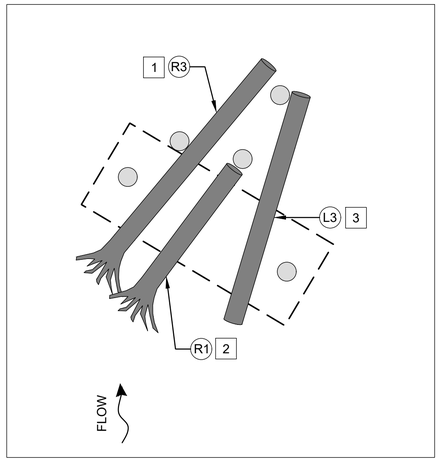
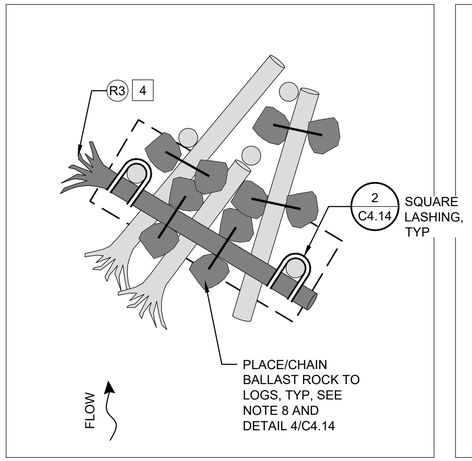


VERTICAL PILES



LAYER 1



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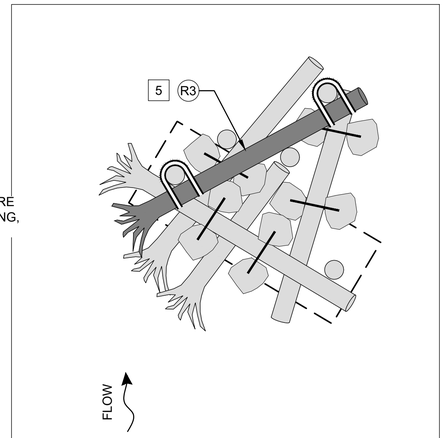

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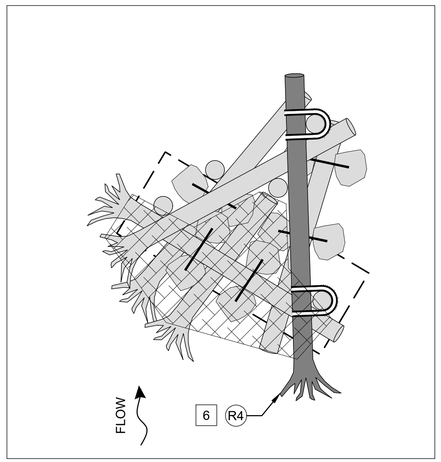

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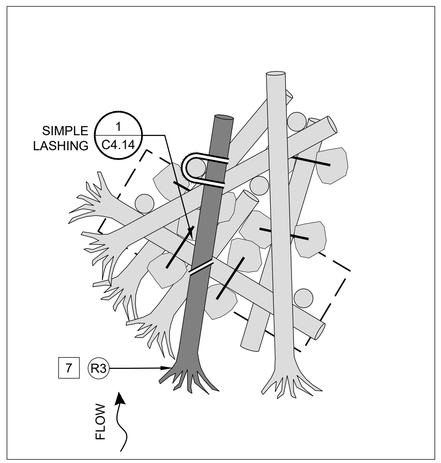

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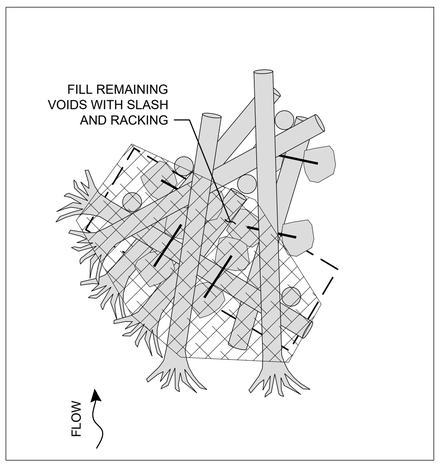

COMPLETE

LOG SCHEDULE - RIVER BANK ELS:

LOG ID #	DIAMETER (IN)	LENGTH (FT)	ROOTWAD	QTY/ STRUCT
P2	24	20	YES	5
L3	24	25	NO	1
R1	24	15	YES	1
R3	24	25	YES	4
R4	24	30	YES	1
RACKING	4-16	15-30		40-50
SLASH	-	-		30 CY

ROCK SCHEDULE - RIVER BANK ELS:

	WEIGHT (TONS)	QTY/ STRUCT
BALLAST ROCKS	2	10

LEGEND:

X#	LOG TYPE ID
#	LOG PLACEMENT SEQUENCING ORDER
CP#	CONTROL POINT

TYPE 3 RIVER BANK ELS LAYERING PLAN

SCALE: NTS

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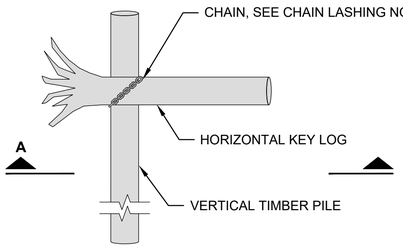
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

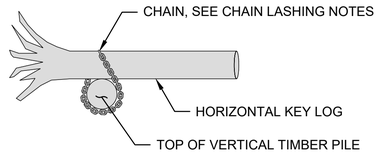
PHASE 1 ADAPTIVE MANAGEMENT

RIVER BANK ELS LAYERING PLAN

DATE:	OCT 2024
PROJECT NO:	14-05790-000
DRAWING NO:	C4.13
SHEET NO:	17 OF 19



PLAN

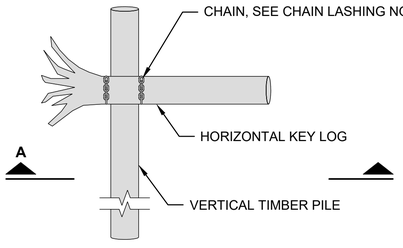


SECTION

DETAIL - SIMPLE CHAIN LASHING

SCALE: NTS

1 / -



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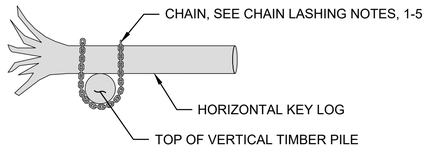
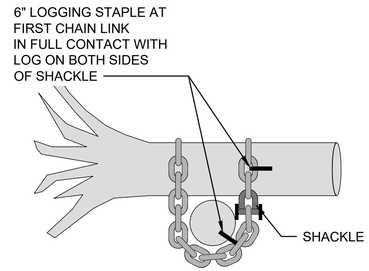


SECTION

DETAIL - SQUARE CHAIN LASHING

SCALE: NTS

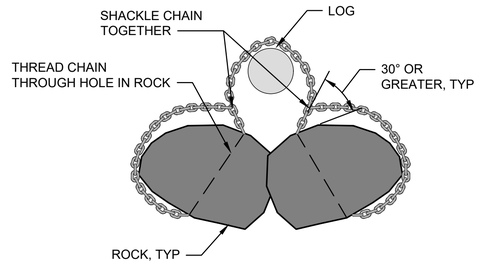
2 / -



DETAIL - CHAIN CONNECTION

SCALE: NTS

3 / -



NOTE:
REMOVE SLACK IN CHAIN OVER LOG.

DETAIL - LOG TO ROCK CONNECTION

SCALE: NTS

4 / -

CHAIN LASHING NOTES:

1. LASH HORIZONTAL LOGS TO VERTICAL TIMBER PILES WITH CHAIN AS SHOWN ON DETAIL AND LAYERING PLAN OR AS DIRECTED BY ENGINEER. CHAIN LASHING SYSTEM SHALL BE PUT IN TENSION TO 1/4 OF THE CHAIN WORKING LOAD LIMIT AND BE MAINTAINED DURING CHAIN SHACKLING.
2. CHAIN LENGTH NEEDED PER LASHING WILL VARY BASED ON DIAMETER OF LOGS AT THE ACTUAL LOCATIONS THEY ARE LASHED TOGETHER.
3. CHAIN FOR LASHING SHALL BE 3/8 INCH DIAMETER CARBON-WELDED GRADE 43 HIGH-TEST CHAIN, WITH A MINIMUM WORKING LOAD LIMIT OF 5400 LBS.
4. ALL HARDWARE USED FOR LASHING SHALL BE STAINLESS STEEL OR NATURAL UNTREATED STEEL, AND CONNECTIONS SHALL BE OF THE QUANTITY AND TYPE SPECIFIED BY THE MANUFACTURER WITH AN EQUAL OR GREATER STRENGTH THAN THE CHAIN BREAKING STRENGTH OR AS APPROVED BY THE ENGINEER.
5. MAR OR ROUND ALL EXPOSED HARDWARE NUTS AND BOLT THREADS AFTER INSTALLATION FOR THEFT PROTECTION. ENGINEER OR OWNER SHALL APPROVE ANY COATING PRIOR TO CONTRACTOR APPLYING IT. SECURE CHAIN TO LOG AND PILE USING 6 INCH LOGGING STAPLE.
6. CONTRACTOR MAY SUBMIT ALTERNATIVE CHAIN CONNECTION SYSTEM FOR APPROVAL.

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DRAFT

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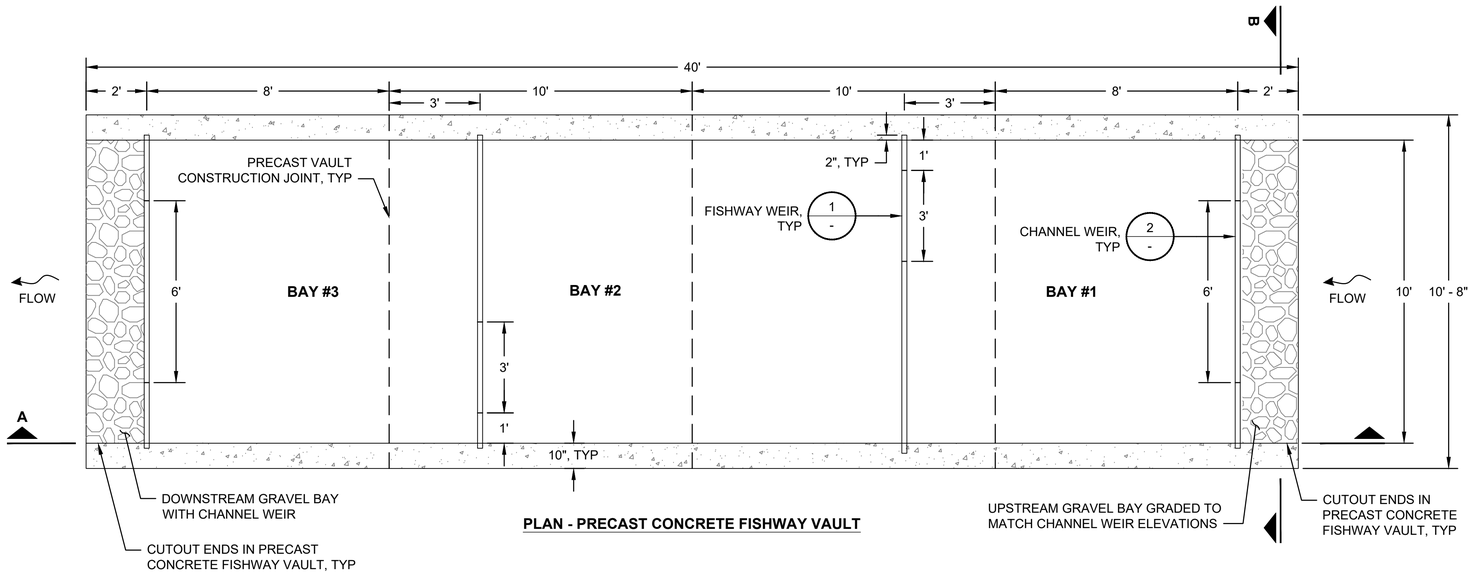
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

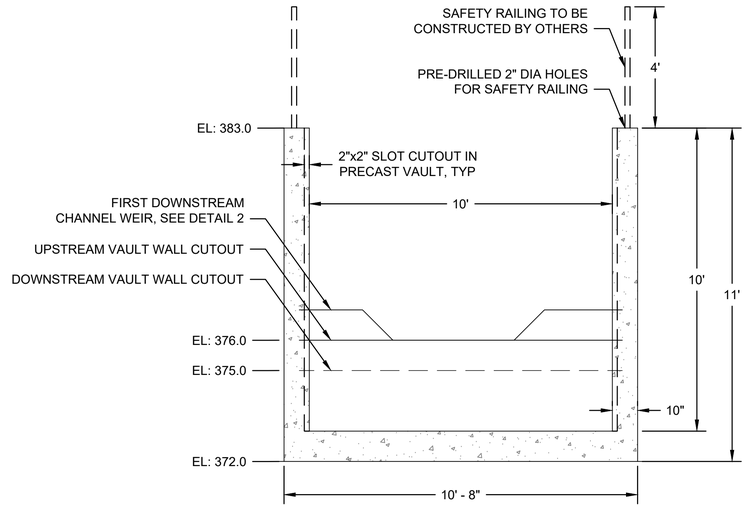
PHASE 1 ADAPTIVE MANAGEMENT

LOG CONNECTION DETAILS

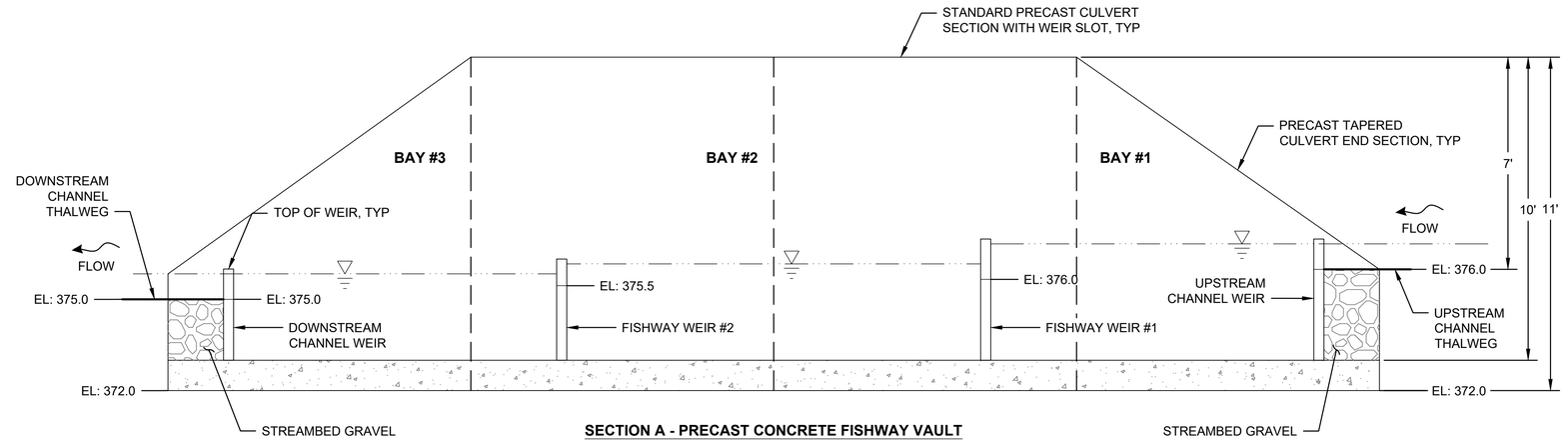
DATE: OCT 2024
PROJECT NO: 14-05790-000
DRAWING NO: C4.14
SHEET NO: 18 OF 19



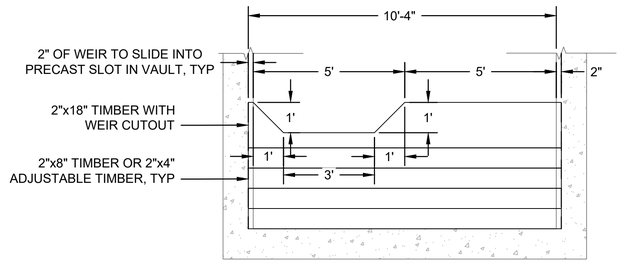
PLAN - PRECAST CONCRETE FISHWAY VAULT



SECTION B - PRECAST FISHWAY VAULT CUTOUTS ON ENDS OF VAULT



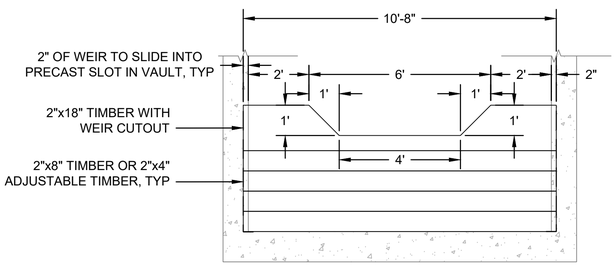
SECTION A - PRECAST CONCRETE FISHWAY VAULT



DETAIL - FISHWAY WEIR

SCALE: NTS

1
-



DETAIL - CHANNEL WEIR

SCALE: NTS

2
-

CALL 811 BEFORE YOU DIG

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION

No.	REVISION	BY	APP'D	DATE

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

HERRERA Science + Planning + Design herrerainc.com

LUMMI NATION TREATY OF 1855

DRAFT

DESIGNED: I. MOSTRENKO	DRAWN: M. McCARTHY
DESIGNED: T. FOULK	DRAWN: E. MARSHALL
DESIGNED: B. SCOTT	CHECKED: B. SCOTT
SCALE: AS NOTED	APPROVED: M. EWBANK

SOUTH FORK NOOKSACK RIVER SKOOKUM-EDFRO REACH HABITAT RESTORATION PROJECT

PHASE 1 ADAPTIVE MANAGEMENT

EMERGENCY FISHWAY VAULT DETAILS

DATE: OCT 2024

PROJECT NO: 14-05790-000

DRAWING NO: C4.20

SHEET NO: 19 OF 19

O:\proj\Y2014\14-05790-000\CAD\Sheet\Ph1 AMDetails.dwg | 10/15/2024 12:44 PM | Eric Marshall