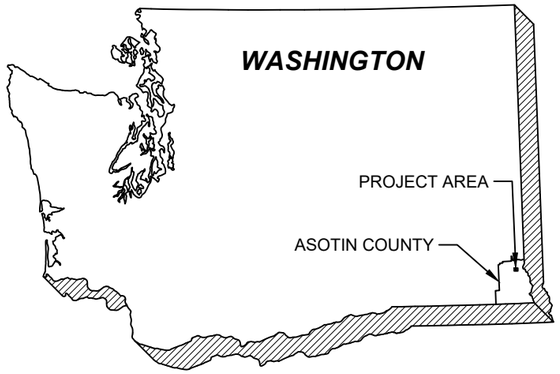
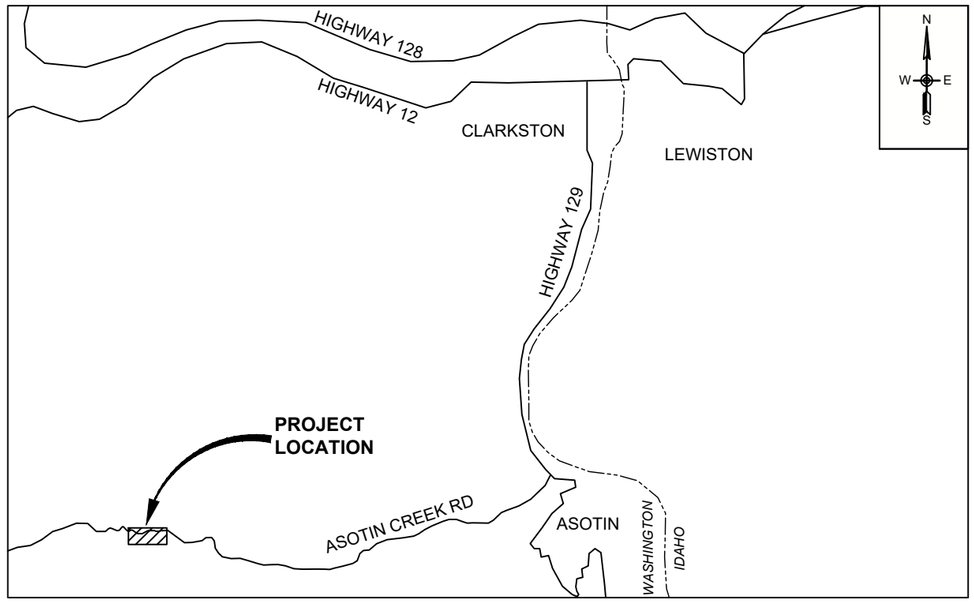
ASOTIN CREEK PA-06
FISH HABITAT RESTORATION PROJECT
100% FINAL DESIGN
DECEMBER 2022



VICINITY MAP
SCALE: NTS



LOCATION MAP
SCALE: 1" = 2500'

ENGINEER:

Alta Science & Engineering, Inc.
220 EAST 5TH STREET, SUITE 325
MOSCOW, IDAHO 83843
TELEPHONE: (208) 882-7858

PROJECT SPONSOR:

ASOTIN COUNTY CONSERVATION DISTRICT
1397 PORT DRIVE
CLARKSTON, WA 99403-2012
TELEPHONE: (509) 552-8117

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-1-22

SHEET INDEX

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CONSTRUCTION SET

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: CS
ENGINEER: J. DZARA	SCALE: AS NOTED		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	COVER SHEET	SHEET: 1 OF 19

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GENERAL NOTES AND SPECIFICATIONS

1. LOCATIONS OF EXISTING SITE FEATURES ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATION OF FEATURES AND ALL EXISTING UTILITIES BEFORE COMMENCING WORK. UNDERGROUND UTILITIES SHALL BE LOCATED AND MARKED PRIOR TO EXCAVATION. CALL THE ONE-CALL UTILITY LOCATE SERVICE AT 1-800-424-5555 (or 811) AT LEAST TWO WORKING DAYS PRIOR TO STARTING CONSTRUCTION.
2. CONTRACTOR SHALL LOCATE, PROTECT AND, IF DAMAGED DURING CONSTRUCTION, REPAIR ALL ABOVE GROUND AND BELOW GROUND UTILITIES DURING CONSTRUCTION INCLUDING GAS, ELECTRIC, SEPTIC, WATER, SANITARY, STORM, COMMUNICATION, SPRINKLERS, IRRIGATION AND ETC. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE UTILITY COMPANIES FOR INSPECTIONS (AS REQUIRED) WHILE WORKING AROUND UTILITIES.
3. THE CONTRACTOR IS RESPONSIBLE FOR SITE CONTROLS, ENVIRONMENTAL PROTECTION, AND THE HEALTH AND SAFETY OF THEIR EMPLOYEES AT ALL TIMES.
4. THE OWNER AND ENGINEER SHALL BE NOTIFIED AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.
5. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THIS CONTRACT, AND AS REQUIRED BY AMERICAN PUBLIC WORKS ASSOCIATION/WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (APWA/WSDOT), AND ALL OTHER APPLICABLE LOCAL, STATE, AND NATIONAL REQUIREMENTS, UNLESS OTHERWISE NOTED.
6. CONSTRUCTION MAY COMMENCE AFTER NOTICE TO PROCEED IS ISSUED BY THE OWNER.
7. CONTRACTOR SHALL PROTECT ADJACENT PROPERTIES AND RIGHTS-OF-WAY FROM DAMAGE AND DEBRIS DURING CONSTRUCTION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING MONUMENTS AND ANY OTHER SURVEY MARKERS DURING CONSTRUCTION. ALL SUCH MONUMENTS OR MARKERS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED BY A PROFESSIONAL LICENSED SURVEYOR AT THE CONTRACTOR'S EXPENSE.
9. A COPY OF THE PLAN SET MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
10. IF THE CONTRACTOR DISCOVERS ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND EXISTING CONDITION ENCOUNTERED, THE CONTRACTOR SHALL NOTIFY ALTA SCIENCE & ENGINEERING IMMEDIATELY.
11. AT ALL TIMES DURING CONSTRUCTION THE CONTRACTOR SHALL MAINTAIN ALL ENVIRONMENTAL PROTECTION DEVICES AND BMPs AS DETAILED IN THE WORK AREA ISOLATION SECTION ON SHEET G2. ALL SPILLS SHALL BE REPORTED TO THE OWNER AND CLEANED UP IMMEDIATELY.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SIZING OF EQUIPMENT USED DURING THE PROJECT AND FOR WEIGHT RESTRICTIONS ON EXISTING BRIDGES AND ROADS.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER ACTION NEEDED TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACT.
14. THE CONTRACTOR SHALL BE FAMILIAR WITH AND COMPLY WITH ALL CONDITIONS OF THE PERMITS OBTAINED FOR THE PROJECT.
15. ALL EXISTING MATURE VEGETATION SHALL BE PROTECTED AND REMAIN UNDISTURBED UNLESS DIRECTED OTHERWISE BY THE OWNER OR THE OWNER'S FIELD REPRESENTATIVE OR AS NOTED ON PLANS.
16. DUST CONTROL SHALL BE PROVIDED AS NEEDED BY THE CONTRACTOR. WATER APPLICATION WILL BE PROVIDED THROUGHOUT THE PROJECT PRIOR TO EXCAVATION ACTIVITY, DURING EXCAVATION, ON ACCESS AND HAUL ROUTES, AT WORK INTERVALS WHERE WIND AND/OR DRY WEATHER CREATES AIRBORNE EMISSIONS, DURING LOADING/STOCKPILING, AND PRIOR TO LEAVING THE PREMISES AT THE END OF EACH WORK DAY.
17. WORK OUTSIDE OF WORK LIMITS SHOWN IN THIS DRAWING SET MUST BE APPROVED BY THE OWNER.
18. CONTRACTOR SHALL COMPLY WITH HIP GENERAL CONSERVATION MEASURES PROVIDED IN SHEETS G2 TO G3.

EMERGENCY CONTACT AND UTILITY INFORMATION

FIRE DEPARTMENT
ASOTIN COUNTY FIRE
PROTECTION DISTRICT 1
(509) 758-5181

POLICE
ASOTIN COUNTY SHERIFF
127 2ND STREET
ASOTIN, WA 99402
(509) 243-4717

EMERGENCY SERVICES
ASOTIN COUNTY EMERGENCY MANAGER
MARK JANOWSKI
(509) 243-2088 (PHONE)
(509) 780-2782 (CELL)

CONSTRUCTION SET

LEGEND AND SYMBOLS

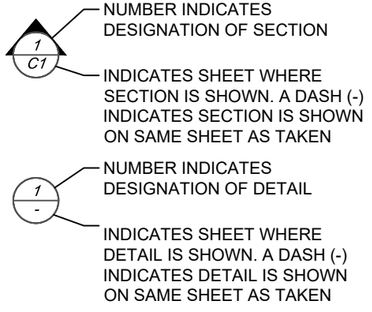
- OHWM
- EXISTING BUILDING
- EXISTING CONCRETE
- EXISTING FENCE
- DESIGN FENCE
- EXISTING ROAD
- TEMPORARY CONSTRUCTION ACCESS ROAD
- ASOTIN CREEK EXISTING CHANNEL
- SIDE CHANNEL
- EXISTING SIDE CHANNEL
- OFF CHANNEL HABITAT AREA
- REMOVABLE CATTLE PANELS
- EXISTING ROCK CROSSING
- FLOODPLAIN ROUGHNESS
- LIVESTOCK CROSSING
- HYDROSEED
- SOIL/ROCK BERM
- BRUSH FASCINE TREATMENT
- TEMPORARY CHANNEL CROSSING
- HABITAT STRUCTURE
- KEY STRUCTURE / LOG
- POST ASSISTED LOG STRUCTURE
- WEED REMOVAL AREA

ABBREVIATIONS

℄	CENTER LINE
±	PLUS OR MINUS
ALTA-SE	ALTA SCIENCE & ENGINEERING
APPROX.	APPROXIMATE
BMPs	BEST MANAGEMENT PRACTICES
CONST	CONSTRUCTION
D	DIAMETER
DEG	DEGREE
DEPT.	DEPARTMENT
ELEV.	ELEVATION
EX.	EXISTING
FIN.	FINISHED
FT	FEET
GPS	GLOBAL POSITIONING SYSTEM
H	HORIZONTAL
	INVERT ELEVATION
IR	IRON ROD
LF	LINEAR FEET
MIN.	MINIMUM
NAD	NORTH AMERICAN DATUM
NE	NORTHEAST
No.	NUMBER
NTS	NOT TO SCALE
O.C.	ON CENTER
OHWM	ORDINARY HIGH WATER MARK
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
ROW	RIGHT-OF-WAY
SQ	SQUARE
STA	STATION
SW	SOUTHWEST
TYP	TYPICAL
TEMP	TEMPORARY
WSPS	WASHINGTON STATE PLANE SOUTH
W/	WITH

SECTION AND DETAIL DESIGNATION

POINT AT WHICH SECTION OR DETAIL IS TAKEN



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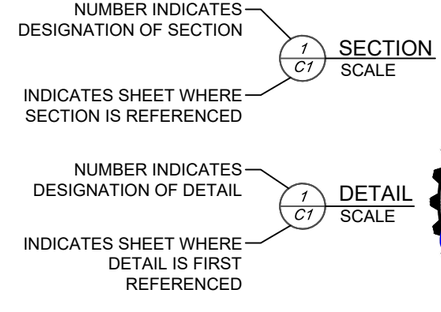

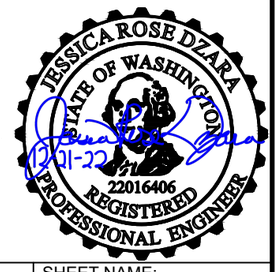

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: G1
ENGINEER: J. DZARA	SCALE: N/A		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	NOTES, LEGEND AND ABBREVIATIONS	SHEET: 2 OF 19

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HIP GENERAL CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS

THE ACTIVITIES COVERED UNDER THE HIP ARE INTENDED TO PROTECT AND RESTORE FISH AND WILDLIFE HABITAT WITH LONG-TERM BENEFITS TO ESA-LISTED SPECIES. THE FOLLOWING GENERAL CONSERVATION MEASURES (DEVELOPED IN COORDINATION WITH USFWS AND NMFS) WILL BE APPLIED TO ALL ACTIONS OF THIS PROJECT.

PROJECT DESIGN AND SITE PREPARATION.

1. STATE AND FEDERAL PERMITS.

A. ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL PROJECT AUTHORIZATIONS WILL BE OBTAINED BEFORE PROJECT IMPLEMENTATION.

B. THESE PERMITS AND AUTHORIZATIONS INCLUDE, BUT ARE NOT LIMITED TO, NATIONAL ENVIRONMENTAL POLICY ACT, NATIONAL HISTORIC PRESERVATION ACT, THE APPROPRIATE STATE AGENCY REMOVAL AND FILL PERMIT, USACE CLEAN WATER ACT (CWA) 404 PERMITS, CWA SECTION 401 WATER QUALITY CERTIFICATIONS, AND FEMA NO-RISE ANALYSES.

2. TIMING OF IN-WATER WORK.

A. APPROPRIATE STATE (OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW), WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW), IDAHO DEPARTMENT OF FISH AND GAME (IDFG), AND MONTANA FISH WILDLIFE AND PARKS (MFWP)) GUIDELINES FOR TIMING OF IN-WATER WORK WINDOWS (IWW) WILL BE FOLLOWED.

B. CHANGES TO ESTABLISHED WORK WINDOWS WILL BE APPROVED BY REGIONAL STATE BIOLOGISTS AND BPA'S EC LEAD.

C. LAMPREY. WORKING IN STREAM OR RIVER CHANNELS THAT CONTAIN PACIFIC LAMPREY WILL BE AVOIDED FROM MARCH 1 TO JULY 1 FOR REACHES <5,000 FEET IN ELEVATION AND FROM MARCH 1 TO AUGUST 1 FOR REACHES >5,000 FEET. IF EITHER TIMEFRAME IS INCOMPATIBLE WITH OTHER OBJECTIVES, THE AREA WILL BE SURVEYED FOR NESTS AND LAMPREY PRESENCE, AND AVOIDED IF POSSIBLE. IF LAMPREYS ARE KNOWN TO EXIST, THE PROJECT SPONSOR WILL UTILIZE DEWATERING AND SALVAGE PROCEDURES (SEE FISH SALVAGE AND ELECTROFISHING SECTIONS) TO MINIMIZE ADVERSE EFFECTS.

D. THE IN-WATER WORK WINDOW IS JULY 15 - SEPTEMBER 15.

3. SITE LAYOUT AND FLAGGING.

A. CONSTRUCTION AREAS TO BE CLEARLY FLAGGED PRIOR TO CONSTRUCTION.

B. AREAS TO BE FLAGGED WILL INCLUDE:

1. SENSITIVE RESOURCE AREAS, SUCH AS AREAS BELOW ORDINARY HIGH WATER, SPAWNING AREAS, SPRINGS, AND WETLANDS;
2. EQUIPMENT ENTRY AND EXIT POINTS;
3. ROAD AND STREAM CROSSING ALIGNMENTS;
4. STAGING, STORAGE, AND STOCKPILE AREAS; AND
5. NO-SPRAY AREAS AND BUFFERS.

4. TEMPORARY ACCESS ROADS AND PATHS.

A. EXISTING ACCESS ROADS AND PATHS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER AND LENGTH OF TEMPORARY ACCESS ROADS AND PATHS THROUGH RIPARIAN AREAS AND FLOODPLAINS WILL BE MINIMIZED.

B. VEHICLE USE AND HUMAN ACTIVITIES, INCLUDING WALKING, IN AREAS OCCUPIED BY TERRESTRIAL ESA-LISTED SPECIES WILL BE MINIMIZED.

C. TEMPORARY ACCESS ROADS AND PATHS WILL NOT BE BUILT ON SLOPES WHERE GRADE, SOIL, OR OTHER FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE. IF SLOPES ARE STEEPER THAN 30%, THEN THE ROAD WILL BE DESIGNED BY A CIVIL ENGINEER WITH EXPERIENCE IN STEEP ROAD DESIGN.

D. THE REMOVAL OF RIPARIAN VEGETATION DURING CONSTRUCTION OF TEMPORARY ACCESS ROADS WILL BE MINIMIZED. WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED, VEGETATION WILL BE CUT AT GROUND LEVEL (NOT GRUBBED).

E. AT PROJECT COMPLETION, ALL TEMPORARY ACCESS ROADS AND PATHS WILL BE OBLITERATED, AND THE SOIL WILL BE STABILIZED AND REVEGETATED. ROAD AND PATH OBLITERATION REFERS TO THE MOST COMPREHENSIVE DEGREE OF DECOMMISSIONING AND INVOLVES DECOMPACTING THE SURFACE AND DITCH, PULLING THE FILL MATERIAL ONTO THE RUNNING SURFACE, AND RESHAPING TO MATCH THE ORIGINAL CONTOUR.

5. TEMPORARY STREAM CROSSINGS.

A. EXISTING STREAM CROSSINGS OR BEDROCK WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER OF TEMPORARY STREAM CROSSINGS WILL BE MINIMIZED.

B. TEMPORARY BRIDGES AND CULVERTS WILL BE INSTALLED TO ALLOW FOR EQUIPMENT AND VEHICLE CROSSING OVER PERENNIAL STREAMS DURING CONSTRUCTION. TREATED WOOD SHALL NOT BE USED ON TEMPORARY BRIDGE CROSSINGS OR IN LOCATIONS IN CONTACT WITH OR DIRECTLY OVER WATER.

C. FOR PROJECTS THAT REQUIRE EQUIPMENT AND VEHICLES TO CROSS IN THE WET:

1. THE LOCATION AND NUMBER OF ALL WET CROSSINGS SHALL BE APPROVED BY THE BPA EC LEAD AND DOCUMENTED IN THE CONSTRUCTION PLANS;
2. VEHICLES AND MACHINERY SHALL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL WHENEVER POSSIBLE;
3. NO STREAM CROSSINGS WILL OCCUR 300 FEET UPSTREAM OR 100 FEET DOWNSTREAM OF AN EXISTING REDD OR SPAWNING FISH; AND
4. AFTER PROJECT COMPLETION, TEMPORARY STREAM CROSSINGS WILL BE OBLITERATED AND BANKS RESTORED.

6. STAGING, STORAGE, AND STOCKPILE AREAS.

A. STAGING AREAS (USED FOR CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING, SERVICING, AND HAZARDOUS MATERIAL STORAGE) CLOSER THAN 150 FEET HAVE BEEN APPROVED BY THE EC LEAD. CONTRACTOR SHALL FOLLOW SPILL AND CONTAINMENT PRECAUTIONS.

B. NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD, GRAVEL, AND BOULDERS, MAY BE STAGED WITHIN 150 FEET IF CLEARLY INDICATED IN THE PLANS THAT AREA IS FOR NATURAL MATERIALS ONLY.

C. ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE STOCKPILED FOR USE DURING SITE RESTORATION AT A SPECIFICALLY IDENTIFIED AND FLAGGED AREA.

D. ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, WILL BE DISPOSED OF OUTSIDE THE 100-YEAR FLOODPLAIN.

7. EQUIPMENT.

A. MECHANIZED EQUIPMENT AND VEHICLES WILL BE SELECTED, OPERATED, AND MAINTAINED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS ON THE ENVIRONMENT (E.G., MINIMALLY-SIZED, LOW PRESSURE TIRES; MINIMAL HARD-TURN PATHS FOR TRACKED VEHICLES; TEMPORARY MATS OR PLATES WITHIN WET AREAS OR ON SENSITIVE SOILS).

B. EQUIPMENT WILL BE STORED, FUELED, AND MAINTAINED IN AN CLEARLY IDENTIFIED STAGING AREA THAT MEETS STAGING AREA CONSERVATION MEASURES.

C. EQUIPMENT WILL BE REFUELED IN A VEHICLE STAGING AREA OR IN AN ISOLATED HARD ZONE, SUCH AS A PAVED PARKING LOT OR ADJACENT, ESTABLISHED ROAD (THIS MEASURE APPLIES ONLY TO GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 5 GALLONS).

D. BIODEGRADABLE LUBRICANTS AND FLUIDS WILL BE USED ON EQUIPMENT OPERATING IN AND ADJACENT TO THE STREAM CHANNEL AND LIVE WATER.

E. EQUIPMENT WILL BE INSPECTED DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION WITHIN 150 FEET OF ANY NATURAL WATER BODY OR WETLAND.

F. EQUIPMENT WILL BE THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS NECESSARY DURING OPERATION, TO REMAIN GREASE FREE.

G. REFUELING SHALL OCCUR ONLY IN THE STAGING AREA OR ON ASOTIN CREEK ROAD.

H. SPILL CONTAINMENT KITS SHALL BE PRESENT IN THE STAGING AREA DURING ANY REFUELING OPERATIONS.

8. EROSION CONTROL.

A. TEMPORARY EROSION CONTROL MEASURES INCLUDE:

1. TEMPORARY EROSION CONTROLS WILL BE IN PLACE BEFORE ANY SIGNIFICANT ALTERATION OF THE ACTION SITE AND APPROPRIATELY INSTALLED DOWNSLOPE OF PROJECT ACTIVITY WITHIN THE RIPARIAN BUFFER AREA UNTIL SITE REHABILITATION IS COMPLETE;
2. IF THERE IS A POTENTIAL FOR ERODED SEDIMENT TO ENTER THE STREAM, SEDIMENT BARRIERS WILL BE INSTALLED AND MAINTAINED FOR THE DURATION OF PROJECT IMPLEMENTATION;
3. TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE SEDGE MATS, FIBER WATTLES, SILT FENCES, JUTE MATTING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC;
4. SOIL STABILIZATION UTILIZING WOOD FIBER MULCH AND TACKIFIER (HYDRO-APPLIED) MAY BE USED TO REDUCE EROSION OF BARE SOIL IF THE MATERIALS ARE NOXIOUS WEED FREE AND NONTOXIC TO AQUATIC AND TERRESTRIAL ANIMALS, SOIL MICROORGANISMS, AND VEGETATION;
5. SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL; AND
6. ONCE THE SITE IS STABILIZED AFTER CONSTRUCTION, TEMPORARY EROSION CONTROL MEASURES WILL BE REMOVED.

B. EMERGENCY EROSION CONTROLS. THE FOLLOWING MATERIALS FOR EMERGENCY EROSION CONTROL WILL BE AVAILABLE AT THE WORK SITE:

1. A SUPPLY OF SEDIMENT CONTROL MATERIALS; AND
2. AN OIL-ABSORBING FLOATING BOOM WHENEVER SURFACE WATER IS PRESENT.

9. DUST ABATEMENT.

A. THE PROJECT SPONSOR WILL DETERMINE THE APPROPRIATE DUST CONTROL MEASURES BY CONSIDERING SOIL TYPE, EQUIPMENT USAGE, PREVAILING WIND DIRECTION, AND THE EFFECTS CAUSED BY OTHER EROSION AND SEDIMENT CONTROL MEASURES.

B. WORK WILL BE SEQUENCED AND SCHEDULED TO REDUCE EXPOSED BARE SOIL SUBJECT TO WIND EROSION.

C. DUST-ABATEMENT ADDITIVES AND STABILIZATION CHEMICALS (TYPICALLY MAGNESIUM CHLORIDE, CALCIUM CHLORIDE SALTS, OR LIGNINSULFONATE) WILL NOT BE APPLIED WITHIN 25 FEET OF WATER OR A STREAM CHANNEL AND WILL BE APPLIED SO AS TO MINIMIZE THE LIKELIHOOD THAT THEY WILL ENTER STREAMS. APPLICATIONS OF LIGNINSULFONATE WILL BE LIMITED TO A MAXIMUM RATE OF 0.5 GALLONS PER SQUARE YARD OF ROAD SURFACE, ASSUMING MIXED 50:50 WITH WATER.

D. APPLICATION OF DUST ABATEMENT CHEMICALS WILL BE AVOIDED DURING OR JUST BEFORE WET WEATHER, AND AT STREAM CROSSINGS OR OTHER AREAS THAT COULD RESULT IN UNFILTERED DELIVERY OF THE DUST ABATEMENT MATERIALS TO A WATERBODY (TYPICALLY THESE WOULD BE AREAS WITHIN 25 FEET OF A WATERBODY OR STREAM CHANNEL; DISTANCES MAY BE GREATER WHERE VEGETATION IS SPARSE OR SLOPES ARE STEEP).

E. SPILL CONTAINMENT EQUIPMENT WILL BE AVAILABLE DURING APPLICATION OF DUST ABATEMENT CHEMICALS.

F. PETROLEUM-BASED PRODUCTS WILL NOT BE USED FOR DUST ABATEMENT.

Designed
Drawn
Checked
Approved
Title

HIP GENERAL CONSERVATION MEASURES

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

File Name
2021 HIP GCA

Drawing No.
G2

Sheet 3 of 19

PROJECT DESIGN AND SITE PREPARATION (CONTINUED).

11. SPILL PREVENTION, CONTROL, AND COUNTER MEASURES.

A. A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.

B. WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT THE WORK SITE.

C. SPILL CONTAINMENT KITS (INCLUDING INSTRUCTIONS FOR CLEANUP AND DISPOSAL) ADEQUATE FOR THE TYPES AND QUANTITY OF HAZARDOUS MATERIALS USED AT THE SITE WILL BE AVAILABLE AT THE WORK SITE.

D. WORKERS WILL BE TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE LOCATION OF SPILL CONTAINMENT KITS.

E. ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN IMPERVIOUS COVER, SUCH AS A TARPAULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED OF AT A FACILITY THAT IS APPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.

F. PUMPS USED ADJACENT TO WATER SHALL USE SPILL CONTAINMENT SYSTEMS.

G. ALL HAZARDOUS MATERIALS STORED ON SITE SHALL BE STORED IN A SECONDARY CONTAINMENT SYSTEM.

12. INVASIVE SPECIES CONTROL.

A. PRIOR TO ENTERING THE SITE, ALL VEHICLES AND EQUIPMENT WILL BE POWER WASHED, ALLOWED TO FULLY DRY, AND INSPECTED TO MAKE SURE NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERES TO THE SURFACE.

B. WATERCRAFT, WADERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INSPECTED FOR AQUATIC INVASIVE SPECIES.

C. WADING BOOTS WITH FELT SOLES ARE NOT TO BE USED DUE TO THEIR PROPENSITY FOR AIDING IN THE TRANSFER OF INVASIVE SPECIES UNLESS DECONTAMINATION PROCEDURES HAVE BEEN APPROVED BY THE EC LEAD.

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. CONSTRUCTION AND DISCHARGE WATER.

A. SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.

B. DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.

C. CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS, AND OTHER POLLUTANTS.

2. TIME AND EXTENT OF DISTURBANCE.

A. EARTHWORK REQUIRING IN-STREAM MECHANIZED EQUIPMENT (INCLUDING DRILLING, EXCAVATION, DREDGING, FILLING, AND COMPACTING) WILL BE COMPLETED AS QUICKLY AS POSSIBLE.

B. MECHANIZED EQUIPMENT WILL WORK FROM TOP OF BANK UNLESS WORK FROM ANOTHER LOCATION WILL RESULT IN LESS HABITAT DISTURBANCE (TURBIDITY, VEGETATION DISTURBANCE, ETC.).

3. CESSATION OF WORK.

A. PROJECT OPERATIONS WILL CEASE WHEN HIGH FLOW CONDITIONS MAY RESULT IN INUNDATION OF THE PROJECT AREA (FLOOD EFFORTS TO DECREASE DAMAGES TO NATURAL RESOURCES PERMITTED).

B. WATER QUALITY LEVELS EXCEEDED. SEE CWA SECTION 401 WATER QUALITY CERTIFICATION AND TURBIDITY MEASURES.

4. SITE RESTORATION.

A. DISTURBED AREAS, STREAM BANKS, SOILS, AND VEGETATION WILL BE CLEANED UP AND RESTORED TO IMPROVED OR PRE-PROJECT CONDITIONS.

B. PROJECT-RELATED WASTE WILL BE REMOVED.

C. TEMPORARY ACCESS ROADS AND STAGING WILL BE DECOMPACTED AND RESTORED. SOILS WILL BE LOOSENED IF NEEDED FOR REVEGETATION OR WATER INFILTRATION.

D. THE PROJECT SPONSOR WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO THE SITE TO MONITOR AND MAINTAIN THE SITE OVER THE LIFE OF THE PROJECT.

5. REVEGETATION.

A. PLANTING AND SEEDING WILL OCCUR PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.

B. A MIX OF NATIVE SPECIES (INVASIVE SPECIES NOT ALLOWED) APPROPRIATE TO THE SITE WILL BE USED TO REESTABLISH VEGETATION, PROVIDE SHADE, AND REDUCE EROSION. REESTABLISHED VEGETATION SHOULD BE AT LEAST 70% OF PRE-PROJECT CONDITIONS WITHIN THREE YEARS.

C. VEGETATION SUCH AS WILLOWS, SEDGES, OR RUSH MATS WILL BE SALVAGED FROM DISTURBED OR ABANDONED AREAS TO BE REPLANTED.

D. SHORT-TERM STABILIZATION MEASURE MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, OR OTHER SIMILAR TECHNIQUES.

E. SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50 FEET OF ANY STREAM, WATE BODY, OR WETLAND.

F. FENCING WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.

6. CWA SECTION 401 WATER QUALITY CERTIFICATION.

A. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL COMPLETE AND RECORD WATER QUALITY OBSERVATIONS (SEE TURBIDITY MONITORING) TO ENSURE IN-WATER WORK IS NOT DEGRADING WATER QUALITY.

B. DURING CONSTRUCTION, WATER QUALITY PROVISIONS PROVIDED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WASHINGTON DEPARTMENT OF ECOLOGY, IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WILL BE FOLLOWED.

TURBIDITY MONITORING.

A. RECORD THE READING, LOCATION, AND TIME FOR THE BACKGROUND READING APPROXIMATELY 100 FEET UPSTREAM OF THE PROJECT AREA USING A RECENTLY CALIBRATED TURBIDIMETER OR VIA VISUAL OBSERVATION (SEE THE HIP HANDBOOK TURBIDITY MONITORING SECTION FOR A VISUAL OBSERVATION KEY).

B. RECORD THE TURBIDITY READING, LOCATION, AND TIME AT THE MEASUREMENT COMPLIANCE LOCATION POINT.

1. 50 FEET DOWNSTREAM FOR STREAMS LESS THAN 30 FEET WIDE.
2. 100 FEET DOWNSTREAM FOR STREAMS BETWEEN 30 AND 100 FEET WIDE.
3. 200 FEET DOWNSTREAM FOR STREAMS GREATER THAN 100 FEET WIDE.
4. 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR LOCATIONS SUBJECT TO TIDAL OR COASTAL SCOUR.

C. TURBIDITY SHALL BE MEASURED (BACKGROUND LOCATION AND COMPLIANCE POINTS) EVERY 4 HOURS WHILE WORK IS BEING IMPLEMENTED.

D. IF THERE IS A VISIBLE DIFFERENCE BETWEEN A COMPLIANCE POINT AND THE BACKGROUND, THE EXCEEDANCE WILL BE NOTED IN THE PROJECT COMPLETION FORM (PCF). ADJUSTMENTS OR CORRECTIVE MEASURES WILL BE TAKEN IN ORDER TO REDUCE TURBIDITY.

E. IF EXCEEDANCES OCCUR FOR MORE THAN TWO CONSECUTIVE MONITORING INTERVALS (AFTER 8 HOURS), THE ACTIVITY WILL STOP UNTIL THE TURBIDITY LEVEL RETURNS TO BACKGROUND. THE BPA EC LEAD WILL BE NOTIFIED OF ALL EXCEEDANCES AND CORRECTIVE ACTIONS AT PROJECT COMPLETION.

F. IF TURBIDITY CONTROLS (COFFER DAMS, WADDLES, FENCING, ETC.) ARE DETERMINED INEFFECTIVE, CREWS WILL BE MOBILIZED TO MODIFY AS NECESSARY. OCCURRENCES WILL BE DOCUMENTED IN THE PROJECT COMPLETION FORM (PCF).

G. FINAL TURBIDITY READINGS, EXCEEDANCES, AND CONTROL FAILURES WILL BE SUBMITTED TO THE BPA EC LEAD USING THE PROJECT COMPLETION FORM (PCF).

Designed
Drawn
Checked
Approved
Title

HIP GENERAL CONSERVATION MEASURES

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

JESSICA ROSE DZARA
STATE OF WASHINGTON
4/21/22
22016406
REGISTERED
PROFESSIONAL ENGINEER

File Name
2021 HIP GCA

Drawing No.
G3

NOTES:

1. THIS MAP REPRESENTS SET CONTROL POINTS OR OBSERVED POINTS FOR PRESERVATION PRIOR TO CONSTRUCTION AND DOES NOT INCLUDE BOUNDARY ANALYSIS.
2. A MONUMENTS SEARCH WAS PERFORMED IN THE SITE LIMITS AS REQUIRED BY WASHINGTON STATE CODE AND NO SURVEY MONUMENTS WERE FOUND.
3. ALTA IS NOT REPRESENTING ITSELF AS PROFESSIONAL LAND SURVEYORS. THE TOPOGRAPHIC MAPPING AND ELEVATION INFORMATION IN THESE PLANS SHALL BE CONSIDERED NON-AUTHORITATIVE INCIDENTAL TO ENGINEERING WORK.
4. LIDAR DATA PROVIDED BY ASOTIN COUNTY CONSERVATION DISTRICT. COLLECTED AND PROCESSED BY QUANTUM SPATIAL, REPORTED BY ECO LOGICAL RESEARCH, INC. IN 2012.

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

N
W E
S

0 60 120
SCALE: 1" = 120'

EXISTING BUILDINGS

EXISTING LIVESTOCK FENCE

STAGING AREA

ASOTIN CREEK ROAD

CHK
N: 381341.51
E: 2480977.75
ELEV: 1197.16

AC100 COR
N: 381260.33
E: 2480899.72
ELEV: 1197.48

EXISTING CHANNEL THALWEG

WORK LIMITS

CONSTRUCTION SET

Alta
Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SURVEY CONTROL
ENGINEER: J. DZARA	SCALE: 1" = 120'		
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	
DATE: 12/21/2022	DATE: 12/21/2022		

SHEET NAME: G4
DATE: 12/21/2022
PROJECT NO.: 20038-10
SHEET: 5 OF 19

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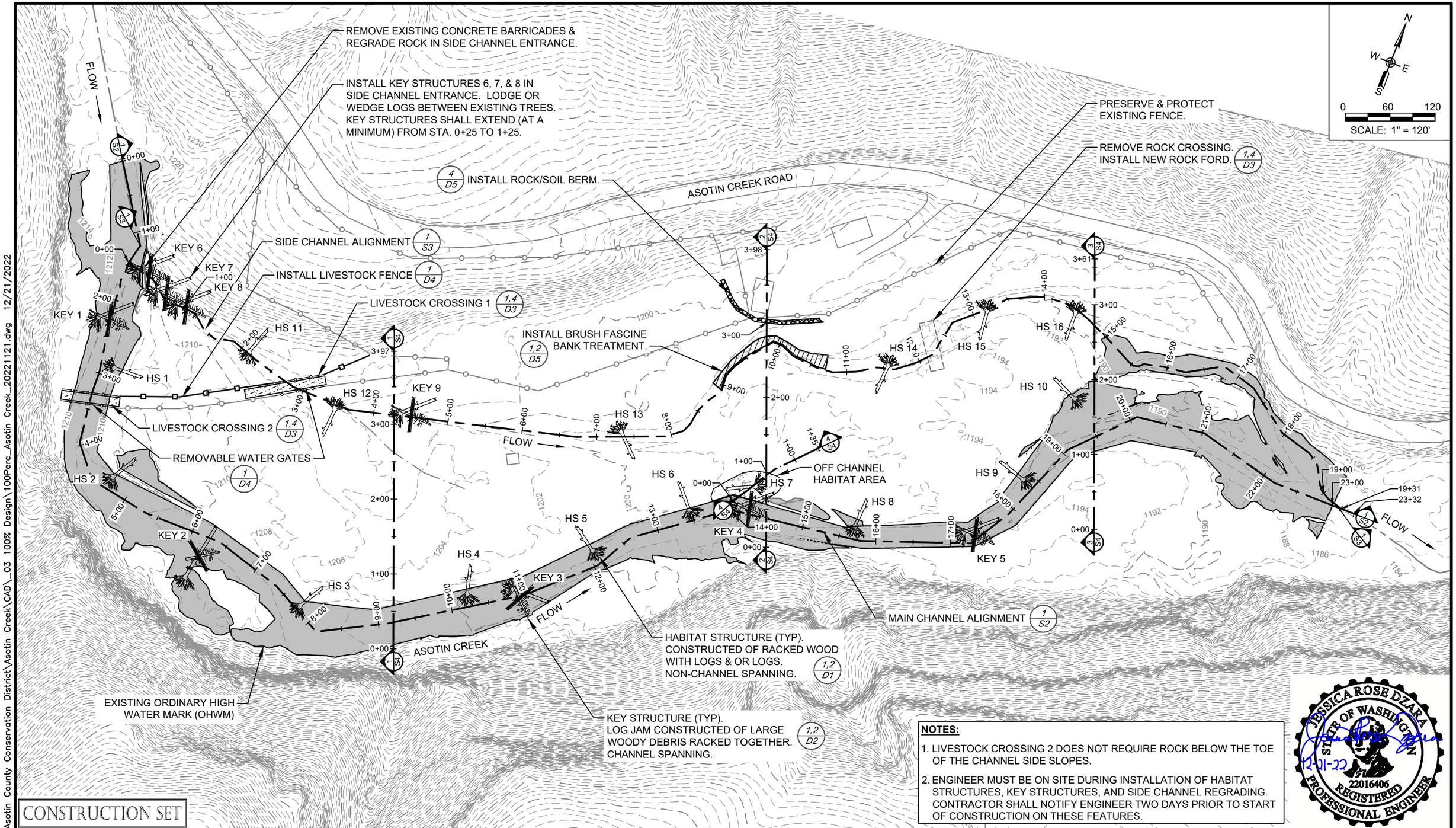

NOTES:

1. LIVESTOCK CROSSING 2 DOES NOT REQUIRE ROCK BELOW THE TOE OF THE CHANNEL SIDE SLOPES.
2. ENGINEER MUST BE ON SITE DURING INSTALLATION OF HABITAT STRUCTURES, KEY STRUCTURES, AND SIDE CHANNEL REGRADING. CONTRACTOR SHALL NOTIFY ENGINEER TWO DAYS PRIOR TO START OF CONSTRUCTION ON THESE FEATURES.

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta
Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: S1
ENGINEER: J. DZARA	SCALE: 1" = 120'		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	PROJECT OVERVIEW	SHEET: 6 OF 19

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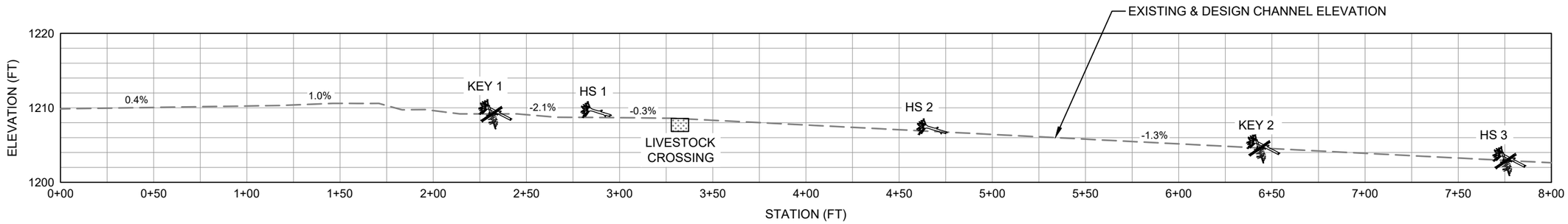

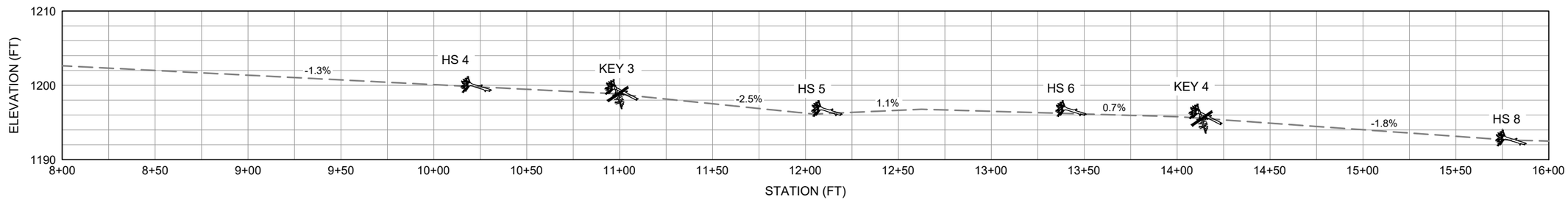

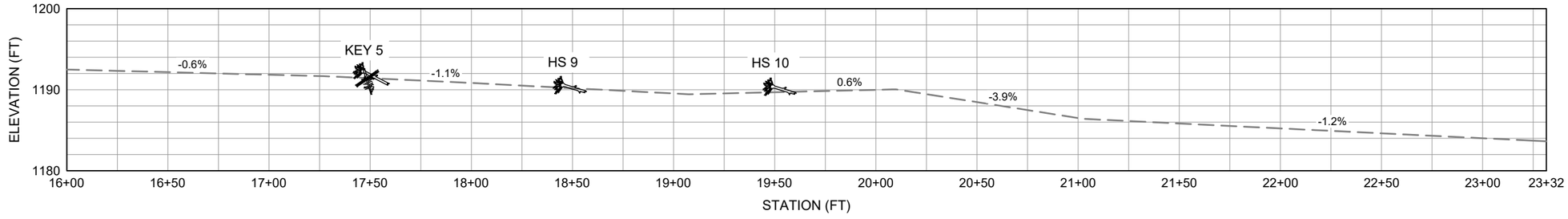

1 / - MAIN CHANNEL PROFILE
SCALE: 1" = 60' HORIZONTAL, 1" = 15' VERTICAL

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: S2
ENGINEER: J. DZARA	SCALE: AS NOTED		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	MAIN CHANNEL PROFILE VIEW	SHEET: 7 OF 19

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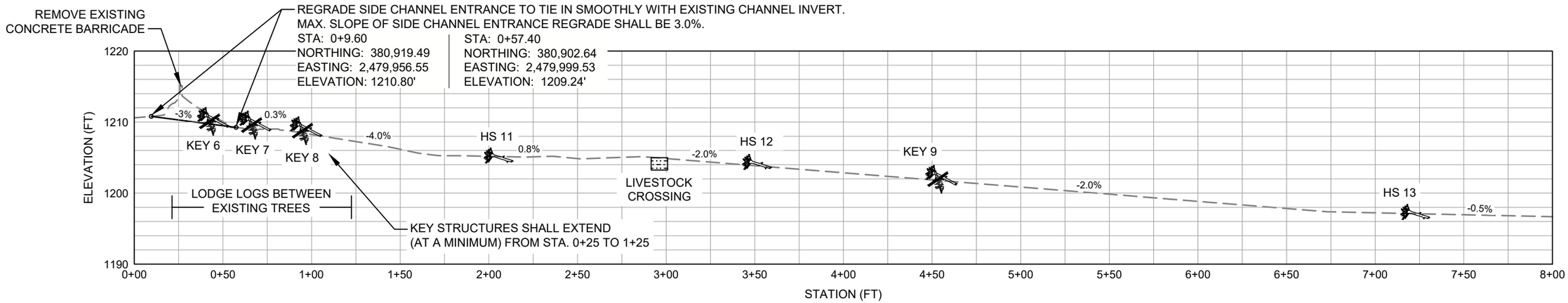

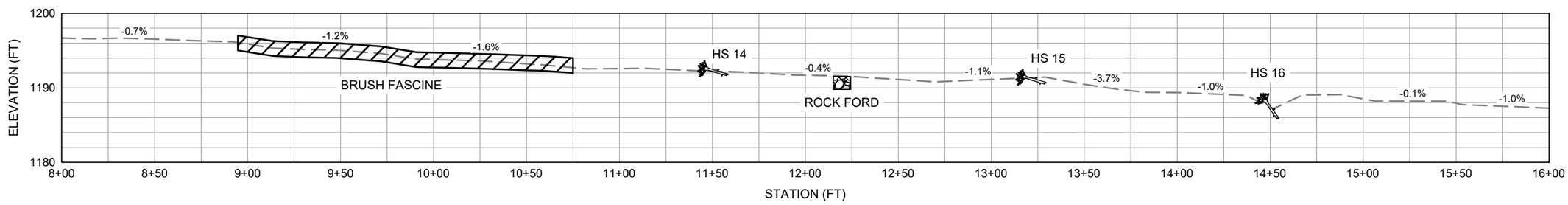

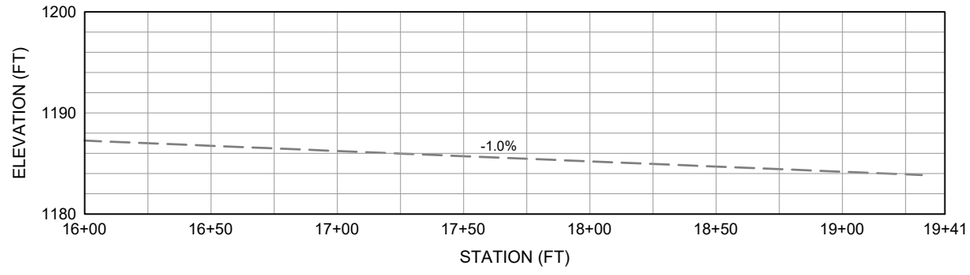

1 SIDE CHANNEL PROFILE
SCALE: 1" = 60' HORIZONTAL, 1" = 15' VERTICAL

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SIDE CHANNEL PROFILE VIEW
ENGINEER: J. DZARA	SCALE: AS NOTED		
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	
DATE: 12/21/2022	DATE: 12/21/2022		

SHEET NAME:	S3
DATE:	12/21/2022
PROJECT NO.:	20038-10
SHEET:	8 OF 19

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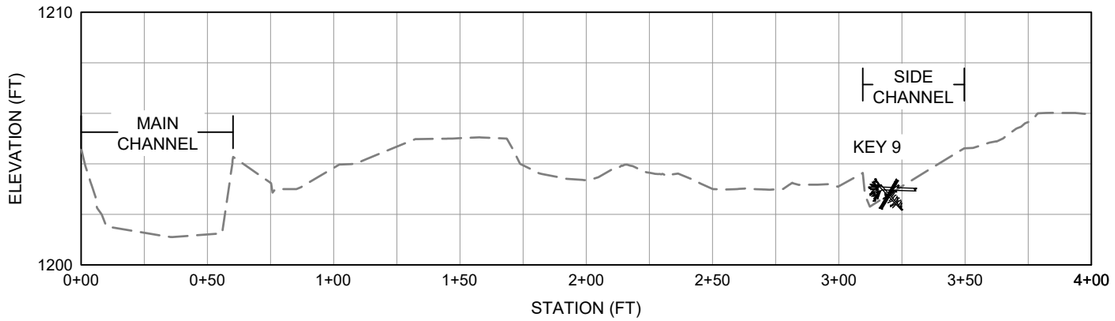
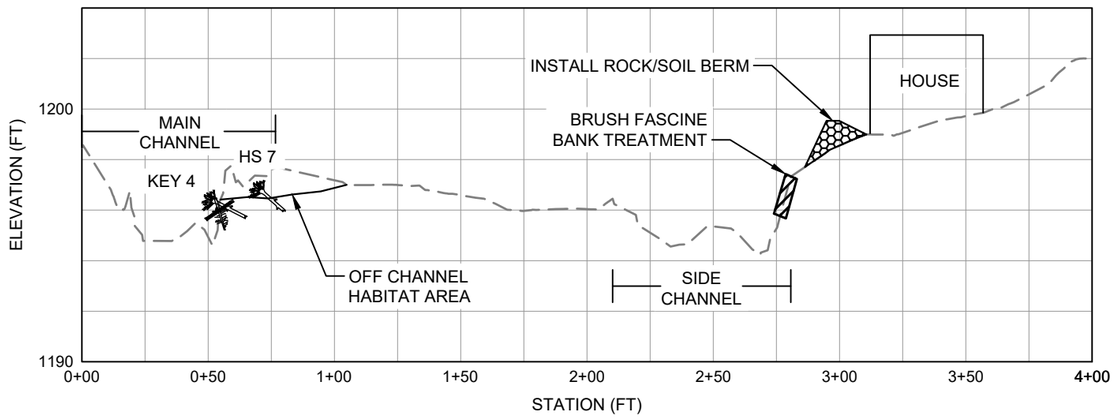
NOTES:

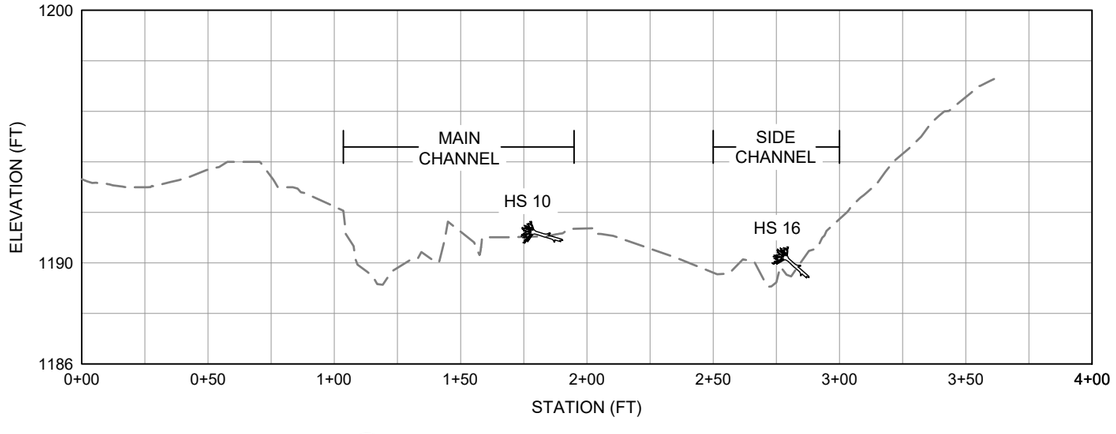
1. OFF CHANNEL HABITAT AREA SHALL HAVE A BOTTOM WIDTH OF APPROX. 10'.
2. OFF CHANNEL HABITAT BOTTOM SHALL FOLLOW THE OFF CHANNEL HABITAT DESIGN PROFILE AS SHOWN IN CROSS SECTION 4.
3. SIDE SLOPES OF OFF CHANNEL HABITAT AREA SHALL BE 15:1 AND TIE IN SMOOTHLY TO SURROUNDING GROUND.
4. OFF CHANNEL HABITAT AREA BOUNDARIES SHALL ALL TIE IN SMOOTHLY TO SURROUNDING AREA.
5. MAXIMUM OFF CHANNEL HABITAT AREA DEPTH SHALL BE 1' BELOW SURROUNDING GROUND SURFACE.



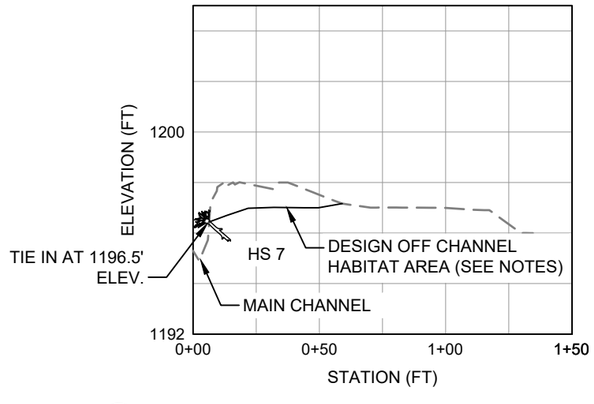
1 - CROSS-SECTION 1
SCALE: 1" = 60' HORIZONTAL, 1" = 10' VERTICAL



2 - CROSS-SECTION 2
SCALE: 1" = 60' HORIZONTAL, 1" = 10' VERTICAL



3 - CROSS-SECTION 3
SCALE: 1" = 60' HORIZONTAL, 1" = 10' VERTICAL



4 - CROSS-SECTION 4
SCALE: 1" = 60' HORIZONTAL, 1" = 10' VERTICAL

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PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)
ENGINEER: J. DZARA	SCALE: AS NOTED
CHECKED: S. FIROR	APPROVED: J. DZARA
DATE: 12/21/2022	DATE: 12/21/2022

ASOTIN CREEK PA-06

ASOTIN COUNTY, WA

CROSS-SECTION PROFILES

SHEET NAME:	S4
DATE:	12/21/2022
PROJECT NO.:	20038-10
SHEET:	9 OF 19

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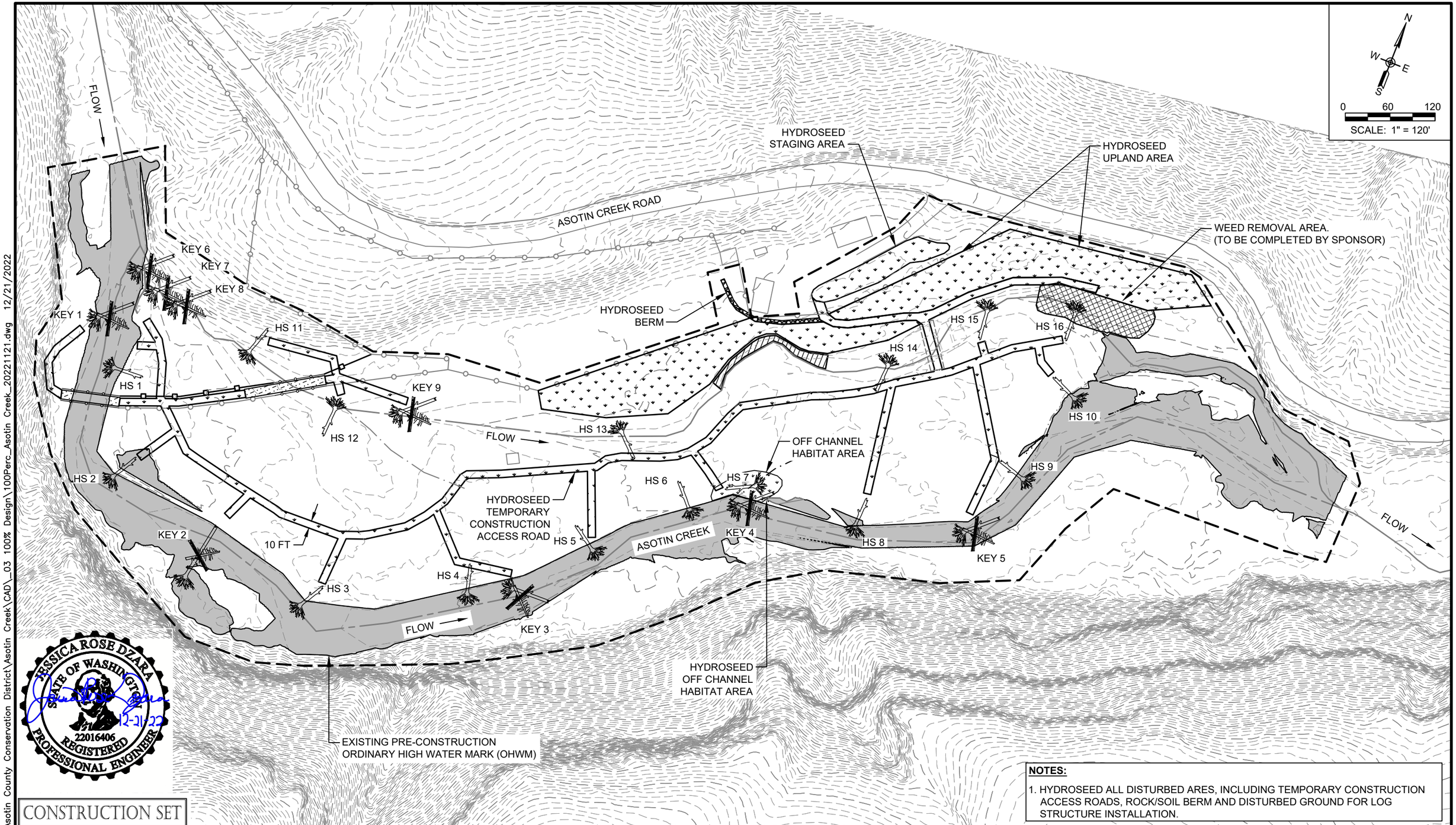


JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

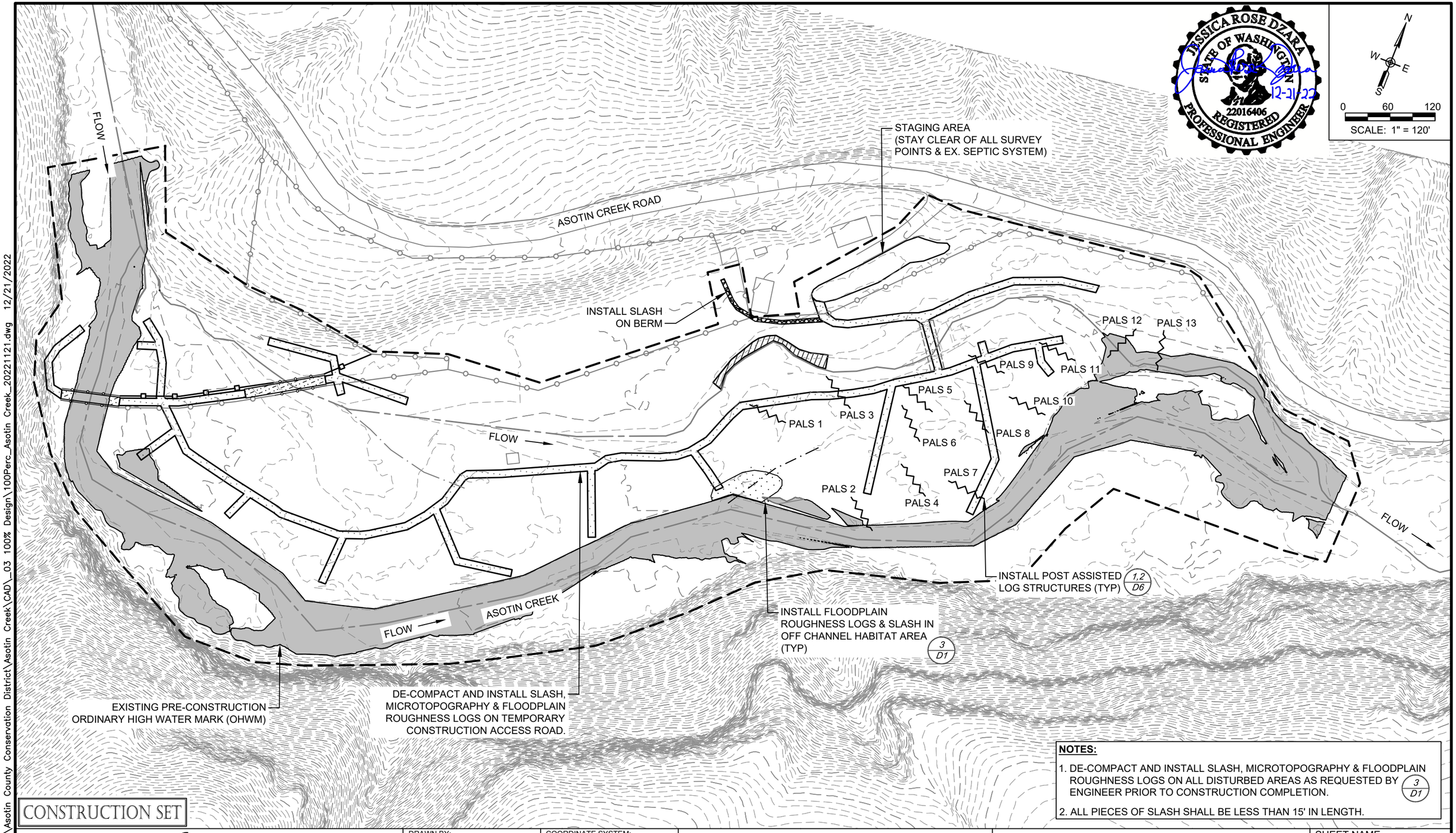
CONSTRUCTION SET

NOTES:

1. HYDROSEED ALL DISTURBED ARES, INCLUDING TEMPORARY CONSTRUCTION ACCESS ROADS, ROCK/SOIL BERM AND DISTURBED GROUND FOR LOG STRUCTURE INSTALLATION.

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: S5
ENGINEER: J. DZARA	SCALE: 1" = 120'		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	HYDROSEEDING PLAN	SHEET: 10 OF 19



JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

N
W E
S

0 60 120
SCALE: 1" = 120'

NOTES:

1. DE-COMPACT AND INSTALL SLASH, MICROTOPOGRAPHY & FLOODPLAIN ROUGHNESS LOGS ON ALL DISTURBED AREAS AS REQUESTED BY ENGINEER PRIOR TO CONSTRUCTION COMPLETION. (3 / D1)
2. ALL PIECES OF SLASH SHALL BE LESS THAN 15' IN LENGTH.

CONSTRUCTION SET

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DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: S6
ENGINEER: J. DZARA	SCALE: 1" = 120'		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	FLOODPLAIN ROUGHNESS PLAN	SHEET: 11 OF 19

SUGGESTED CONSTRUCTION SEQUENCING:

1. INSTALL WOOD STRUCTURES HS 11 THRU 16 AND KEY 9 IN THE SIDE CHANNEL IN DRY CONDITIONS.
2. INSTALL LIVESTOCK CROSSING 1.
3. INSTALL KEY 1.
4. INSTALL LIVESTOCK CROSSING 2.
5. INSTALL OFF CHANNEL HABITAT AREA AND HS 7.
6. INSTALL MAIN CHANNEL WOOD STRUCTURES HS 1 THRU 10 AND KEY 2 THRU 5.
7. REMOVE ROCK CROSSING AND INSTALL ROCK FORD.
8. INSTALL BRUSH FASCINE.
9. REMOVE JERSEY BARRIERS AT SIDE CHANNEL ENTRANCE. RE-GRADE SIDE CHANNEL ENTRANCE AND INSTALL KEY 6, 7 AND 8.
10. INSTALL ROCK/SOIL BERM.
11. INSTALL SLASH AND HYDROSEED.
12. INSTALL SLASH ON STAGING AREA AND ACCESS ROAD NORTH OF SIDE CHANNEL.

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

N
W E
S
0 60 120
SCALE: 1" = 120'

FLOW
EXISTING JERSEY BARRIERS
KEY 6
KEY 7
KEY 8
KEY 1
TEMPORARY CHANNEL CROSSING 1
HS 11
LIVESTOCK CROSSING 1
HS 1
HS 12
KEY 9
SIDE CHANNEL
FLOW
HS 13
LIVESTOCK CROSSING 2
HS 2
HS 6
HS 7
TEMPORARY CONSTRUCTION ACCESS ROAD
10 FT
KEY 2
HS 5
ASOTIN CREEK
KEY 4
HS 8
KEY 5
HS 3
HS 4
MAIN CHANNEL
FLOW
KEY 3
EXISTING PRE-CONSTRUCTION ORDINARY HIGH WATER MARK (OHWM)
ASOTIN CREEK ROAD
ROCK/SOIL BERM
BRUSH FASCINE BANK TREATMENT
OFF CHANNEL HABITAT AREA
STAGING AREA (STAY CLEAR OF ALL SURVEY POINTS & EX. SEPTIC SYSTEM)
ROCK CROSSING/ ROCK FORD
HS 14
HS 15
HS 16
HS 10
HS 9
FLOW

NOTES:

1. STAGING AND REFUELING SHALL OCCUR IN DESIGNATED STAGING AREA OR ON ASOTIN CREEK ROAD ONLY.
2. SEE SHEETS G2 AND G3 FOR SPILL PREVENTION AND CONTAINMENT PRECAUTIONS REQUIRED.
3. WOOD STRUCTURES IN THE MAIN CHANNEL TO BE INSTALLED DURING LOW WATER CONDITIONS ONLY.
4. FISH ISOLATION ACCORDING TO SHEETS G2, G3, AND G4 SHALL BE COMPLETED PRIOR TO ANY WORK IN THE WATER.

CONSTRUCTION SET

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)
ENGINEER: J. DZARA	SCALE: 1" = 120'
CHECKED: S. FIROR	APPROVED: J. DZARA
DATE: 12/21/2022	DATE: 12/21/2022

ASOTIN CREEK PA-06

ASOTIN COUNTY, WA

SITE ACCESS AND STAGING AREAS

SHEET NAME:	S7
DATE:	12/21/2022
PROJECT NO.:	20038-10
SHEET:	12 OF 19

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Estimated Feature Quantities		
	Length (LF)	Area (SF)
Brush Fascine	180	--
Off Channel Habitat Area	--	2500
Rock Soil Berm	165	--
Upland Hydroseeding Area	--	48320
Livestock Fence	275	--
Removable Water Gates	80	--
Remove Concrete Barricades	70	--
Side Channel Entrance Reshaping	50	--
Livestock Crossings	190	--
Remove Rock Crossing	60	--
Rock Ford	70	--

Estimated Wood Material Quantities					
	Anchor Logs, min. length 60'	Small Logs, max length 15'	Posts, min. dia. 3"	Posts, min. dia. 6" (if needed)	Slash
	(EA)	(EA)	(EA)	(EA)	(10 CY)
Habitat Structures	16	48	--	48	--
Key Structures	36	36	--	90	4.5
Brush Fascine	--	72	--	--	18
PALS	--	--	165	--	5.5
Off Channel Habitat Area	--	6	--	--	1.5
Disturbed Areas*	--	--	--	--	19.5
Total	**52**	**162**	**165**	**138**	**49**

*Slash listed for each feature is the est. quantity required to construct the feature. Slash to cover disturbed ground during construction is accounted for in the disturbed areas line.

Estimated Vegetation Quantities		
	Live Willow Stakes	Native Seed
	(EA)	(LBS)
Brush Fascine	540	1
Staging Area	--	2
Berm	--	1
Access Roads	--	12
Log Structures	--	2
Off Channel Habitat Area	--	1
Upland HydroSeeding Areas	--	20
Total	**540**	**39**

Estimated Earthwork Quantities							
	Structural Fill (if needed*)	6" Minus Rock	12" Minus Rock	Rock Armoring	Topsoil	Excavation Generating Spoils	30" Boulders
	(BCY)	(BCY)	(BCY)	(BCY)	(LCY)	(BCY)	(EA)
Habitat Structures	100	--	--	--	--	100	--
Key Structures	80	--	--	--	--	80	18
Brush Fascine	--	--	--	--	--	70	--
Livestock Crossings	--	30	60	--	--	90	--
Rock Ford	--	20	30	--	--	50	--
Remove Rock Crossing	--	--	--	--	--	90	--
Side Channel Reshaping	--	--	--	--	--	20	--
Rock Soil Berm	40	--	--	20	20	--	--
Off Channel Habitat Area	--	--	--	--	--	50	--
Total	**220**	**50**	**90**	**20**	**20**	**550**	**18**

*at 1:1 mix with native material. If native material can be used in place of structural fill, no spoils will be generated.

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

NO.	DATE	REVISIONS	BY	CHK

DRAFTER: S. MOROSKY/B. ROLLINS
DESIGNER: J. DZARA
CHECKED: S. FIROR
DATE: 12/21/2022

COORDINATE SYSTEM: WSPS NAD83 US FT (2011)
SCALE: N/A
APPROVED: J. DZARA
DATE: 12/21/2022

Alta Science & Engineering, Inc.

ASOTIN CREEK PA-06

ASOTIN COUNTY, WA

MATERIAL QUANTITIES

SHEET: S8
DATE: 12/21/2022
PROJECT NO.: 20038-10
SHEET NO.: 13 OF 19

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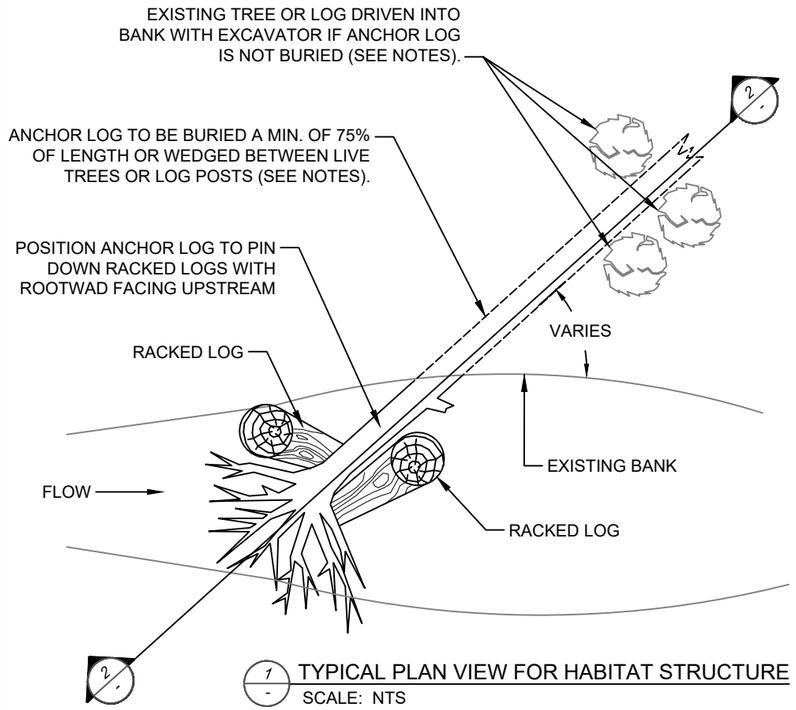
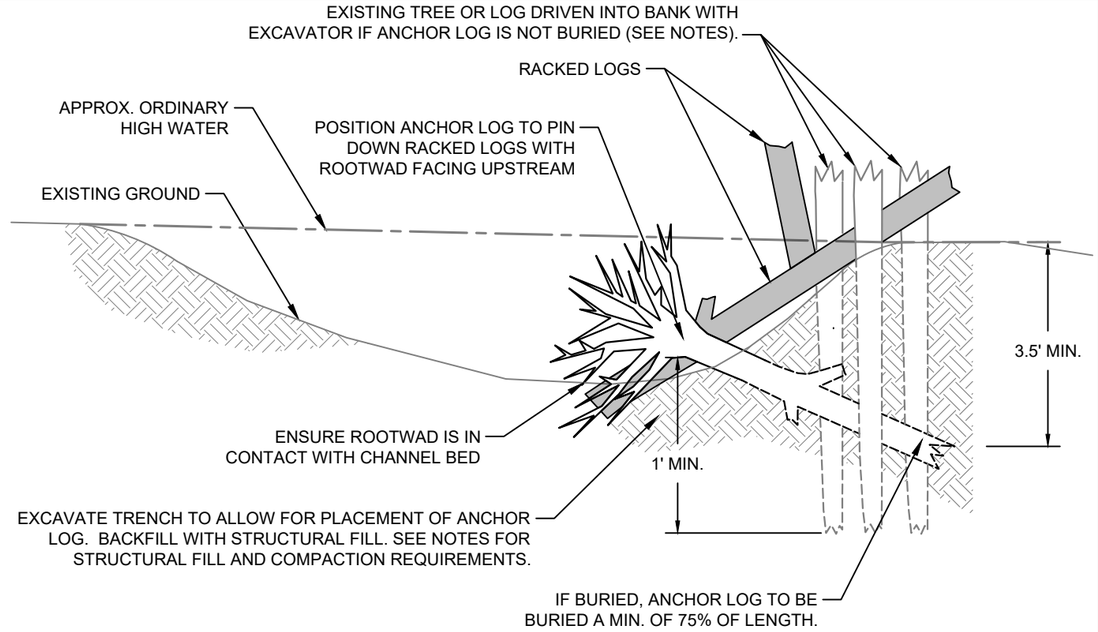


1 - TYPICAL PLAN VIEW FOR HABITAT STRUCTURE
SCALE: NTS

NOTES:

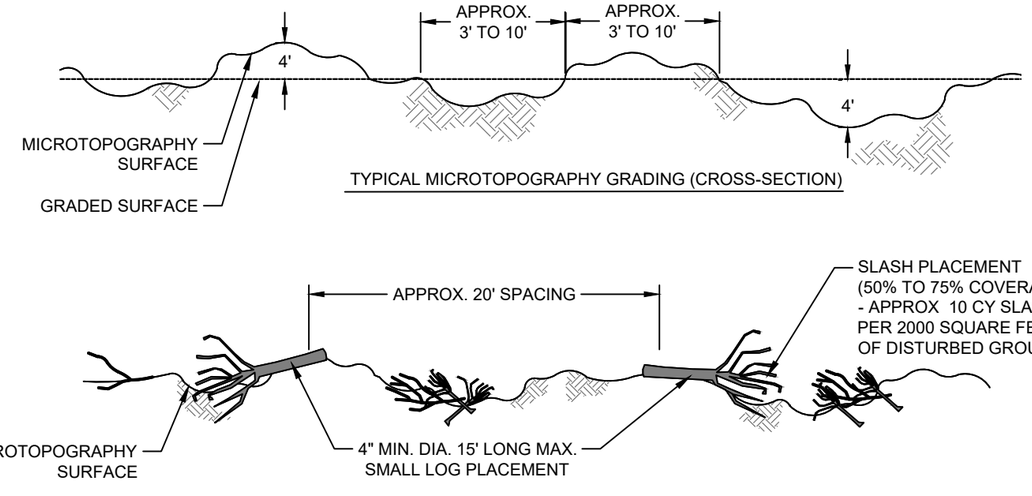
1. ENGINEER MUST BE PRESENT DURING HABITAT STRUCTURE CONSTRUCTION.
2. EACH LOG JAM STRUCTURE SHALL UTILIZE ONE LARGE INDIVIDUAL LOG (APPROX. 18 IN. TO 24 IN. DIAMETER, AND A MINIMUM OF 40 FT. IN TOTAL LENGTH) WITH THE ROOTWAD INTACT, TO BE USED AS THE ANCHOR LOG.
3. RACKED LOGS (TWO OR THREE PER STRUCTURE) SHOULD BE SMALLER IN SIZE THAN ANCHOR LOGS (WITH OR WITHOUT ROOTWADS AND WITH OR WITHOUT BRANCHES) BUT SHOULD VARY IN BOTH LENGTH AND DIAMETER.
4. ANCHOR LOGS AND RACKED LOGS ARE SUBJECT TO APPROVAL BY THE ENGINEER.
5. ANCHOR LOG TRENCH SHALL BE BACKFILLED WITH STRUCTURAL FILL IN 6" MAX. LIFTS AND COMPACTED WITH VIBRATORY COMPACTION EQUIPMENT WITH THREE COMPLETE PASSES MIN. OR UNTIL VISUAL DISPLACEMENT CEASES. STRUCTURAL FILL MAY BE SOURCED ON SITE IF COMPACTION REQUIREMENTS CAN BE MET.
6. IF SITE CONDITIONS DO NOT ALLOW FOR BURIAL AND COMPACTION REQUIREMENTS TO BE MET, ANCHOR LOG SHALL BE WEDGED BETWEEN LIVE TREES AND/OR LOG POSTS. LOG POSTS SHALL BE DRIVEN TO A MIN. DEPTH OF 3' BELOW GROUND SURFACE, 1' BELOW THE LOWEST POINT IN THE CHANNEL BED. ANCHOR LOG SHALL HAVE A MIN. OF ONE LOG POST OR LIVE TREE ON BOTH THE UPSTREAM AND DOWNSTREAM SIDE OF THE ANCHOR LOG. LOG POSTS SHALL EXTEND A MIN. OF 2.5' ABOVE THE GROUND SURFACE. LOG POSTS AND LIVE TREES SHALL HAVE A MIN. DIA. OF 6".



NOTE:

CONTRACTOR SHALL NOTIFY ENGINEER TWO DAYS PRIOR TO START OF CONSTRUCTION ON ANY OF THESE FEATURES.

2 - TYPICAL SECTION VIEW FOR HABITAT STRUCTURE
SCALE: NTS



3 - SLASH AND FLOODPLAIN ROUGHNESS DETAILS
SCALE: NTS

4 - EXAMPLE OF TYPICAL FINISHED SLASH PLACEMENT DETAIL
SCALE: NTS

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta
Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)
ENGINEER: J. DZARA	SCALE: N/A
CHECKED: S. FIROR	APPROVED: J. DZARA
DATE: 12/21/2022	DATE: 12/21/2022

ASOTIN CREEK PA-06

ASOTIN COUNTY, WA

DETAILS - FLOODPLAIN ROUGHNESS AND HABITAT STRUCTURE

SHEET NAME:	D1
DATE:	12/21/2022
PROJECT NO.:	20038-10
SHEET:	14 OF 19

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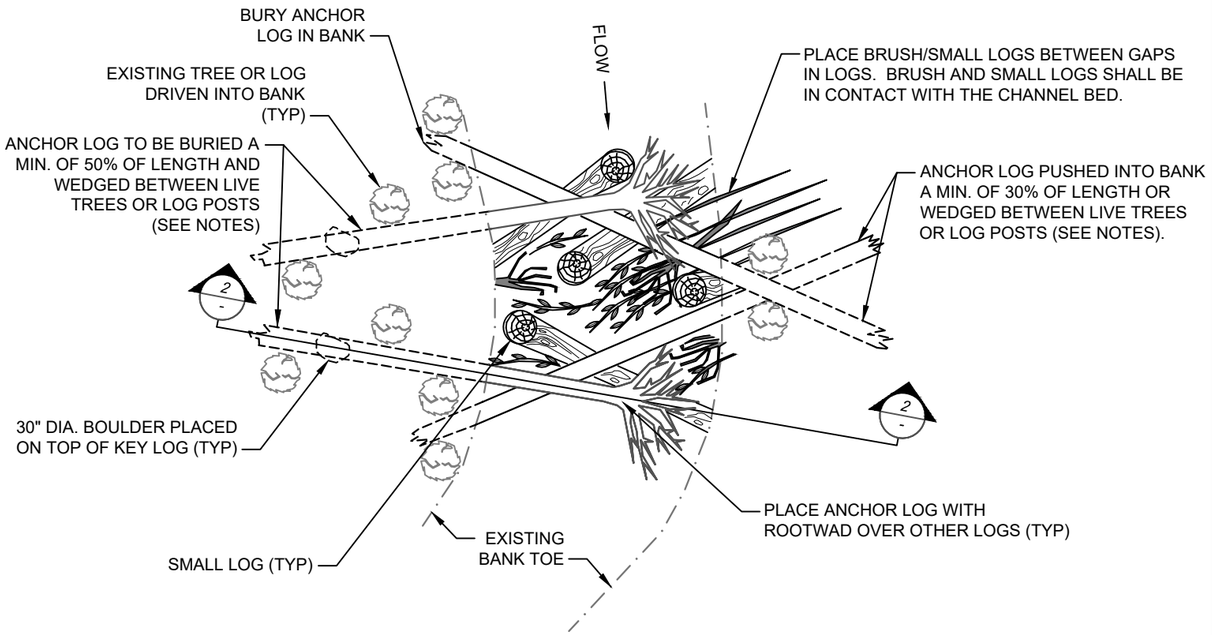
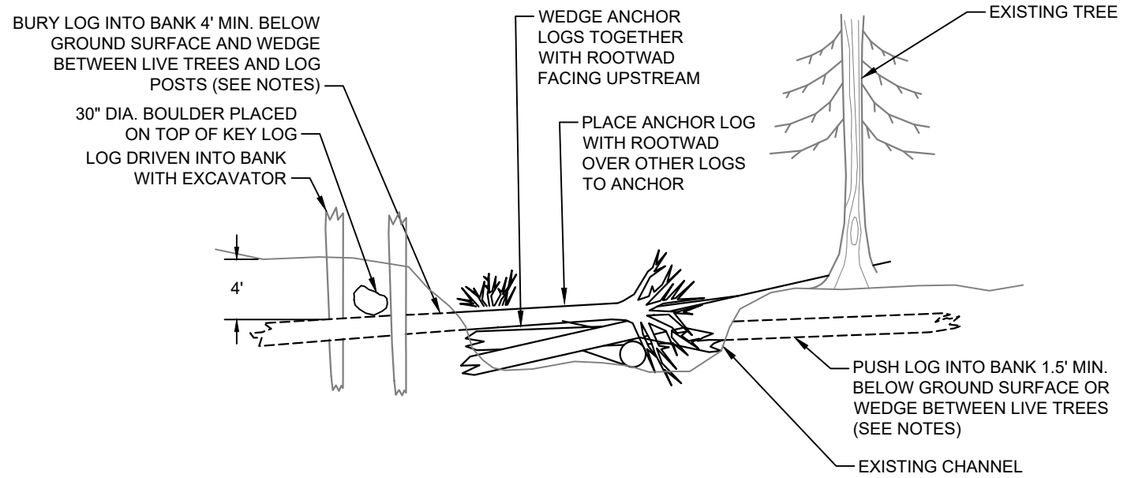


1 - CHANNEL SPANNING KEY STRUCTURE PLAN VIEW

SCALE: NTS

NOTES:

1. KEY STRUCTURE LOGS SHALL BE PLACED TO INTERLOCK WITH EXISTING TREES OR DRIVEN LOG POSTS.
2. ANCHOR LOGS SHALL BE MIN. 18" DIA. AND 60' LONG.
3. USE A MIN. OF 4 ANCHOR LOGS PER STRUCTURE WITH MIN. OF 2 HAVING ROOTWADS.
4. PUSH ANCHOR LOGS WITHOUT ROOTWADS INTO BANK AS FAR AS POSSIBLE. ANCHOR LOGS ON NEAR BANK SHALL BE BURIED.
5. SMALL LOGS, MIN. OF 4 PER STRUCTURE, SHOULD BE A MAX. LENGTH OF 15'. SHOULD VARY IN BOTH LENGTH AND DIA. RACKED LOGS MAY OR MAY NOT HAVE ROOTWADS.
6. PLACE SLASH AROUND STRUCTURE ON ALL DISTURBED AREAS.
7. INCORPORATE SLASH AND SMALL LOGS (MAX. LENGTH OF 15') TO FILL VOID SPACE BETWEEN ANCHOR LOGS.
8. IF SITE CONDITIONS DO NOT ALLOW FOR COMPACTION REQUIREMENTS TO BE MET, STRUCTURAL FILL SHALL BE ADDED UNTIL COMPACTION REQUIREMENTS ARE MET. LOG POSTS SHALL BE DRIVEN TO A MIN. DEPTH OF 1' BELOW LOWEST POINT IN CHANNEL BED. ANCHOR LOG SHALL HAVE A MIN. OF ONE LOG POST OR LIVE TREE ON BOTH THE UPSTREAM AND DOWNSTREAM SIDE OF THE ANCHOR LOG. LOG POSTS SHALL EXTEND A MIN. OF 2.5' ABOVE THE GROUND SURFACE. LOG POSTS AND LIVE TREES SHALL HAVE A MIN. DIA. OF 6".
9. ANCHOR AND SMALL LOGS ARE SUBJECT TO APPROVAL BY ENGINEER.
10. ENGINEER MUST BE PRESENT DURING CHANNEL SPANNING KEY STRUCTURE CONSTRUCTION.
11. NO CROSSING OF LIVE WATER WITH EQUIPMENT SHALL BE PERMITTED TO CONSTRUCT KEY STRUCTURES. KEY STRUCTURE SHALL BE LOCATED WHERE LIVE TREES CAN BE USED FOR BALLAST ON THE OPPOSITE BANK OF EQUIPMENT.
12. LOGS WITH ROOTWADS SHALL BE BURIED A MIN. OF 50% OF LENGTH IN THE NEAR BANK TO AVOID CROSSING OF LIVE WATER.



2 - CHANNEL SPANNING KEY STRUCTURE CROSS-SECTION

SCALE: NTS

NOTE:

CONTRACTOR SHALL NOTIFY ENGINEER TWO DAYS PRIOR TO START OF CONSTRUCTION ON ANY OF THESE FEATURES.

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER

CONSTRUCTION SET

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ENGINEER: J. DZARA	SCALE: N/A
CHECKED: S. FIROR	APPROVED: J. DZARA
DATE: 12/21/2022	DATE: 12/21/2022

ASOTIN CREEK PA-06

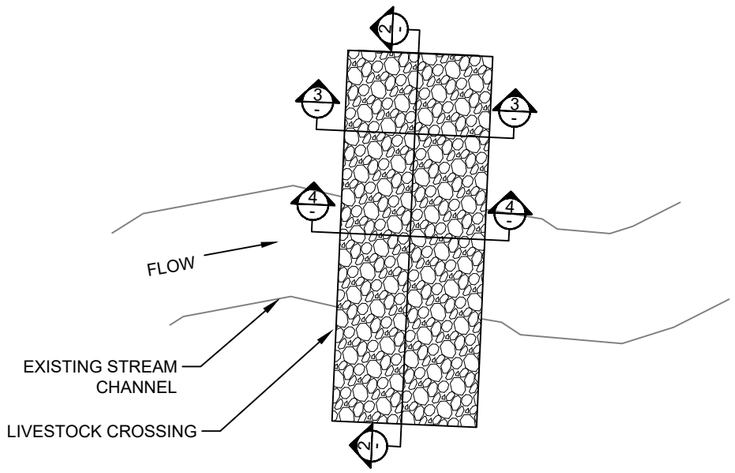
ASOTIN COUNTY, WA

DETAILS - KEY STRUCTURE & CONTAINER PLANTING

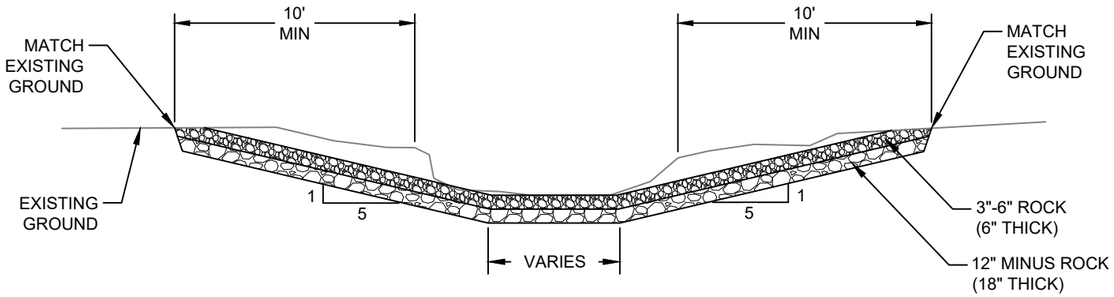
SHEET NAME:	D2
DATE:	12/21/2022
PROJECT NO.:	20038-10
SHEET:	15 OF 19

NOTES:

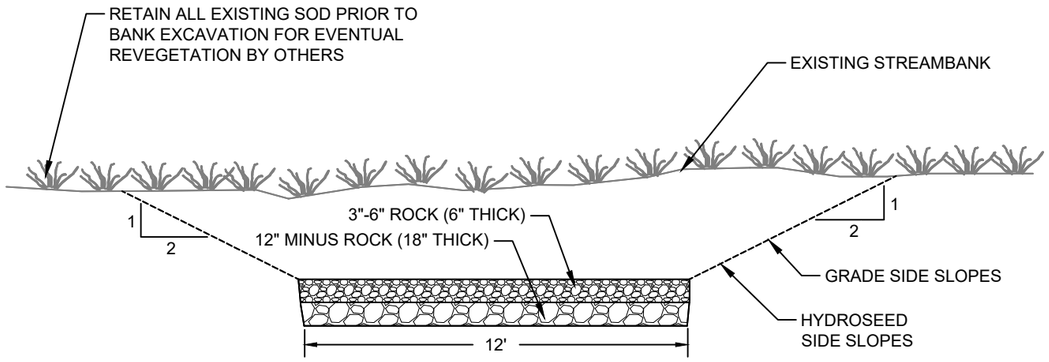
1. 3"- 6" ROCK SHALL HAVE A D50 = 4.5".
2. COMPACT SUBGRADE BELOW EXCAVATION TO ENSURE ADEQUATE BASE FOR ROCK.
3. MATCH CROSSING AND RAMP BOTTOM WIDTH TO EXISTING STREAM CHANNEL WIDTH.
4. FINISH GRADE OF LOW-WATER CROSSING AND RAMP SHOULD NOT BE HIGHER THAN EXISTING CHANNEL BOTTOM.
5. LIVESTOCK CROSSING 2 DOES NOT REQUIRE ROCK BELOW THE TOE OF CHANNEL SIDE SLOPES.
6. LIVESTOCK CROSSINGS SHALL EXTEND A MINIMUM OF 10' FROM THE CHANNEL TOP OF BANK ON EITHER SIDE.



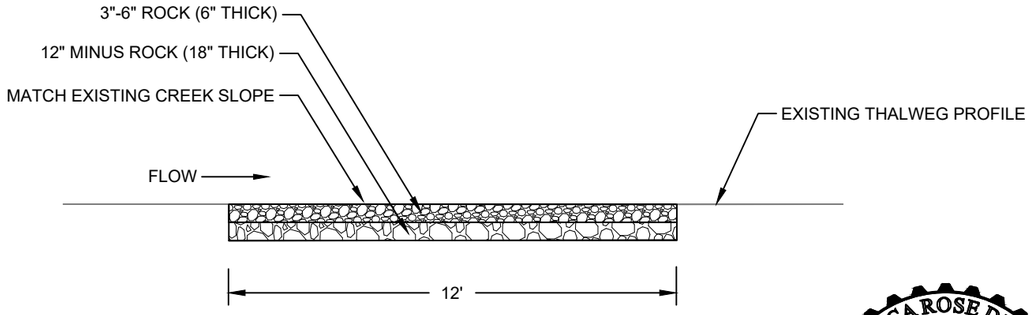
1 - TYPICAL PLAN VIEW FOR LIVESTOCK CROSSING & ROCK FORD
SCALE: NTS



2 - TYPICAL CROSS SECTION FOR LIVESTOCK CROSSING & ROCK FORD
SCALE: NTS



3 - TYPICAL STREAMBANK CUT SECTION FOR LIVESTOCK CROSSING & ROCK FORD
SCALE: NTS



4 - TYPICAL PROFILE FOR LIVESTOCK CROSSING & ROCK FORD
SCALE: NTS

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta
Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: D3
ENGINEER: J. DZARA	SCALE: N/A		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022	DETAILS - LIVESTOCK CROSSING & ROCK FORD	SHEET: 16 OF 19

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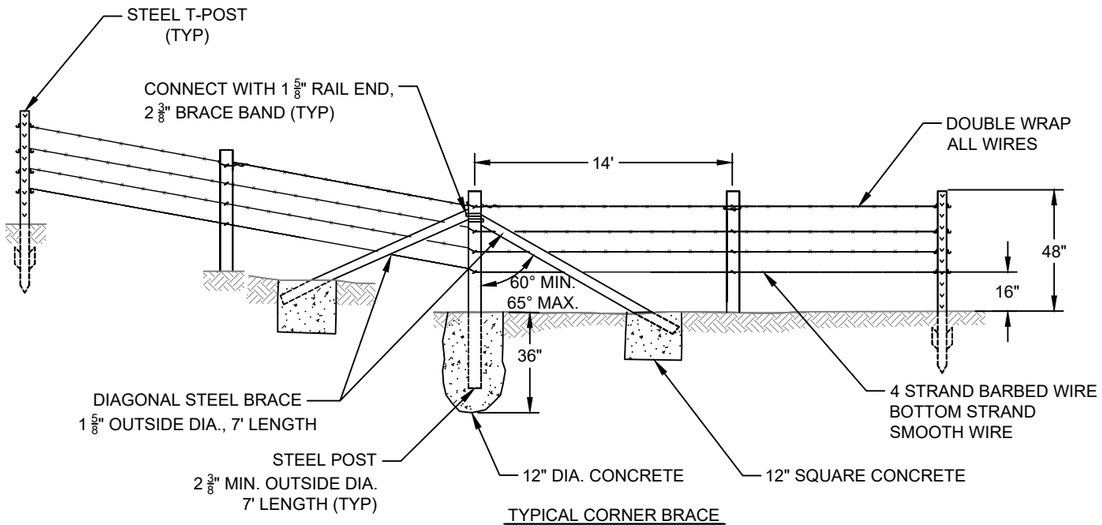
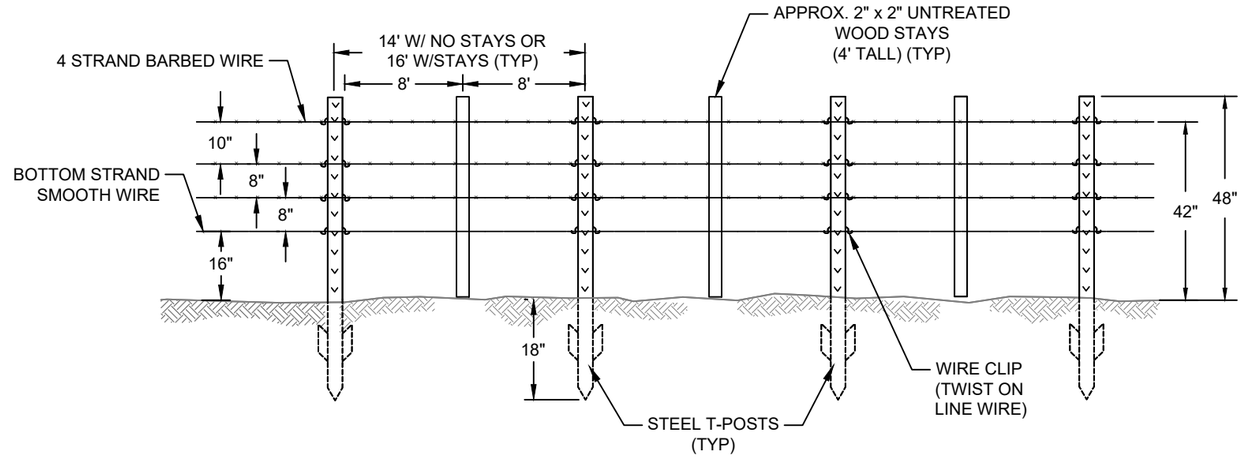
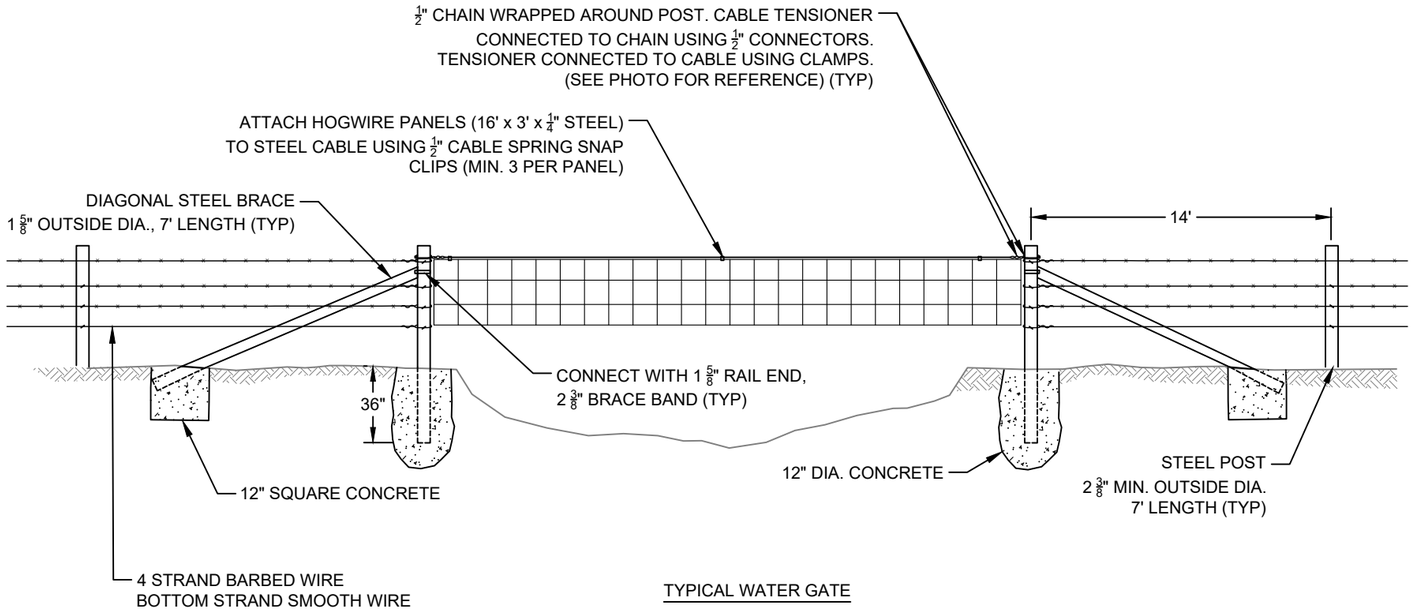


TYPICAL CORNER BRACE



TYPICAL POST AND WIRE SPACING



TYPICAL WATER GATE

NOTES:

1. WIRE SHALL BE GALVANIZED, 12.5 GAUGE WITH 70,000 PSI STRENGTH.
2. STEEL T-POSTS SHALL BE 5.5' MIN. LENGTH, 1.33 LB/FT, AND PAINTED.
3. CORNER BRACES ARE REQUIRED AT ANGLED FENCE GREATER THAN 5 DEGREES.
4. STEEL POSTS IN CORNER BRACES SHALL BE 3.65 LB/FT OR EQUIVALENT, AND GALVANIZED WITH 2 OZ/SQ FT ZINC COATING. CORNER POSTS SHALL BE SET A MIN. OF 3' IN EITHER 12" DIA. OR 12" SQUARE CONCRETE.
5. DIAGONAL STEEL BRACES SHALL BE 2.25 LB/FT OR EQUIVALENT, AND EMBEDDED IN 1' IN EITHER 12" DIA. OR 12" SQUARE CONCRETE.
6. WATER GATE IS DESIGNED TO HAVE HOGWIRE PANELS REMOVED AT HIGH FLOW EVENTS.
7. LANDOWNER SHALL APPROVE FENCE STAKING PRIOR TO FENCE INSTALLATION.

1 / - FENCING DETAILS
SCALE: NTS

CONSTRUCTION SET

Alta
Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: D4
ENGINEER: J. DZARA	SCALE: N/A		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022		SHEET: 17 OF 19

DETAILS - LIVESTOCK FENCE

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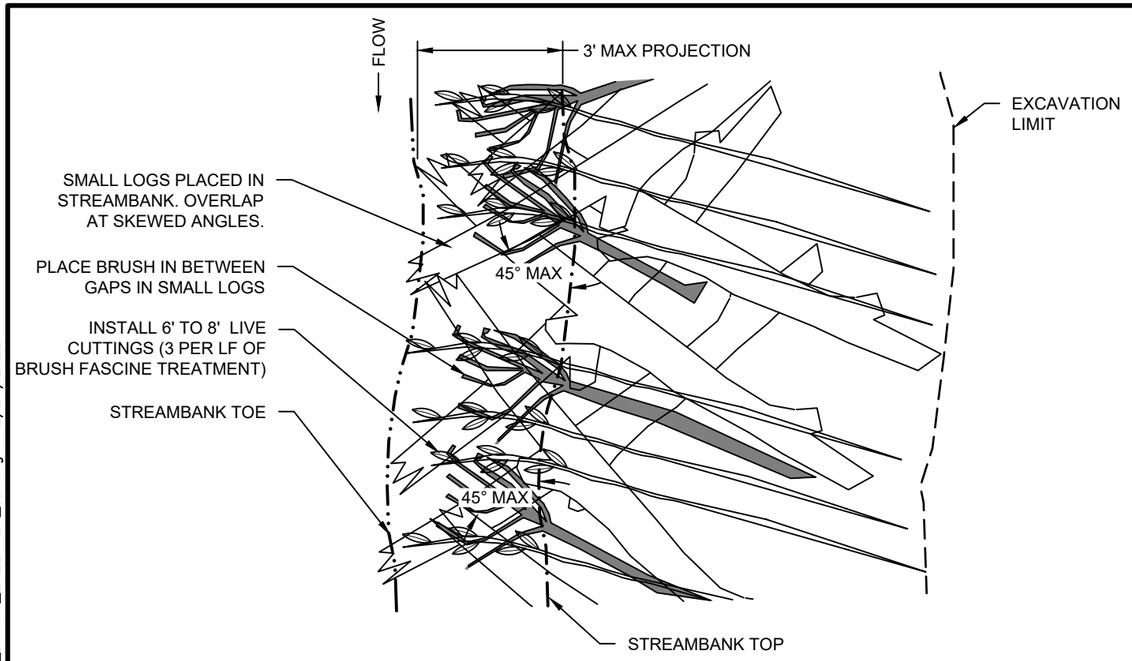
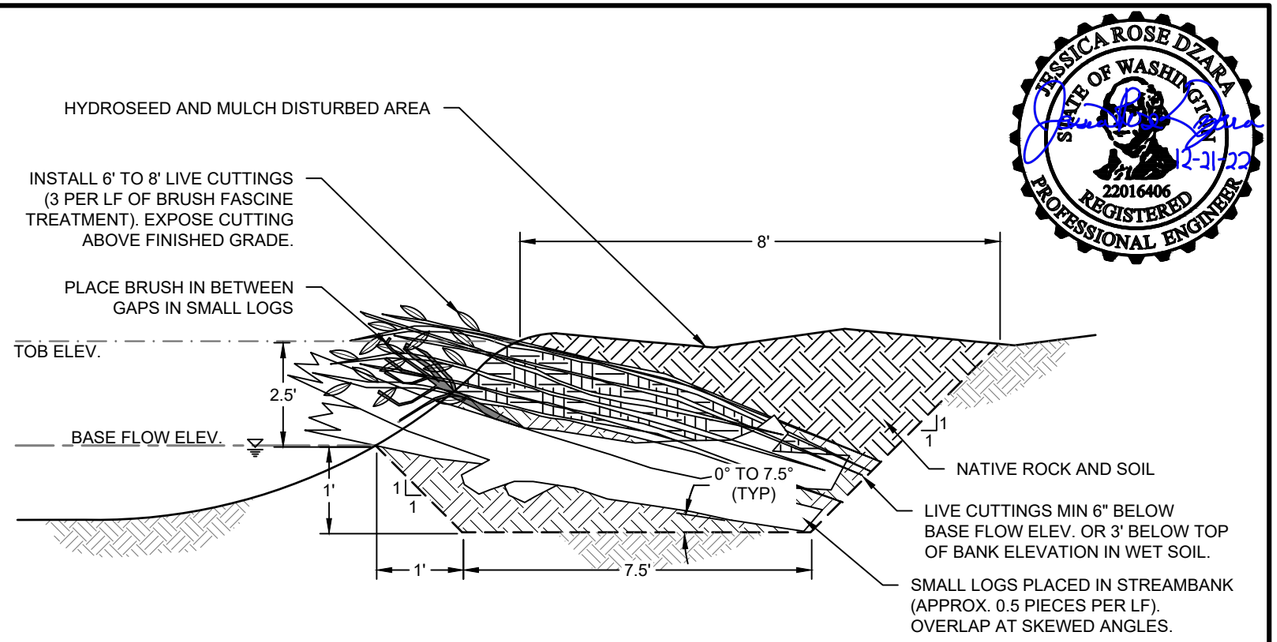
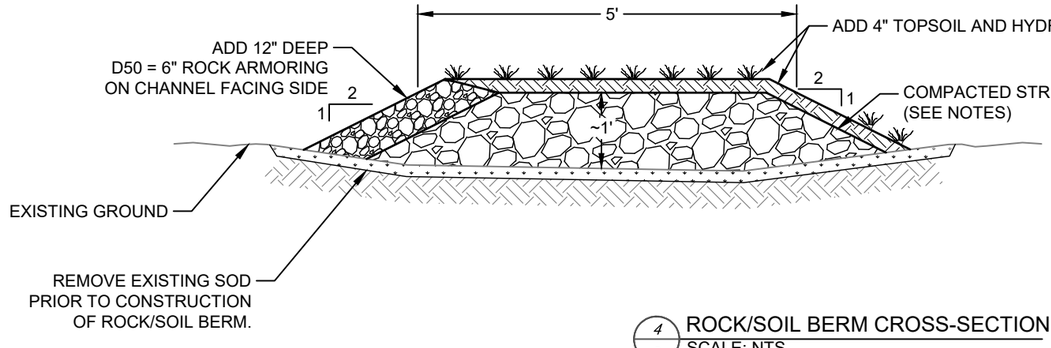


1 / - BRUSH FASCINE PLAN VIEW
SCALE: NTS



2 / - BRUSH FASCINE CROSS-SECTION
SCALE: NTS



4 / - ROCK/SOIL BERM CROSS-SECTION
SCALE: NTS

NOTES:

1.) STRUCTURAL FILL SHALL BE A PIT RUN (CRUSHED BASALT RANGING IN SIZE FROM 1" TO 6" WITH A MINIMUM OF 15% FINES.

2.) PLACE AND COMPACT STRUCTURAL FILL IN 6 INCH MAX. LOOSE LIFTS AND COMPACT UNTIL THE FINAL TOP ELEVATIONS IS AT APPROX. 1' ABOVE SURROUNDING GROUND ELEVATION.

3.) ADJUST STRUCTURAL FILL TO A MOISTURE CONTENT THAT IS SUITABLE FOR COMPACTION.

4.) OPERATE VIBRATORY COMPACTION EQUIPMENT OVER THE FULL WIDTH OF EACH 6 INCH LIFT WITH A MIN. OF THREE COMPLETE PASSES OR UNTIL VISUAL DISPLACEMENT CEASES.

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: D5
ENGINEER: J. DZARA	SCALE: N/A		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022		SHEET: 18 OF 19

DETAILS - BRUSH FASCINE & ROCK/SOIL BERM

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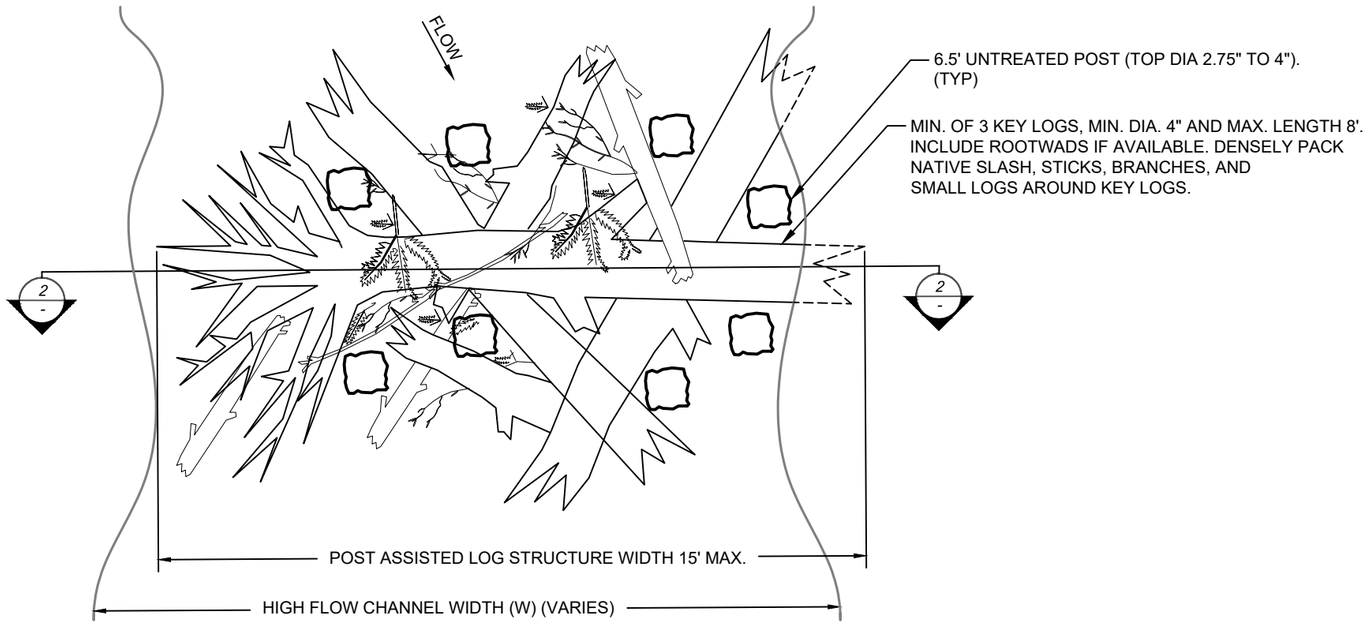
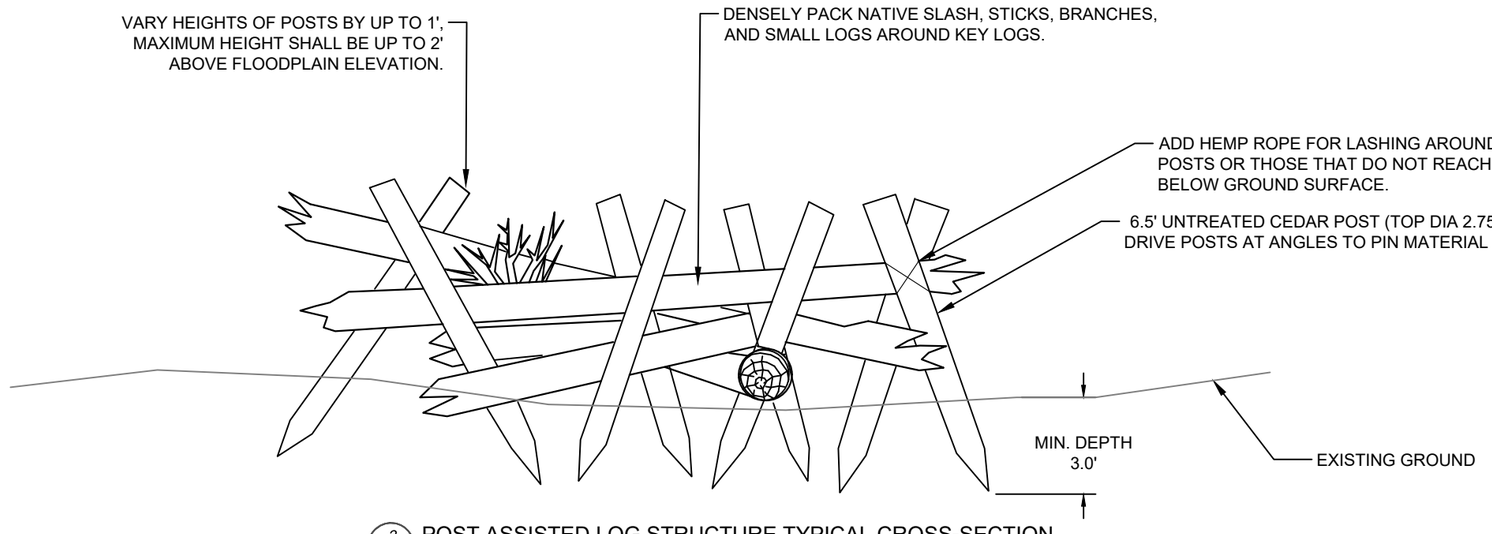
NOTES:

1. MAX. STRUCTURE LENGTH IS 15'. STRUCTURES SHALL NOT BE FIELD FIT TO EXCEED THIS LENGTH.
2. PALS SHALL BE INSTALLED PERPENDICULAR TO THE HIGH FLOW PATHS.
3. MAX. LENGTH OF LOGS USED IN THE PALS SHALL BE 8'.



1 - POST ASSISTED LOG STRUCTURE PLAN VIEW
SCALE: NTS



2 - POST ASSISTED LOG STRUCTURE TYPICAL CROSS-SECTION
SCALE: NTS

JESSICA ROSE DZARA
STATE OF WASHINGTON
22016406
REGISTERED
PROFESSIONAL ENGINEER
12-21-22

CONSTRUCTION SET

Alta
Science & Engineering, Inc.

DRAWN BY: S. MOROSKY/B. ROLLINS	COORDINATE SYSTEM: WSPS NAD83 US FT (2011)	ASOTIN CREEK PA-06	SHEET NAME: D6
ENGINEER: J. DZARA	SCALE: N/A		DATE: 12/21/2022
CHECKED: S. FIROR	APPROVED: J. DZARA	ASOTIN COUNTY, WA	PROJECT NO.: 20038-10
DATE: 12/21/2022	DATE: 12/21/2022		SHEET: 19 OF 19

DETAILS - PALS
(POST ASSISTED LOG STRUCTURE)

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