



Lewis County Department of Public Works

Erik P. Martin, PE, Director

Tim D. Fife, PE, County Engineer

March 7, 2018

Fish Barrier Removal Board
c/o Tom Jameson, WDFW Fish Passage Division Manager
PO Box 43200
Olympia, WA 98504-3200

RE: Match Certification Credit for the Middle Fork Newaukum Fish Passage_
Site ID 021(45011)(07070)

Mr. Jameson,

Lewis County is submitting this letter to serve as both a request of match certification as well as a statement of intent to amend the Grant amount in the near future. The Middle Fork Newaukum Fish Passage Site ID 021(45011)(07070) Project is slated to receive approximately \$525,000 funds from the Brian Abbott Fish Passage Barrier Removal Board's Watershed Pathway's Grant for the 2017-2019 biennium under the 2018 Supplemental Capital Budget. Original estimates showed project costs at approximately \$525,000. However, recent estimates completed by Washington State Department of Fish and Wildlife and Lewis County Public Works staff show project costs to be more likely in the range of \$880,000 to \$1,110,000.

Lewis County intends to provide match for the design and construction of the Middle Fork Newaukum Fish Passage Site ID 021(45011)(07070) project through the construction of another fish passage barrier removal project within the same watershed.

Lewis County is proposing the use the of the *Frase Creek Removal and Channel Realignment Project* [Culvert Site ID 021(64002)(00529)] as match for the Middle Fork Newaukum Fish Passage Site ID 021(45011)(07070) Project. Design for The *Frase Creek Removal and Channel Realignment Project* Frase Creek Barrier has been completed and is undergoing permitting scheduled for 2019 construction.

Road Maintenance & Fleet Services

466 West Main St.
Chenahis, WA 98532
☎ 360.740.3380
☎ 360.740.2741

Administration, Engineering, Utilities, Real Estate Services & Traffic

2025 NE Kresky Ave.
Chenahis, WA 98532
☎ 360.740.1123
☎ 360.740.1479

Solid Waste Services

Post Office Box 180
Centralia, WA 98531
☎ 360.740.1451
☎ 360.330.7805

The Frase Creek project is estimated to cost \$1,000,000.

Grant funds have been applied for the *Frase Creek Barrier Removal and Channel Realignment Project* in the amount of \$147,500 from the US Fish and Wildlife Service's National Fish Passage Program Grant and \$594,591 from the Chehalis Basin Strategy's Aquatic Species Restoration Plan Grant and will be submitted for Salmon Recovery Funding Board Grant as well.

The County is planning on utilizing up to \$170,000 of construction costs of the Frase Creek Removal and Channel Realignment Project (including grant funding) as match for the Match Certification Credit, at the prescribed 15% for the Middle Fork Newaukum Fish Passage Site ID 021(45011)(07070). While it is not anticipated at this time that the additional construction funds will be used for any other project the County would also like to reserve the right to utilize any remaining funds as match for any other projects which may allow the utilization of such funds as match.

As a result of more recent Newaukum project cost estimates mentioned earlier in this letter, it will be necessary for Lewis County to formally request an amendment to the project agreement immediately after execution for an amount somewhere between \$360,000 and \$500,000. Should it be determined that there are no funds available to satisfy the cost increase the County will submit a scope change to move forward with a design only project at that time.

I, Erik Martin, certify the information provided above to be true and accurate.

Regards,



Erik Martin P.E.
Director
Lewis County Public Works

Fish Barrier Removal Board Grant Program

Match Certification Credit Form

The preference of the Fish Barrier Removal Board is for the project sponsor to provide a 15% match of the grant award. However, the board recognizes that under certain circumstances a project match may be a hardship for the project sponsor. A match certification credit may be used to meet the spirit of providing matching resources and help increase coordination within a watershed (at a HUC 10 scale).

1. Project Information:

Sponsor Name: Lewis County Public Works
Email & Phone: Ann.Weckback@lewiscountywa.gov - (360) 740-1440
Recovery Region: Washington Coast, Chehalis Basin Lead Entity
Stream Name: Middle Fork Newaukum River
WDFW Site ID: Site ID 021(45011)(07070)
Total Project Cost: \$525,000

2. Select which Match Certification Credit you are applying for:

- Another fish passage barrier removal within the same watershed** – Another fish passage barrier removal within the same watershed (HUC 10 Scale) may be used as match for Fish Barrier Removal Board funding if all of the following criteria are met:
- The matching project was not funded by the Fish Barrier Removal Board or previously used as match.
 - The matching project must be congruently under contract (construction or grant) with the FBRB contract or have been constructed within the previous four years from the time FBRB funds become available.
 - If already constructed, the matching project must be 100% passable per WDFW barrier assessment guidelines.
 - Eligible matching projects include design work, feasibility studies, and other activities that are specific to a particular barrier removal. Watershed inventory, assessment, and prioritization efforts are not eligible to use as match.
- Project Sponsor Hardship**– The project sponsor is not able to meet the minimum 15% match and there are no other fish passage barrier removal projects within the watershed that can be used as match.

3. The project sponsor must provide the following materials based on the type of Match Certification Credit being applied for:

a) *Another fish passage barrier removal within the same watershed*

- i. Completed Match Certification Credit Form (plus attachments listed below)
- ii. A letter from the sponsor or owner removing the barrier (e.g., state, county, city, forest landowner, RFEG or CD) certifying the matching project is either under contract (construction or grant), included on a public works list and in the design or permitting phase, or a grant application is in the process of being awarded to remove the barrier. The letter must be signed by someone with signature authority within the organization.
- iii. Submit a map and description of the project.
- iv. Provide photos of the site.
- v. Provide barrier assessment information, when and who conducted the survey.
- vi. Provide a preliminary design, final design, or as-built drawings.
- vii. Estimated or final cost of the project and completion date with supporting documentation.
- viii. Must certify that the match is not being used or will be used for any other project.

a) *Project Sponsor Hardship*

- ix. Completed Match Certification Form (plus attachments listed below)
- x. Provide a statement describing the match amount (or percentage) your organization can commit. Please detail the type of match and dollar or in-kind value.
- xi. Explain the resources that have been investigated for potential match
- xii. Explain the organizational hardship

4. Please submit the completed Match Certification Credit materials to:

Fish Barrier Removal Board
c/o Tom Jameson, WDFW Fish Passage Division Manager
PO Box 43200
Olympia, WA 98504-3200
Thomas.Jameson@dfw.wa.gov

The Fish Barrier Removal Board will review match eligibility for all proposed projects and may approve or deny match eligibility on a case-by-case basis. The Fish Barrier Removal Board will track match sources to avoid double matching.

Frase Creek Culvert Barrier Removal

The primary objective of the Frase Creek Barrier Removal is to replace an existing fish passage barrier with a fish passable structure and realign 300ft of the streambed channel. The project will restore salmon access to 2.74 linear miles of potential habitat; approximately 388 square meters (0.10 acres) of spawning habitat and 8,442 square meters (2.89 acres) of rearing habitat for the Southwest Washington ESU (evolutionary significant unit) of coho salmon, and the Southwest Washington DPS (distinct population segment) of winter steelhead, as well as searun cutthroat and resident cutthroat trout.

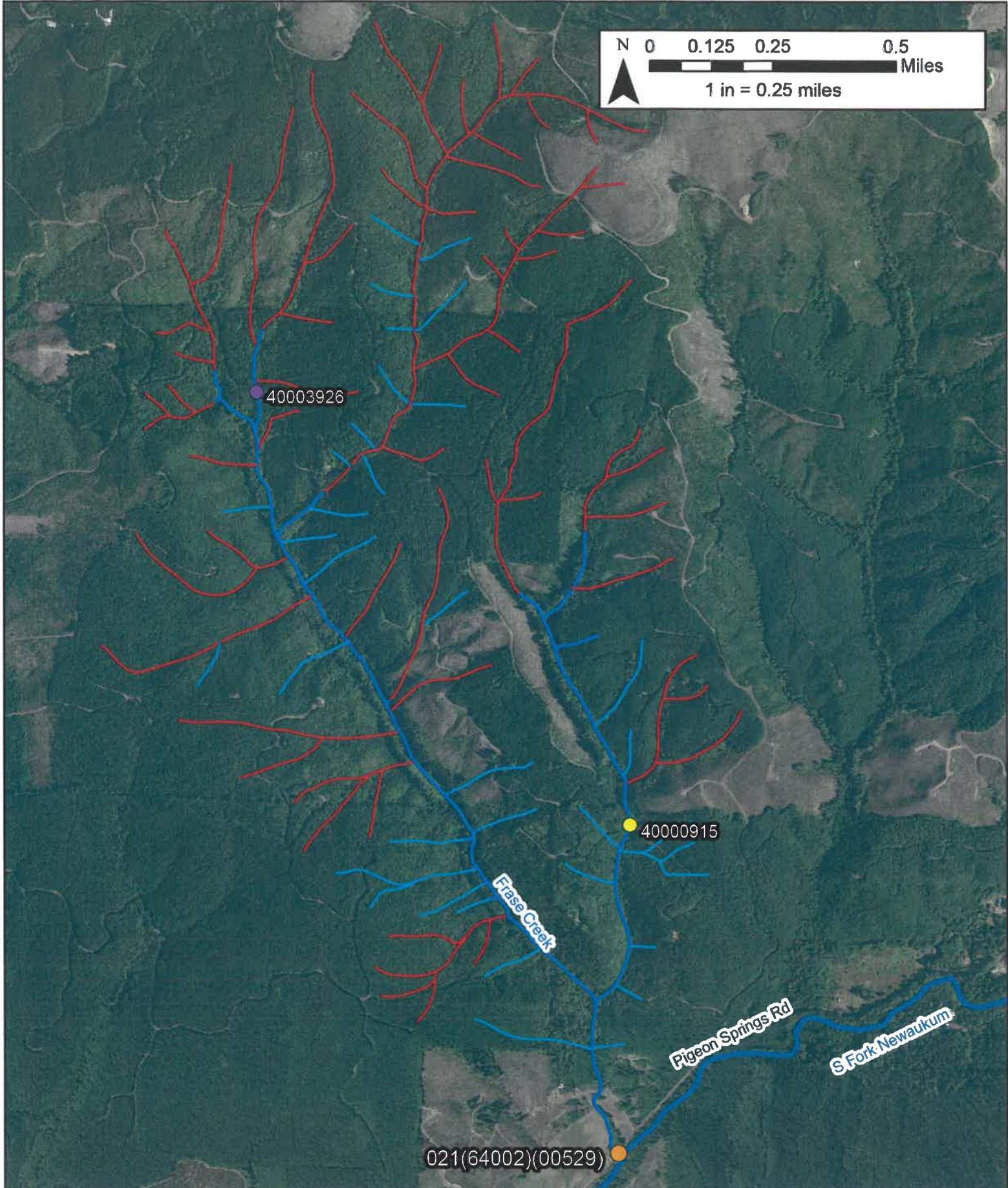
The culvert proposed for replacement is ranked 18th on a list of priority culverts for replacement within the Chehalis Basin and 11th on a list of priority culverts to be replaced that are owned by Lewis County. A stream survey on Frase Creek was performed by Parametrix, Inc. Canopy cover upstream of the culvert proposed for replacement averages 97 percent.

The existing fish passage barrier is a 2.13 x 1.52 meter (7 x 5 ft) corrugated metal squash pipe. The culvert is 0 percent passable due to a 1.16 meter (3.8 ft) outfall drop, a slope of two percent, and lack of substrate within the culvert. The culvert is also a constriction point as the bankfull width of the channel is 4 meters (13.17 ft).

The proposed fish passable structure to replace the culvert barrier will be a precast concrete box culvert 6.10 meters (20 ft) in width, 3.50 Meters (11.5 ft) in height, and 18.28 meters (60 ft) in length. The proposed width meets the minimum width of 5.79 meters (19 ft) as is required by the stream simulation design method (using an 8 percent increasing bankfull width to incorporate 2099 climate change data).

Currently there is a natural bedrock ledge outcrop near the culvert outlet which may function as a partial barrier during low flows. The project proposed to relocate the culvert outlet as well as realign/regrade approximately 300 ft of the channel to provide a 3.78 percent slope for passability. The realigned channel will include a meandering low flow notch, 12 pieces of LWD, and two 1 ft pools. An approximate 35 ft riparian buffer strip will be planted on either side of the channel with western red cedar, big leaf maple, Geyer willow, Nookta rose, common snowberry, Oregon grape, and oceanspray..

Removing the current culvert barrier and replacing it with properly designed fish passable structure will not only allow for fish passage of all life stages it will also minimize bank erosion. The incorporation of large woody debris into the final design is anticipated to retain bedloads and elevate streambed levels to allow for better floodplain connectivity, increase habitat complexity and increase organic inputs. Increasing the hydraulic opening is anticipated to reduce sedimentation, improve floodplain connectivity, and improve water quality.



- Legend**
- Culvert Proposed for Replacement by Lewis County
 - Culvert Scheduled for Replacement in 2017 or 2018
 - Culvert Scheduled for Removal in 2017 or 2018
 - Fishbearing Stream
 - Non-fishbearing Stream
 - Stream of Unknown Fish Presence
 - South Fork Newaukum River
 - Road

Figure 2: Watershed Information
 Frase Creek Barrier Removal and Channel Realignment
 Section 12, Township 13 North, Range 1 East

Frase Creek Barrier Removal and Channel Realignment

Photo Log



Photo 1: View of Frase Creek upstream from culvert



Photo 2: View of culvert inlet



Photo 3: View of South Fork Newaukum River downstream from culvert



Photo 4: View of culvert outlet



Photo 5: View of Frase Creek downstream from private bridge



Photo 6: Southwest facing view of area of propose new alignment

Barrier Evaluation Form – Single Culvert at Crossing

Location Information

Project Name: Frase Creek – 021(64022)(00529)		SRFB Project #: 16-1709	County: Lewis County
HPA #:		Parcel #: 032429002002	
GPS Location: Datum - WGS84 -decimal degrees		Latitude: 46.62334	Longitude: -122.6324
¼ Section:	Section: 12	Township: 13N	Range: 01 <input checked="" type="checkbox"/> East <input type="checkbox"/> West
Stream Name: Frase Creek		Tributary To: Middle South Fork Newaukum River	WRIA #: 22-23
Driving Directions: From I-5 take the WA-508 E exit, Exit 71. Turn east onto WA-508. Travel on WA-508 for 13.45 miles, turn left on to Centralia Alpha Rd. Follow Centralia Alpha Rd for 0.55 miles then stay straight onto Pigeon Springs Rd. The project site will be 0.63 miles on Pigeon Springs Rd.			

Landowner Information

Landowner: Frase Incorporated		Mailing Address: 181 PIGEON SPRINGS RD	
City: ONALASKA	State: WA	Zip: 98570	Telephone: ()
Cell: ()	Fax: ()	E-mail:	

Evaluator Information

Evaluator Name: Nicholas Noble		Affiliation: Lewis County Public Works	
Mailing Address: 2025 NE Kresky Ave		City: Chehalis	State: WA Zip: 98532
Telephone: 360-496-8432	Fax:	Cell:	E-mail: Nicholas.Noble@Lewiscountywa.gov

Barrier Information (measurements in meters)

Is the Stream Fish-bearing? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown		Species: Coho (Spawning), Winter Steelhead (Spawning), Cutthroat	Date of Visit: 11/09/15
Fish-bearing Criteria: <input type="checkbox"/> Fish Observation <input checked="" type="checkbox"/> Stream Type <input type="checkbox"/> SASSI/Stream Catalog <input type="checkbox"/> Physical Criteria <input type="checkbox"/> Other.			
Stream Flow: <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Unknown Source of Information:			
Will this Culvert be Entered into the WDFW-FPDSI (formerly SSHEAR) Database? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, Site ID #: 021(64022)(00529)			
Shape: SQSH	Material: CST	Apron: <input checked="" type="checkbox"/> None <input type="checkbox"/> Upstream <input type="checkbox"/> Downstream <input type="checkbox"/> Both	Span: 2.13
Rise: 1.54	Length: 10.36	Water Depth in Culvert: 0.12	Water Surface Drop: 1.16
Drop Location: <input checked="" type="checkbox"/> Outlet <input type="checkbox"/> Inlet <input type="checkbox"/> Inside	Countersunk: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown		Culvert Slope(%): 3.53%
Bankfull Width (outside influence of culvert): 3.96		Culvert Span/Bankfull Width Ratio: 0.54	
Plunge Pool: Length (culvert to tail-out):	OHW width:	Max depth:	Road Fill DS: 1.15 Road Width: 5.9
Fishway Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, describe in Comments)			Tide Gate Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
Is this Culvert a Fish Passage Barrier? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Level B needed			
Problem with Culvert: <input checked="" type="checkbox"/> WS drop <input type="checkbox"/> Slope <input type="checkbox"/> Velocity <input type="checkbox"/> Depth		Percent Passability: <input checked="" type="checkbox"/> 0% <input type="checkbox"/> 33% <input type="checkbox"/> 67% <input type="checkbox"/> 100%	
Habitat Quality: <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Good <input type="checkbox"/> Poor <input type="checkbox"/> Unknown			

Comments (describe crossing condition, fish observations, habitat quality etc): Coho and Winter steelhead have been seen utilizing the stream.
4,221 m of rearing habitat and 194 m of spawning habitat

Expanded Barrier Evaluation Form

Project Information

Project Name: Frase Creek- 021(64022)(00529)

SRFB Project #: 16-1709

Date: 4-14-16

Evaluator Information

Evaluator Name: **Nicholas Noble**

Affiliation: **Lewis County Public Works**

Mailing Address: **2025 NE Kresky Ave**

City: **Chehalis**

State: **WA**

Zip: **98532**

Telephone: **360-496-8432** FAX:

Cell:

E-mail: **Nicholas.Noble@lewiscountywa.gov**

Watershed Information

Amount of Habitat Upstream: **3926(m)** Map Measure Hip Chain Basin Area (square miles above culvert): 2.1

Stream Flow: Perennial Intermittent Unknown Source of Information:

Has a Barrier Inventory Been Conducted in the Watershed? Yes (road) Yes (stream survey) No Unknown

If Yes, List Source and Date Completed: Parametrix, Inc. 2001. Frase Creek Stream Habitat and Barrier Assessment Survey, December.

Distance Walked DS: - (m) Walked to: Known Anadromous Natural Barrier Human-made Barrier Other: South Fork Newaukum

List Downstream Culverts, Dams, Bridges, and Natural Barriers. Include Passable Features. Attach Additional Pages if Needed.

Distance DS: % Passable: Site ID#: Location:

Distance DS: % Passable: Site ID#: Location:

Distance walked US: 2,992 (m) Walked to: Physical End of Fish Use Natural Barrier Human-made Barrier Other:

List Upstream Culverts, Dams, Bridges and Natural Barriers. Include Passable Features. Attach Additional Pages if Needed.

Distance US: 2,942m % Passable: <66 Site ID#: 40000915 Location: 46.633231, -122.632117

Distance US: 1,194m % Passable: <66 Site ID#: 40003926 Location: 46.645706, -122.648461

Fish Species/Habitat Quality

What Species are Currently Blocked, at Least Partially, by this Barrier? Include Juvenile Life Stages.

Sockeye Chum Pink Coho Chinook Steelhead Searun Cutthroat Resident Cutthroat

Anadromous Bull Resident Bull Rainbow Trout Brook Trout Brown Trout Resident Trout

Information Source (including on-site observations): SalmonScope

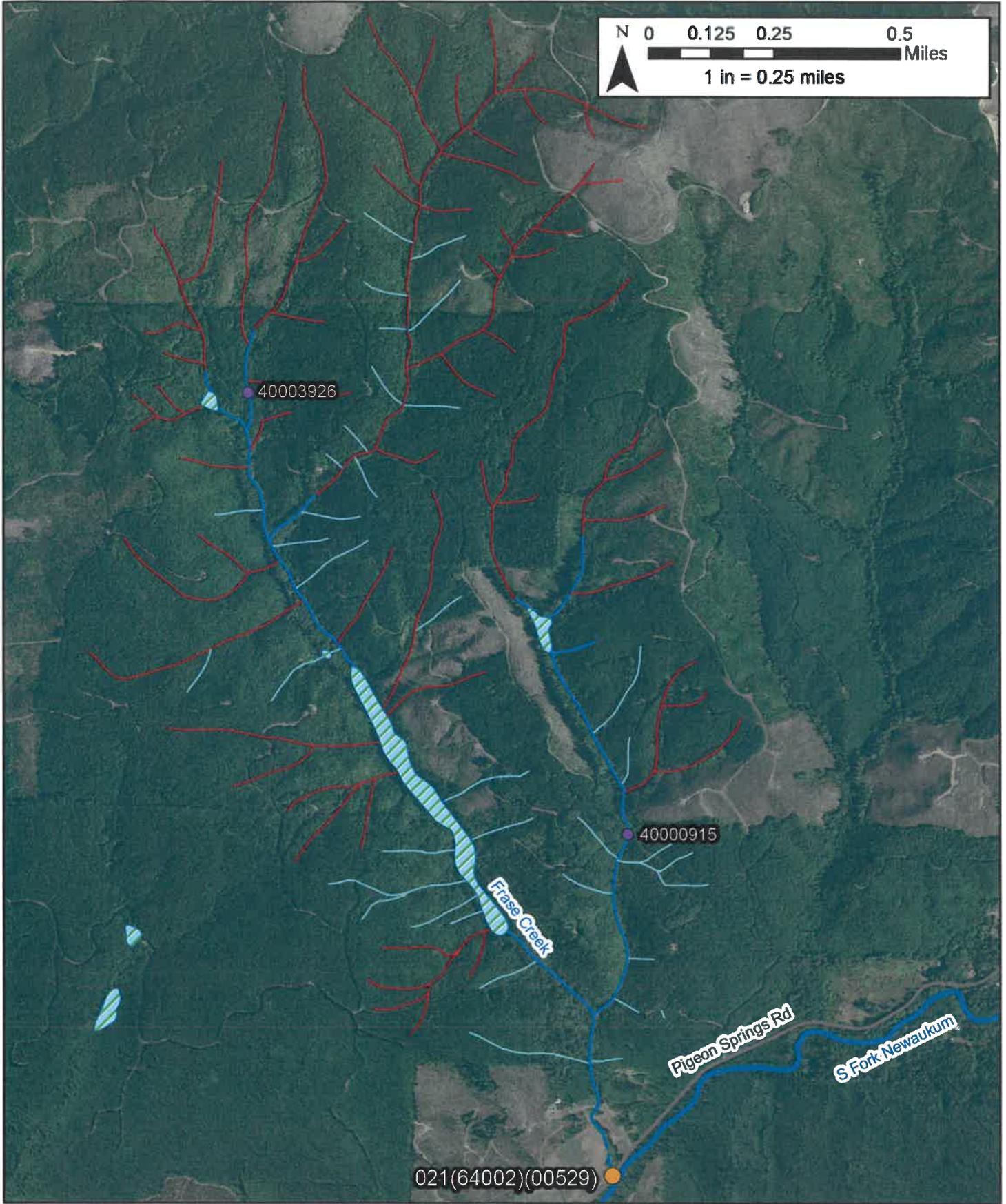
Range of Gradient Downstream: Range of Gradient Upstream: >3% Size of any US Lake/Wetlands: 63,575 (sq. m)

Predominant Land Use: Forest Agriculture Rural residential Urban % Canopy Cover: 97%

In-stream Cover: High Medium Low Channel Stability: High Medium Low

Rearing Quality: Excellent Good Poor Spawning Quality: Excellent Good Poor

Describe Habitat Upstream from Barrier: Habitat upstream from barrier has 4,221 m of rearing habitat and 194 m of spawning habitat.



Legend

- Culvert Proposed for Replacement by Lewis County
- RMAP Culvert Scheduled for Replacement in 2017 or 2018
- Wetlands
- South Fork Newaukum River
- Fishbearing Stream
- Non-fishbearings Stream
- Stream of Unknown Fish Presence
- Road

Figure 1: Watershed Information

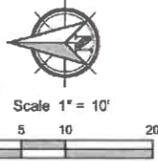
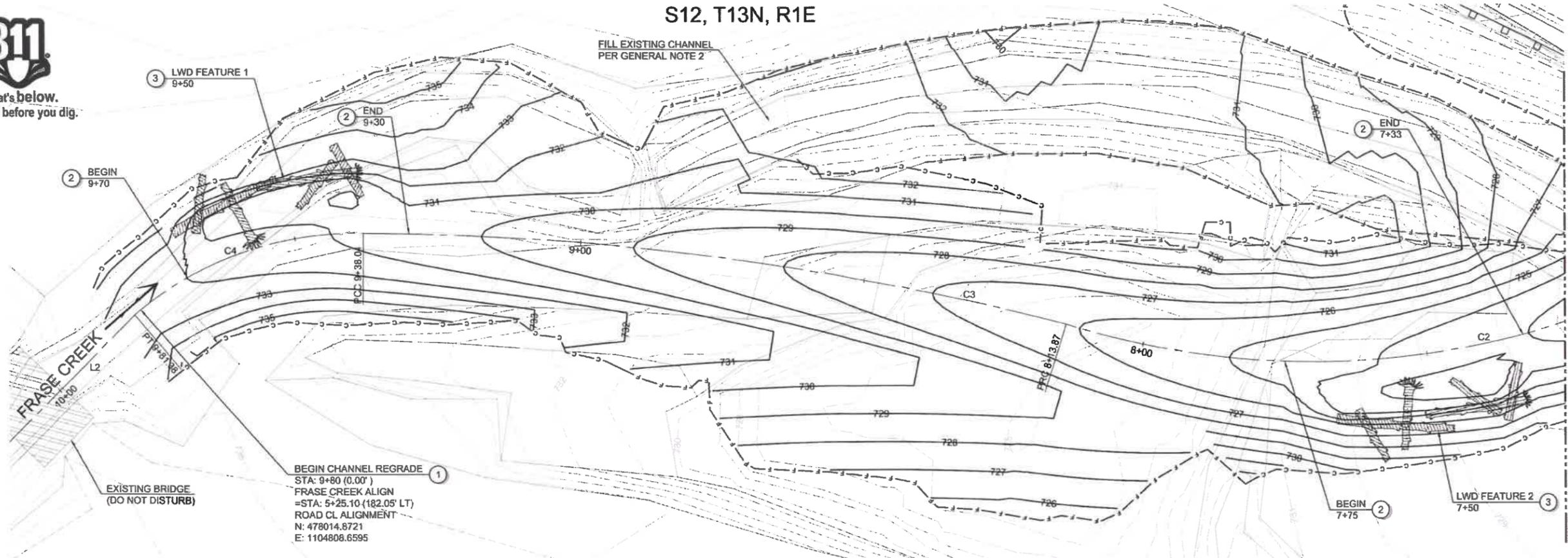
Frase Creek Culvert Removal
Section 12, Township 13N, Range 1E

April 14, 2016



Know what's below.
Call before you dig.

S12, T13N, R1E



BEGIN CHANNEL REGRADE
STA: 9+80 (0.00')
FRASE CREEK ALIGN
= STA: 5+25.10 (182.05' LT)
ROAD CL ALIGNMENT
N: 478014.8721
E: 1104808.6595

FRASE CREEK ALIGNMENT DATA

CENTERLINE LINE DATA		
#	Length	Direction
L2	42.916	N45° 36' 32.86"W

CENTERLINE CURVE DATA				
#	Δ	R	L	T
C2	41°11'27"	144.26	103.71	54.21
C3	13°55'51"	510.70	124.17	62.39
C4	41°40'09"	59.59	43.34	22.68

LARGE WOODY DEBRIS CONTROL TABLE				
LWD FEATURE #	STATION	OHW ELEVATION	LOGS*	VOLUME (FT³)
1	3+80	244.97	1,2,3,4,4,4	110
2	1+18	244.05	1,2,3,4,4,4	110

* SEE LOG SCHEDULE

LOG SCHEDULE					
LOG #	LOG LENGTH (FT)	LOG DIAMETER (FT)	ROOTWAD LENGTH (FT)	ROOTWAD DIAMETER (FT)	VOLUME (FT³)
1*	18	1.5	2	3	40.3
2*	20	1.5	-	-	35.3
3	10	1	1.5	2	10.7
4	10	1	-	-	7.9

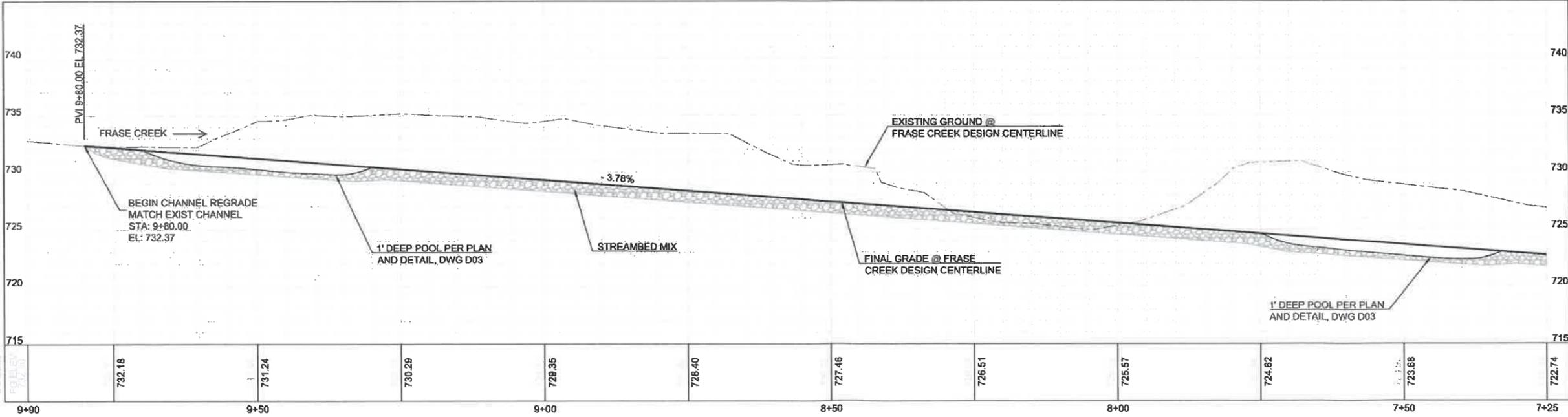
* KEY LOG (VOLUME > 35 FT³)

CONSTRUCTION PLAN NOTES:

- ① RECONSTRUCT CREEK CHANNEL PER DETAIL, SEE DWG D03
- ② VARY TYP CHANNEL SECTION PER DETAIL, DWG D03, TO CONSTRUCT 1-FT DEEP POOL BELOW CHANNEL FINAL GRADE LINE AS SHOWN ON PROFILE.
- ③ INSTALL LARGE WOODY DEBRIS FEATURE PER TABLES, DWG C01 AND DETAIL, DWG D03

GENERAL NOTES:

- 1. THALWEG AND WOODY DEBRIS ARE TO BE PLACED AS SHOWN ON PLANS. MINOR CHANGES TO THE LOG FEATURES CAN BE MADE IN THE FIELD BY THE CONTRACTOR IF APPROVED BY THE ON-SITE REPRESENTATIVE.
- 2. FILL OUTSIDE OF CHANNEL SECTION SHALL CONSIST OF EXCAVATED NATIVE MATERIAL AND IN ACCORDANCE TO THE LANDSCAPE STABILIZATION PLAN.
- 3. SEE DWG L01 THRU L03 FOR LANDSCAPE STABILIZATION PLAN.



PBS
Engineering + Environmental
1180 NW Maple Street,
Suite 160
Issaquah, WA 98027
425.654.8775
www.pbsenv.com



FRASE CREEK CULVERT REPLACEMENT
NORTH OF CENTRALIA ALPHA RD ON PIGEON SPRINGS RD
LEWIS COUNTY PUBLIC WORKS

CREEK AND CULVERT PLAN AND PROFILE

NO.	REVISION	BY	DATE	CHK

PROJECT: 75238.003
DRAWN: DKE
CHECKED: RED
DATE: 11-22-2017
DWG NO. **C01** SHEET NO. 4 OF 14

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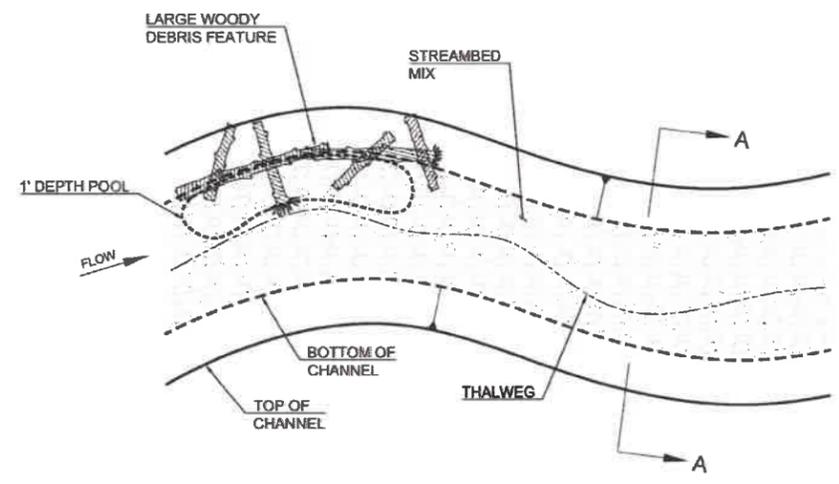
PROJECT:	75238.003
DRAWN:	DKE
CHECKED:	RED
DATE:	11-22-2017
DWG NO.	D03
SHEET NO.	9 OF 14

STREAMBED BOULDER SIZING	
ROCK SIZE	APPROXIMATE SIZE
TWO MAN	18" - 28"

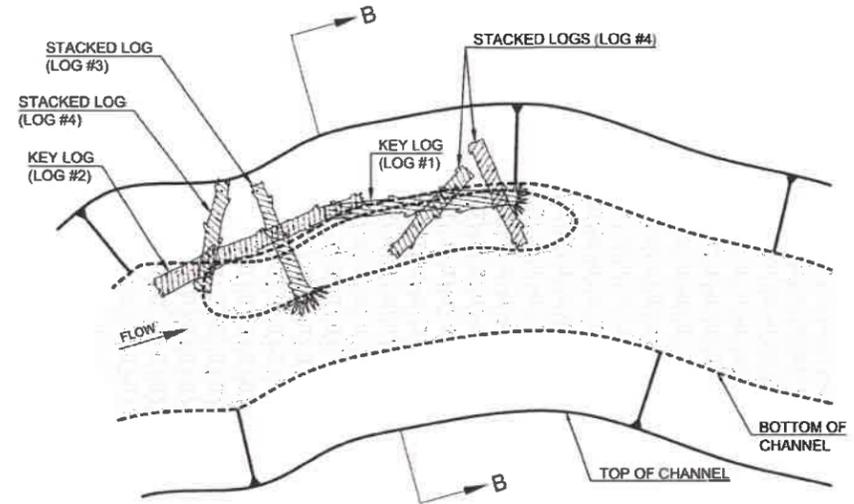
12" STREAMBED COBBLES GRADATION	
APPROXIMATE SIZE	% PASSING
12"	99 - 100
10"	70 - 90
5"	30 - 60
3/4"	10 MAX

STREAMBED SEDIMENT GRADATION	
SIEVE SIZE	% PASSING
2.5"	99 - 100
2"	65 - 95
1"	50 - 85
U.S. NO. 4	26 - 44
U.S. NO. 40	16 MAX
U.S. NO. 200	5.0 - 9.0

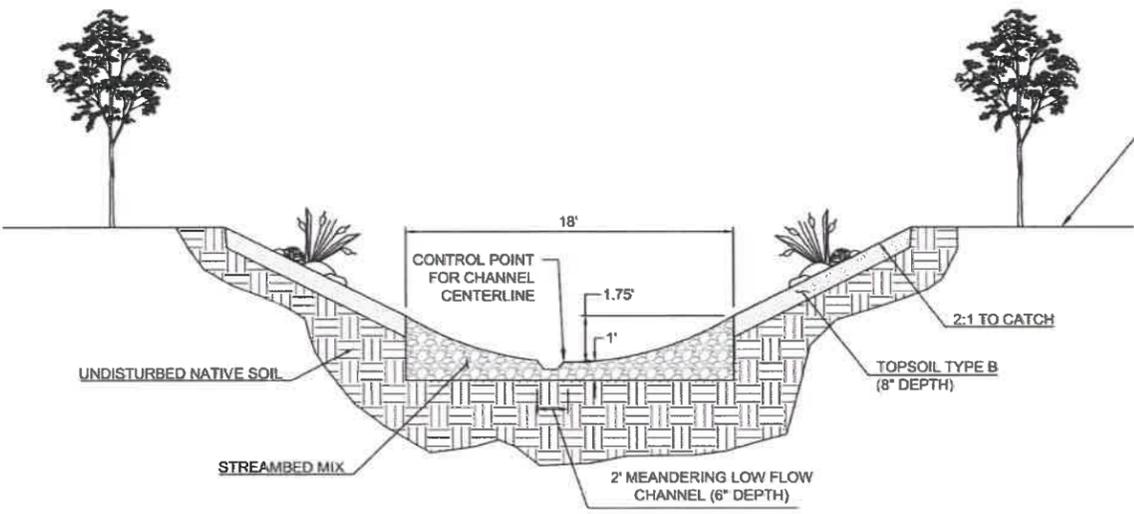
- GENERAL NOTES:**
- LARGE WOODY DEBRIS FEATURES AND THALWEG LOCATIONS ARE TO BE PLACED AS SHOWN ON PLANS. MINOR CHANGES TO THE WOOD FEATURES CAN BE MADE IN THE FIELD BY THE CONTRACTOR IF APPROVED BY THE ON-SITE REPRESENTATIVE.
 - STREAMBED MIX: THREE PARTS 12" STREAMBED COBBLES SHALL BE MIXED THOROUGHLY WITH ONE PART STREAMBED SEDIMENT. TWO-MAN STREAMBED BOULDERS SHALL BE ADDED TO THE STREAMBED MIX AND PLACED AS DIRECTED BY THE ENGINEER.
 - STREAMBED SEDIMENT IS TO PROVIDE STABILITY TO THE COBBLE MIX AND BE PLACED IN AREA OF VOIDS TO CREATE A UNIFORM, NON-POROUS BED.
 - SEE LANDSCAPING PLANS ON DWG L01-L03 FOR FINAL STABILIZATION REQUIREMENTS.



CHANNEL PLAN

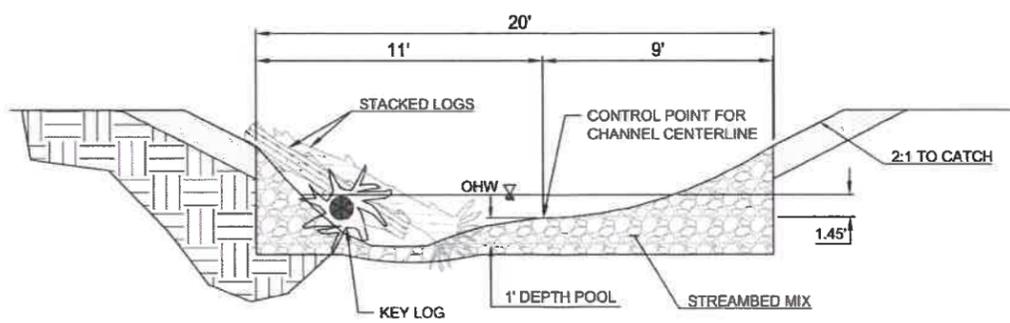


LARGE WOODY DEBRIS PLAN



CHANNEL SECTION A-A

1 FRASE CREEK CHANNEL
NOT TO SCALE



LARGE WOODY DEBRIS SECTION B-B

2 LARGE WOODY DEBRIS FEATURE
NOT TO SCALE

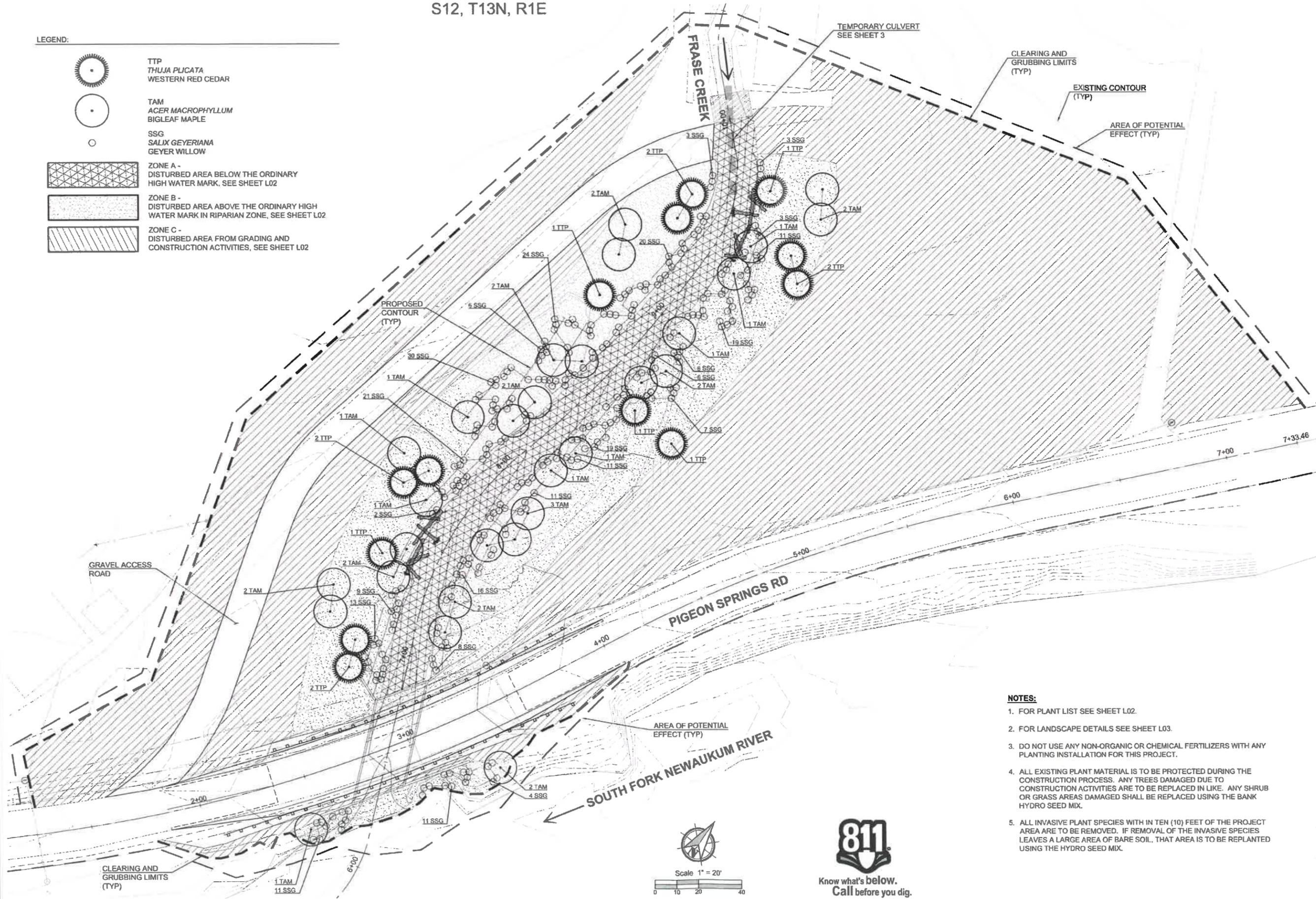
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100% PLANS

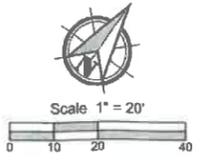
S12, T13N, R1E

LEGEND:

-  TTP
THUJA PLICATA
WESTERN RED CEDAR
-  TAM
ACER MACROPHYLLUM
BIGLEAF MAPLE
-  SSG
SALIX GEYERIANA
GEYER WILLOW
-  ZONE A -
DISTURBED AREA BELOW THE ORDINARY
HIGH WATER MARK, SEE SHEET L02
-  ZONE B -
DISTURBED AREA ABOVE THE ORDINARY HIGH
WATER MARK IN RIPARIAN ZONE, SEE SHEET L02
-  ZONE C -
DISTURBED AREA FROM GRADING AND
CONSTRUCTION ACTIVITIES, SEE SHEET L02



- NOTES:**
- FOR PLANT LIST SEE SHEET L02.
 - FOR LANDSCAPE DETAILS SEE SHEET L03.
 - DO NOT USE ANY NON-ORGANIC OR CHEMICAL FERTILIZERS WITH ANY PLANTING INSTALLATION FOR THIS PROJECT.
 - ALL EXISTING PLANT MATERIAL IS TO BE PROTECTED DURING THE CONSTRUCTION PROCESS. ANY TREES DAMAGED DUE TO CONSTRUCTION ACTIVITIES ARE TO BE REPLACED IN LIKE. ANY SHRUB OR GRASS AREAS DAMAGED SHALL BE REPLACED USING THE BANK HYDRO SEED MIX.
 - ALL INVASIVE PLANT SPECIES WITH IN TEN (10) FEET OF THE PROJECT AREA ARE TO BE REMOVED. IF REMOVAL OF THE INVASIVE SPECIES LEAVES A LARGE AREA OF BARE SOIL, THAT AREA IS TO BE REPLANTED USING THE HYDRO SEED MIX.



PBS
Engineering +
Environmental
1180 NW Maple Street,
Suite 160
Issaquah, WA 98027
425.654.8775
www.pbserv.com



FRASE CREEK CULVERT REPLACEMENT
NORTH OF CENTRALIA ALPHA RD ON PIGEON SPRINGS RD
LEWIS COUNTY PUBLIC WORKS
LANDSCAPE PLAN

NO.	REVISION	BY	DATE	CHK

PROJECT:	75238.003
DRAWN:	DKE
CHECKED:	RED
DATE:	11-22-2017
DWG NO.	L01
SHEET NO.	10
	OF
	14

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100% PLANS



GENERAL NOTES:

- REFER TO CIVIL ENGINEER'S DRAWINGS FOR UTILITY INFORMATION, INCLUDING STORM DRAIN, SEWER, WATER, ELECTRICAL, GAS, TELEPHONE AND CABLE.
- REFER TO COUNTY STANDARD PLANS AND SPECIFICATIONS WHERE APPLICABLE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH ALL CONSTRUCTION OPERATIONS. ALL PIPING, CONDUIT, SLEEVES, ETC., SHALL BE SET IN PLACE PRIOR TO INSTALLATION OF IRRIGATION AND PLANTING CONSTRUCTION ITEMS.
- CONTRACTOR SHALL BE RESPONSIBLE TO CONSULT WITH COUNTY REPRESENTATIVE, APPROPRIATE AGENCIES AND PLANS, FOR THE LOCATIONS OF ALL UNDERGROUND UTILITIES, PIPES AND STRUCTURES. CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR ALL DAMAGES CAUSE AS A RESULT OF THEIR WORK.
- CONTRACTOR SHALL NOT WILLFULLY PROCEED WITH CONSTRUCTION AS DESIGNED WHEN IT IS OBVIOUS THAT OBSTRUCTIONS, AREA DISCREPANCIES AND/OR GRADE DIFFERENCE EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. SUCH CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER'S AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATIONS.

PLANTING NOTES:

INSTALLATION:

- THE CONTRACTOR SHALL INSTALL THE LANDSCAPE ACCORDING TO THESE PLANS, DETAILS, AND THE SPECIFICATIONS.
- VERIFY LOCATIONS OF ALL PERTINENT SITE IMPROVEMENTS UNDER OTHER SECTIONS. IF ANY PART OF THIS PLAN CANNOT BE FOLLOWED DUE TO SITE CONDITIONS, CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE FOR INSTRUCTION PRIOR TO COMMENCING WORK.
- EXACT LOCATIONS OF PLANT MATERIALS SHALL BE REVIEWED BY THE OWNER'S AUTHORIZED REPRESENTATIVE IN THE FIELD PRIOR TO INSTALLATION. OWNER'S AUTHORIZED REPRESENTATIVE RESERVES THE RIGHT TO ADJUST PLANTS TO EXACT LOCATION IN THE FIELD.
- ALL PLANTS SHALL BE GROWN FOR THIS REGION OR SHALL BE ADEQUATELY CLIMATIZED.
- DO NOT MAKE SUBSTITUTIONS. IF SPECIFIED LANDSCAPE MATERIAL IS NOT OBTAINABLE, SUBMIT PROOF OF NON-AVAILABILITY FROM AT LEAST FIVE (5) SOURCES TO THE COUNTY LANDSCAPE ARCHITECT, TOGETHER WITH THE PROPOSAL FOR USE OF EQUIVALENT MATERIAL FOR FINAL APPROVAL.
- CONTRACTOR SHALL CONTACT THE LANDSCAPE ARCHITECT OR OWNER'S REPRESENTATIVE FOR PLANT MATERIAL INSPECTION PRIOR TO INSTALLATION.
- CONTRACTOR SHALL REPAIR OR REPLACE ANY EXISTING LANDSCAPE AFFECTED BY CONSTRUCTION TO ITS ORIGINAL CONDITION. CONTACT LANDSCAPE ARCHITECT IF ANY AREAS NOT ORIGINALLY LANDSCAPED, BECOME LANDSCAPE.

PLANTING LIST, SPECIFICATIONS, AND DETAILS:
 PLANTING LIST IS ON THIS SHEET.
 FOR PLANTING DETAILS SEE SHEET L03.
 FOR PLANTING SPECIFICATIONS SEE ASSOCIATED SPECIAL PROVISIONS.

TREE PROTECTION STANDARDS:

PLACING MATERIAL NEAR TREES:
 NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE PROTECTED AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHOUT AND LOCATING BURN HOLES. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.

PROTECTIVE BARRIER:
 BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION FOR WHICH A TREE REMOVAL PERMIT IS REQUIRED, THE APPLICANT SHALL:

ERECT AND MAINTAIN A READILY VISIBLE PROTECTIVE TREE FENCE ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE ENGINEER.

PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.

MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE ENGINEER AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.

ENSURE THAT ANY LANDSCAPE WORK DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.

IN ADDITION TO THE ABOVE, THE ENGINEER MAY REQUIRE THE FOLLOWING:

COVER WITH MULCH TO A DEPTH OF AT LEAST 6 INCHES OR WITH PLYWOOD OR SIMILAR MATERIAL THE AREAS ADJOINING THE CRITICAL ROOT ZONE OF A TREE IN ORDER TO PROTECT ROOTS FROM DAMAGE CAUSED BY HEAVY EQUIPMENT.

MINIMIZE ROOT DAMAGE BY EXCAVATING A 2 FOOT DEEP TRENCH, AT EDGE OF CRITICAL ROOT ZONE, TO CLEANLY SEVERE THE ROOTS OF TREES TO BE RETAINED.

HAVE CORRECTIVE PRUNING PERFORMED ON PROTECTED TREES IN ORDER TO AVOID DAMAGE FROM MACHINERY OR BUILDING ACTIVITY.

MAINTAIN TREES THROUGHOUT CONSTRUCTION PERIOD BY WATERING.

GRADE:
 THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED WITHOUT THE ENGINEER'S AUTHORIZATION. THE ENGINEER MAY ALLOW COVERAGE OF UP TO ONE HALF OF THE AREA OF THE TREE'S CRITICAL ROOT ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR PLANTING PLANS, IF IT WILL NOT IMPERIL THE SURVIVAL OF THE TREE. AERATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.

IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE'S CRITICAL ROOT ZONE, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.

TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATION SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OF SOIL TO EROSION FOR THE LEAST POSSIBLE TIME. TO CONTROL EROSION, SHRUBS, GROUNDCOVERS AND STUMPS SHALL BE MAINTAINED ON THE INDIVIDUAL LOTS, WHERE FEASIBLE.

PLANT LIST					
SYM	QTY	NAME	CONTAINER	SPACING	COMMENTS
TREES					
TAM	29	Acer macrophyllum Bigleaf Maple	B&B or 15 Gal 1" Cal	PER PLAN	
TTP	13	Thuja plicata Western Red Cedar	B&B or 15 Gal 3' Height	PER PLAN	
STAKES					
SSG	276	Salix geyeriana Geyer Willow	Live Stake or Cutting 0.5" Cal x 3' Long Minimum Dimensions	PER PLAN	Install plant protection around five stakes.
ZONE A - DISTURBED AREA BELOW ORDINARY HIGH WATER					
	1,136	Agrostis exarata Spike Bent Grass	Plug	12" O.C.	Plant in groupings of 20 - 30 plants. Planting group should not create a square. See details, sheet L03.
5,679 SF	1,136	Carex stipata Sawtoak Sedge	Plug	12" O.C.	Plant in groupings of 20 - 30 plants. Planting group should not create a square. See details, sheet L03.
	1,136	Eleocharis palustris Spike Rush	Plug	12" O.C.	Plant in groupings of 20 - 30 plants. Planting group should not create a square. See details, sheet L03.
	1,136	Juncus effusus Soft Rush	Plug	12" O.C.	Plant in groupings of 20 - 30 plants. Planting group should not create a square. See details, sheet L03.
	1,136	Scirpus microcarpus Small-fruited Bulrush	Plug	12" O.C.	Plant in groupings of 20 - 30 plants. Planting group should not create a square. See details, sheet L03.
ZONE B - DISTURBED AREA ABOVE ORDINARY HIGH WATER					
	22,583 SF	38.5% - Hordeum brachyantherum (Meadow Barley) 20% - Bromus carinatus (California Brome) 12% - Festuca rubra rubra (Native Red Fescue) 10% - Glyceria occidentalis (Northwestern Mannagrass) 5% - Rosa nutkana (Nootka Rose) 5% - Symphoricarpos alba (Common Snowberry) 4.5% - Mahonia aquifolium (Oregon Grape) 3% - Deschampsia cespitosa (Tufted Hairgrass) 1.5% - Agrostis exarata (Spike Bentgrass) 0.5% - Holodiscus discolor (Oceanspray)	Seed Mix	3 lbs / 1,000 SF	Place jute erosion control mat, then hydroseed the bank to ensure establishment of seed mix and erosion control. See details, sheet L03. *Shrub Swamp* Mix as available from Sunmark Seeds of Portland, OR, or approved equal.
ZONE C - DISTURBED AREA FROM GRADING AND CONSTRUCTION ACTIVITIES					
	52,797 SF	43% - Elymus glaucus (Blue Wildrye) 37% - Hordeum brachyantherum (Meadow Barley) 11% - Lolium multiflorum (Annual Ryegrass) 7% - Festuca idahoensis (Idaho Fescue) 1% - Festuca ovina (Sheep Fescue) 0.6% - Deschampsia elongata (Slender Hairgrass) 0.4% - Koeleria macrantha (Junegrass)	Seed Mix	1 lbs / 1,000 SF	For slopes between 2:1 and 3:1, place jute mat, then hydroseed to ensure establishment of seed mix and erosion control. For slopes less than 3:1, do not place jute mat after seeding. See details, sheet L03. Provide mix as specified, or approved equal.

FRASE CREEK CULVERT REPLACEMENT
 NORTH OF CENTRALIA ALPHA RD ON PIGEON SPRINGS RD
 LEWIS COUNTY PUBLIC WORKS
LANDSCAPE NOTES

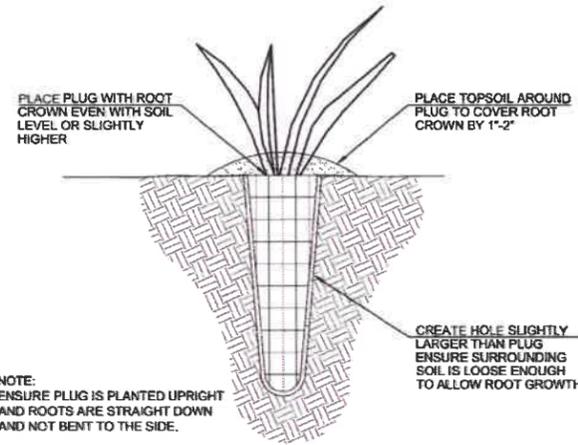
NO.	REVISION	BY	DATE	DWG

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 CHECKED: RED
 DATE: 11-22-2017

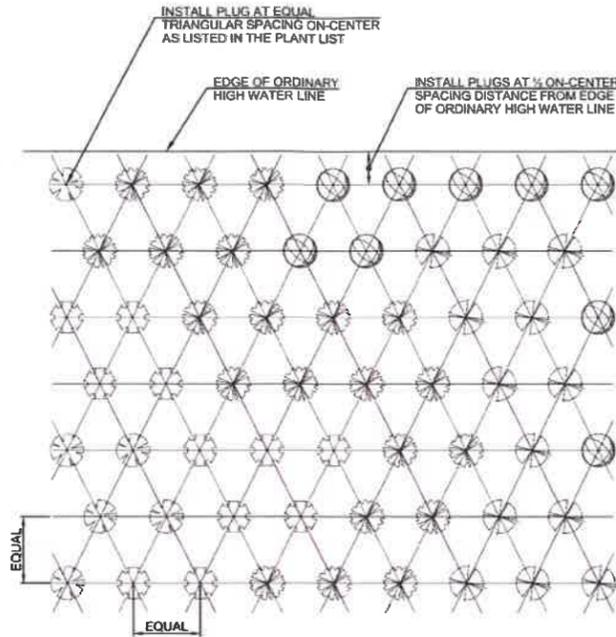
DWG NO. **L02** SHEET NO. **11**
 OF **14**

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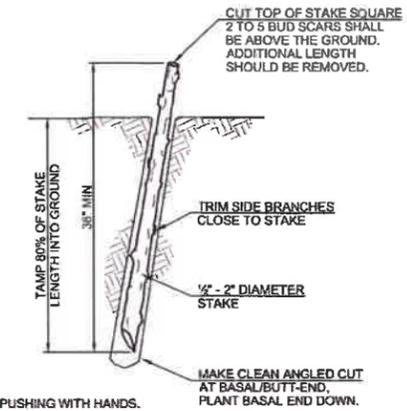
100% PLANS



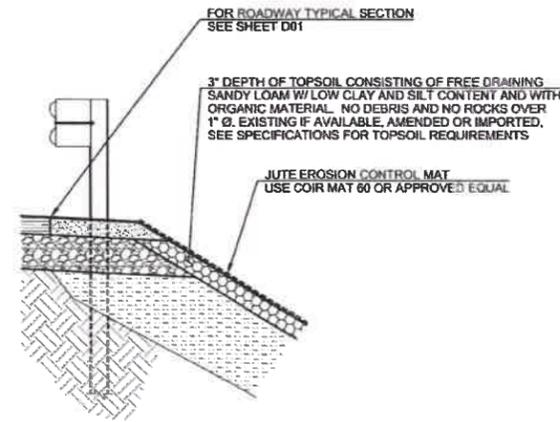
1 Plug Planting Detail
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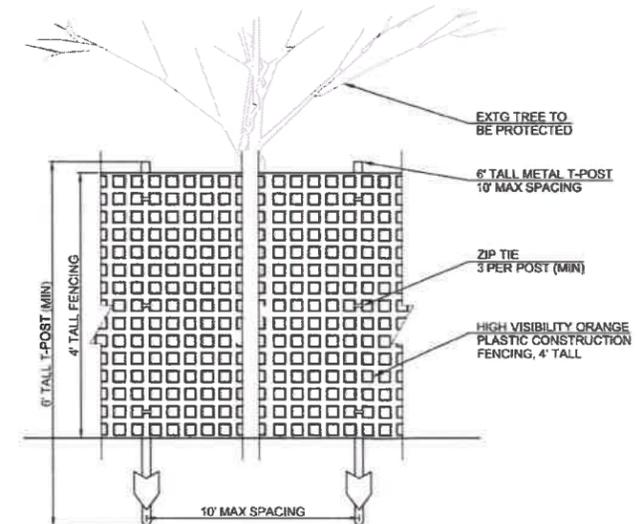
2 Plug Layout Detail
NOT TO SCALE



3 Live Stake Detail
NOT TO SCALE



4 Zone C - Roadside Soil Cross Section
NOT TO SCALE



5 Tree Protection Fencing
NOT TO SCALE

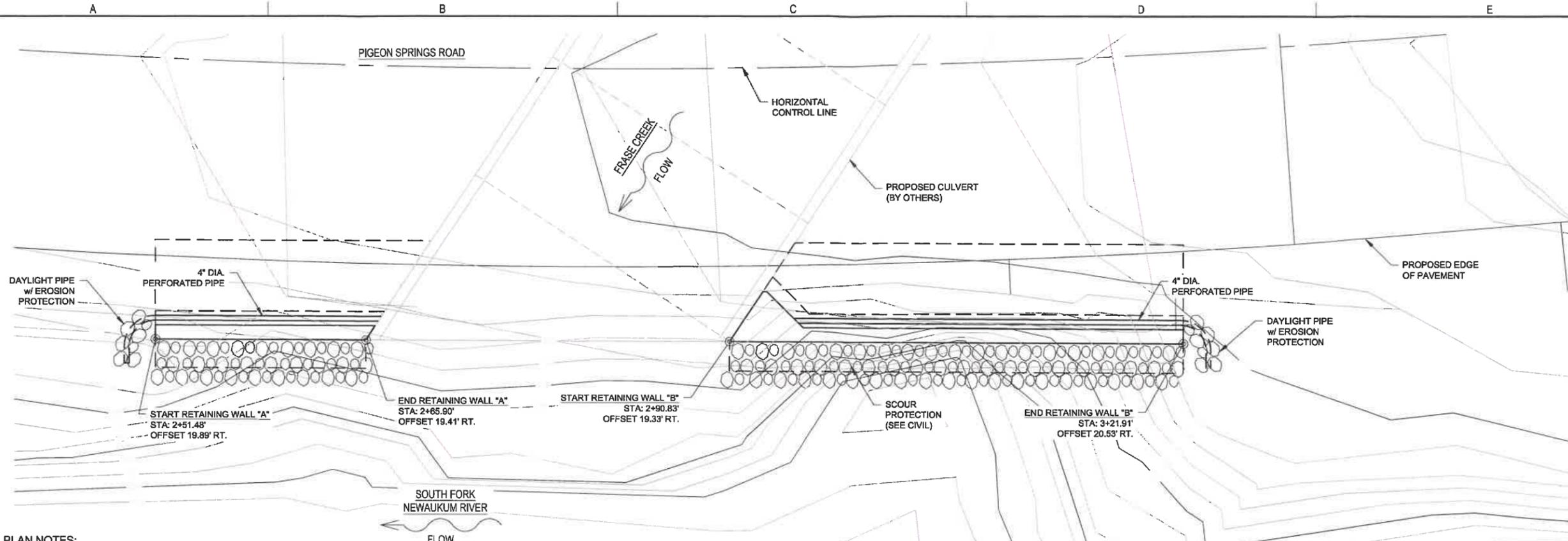


NO.	REVISION	BY	DATE	CHK

PROJECT: 75238.003
DRAWN: DIKE
CHECKED: RED
DATE: 11-22-2017

100% PLANS

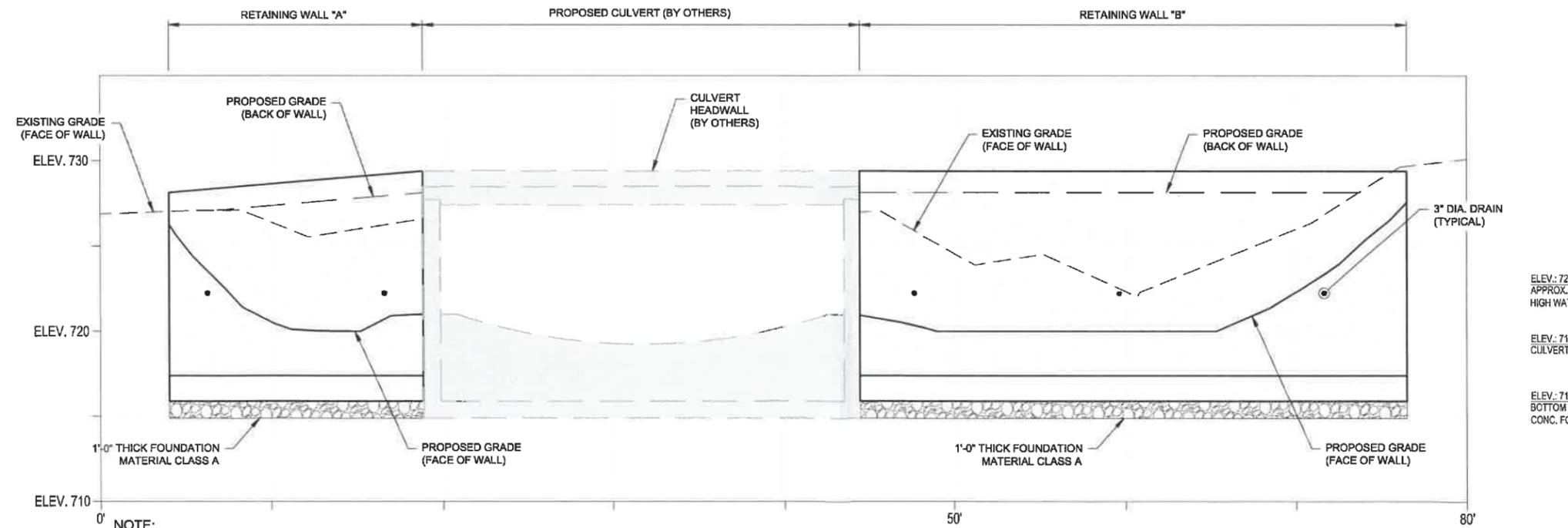
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OF **14**



PLAN NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 2016 WSDOT STANDARD SPECIFICATIONS.
2. SEE SHEET S-200 FOR MATERIAL AND CONSTRUCTION NOTES.

RETAINING WALLS - PLAN VIEW
SEE BAR SCALE



- NOTE:**
1. SCOUR PROTECTION NOT SHOWN FOR CLARITY (SEE CIVIL).

RETAINING WALLS - ELEVATION VIEW
SEE BAR SCALE

REV.	DESCRIPTION	DATE	BY
2	REVISED ELEVATIONS	11/21/2017	MBD
1	REVISED RETAINING WALL LAYOUT	06/12/2017	MBD
0	ISSUE FOR BID	05/04/2017	MBD

APTUM
411 NE 6TH AVENUE SUITE D
CAMAS, WA 98607
TEL: (360) 216-4086

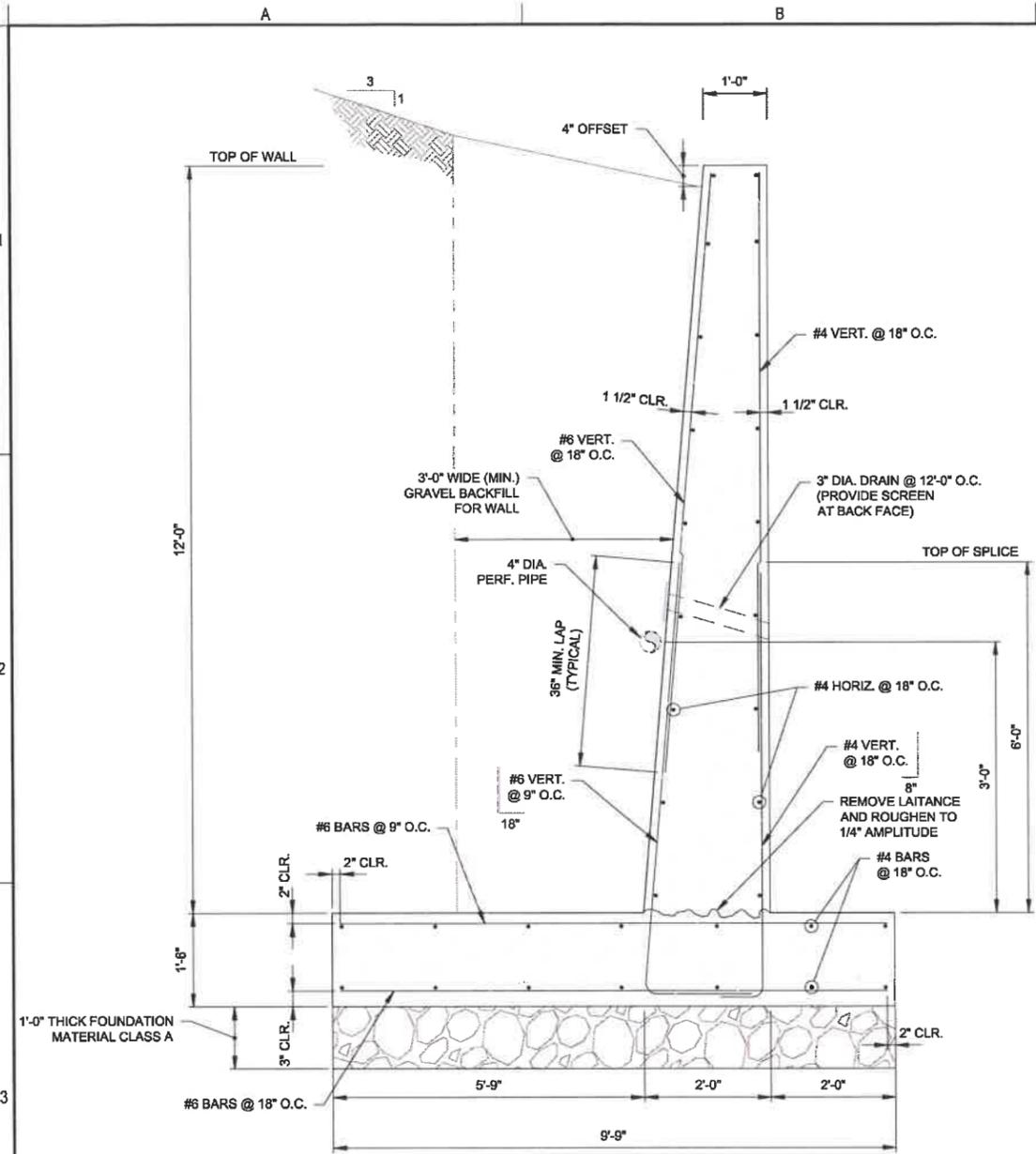
DESIGN: MBD
DRAWN: SAZ
CHECKED: SAZ
APPROVED: MBD
DATE SUBMITTED: 06/12/2017

FRASE CREEK CULVERT RETAINING WALLS
46° 37' 24.6"N 122° 37' 56.0"W

RETAINING WALLS
PLAN & ELEVATION VIEWS

S-100
SHEET NO.
1 of 2

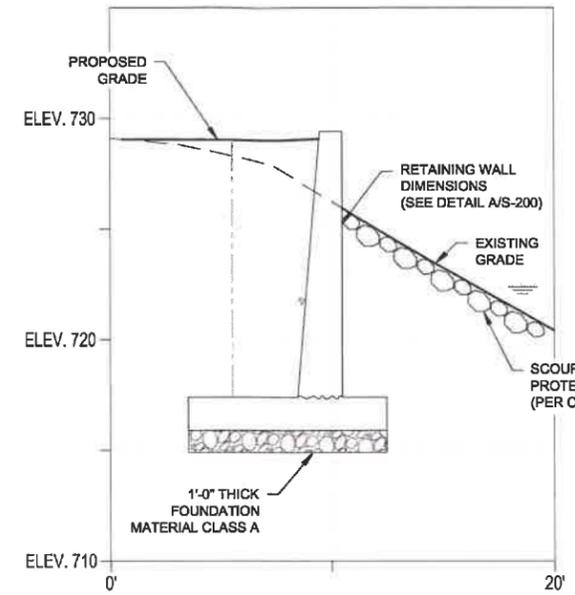




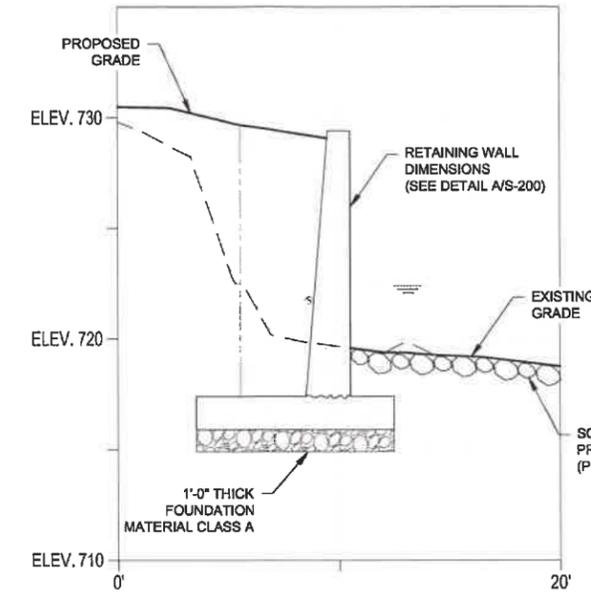
A RETAINING WALL SECTION
NOT TO SCALE

CONSTRUCTION NOTES:

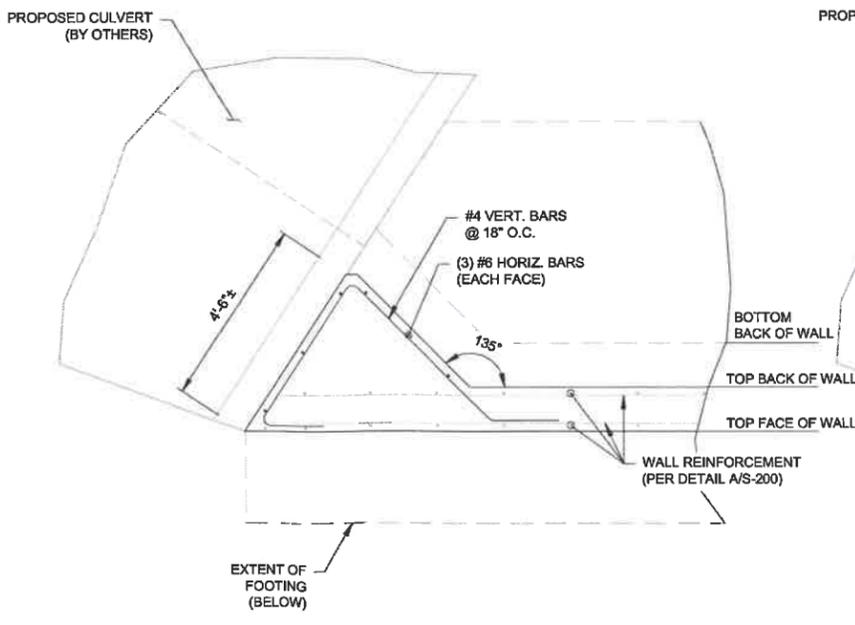
- CONSTRUCTION SHALL CONFORM TO THE 2016 WSDOT STANDARD SPECIFICATIONS.
- RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATION SECTION 6-11.
- CONCRETE SHALL CONFORM TO CLASS 4000.
- REINFORCING SHALL CONFORM TO ASTM A706 GRADE 60.
- FOUNDATION MATERIAL CLASS A SHALL CONFORM TO WSDOT SPECIFICATION 9-03.17. FOUNDATION SHALL BE PLACED IN LOOSE 6 INCH LIFTS AND COMPACTED TO 95% MAXIMUM DRY DENSITY DETERMINED USING ASTM D1557.
- GRAVEL BACKFILL FOR WALLS SHALL CONFORM TO WSDOT STANDARD SPECIFICATION 9-03.12(2). BACKFILL PLACED, WITHIN 3 FEET OF BACK OF WALL SHALL BE PLACED IN 6 INCH MAXIMUM LIFT THICKNESS AND COMPACTED USING HAND OPERATED EQUIPMENT TO 95% MAXIMUM DRY DENSITY DETERMINED USING ASTM D1557.
- WALL DESIGNED IN USING GEOTECHNICAL RECOMMENDATIONS FROM "GEOTECHNICAL ENGINEERING REPORT FRASE CREEK CULVERT REPLACEMENT; ONALASKA, WASHINGTON" DATED FEBRUARY 6, 2017 PREPARED BY LANDAU ASSOCIATES; OLYMPIA, WASHINGTON.



B CROSS-SECTION @ RETAINING WALL "A"
NOT TO SCALE

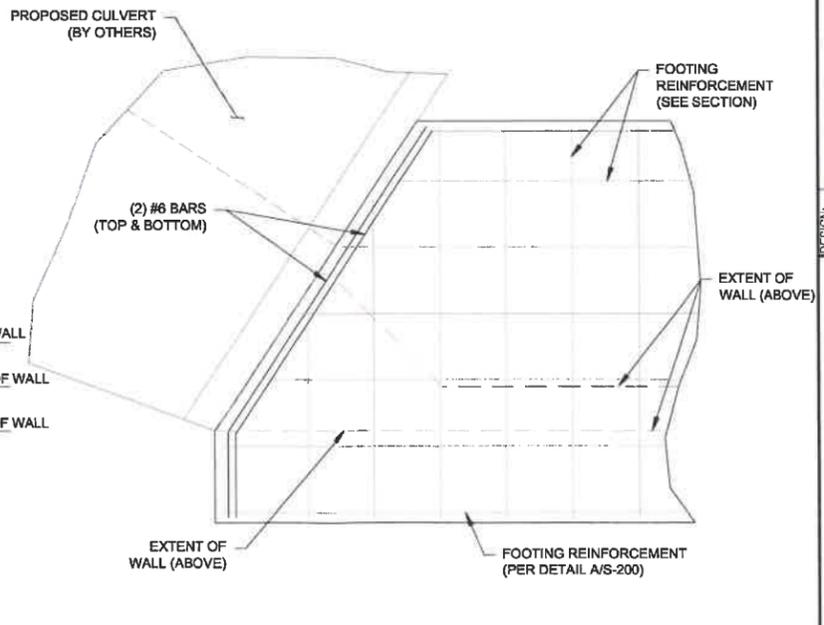


C CROSS-SECTION @ RETAINING WALL "B"
NOT TO SCALE



D CORNER REINFORCEMENT @ WALL
NOT TO SCALE

- NOTE:**
- FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY.



E CORNER REINFORCEMENT @ FOOTING
NOT TO SCALE

- NOTE:**
- WALL REINFORCEMENT NOT SHOWN FOR CLARITY.

REV.	DESCRIPTION	DATE	BY
2	REVISED RETAINING WALL SECTIONS	11/21/2017	MRD
1	REVISED RETAINING WALL LAYOUT	05/12/2017	MRD
0	ISSUE FOR BID	05/04/2017	MRD

APTUM
411 NE 6TH AVENUE SUITE D
CAMAS, WA 98607
TEL: (360) 216-4086

DESIGN: MRD
DRAWN: SLMc
CHECKED: SAZ
APPROVE: MRD
DATE SUBMITTED: 06/12/2017

FRASE CREEK CULVERT RETAINING WALLS
46° 37' 24.6"N 122° 37' 56.0"W

RETAINING WALL DETAILS