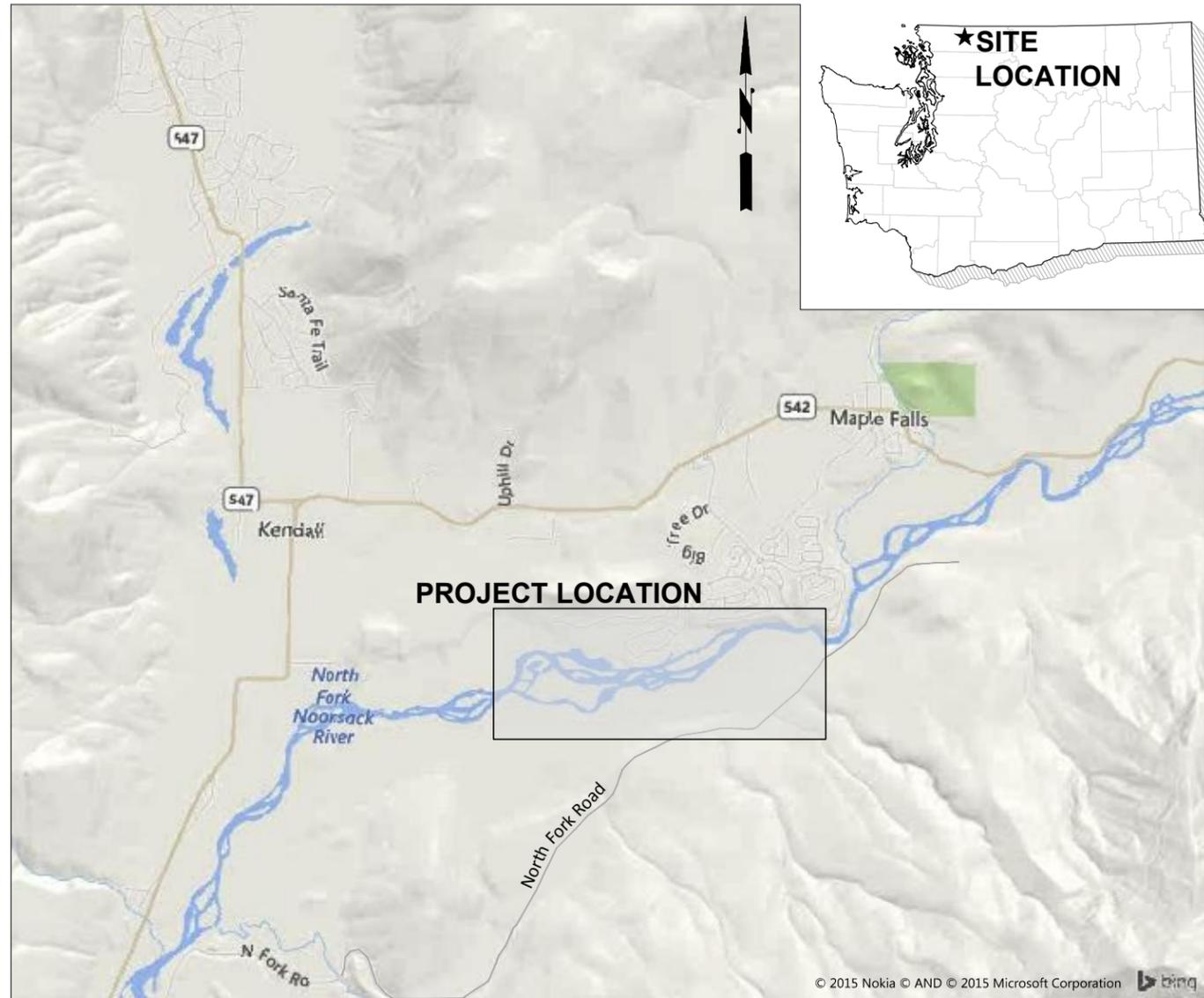


NORTH FORK NOOKSACK RIVER FARMHOUSE REACH RESTORATION PROJECT PHASE 2A

WHATCOM COUNTY, WASHINGTON



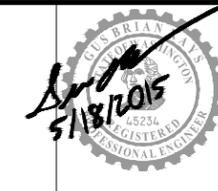
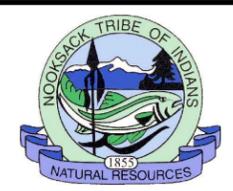
VICINITY MAP
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SHEET INDEX		
SHEET NO.	DWG NO.	SHEET DESCRIPTION
1	G-1	VICINITY MAP AND SHEET INDEX
2	G-2	EXISTING CONDITIONS
3	C-1	SITE PLAN AND PROPOSED WORK
4	C-2	PHASE 2 AND 2A PLAN
5	C-3	PHASE 2A PLAN
6	C-4	GENERAL NOTES
7	C-5	STRUCTURE TYPE 1 PLAN AND NOTES
8	C-6	STRUCTURE TYPE 1 LAYERING PLAN
9	C-7	WOODY GNARL PLAN AND NOTES
10	C-8	WOODY GNARL LAYERING PLAN
11	ESC-1	TESC PLAN
12	ESC-2	TESC DETAILS

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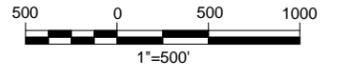
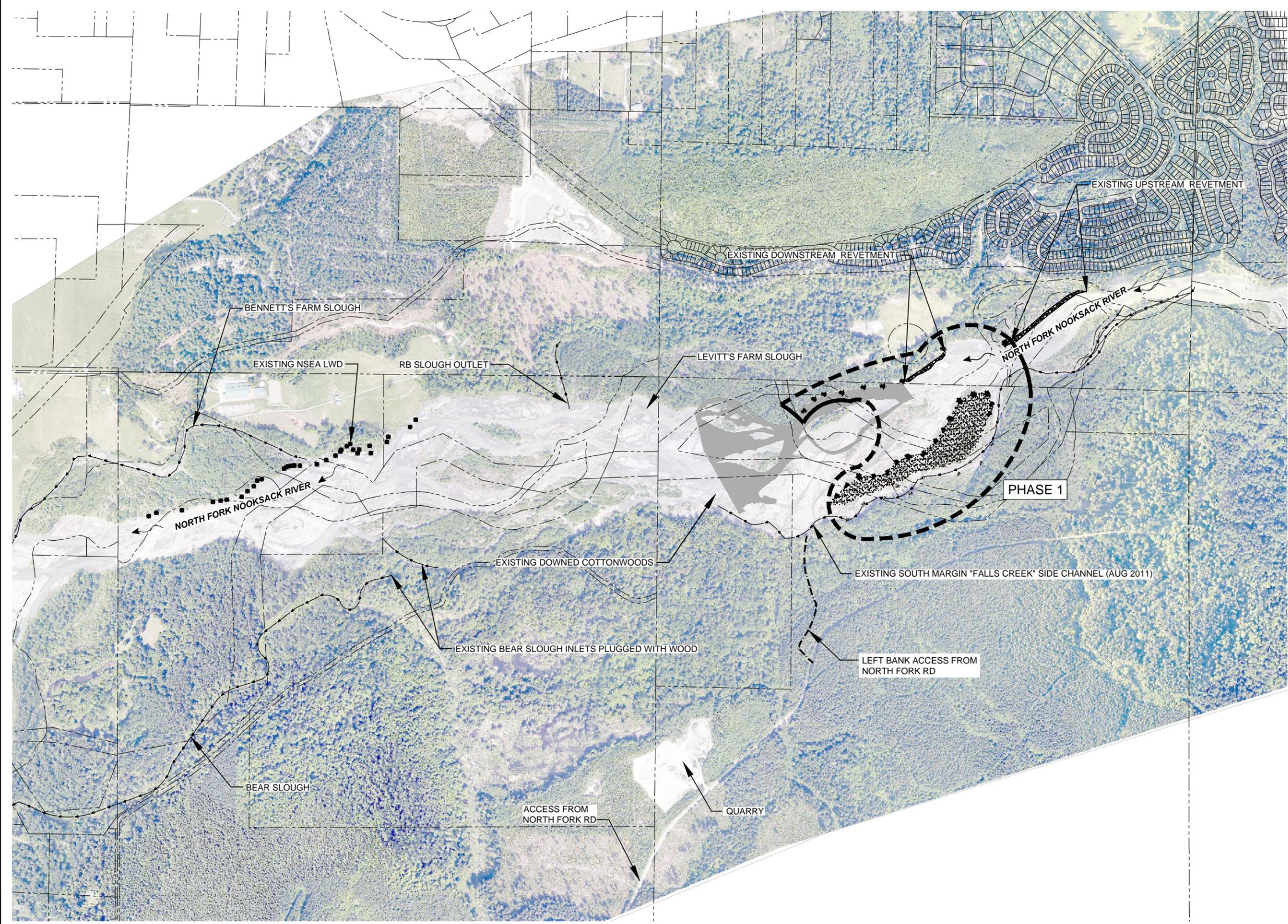
DESIGNED: G. KAYS	DRAWN: L. TURNIDGE
DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

**NORTH FORK NOOKSACK RIVER
FARMHOUSE REACH RESTORATION PROJECT
PHASE 2A**

VICINITY MAP AND SHEET INDEX

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: G-1
SHEET NO: 1 OF 12

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LEGEND:

	PARCEL
	EXISTING SIDE CHANNEL (2011)
	EXISTING REVETMENT
	EXISTING ACCESS ROAD
	PHASE 1 EXTENTS (EXISTING)
	EXISTING NSEA LWD
	APPROX. EXISTING REVETMENT EXTENTS
	03/02/15 CHANNEL WETTED EDGE

- NOTES:**
- 2013 AERIAL PHOTO, CURRENT CONDITIONS SHOULD BE VERIFIED.
 - PARCEL LINES PROVIDED BY WHATCOM COUNTY GIS DATA BASE AND ARE APPROXIMATE
 - EXISTING REVETMENT LOCATIONS SHOWN ARE APPROXIMATE.
 - 2015 SIDE CHANNELS SHOWN INDICATE WETTED CHANNELS OBSERVED DURING 2015 FIELD VISIT.
 - CONSTRUCTION OF PHASE 1 COMPLETED SEPTEMBER 2014.

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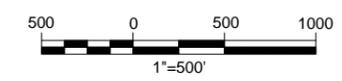


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DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

NORTH FORK NOOKSACK RIVER
FARMHOUSE REACH RESTORATION PROJECT
PHASE 2A
 EXISTING CONDITIONS

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: G-2
SHEET NO: 2 OF 12

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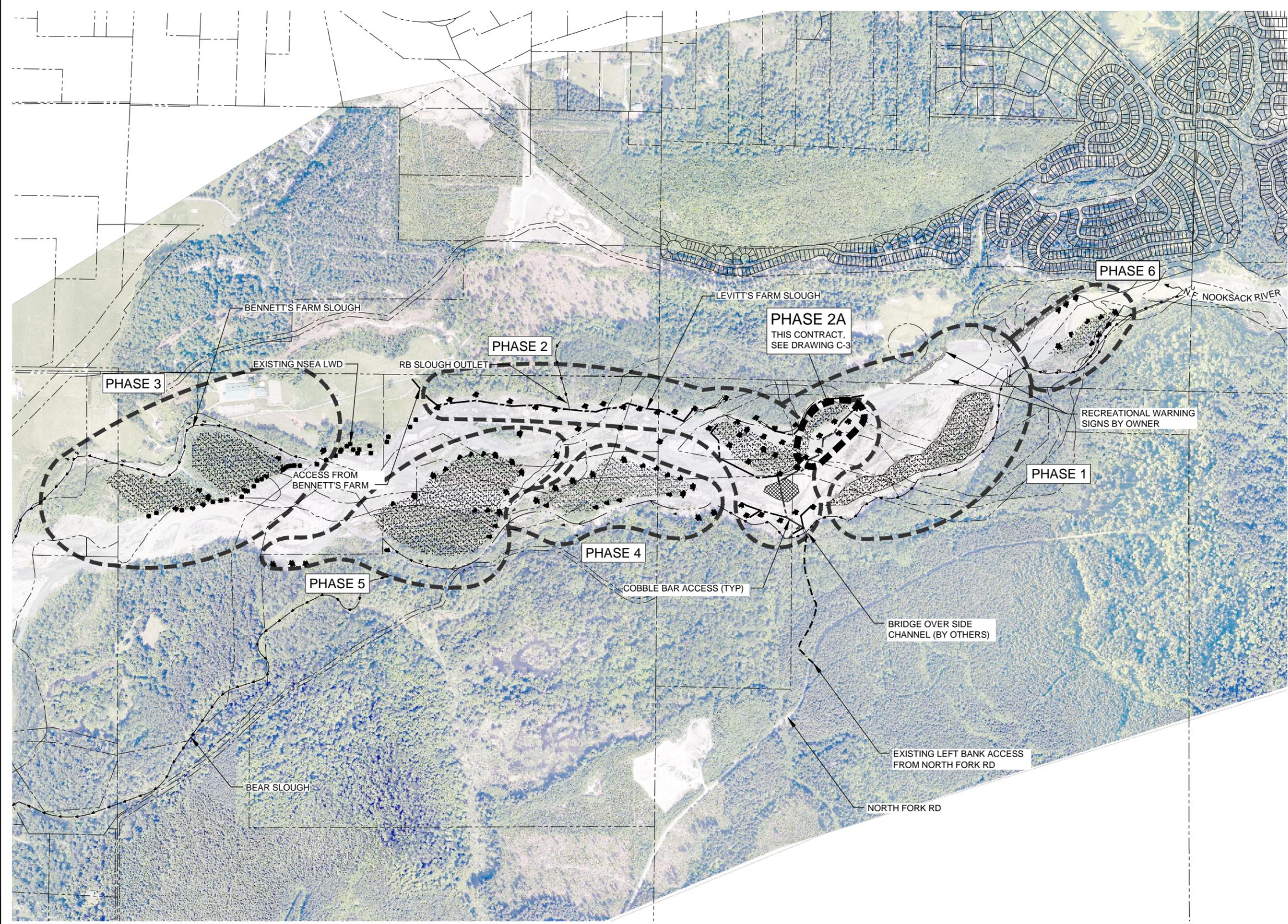


LEGEND:

	PARCEL
	EXISTING SIDE CHANNEL
	EXISTING ACCESS ROAD
	TEMPORARY ACCESS ROAD
	EXISTING NSEA LWD
	POTENTIAL SIDE CHANNEL
	POTENTIAL FORESTED ISLAND
	PHASE 2A EXTENTS
	PHASE EXTENTS NOT IN CONTRACT
	APPROX. EXISTING REVETMENT EXTENTS
	PHASE 2A STAGING AREA
	STRUCTURE TYPE 1
	STRUCTURE TYPE 2
	WOODY GNARL

NOTES:

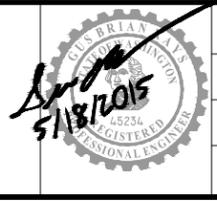
- 2013 AERIAL PHOTO, CURRENT CONDITIONS SHOULD BE VERIFIED.
- SEE SHEET C-3 FOR PHASE 2A. PHASING SEQUENCE AND EXTENTS SHOWN FOR PHASES 2 - 6 ARE FOR REFERENCE ONLY. ACTUAL PHASING TO BE COORDINATED WITH ACTIVE WETTED CHANNEL EXTENTS, ACCESS AVAILABILITY, AND CHANNEL RESPONSES TO EARLIER PHASES.
- PROPOSED FORESTED ISLAND EXTENTS SHOWN ARE APPROXIMATE AND REFLECT POTENTIAL FUTURE CONDITIONS. SECONDARY CHANNELS MAY BIFURCATE ISLANDS AND MAINSTEM ALIGNMENT MAY ADJUST ISLAND SHAPES.



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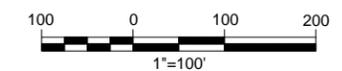
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DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

NORTH FORK NOOKSACK RIVER
FARMHOUSE REACH RESTORATION PROJECT
PHASE 2A

SITE PLAN AND PROPOSED WORK

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-1
SHEET NO: 3 OF 12

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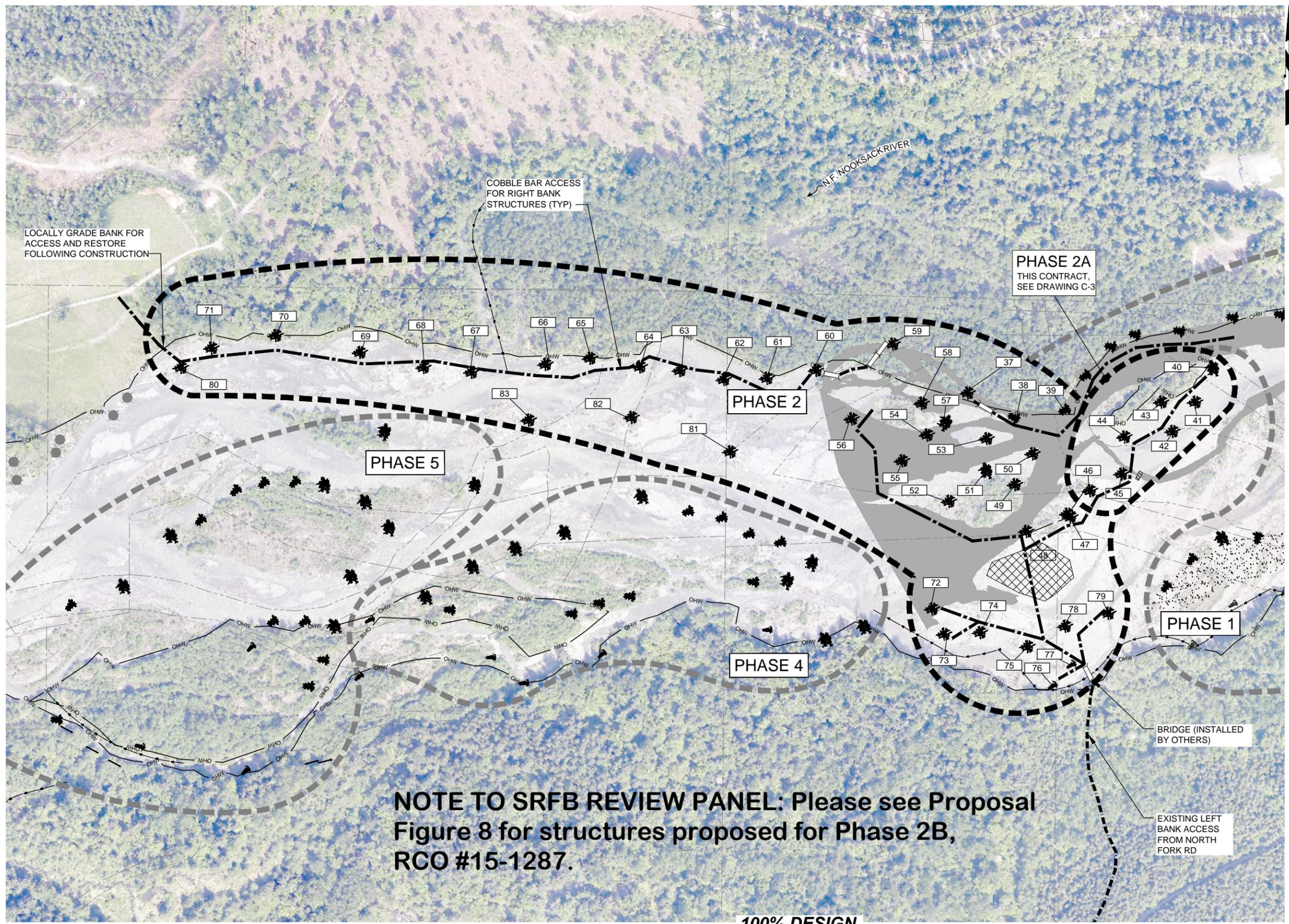


LEGEND:

	APPROXIMATE OHW (NOOKSACK TRIBE) PARCEL
	EXISTING SIDE CHANNEL
	EXISTING ACCESS ROAD
	TEMPORARY BRIDGE
	TEMPORARY ACCESS CORRIDORS
	PHASE EXTENTS NOT IN CONTRACT
	PHASE 2 AND 2A ELJ LIMITS
	TEMPORARY STEEL ROAD PLATE FOR SIDE CHANNEL CROSSING
	TEMPORARY STAGING
	03/02/15 CHANNEL WETTED EDGE
	EXISTING NSEA LWD
	STRUCTURE TYPE 1
	STRUCTURE TYPE 2
	STRUCTURE TYPE 3
	WOODY GNARL

NOTES:

- 2013 AERIAL PHOTO, CURRENT CONDITIONS SHOULD BE VERIFIED.
- SEE SHEET C-3 FOR PHASE 2A. PHASING SEQUENCE AND EXTENTS SHOWN FOR PHASES 2 - 6 ARE FOR REFERENCE ONLY. ACTUAL PHASING TO BE COORDINATED WITH ACTIVE WETTED CHANNEL EXTENTS, ACCESS AVAILABILITY, AND CHANNEL RESPONSES TO EARLIER PHASES.
- ACCESS TO STRUCTURES 56 THROUGH 67 MAY REQUIRE TEMPORARY BRIDGES TO CROSS SIDE CHANNEL LOW FLOW.
- CONTRACTOR SHALL BECOME FAMILIAR WITH VARIABILITY OF NORTH FORK NOOKSACK FLOWS TO BE EXPECTED DURING CONSTRUCTION. FLOW SHOWN IN PICTOMETRY CORRESPONDS WITH A FLOW OF 2200-2600 CFS AT THE NORTH FORK RIVER NEAR GLACIER GAGE.
- CONSTRUCTION INCLUDING STAGING AREAS SHOWN MAY BE INUNDATED DURING HIGHER FLOWS. CONTRACTOR SHALL MONITOR NOAA RIVER FORECAST FOR THE NORTH FORK NOOKSACK RIVER AT GLACIER AND BUTTON UP WORK AND STAGING AREAS WHEN FLOWS THAT MAY INUNDATE WORK AREAS ARE PREDICTED.
- PHASE 2 ELJ NUMBERING CONTINUED FROM PHASE 1



NOTE TO SRFB REVIEW PANEL: Please see Proposal Figure 8 for structures proposed for Phase 2B, RCO #15-1287.

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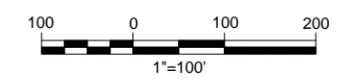
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DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

**NORTH FORK NOOKSACK RIVER
FARMHOUSE REACH RESTORATION PROJECT
PHASE 2A**

PHASE 2 AND 2A PLAN

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-2
SHEET NO: 4 OF 12

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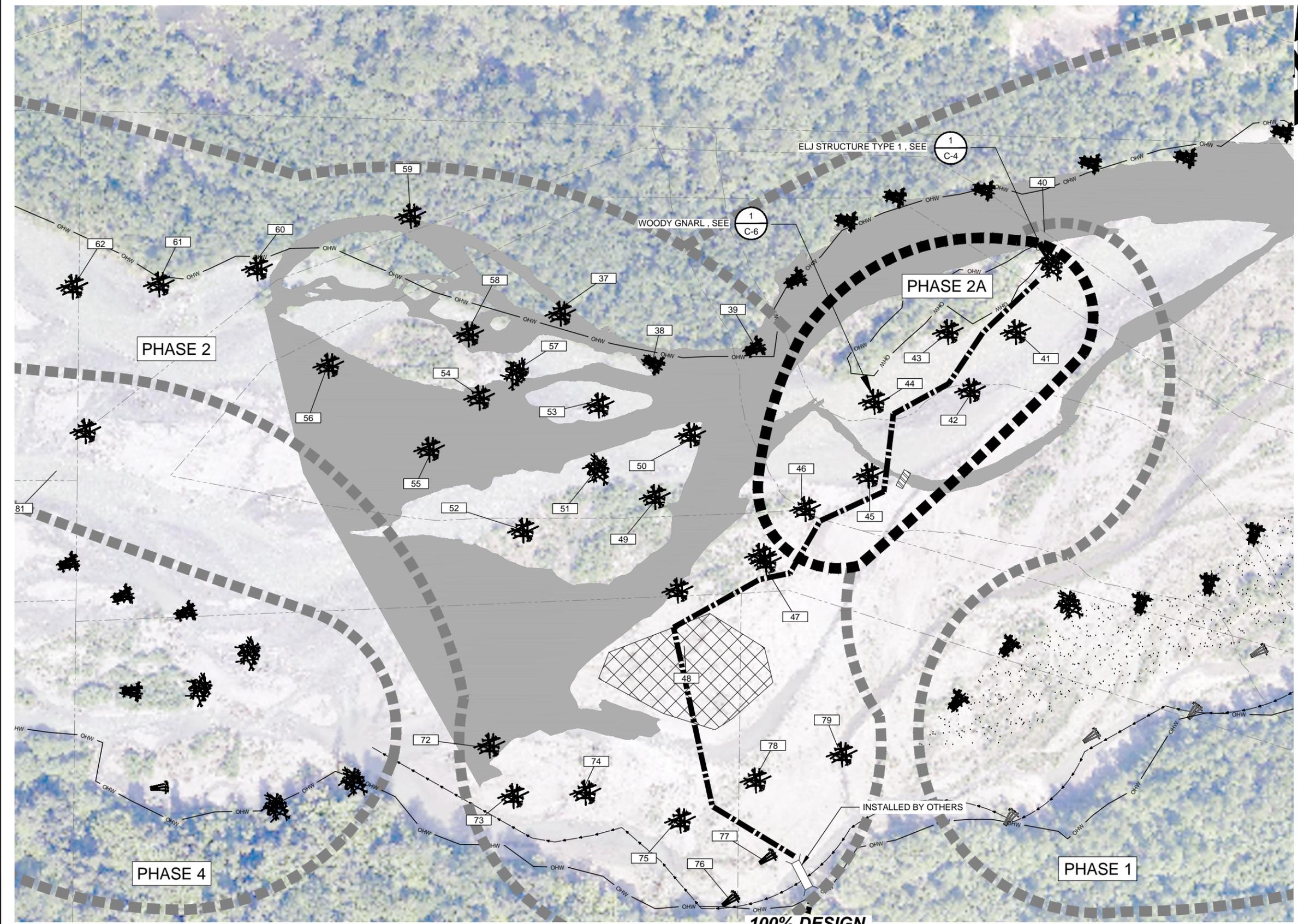


LEGEND:

- OHW APPROXIMATE OHW (NOOKSACK TRIBE) PARCEL
- EXISTING SIDE CHANNEL
- TEMPORARY BRIDGE
- PHASE 2A TEMPORARY ACCESS CORRIDORS
- PHASE EXTENTS NOT IN CONTRACT
- PHASE 2A ELJ EXTENTS
- TEMPORARY STEEL ROAD PLATE FOR SIDE CHANNEL CROSSING
- TEMPORARY STAGING
- 03/02/15 CHANNEL WETTED EDGE
- STRUCTURE TYPE 1
- STRUCTURE TYPE 2
- STRUCTURE TYPE 3
- WOODY GNARL

NOTES:

1. 2013 AERIAL PHOTO, CURRENT CONDITIONS SHOULD BE VERIFIED.
2. ACCESS TO STRUCTURES 56 THROUGH 67 MAY REQUIRE TEMPORARY BRIDGES TO CROSS SIDE CHANNEL LOW FLOW.
3. CONTRACTOR SHALL BECOME FAMILIAR WITH VARIABILITY OF NORTH FORK NOOKSACK FLOWS TO BE EXPECTED DURING CONSTRUCTION. FLOW SHOWN IN PICTOMETRY CORRESPONDS WITH A FLOW OF 2200-2600 CFS AT THE NORTH FORK RIVER NEAR GLACIER GAGE.
4. CONSTRUCTION INCLUDING STAGING AREAS SHOWN MAY BE INUNDATE DURING HIGHER FLOWS. CONTRACTOR SHALL MONITOR NOAA RIVER FORECAST FOR THE NORTH FORK NOOKSACK RIVER AT GLACIER AND BUTTON UP WORK AND STAGING AREAS WHEN FLOWS THAT MAY INUNDATE WORK AREAS ARE PREDICTED.
5. PHASE 2 ELJ NUMBERING CONTINUED FROM PHASE 1



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DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

NORTH FORK NOOKSACK RIVER
FARMHOUSE REACH RESTORATION PROJECT
PHASE 2A

PHASE 2A PLAN

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-3
SHEET NO: 5 OF 12

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GENERAL NOTES:

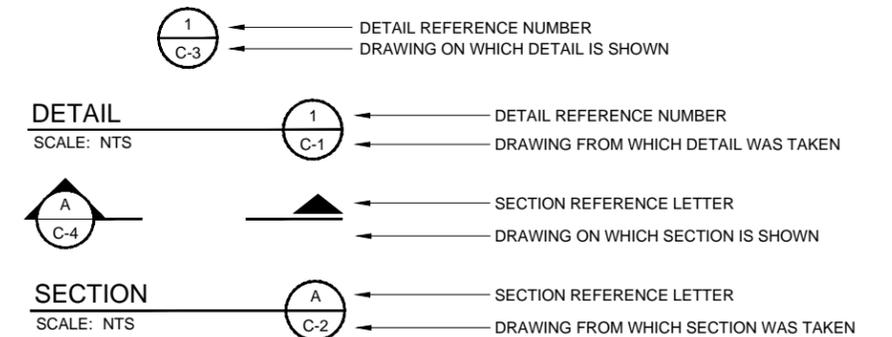
- EQUIPMENT AND MATERIAL STAGING AREAS TO BE LOCATED AS SHOWN ON THE SITE PLAN. EQUIPMENT AND MATERIAL SHALL NOT BE STORED OUTSIDE OF IDENTIFIED STAGING AREA EXTENTS, UNLESS APPROVED BY OWNER OR SITE ENGINEER.
- CONTRACTOR SHALL LIMIT MACHINERY MOVEMENT AND DISTURBANCE TO STAGING AREAS, TEMPORARY ACCESS CORRIDORS, AND WITHIN A 30FT BUFFER AROUND ELJs OR IDENTIFIED AS ACCEPTABLE BY ON-SITE ENGINEER OR OWNER.
- CLEARING LIMITS FOR TEMPORARY ACCESS AND PROPOSED STRUCTURES SHALL BE LIMITED TO THE AREA REQUIRED FOR SAFE EQUIPMENT OPERATION. CLEARING LIMITS SHALL BE FLAGGED BY CONTRACTOR AND APPROVED BY OWNER OR ENGINEER AT LEAST 3 DAYS PRIOR TO CLEARING ACTIVITIES. CLEARING LIMITS SHALL BE FLAGGED TO MINIMIZE THE AREA OF DISTURBANCE.
- CONTRACTOR SHALL PROVIDE 48 HOURS ADVANCE NOTICE TO THE ENGINEER AND OWNER PRIOR TO ANY REQUIRED INSPECTION. GENERAL CONTRACTOR SHALL SUBMIT FOR APPROVAL A CONSTRUCTION SEQUENCE PLAN 5 DAYS PRIOR TO SITE WORK.
- FIELD VERIFY WITH ENGINEER ALL ENGINEERED LOG JAM LOCATIONS, LENGTHS, WIDTHS, AND ELEVATIONS PRIOR TO EXCAVATION, ASSEMBLY, AND INSTALLATION OF EACH STRUCTURE. CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING A MINIMUM OF TWO OFFSET STAKES PER ELJ.
- 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 BANKFULL WATER ELEVATION.
- EQUIPMENT SHALL BE CHECKED DAILY FOR LEAKS, AND ANY NECESSARY REPAIRS SHALL BE COMPLETED PRIOR TO COMMENCING WORK ACTIVITIES. SPILL KITS SHALL BE ACCESSIBLE AT ALL TIMES TO EQUIPMENT OPERATORS.
- 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, GROUNDWATER, OR WETLANDS.
- 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. WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND WASHINGTON DEPARTMENT OF ECOLOGY SHALL BE CONTACTED IMMEDIATELY BY THE ENGINEER OR BY HIS/HER DESIGNEE. WORK SHALL NOT RESUME UNTIL FURTHER APPROVAL BY OWNERS REPRESENTATIVE.
- EROSION CONTROL METHODS SHALL BE USED TO PROTECT WATER OF THE STATE. EROSION CONTROL MEASURES ARE SHOWN ON DRAWINGS EC-1 AND EC-2. THESE MEASURES ARE INITIAL AND ADDITIONAL MEASURES MAY BE REQUIRED BASED ON MEANS AND METHODS.
- ALTERATION OR DISTURBANCE OF THE BANK AND BANK VEGETATION SHALL BE MINIMIZED TO THAT NECESSARY TO CONSTRUCT THE PROJECT.
- IF HIGH FLOW CONDITIONS THAT MAY CAUSE SILTATION OR EROSION ARE ENCOUNTERED DURING CONSTRUCTION, WORK SHALL STOP UNTIL THE FLOW SUBSIDES.
- CONTRACTOR SHALL SALVAGE ALL LIVING CONIFERS WITH A DIAMETER OF 2-6" DIAMETER WITHIN THE ELJ CONSTRUCTION FOOTPRINT AND STAGE FOR REPLANTING. CONTRACTOR SHALL REPLANT CONIFERS ON DEPOSITIONAL BARS FOLLOWING COMPLETION OF ELJ CONSTRUCTION WITH GUIDANCE FROM THE OWNER.
- CONTRACTOR SHALL SALVAGE ALL TREES WITH DIAMETER BREAST HEIGHT (DBH) GREATER THAN 10 IN. WITHIN CLEARED AREAS FOR USE IN ELJ STRUCTURES AS RACKING. SMALLER CLEARED DEBRIS SHALL BE SALVAGED FOR USE AS SLASH. EXISTING LOG JAMS OR LARGE WOODY DEBRIS WHICH REQUIRES CLEARING FOR ELJ CONSTRUCTION SHALL BE SALVAGED, STOCKPILED LOCALLY AND RE-PLACED ON THE FINISHED ELJ AS DIRECTED BY OWNER OR ENGINEER.
- EXCAVATIONS THAT HAVE POTENTIAL TO IMPACT THE WETTED CHANNEL OF THE NORTH FORK NOOKSACK SHALL BE ISOLATED FROM THE ACTIVE CHANNEL DURING CONSTRUCTION. ISOLATION MEANS SHALL CONSIST OF SILT BOOMS, BULK BAGS, BLADDER DAMS OR APPROVED EQUAL AS NECESSARY TO PREVENT IMPACTS TO WATER QUALITY. WET EXCAVATION SPOILS SHALL BE MAINTAINED TO ENSURE RUNOFF DOES NOT VIOLATE WATER QUALITY REQUIREMENTS.
- CONTRACTOR SHALL LIMIT TEMPORARY ACCESS ROAD/CORRIDORS TO 16' WIDE.
- ALL LAND OWNER AGREEMENTS, ACCESS EASEMENTS AND PERMITS SHALL BE COORDINATED BY THE OWNER PRIOR TO BEGINNING CONSTRUCTION. COPIES OF AGREEMENTS/PERMITS WILL BE PROVIDED TO CONTRACTOR.
- 2013 PICTOMETRY SHOWN FOR ILLUSTRATION ONLY. CONTRACTOR SHALL VERIFY CURRENT CONDITIONS. FLOW SHOWN IN PICTOMETRY IS APPROXIMATELY 2200-2600 CFS AT THE NORTH FORK NOOKSACK RIVER NEAR GLACIER GAGE. CONTRACTOR SHALL MONITOR THE NOAA NORTHWEST RIVER FORECAST CENTER WEB SITE DURING CONSTRUCTION AND ADJUST WORK FOR PREDICTED FLOWS THAT MAY INUNDATE OR EFFECT WORK.
- CONTRACTOR SHALL BECOME FAMILIAR WITH VARIABILITY OF NORTH FORK NOOKSACK FLOWS TO BE EXPECTED DURING CONSTRUCTION
- RACKING MATERIAL SHALL CONSIST OF APPROX. 75-100 INDIVIDUAL 10-20FT LONG 6-16" DBH LOGS PER STRUCTURE. RACKING PLACEMENT SHALL BE COORDINATED WITH LOG LAYER PLACEMENT AND SLASH PLACEMENT TO ENSURE RACKING AND SLASH FILL VOIDS IN FACE OF STRUCTURE. RACKING MATERIAL SHALL BE FREE OF ALL DEBRIS AND TRASH

SURVEY NOTES:

- BASIS OF BEARINGS IS THE WASHINGTON STATE PLANE COORDINATE SYSTEM, NORTH ZONE, N.A.D. 83/91.
- ELEVATIONS ARE BASED ON 2013 LIDAR (NAVD88).
- ELEVATIONS ARE APPROXIMATE AND MAY VARY.

TABLE - PILE DEPTH

STRUCTURE	PILE DEPTH (FT)
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ELJ 45	13
ELJ 44	10
ELJ 43	VARIABLE 13 TO 14
ELJ 42	14
ELJ 41	14
ELJ 40	14

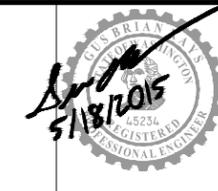
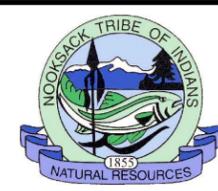


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 "TYP" INDICATES THAT THE DETAIL/SECTION IS UNIFORMLY TYPICAL THROUGHOUT PROJECT EXCEPT WHERE OTHERWISE NOTED
 "VAR" SPECIFIES THAT DETAIL/SECTION WAS TAKEN FROM VARIOUS DRAWINGS

NOTE AND DETAIL/SECTION REFERENCING

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DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

NORTH FORK NOOKSACK RIVER FARMHOUSE REACH RESTORATION PROJECT PHASE 2A

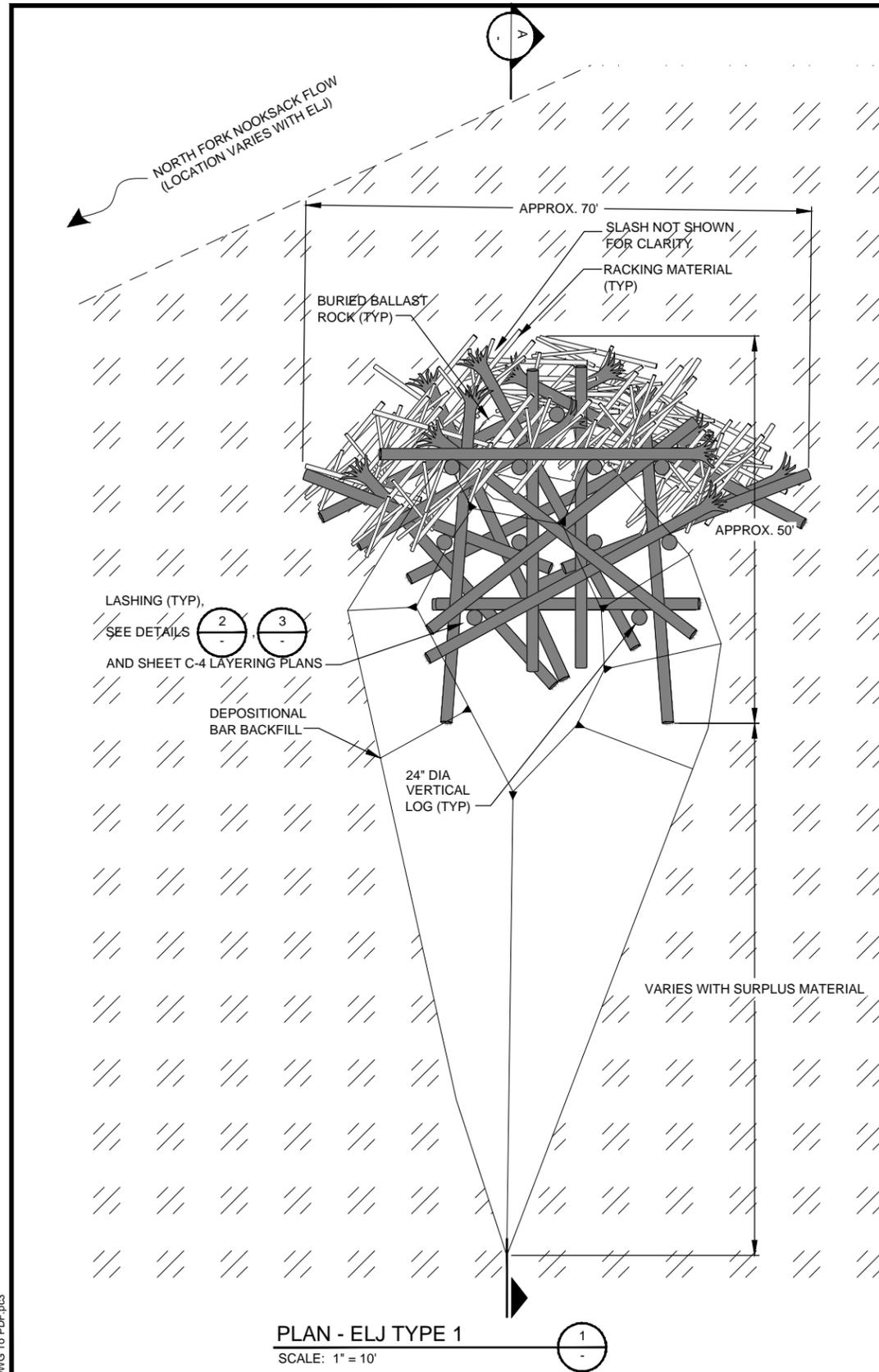
GENERAL NOTES

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-4
SHEET NO: 6 OF 12

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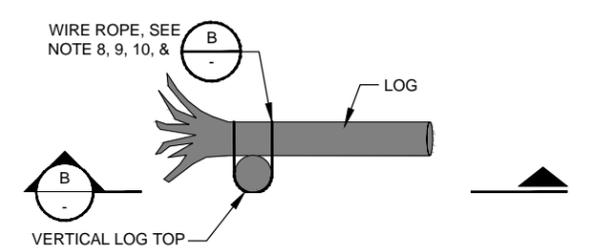
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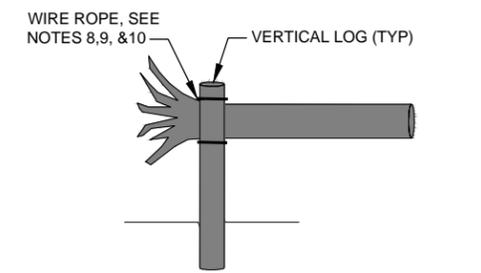
PLAN - ELJ TYPE 1
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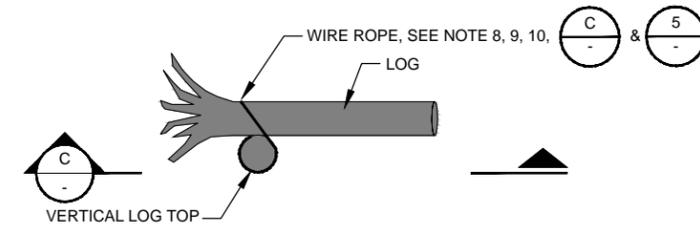
- ACCESS ROAD ALIGNMENT SHALL BE STAKED OR FLAGGED BY OWNER. ALIGNMENT SHALL BE STAKED TO MINIMIZE DISTURBANCE OF EXISTING MATURE VEGETATION.
- CONTRACTOR SHALL PLANT ELJ WITH SALVAGED TREES FOLLOWING CONSTRUCTION.
- SEE LAYERING PLAN FOR RACKING AND SLASH PLACEMENT, NUMBERS, AND VOLUMES.
- ENGINEERED LOG JAM EXCAVATION DEPTH SHALL VARY WITH LOCAL GRADES AND VERTICAL LOG DEPTHS (SEE C-4 FOR DEPTHS). THE FIRST/LOWEST LAYER OF HORIZONTAL LOG LAYERS SHALL BE PLACED APPROXIMATELY 5FT UP FROM THE BOTTOM OF THE VERTICAL LOGS.
- EXCAVATION SPOILS SHALL BE STOCKPILED TO ALLOW LOG LAYER PLACEMENT AND CONSTRUCTION ACCESS.
- DEPOSITIONAL BAR EXTENTS VARY. DEPOSITIONAL BAR CONSTRUCTED WITH EXCAVATION SPOILS.
- ELJ BACKFILL OVER LOG PLACEMENTS TO BE MAINTAINED ABOVE THE 100 YEAR FLOOD WATER SURFACE TO PRECLUDE OVERTOPPING. CONTRACTOR SHALL MAINTAIN A FINAL ELJ BACKFILL GRADE OVER LOGS OF AT LEAST 5' ABOVE EXISTING COBBLE BAR GRADES AND 1FT ABOVE TOP LAYER OF LOGS.
- ALL LOG TO LOG LASHING SHALL BE $\frac{1}{2}$ " OR $\frac{7}{16}$ " ϕ 6-19 IWRC (IPS) GALVANIZED WIRE ROPE UNLESS OTHERWISE SPECIFIED IN LAYER PLAN. BOULDER TO LOG LASHING SHALL BE $\frac{3}{8}$ " ϕ GRADE 43 NATURAL FINISH CHAIN. MANILA ROPE SHALL BE 1" ϕ . SEE LAYER PLAN FOR LASHING TYPES LOCATIONS.
- ALL CONNECTING HARDWARE SHALL HAVE A RATED WORKING LOAD LIMIT OF EQUAL OR GREATER STRENGTH THAN WIRE ROPE OR CHAIN. ALL WIRE ROPE CLAMPS AND HAND SPLICING SHALL BE PER THE MANUFACTURERS SPECIFICATIONS.
- SHACKLES SHALL BE SAFETY SHACKLES AND THREADS SHALL BE MARRED TO PREVENT REMOVAL OF SHACKLES.
- ENGINEER SHALL STAKE 2 VERTICAL LOG DEPTHS FOR ELJ'S BASED ON THE RELATIVE DEPTH TO THE ADJACENT CHANNEL BOTTOM. DEPTH SHALL NOT EXCEED 15'. CONTRACTOR SHALL MARK DEPTH OF BURIAL LOCATION ON ALL VERTICAL LOGS PRIOR TO PLACEMENT WITH BLAZE ORANGE MARKING PAINT. SEE VERTICAL LOG DEPTH TABLE ON DRAWING C-4.
- TWO DRILLED ROCKS PER CHAIN. SEE DETAIL 4 AND LAYERING PLAN FOR LOCATION AND NUMBER.



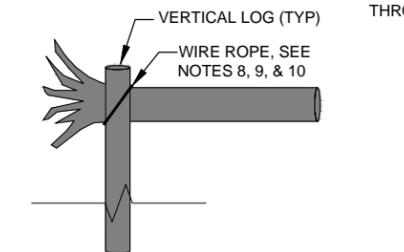
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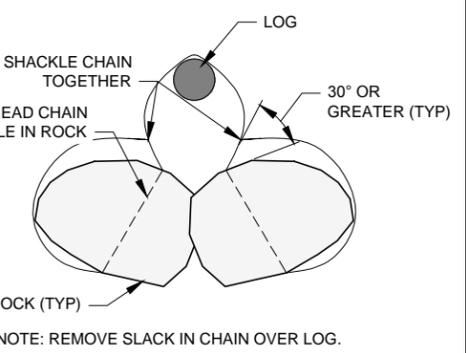
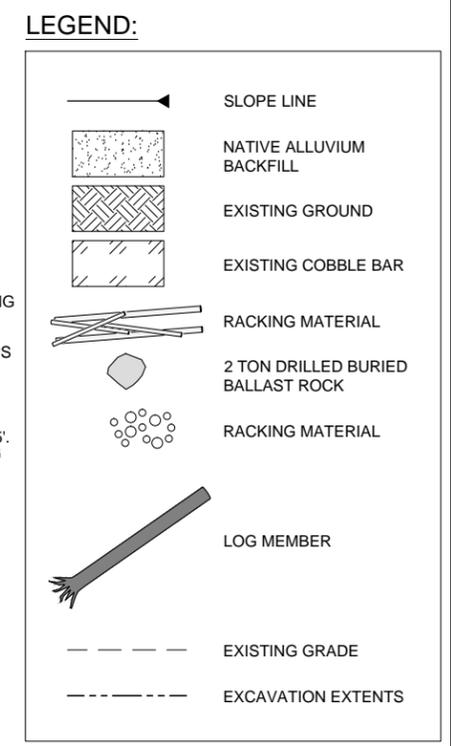
TYPICAL SADDLE LASH ELEVATION
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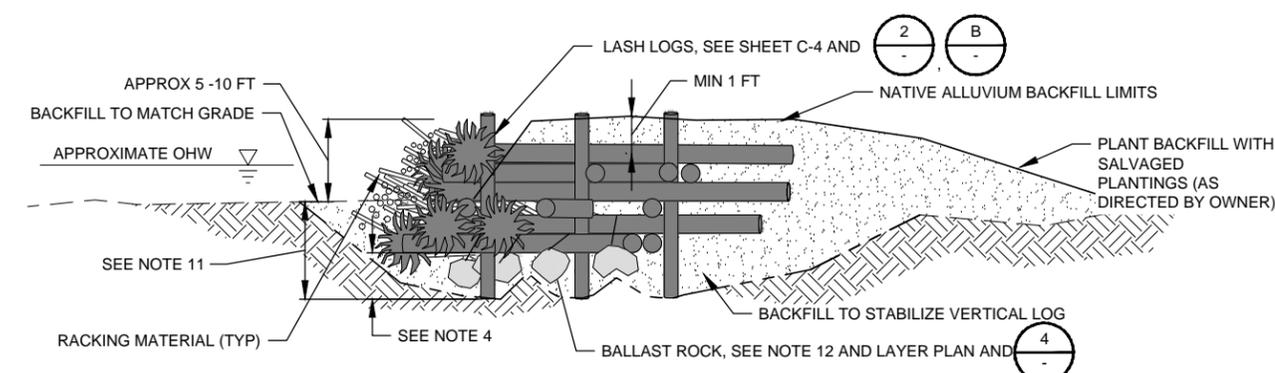
TYPICAL SIMPLE LASH PLAN
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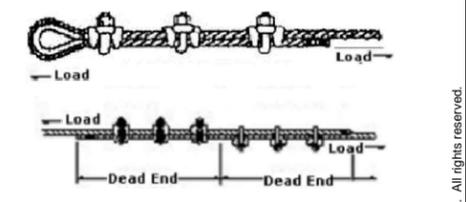
TYPICAL SIMPLE LASH ELEVATION
 SCALE: NTS



LOG TO ROCK CONNECTION
 SCALE: NTS



SECTION - ELJ TYPE 1
 SCALE: 1" = 10'



WIRE ROPE CLAMP DETAIL
 SCALE: NTS

100% DESIGN

No.	REVISION	BY	APPD	DATE

ONE INCH
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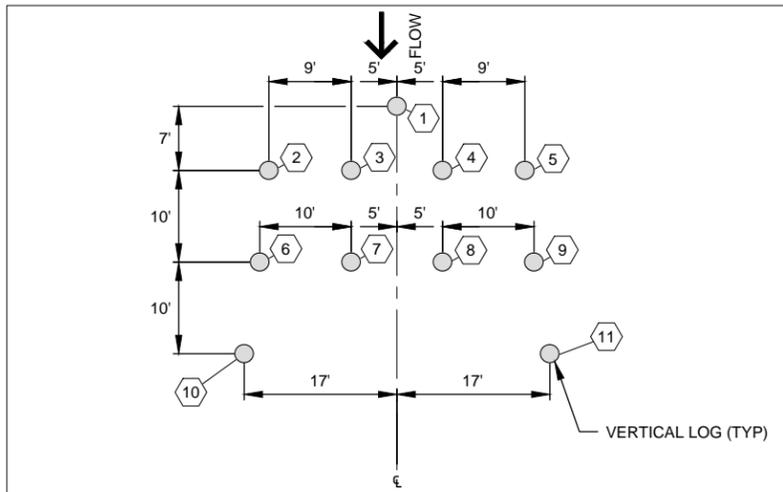
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DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

**NORTH FORK NOOKSACK RIVER
 FARMHOUSE REACH RESTORATION PROJECT
 PHASE 2A**

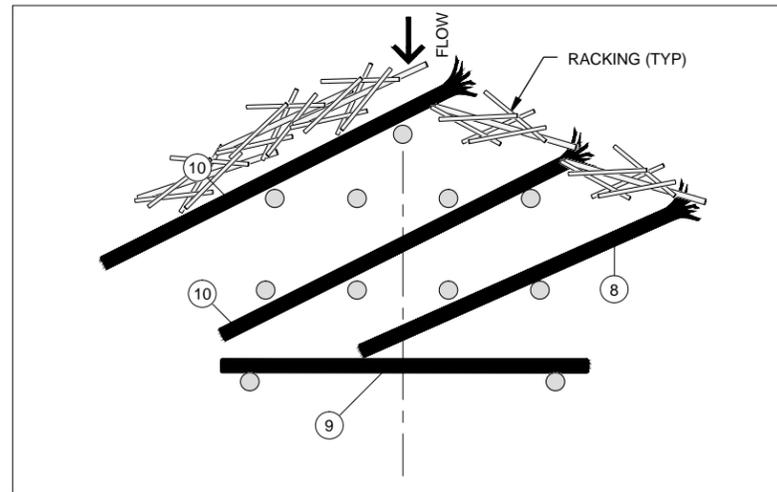
STRUCTURE TYPE 1 PLAN AND NOTES

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-5
SHEET NO: 7 OF 12

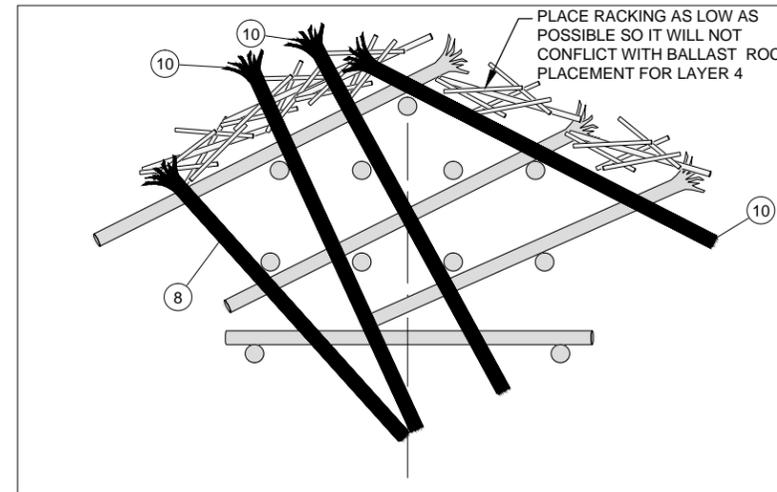
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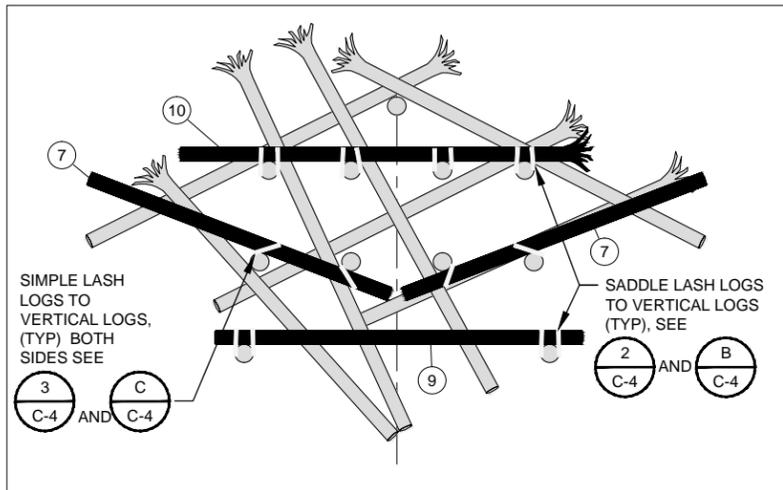
VERTICAL LOG LAYOUT



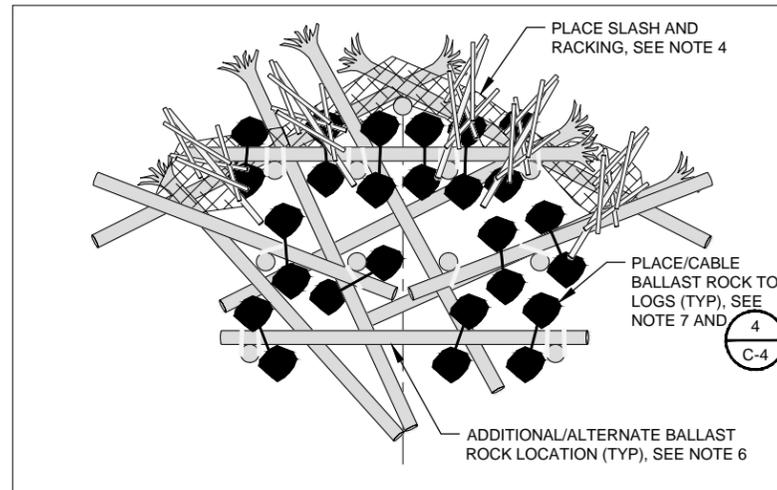
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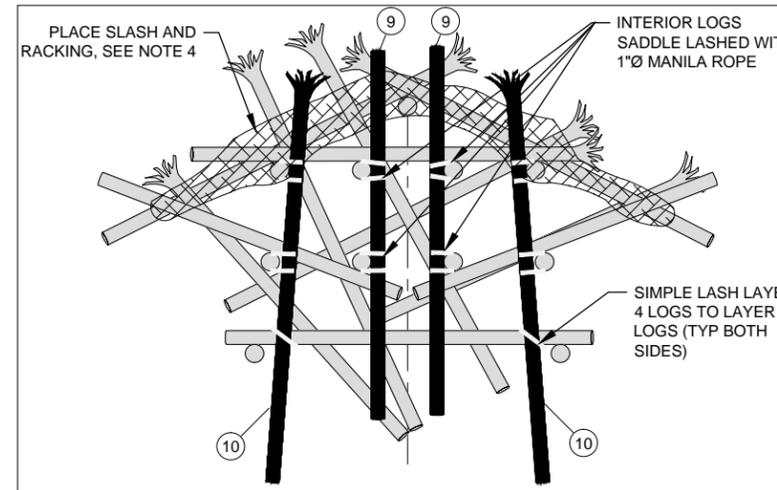
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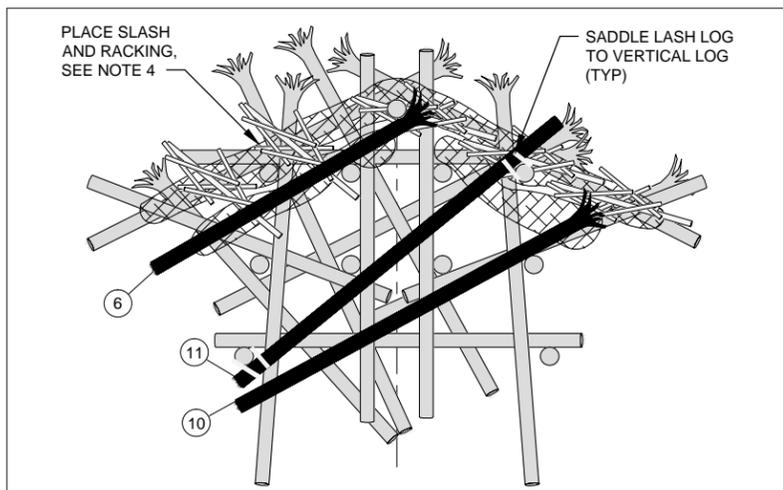
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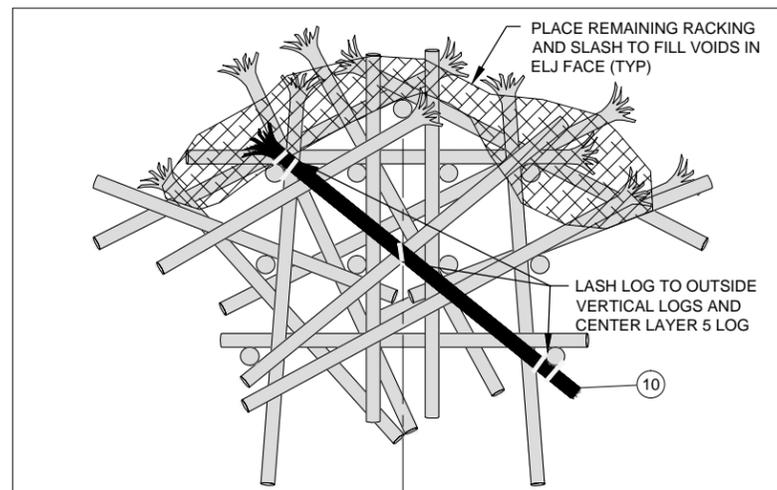
LAYER 4



LAYER 5



LAYER 6



LAYER 7

NOTES:

- 2 VERTICAL LOG LOCATIONS SHALL BE STAKED BY ENGINEER FOR LAYOUT.
- LOG MATERIALS SHALL BE PLACED AT THE LOCATIONS AND ELEVATIONS SPECIFIED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
- TRIM LOGS AS REQUIRED OR DIRECTED BY OWNER.
- SLASH AND RACKING TO FILL VOIDS BETWEEN LOG LAYERS. SEQUENCING OF SLASH PLACEMENT MAY NEED TO BE MODIFIED FOR CHAINING OF ROCK BALLAST. SUBSEQUENT LOG LAYERS SHALL COMPRESS SLASH AND RACKING PLACED IN PREVIOUS LAYERS.
- PLACE BACKFILL FLUSH WITH LAYER 4 LOGS FOLLOWING LAYER 4 BALLAST ROCK PLACEMENT AND LASHING. BACKFILL EACH FOLLOWING LAYER WITH NATIVE ALLUVIUM BACKFILL FLUSH WITH CURRENT LAYER PRIOR TO PLACEMENT OF SUBSEQUENT LAYER. BUCKET COMPACT BACKFILL.
- AUGMENT OR DELETE ROCK QUANTITIES AS NEEDED TO MAINTAIN AN AVERAGE ELJ ROCK BALLAST OF 52 TONS. NOTIFY OWNER OF CHANGES.
- PLACE BALLAST ROCKS AS LOW WITHIN THE ELJ AS POSSIBLE AND ENSURE CHAIN BETWEEN BALLAST ROCKS HAS NO SLACK. ROCK SHALL NOT BE EXPOSED AT FINISHED GRADE.
- RACKING, SLASH, LASHINGS, AND BALLAST BOULDERS ONLY SHOWN IN LAYERS WHERE PLACEMENT OCCURS FOR CLARITY.
- FINISH ALL MANILA LASHING WITH CLOVE HITCH. STAPLE LOOSE ENDS OF CLOVE HITCH TO LOGS.

TABLE - ELJ TYPE 1 LOG SCHEDULE

LOG ID #	DIAMETER (IN)	LENGTH (FT)	ROOTWAD	QUANTITY/ STRUCTURE
6	18	35	YES	1
7	18	35	NO	2
8	18	40	YES	2
9	18	40	NO	4
10	18	45	YES	10
11	18	45	NO	1
				20 TOTAL
VERTICAL LOG #	24	20	NO	11

TOTAL: 31 PER STRUCTURE

TABLE - ELJ TYPE 1 ROCK SCHEDULE

	WEIGHT (TONS)	QUANTITY/ STRUCTURE
BALLAST ROCKS	2	26

TABLE - ELJ TYPE 1 SLASH SCHEDULE

	QUANTITY/ STRUCTURE (CY)
SLASH	80-100

TABLE - ELJ TYPE 1 RACKING SCHEDULE

	QUANTITY/ STRUCTURE
RACKING LOGS	75 - 100

100% DESIGN

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Cad User: Eric Marshall
Plotter: DWG To PDF.pc3

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DESIGNED: G. KAYS	DRAWN: L. TURNIDGE
DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

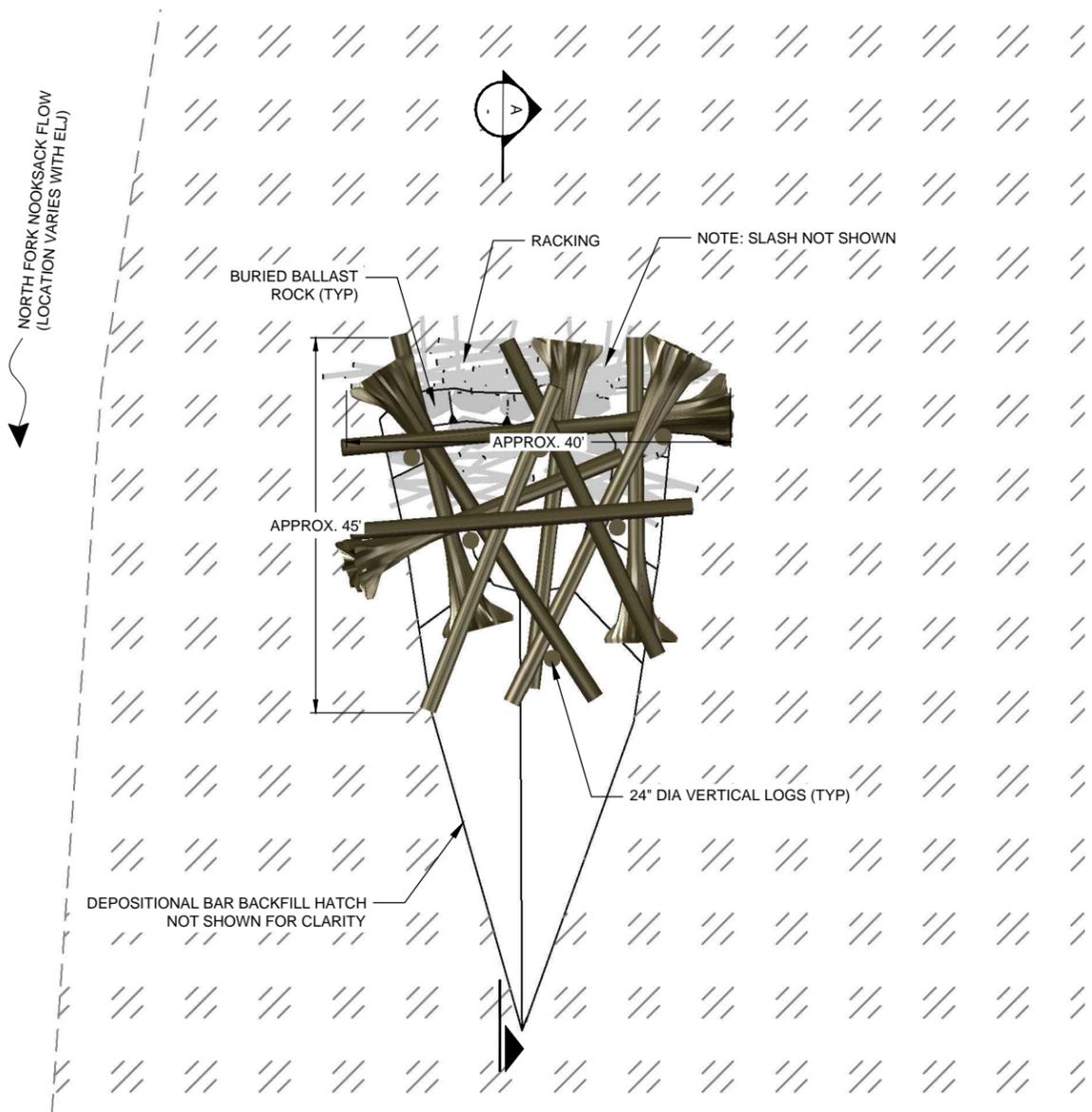
**NORTH FORK NOOKSACK RIVER
FARMHOUSE REACH RESTORATION PROJECT
PHASE 2A**

STRUCTURE TYPE 1 LAYERING PLAN

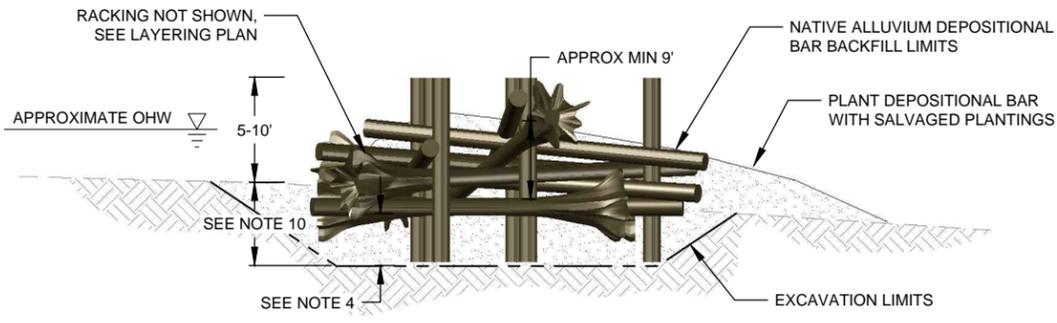
DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-6
SHEET NO: 8 OF 12

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 Cad User: Eric Marshall
 Plotter: DWG To PDF.pc3



TYPICAL WOODY GNARL PLAN
 SCALE: 1" = 10'
 1
 C-2



TYPICAL WOODY GNARL SECTION
 SCALE: 1" = 10'
 A

LEGEND:

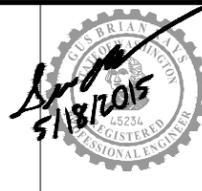
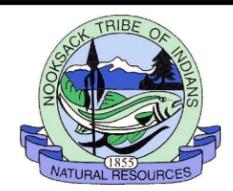
- SLOPE LINE
- NATIVE ALLUVIUM BACKFILL
- EXISTING GROUND
- EXISTING COBBLE BAR
- RACKING LOGS (PLAN VIEW)
- 2 TON DRILLED BURIED BALLAST ROCK
- LOG MEMBER
- EXISTING GRADE
- EXCAVATION EXTENTS

NOTES:

1. ACCESS ROAD ALIGNMENT SHALL BE STAKED OR FLAGGED BY OWNER. ALIGNMENT SHALL BE STAKED TO MINIMIZE DISTURBANCE OF EXISTING MATURE VEGETATION.
2. CONTRACTOR SHALL PLANT ELJ WITH SALVAGED TREES FOLLOWING CONSTRUCTION.
3. SEE LAYERING PLAN FOR RACKING AND SLASH PLACEMENT, NUMBERS, AND VOLUMES.
4. ENGINEERED LOG JAM EXCAVATION DEPTH SHALL VARY WITH LOCAL GRADES AND VERTICAL LOG DEPTHS. THE FIRST/LOWEST LAYER OF HORIZONTAL LOG LAYERS SHALL BE PLACED APPROXIMATELY 5FT UP FROM THE BOTTOM OF THE VERTICAL LOGS.
5. EXCAVATION SPOILS SHALL BE STOCKPILED TO ALLOW LOG LAYER PLACEMENT AND CONSTRUCTION ACCESS.
6. DEPOSITIONAL BAR EXTENTS VARY. DEPOSITIONAL BAR CONSTRUCTED WITH EXCAVATION SPOILS.
7. ELJ BACKFILL OVER LOG PLACEMENTS TO BE MAINTAINED ABOVE THE 100 YEAR FLOOD WATER SURFACE TO PRECLUDE OVERTOPPING. CONTRACTOR SHALL MAINTAIN A FINAL ELJ BACKFILL GRADE OVER LOGS OF AT LEAST 5' ABOVE EXISTING COBBLE BAR GRADES AND 1FT ABOVE TOP LAYER OF LOGS.
8. ALL LOG TO LOG LASHING SHALL BE 1/2" OR 7/16" Ø 6-19 IWRC (IPS) GALVANIZED WIRE ROPE UNLESS OTHERWISE SPECIFIED IN LAYER PLAN. BOULDER TO LOG LASHING SHALL BE 3/8" Ø GRADE 43 NATURAL FINISH CHAIN. MANILA ROPE SHALL BE 1" Ø. SEE LAYER PLAN FOR LASHING TYPES AND LOCATIONS.
9. ALL CONNECTING HARDWARE SHALL HAVE A RATED WORKING LOAD LIMIT OF EQUAL OR GREATER STRENGTH THAN WIRE ROPE OR CHAIN. ALL WIRE ROPE CLAMPS AND HAND SPLICING SHALL BE PER THE MANUFACTURERS SPECIFICATIONS.
10. ENGINEER SHALL STAKE 2 VERTICAL LOG DEPTHS FOR ELJ'S BASED ON THE RELATIVE DEPTH TO THE ADJACENT CHANNEL BOTTOM. DEPTH SHALL NOT EXCEED 15'. CONTRACTOR SHALL MARK DEPTH OF BURIAL LOCATION ON ALL VERTICAL LOGS PRIOR TO PLACEMENT WITH BLAZE ORANGE MARKING PAINT. SEE VERTICAL LOG DEPTH TABLE ON DRAWING C-3.
11. TWO DRILLED ROCKS PER CHAIN. SEE DETAIL 4/C-5 AND LAYERING PLAN FOR LOCATION AND NUMBER.
12. SHACKLES SHALL BE SAFETY SHACKLES AND THREADS SHALL BE MARRED TO PREVENT REMOVAL OF SHACKLES.

100% DESIGN

No.	REVISION	BY	APPD	DATE



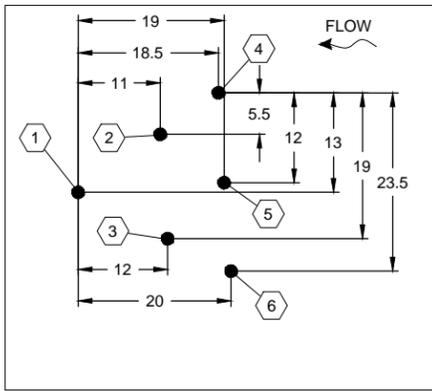
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DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

**NORTH FORK NOOKSACK RIVER
 FARMHOUSE REACH RESTORATION PROJECT
 PHASE 2A**

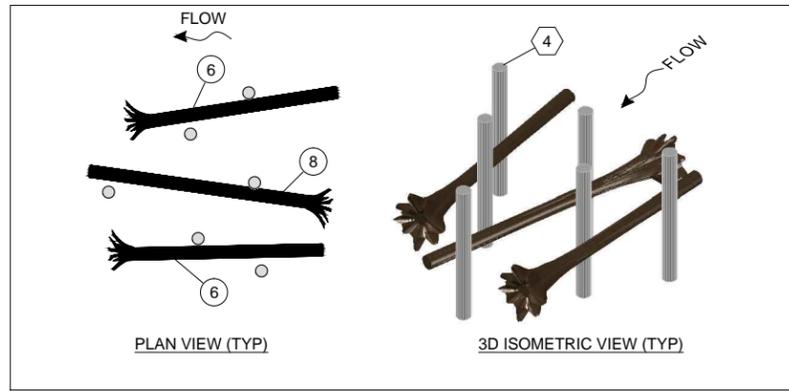
WOODY GNARL PLAN AND NOTES

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-7
SHEET NO: 9 OF 12

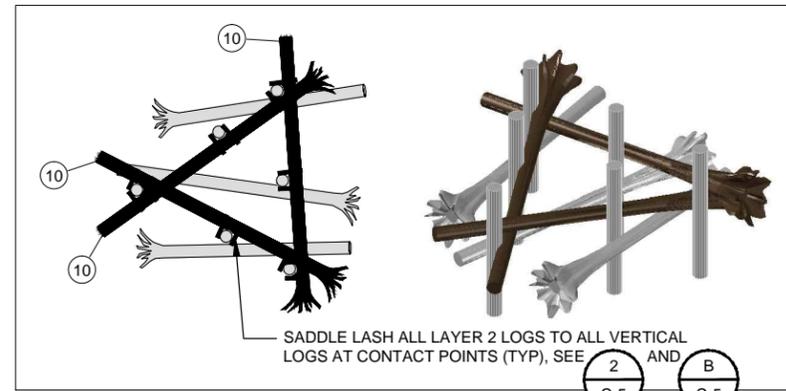
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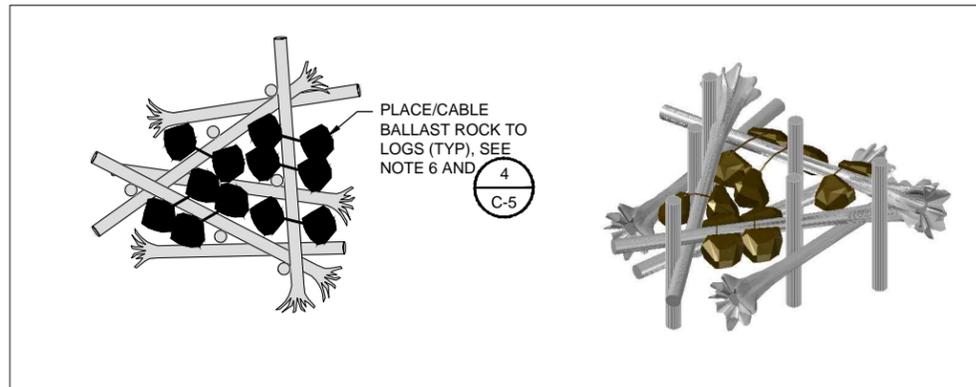
VERTICAL LOG LAYOUT



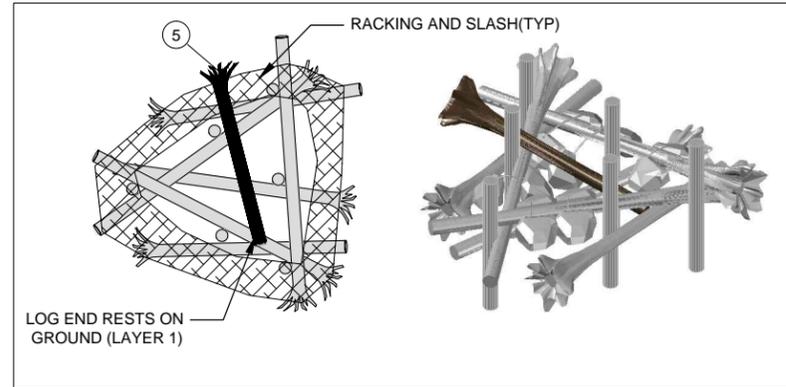
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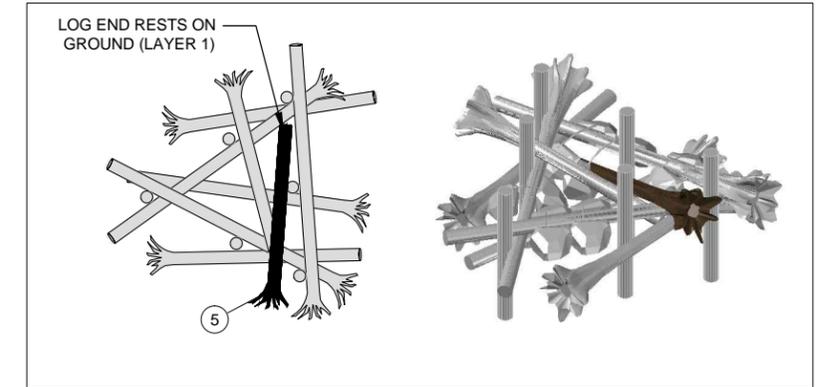
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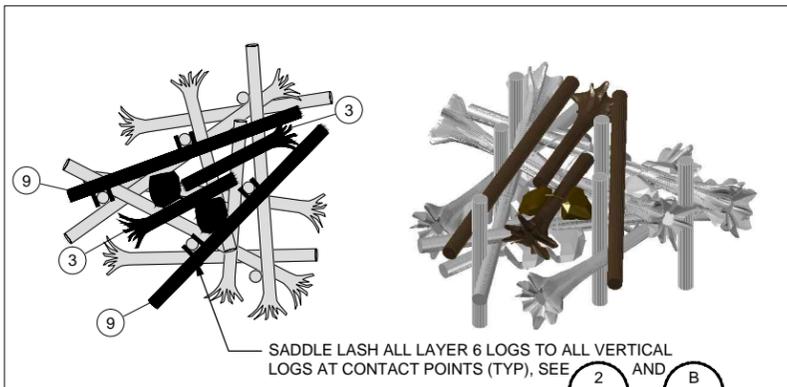
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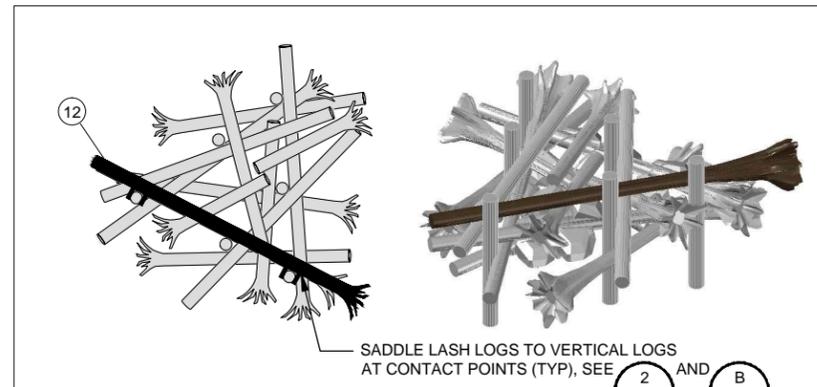
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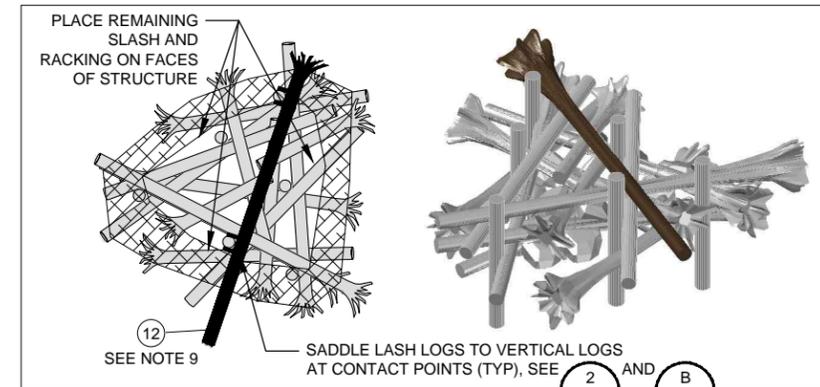
LAYER 5



LAYER 6



LAYER 7



LAYER 8

NOTES:

- 2 VERTICAL LOG LOCATIONS SHALL BE STAKED BY ENGINEER FOR LAYOUT.
- LOG MATERIALS SHALL BE PLACED AT THE LOCATIONS AND ELEVATIONS SPECIFIED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
- TRIM LOGS AS REQUIRED.
- SLASH AND RACKING TO FILL VOIDS BETWEEN LOG LAYERS. SEQUENCING OF SLASH PLACEMENT MAY NEED TO BE MODIFIED FOR CHAINING OF ROCK BALLAST. SUBSEQUENT LOG LAYERS SHALL COMPRESS SLASH AND RACKING PLACED IN PREVIOUS LAYERS.
- PLACE BACKFILL FLUSH WITH LAYER 3 LOGS FOLLOWING LAYER 3 BALLAST ROCK PLACEMENT AND LASHING. BACKFILL EACH FOLLOWING LAYER WITH NATIVE ALLUVIUM BACKFILL FLUSH WITH CURRENT LAYER PRIOR TO PLACEMENT OF SUBSEQUENT LAYER. BUCKET COMPACT BACKFILL.
- PLACE BALLAST ROCKS AS LOW WITHIN THE ELJ AS POSSIBLE AND ENSURE CHAIN BETWEEN BALLAST ROCKS HAS NO SLACK.
- AUGMENT OR DELETE ROCK QUANTITIES AS NEEDED TO MAINTAIN AN ELJ ROCK BALLAST OF 28 TONS
- RACKING, SLASH, LASHINGS, AND BALLAST BOULDERS ONLY SHOWN IN LAYERS WHERE PLACEMENT OCCURS FOR CLARITY.
- ELJ 41 AND 42 SHALL HAVE THE LAYER 8, TYPE 12 LOG REPLACED WITH A 59'-61" DIAMETER BY 40' TO 64' LONG LOG RESPECTIVELY.

TABLE - WOODY GNARL LOG SCHEDULE:

LOG ID #	DIAMETER (IN)	LENGTH (FT)	ROOTWAD	QUANTITY/ STRUCTURE
3	18-24	20	YES	2
5	18-24	30	YES	2
6	18-24	35	YES	2
8	18-24	40	YES	1
9	18-24	40	NO	2
10	18-24	45	YES	3
12	18-24	50	YES	2
TOTAL:				14 TOTAL
VERTICAL LOG #	24	20	NO	6

TOTAL: 20 PER STRUCTURE

TABLE - WOODY GNARL SLASH SCHEDULE

	QUANTITY/ STRUCTURE (CY)
SLASH	70-80

TABLE - WOODY GNARL RACKING SCHEDULE

	QUANTITY/ STRUCTURE
RACKING LOGS	70

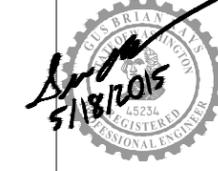
TABLE - WOODY GNARL ROCK SCHEDULE

	WEIGHT (TONS)	QUANTITY/ STRUCTURE
BALLAST ROCKS	2	14

100% DESIGN

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No.	REVISION	BY	APPD	DATE



DESIGNED: G. KAYS	DRAWN: L. TURNIDGE
DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

NORTH FORK NOOKSACK RIVER FARMHOUSE REACH RESTORATION PROJECT PHASE 2A

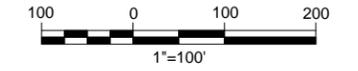
WOODY GNARL LAYERING PLAN

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: C-8
SHEET NO: 10 OF 12

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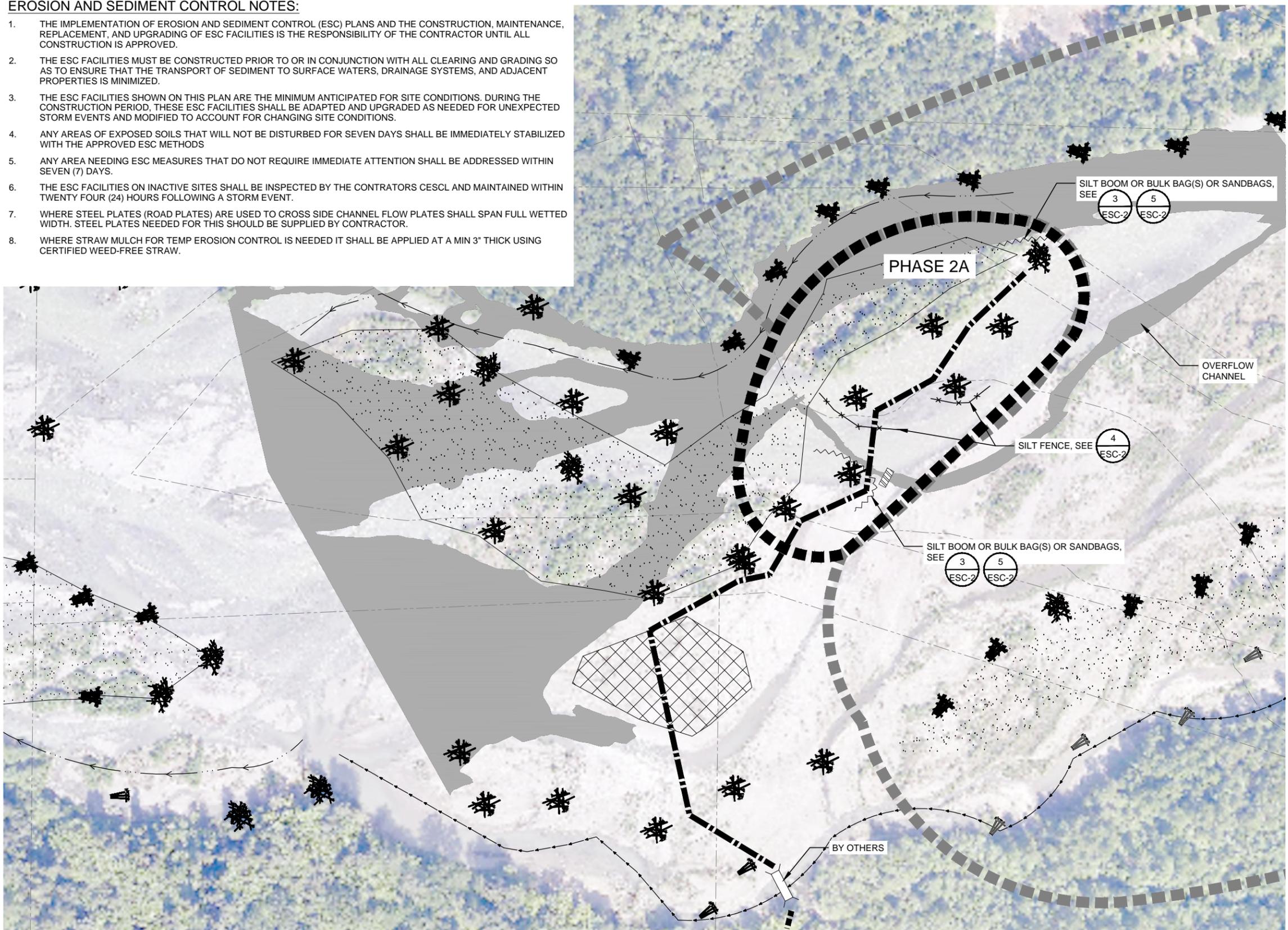
EROSION AND SEDIMENT CONTROL NOTES:

1. THE IMPLEMENTATION OF EROSION AND SEDIMENT CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED.
2. THE ESC FACILITIES MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, AND ADJACENT PROPERTIES IS MINIMIZED.
3. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM ANTICIPATED FOR SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE ADAPTED AND UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS.
4. ANY AREAS OF EXPOSED SOILS THAT WILL NOT BE DISTURBED FOR SEVEN DAYS SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED ESC METHODS
5. ANY AREA NEEDING ESC MEASURES THAT DO NOT REQUIRE IMMEDIATE ATTENTION SHALL BE ADDRESSED WITHIN SEVEN (7) DAYS.
6. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED BY THE CONTRATORS CESCL AND MAINTAINED WITHIN TWENTY FOUR (24) HOURS FOLLOWING A STORM EVENT.
7. WHERE STEEL PLATES (ROAD PLATES) ARE USED TO CROSS SIDE CHANNEL FLOW PLATES SHALL SPAN FULL WETTED WIDTH. STEEL PLATES NEEDED FOR THIS SHOULD BE SUPPLIED BY CONTRACTOR.
8. WHERE STRAW MULCH FOR TEMP EROSION CONTROL IS NEEDED IT SHALL BE APPLIED AT A MIN 3" THICK USING CERTIFIED WEED-FREE STRAW.



LEGEND:

	PARCEL
	EXISTING SIDE CHANNEL
	TEMPORARY ACCESS CORRIDORS
	STRUCTURE TYPE 1
	WOODY GNARL
	BRIDGE
	SILT FENCE
	BULK BAGS/SAND BAGS
	TEMPORARY STEEL ROAD PLATE FOR SIDE CHANNEL CROSSING
	PHASE 1 ELJ LIMITS
	03/02/15 WETTED EDGE
	STAGING AREA



100% DESIGN

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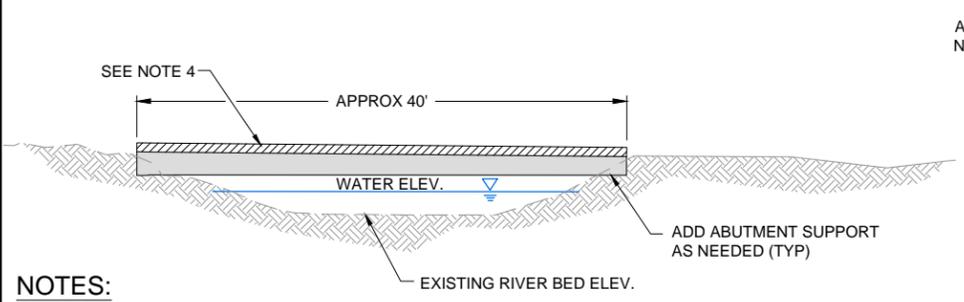
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DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

**NORTH FORK NOOKSACK RIVER
 FARMHOUSE REACH RESTORATION PROJECT
 PHASE 2A**

TESC PLAN

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: ESC-1
SHEET NO: 11 OF 12

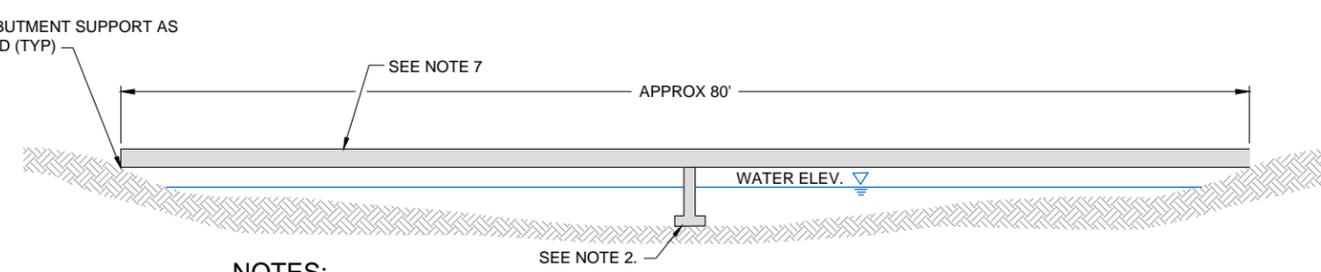
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NOTES:

1. SINGLE SPAN BRIDGES SHALL BE LOCATED SUCH THAT THEY REQUIRE ONLY ONE SPAN TO ELIMINATE IMPACTS TO SUBSTRATE.
2. END OF BRIDGE SHALL BEAR ON HIGH BANKS WITH SUFFICIENT BEARING CAPACITY TO PREVENT SLOUGHING OR COLLAPSE OF CHANNEL BANKS.
3. CONCRETE ECOLOGY BLOCKS OR WOOD ABUTMENTS MAY BE USED TO SUPPORT END OF TEMPORARY BRIDGE AS NEEDED.
4. BRIDGES MAY BE CONSTRUCTED FROM LOGS, RAIL CAR BEDS OR APPROVED EQUAL AND DECKED WITH STEEL SHEET, WOOD LAGGING OR APPROVED EQUAL.
5. ADDITIONAL MEASURES MAY BE REQUIRED TO REDUCE RISK FROM SCOUR.
6. PROVIDE ADEQUATE FREEBOARD TO ALLOW PASSAGE OF WOODY DEBRIS AND POTENTIAL RECREATIONAL USERS. IF ADEQUATE FREEBOARD FOR RECREATIONAL USERS IS NOT AN OPTION PROVIDE ADEQUATE WARNING SIGNAGE AND PORTAGE UPSTREAM OF BRIDGE DURING THE DURATION OF BRIDGE CROSSING.
7. NOOKSACK TRIBAL BIOLOGIST SHALL APPROVE BRIDGE LOCATION PRIOR TO PLACEMENT TO AVOID SPAWNING HABITAT.

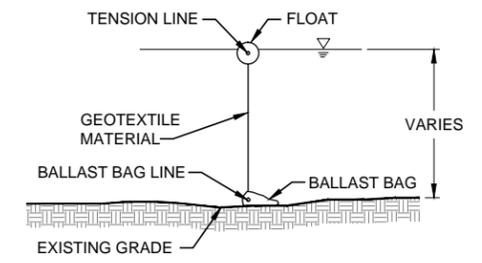
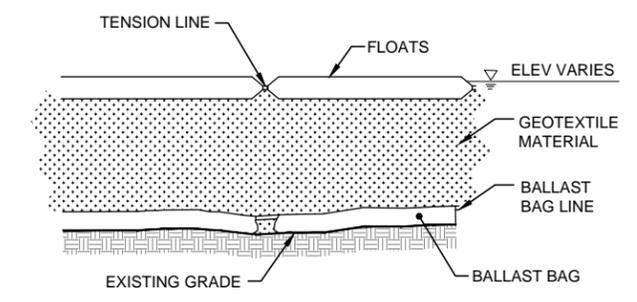
DETAIL - SINGLE SPAN TEMPORARY BRIDGE
SCALE: NTS



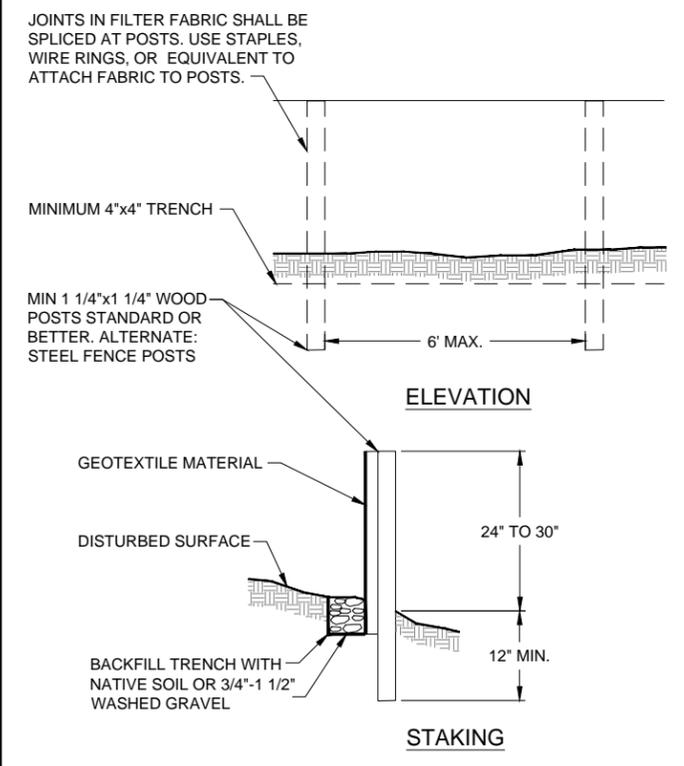
NOTES:

1. TWIN SPAN TEMPORARY BRIDGES USED TO CROSS WIDE CHANNELS.
2. TWIN SPAN BRIDGES MAY OFTEN BE CONSTRUCTED BY PLACING TEMPORARY SUPPORTS INTO THE CHANNEL AS SHOWN. THESE SUPPORTS MAY CONSIST OF LARGE DIAMETER LOGS, ECOLOGY BLOCKS, STEEL PIERS, OR SIMILAR MATERIAL.
3. ENDS OF BRIDGE SHALL BEAR DIRECTLY ONTO EXISTING GROUND.
4. SPANS MAY BE LINKED IN SERIES TO CROSS BROAD WATERWAYS.
5. ADDITIONAL MEASURES MAY BE REQUIRED TO REDUCE RISK FROM SCOUR.
6. BRIDGES MAY BE CONSTRUCTED FROM LOGS, RAIL CAR BEDS OR APPROVED EQUAL AND DECKED WITH STEEL SHEET, WOOD LAGGING OR APPROVED EQUAL.
7. PROVIDE ADEQUATE FREEBOARD TO ALLOW PASSAGE OF WOODY DEBRIS AND POTENTIAL RECREATIONAL USERS. IF ADEQUATE FREEBOARD FOR RECREATIONAL USERS IS NOT AN OPTION PROVIDE ADEQUATE WARNING SIGNAGE AND PORTAGE UPSTREAM OF BRIDGE DURING THE DURATION OF BRIDGE CROSSING.
8. NOOKSACK TRIBAL BIOLOGIST SHALL APPROVE BRIDGE LOCATION PRIOR TO PLACEMENT TO AVOID SPAWNING HABITAT.

DETAIL - TWIN SPAN TEMPORARY BRIDGE
SCALE: NTS



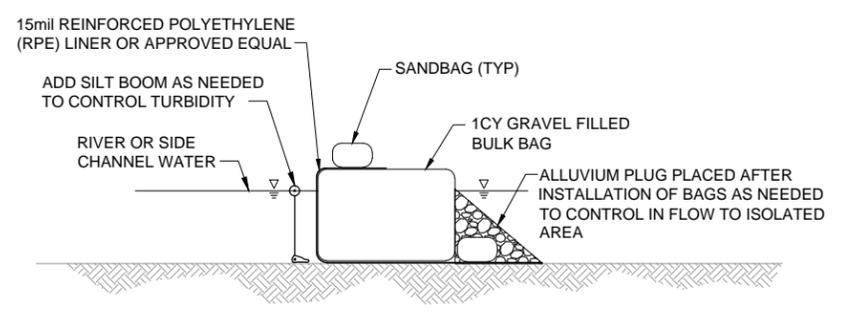
SILT BOOM DETAIL
SCALE: NTS



NOTES:

1. THE FILTER FABRIC (CONSTRUCTION GEOTEXTILE FOR TEMPORARY SILT FENCE) SHALL BE PURCHASED IN A CONTINUOUS ROLL, 5FT WIDE, CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, THE FILTER FABRIC SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6 INCH OVERLAP, AND SECURELY FASTENED TO THE POST.
2. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 12 INCHES.
3. A TRENCH SHALL BE EXCAVATED A MINIMUM OF 4 INCHES WIDE BY 4 INCHES DEEP, UPSLOPE AND ADJACENT TO THE POST TO ALLOW THE FILTER FABRIC TO BE BURIED.
4. THE FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE POSTS, AND 12 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 30 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO TREES.
5. THE TRENCH SHALL BE BACKFILLED WITH NATIVE SOIL OR WITH 3/4"-1 1/2" WASHED GRAVEL.
6. SILT FENCES SHALL BE REMOVED AT DIRECTION OF ENGINEER, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
7. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL EVENT AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
8. SILT FENCE PERFORMANCE SHALL BE EVALUATED AND SILT FENCE LOCATIONS SHALL BE EVALUATED AND ADJUSTED AS DIRECTED OR APPROVED BY THE ENGINEER AND THE PERMITTING AUTHORITY.
9. SILT FENCE SHALL BE INSTALLED AS SHOWN ON DRAWINGS.
10. ANY DEVIATION OR CHANGE TO SILT FENCE DETAILS MUST BE APPROVED BY THE OWNERS REPRESENTATIVE.
11. THE CONTRACTOR SHALL MAINTAIN A COPY OF THE MANUFACTURER'S SPECIFICATIONS FOR FILTER FABRIC ON SITE.
12. MAINTENANCE STANDARDS:
 - A. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.
 - B. IF CONCENTRATED FLOWS ARE EVIDENT UPHILL OF THE SILT FENCE, THEY MUST BE INTERCEPTED AND CONVEYED TO A SEDIMENT TRAP OR POND, OR OTHERWISE DIVERTED TO A LOCATION THAT DOES NOT RESULT IN TURBID DISCHARGES TO SURFACE WATERS.
 - C. THE UPHILL SIDE OF THE SILT FENCE SHALL BE CHECKED FOR SIGNS OF THE SILT FENCE CLOGGING, ACTING AS A BARRIER TO FLOW, AND CAUSING CHANNELIZATION OF FLOWS PARALLEL TO THE FENCE. IF SUCH CHANNELIZATION OCCURS, THE CONTRACTOR SHALL REPLACE THE FENCE OR REMOVE THE TRAPPED SEDIMENT.
 - D. SEDIMENT SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN THE SEDIMENT IS 6 INCHES HIGH.
 - E. IF THE FILTER FABRIC HAS DETERIORATED DUE TO ULTRAVIOLET BREAKDOWN, IT SHALL BE REPLACED.

DETAIL - SILT FENCE
SCALE: NTS



NOTES:

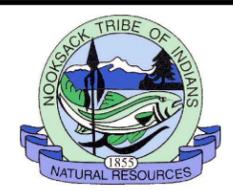
1. PLACE/REMOVE ALLUVIUM AS LAST STEP OF BULK BAG ISOLATION SYSTEM INSTALLATION/REMOVAL.

TYPICAL SINGLE BULK BAG ISOLATION
SCALE: NTS



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Cadd User: Eric Marshall
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No.	REVISION	BY	APPD	DATE



100% DESIGN



DESIGNED: G. KAYS	DRAWN: L. TURNIDGE
DESIGNED: M. BEGGS	DRAWN: E. MARSHALL
DESIGNED: -	CHECKED: -
SCALE: AS NOTED	APPROVED: M. SPILLANE

NORTH FORK NOOKSACK RIVER FARMHOUSE REACH RESTORATION PROJECT PHASE 2A

TESC DETAILS

DATE: MAY 2015
PROJECT NO: 09-04592-001
DRAWING NO: ESC-2
SHEET NO: 12 OF 12

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