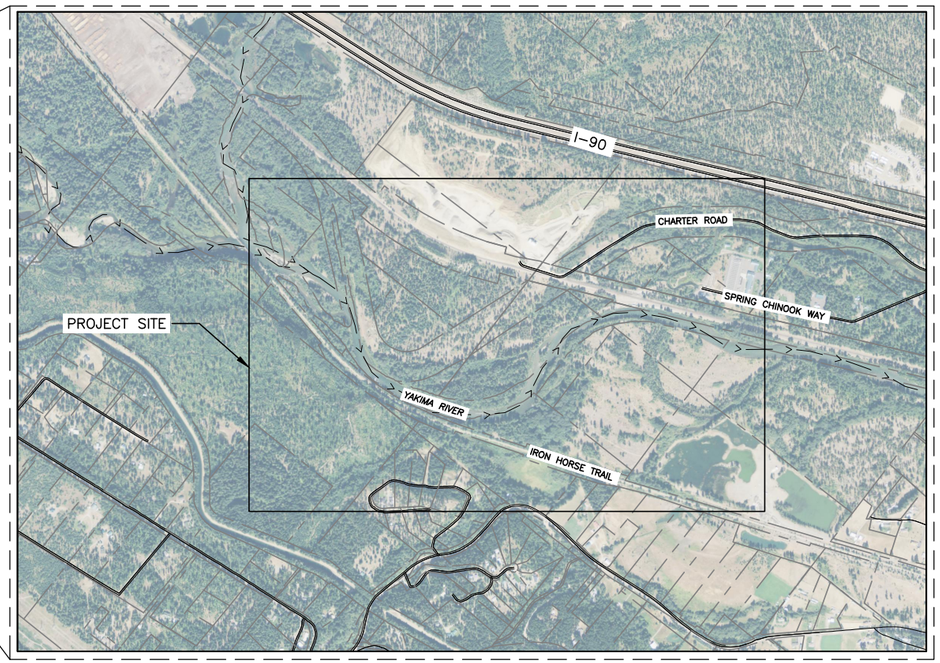
YAKIMA RIVER EDGE HABITAT PROJECT

YAKAMA NATION

WASHINGTON STATE
SCALE: 1"=50 MILES
50 25 0 50 100



PROJECT VICINITY
SCALE: 1"=1,000'

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DRAWING LIST	
SHEET NUMBER	SHEET TITLE
1	COVER SHEET
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9	RESTORATION DETAILS

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0 Ø 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT PLOTTED TO ORIGINAL SCALE.

FISHERIES YKFP YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RH, TA, MF	LATITUDE	47°11'00"N
CHECKED	RH	LONGITUDE	121°42'00"W
DRAWN	MW, GM	TN/SC/RG	T20N/S31/R9E
CHECKED	RH	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

COVER SHEET

1

SHEET 1 OF 9

Aug 22, 2014 FINAL DRAWINGS

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GENERAL NOTES

1. THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF YAKAMA NATION FISHERIES, HEREAFTER REFERRED TO AS "OWNER" AND THEIR AUTHORIZED AGENTS.

2. NATURAL SYSTEMS DESIGN HEREAFTER REFERRED TO AS "ENGINEER" IS RESPONSIBLE FOR THE PREPARATION OF THESE ORIGINAL PLANS AND ASSOCIATED SPECIFICATIONS; AND WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGE, OR USE, OF THESE PLANS WHICH INCLUDES ALTERATION, DELETION, OR EDITING OF THIS DOCUMENT WITHOUT EXPLICIT WRITTEN PERMISSION FROM THE ENGINEER. ANY OTHER UNAUTHORIZED USE OF THIS DOCUMENT IS PROHIBITED.

3. MINOR MODIFICATIONS ARE EXPECTED TO SUIT JOB SITE DIMENSIONS OR CONDITIONS. SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. THE OWNER, ENGINEER AND APPROPRIATE REGULATORY AGENCIES SHALL BE NOTIFIED OF ANY OWNER–AUTHORIZED CHANGE RESULTING IN MORE THAN A 10% DESIGN CHANGE OF PROPOSED FOOTPRINT OR THAT SIGNIFICANTLY AFFECTS THE INTENDED BENEFIT OR FUNCTION OF A PROJECT ELEMENT.

4. THE LOCATION OF ALL FEATURES SHOWN IS APPROXIMATE.

5. THE CONTRACTOR AGREES TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; AND FURTHER AGREES THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS IN ACCORDANCE WITH THE PROVISIONS OUTLINED BY THE PROJECT CONTRACT AND SPECIFICATIONS.

6. ALL IMPROVEMENTS SHALL BE ACCOMPLISHED UNDER THE APPROVAL, INSPECTION, AND TO THE SATISFACTION OF THE OWNER. IMPROVEMENT CONSTRUCTION SHALL COMPLY WITH THESE PLANS AND THE WA STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STANDARD PLANS FOR CONSTRUCTION OF ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, CURRENT EDITION UNLESS NOTED OTHERWISE. ALL REFERENCES TO THE "STANDARD SPECIFICATIONS" SHALL MEAN THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STANDARD SPECIFICATIONS FOR CONSTRUCTION OF LOCAL STREETS AND ROADS, CURRENT EDITION. CONSTRUCTION NOT SPECIFIED ON THESE PLANS SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR IS OBLIGATED TO BE FAMILIAR WITH APPLICABLE SECTIONS OF THE STANDARD SPECIFICATIONS NOT DISCUSSED IN THE GENERAL NOTES. THE CONTRACT SPECIAL PROVISIONS SHALL SUPERSEDE THOSE OF THE STANDARD SPECIFICATIONS WHERE DISCREPANCIES OCCUR.

7. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND SUBCONTRACTOR(S) TO EXAMINE THE PROJECT SITE PRIOR TO THE OPENING OF BID PROPOSALS. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, SUCH AS THE NATURE AND LOCATION OF THE WORK; AND THE GENERAL AND LOCAL CONDITIONS, PARTICULARLY THOSE AFFECTING THE AVAILABILITY OF TRANSPORTATION, THE DISPOSAL, HANDLING, AND STORAGE OF MATERIALS, AVAILABILITY OF LABOR, WATER, ELECTRICITY, ROADS, THE UNCERTAINTIES OF WEATHER, THE CONDITIONS OF THE GROUND, SURFACE AND SUBSURFACE MATERIALS, GROUNDWATER, THE EQUIPMENT AND FACILITIES NEEDED FOR AND DURING THE PERFORMANCE OF THE WORK, AND THE COSTS THEREOF. ANY FAILURE BY THE CONTRACTOR AND SUBCONTRACTOR(S) TO ACQUAINT THEMSELVES WITH ALL THE AVAILABLE INFORMATION WILL NOT RELIEVE THE CONTRACTOR AND SUBCONTRACTOR(S) FROM RESPONSIBILITY FOR PROPERLY ESTIMATING THE DIFFICULTY AND COST OF SUCCESSFULLY PERFORMING THE WORK.

8. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE CONTRACT DOCUMENTS AND FOR ALL SUBMITTALS REQUIRED TO THE OWNER FOR REVIEW AND ACCEPTANCE.

PERMIT NOTES

1. EVERY REASONABLE EFFORT SHALL BE MADE TO CONDUCT THE ACTIVITIES SHOWN IN THESE PLANS, IN A MANNER THAT MINIMIZES THE ADVERSE IMPACT ON WATER QUALITY, FISH AND WILDLIFE, AND THE NATURAL ENVIRONMENT.

2. ALL WORK WILL BE IN COMPLIANCE WITH PERMIT CONDITIONS ISSUED BY PERTINENT REGULATORY AGENCIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE COPIES OF ALL PERMITS ON THE JOB SITE, UNDERSTAND AND COMPLY WITH ALL PERMIT CONDITIONS.

3. ALL WORK THAT DISTURBS THE SUBSTRATE, BANK, OR SHORE OF A WATERS OF THE STATE THAT CONTAINS FISH LIFE SHALL BE CONDUCTED ONLY DURING THE WORK PERIOD FOR THAT WATERBODY AS ALLOWED BY RELEVANT HYDRAULIC WORK PERMITS. THOSE PORTIONS OF THE PROJECT WORK THAT OCCUR OUTSIDE OR ABOVE THE ORDINARY HIGH WATER MARK (ABOVE THE USACE JURISDICTIONAL LINE) ARE NOT SUBJECT TO THE WORK PERIODS DESCRIBED ABOVE UNLESS SPECIFIED IN THE RELEVANT PERMITS.

4. ALL ACTIVITIES THAT INVOLVE WORK ADJACENT TO, OR WITHIN THE WETTED CHANNEL SHALL, AT ALL TIMES, REMAIN CONSISTENT WITH ALL APPLICABLE WATER QUALITY STANDARDS; EFFLUENT LIMITATION; AND STANDARDS OF PERFORMANCE, PROHIBITIONS, PRETREATMENT STANDARDS, AND MANAGEMENT PRACTICES ESTABLISHED PURSUANT TO THE CLEAN WATER ACT OR PURSUANT TO APPLICABLE STATE AND LOCAL LAW.

5. 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.

6. IF, DURING CONSTRUCTION, ARCHAEOLOGICAL REMAINS ARE ENCOUNTERED, CONSTRUCTION IN THE VICINITY SHALL BE HALTED, AND THE STATE OFFICE OF HISTORIC PRESERVATION AND THE OWNER SHALL BE NOTIFIED IMMEDIATELY.

SURVEY NOTES

1. UNLESS NOTED OTHERWISE ON THE PLANS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURVEY MONUMENTS AND OTHER SURVEY MARKERS DURING CONSTRUCTION.

2. THE CONTRACTOR SHALL MAINTAIN A SET OF PLANS ON THE JOB SHOWING "AS–CONSTRUCTED" CHANGES MADE TO DATE. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUPPLY TO OWNER A SET OF PLANS, MARKED UP TO THE SATISFACTION OF THE OWNER, REFLECTING THE AS–CONSTRUCTED MODIFICATIONS.

3. ELEVATIONS SHOWN ON THE PLANS FOR PIPE INVERTS, TOPS OF BANKS, THALWEG, GRADE CONTROLS, ETC., ARE BASED UPON THE TOPOGRAPHIC INFORMATION SHOWN ON THE PLANS. THE CONTRACTOR SHALL VERIFY ALL NECESSARY SURFACE ELEVATIONS IN THE FIELD AND NOTIFY THE OWNER OF ANY DISCREPANCIES, WHICH MIGHT AFFECT PROPER OPERATION OF THE NEW FACILITIES BEFORE BREAKING GROUND AND PRIOR TO FACILITY INSTALLATION. THE OWNER SHALL BE CONTACTED IN THE EVENT ELEVATIONS ARE INCORRECT SO THAT THE PROPER ADJUSTMENTS CAN BE MADE BY ENGINEER PRIOR TO THE INSTALLATION OF THE FACILITIES, AS SET FORTH IN THE SPECIAL PROVISIONS.

4. LIDAR FOR THIS PROJECT WAS PROVIDED BY THE PUGET SOUND LIDAR CONSORTIUM, FEDERAL EMERGENCY MANAGEMENT AGENCY, AND IS REPRESENTATIVE OF 2011 CONDITIONS. THE DATUM IS NAD 1983 (FT.) STATE PLANE COORDINATE SYSTEM (WA SOUTH ZONE).

EROSION, SEDIMENT CONTROL AND WATER MANAGEMENT NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING ALL TEMPORARY EROSION CONTROL MEASURES. THE EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND PERFORMANCE OF THE TEMPORARY EROSION CONTROL MEASURES THROUGHOUT THE DURATION OF THE PROJECT.

2. A SEDIMENT AND EROSION CONTROL PLAN WILL BE DEVELOPED BY THE CONTRACTOR AND SUBMITTED FOR APPROVAL BY OWNER AND/OR THE ENGINEER BEFORE ANY CONSTRUCTION MAY BEGIN. THE SEDIMENT AND EROSION CONTROL PLAN WILL IDENTIFY BEST MANAGEMENT PRACTICES TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, AND ADJACENT PROPERTIES IS MINIMIZED.

3. ACTIVITIES SHALL BE DESIGNED AND CONSTRUCTED TO AVOID AND MINIMIZE ADVERSE IMPACTS TO WATERS OF THE UNITED STATES TO THE MAXIMUM EXTENT PRACTICAL THROUGH THE USE OF PRACTICAL ALTERNATIVES. ALTERNATIVES THAT SHALL BE CONSIDERED INCLUDE THOSE THAT MINIMIZE THE NUMBER AND EXTENT OF IN–WATER WORK AND EQUIPMENT CROSSINGS OF WETTED CHANNELS.

4. AT NO TIME SHALL SEDIMENT–LADEN WATER BE DISCHARGED OR PUMPED DIRECTLY INTO THE SUBJECT RIVER, STREAM, OR WETLAND. WATER SHALL BE DISCHARGED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN THE PROJECT PERMITS AND / OR SPECIFICATIONS.

5. IF HIGH WATER LEVEL CONDITIONS THAT CAUSE SILTATION OR EROSION ARE ENCOUNTERED DURING CONSTRUCTION, WORK SHALL STOP UNTIL THE WATER LEVEL SUBSIDES.

6. PERMIT CONDITIONS CONTAIN SPECIFIC REQUIREMENTS FOR THE CONTROL OF EROSION AND TURBIDITY FROM PROJECT OPERATIONS. TURBIDITY WILL BE MONITORED ON A FREQUENT BASIS BY THE PROJECT MANAGEMENT AND INSPECTION STAFF ON–SITE. TURBIDITY AMOUNTS IN EXCESS OF THE PERMITTED CONCENTRATIONS AND/OR DURATIONS WILL CAUSE WORK TO BE STOPPED UNTIL IMPROVED PRACTICES ARE IN EFFECT AND THE PROBLEMS CONTROLLED. THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR ANY PROJECT DELAYS THAT OCCUR BY NATURE OF THIS FAILURE TO ADEQUATELY CONTAIN SEDIMENT ON–SITE.

7. CONTRACTOR SHALL LIMIT MACHINERY MOVEMENT TO CONSTRUCTION AREAS DEFINED ON SITE PLAN OR IDENTIFIED AS ACCEPTABLE BY THE ENGINEER OR OWNER.

8. ALL EXTERNAL GREASE AND OIL SHALL BE PRESSURE–WASHED OFF THE EQUIPMENT PRIOR TO TRANSPORT TO THE SITE.

9. 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 SUBJECT RIVER, STREAM, OR WETLAND.

10. THE CONTRACTOR SHALL HAVE AN EMERGENCY SPILL KIT ONSITE AT ALL TIMES.

11. NO TREES OR WETLAND VEGETATION SHALL BE REMOVED UNLESS THEY ARE SHOWN AND NOTED TO BE REMOVED ON THE PLANS OR AS DIRECTLY SPECIFIED ON–SITE BY THE PROJECT MANAGEMENT STAFF. ALL TREES CONFLICTING WITH GRADING SHALL BE REMOVED. NO GRADING SHALL TAKE PLACE WITHIN THE DRIP LINE OF TREES NOT TO BE REMOVED UNLESS OTHERWISE APPROVED.

12. FOLLOWING CONSTRUCTION, SITE RESTORATION WILL INCLUDE ESTABLISHING LONG–TERM EROSION PROTECTION MEASURES. THESE MEASURES WILL INCLUDE PLANTINGS, EROSION CONTROL FABRIC, SEED, AND MULCH. EQUIPMENT AND EXCESS SUPPLIES WILL BE REMOVED AND THE WORK AREA WILL BE CLEANED. MAINTENANCE ACTIVITIES FOR THE NEWLY CONSTRUCTED RESTORATION PROJECTS ARE ANTICIPATED TO OCCUR PERIODICALLY.

CONSTRUCTION NOTES

1. CONTRACT DOCUMENTS REFER TO THESE PLANS.

2. CONTRACTOR SHALL FURNISH ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY TO COMPLETE ALL WORK AS INDICATED IN THE CONTRACT DOCUMENTS.

3. CONSTRUCTION HOURS SHALL BE WEEKDAYS BETWEEN 7:00 A.M. AND 6:30 P.M. UNLESS PRIOR APPROVAL IS RECEIVED FROM THE OWNER.

4. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE OWNER PRIOR TO PROCEEDING WITH THE WORK.

5. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE BY THE OWNER OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.

6. ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

7. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE BEST SKILLS AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THIS CONTRACT.

8. THE CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, ROADWAY, DRAINAGE WAYS, PRIVATE BRIDGE, CULVERTS, AND VEGETATION UNTIL SUCH ITEMS ARE TO BE DISTURBED OR REMOVED AS INDICATED ON THE CONTRACT DOCUMENTS.

9. THE CONTRACTOR SHALL KEEP THE JOB SITE CLEAN AND HAZARD FREE. CONTRACTOR SHALL DISPOSE OF ALL DIRT, DEBRIS, AND RUBBISH FOR THE DURATION OF THE WORK. UPON COMPLETION OF WORK, CONTRACTOR SHALL REMOVE ALL MATERIAL AND EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY.

10. NOTES AND DETAILS ON THE PLANS SHALL TAKE PRECEDENCE OVER GENERAL NOTES HEREIN.

11. DIMENSIONS CALLOUTS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON THE PLANS.

12. THE PLANS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF ALL CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURES, WORKS, AND THE PUBLIC DURING CONSTRUCTION.

13. MATERIAL SHALL NOT BE STORED OUTSIDE OF IDENTIFIED STAGING AREAS. THE CONTRACTOR SHALL USE ONLY DESIGNATED SPECIFIC SITES FOR STORAGE OF EQUIPMENT AND MATERIALS AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF ALL EQUIPMENT AND MATERIALS.

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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT PLOTTED TO ORIGINAL SCALE.

FISHERIES YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RH, TA, MF	LATITUDE	47°11'00"N
CHECKED	RH	LONGITUDE	121°42'00"W
DRAWN	MW, GM	TN/SC/RG	T20N/S31/R9E
CHECKED	RH	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

GENERAL NOTES

Aug 22, 2014 FINAL DRAWINGS

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GENERAL LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE
- EXISTING ROAD
- ACCESS ROAD
- CL CL — CLEARING LIMIT
- GL GL — GRADING LIMIT
- -5- — EXISTING MAJOR CONTOUR
- -1- — EXISTING MINOR CONTOUR
- 5 — PROPOSED MAJOR CONTOUR
- 1 — PROPOSED MINOR CONTOUR
- LOW FLOW CHANNEL
- EXISTING FLOW
- OHWM — EXISTING OHWM
- **OHWM** — PROPOSED OHWM
- MHHW — MEAN HIGHER HIGH WATER
- MHW MHW — MEAN HIGH WATER
- MLLW — MEAN LOWER LOW WATER
- 2-YR — 2-YEAR FLOOD BOUNDARY
- 100-YR — 100-YEAR FLOOD BOUNDARY
- SD SD — EXISTING STORM SEWER
- SS SS — EXISTING SANITARY SEWER
- WL WL — EXISTING WETLAND
- **WL WL** — PROPOSED WETLAND
- W W W — EXISTING WATER
- **W W W** — PROPOSED WATER
- TYPE 1 ELJ LOCATIONS
- EXPOSED GRAVEL BAR DURING LOW FLOW CONSTRUCTION PERIOD
- TYPE 2 ELJ
- TYPE 3 ELJ
- CONTROL POINT LOCATION

DETAIL AND SECTION REFERENCING

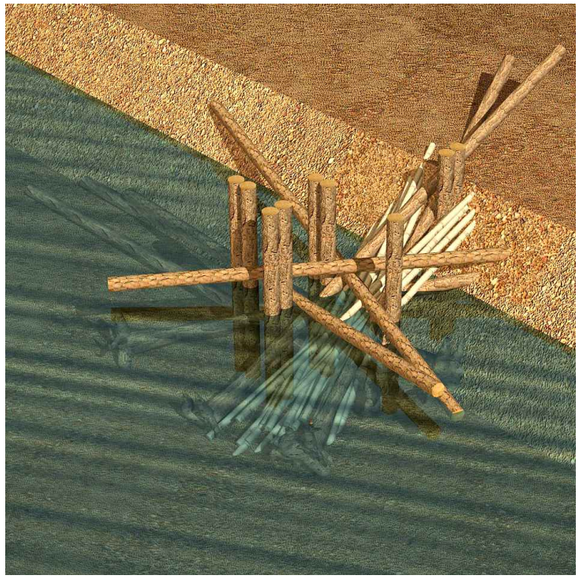
- 1 — NOTE REFERENCING NUMBER
- 4 / 6 — DETAIL REFERENCE NUMBER; SHEET ON WHICH DETAIL APPEARS
- 4 / 2 — DETAIL REFERENCE NUMBER; SHEET ON WHICH DETAIL APPEARS
- (TYP) — SPECIFIES THAT DETAIL IS UNIFORMLY TYPICAL THROUGHOUT PROJECT EXCEPT WHERE OTHERWISE NOTED
- (VAR) — SPECIFIES THAT DETAIL WAS TAKEN FROM SEVERAL SHEETS
- A / A32 — SECTION A–A IS SHOWN ON SHEET 32

SECTION A–A 32
SCALE: NTS

SECTION A–A IS SHOWN ON SHEET 32

REFERENCE IMAGE OF NATURALLY–OCCURING LOGJAM FOR TYPE 3 ELJ

REFERENCE IMAGE OF NATURALLY–OCCURING LOGJAM FOR TYPE 1 ELJ LOCATED AT RM 185.65



VISUALIZATION OF TYPE 1 ELJ DURING SPRING AND SUMMER FLOW

State of Washington — Licensed Geologist — 1151 — Timothy B. Abbe

Michael E. Hrachovec — State of Washington — 36039 — Registered Professional Engineer

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Fisheries — Yakama Nation

Natural Systems Design

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YAKIMA RIVER EDGE HABITAT PROJECT

LEGEND

SHEET 3 OF 9

Aug 22, 2014 FINAL DRAWINGS

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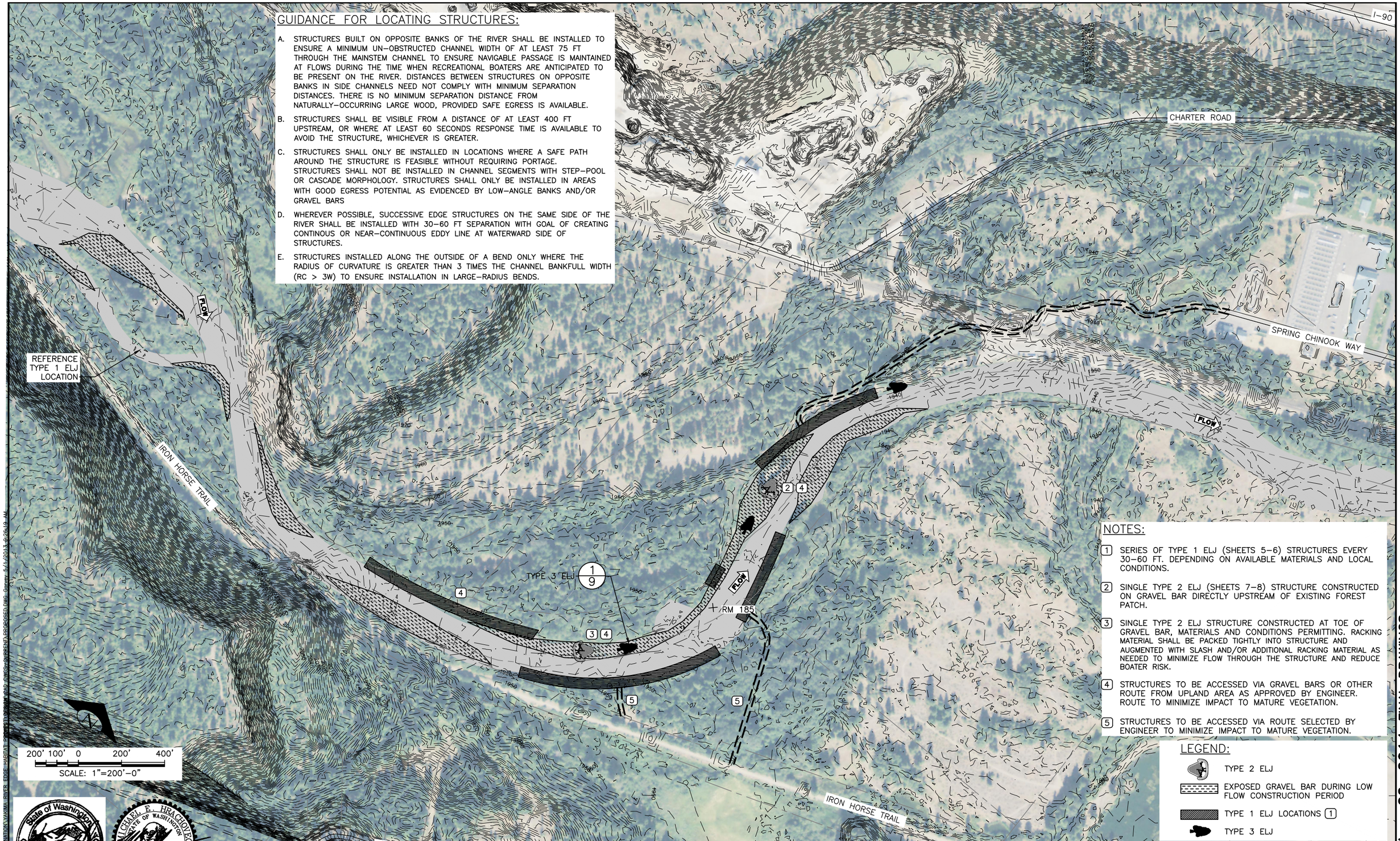

GUIDANCE FOR LOCATING STRUCTURES:

A. STRUCTURES BUILT ON OPPOSITE BANKS OF THE RIVER SHALL BE INSTALLED TO ENSURE A MINIMUM UN-OBSTRUCTED CHANNEL WIDTH OF AT LEAST 75 FT THROUGH THE MAINSTEM CHANNEL TO ENSURE NAVIGABLE PASSAGE IS MAINTAINED AT FLOWS DURING THE TIME WHEN RECREATIONAL BOATERS ARE ANTICIPATED TO BE PRESENT ON THE RIVER. DISTANCES BETWEEN STRUCTURES ON OPPOSITE BANKS IN SIDE CHANNELS NEED NOT COMPLY WITH MINIMUM SEPARATION DISTANCES. THERE IS NO MINIMUM SEPARATION DISTANCE FROM NATURALLY-OCCURRING LARGE WOOD, PROVIDED SAFE EGRESS IS AVAILABLE.

B. STRUCTURES SHALL BE VISIBLE FROM A DISTANCE OF AT LEAST 400 FT UPSTREAM, OR WHERE AT LEAST 60 SECONDS RESPONSE TIME IS AVAILABLE TO AVOID THE STRUCTURE, WHICHEVER IS GREATER.

C. STRUCTURES SHALL ONLY BE INSTALLED IN LOCATIONS WHERE A SAFE PATH AROUND THE STRUCTURE IS FEASIBLE WITHOUT REQUIRING PORTAGE. STRUCTURES SHALL NOT BE INSTALLED IN CHANNEL SEGMENTS WITH STEP-POOL OR CASCADE MORPHOLOGY. STRUCTURES SHALL ONLY BE INSTALLED IN AREAS WITH GOOD EGRESS POTENTIAL AS EVIDENCED BY LOW-ANGLE BANKS AND/OR GRAVEL BARS

D. WHEREVER POSSIBLE, SUCCESSIVE EDGE STRUCTURES ON THE SAME SIDE OF THE RIVER SHALL BE INSTALLED WITH 30-60 FT SEPARATION WITH GOAL OF CREATING CONTINOUS OR NEAR-CONTINUOUS EDDY LINE AT WATERWARD SIDE OF STRUCTURES.

E. STRUCTURES INSTALLED ALONG THE OUTSIDE OF A BEND ONLY WHERE THE RADIUS OF CURVATURE IS GREATER THAN 3 TIMES THE CHANNEL BANKFULL WIDTH (RC > 3W) TO ENSURE INSTALLATION IN LARGE-RADIUS BENDS.

NOTES:

1. SERIES OF TYPE 1 ELJ (SHEETS 5-6) STRUCTURES EVERY 30-60 FT. DEPENDING ON AVAILABLE MATERIALS AND LOCAL CONDITIONS.
2. SINGLE TYPE 2 ELJ (SHEETS 7-8) STRUCTURE CONSTRUCTED ON GRAVEL BAR DIRECTLY UPSTREAM OF EXISTING FOREST PATCH.
3. SINGLE TYPE 2 ELJ STRUCTURE CONSTRUCTED AT TOE OF GRAVEL BAR, MATERIALS AND CONDITIONS PERMITTING. RACKING MATERIAL SHALL BE PACKED TIGHTLY INTO STRUCTURE AND AUGMENTED WITH SLASH AND/OR ADDITIONAL RACKING MATERIAL AS NEEDED TO MINIMIZE FLOW THROUGH THE STRUCTURE AND REDUCE BOATER RISK.
4. STRUCTURES TO BE ACCESSED VIA GRAVEL BARS OR OTHER ROUTE FROM UPLAND AREA AS APPROVED BY ENGINEER. ROUTE TO MINIMIZE IMPACT TO MATURE VEGETATION.
5. STRUCTURES TO BE ACCESSED VIA ROUTE SELECTED BY ENGINEER TO MINIMIZE IMPACT TO MATURE VEGETATION.

LEGEND:

- TYPE 2 ELJ
- EXPOSED GRAVEL BAR DURING LOW FLOW CONSTRUCTION PERIOD
- TYPE 1 ELJ LOCATIONS (1)
- TYPE 3 ELJ

State of Washington Licensed Geologist 1151 Timothy B. Abbe

MICHAEL E. HRACHOVEC STATE OF WASHINGTON 36039 REGISTERED PROFESSIONAL ENGINEER

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YAKIMA RIVER EDGE HABITAT PROJECT

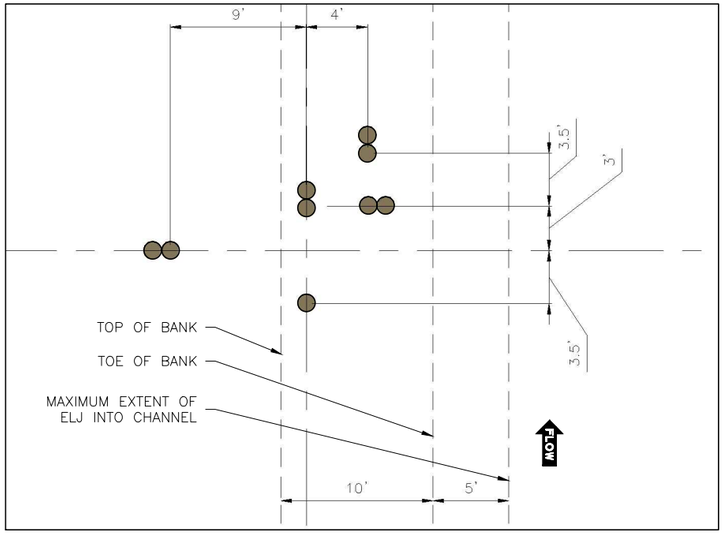
PROPOSED

4

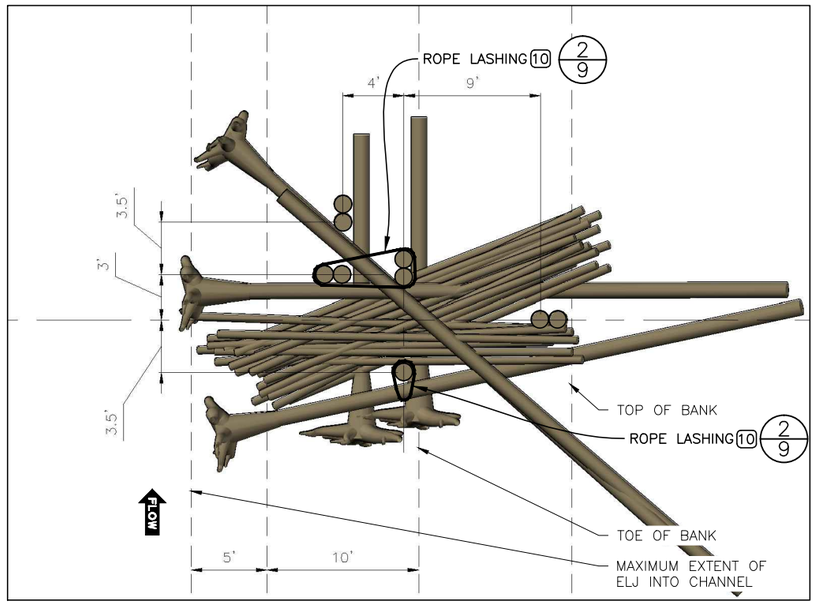
SHEET 4 OF 9

Aug 22, 2014 FINAL DRAWINGS

TYPE 1 ELJ – LOG SCHEDULE				
LOG ID	DIA* (IN)	LENGTH** (FT)	ROOTWAD (Y/N)	QUANTITY PER STRUCTURE
1	14	25	N	9
2	14	40	Y	5
3	14	40	OPTIONAL	1
4	14	20	Y	2
* MINIMUM DIAMETER AT BREAST HEIGHT (2" MAXIMUM TAPER)				
** TOTAL LENGTH INCLUDING ROOTWAD				



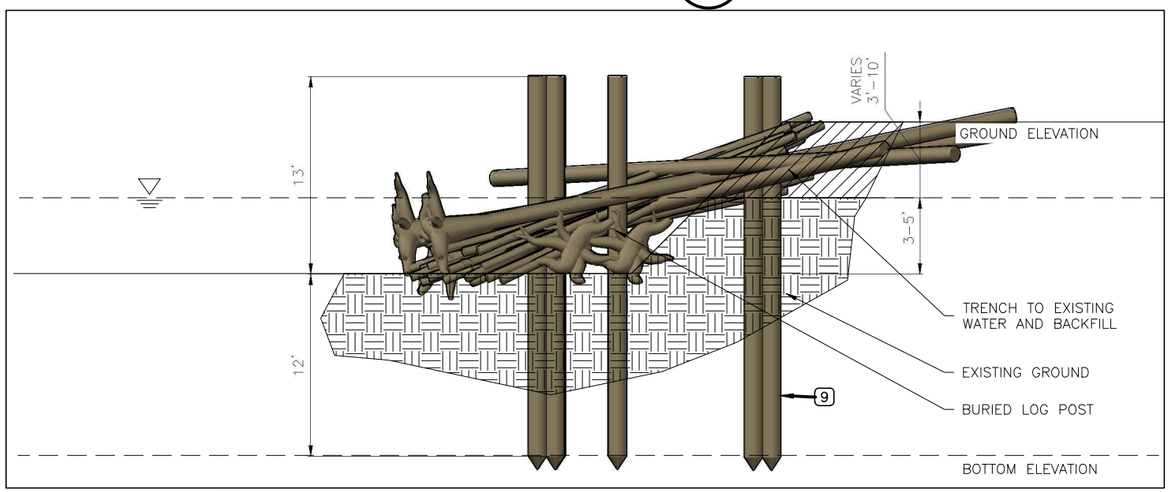
TYPE 1 ELJ LEFT BANK POST LAYOUT PLAN 1/4
SCALE: 1"=5'



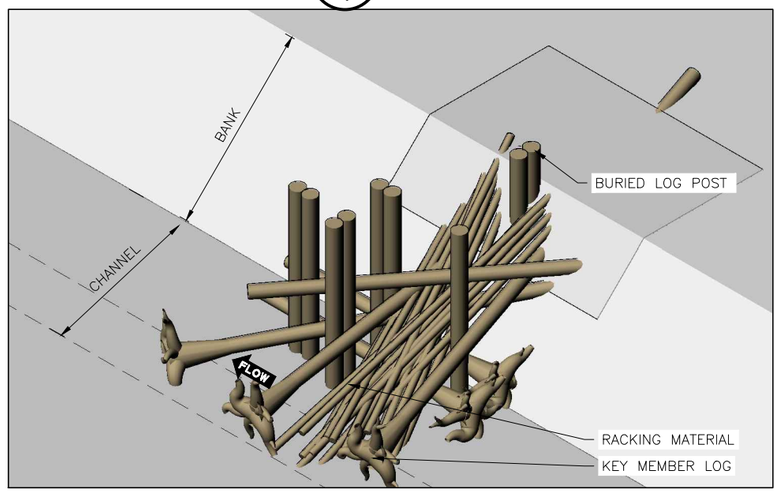
TYPE 1 ELJ RIGHT BANK STRUCTURE PLAN 2/4
SCALE: 1"=5'

TYPE 1 ELJ STRUCTURE NOTES

1. FINAL ELJ HEIGHT TO BE ACHIEVED AS SPECIFIED REGARDLESS OF ACTUAL LOG DIAMETERS USED OR STACKING ARRANGEMENT.
2. ALL LARGE WOOD DIMENSIONS DO NOT INCLUDE BARK THICKNESS.
3. RACKING MATERIAL SHALL CONSIST OF APPROXIMATELY 20 INDIVIDUAL LOGS PER STRUCTURE WITH 6" – 12" DIA DBH AND A MINIMUM OF 20–FEET LENGTH. RACKING PLACEMENT SHALL BE TIGHTLY PLACED AND AUGMENTED WITH SLASH WITH EACH LAYER PLACEMENT TO ENSURE RACKING MATERIAL EXTENDS THROUGH STRUCTURE, IS PINNED IN PLACE BY SUBSEQUENT LAYERS, TO MINIMIZE FLOW THROUGH THE STRUCTURE TO REDUCE BOATER RISK.
4. THE CONTRACTOR SHALL FIELD VERIFY WITH THE OWNER REPRESENTATIVE OR ENGINEER ALL POST LOCATIONS, LENGTHS, WIDTHS AND ELEVATIONS PRIOR TO EXCAVATION, ASSEMBLY AND INSTALLATION OF EACH STRUCTURE. CARE SHOULD BE TAKEN TO MINIMIZE DISTURBANCE TO TREES GROWING ON RIVER BANK AND ALL CLEARING MUST BE APPROVED BY THE OWNER REPRESENTATIVE OR ENGINEER.
5. LOCATIONS FOR ALL STRUCTURE PLACEMENTS WILL BE STAKED IN FIELD BY THE ENGINEER OR OWNER REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
6. EXCAVATION LIMITS SHALL BE FIELD VERIFIED BY THE OWNER'S REPRESENTATIVE OR ENGINEER PRIOR TO EXCAVATION COMMENCING AND PLACEMENT OF ANY LARGE WOOD.
7. LOG TYPE IDENTIFICATION SHALL BE PAINTED ON ALL LOGS BY THE CONTRACTOR IN A PLACE VISIBLE FOR FIELD VERIFICATION PRIOR TO PLACEMENT WITH LEAD–FREE, BLAZE–ORANGE SURVEY MARKING PAINT.
8. MATERIAL TO BE EXCAVATED FOR TRENCHING MAY CONTAIN VEGETATION, TREES, SOIL, LARGE ROCKS, COBBLE, GRAVEL AND/OR RUBBLE. TRENCH VOLUME AND PLACEMENT WILL VARY TO SUIT SITE CONDITIONS AND IS APPROXIMATELY 40 CY PER STRUCTURE. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET TO MAXIMUM EXTENT PRACTICAL WHEN RE–INSTALLING EXCAVATED MATERIAL. UPSLOPE AREA MAY ALSO NEED TO BE RE–GRADED TO FACILITATE STRUCTURE INSTALLATION. LARGE ROCK MOVED DURING EXCAVATION FOR TRENCHING SHALL BE REPLACED IN LOCATION SPECIFIED BY ENGINEER OR OWNER REPRESENTATIVE. SITE TO BE RESTORED TO APPROXIMATE ORIGINAL CONTOURS, WITH EXCESS SOILS POTENTIALLY MOUNDED ON TOP OF LOG ENDS OR DISPERSED ADJACENT TO STRUCTURE AS DIRECTED BY ENGINEER.
9. LOG POSTS TO BE INSTALLED USING VIBRATORY–DRIVEN APPROACH OF TRACKHOE–MOUNTED HOE–PACK FITTED WITH STEEL RETAINING COLLAR WELDED TO FOOT OF HOE–PACK UNIT. IMPACT–DRIVING WITH PILE DRIVING EQUIPMENT WILL NOT BE ALLOWED. POSTS MAY BE INSTALLED AT UP TO 20–DEGREE ANGLE AS DIRECTED BY ENGINEER TO RETAIN KEY MEMBERS AND/OR RACKING MATERIAL. ARRANGEMENTS OF POSTS AND KEY MEMBERS AND RACKING MATERIAL MAY BE ADJUSTED BY ENGINEER TO SUIT SITE CONSTRAINTS. BROKEN POSTS SHALL BE AUGMENTED WITH ADDITIONAL POSTS ADJACENT TO THE ORIGINAL. UP TO TWO ADDITIONAL POSTS MAY BE INSTALLED AS DIRECTED BY ENGINEER IF NEEDED TO SUIT SITE CONDITIONS.
10. 1" MANILA ROPE SHALL BE TIGHTLY LASHED MIN 3 TIMES AROUND POSTS AND LOGS AND SECURED WITH 1" STEEL U–CLAMPS, 4 TOTAL, TO RETAIN LOGS WITHIN POSTS AGAINST BUOYANT FORCES. ROPE TO BE SECURED TO FIRST POST WITH A CLOVE HITCH, AND TO THE FINAL POST WITH A CLOVE HITCH. THE ROPE SHALL BE PULLED TIGHT WITH TRACKHOE BUCKET PRIOR TO INSTALLING FINAL CLOVE HITCH. A MINIMUM OF 4' OF ROPE SHALL EXTEND FROM THE TAIL OF EACH CLOVE HITCH AND THAT PORTION SHALL BE CLAMPED TWICE TO THE ROPE LOOPS.



TYPE 1 ELJ STRUCTURE PROFILE 3/4
SCALE: 1"=5'



TYPE 1 ELJ PERSPECTIVE 4/4
NOT TO SCALE

State of Washington — Timothy B. Abbe — Licensed Geologist — 1151

MICHAEL E. HRACHOVEC — STATE OF WASHINGTON — 36039 — REGISTERED PROFESSIONAL ENGINEER

0 Ø 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT PLOTTED TO ORIGINAL SCALE.

FISHERIES — YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RH, TA, MF	LATITUDE	47°11'00"N
CHECKED	RH	LONGITUDE	121°42'00"W
DRAWN	MW, GM	TN/SC/RG	T20N/S31/R9E
CHECKED	RH	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

TYPE 1 ELJ DETAILS

SHEET 5 OF 9

Aug 22, 2014 FINAL DRAWINGS

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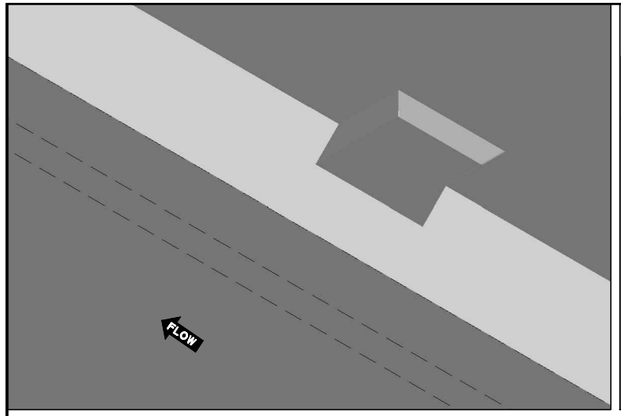
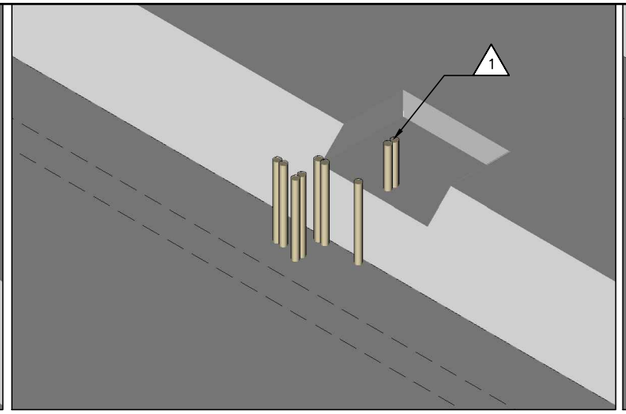
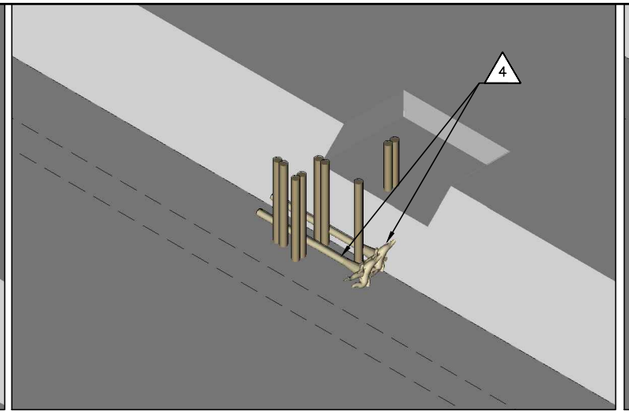


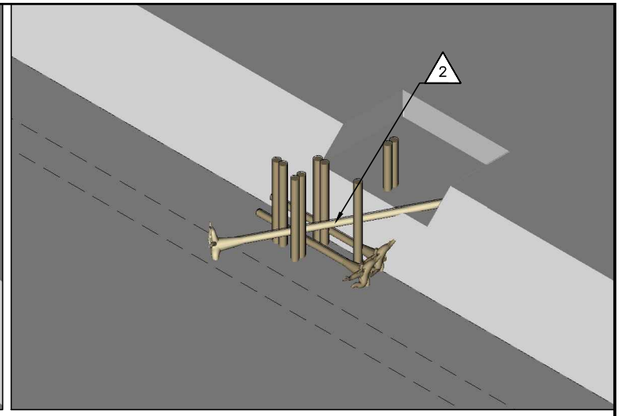
LAYER 1
TRENCH BANK TO WATER LINE AT LOCATION OF ELJ.
ADJUST BANK GRADING AS NEEDED TO PROVIDE MACHINE ACCESS.



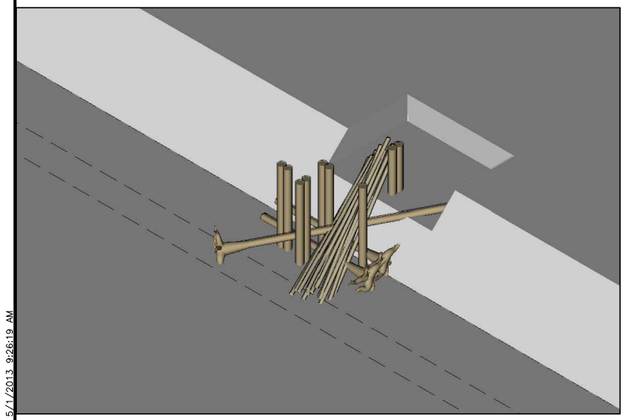
LAYER 2
PLACE NINE POSTS



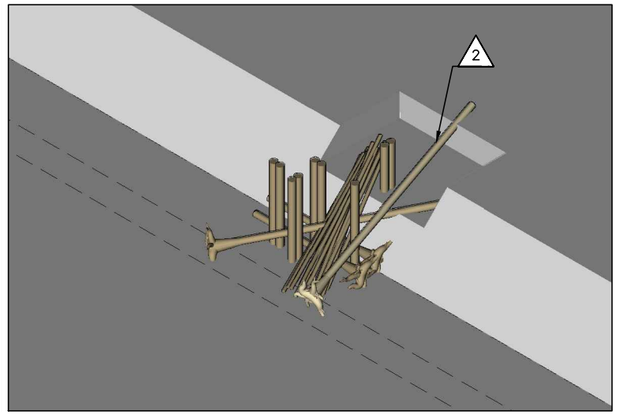
LAYER 3
PLACE TWO FRAME LOG MEMBERS



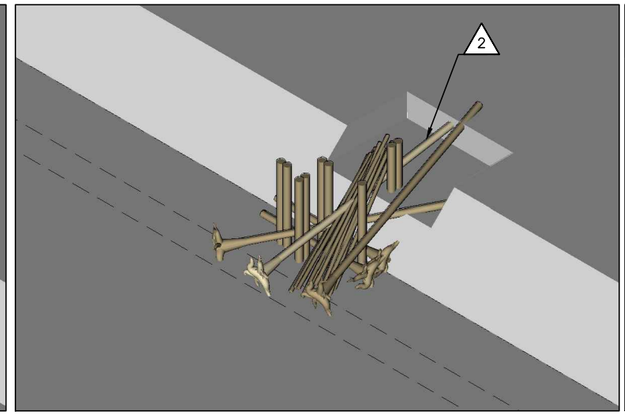
LAYER 4
PLACE ONE FRAME LOG MEMBERS



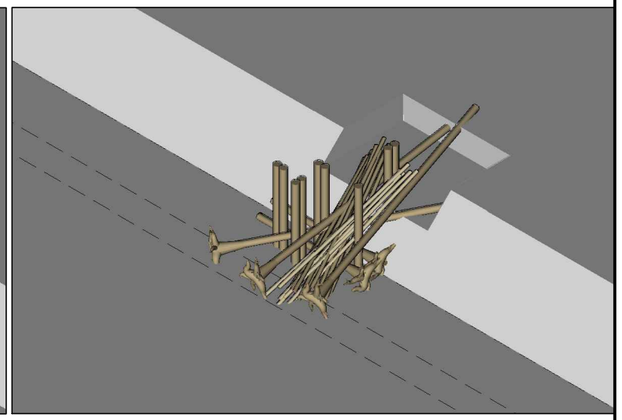
LAYER 5
INSERT RACKING MATERIAL REGULAR AND TIGHT



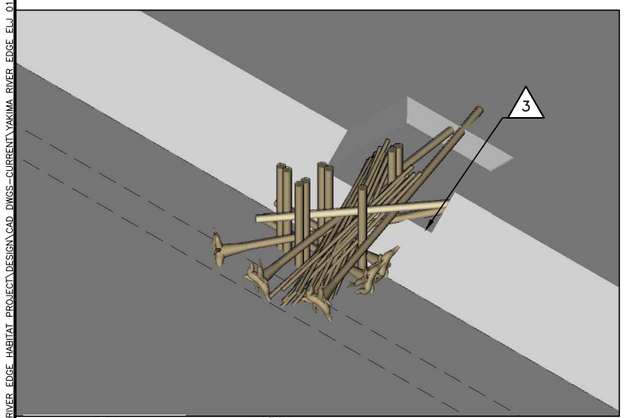
LAYER 6
PLACE ONE FRAME LOG MEMBER



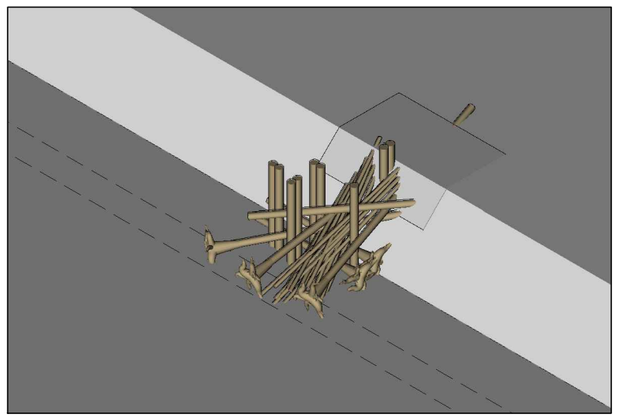
LAYER 7
PLACE ONE FRAME LOG MEMBER



LAYER 8
INSERT RACKING MATERIAL REGULAR AND TIGHT



LAYER 9
PLACE ONE FRAME LOG MEMBER



LAYER 10
BACKFILL TRENCHED AREA WITH NATIVE ALLUVIUM

State of Washington
Timothy B. Abbe
1151
Licensed Geologist

MICHAEL E. HRACHOVEC
STATE OF WASHINGTON
36039
REGISTERED
PROFESSIONAL ENGINEER

0 Ø 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT PLOTTED TO ORIGINAL SCALE.

FISHERIES
YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RH, TA, MF	LATITUDE	47°11'00"N
CHECKED	RH	LONGITUDE	121°42'00"W
DRAWN	MW, GM	TN/SC/RG	T20N/S31/R9E
CHECKED	RH	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

TYPE 1 ELJ LAYERING PLAN

6

SHEET 6 OF 9

Aug 22, 2014 FINAL DRAWINGS

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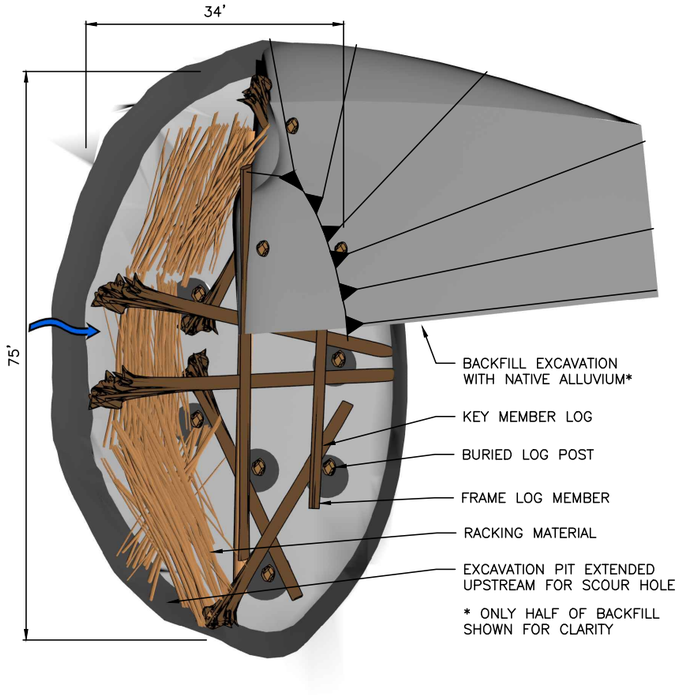
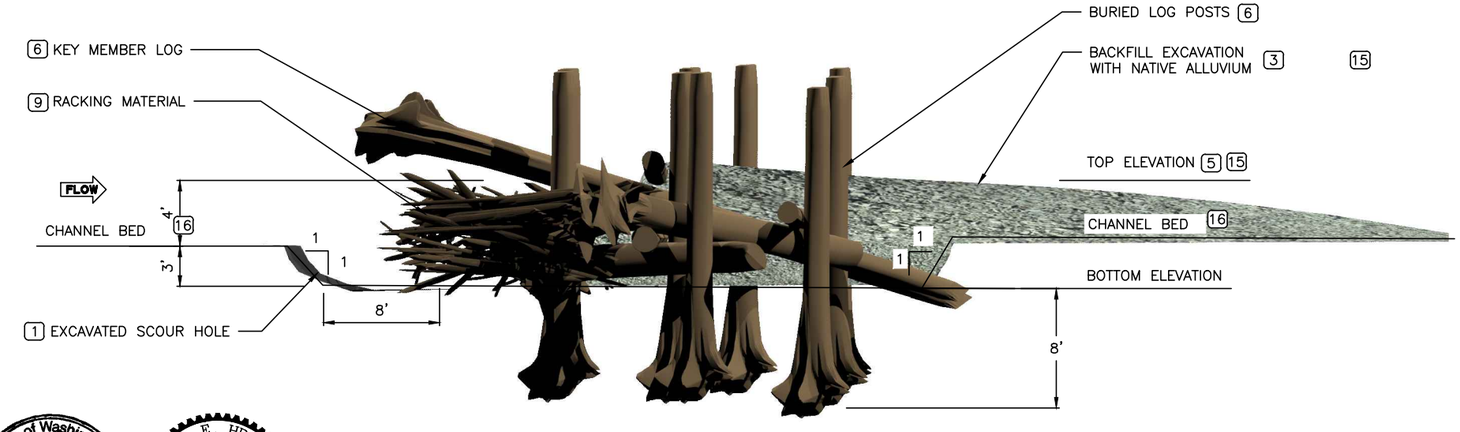


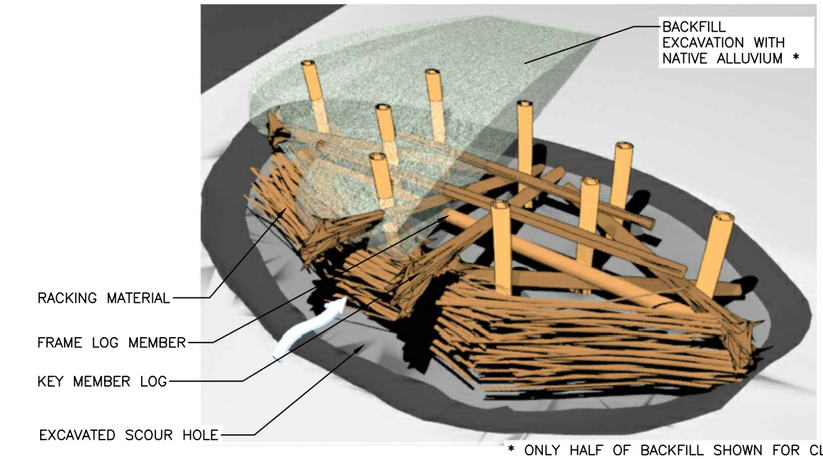
TYPE 2 ELJ STRUCTURE NOTES

1. EXCAVATE IN FRONT OF LOGJAM FOR PLACEMENT OF RACKING MATERIAL. EXCAVATION AREA SHALL NOT BE BACKFILLED WITH ALLUVIUM, BUT LEFT AS A SCOUR HOLE.
2. EXCAVATION SPOILS SHALL BE STAGED ADJACENT TO THE LOGJAM. SPOILS SHALL ALSO BE STOCKPILED TO ALLOW LOG LAYER PLACEMENT AND CONSTRUCTION ACCESS.
3. BACKFILL EXTENTS MAY VARY AND TO BE CONSTRUCTED WITH NATIVE ALLUVIUM FROM EXCAVATION SPOILS.
4. BACKFILL EACH STRUCTURE LAYER WITH NATIVE ALLUVIUM FLUSH WITH THE CURRENT LAYER PRIOR TO PLACEMENT OF THE SUBSEQUENT LAYER.
5. FINAL ELJ HEIGHT TO BE ACHIEVED AS SPECIFIED REGARDLESS OF ACTUAL LOG DIAMETERS USED OR STACKING ARRANGEMENT.
6. ALL LARGE WOOD DIMENSIONS DO NOT INCLUDE BARK THICKNESS.
7. COVER TOP OF BACKFILL AREA AND BASE OF STRUCTURES 6–12 INCHES WITH LOOSE WOOD DEBRIS AND CHIPS.
8. TIE FRAME LOG MEMBERS PER INSTRUCTIONS ON LAYERING PLAN TO VERTICAL POSTS. TIE ROPE TO POST WITH CLOVE HITCH LEAVING A 4' LENGTH OF ROPE. THEN INSTALL 3 LOOPS OF 1" MANILA ROPE AROUND ADJACENT LOGS. ALL CLAMPS AND HAND SPLICING SHALL BE PER THE MANUFACTURER SPECIFICATIONS. TIGHTEN ROPE TO APPROXIMATELY 500–POUNDS TENSION WITH EXCAVATOR BUCKET, TIE OFF WITH A CLOVE HITCH THEN INSTALL 2 CLAMPS EACH TO FASTEN THE ROPE ENDS TO THE LOOPS.
9. RACKING MATERIAL SHALL CONSIST OF APPROXIMATELY 150 CU. YDS PER STRUCTURE WITH 6" – 12" DIA DBH AND A MINIMUM OF 20–FEET LENGTH. RACKING PLACEMENT SHALL OCCUR WITH EACH LAYER PLACEMENT TO ENSURE RACKING MATERIAL EXTENDS THROUGH STRUCTURE AND PINNED IN PLACE BY SUBSEQUENT LAYERS.
10. THE CONTRACTOR SHALL FIELD VERIFY WITH THE OWNER REPRESENTATIVE OR ENGINEER ALL STRUCTURE LOCATIONS, PILE LOCATIONS, LENGTHS, WIDTHS AND ELEVATIONS PRIOR TO EXCAVATION, ASSEMBLY AND INSTALLATION OF EACH STRUCTURE.
11. LOCATIONS FOR ALL STRUCTURE PLACEMENTS WILL BE STAKED IN FIELD BY THE ENGINEER OR OWNER REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
12. EXCAVATION LIMITS SHALL BE FIELD VERIFIED BY THE OWNER REPRESENTATIVE OR ENGINEER PRIOR TO EXCAVATION COMMENCING AND PLACEMENT OF ANY LARGE WOOD.
13. LOG TYPE IDENTIFICATION SHALL BE PAINTED ON ALL LOGS BY THE CONTRACTOR IN A PLACE VISIBLE FOR FIELD VERIFICATION PRIOR TO PLACEMENT WITH LEAD–FREE, BLAZE–ORANGE SURVEY MARKING PAINT.
14. THE WOOD LAYER PLACEMENT IN EACH LOGJAM LAYER SHALL BE FIELD VERIFIED BY ON–SITE OWNER REPRESENTATIVE PRIOR TO BACKFILLING.
15. BACKFILL NOT TO EXCEED TOP ELEVATION. EXCESS BACKFILL TO BE PLACED DOWNSTREAM OF FINISHED ELJ.
16. CHANNEL BED ELEVATION IS REPRESENTATIVE OF A LOCAL AVERAGE CHANNEL BED AT RIFFLES. CHANNEL BED ELEVATION SHOULD NOT BE TAKEN IN POOLS.

TYPE 2 ELJ PLAN
SCALE: 1"=10'



TYPE 2 ELJ PROFILE
SCALE: 1"=5'



* ONLY HALF OF BACKFILL SHOWN FOR CLARITY

TYPE 2 ELJ PERSPECTIVE

State of Washington — Timothy B. Abbe — 1151 — Engineering Geologist — Licensed Geologist

MICHAEL E. HRACHOVEC — 36039 — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON

0 Ø 1
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FISHERIES — YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RLE TA, MF	LATITUDE	48°49'00"N
CHECKED	RN	LONGITUDE	122°68'00"W
DRAWN	MW, GM	TN/SC/RG	T38N/S27/R8E
CHECKED	RLE	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

TYPE 2 ELJ DETAILS

SHEET 7 OF 9

Aug 22, 2014 FINAL DRAWINGS

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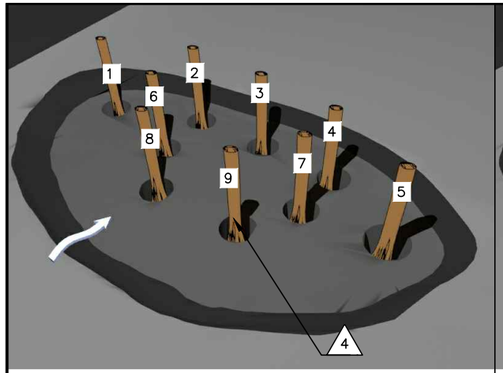
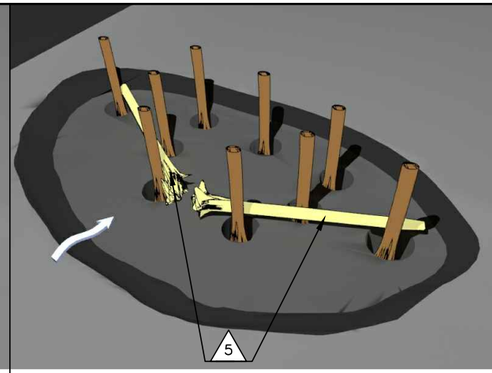
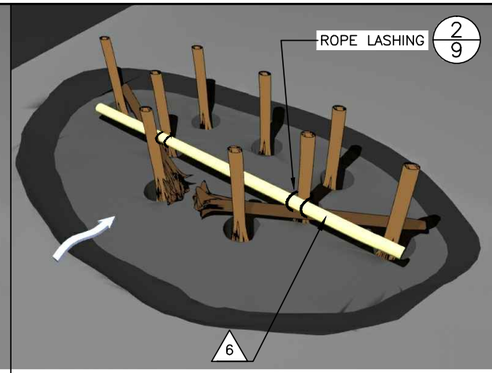


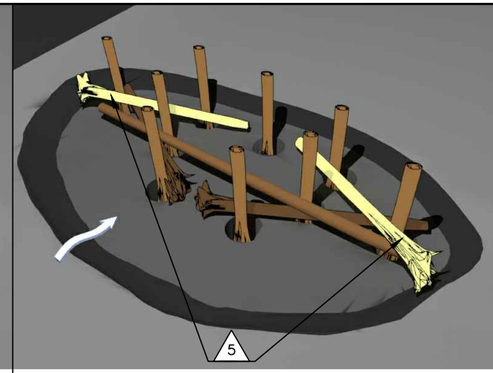
LAYER 0
EXCAVATE, PLACE, AND BACKFILL NINE VERTICAL LOG POSTS



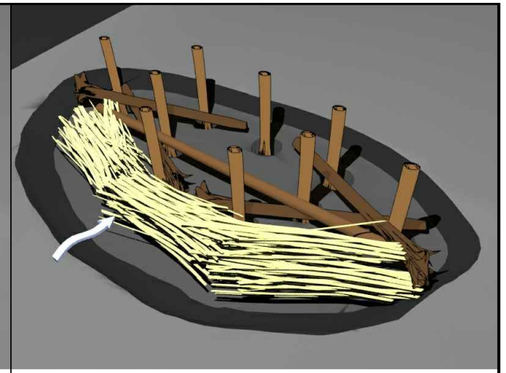
LAYER 1
PLACE TWO FRAME LOG MEMBERS



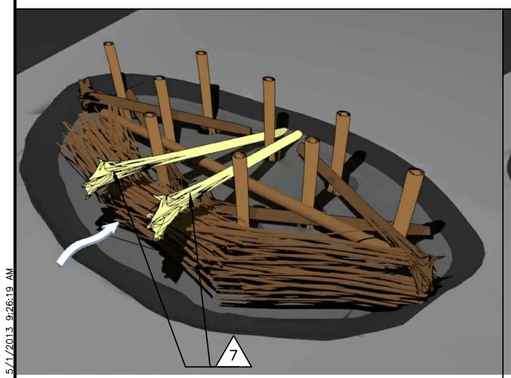
LAYER 2
PLACE ONE FRAME LOG MEMBER AND ROPE LASH TO VERTICAL POSTS



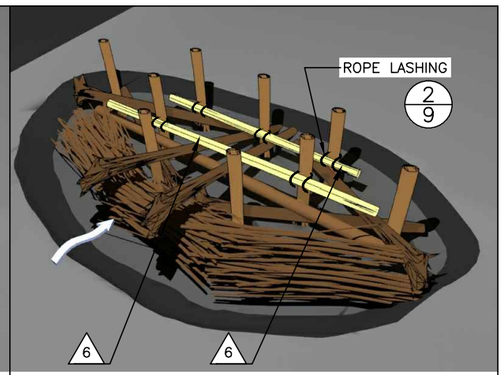
LAYER 3
PLACE TWO FRAME LOG MEMBERS



LAYER 4
PLACE RACKING MATERIAL INTERLOCKED AND TIGHT



LAYER 5
PLACE TWO FRAME LOG MEMBERS



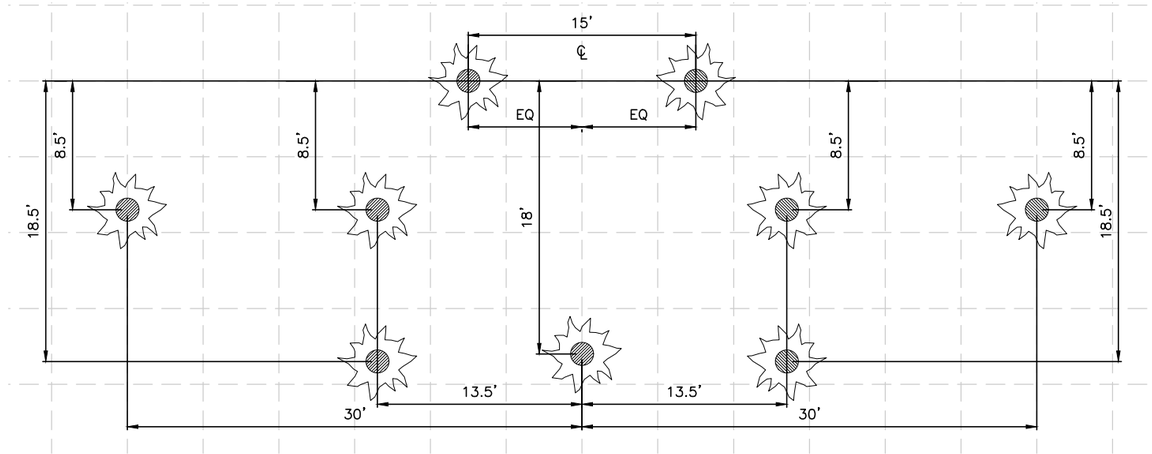
LAYER 6
PLACE TWO FRAME LOG MEMBERS AND ROPE LASH TO VERTICAL POSTS

TYPE 2 ELJ - LOG SCHEDULE

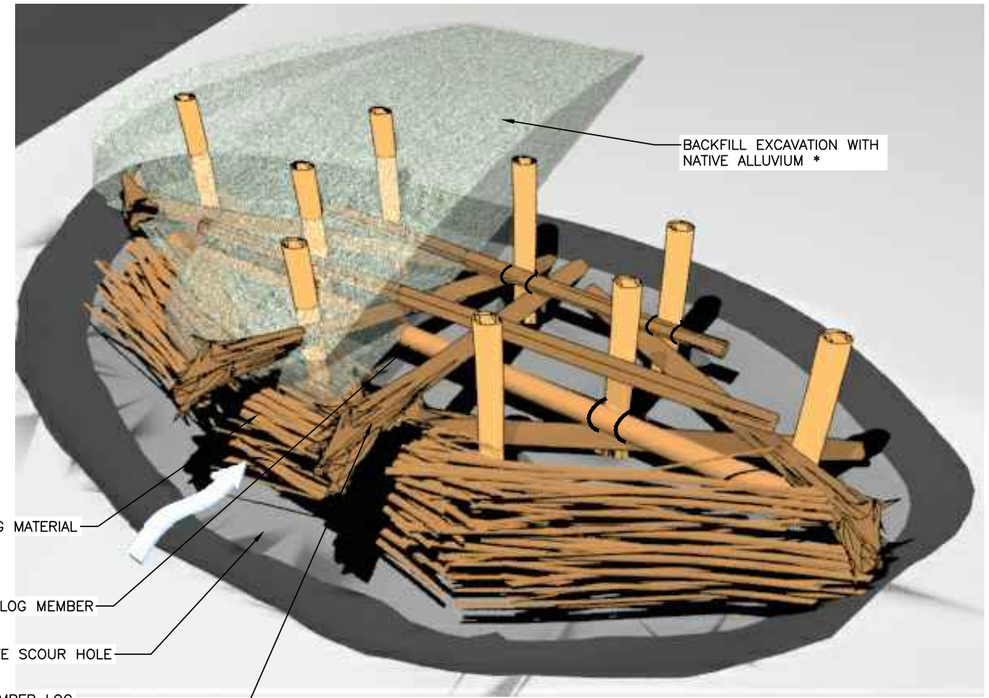
LOG ID	DIA* (IN)	LENGTH** (FT)	ROOTWAD (Y/N)	QUANTITY PER STRUCTURE
4	14	20	Y	9
5	14	40	Y	4
6	14	50	N	3
7	14	50	Y	2

** DIAMETER AT BREAST HEIGHT*

*** TOTAL LENGTH INCLUDING ROOTWAD*



TYPE 2 ELJ POST LAYOUT
SCALE: 1" = 5'



* ONLY HALF OF BACKFILL SHOWN FOR CLARITY

COMPLETED TYPE 2 ELJ

State of Washington — Timothy B. Abbe — 1151 — Licensed Geologist

MICHAEL E. HRACHOVEC — STATE OF WASHINGTON — 36039 — REGISTERED PROFESSIONAL ENGINEER

0 Ø 1
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FISHERIES — YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RH, TA, MF	LATITUDE	47°11'00"N
CHECKED	RH	LONGITUDE	121°42'00"W
DRAWN	MW, GM	TN/SC/RG	T20N/S31/R9E
CHECKED	RH	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

TYPE 2 ELJ LAYERING PLAN

8

SHEET 8 OF 9

Aug 22, 2014 FINAL DRAWINGS

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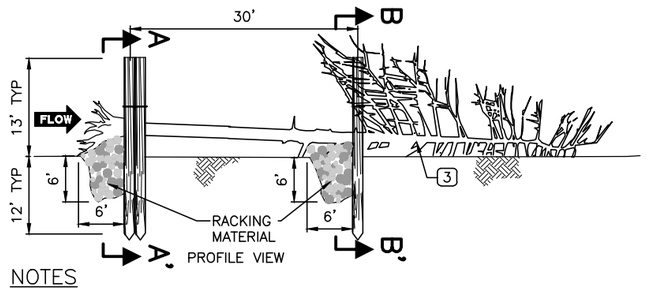
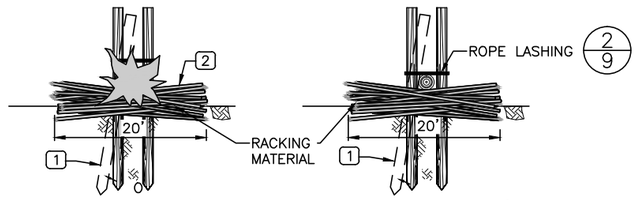


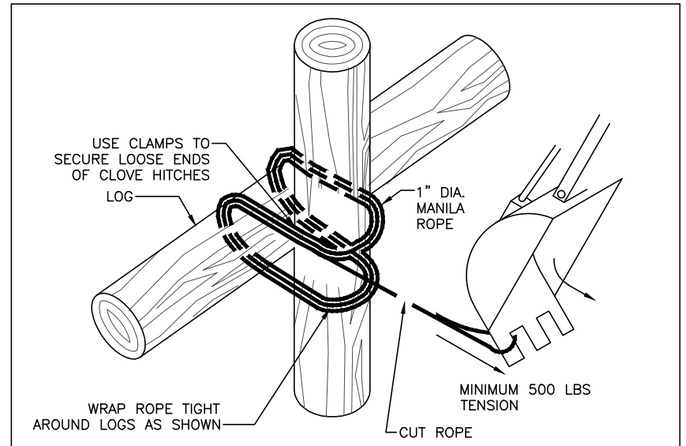
NOTES

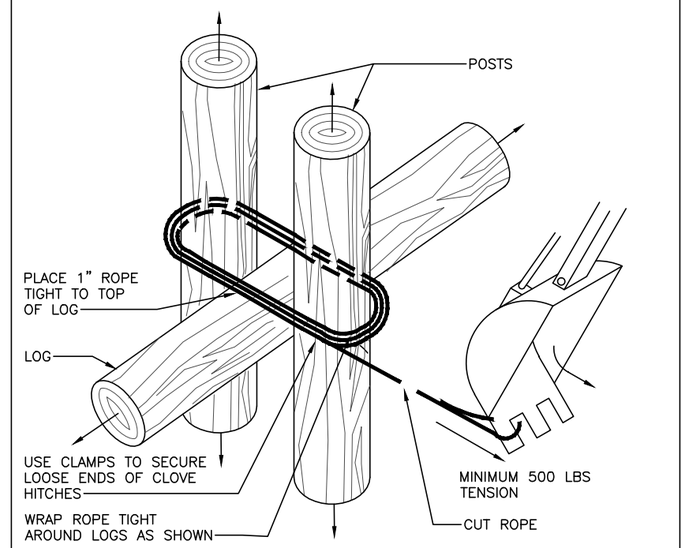
1. LOG POSTS TO BE INSTALLED USING VIBRATORY–DRIVEN APPROACH OF TRACKHOE–MOUNTED HOE–PACK FITTED WITH STEEL RETAINING COLLAR WELDED TO FOOT OF HOE–PACK UNIT. IMPACT–DRIVING WITH PILE DRIVING EQUIPMENT WILL NOT BE ALLOWED. POSTS MAY BE INSTALLED AT UP TO 20–DEGREE ANGLE AS DIRECTED BY ENGINEER TO RETAIN KEY MEMBERS AND/OR RACKING MATERIAL. ARRANGEMENTS OF POSTS AND KEY MEMBERS AND RACKING MATERIAL MAY BE ADJUSTED BY ENGINEER TO SUIT SITE CONSTRAINTS. BROKEN POSTS SHALL BE AUGMENTED WITH ADDITIONAL POSTS ADJACENT TO THE ORIGINAL. UP TO TWO ADDITIONAL POSTS MAY BE INSTALLED AS DIRECTED BY ENGINER IF NEEDED TO SUIT SITE CONDITIONS.
2. RACKING MATERIAL SHALL CONSIST OF APPROXIMATELY 40 INDIVIDUAL LOGS PER STRUCTURE WITH 6"– 12" AVERAGE DIAMETER AND A MINIMUM OF 20 FEET LENGTH. MATERIALS EXCAVATED TO ALLOW PLACEMENT OF RACKING MATERIAL WILL BE DISPERSED ON ADJACENT BAR AS DIRECTED BY ENGINEER.
3. KEY MEMBER TO BE WHOLE TREE, MIN 14" DBH WITH ROOT WAD MIN 8 FT DIAMETER, MIN LENGTH OF 60 FT, WITH BRANCHES INTACT. PROTECT ROOTS AND BRANCHES FROM DAMAGE WHILE STAGING AND INSTALLING TREE.



TYPE 3 ELJ 1/4

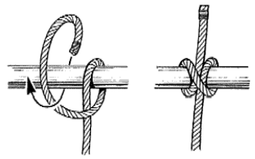
SCALE: 1" = 10'





NOTES

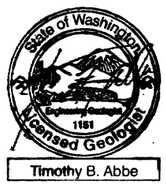
1. ALL LASHING TO HAVE A MINIMUM OF 3 WRAPS PER LASH.
2. START AND END WITH A CLOVE HITCH.
3. ROPE ENDS TO BE CLAMPED TWICE PER ROPE END. CLAMP TO HAVE AN INNER DIAMETER OF 1".



Clove Hitch

ROPE LASHING 2/5,8,9

NTS



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FISHERIES YAKAMA NATION

Natural Systems Design

NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RH, TA, MF	LATITUDE	47°11'00"N
CHECKED	RH	LONGITUDE	121°42'00"W
DRAWN	MW, GM	TN/SC/RG	T20N/S31/R9E
CHECKED	RH	DATE	6/18/2014

YAKIMA RIVER EDGE HABITAT PROJECT

RESTORATION DETAILS

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SHEET 9 OF 9

Aug 22, 2014 FINAL DRAWINGS

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