

## **APPENDIX B**

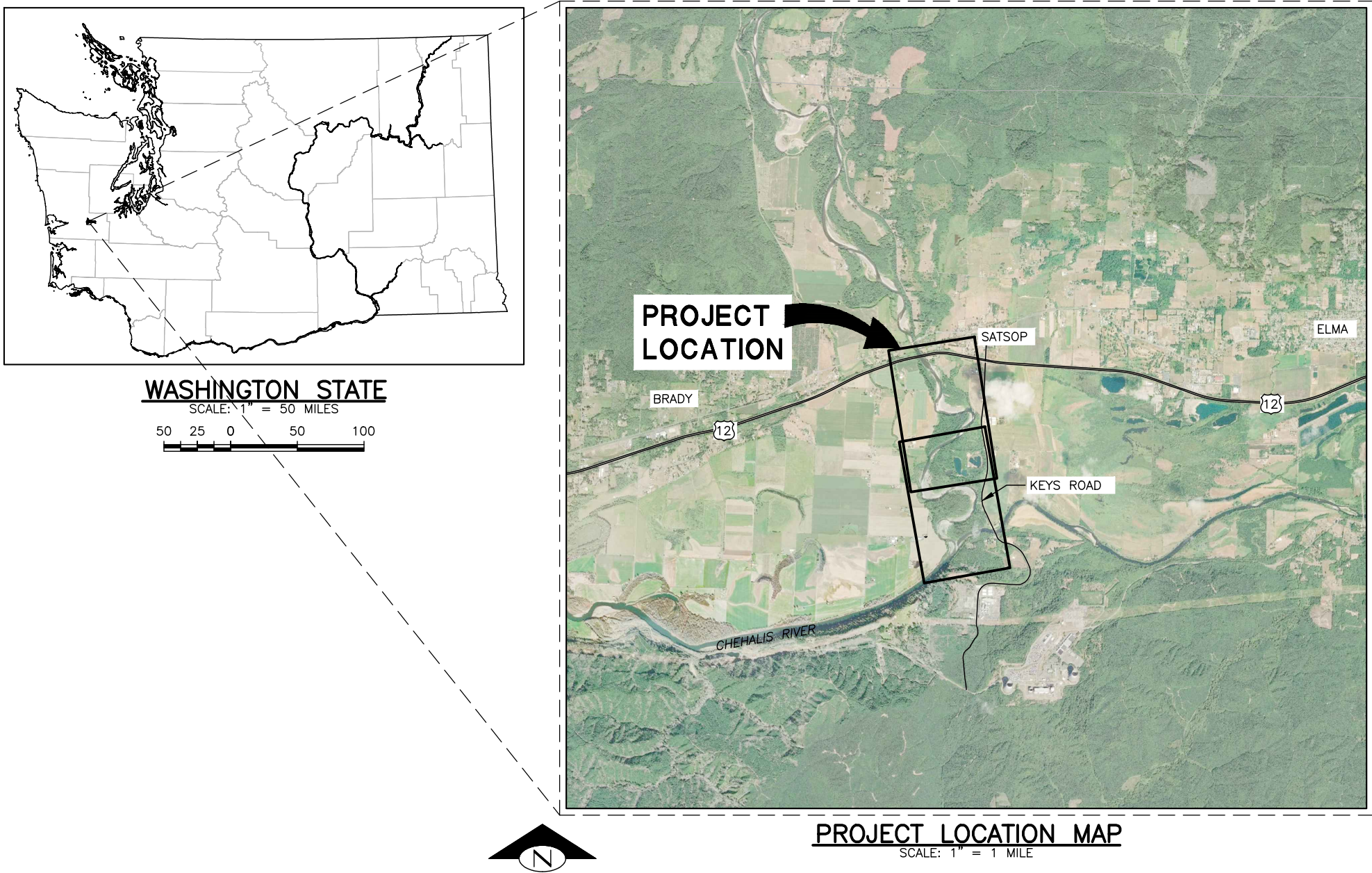
### **Draft Preliminary Design**

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# LOWER SATSOP ASSESSMENT AND DESIGN

## PHASE I PRELIMINARY DESIGN

### GRAYS HARBOR COUNTY



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11	FLOODPLAIN ROUGHNESS ELJ DETAILS
12	RELIEF CHANNEL PROFILE AND SECTIONS
13	DETAILS – TESC

#### CONTACT INFORMATION

##### NATURAL SYSTEMS DESIGN, INC

1900 N NORTHLAKE WAY, SUITE 211  
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(206) 834-0175

##### GRAYS HARBOR COUNTY

DEPARTMENT OF PUBLIC WORKS  
110 WEST BROADWAY, SUITE 31  
MONTESANO, WA 98563  
(360) 249-4222

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



NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RLE, MS	LATITUDE	47°03'49"N
CHECKED	RLE	LONGITUDE	123°29'29"W
DRAWN	MS, GM	TN/SC/RG	T18W/S12/R7W
CHECKED	RLE	DATE	2/14/2019

LOWER SATSOP ASSESSMENT  
AND DESIGN

COVER SHEET

1  
SHEET 1 OF 13

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Sep 27, 2019 PHASE I PRELIMINARY DESIGN 60% NOT FOR CONSTRUCTION



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GENERAL NOTES

1. THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF GRAYS HARBOR COUNTY, HEREAFTER REFERRED TO AS "OWNER" AND "CONTRACTOR" 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 WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WASHDOT) 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 (WASHDOT) 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 ANCHOR QEA AND WAS COLLECTED AS PART OF THE CHEHALIS BASIN LIDAR ACQUISITION AND IS REPRESENTATIVE OF 2017 CONDITIONS. THE VERTICAL DATUM IS NAVD88 GEOID12B. THE HORIZONTAL DATUM IS NAD83 (2011) WASHINGTON STATE PLANE SOUTH, US SURVEY FEET.

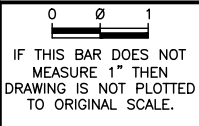
EROSION, SEDIMENT CONTROL AND WATER MANAGEMENT NOTES

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. ALL EQUIPMENT OPERATING BELOW OHWM SHALL UTILIZE READILY BIODEGRADABLE VEGETABLE-BASED HYDRAULIC FLUIDS.
10. 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.
11. THE CONTRACTOR SHALL HAVE AN EMERGENCY SPILL KIT ONSITE AT ALL TIMES.
12. 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.

13. 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.



NAME OR INITIALS AND DATE	
DESIGNED	RLE, MS
CHECKED	RLE
DRAWN	MS, GM
CHECKED	RLE

GEOGRAPHIC INFORMATION	
LATITUDE	47°03'49"N
LONGITUDE	123°29'29"W
TN/SC/RG	T18W/S12/R7W
DATE	2/14/2019

LOWER SATSOP ASSESSMENT AND DESIGN

GENERAL NOTES

2

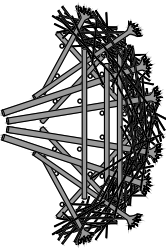
SHEET 2 OF 13

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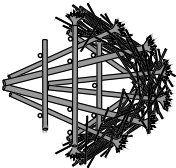


GENERAL LEGEND

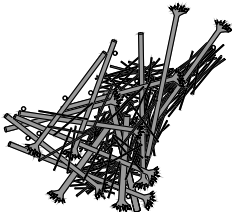
- PROPERTY LINE
- PHASE LINE
- RIGHT OF WAY LINE
- EXISTING ROAD
- ACCESS ROAD
- CLEARING LIMIT
- GRADING LIMIT
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- LOW FLOW CHANNEL
- EXISTING FLOW
- EXISTING OHWM
- PROPOSED OHWM
- MEAN HIGHER HIGH WATER
- MEAN HIGH WATER
- MEAN LOWER LOW WATER
- 2-YEAR FLOOD BOUNDARY
- 100-YEAR FLOOD BOUNDARY
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WETLAND
- PROPOSED WETLAND
- EXISTING WATER
- PROPOSED WATER
- DEMOLITION/REMOVAL AREA
- EXISTING FENCE
- EXISTING CONIFEROUS TREE
- EXISTING DECIDUOUS TREE
- CONTROL POINT LOCATION
- PHOTO POINT LOCATION



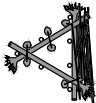
ENGINEERED LOGJAM (ELJ)  
TYPE 1 APEX



ENGINEERED LOGJAM (ELJ)  
TYPE 2 APEX



ENGINEERED LOGJAM (ELJ)  
TYPE 1 DEFLECTOR



ENGINEERED LOGJAM (ELJ)  
FLOODPLAIN ROUGHNESS

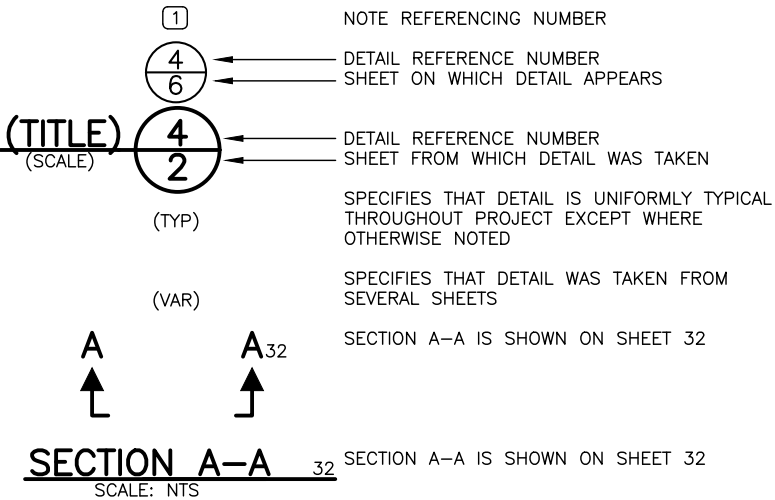
RESTORATION LEGEND

- FILL SLOPE LINE
- EXCAVATION SLOPE LINE
- EMERGENT SCRUB-SHRUB WETLAND REHABILITATION
- EMERGENT SCRUB-SHRUB WETLAND CREATION
- ACTIVE FLOODPLAIN FOREST RESTORATION
- ACTIVE FLOODPLAIN FOREST ENHANCEMENT
- TERRACE FLOODPLAIN FOREST RESTORATION
- TERRACE FLOODPLAIN FOREST ENHANCEMENT
- FLOOD FENCE GROVE
- WETLAND-KNOTWEED CONTROL
- SILVOPASTURE TREATMENT AREA

TEMPORARY EROSION CONTROL LEGEND

- SILT BOOM
- BLOCK NETS
- SILT FENCE
- STRAW WATTLE
- DEWATERING LINE DISCHARGE
- PROPOSED STAGING AREA
- BULK BAG COFFERDAM
- TEMPORARY ACCESS ROAD
- TEMPORARY ACCESS BRIDGE
- PUMP DISCHARGE OUTLET
- DEWATERING PUMP

DETAIL AND SECTION REFERENCING



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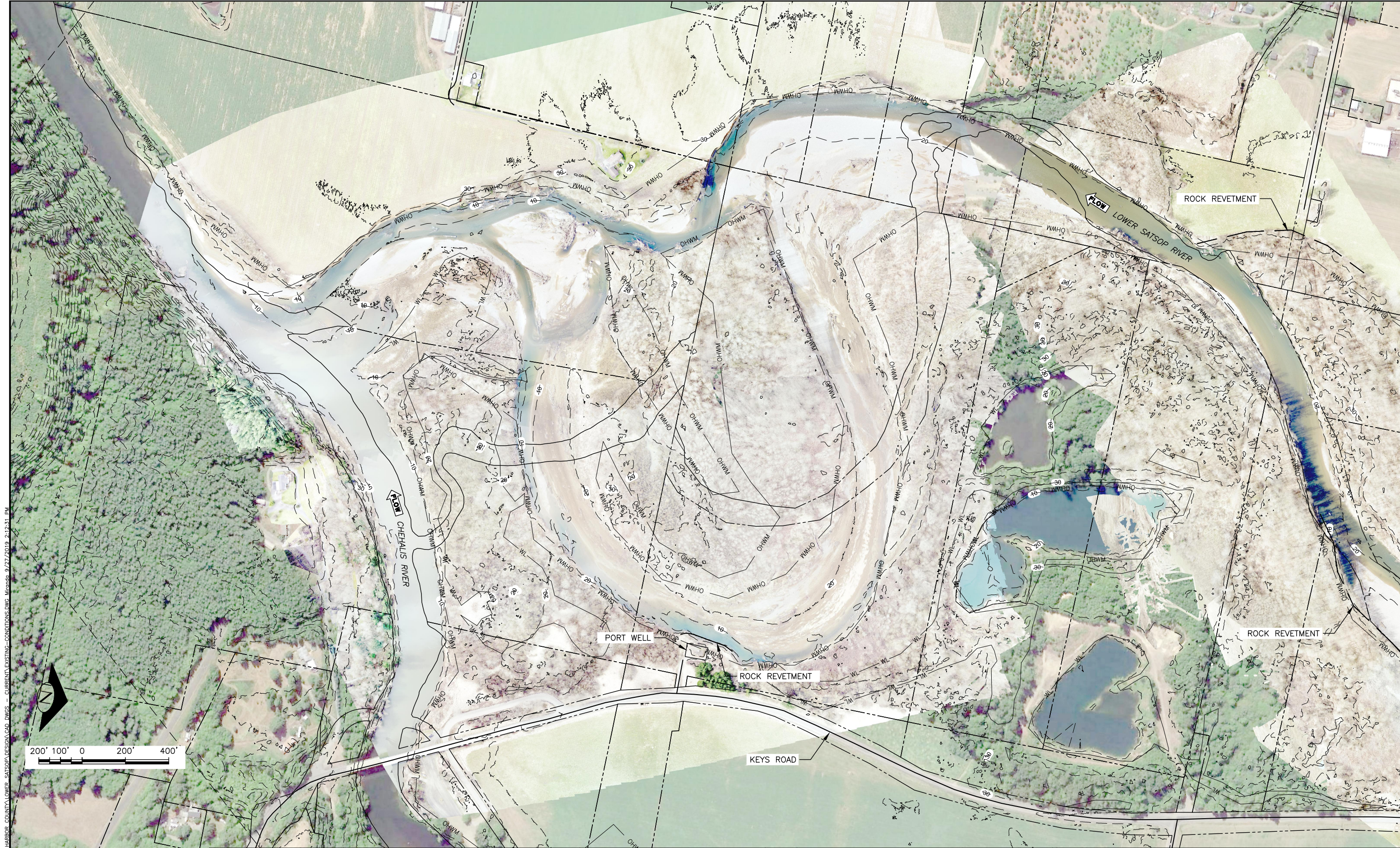
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LOWER SATSOP ASSESSMENT  
AND DESIGN

LEGEND

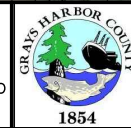
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## LOWER SATSOP ASSESSMENT AND DESIGN

## EXISTING CONDITIONS

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EVALUATE OPTIONS TO  
MOVE HOUSE, SUBJECT TO  
HOMEOWNER APPROVAL

FLOODPLAIN  
ROUGHNESS ELJ

TYPE I APEX ELJ

TYPE I DEFLECTOR ELJ

TEMPORARY  
BYPASS CHANNEL

TYPE II APEX ELJ

WDFW FLOODPLAIN  
RESTORATION PROJECT

WEST DIKE

POND A

POND B

EXISTING SPOIL PILE

POND C

EAST DIKE

NOTES:

- 1 ALLUVIUM EXCAVATED FROM TEMPORARY BYPASS CHANNEL TO BE USED AS BACKFILL AT ELJ'S.
- 2 RECOMMEND MOVING HOUSE AWAY FROM POTENTIAL RIVER AVULSION PATHWAY, PENDING LANDOWNER APPROVAL.
- 3 HATCHED AREA SHOWS EXPECTED EXTENT OF STANDING WATER BASED ON DRONE IMAGERY CAPTURED MARCH OF 2019. ACTUAL EXTENT OF INUNDATION MAY BE LESS AT TIME OF CONSTRUCTION AS MEANDER IS ACTIVELY AGGRADING.

200' 100' 0 200' 400'



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LOWER SATSOP ASSESSMENT  
AND DESIGN

PROPOSED CONDITIONS

5  
SHEET 5 OF 13

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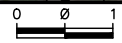


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NOTES:

- 1 INSTALL STABILIZED CONSTRUCTION ENTRANCE.
- 2 TEMPORARY ACCESS ROUTE TO BE DECOMPACTED UPON DEMOB BY SCARIFYING TOP 12 INCHES OF SOIL AND SPREADING SEED FREE MULCH OR STRAW.
- 3 TEMPORARY BRIDGE WILL BE USED TO CROSS RELIEF CHANNEL.



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LOWER SATSOP ASSESSMENT AND DESIGN

ACCESS AND STAGING

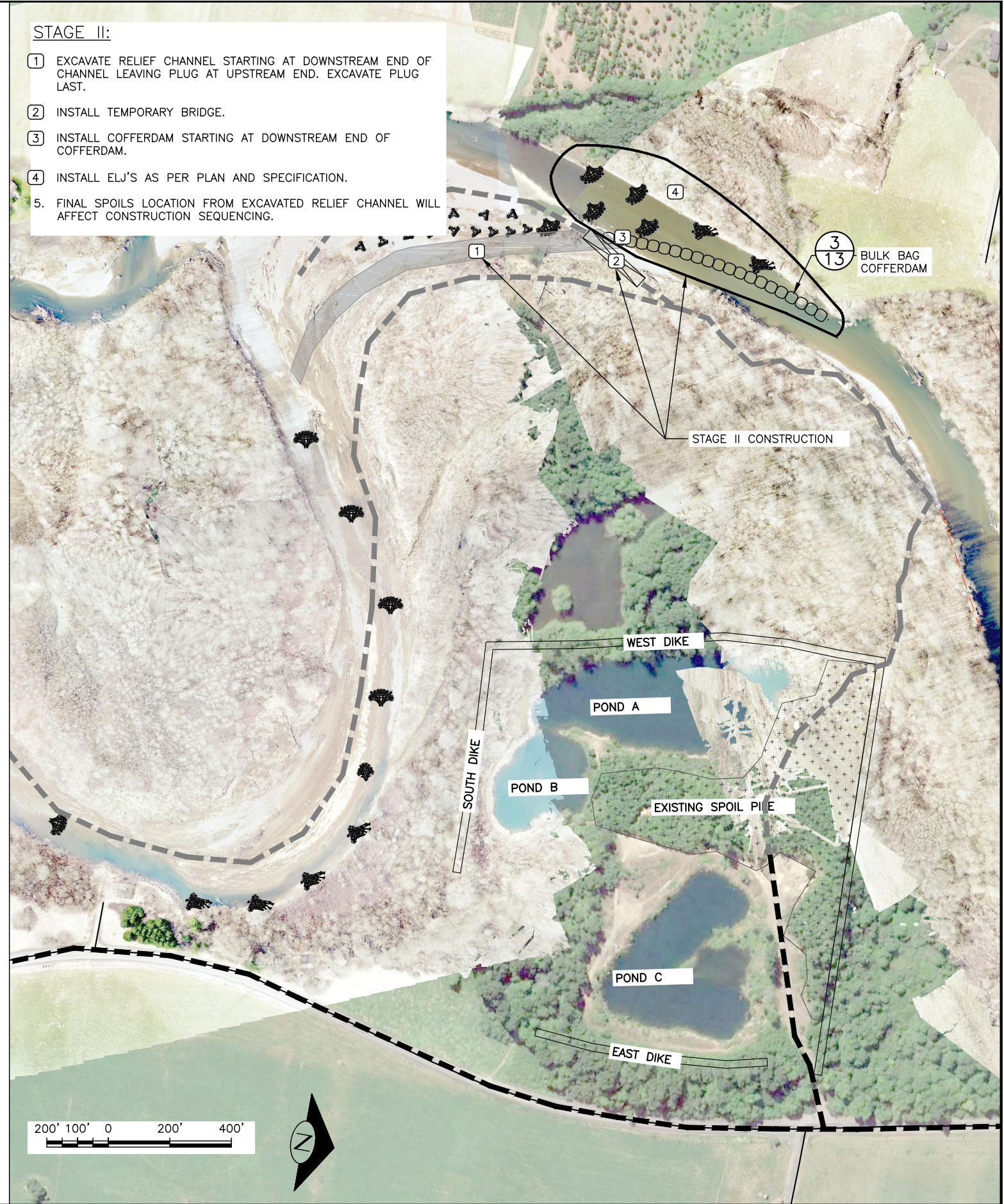


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- STAGE I:
1. INSTALL ELJ'S IN MEANDER AND ON DRY FLOODPLAIN AS PER PLAN AND SPECIFICATION. INSTALL COFFERDAMS AS NEEDED TO ISOLATE AND DE-WATER STRUCTURES FROM STANDING WATER IN MEANDER.



- STAGE II:
1. EXCAVATE RELIEF CHANNEL STARTING AT DOWNSTREAM END OF CHANNEL LEAVING PLUG AT UPSTREAM END. EXCAVATE PLUG LAST.
  2. INSTALL TEMPORARY BRIDGE.
  3. INSTALL COFFERDAM STARTING AT DOWNSTREAM END OF COFFERDAM.
  4. INSTALL ELJ'S AS PER PLAN AND SPECIFICATION.
  5. FINAL SPOILS LOCATION FROM EXCAVATED RELIEF CHANNEL WILL AFFECT CONSTRUCTION SEQUENCING.



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DRAWN	MS, GM
CHECKED	RLE

GEOGRAPHIC INFORMATION	
LATITUDE	47°03'49"N
LONGITUDE	123°29'29"W
TN/SC/RG	T18W/S12/R7W
DATE	2/14/2019

LOWER SATSOP ASSESSMENT  
AND DESIGN

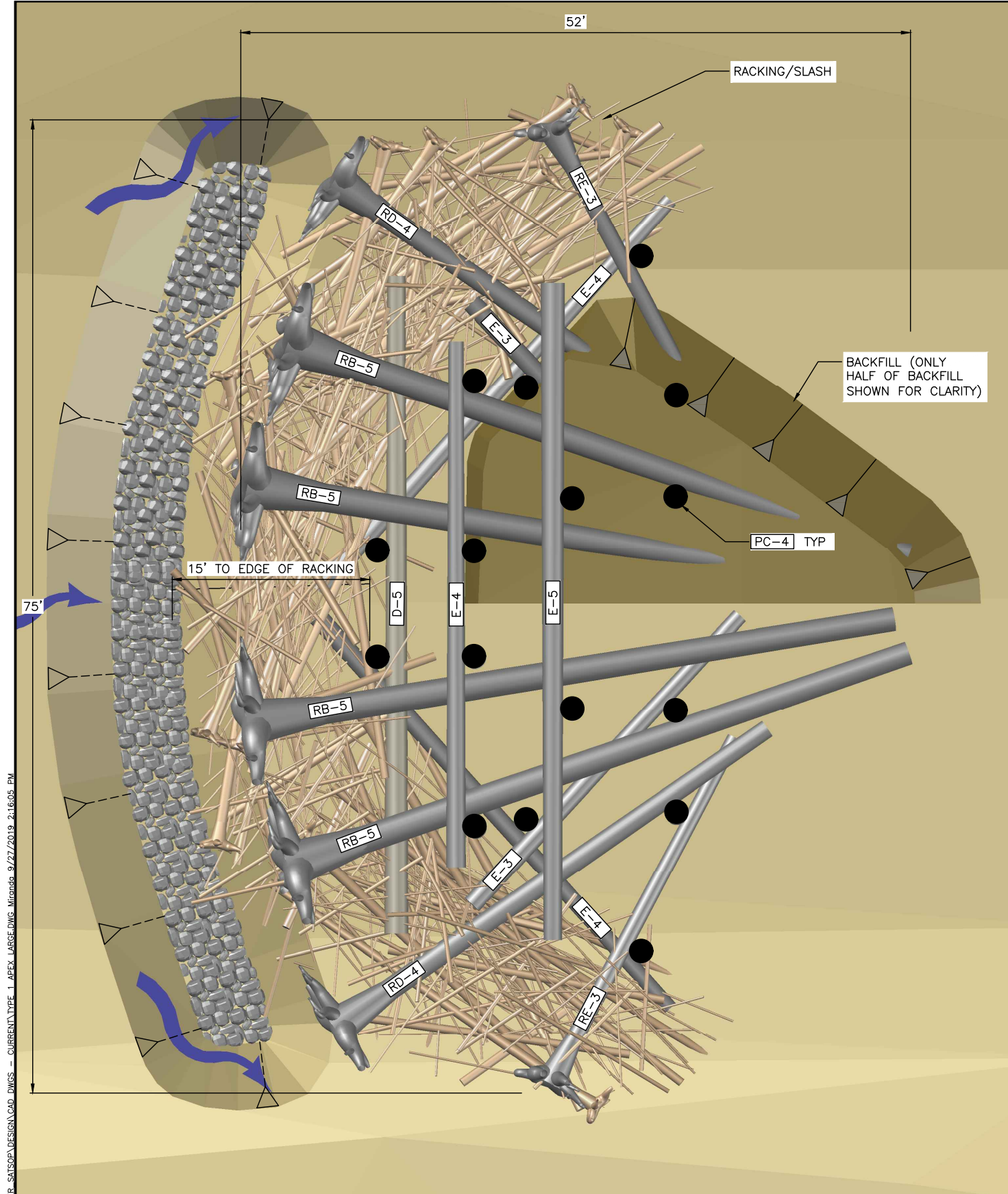
CONSTRUCTION SEQUENCING  
AND TESC

7  
SHEET 7 OF 13

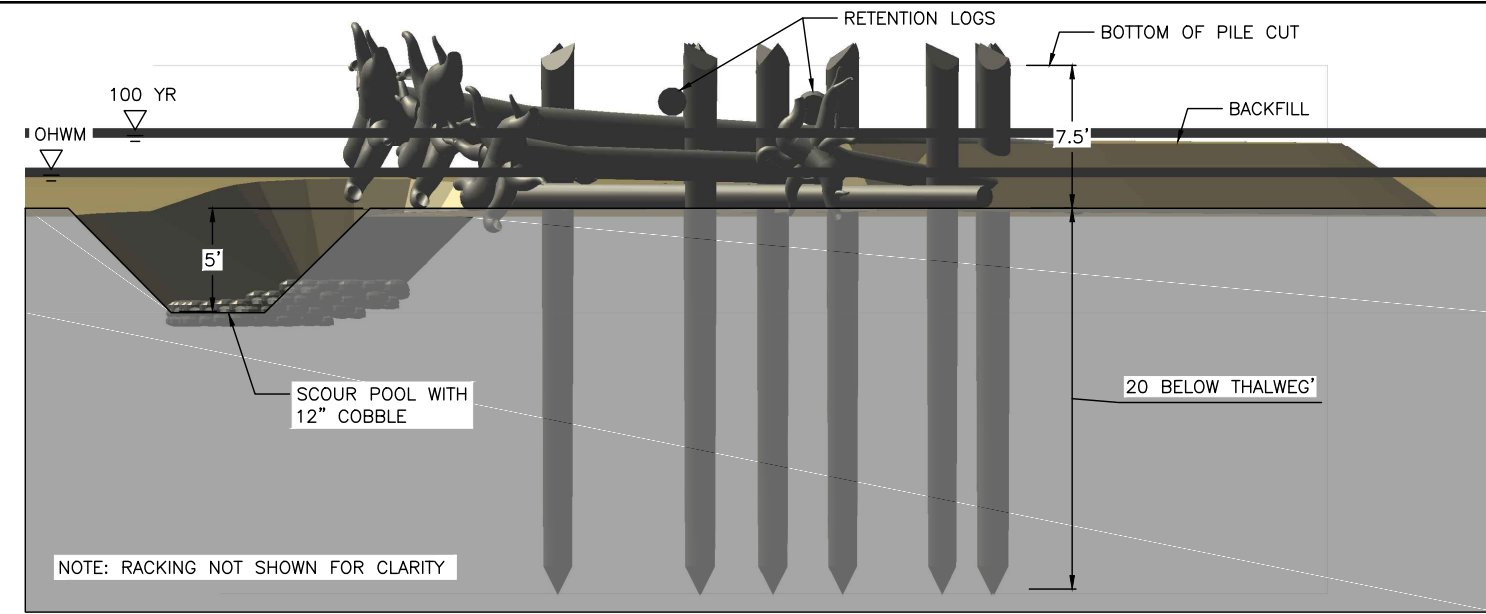
Sep 27, 2019 PHASE I PRELIMINARY DESIGN 60% NOT FOR CONSTRUCTION



N:\PROJECTS\GRAYS HARBOR COUNTY\LOWER SATSOP\DESIGN\CAD DWGS - CURRENT\TYPE 1 APEX LARGE.DWG Mirrored 9/27/2019 2:16:05 PM



TYPE 1 APEX ELJ PLAN  
SCALE: 1" = 5'



TYPE 1 APEX ELJ PROFILE  
SCALE: 1" = 5'

NOTES

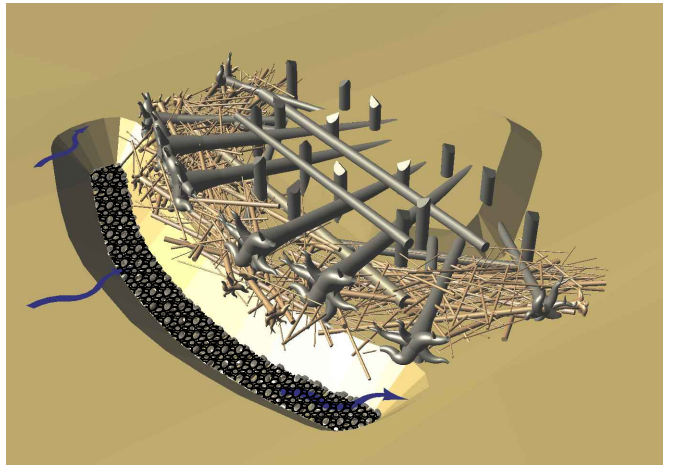
1. ALL LOGS SHALL BE DOUGLAS FIR, PONDEROSA PINE, WESTERN RED CEDAR, OR WESTERN LARCH TREES.
2. ALL PILES SHALL BE ROUND, UNTREATED TIMBER PILES AND SHALL BE DOUGLAS FIR. PILES SHALL BE FREE FROM DEFECTS, CRACKS, AND SPLITTING AT THE TIME OF DRIVING.
3. LOGS WITH ROOTWADS SHALL HAVE A DIAMETER AS SHOWN MEASURED AT DBH, DEFINED AS 4.5 FEET ABOVE GROUND WHEN TREE WAS STANDING.
4. THE CONTRACTOR SHALL PLACE LOGS AS ILLUSTRATED ON THIS SHEET UNLESS DIRECTED OTHERWISE BY THE CONTRACTING OFFICER.
5. SOIL EXCAVATED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL GROUND FOLLOWING PLACEMENT OF ALL LOGS.
6. RACKING LOGS SHALL CONSIST OF TREES WITH BRANCHES HAVING A BASE DIAMETER OF 6-12 INCHES AND A LENGTH OF 20-40 FT. TOTAL NUMBER OF RACKING LOGS PER STRUCTURE SHALL BE 150 PIECES. RACKING MATERIAL SHALL OCCUR WITH EACH LAYER TO ENSURE THAT RACKING MATERIAL EXTENDS THROUGH THE STRUCTURE AND IS PINNED BY SUBSEQUENT LAYERS. SLASH MATERIAL SHALL CONSIST OF LIMBS AND BRANCHES AND A BASE DIAMETER BETWEEN 1 AND 3 INCHES. TOTAL SLASH MATERIAL QUANTITY SHALL BE 50 CUBIC YARDS. SLASH MATERIAL SHALL BE PLACED AS DIRECTED BY THE CONTRACTING OFFICER.
7. RETENTION LOGS TO BE PLACED TO PIN RACKING MATERIAL IN PLACE AT THE DIRECTION OF THE CONTRACTING OFFICER.
8. CONNECT LOGS BY LOG PINNING OR OR BOLTED CONNECTION WHERE INDICATED ON THE DRAWINGS. SEE DETAILS.
9. AT LOCATIONS WHERE SITE CONDITIONS ALLOW (IN DRY OR LIMITED DEWATERING), SCOUR POOL TO BE EXCAVATED. EXCAVATED ALLUVIUM TO BE PLACED BEHIND THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER. EXTENTS AND LOCATION OF THE SCOUR POOL IS APPROXIMATE AND TO BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER.
10. EXISTING WOODY MATERIAL AT THE STRUCTURE CONSTRUCTION SITE SHALL BE MOVED OR PROTECTED FROM CONSTRUCTION ACTIVITIES AND THEN INCORPORATED INTO THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER.

TYPE 1 APEX ELJ LOG SCHEDULE

LOG ID	DIA* (INCHES)	LENGTH ** (FEET)	ROOTWAD (Y/N)	QUANTITY PER STRUCTURE	NOTES
RB-5	20-24	50	Y	4	
RD-4	18-20	40	Y	2	
RE-3	14-18	30	Y	2	
D-5	18-20	50	N	1	
E-3	15-18	30	N	2	
E-4	15-18	40	N	3	
E-5	15-18	50	N	1	
PC-4	21-23	40	N	16	

\* MINIMUM DIAMETER AT BREAST HEIGHT (1" PER 10' MAXIMUM TAPER)  
\*\* TOTAL LENGTH INCLUDING ROOTWAD

TYPE 1 APEX ELJ PERSPECTIVE  
NOT TO SCALE



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

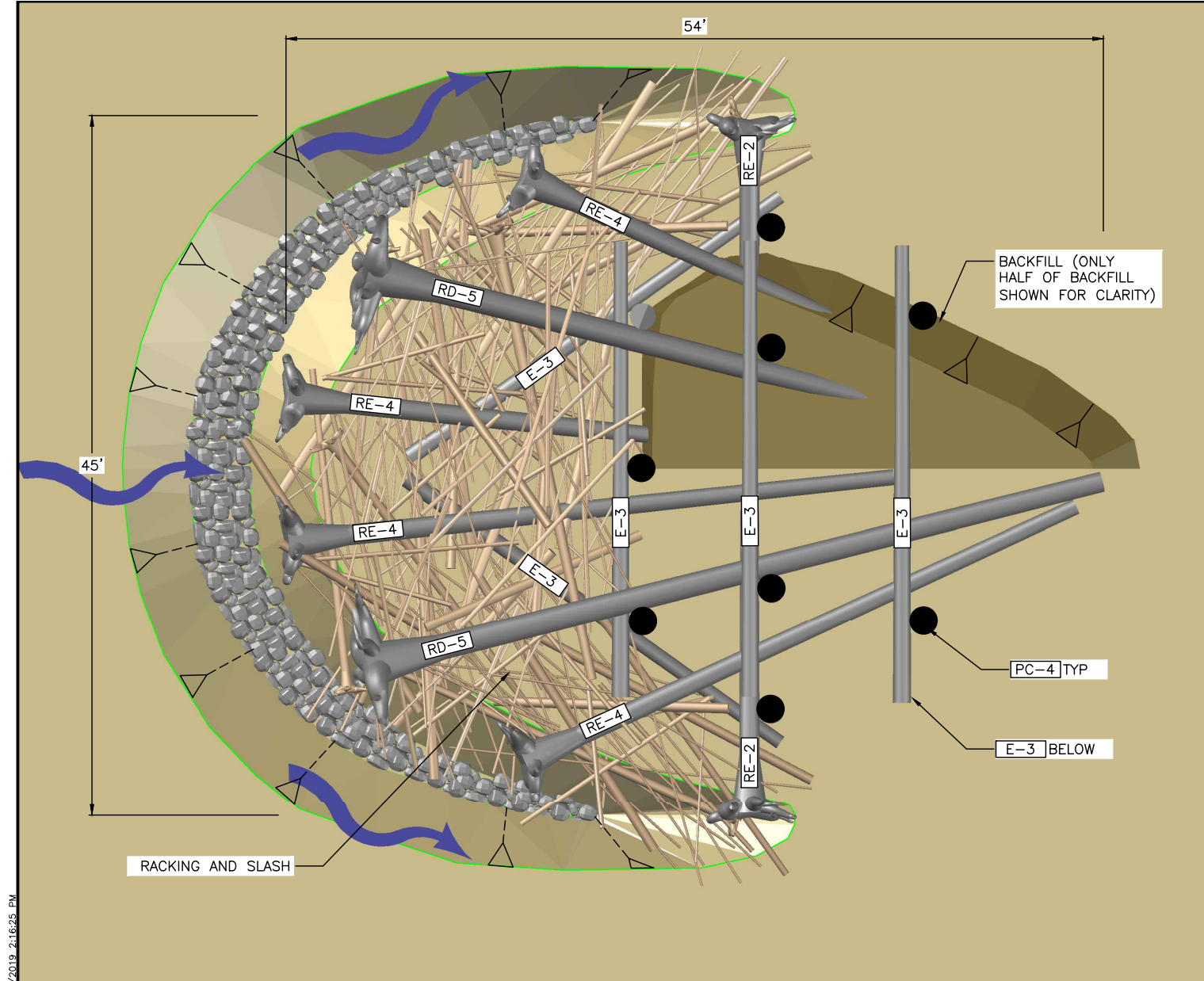


NAME OR INITIALS AND DATE	GEOGRAPHIC INFORMATION
DESIGNED RLE, MS	LATITUDE 47°03'49"N
CHECKED RLE	LONGITUDE 123°29'29"W
DRAWN MS, GM	TN/SC/RG T18W/S12/R7W
CHECKED RLE	DATE 2/14/2019

LOWER SATSOP ASSESSMENT AND DESIGN

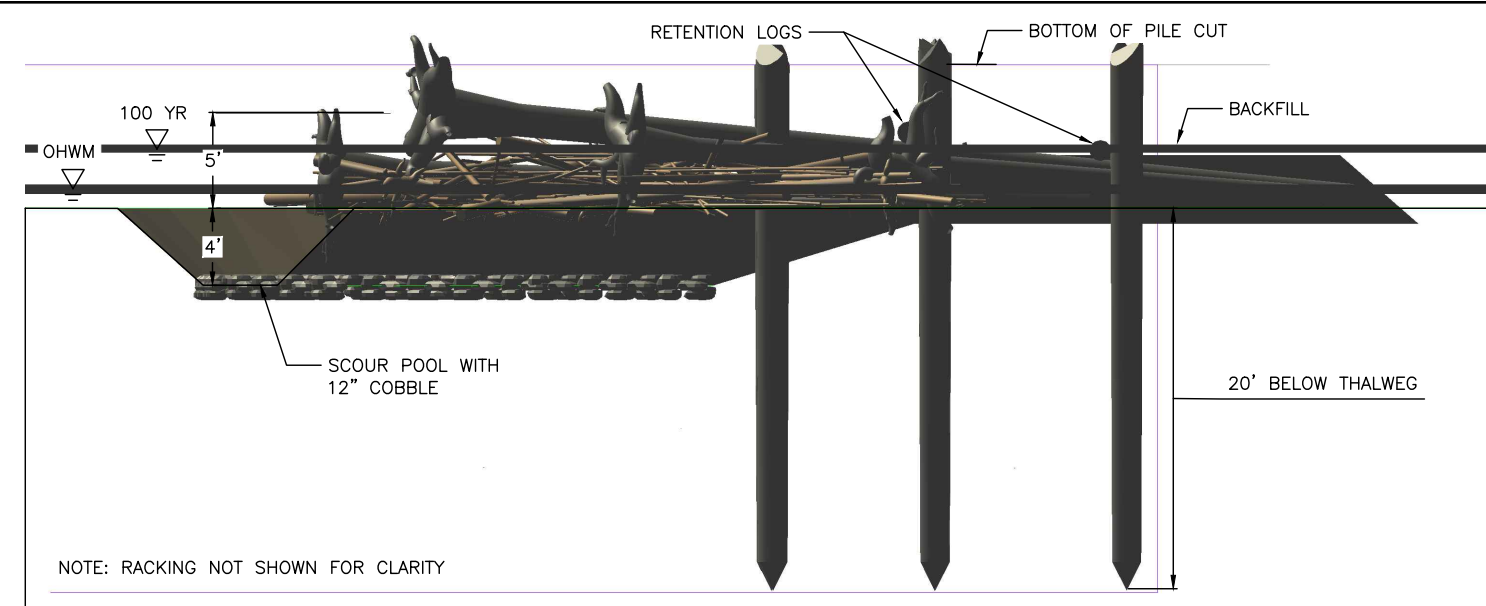
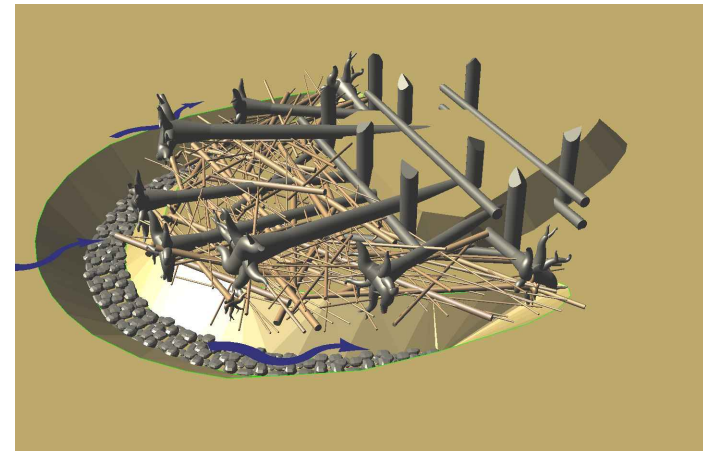


N:\PROJECTS\GRAYS HARBOR COUNTY\LOWER SATSOP\DESIGN\LOAD DWGS - CURRENT\TYPE 2 APEX SMALL.DWG Mirrored 9/27/2019 2:16:25 PM



1 - TYPE 2 APEX ELJ PLAN  
SCALE: 1" = 5'

TYPE 2 APEX ELJ PERSPECTIVE  
NOT TO SCALE



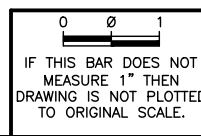
TYPE 2 APEX ELJ PROFILE  
SCALE: 1" = 5'

### NOTES

- ALL LOGS SHALL BE DOUGLAS FIR, PONDEROSA PINE, WESTERN RED CEDAR, OR WESTERN LARCH TREES.
- ALL PILES SHALL BE ROUND, UNTREATED TIMBER PILES AND SHALL BE DOUGLAS FIR. PILES SHALL BE FREE FROM DEFECTS, CRACKS, AND SPLITTING AT THE TIME OF DRIVING.
- LOGS WITH ROOTWADS SHALL HAVE A DIAMETER AS SHOWN MEASURED AT DBH, DEFINED AS 4.5 FEET ABOVE GROUND WHEN TREE WAS STANDING.
- THE CONTRACTOR SHALL PLACE LOGS AS ILLUSTRATED ON THIS SHEET UNLESS DIRECTED OTHERWISE BY THE CONTRACTING OFFICER.
- SOIL EXCAVATED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL GROUND FOLLOWING PLACEMENT OF ALL LOGS.
- THE LOCATION SHOWN ON THE SHEET IS APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER.
- RACKING LOGS SHALL CONSIST OF TREES WITH BRANCHES HAVING A BASE DIAMETER OF 6-12 INCHES AND A LENGTH OF 20-40 FT. TOTAL NUMBER OF RACKING LOGS PER STRUCTURE SHALL BE 100 PIECES. RACKING MATERIAL SHALL OCCUR WITH EACH LAYER TO ENSURE THAT RACKING MATERIAL EXTENDS THROUGH THE STRUCTURE AND IS PINNED BY SUBSEQUENT LAYERS. SLASH MATERIAL SHALL CONSIST OF LIMBS AND BRANCHES AND A BASE DIAMETER BETWEEN 1 AND 3 INCHES. TOTAL SLASH MATERIAL QUANTITY SHALL BE 30 CUBIC YARDS. SLASH MATERIAL SHALL BE PLACED AS DIRECTED BY THE CONTRACTING OFFICER.
- RETENTION LOGS TO BE PLACED TO PIN RACKING MATERIAL IN PLACE AT THE DIRECTION OF THE CONTRACTING OFFICER.
- CONNECT LOGS BY LOG PINNING OR OR BOLTED CONNECTION WHERE INDICATED ON THE DRAWINGS. SEE DETAILS.
- AT LOCATIONS WHERE SITE CONDITIONS ALLOW (IN DRY OR LIMITED DEWATERING), SCOUR POOL TO BE EXCAVATED. EXCAVATED ALLUVIUM TO BE PLACED BEHIND THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER. EXTENTS AND LOCATION OF THE SCOUR POOL IS APPROXIMATE AND TO BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER.
- EXISTING WOODY MATERIAL AT THE STRUCTURE CONSTRUCTION SITE SHALL BE MOVED OR PROTECTED FROM CONSTRUCTION ACTIVITIES AND THEN INCORPORATED INTO THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER.

### TYPE 2 APEX ELJ LOG SCHEDULE

LOG ID	DIA* (INCHES)	LENGTH ** (FEET)	ROOTWAD (Y/N)	QUANTITY PER STRUCTURE	NOTES
RD-5	18-22	50	Y	2	
RE-4	14-18	40	Y	4	
RE-2	14-18	20	Y	2	
E-3	15-18	30	N	6	
PC-4	21-23	40	N	9	
* MINIMUM DIAMETER AT BREAST HEIGHT (1" PER 10' MAXIMUM TAPER)					
** TOTAL LENGTH INCLUDING ROOTWAD					

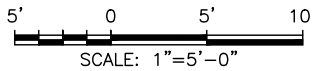
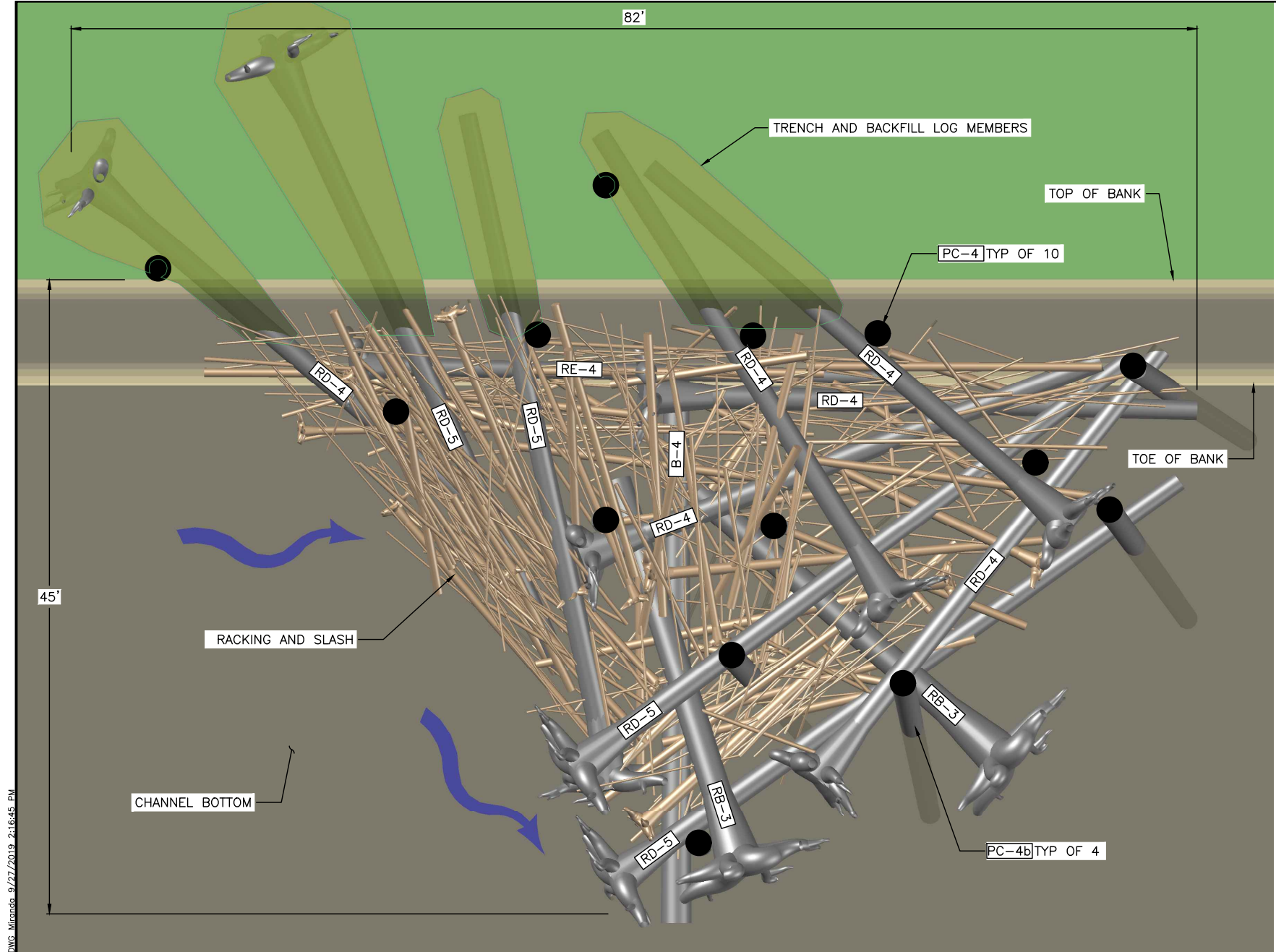


NAME OR INITIALS AND DATE	GEOGRAPHIC INFORMATION
DESIGNED RLE, MS	LATITUDE 47°03'49"N
CHECKED RLE	LONGITUDE 123°29'29"W
DRAWN MS, GM	TN/SC/RG T18W/S12/R7W
CHECKED RLE	DATE 2/14/2019

LOWER SATSOP ASSESSMENT  
AND DESIGN

TYPE 2 APEX ELJ DETAILS

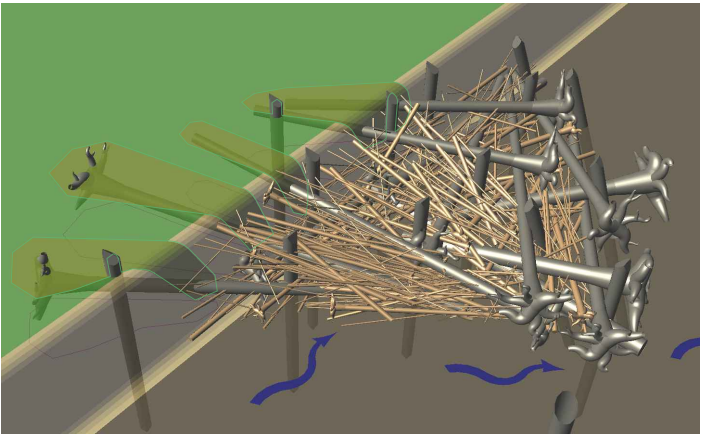




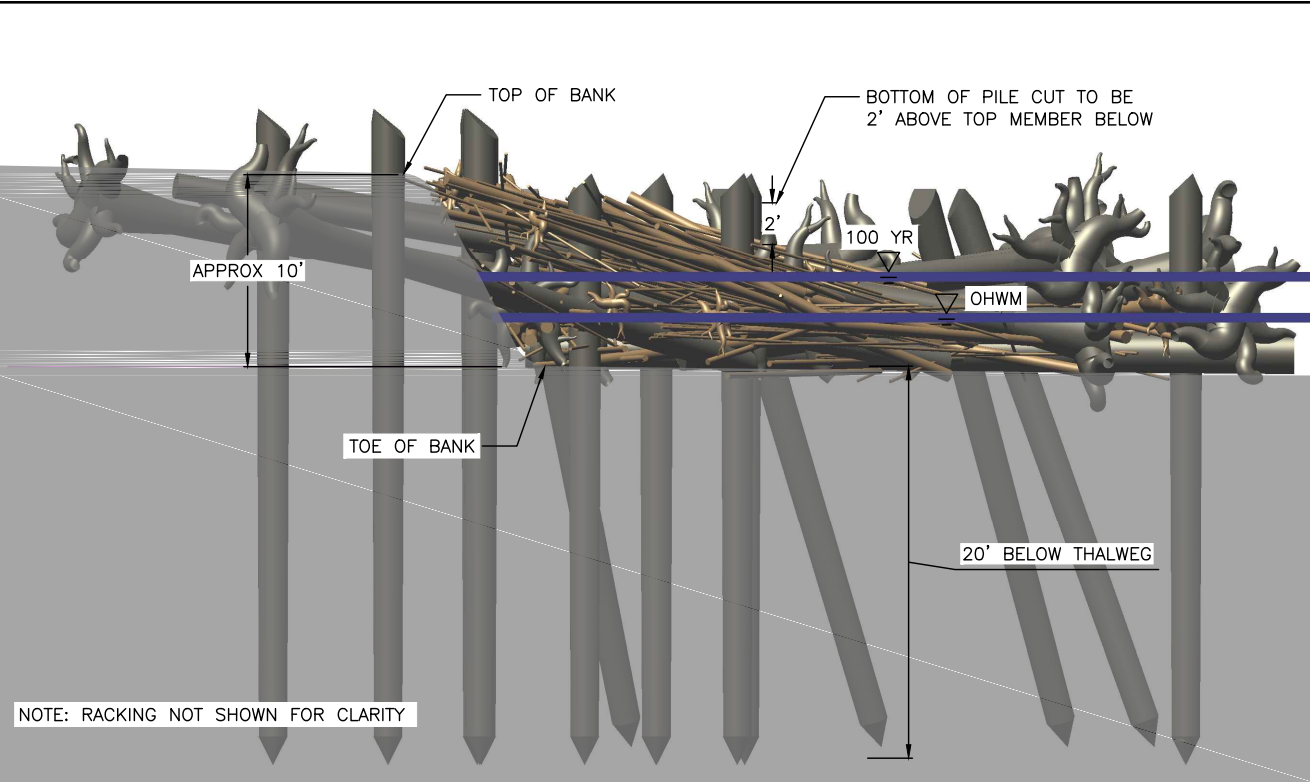
TYPE 1 DEFLECTOR ELJ PLAN  
SCALE: 1" = 5'

TYPE 1 DEFLECTOR ELJ LOG SCHEDULE					
LOG ID	DIA* (INCHES)	LENGTH ** (FEET)	ROOTWAD (Y/N)	QUANTITY PER STRUCTURE	NOTES
RB-3	22-26	30	Y	2	
RD-5	18-22	50	Y	4	
RD-4	18-22	40	Y	6	
RE-4	14-18	40	Y	1	
B-4	22-26	40	N	1	
PC-4	21-23	40	N	10	
PC-4b	21-23	40	N	4	INSTALL PILE AT 15 TO 20 DEGREES FROM VERTICAL

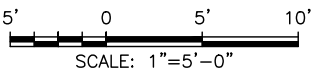
\* MINIMUM DIAMETER AT BREAST HEIGHT (1" PER 10' MAXIMUM TAPER)  
\*\* TOTAL LENGTH INCLUDING ROOTWAD



TYPE 1 DEFLECTOR ELJ PERSPECTIVE  
NOT TO SCALE



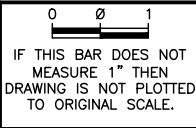
TYPE 1 DEFLECTOR ELJ PROFILE  
SCALE: 1" = 5'



NOTES

- ALL LOGS SHALL BE DOUGLAS FIR, PONDEROSA PINE, WESTERN RED CEDAR, OR WESTERN LARCH TREES.
- ALL PILES SHALL BE ROUND, UNTREATED TIMBER PILES AND SHALL BE DOUGLAS FIR. PILES SHALL BE FREE FROM DEFECTS, CRACKS, AND SPLITTING AT THE TIME OF DRIVING.
- LOGS WITH ROOTWADS SHALL HAVE A DIAMETER AS SHOWN MEASURED AT DBH, DEFINED AS 4.5 FEET ABOVE GROUND WHEN TREE WAS STANDING.
- THE CONTRACTOR SHALL PLACE LOGS AS ILLUSTRATED ON THIS SHEET UNLESS DIRECTED OTHERWISE BY THE CONTRACTING OFFICER.
- SOIL EXCAVATED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL GROUND FOLLOWING PLACEMENT OF ALL LOGS.
- RACKING LOGS SHALL CONSIST OF TREES WITH BRANCHES HAVING A BASE DIAMETER OF 6-12 INCHES AND A LENGTH OF 20-40 FT. TOTAL NUMBER OF RACKING LOGS PER STRUCTURE SHALL BE 120 PIECES. RACKING MATERIAL SHALL OCCUR WITH EACH LAYER TO ENSURE THAT RACKING MATERIAL EXTENDS THROUGH THE STRUCTURE AND IS PINNED BY SUBSEQUENT LAYERS. SLASH MATERIAL SHALL CONSIST OF LIMBS AND BRANCHES AND A BASE DIAMETER BETWEEN 1 AND 3 INCHES. TOTAL SLASH MATERIAL QUANTITY SHALL BE 40 CUBIC YARDS. SLASH MATERIAL SHALL BE PLACED AS DIRECTED BY THE CONTRACTING OFFICER.
- RETENTION LOGS TO BE PLACED TO PIN RACKING MATERIAL IN PLACE AT THE DIRECTION OF THE CONTRACTING OFFICER.
- PILES TO BE DRIVEN WITH EXCAVATOR MOUNTED VIBRATORY EQUIPMENT. PILES TO BE DRIVEN IN A BATTER (NON-VERTICAL) CONFIGURATION AS DIRECTED BY THE CONTRACTING OFFICER.
- CONNECT LOGS BY LOG PINNING OR OR BOLTED CONNECTION WHERE INDICATED ON THE DRAWINGS. SEE DETAILS.
- AT LOCATIONS WHERE SITE CONDITIONS ALLOW (IN DRY OR LIMITED DEWATERING), SCOUR POOL TO BE EXCAVATED. EXCAVATED ALLUVIUM TO BE PLACED BEHIND THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER. EXTENTS AND LOCATION OF THE SCOUR POOL IS APPROXIMATE AND TO BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER.
- EXISTING WOODY MATERIAL AT THE STRUCTURE CONSTRUCTION SITE SHALL BE MOVED OR PROTECTED FROM CONSTRUCTION ACTIVITIES AND THEN INCORPORATED INTO THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER.

N:\PROJECTS\GRAYS HARBOR COUNTY\LOWER SATSOP\DESIGN\CAD DWGS - CURRENT\TYPE 1 DEFLECTOR-LARGE.DWG, Miranda, 9/27/2019, 2:16:45 PM



NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RLE, MS	LATITUDE	47°03'49"N
CHECKED	RLE	LONGITUDE	123°29'29"W
DRAWN	MS, GM	TN/SC/RG	T18W/S12/R7W
CHECKED	RLE	DATE	2/14/2019

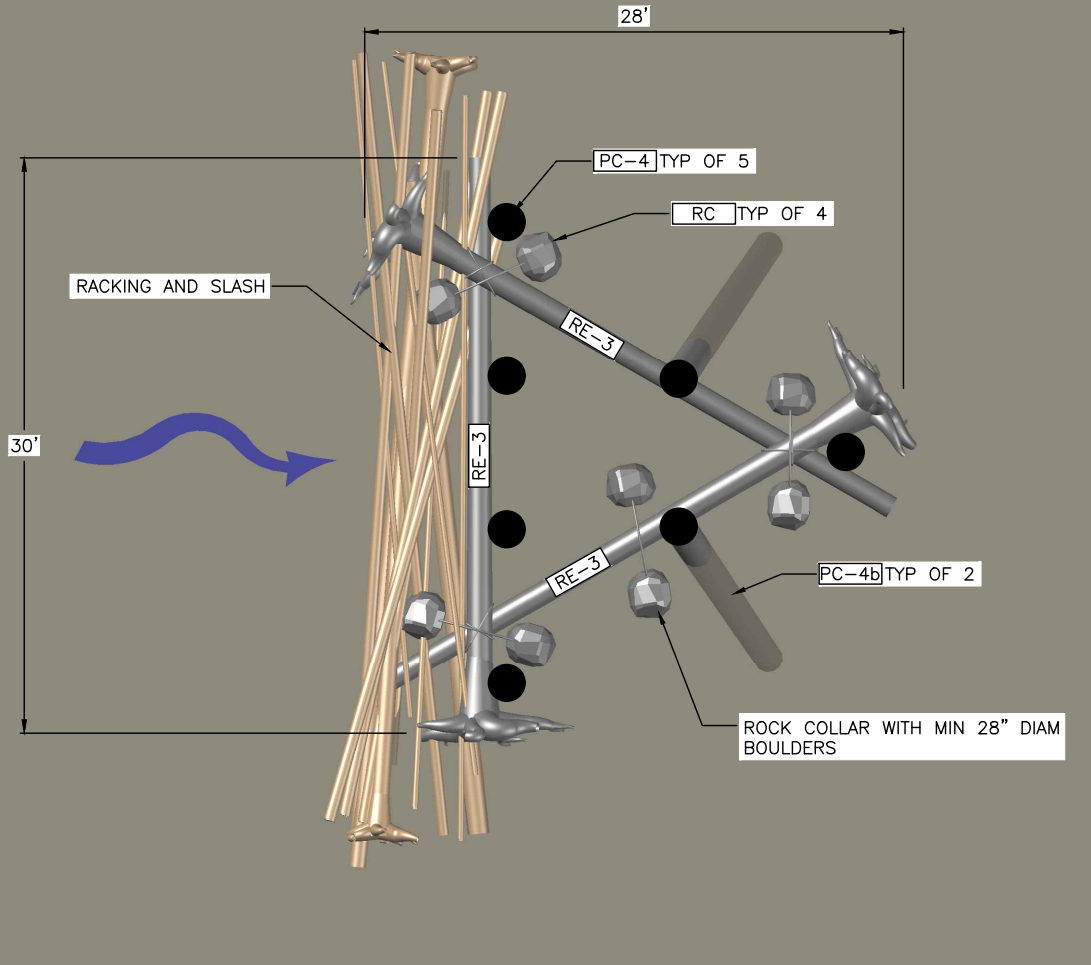
LOWER SATSOP ASSESSMENT  
AND DESIGN

TYPE 1 DEFLECTOR ELJ  
DETAILS

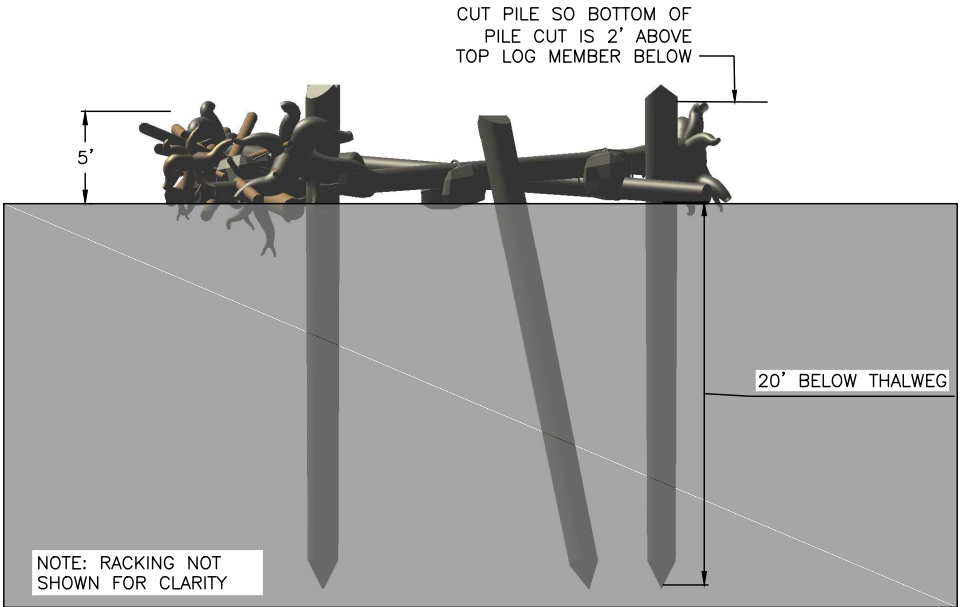
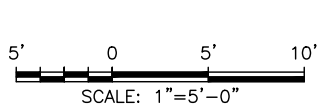
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SHEET 10 OF 13

Sep 27, 2019 PHASE I PRELIMINARY DESIGN 60% NOT FOR CONSTRUCTION

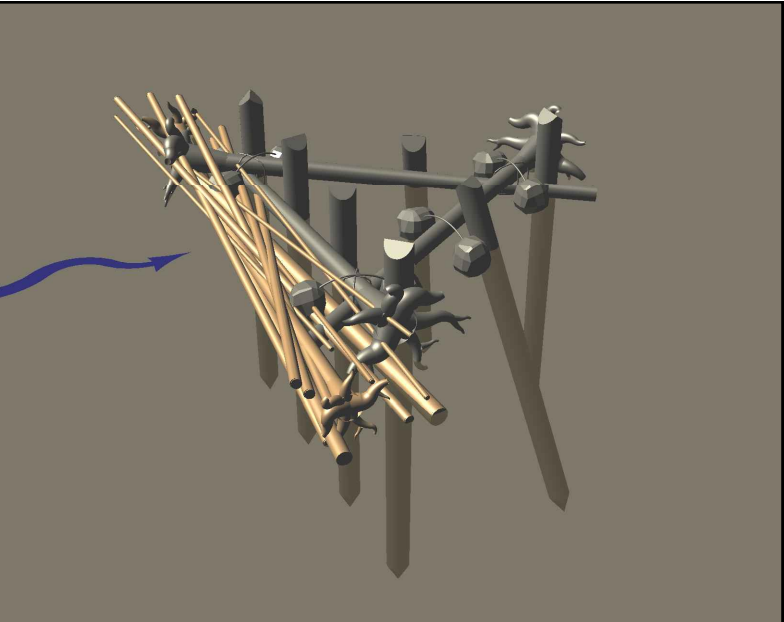
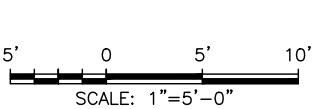
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FLOODPLAIN ROUGHNESS PLAN



FLOODPLAIN ROUGHNESS ELJ PROFILE



FLOODPLAIN ROUGHNESS ELJ PERSPECTIVE

NOTES

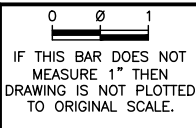
1. ALL LOGS SHALL BE DOUGLAS FIR, PONDEROSA PINE, WESTERN RED CEDAR, OR WESTERN LARCH TREES.
2. ALL PILES SHALL BE ROUND, UNTREATED TIMBER PILES AND SHALL BE DOUGLAS FIR. PILES SHALL BE FREE FROM DEFECTS, CRACKS, AND SPLITTING AT THE TIME OF DRIVING.
3. LOGS WITH ROOTWADS SHALL HAVE A DIAMETER AS SHOWN MEASURED AT DBH, DEFINED AS 4.5 FEET ABOVE GROUND WHEN TREE WAS STANDING.
4. THE CONTRACTOR SHALL PLACE LOGS AS ILLUSTRATED ON THIS SHEET UNLESS DIRECTED OTHERWISE BY THE CONTRACTING OFFICER.
5. SOIL EXCAVATED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL GROUND FOLLOWING PLACEMENT OF ALL LOGS.
6. THE LOCATION SHOWN ON THE SHEET IS APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER.
7. RACKING LOGS SHALL CONSIST OF TREES WITH BRANCHES HAVING A BASE DIAMETER OF 6-12 INCHES AND A LENGTH OF 20-40 FT. TOTAL NUMBER OF RACKING LOGS PER STRUCTURE SHALL BE 12 PIECES. RACKING MATERIAL SHALL OCCUR WITH EACH LAYER TO ENSURE THAT RACKING MATERIAL EXTENDS THROUGH THE STRUCTURE AND IS PINNED BY SUBSEQUENT LAYERS. SLASH MATERIAL SHALL CONSIST OF LIMBS AND BRANCHES AND A BASE DIAMETER BETWEEN 1 AND 3 INCHES. TOTAL SLASH MATERIAL QUANTITY SHALL BE 5 CUBIC YARDS. SLASH MATERIAL SHALL BE PLACED AS DIRECTED BY THE CONTRACTING OFFICER.
8. RETENTION LOGS MAY BE COMPRISED OF WHOLE TREES (NOT SHOWN FOR CLARITY) BASED UPON AVAILABILITY, ACCESS, AND EQUIPMENT.
9. PILES TO BE DRIVEN WITH EXCAVATOR MOUNTED VIBRATORY EQUIPMENT. PILES TO BE DRIVEN IN A BATTER (NON-VERTICAL) CONFIGURATION AS DIRECTED BY THE CONTRACTING OFFICER.
10. EXISTING WOODY MATERIAL AT THE STRUCTURE CONSTRUCTION SITE SHALL BE MOVED OR PROTECTED FROM CONSTRUCTION ACTIVITIES AND THEN INCORPORATED INTO THE STRUCTURE AS DIRECTED BY THE CONTRACTING OFFICER.
11. TRIANGLE FRAME UNITS SHALL BE PRE-ASSEMBLED IN THE DRY AND LIFTED INTO PLACE TO REDUCE IN-WATER WORK DURATION. FRAME UNITS SHALL BE PINNED AT LOG INTERSECTIONS.

FLOODPLAIN ROUGHNESS ELJ LOG SCHEDULE

LOG ID	DIA* (INCHES)	LENGTH ** (FEET)	ROOTWAD (Y/N)	QUANTITY PER STRUCTURE	NOTES
RC	28			4	ROCK COLLAR WITH 28"DIAM BOULDERS
RE-3	14-18	30	Y	3	
PC-4	21-23	40	N	5	
PC-4b	21-23	40	N	2	
RACKING	6-12	20-40	Y/N	12	

\* MINIMUM DIAMETER AT BREAST HEIGHT (1" PER 10' MAXIMUM TAPER)

\*\* TOTAL LENGTH INCLUDING ROOTWAD



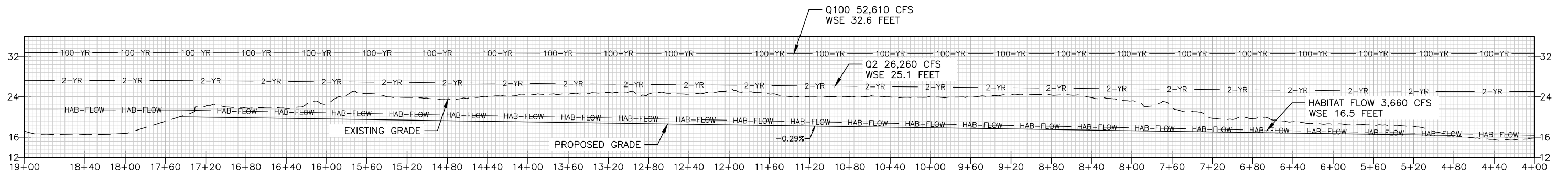
NAME OR INITIALS AND DATE	GEOGRAPHIC INFORMATION
DESIGNED RLE, MS	LATITUDE 47°03'49"N
CHECKED RLE	LONGITUDE 123°29'29"W
DRAWN MS, GM	TN/SC/RG T18W/S12/R7W
CHECKED RLE	DATE 2/14/2019

LOWER SATSOP ASSESSMENT AND DESIGN	FLOODPLAIN ROUGHNESS ELJ DETAILS	11
		SHEET 11 OF 13

Sep 27, 2019 PHASE I PRELIMINARY DESIGN 60% NOT FOR CONSTRUCTION



N:\PROJECTS\GRAY HARBOR COUNTY\LOWER SATSOP\DESIGN\CAD DWGS - CURRENT\YES\SURFACE\RC-COMPOSITE.DWG Mirrored 9/27/2019 2:28:47 PM

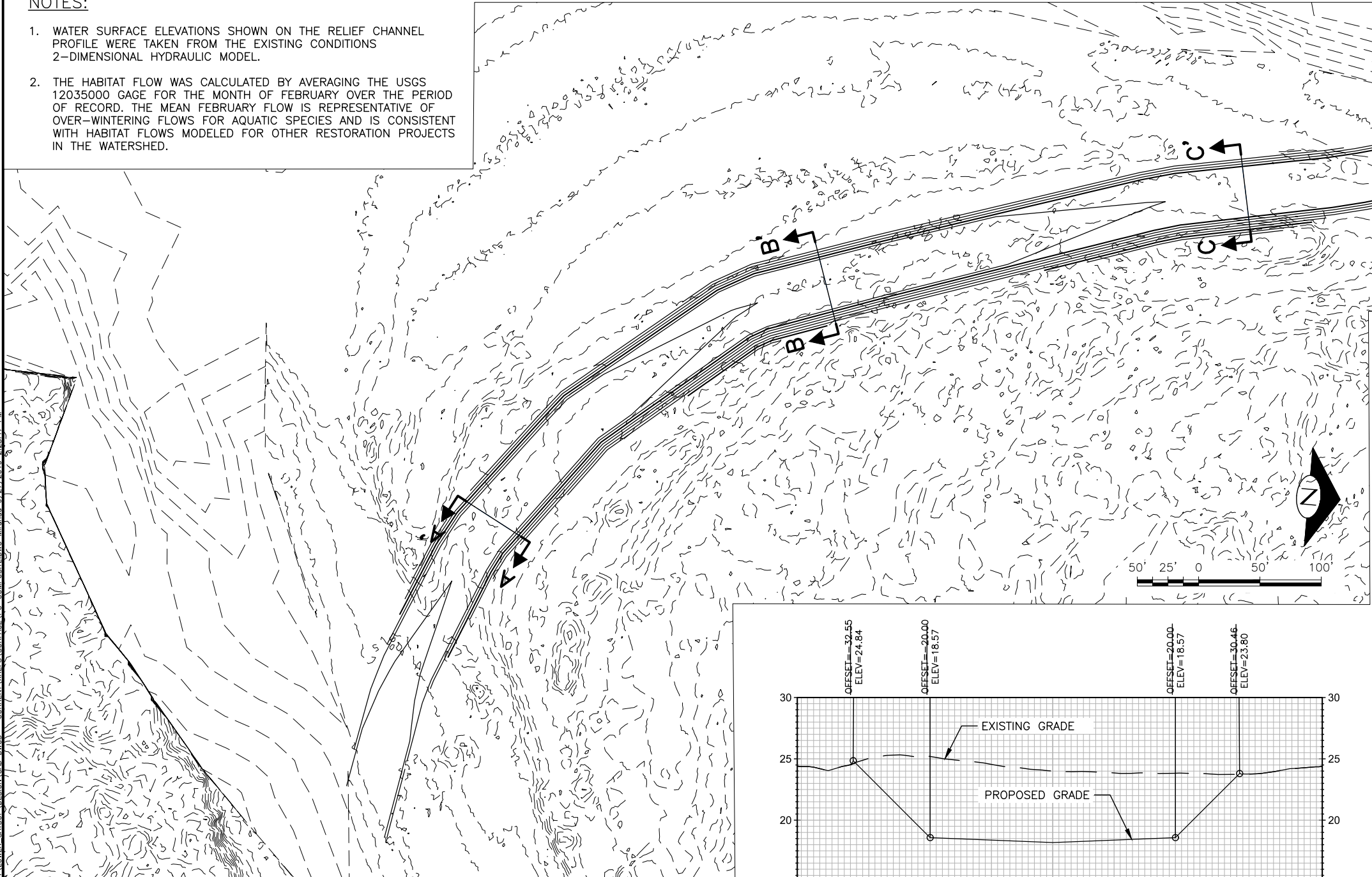


RELIEF CHANNEL PROFILE

SCALE: 1:50

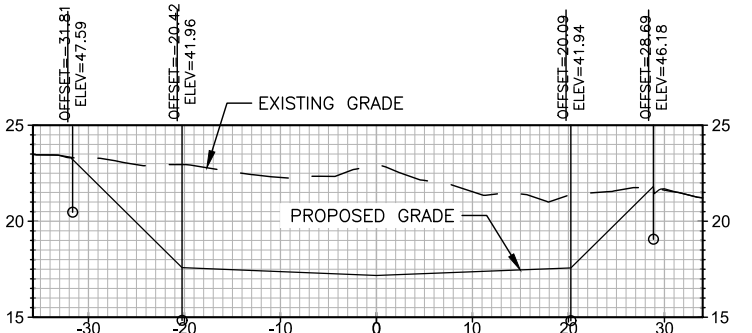
NOTES:

1. WATER SURFACE ELEVATIONS SHOWN ON THE RELIEF CHANNEL PROFILE WERE TAKEN FROM THE EXISTING CONDITIONS 2-DIMENSIONAL HYDRAULIC MODEL.
2. THE HABITAT FLOW WAS CALCULATED BY AVERAGING THE USGS 12035000 GAGE FOR THE MONTH OF FEBRUARY OVER THE PERIOD OF RECORD. THE MEAN FEBRUARY FLOW IS REPRESENTATIVE OF OVER-WINTERING FLOWS FOR AQUATIC SPECIES AND IS CONSISTENT WITH HABITAT FLOWS MODELED FOR OTHER RESTORATION PROJECTS IN THE WATERSHED.



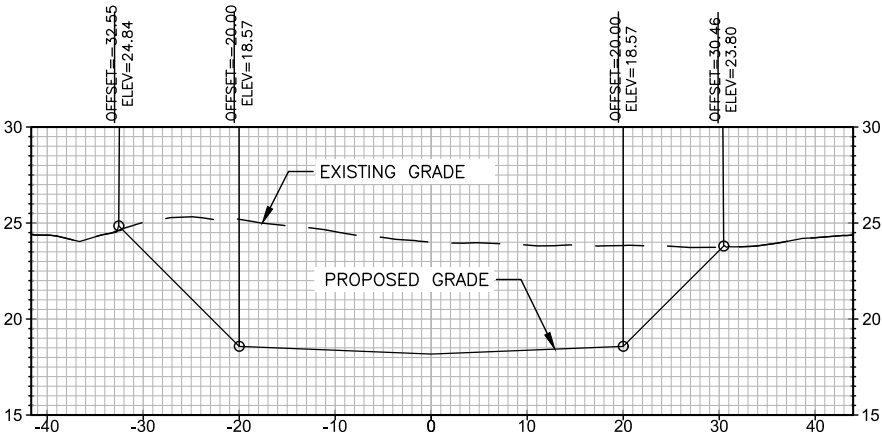
RELIEF CHANNEL PLAN VIEW

SCALE: 1:50



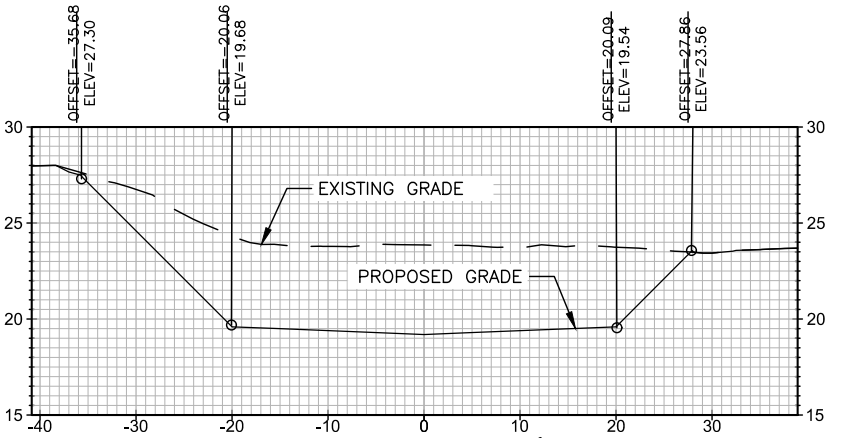
SECTION A-A'

SCALE: 1:10



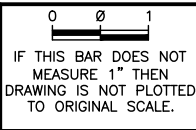
SECTION B-B'

SCALE: 1:10



SECTION C-C'

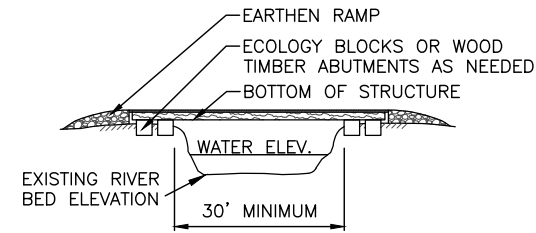
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NAME OR INITIALS AND DATE		GEOGRAPHIC INFORMATION	
DESIGNED	RLE, MS	LATITUDE	47°03'49\"N
CHECKED	RLE	LONGITUDE	123°29'29\"W
DRAWN	MS, GM	TN/SC/RG	T18W/S12/R7W
CHECKED	RLE	DATE	2/14/2019

LOWER SATSOP ASSESSMENT  
AND DESIGN

RELIEF CHANNEL PROFILE AND  
SECTIONS



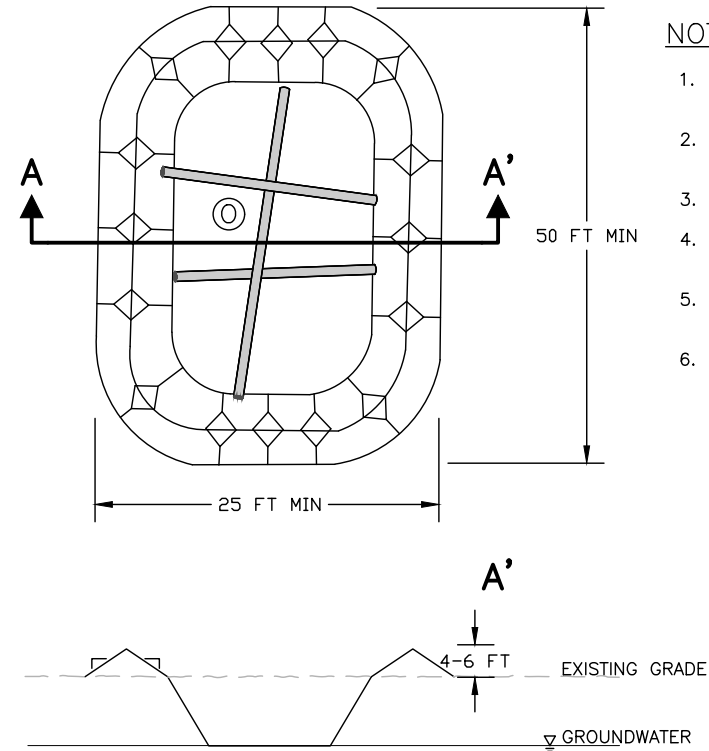
## NOTES FOR TEMPORARY BRIDGE:

1. CONTRACTOR TO DESIGN TEMPORARY BRIDGE.
2. BRIDGE SHALL BE LOCATED SUCH THAT ONLY ONE SPAN IS USED TO ELIMINATE IMPACTS TO SUBSTRATE OF CHANNEL.
3. END OF BRIDGE SHALL BEAR ON HIGH BANKS WITH SUFFICIENT BEARING CAPACITY TO PREVENT SLOUGHING OR COLLAPSE OF SIDE CHANNEL BANKS.
4. CONCRETE ECOLOGY BLOCKS OR WOOD ABUTMENTS MAY BE USED TO SUPPORT ENDS OF TEMPORARY BRIDGE AS NEEDED.
5. BRIDGES MAY BE CONSTRUCTED FROM LOGS, RAIL CAR BEDS OR APPROVED EQUAL AND DECKED WITH STEEL SHEET, WOOD LAGGING OR APPROVED EQUAL.

## TEMPORARY BRIDGE DETAILS

NOT TO SCALE

1  
13



## NOTES

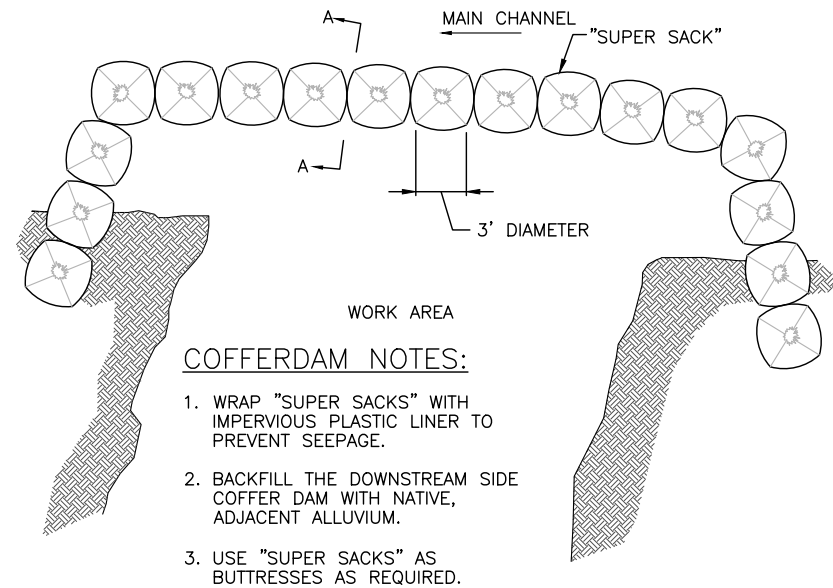
1. CONTAINMENT POND LOCATION TO BE DETERMINED BY CONTRACTOR.
2. POND WALLS WILL BE CONSTRUCTED FROM ONSITE NATIVE MATERIAL.
3. POND WILL BE ISOLATED FROM FLOWING WATERS.
4. CONTRACTOR SHALL MAINTAIN POND TO REDUCE RISK OF POND FAILURE.
5. FOLLOWING USE, MATERIALS SHALL BE RETURNED TO GRAVEL BAR AND SPREAD EVENLY.
6. PUMP OUTLET SECURED TO CROSS LOGS.



## PUMP OUTLET CONTAINMENT POND DETAILS

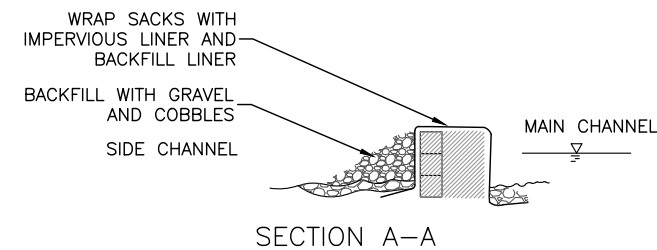
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2  
13



## COFFERDAM NOTES:

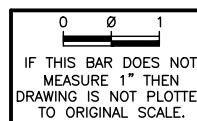
1. WRAP "SUPER SACKS" WITH IMPERVIOUS PLASTIC LINER TO PREVENT SEEPAGE.
2. BACKFILL THE DOWNSTREAM SIDE COFFER DAM WITH NATIVE, ADJACENT ALLUVIUM.
3. USE "SUPER SACKS" AS BUTTRESSES AS REQUIRED.



## COFFERDAM DETAILS

NOT TO SCALE

3  
13



NAME OR INITIALS AND DATE	GEOGRAPHIC INFORMATION
DESIGNED RLE, MS	LATITUDE 47°03'49"N
CHECKED RLE	LONGITUDE 123°29'29"W
DRAWN MS, GM	TN/SC/RG T18W/S12/R7W
CHECKED RLE	DATE 2/14/2019

LOWER SATSOP ASSESSMENT  
AND DESIGN

DETAILS – TESC

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