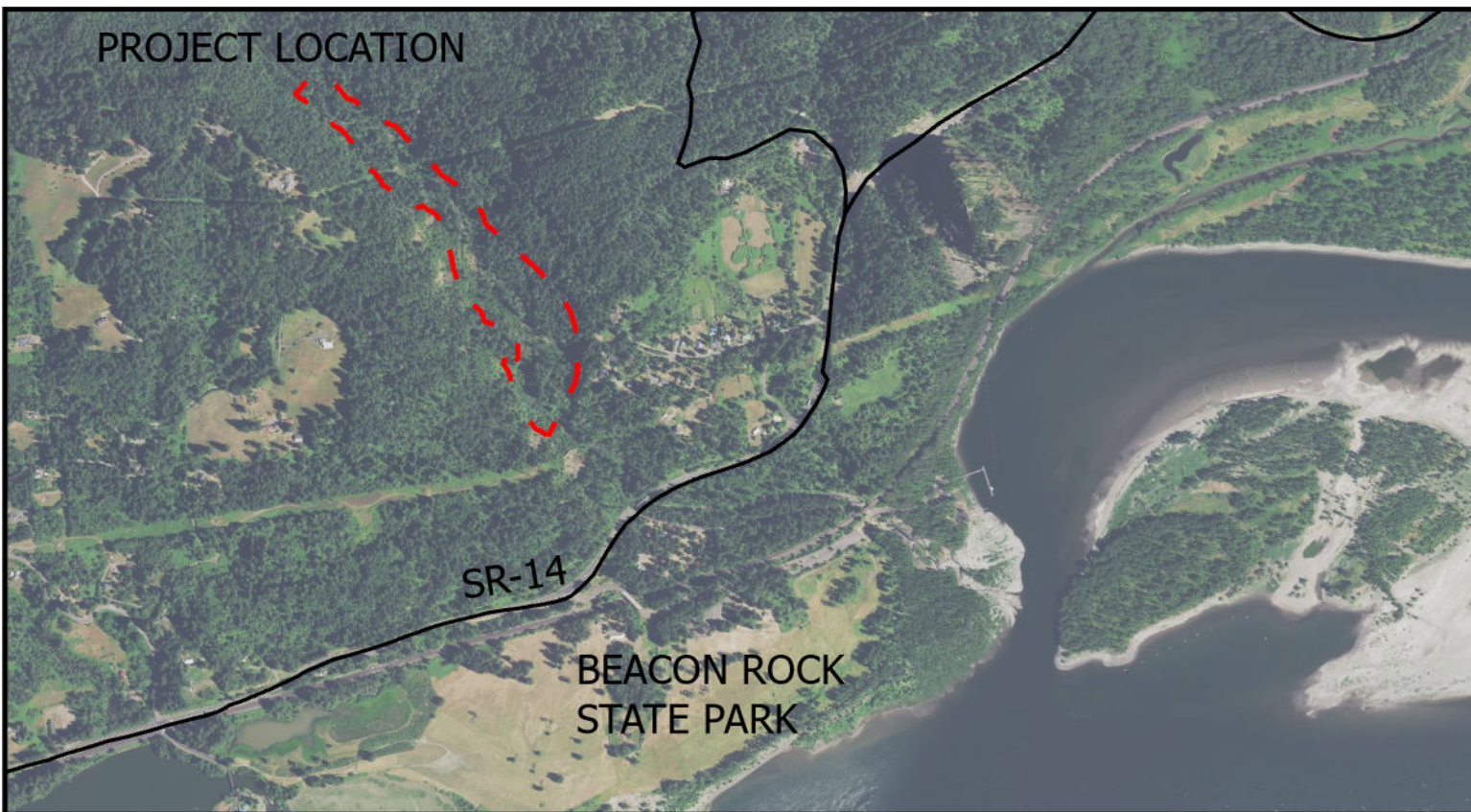


Lower Columbia Estuary Partnership
Woodard Creek Valley Bottom Reconnection Project
Final Design
June 2023



LOCATION MAP
STATE OF WASHINGTON
NOT TO SCALE



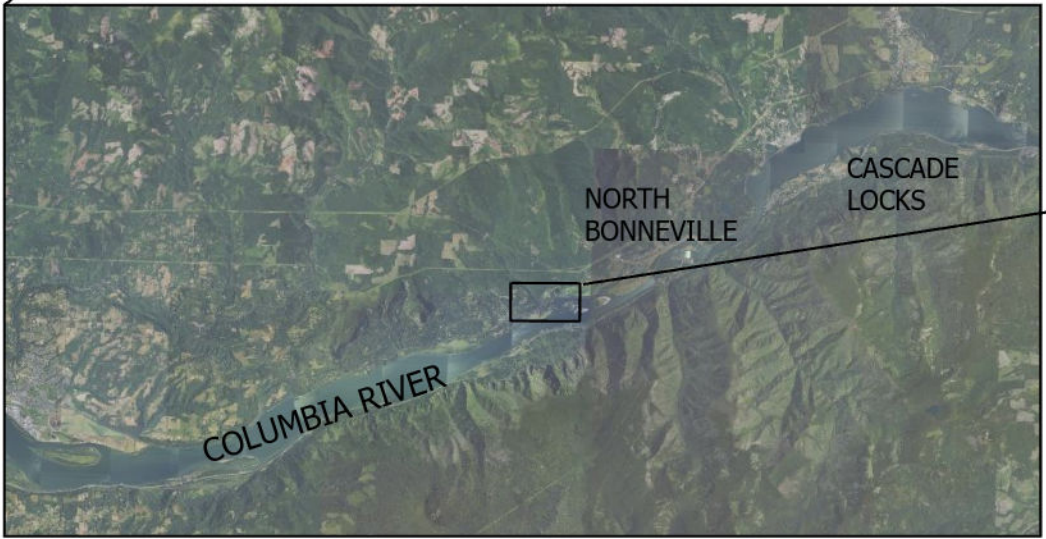
SITE MAP
NOT TO SCALE

COORDINATES:

LATITUDE: 45 DEG 37'55.2"N
LONGITUDE: 122 DEG 2'32.28"W

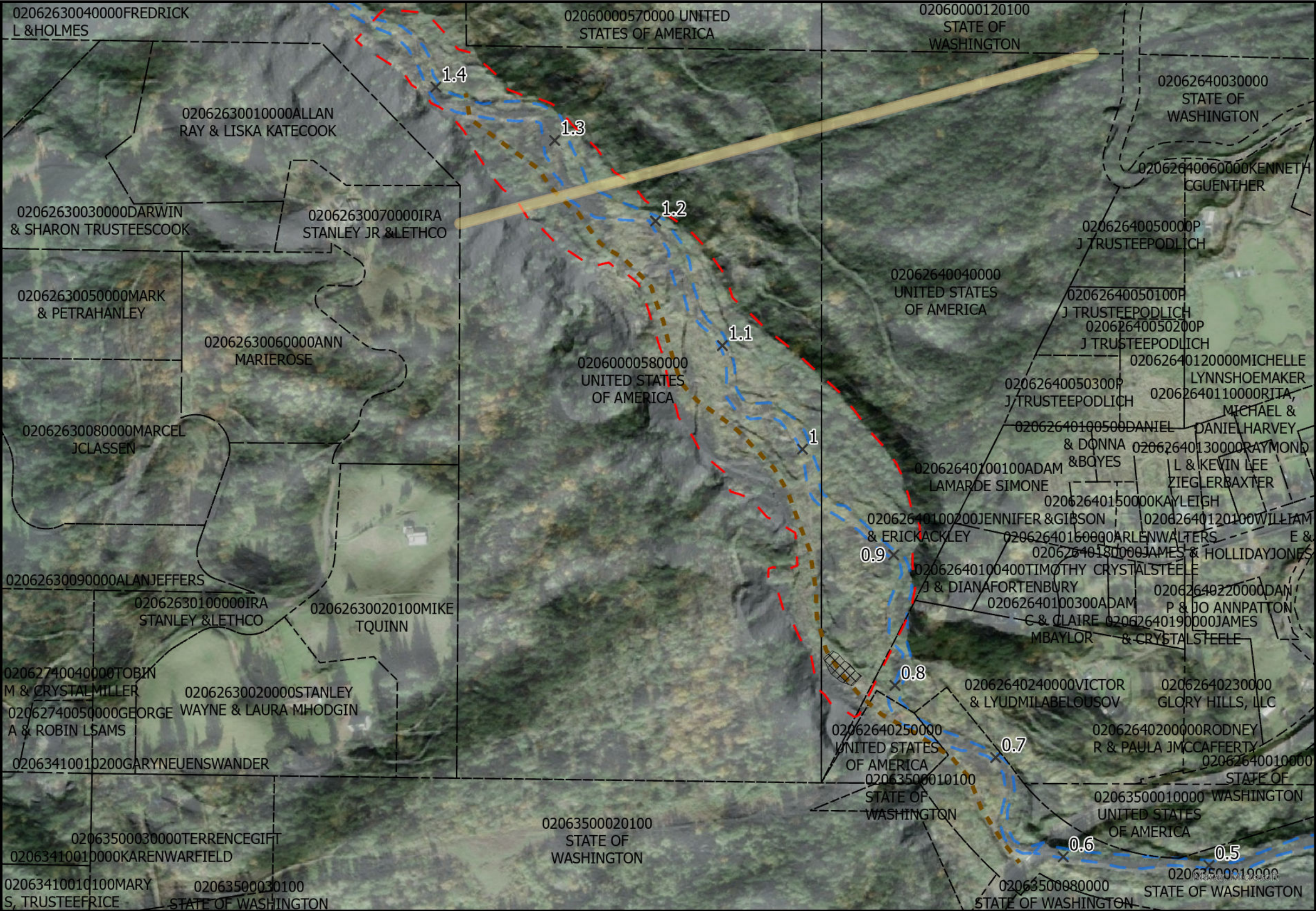
SECTION 27, TOWNSHIP 2N, RANGE 6E

WATERBODY: WOODARD CREEK
TRIBUTARY TO COLUMBIA RIVER



VICINITY MAP
NOT TO SCALE

- SHEET INDEX**
- 1. COVER, LOCATION, AND INDEX SHEET
 - 2. ACCESS AND STAGING PLAN
 - 3. WOODARD CREEK VALLEY BOTTOM RECONNECTION SITE MAP AND SHEET INDEX
 - 4. PLAN VIEW OF PROPOSED CONDITIONS (RM 0.77-0.91)
 - 5. PLAN VIEW OF PROPOSED CONDITIONS (RM 0.91-1.00)
 - 6. PLAN VIEW OF PROPOSED CONDITIONS (RM 1.00-1.10)
 - 7. PLAN VIEW OF PROPOSED CONDITIONS (RM 1.10-1.20)
 - 8. VALLEY RESET TYPICAL DRAWINGS
 - 9. ISLAND JAM TYPICAL DRAWINGS
 - 10. VALLEY CROSS-SECTION A-A'
 - 11. VALLEY CROSS-SECTION B-B'
 - 12. VALLEY CROSS-SECTION C-C'
 - 13. VALLEY LONGITUDINAL PROFILES
 - 14. PLANTING LIST AND NATIVE SEED MIX



LEGEND

- X RIVER MILE (TENTHS)
- ORDINARY HIGH WATER (OHW)
- - TAXLOTS
- - PROJECT BOUNDARY
- WILLIAMS GAS PIPELINE CORRIDOR
- ▨ STAGING AREA
- - TEMPORARY ACCESS ROAD

- NOTES:
1. OLD ROAD BED WILL BE USED FOR TEMPORARY ACCESS ROUTE
 2. STAGING AREA IS LOCATED > 150' FROM FLOWING WATER AT SUMMER BASEFLOW
 3. LCEP TO OBTAIN PERMITS TO ACCESS NFS LANDS (PROJECT SITE) ACROSS STATE PARKS, BPA AND PRIVATE LANDOWNERS FROM SR-14.
 4. LCEP TO COORDINATE WITH WILLIAMS PIPELINE FOR EQUIPMENT ACCESS ACROSS THE GAS PIPELINE.
 5. A CULVERT WILL BE NEEDED FOR TEMPORARY ACCESS ROAD WHERE IT CROSSES THE WOODARD CREEK MAINSTEM.



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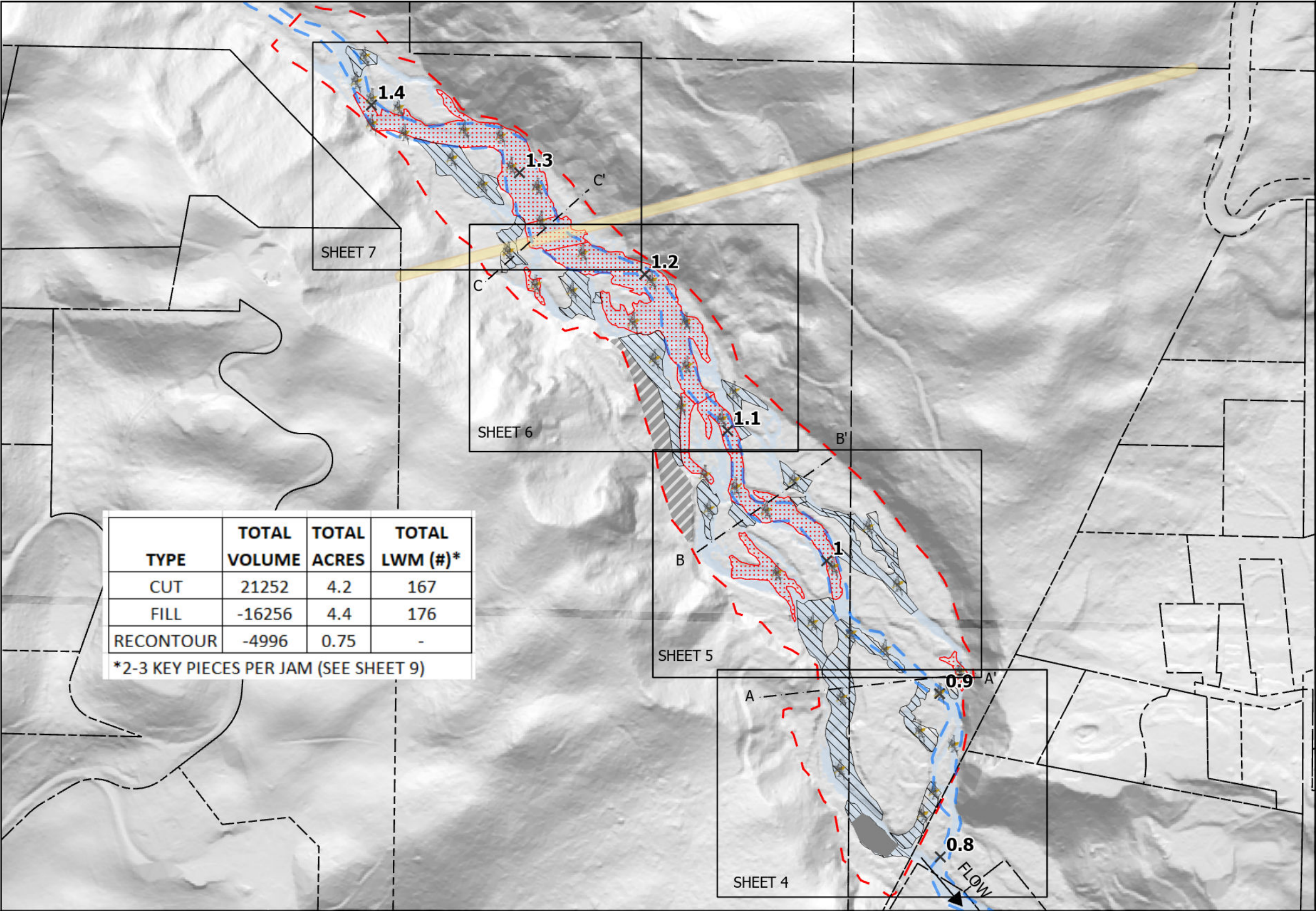
LOWER COLUMBIA ESTUARY PARTNERSHIP
WOODARD CREEK VALLEY BOTTOM RECONNECTION
FINAL DESIGN



ACCESS AND STAGING PLAN

SHEET

2 OF 14



LEGEND

- WOOD PLACEMENT
- RIVER MILE (TENTHS)
- CROSS-SECTIONS
- WILLIAMS GAS PIPELINE CORRIDOR
- ORDINARY HIGH WATER (OHW)
- TAXLOTS
- PROJECT BOUNDARY
- REMOVAL (CUT) ZONES
- FILL ZONES
- POST-RESTORATION INUNDATION
- RECONTOUR
- STAGING AREA

NOTES:
1. LARGE WOODY MATERIAL (LWM) WILL BE DISTRIBUTED ACROSS CUT AND FILL ZONES AND PORTIONS OF MAINSTEM CHANNEL THAT IS CURRENTLY AT TARGET AT A RATE OF 40 TREES PER ACRE. 2/3 OF LWM WILL BE CLUSTERED IN PARTIALLY BURIED, ISLAND JAMS AND 1/3 SCATTERED ACROSS RECONNECTED VALLEY FLOOR.
2. LWM CONSISTS OF 18"+ DBH, 50'+ LONG PIECES OF TREES WITH ROOTWAD IN TACT.
3. WOOD WILL BE SOURCED WITHIN THE PROJECT AREA OR IN NEARBY NFS LANDS



TYPE	TOTAL VOLUME	TOTAL ACRES	TOTAL LWM (#)*
CUT	21252	4.2	167
FILL	-16256	4.4	176
RECONTOUR	-4996	0.75	-

*2-3 KEY PIECES PER JAM (SEE SHEET 9)

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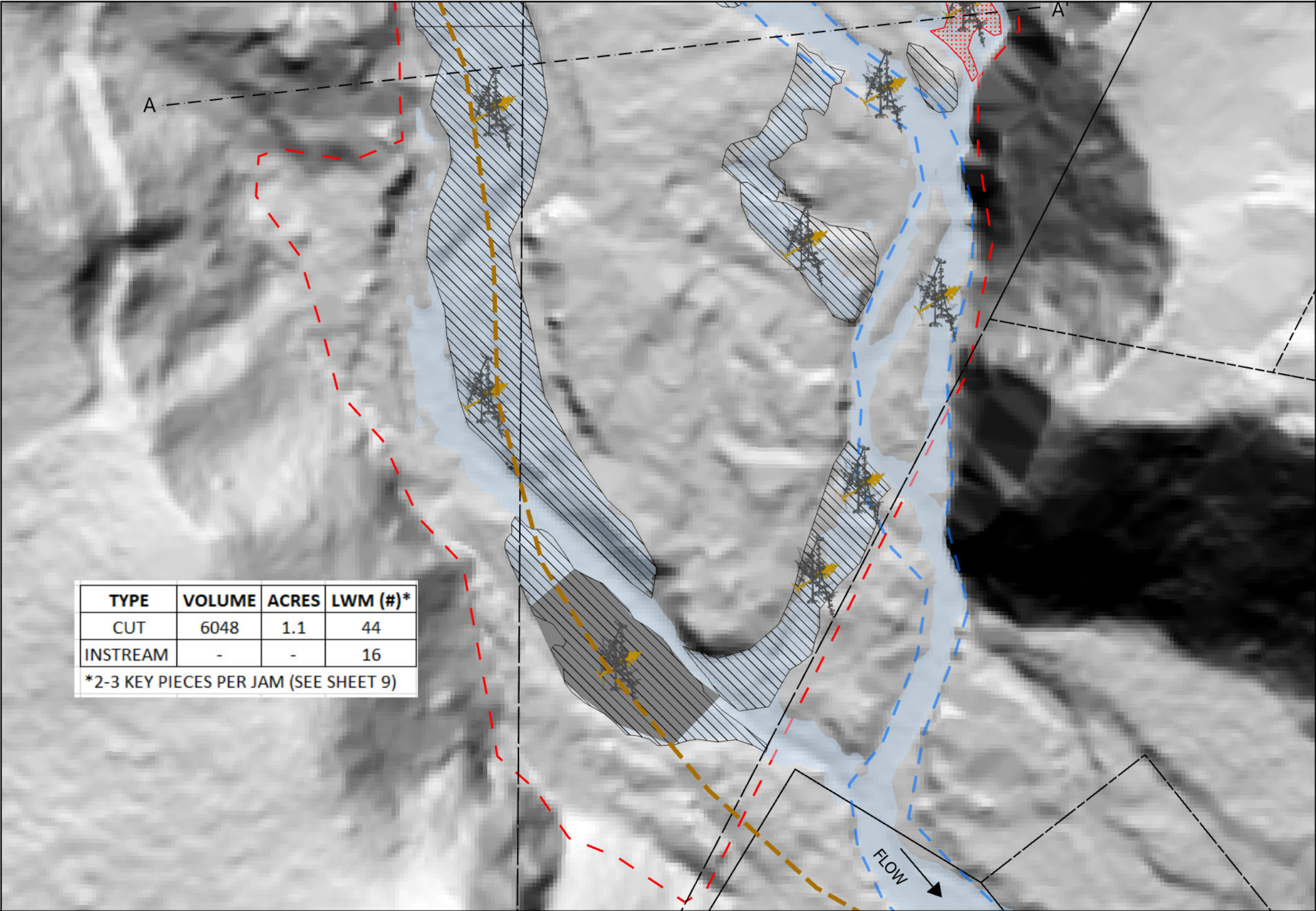
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LOWER COLUMBIA ESTUARY PARTNERSHIP
WOODARD CREEK VALLEY BOTTOM RECONNECTION
FINAL DESIGN



WOODARD CREEK VALLEY
BOTTOM RECONNECTION SITE
MAP AND SHEET INDEX

SHEET
3 OF 14



LEGEND



WOOD PLACEMENT

- TEMPORARY ACCESS ROAD
- CROSS-SECTIONS
- ORDINARY HIGH WATER (OHW)
- REMOVAL (CUT) ZONES
- FILL ZONES
- TAXLOTS
- STAGING AREA
- POST-RESTORATION INUNDATION
- PROJECT BOUNDARY

- NOTES:
1. OLD ROAD BED WILL BE USED FOR TEMPORARY ACCESS ROUTE
 2. STAGING AREA IS LOCATED > 150' FROM FLOWING WATER AT SUMMER BASEFLOW
 3. TREES WILL BE PUSHED OVER ON CUT ZONES AND ALONG ACCESS ROUTES FOR USE ON CUT/FILL ZONES (~40 TREES PER ACRE, PARTIALLY BURIED).
 4. DRY AREAS WILL BE CUT FIRST, THEN WATER DIVERTED INTO NEWLY CREATED FLOW PATHS TO DEWATER



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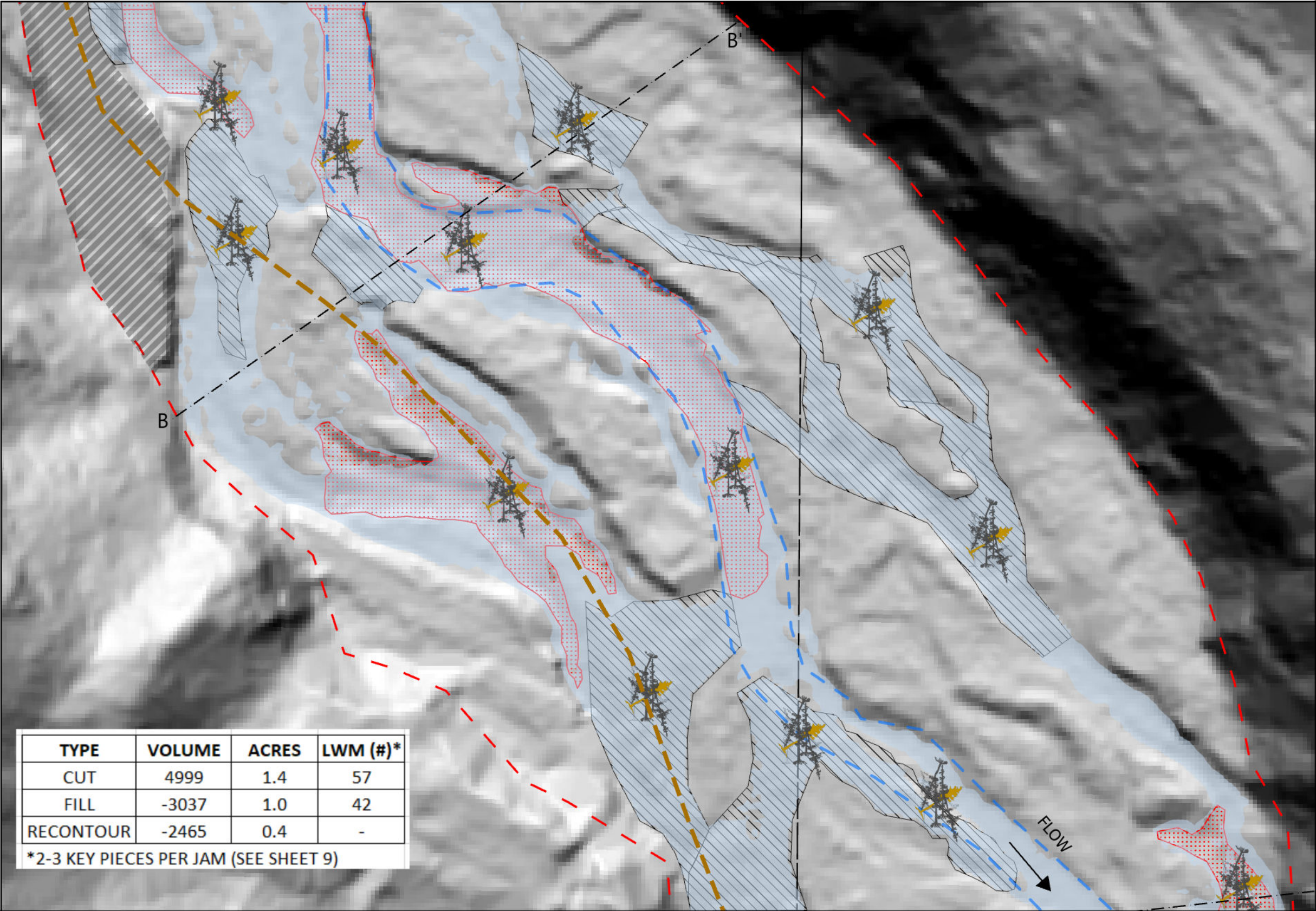
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LOWER COLUMBIA ESTUARY PARTNERSHIP
WOODARD CREEK VALLEY BOTTOM RECONNECTION
FINAL DESIGN



PLAN VIEW OF PROPOSED
CONDITIONS (RM 0.77 - 0.91)



LEGEND



WOOD PLACEMENT

TEMPORARY ACCESS ROAD

CROSS-SECTIONS

ORDINARY HIGH WATER (OHW)

REMOVAL (CUT) ZONES

FILL ZONES

TAXLOTS

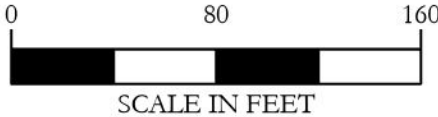
POST-RESTORATION INUNDATION

PROJECT BOUNDARY

RECONTOUR

NOTES:

1. OLD ROAD BED WILL BE USED FOR TEMPORARY ACCESS ROUTE
2. TREES WILL BE PUSHED OVER ON CUT ZONES AND ALONG ACCESS ROUTES FOR USE ON CUT/FILL ZONES (~40 TREES PER ACRE, PARTIALLY BURIED).
4. DRY AREAS WILL BE CUT FIRST, THEN WATER DIVERTED INTO NEWLY CREATED FLOW PATHS TO DEWATER.
5. RECONTOUR AREA WILL INCLUDE PULLING BACK MATERIAL ENCROACHING ON VALLEY FLOOR AND RECONTOURING TO MATCH NATURAL VALLEY WALL SLOPE.



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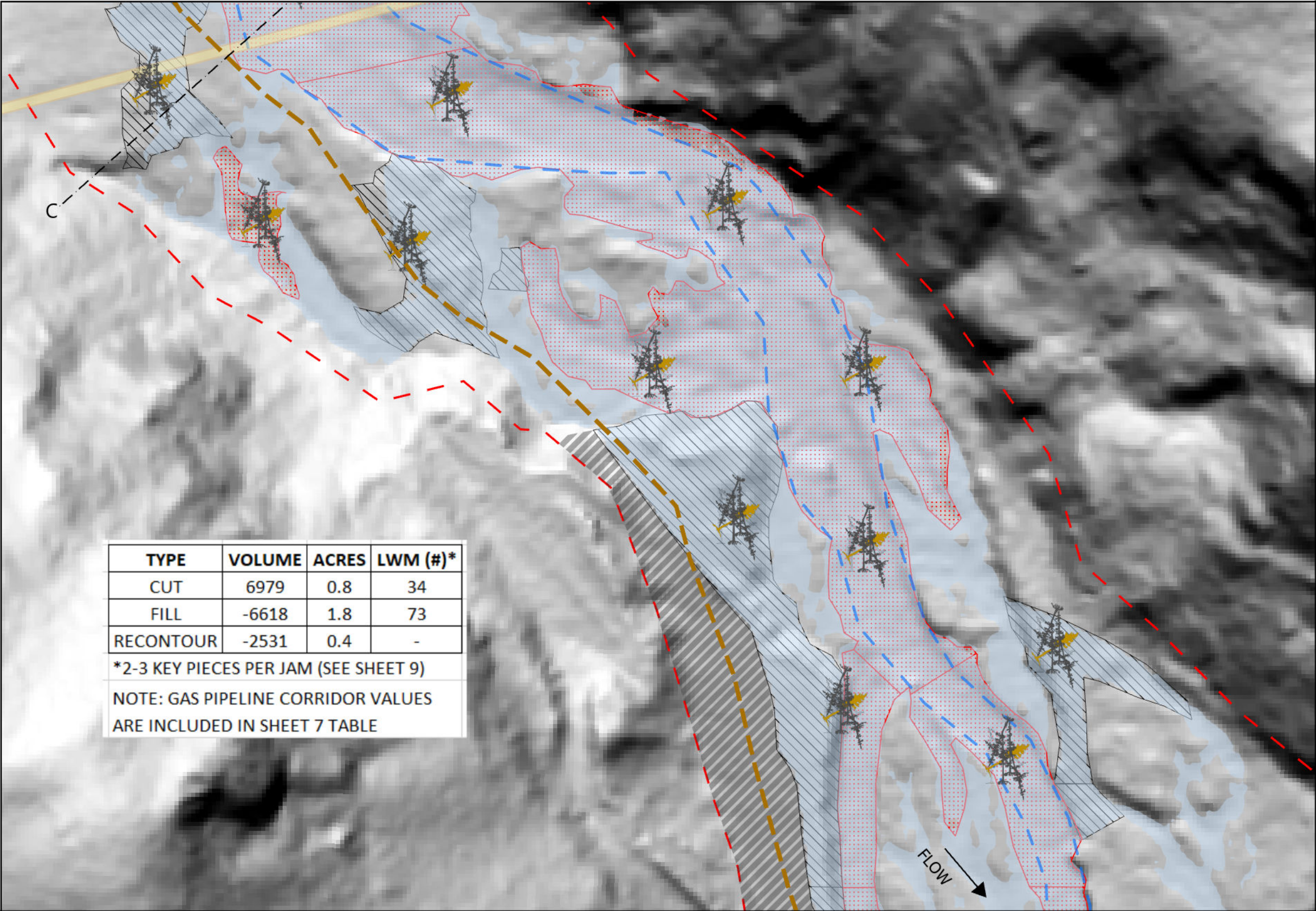
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LOWER COLUMBIA ESTUARY PARTNERSHIP
WOODARD CREEK VALLEY BOTTOM RECONNECTION
FINAL DESIGN



PLAN VIEW OF PROPOSED
CONDITIONS (RM 0.91 - 1.08)



LEGEND

- WOOD PLACEMENT
- TEMPORARY ACCESS ROAD
- WILLIAMS GAS PIPELINE CORRIDOR
- CROSS-SECTIONS
- ORDINARY HIGH WATER (OHW)
- REMOVAL (CUT) ZONES
- FILL ZONES
- TAXLOTS
- POST-RESTORATION INUNDATION (100 CFS)
- PROJECT BOUNDARY
- RECONTOUR

- NOTES:
1. TREES WILL BE PUSHED OVER ON CUT ZONES AND ALONG ACCESS ROUTES FOR USE ON CUT/FILL ZONES (~40 TREES PER ACRE, PARTIALLY BURIED).
 2. DRY AREAS WILL BE CUT FIRST, THEN WATER DIVERTED INTO NEWLY CREATED FLOW PATHS TO DEWATER MAINSTEM PRIOR TO FILLING..
 3. THREE FEET OF FILL MUST BE MAINTAINED OVER BURIED GAS PIPELINE.



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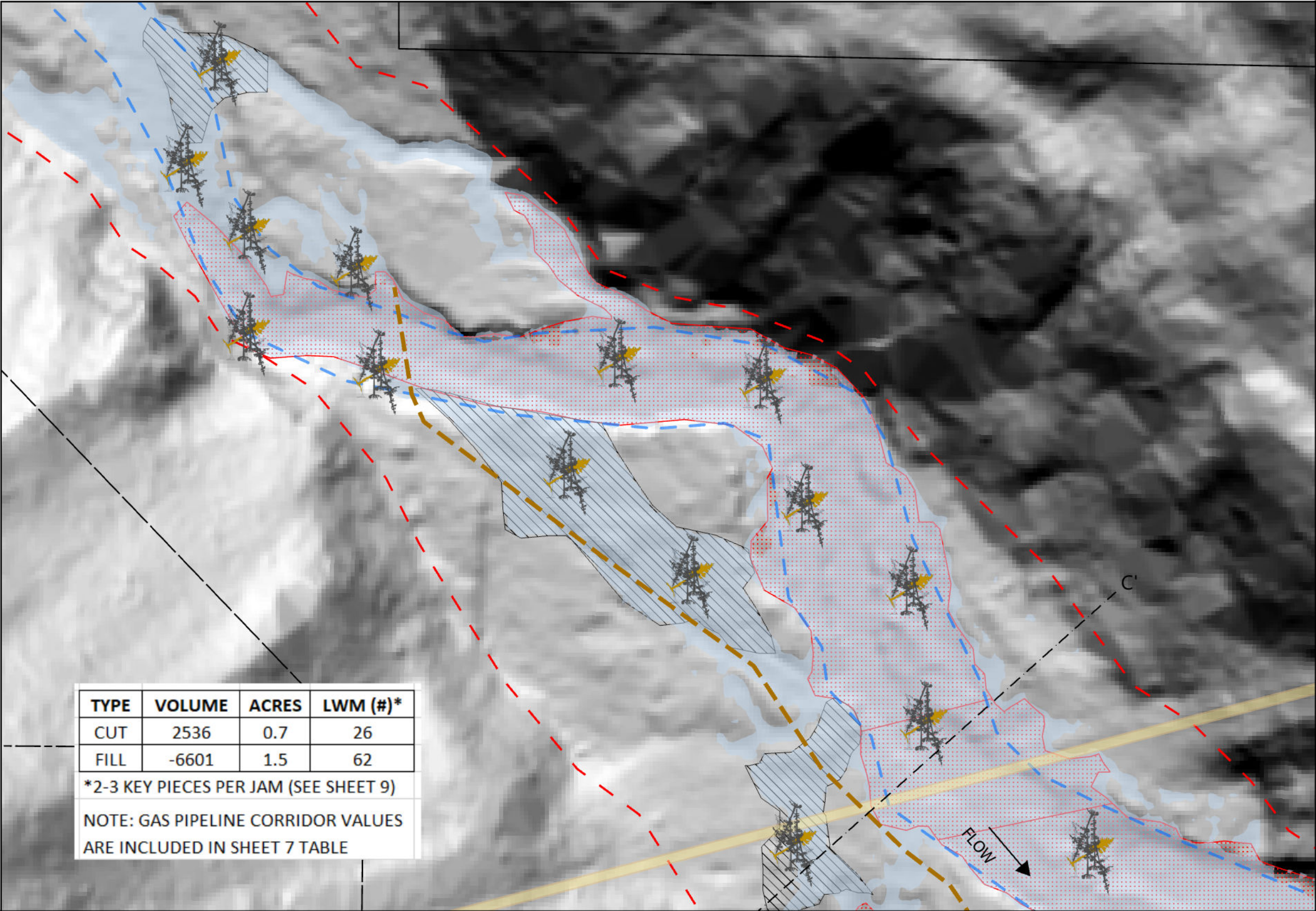
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WOODARD CREEK VALLEY BOTTOM RECONNECTION
FINAL DESIGN



PLAN VIEW OF PROPOSED
CONDITIONS (RM 1.08 - 1.25)



LEGEND

 WOOD PLACEMENT

 TEMPORARY ACCESS ROAD

 WILLIAMS GAS PIPELINE CORRIDOR

 CROSS-SECTIONS

 ORDINARY HIGH WATER (OHW)

 REMOVAL (CUT) ZONES

 FILL ZONES

 TAXLOTS

 POST-RESTORATION INUNDATION (100 CFS)

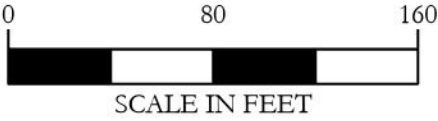
 PROJECT BOUNDARY

NOTES:

1. UPPER MOST LARGE WOOD PLACEMENT PLACED AS PART OF PHASE 1 PROJECT, PHASE 2 WORK WILL INCLUDE FILLING BETWEEN LARGE WOOD PLACEMENT.

2. TREES WILL BE PUSHED OVER ON CUT ZONES AND ALONG ACCESS ROUTES FOR USE ON CUT/FILL ZONES (~40 TREES PER ACRE, PARTIALLY BURIED).

3. DRY AREAS WILL BE CUT FIRST, THEN WATER DIVERTED INTO NEWLY CREATED FLOW PATHS TO DEWATER MAINSTEM PRIOR TO FILLING.



TYPE	VOLUME	ACRES	LWM (#)*
CUT	2536	0.7	26
FILL	-6601	1.5	62

*2-3 KEY PIECES PER JAM (SEE SHEET 9)

NOTE: GAS PIPELINE CORRIDOR VALUES ARE INCLUDED IN SHEET 7 TABLE

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WOODARD CREEK VALLEY BOTTOM RECONNECTION

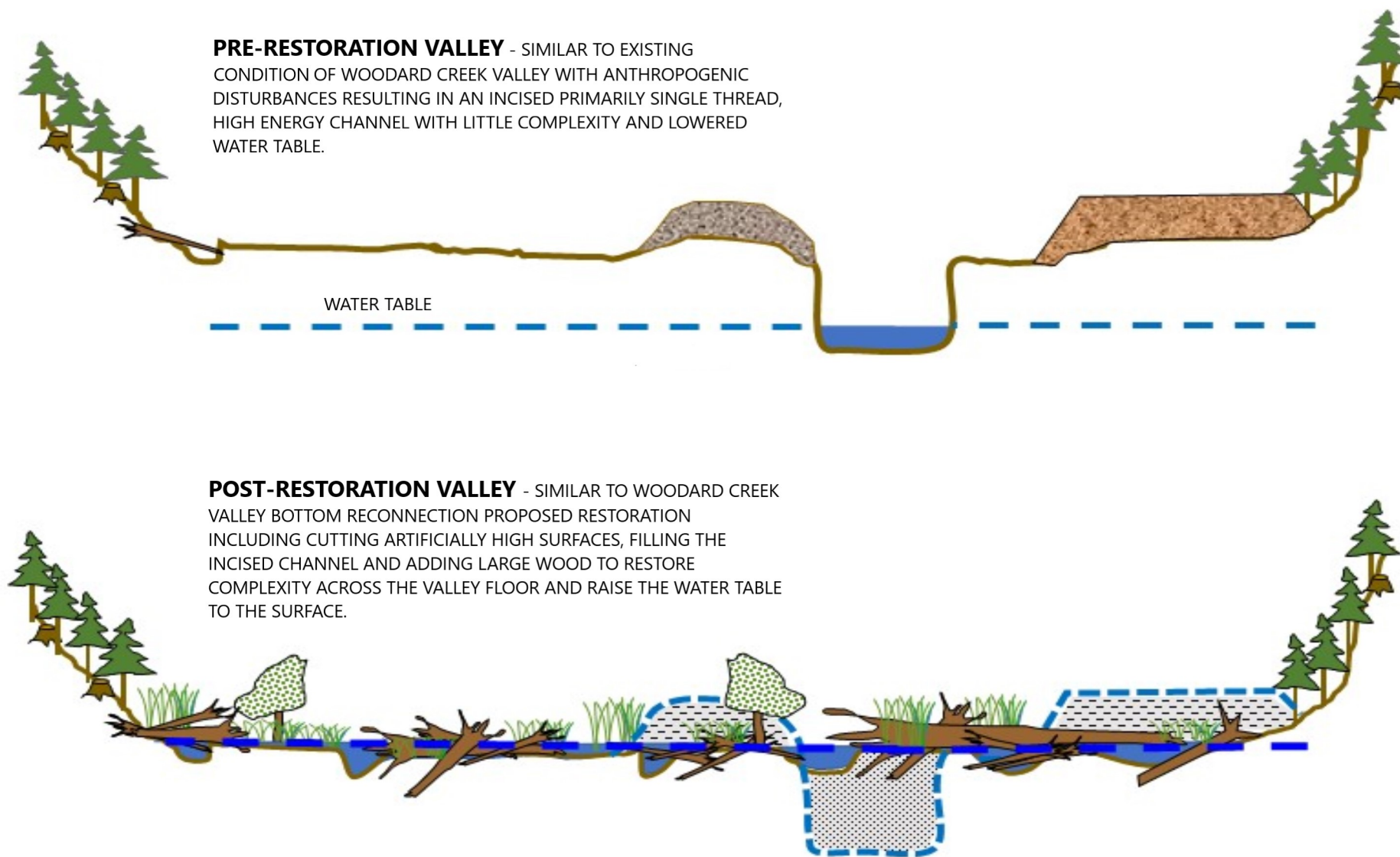
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PLAN VIEW OF PROPOSED

CONDITIONS (RM 1.21 - 1.44)

Lower Columbia Estuary Partnership Woodard Creek Valley Bottom Reconnection Project Final Design June 2023



NOTE: DRAWINGS BY JOHAN HOGERVORST, USFS AND
MODIFIED BY DIANE HOPSTER, USFS

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WOODARD CREEK VALLEY BOTTOM RECONNECTION
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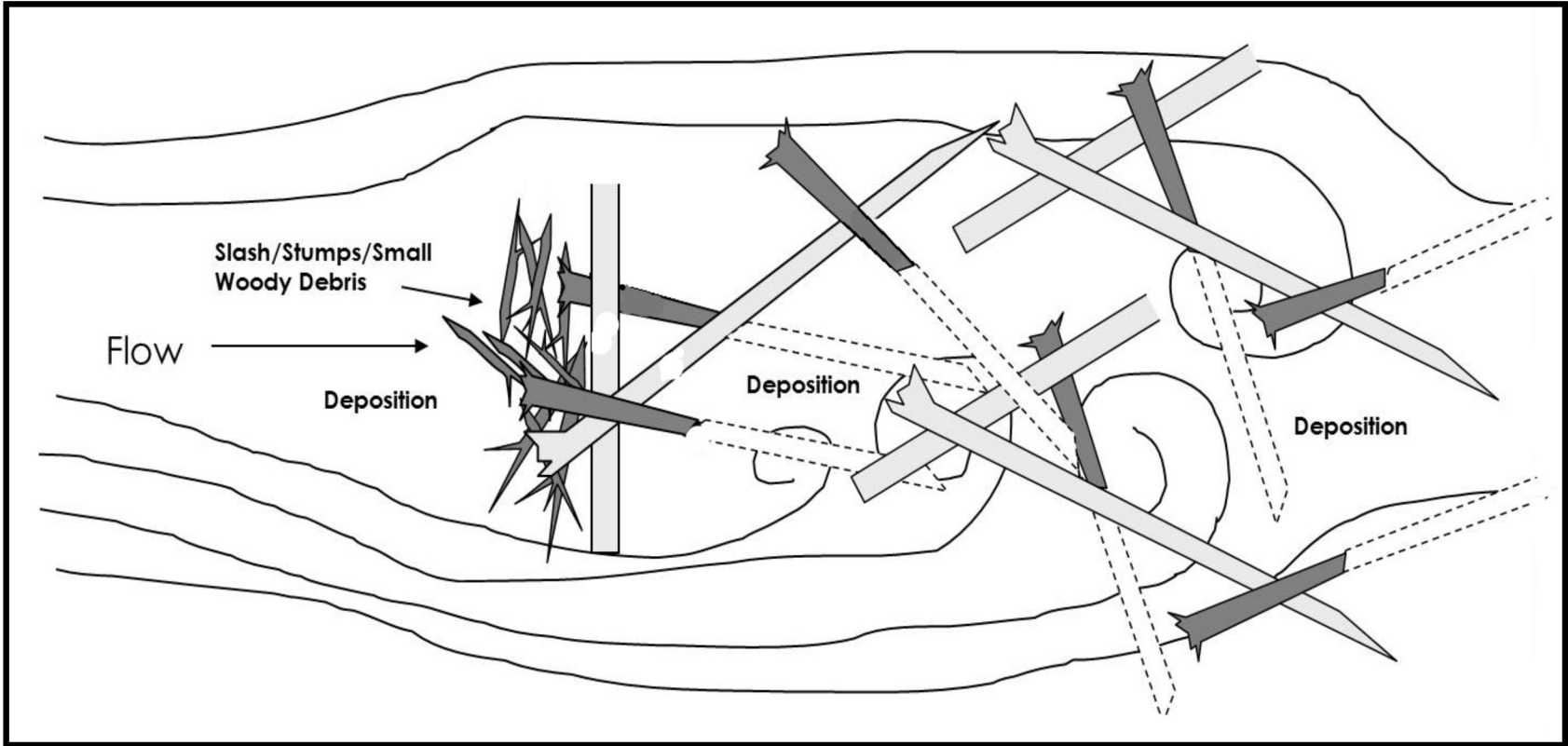


VALLEY RESET TYPICAL
DRAWINGS

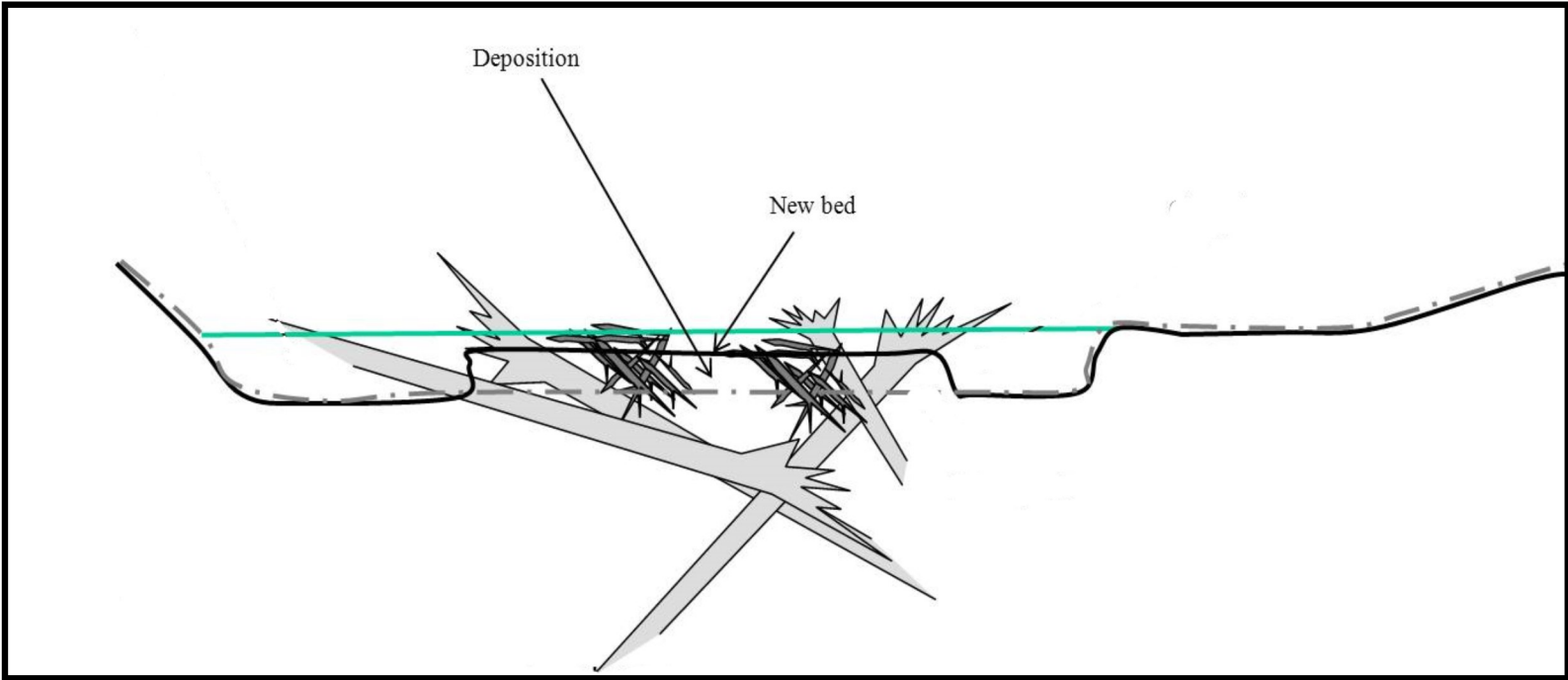
SHEET

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PLAN VIEW

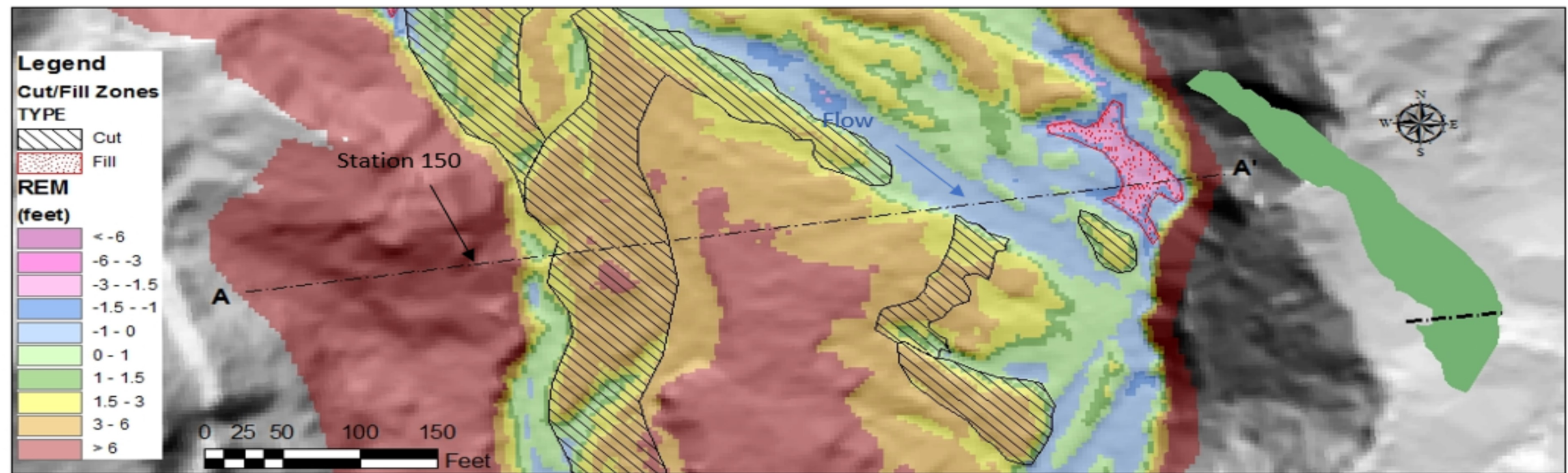
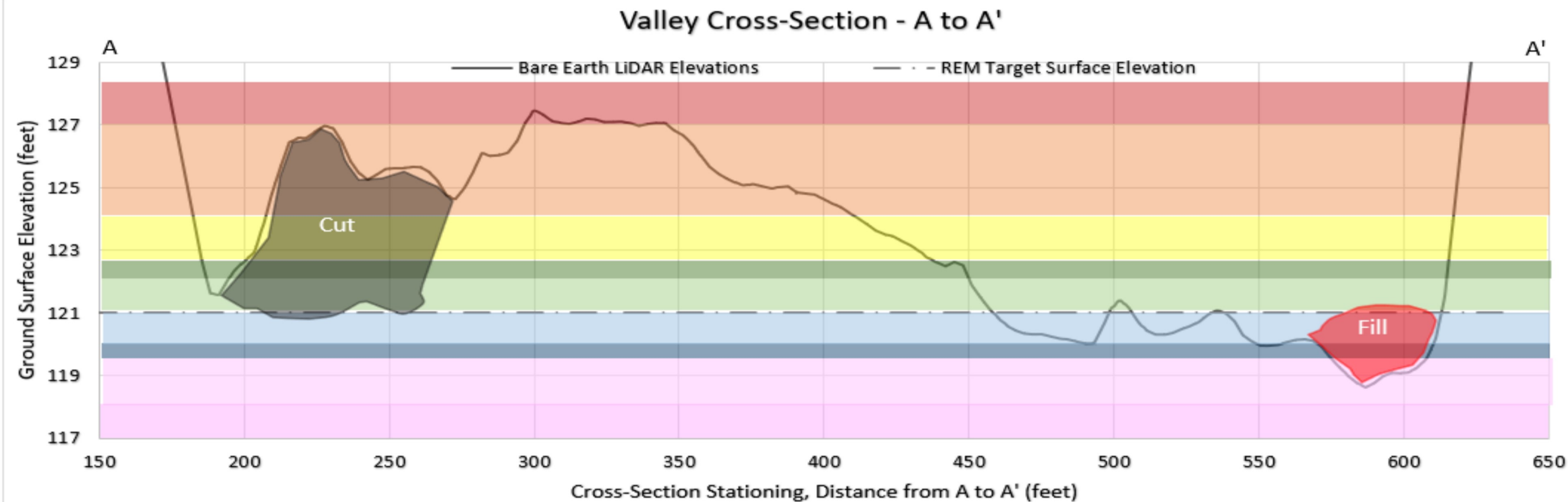


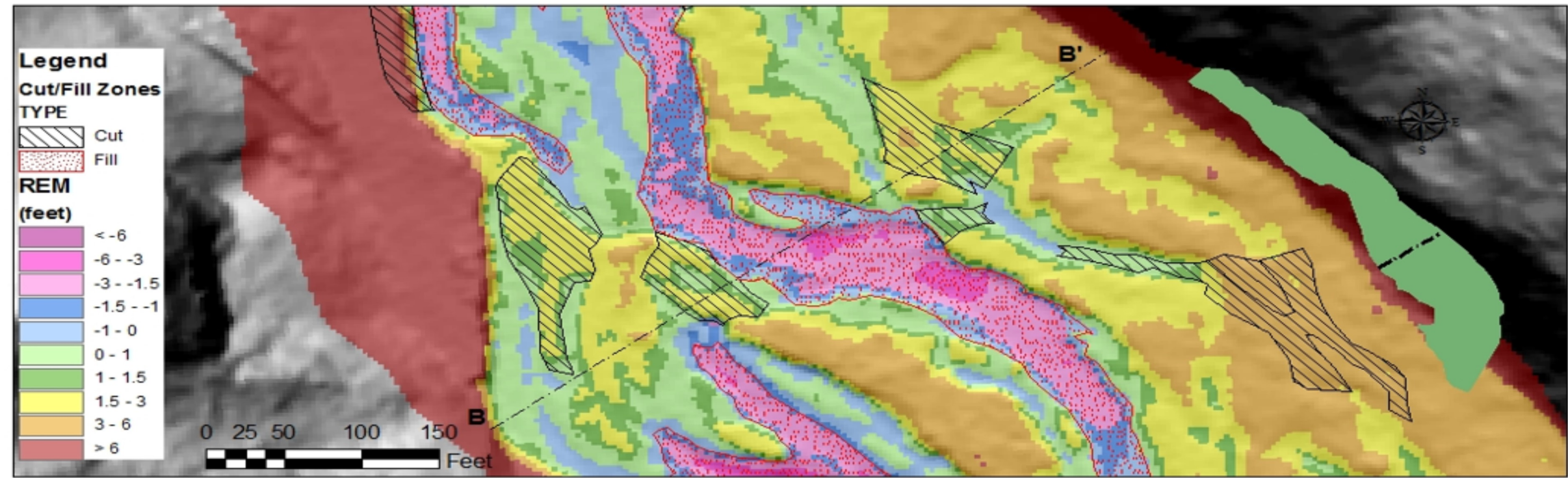
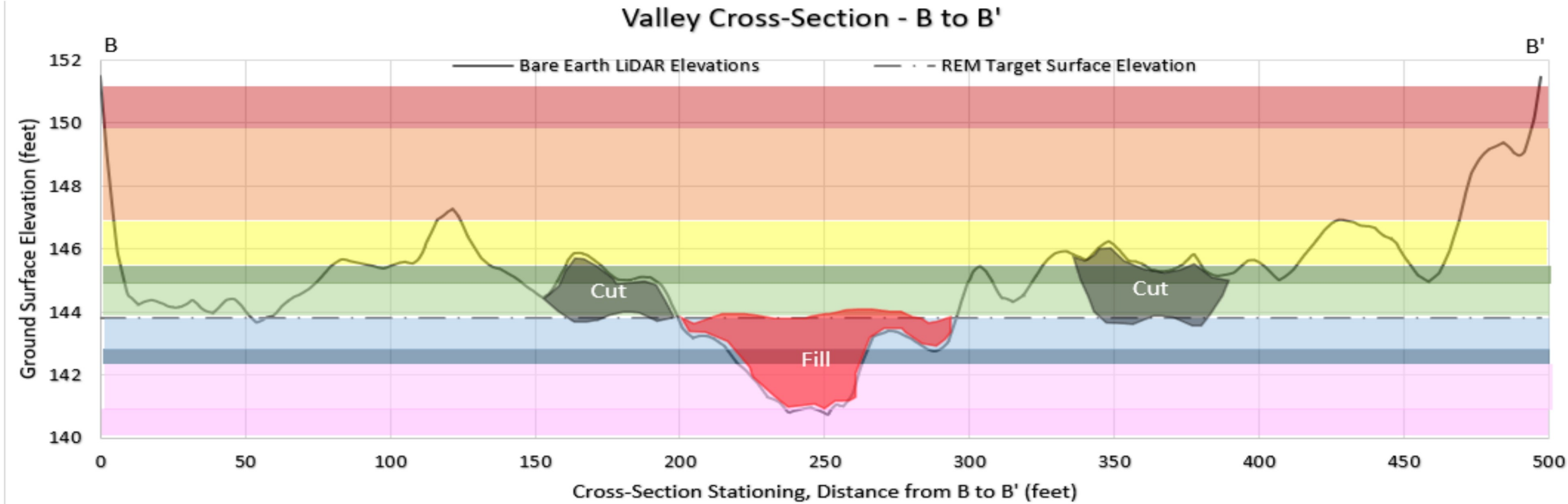
CROSS-SECTION VIEW

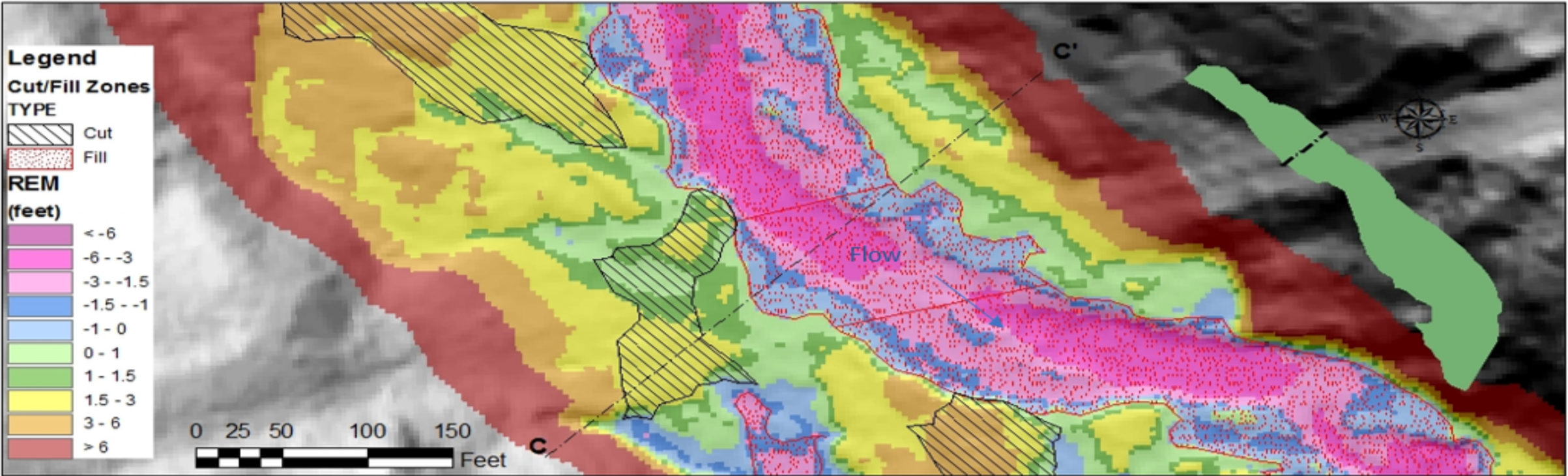
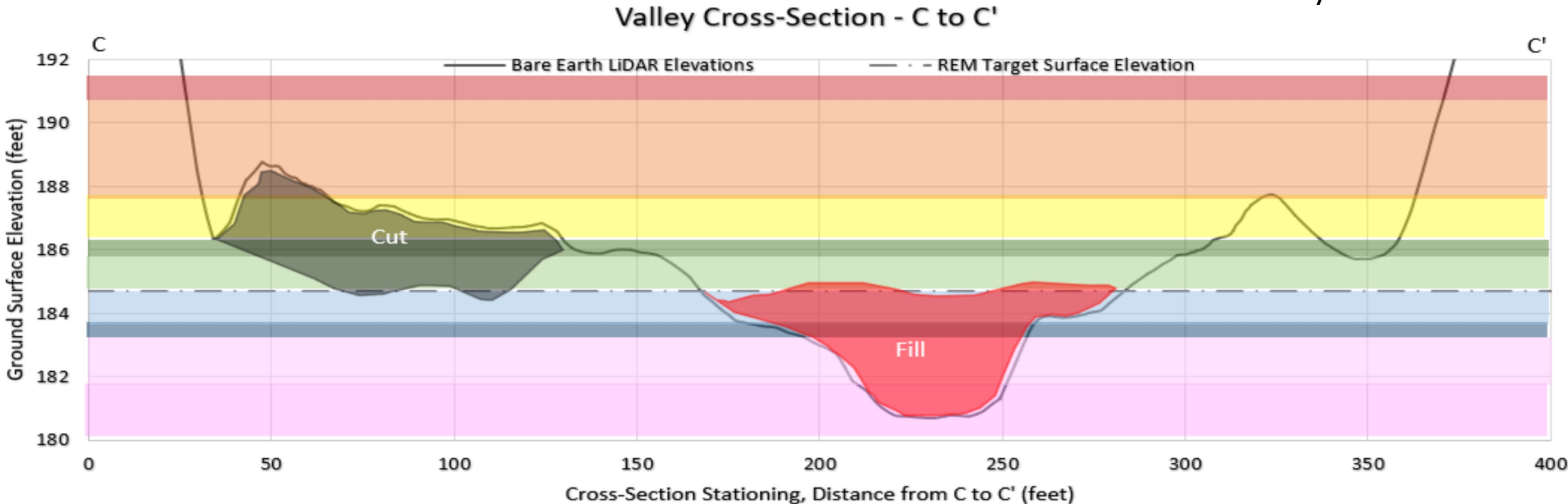


- NOTES:
- 1. EXCAVATE TRENCHES FOR 2 OR 3 WHOLE LENGTH TREES WITH ROOTWADS SO THAT 2/3 OF THE LENGTH OF THE TREE IS BURIED BELOW BED SURFACE. INSTALL TREES AND BACKFILL.
 - 2. PLACE AMPLE SLASH AND SMALL WOODY DEBRIS ON THE UPSTREAM SIDE OF THE ISLAND JAM.
 - 3. INTENT IS TO TRAP DEBRIS AND SEDIMENT SO THAT AN ISLAND FORMS.

NOTE: DRAWING BY PAUL POWERS, USFS AND CARRI PRESS, USFS AND MODIFIED BY DIANE HOPSTER, USFS





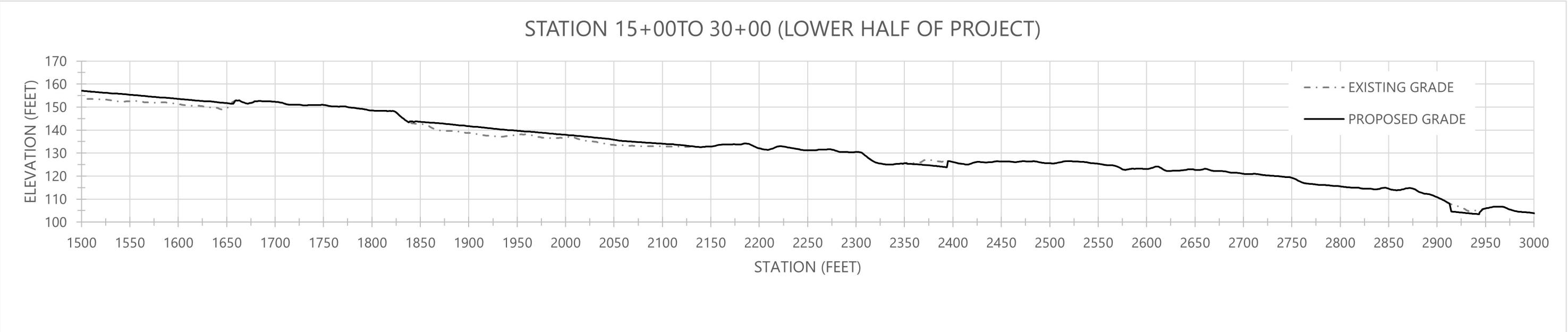
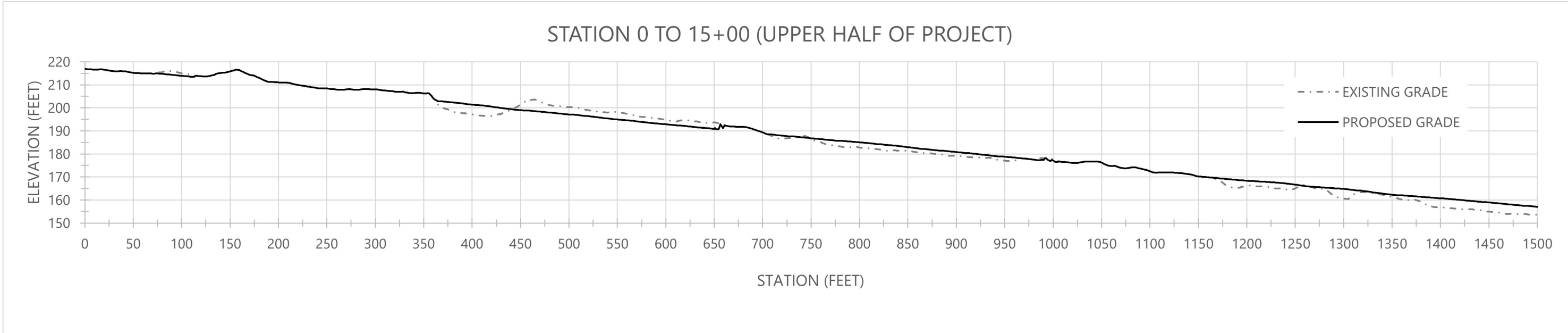


Lower Columbia Estuary Partnership

Woodard Creek Valley Bottom Reconnection Project

Final Design

June 2023



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WOODARD CREEK VALLEY BOTTOM RECONNECTION

FINAL DESIGN



Lower Columbia

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Partnership



VALLEY LONGITUDINAL

PROFILES

SHEET

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PLANTING LIST

		Riparian/ Valley Bottom Wetland	Transitional	Upland	Total
Acreage		5.16	0.57	1.35	7.08
Spacing (ft)		8	8	15	
% Survival		85	85	85	
Plants needed		4132	459	307	4898
15% contingency (total needed)		4752	528	354	5633
Total planned		4752	528	354	5634
Scouler willow	<i>Salix scouleriana</i>			51	51
western red cedar	<i>Thuja plicata</i>			51	51
douglas fir	<i>Pseudotsuga menziesii</i>			51	51
western white pine	<i>Pinus monticola</i>			51	51
ponderosa pine	<i>Pinus ponderosa</i>			50	50
black cottonwood	<i>Populus balsamifera trichocarpa</i>	679			679
Oregon ash	<i>Fraxinus latifolius</i>			50	50
oceanspray	<i>Holodiscus discolor</i>	679			679
common snowberry	<i>Symphoricarpos albus</i>	679			679
western service berry	<i>Amelanchier alnifolia</i>		264		264
creeping Oregon grape	<i>Mahonia nervosa</i>			50	50
beaked hazlenut	<i>Corylus cornuta</i>		264		264
western swordfern	<i>Polystichum munitum</i>	679			679
red huckleberry	<i>Vaccinium parvifolium</i>	678			678
sedge sp.	<i>Carex spp.</i>	679			679
rush sp.	<i>Juncus spp.</i>	679			679

NATIVE SEED MIX

	Species	Target 1st Year Composition %	Total Pounds Needed
tufted hairgrass	DECE	25	2.5
blue wildrye	ELGL	10	16.2
mountain brome	BRCA5	10	34.7
Idaho fescue	FEID	18	9.8
common yarrow	ACMI2	15	0.9
edible thistle	CEID	2	3.1
pearly everlasting	ANMA	10	0.3
Douglas aster	SYSU4	10	9.2

Acres to seed:	7
Target Seedlings/ft ²	22
Seed Bags per Acre:	1
Total No. of Bags	7

PLANTING NOTE: NATIVE PLANTS FROM THE CASCADE ECO-REGION THAT ARE ADAPTABLE WITHIN THE 35-40 DEG. F/<2 FOREST SERVICE PROVISIONAL SEED ZONE WILL BE UTILIZED. PLANT MATERIAL WILL BE COLLECTED FROM ON-SITE PRIOR TO CONSTRUCTION DISTURBANCE OR WITHIN 1 MILE AND WITHIN 500 FT. OF ELEVATION DIFFERENCE. IF SPECIES MUCH BE PURCHASED THROUGH A NURSERY OR WHOLESALE GROWER, MOST LOCAL INVENTORY WILL BE CONSIDERED.