ECOSYSTEM PLANNING & RESTORATION

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Salmon River Phase 3 – As-Built Summary Report

Date: 11/20/2025

Prepared For: United States Fish and Wildlife Service

Prepared By: Ecosystem Planning and Restoration, LLC and Ecosystem Engineering, LLC

Attachments: Attachment 1 – As-Built Plan Set

1. Introduction:

This As-Built Summary Report outlines the results of the post-construction (As-Built) survey submitted to EPR by JB's Excavation Services Inc. and 108 Consulting LLC originally on September 4, 2025, and then updated on October 13, 2025. As-Built survey points and elevations were incorporated into the plan sheets and compared against the design profiles, cross sections, and structure tables. Given the scale of the Salmon River, adjustments during construction were required to address site-specific challenges, including variable terrain, limited accessibility, and the handling and placement of large in-river materials. Vegetation for the project site has not yet been planted, but installation is scheduled for spring (April/May) of 2026.

2. Profile

Overall, the differences between the As-Built and design profiles are noticeable but remain within acceptable tolerances. Lateral deviations between the As-Built and design centerlines range from 0 to 5 feet, which is considered acceptable given field conditions and the natural variability of stream alignment during construction. Vertical elevation differences range from 0 to 2.24 feet. The largest variation occurs between stations 34+87.79 and 41+38.33, where the constructed riffle is deeper than shown in the design plans. This deviation is not expected to impact performance, as the overall channel gradient and habitat structure remain consistent with the design intent.

3. Design Cross Sections

The As-Built cross section data align closely with the proposed design, indicating that construction generally followed the intended design. The observed differences reflect typical field variability, including minor adjustments in the placement of fill for the constructed toe wood and soil lift with rock toe protection benches, localized deepening within pool areas, and slight lateral shifts in the cross sections where bench tie-outs were extended to better match existing site topography. Thalweg alignment also deviated from the original design in some areas.

These variations are considered acceptable to overall project function. The slight lowering of benches is expected to enhance floodplain connectivity by allowing more frequent overbank flow, while the

adjusted thalweg alignments and deepening of pools support improved habitat complexity. Collectively, these differences maintain the design objectives of channel stability reduction of width to depth ratio and habitat enhancement.

4. Structure Table

Constructed riffles, toe wood, and soil lift with stone toe protection structures can be compared using the profile and cross sections discussed in the previous sections above. Rock vane elevations and locations were surveyed as part of the As-built survey and are reported in the structures table. Differences between the As-Built and design elevations vary with the minimum being 0.05 ft and the maximum being 0.55 ft. These differences are considered acceptable and remain consistent with the overall design intent and performance goals. Rock vanes RV-4 and RV-5 were not constructed due to funding restrictions at the time of construction. These additional structures were intended to help direct flows away from the existing banks. With structure RV-3 in place, the flows will be directed away from the banks as the river begins to meander reducing bank stresses as intended. The finished structures that were constructed are expected to maintain stable banks, reduce erosion, and support habitat objectives in line with the project goals.

5. Conclusion

This As-Built Summary Report demonstrates that the constructed conditions closely align with the proposed design intent despite minor deviations. All profile, cross section, and structure analyses confirm that differences between proposed and constructed features are within an acceptable range, reflecting thoughtful adaptation to field conditions and site-specific challenges. Even with the omission of select structures due to budget constraints, completed elements should provide sufficient channel stability, erosion control, and habitat enhancement. Collectively, the project has met its restoration goals, supporting both the functional and ecological uplift of the Salmon River restoration.

ATTACHMENT 1
AS-BUILT PLAN SET

PROJECT: FINAL 100% SALMON RIVER PHASE 3 DESIGN PLAN

SALMON RIVER PHASE 3 HABITAT ENHANCEMENT PLAN

STATE	PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NY	EPR0064	1	23

PROJECT LENGTH

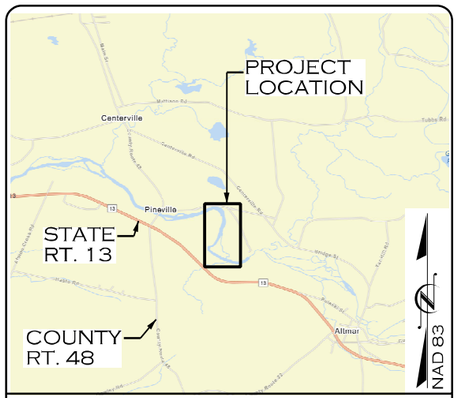
PROPOSED DESIGN STREAM LENGTH = 5,222 LINEAR FEET

OSWEGO COUNTY

LOCATION: TOWN OF ALTMAR

TYPE OF WORK: HABITAT ENHANCEMENT

AS-BUILT PLANS



VICINITY MAP

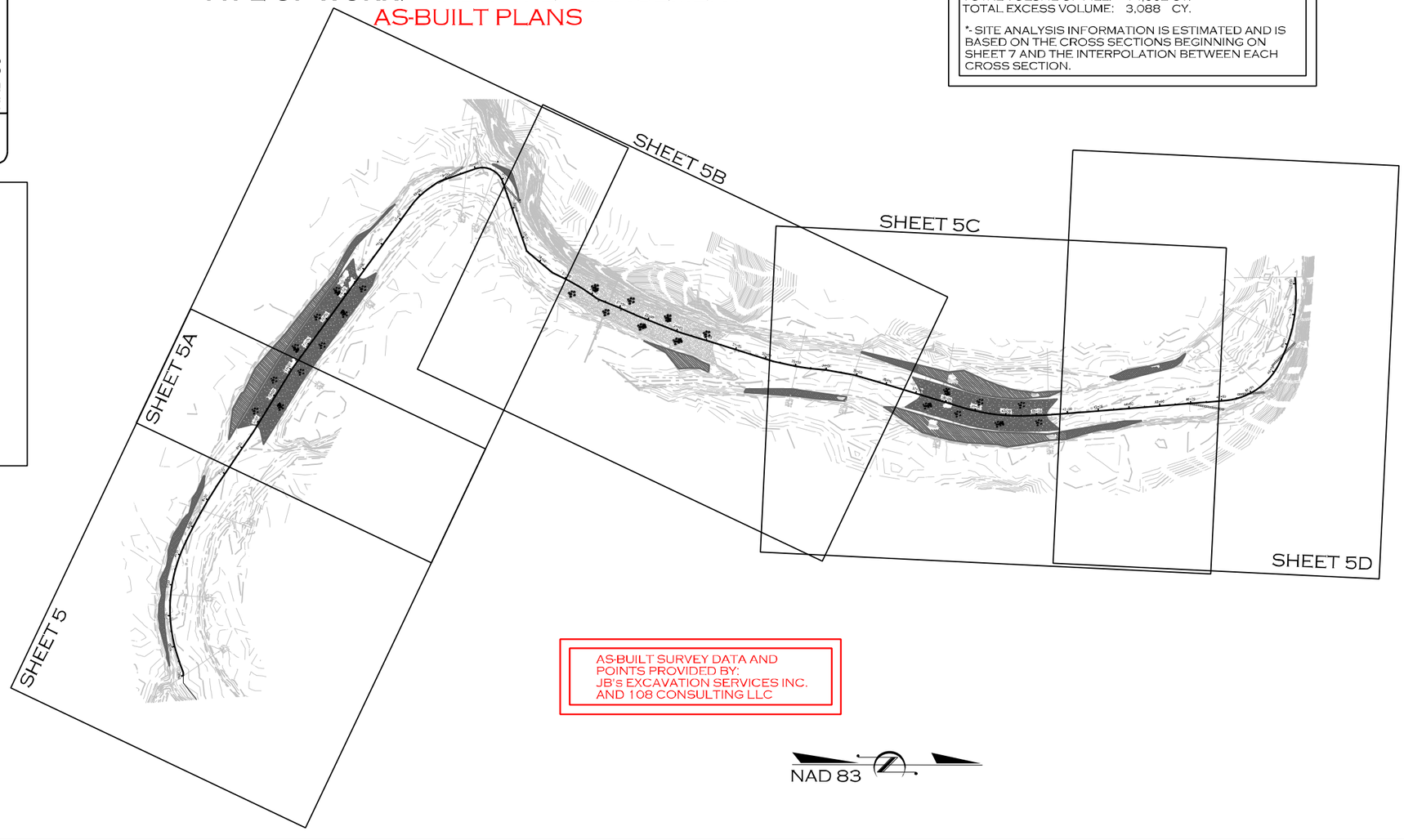
SITE ANALYSIS *

TOTAL VOLUME OF CUT: 17,440 CY.
TOTAL VOLUME OF FILL: 14,352 CY.
TOTAL EXCESS VOLUME: 3,088 CY.

*- SITE ANALYSIS INFORMATION IS ESTIMATED AND IS BASED ON THE CROSS SECTIONS BEGINNING ON SHEET 7 AND THE INTERPOLATION BETWEEN EACH CROSS SECTION.

INDEX OF SHEETS

GEOGRAPHIC COORDINATE SYSTEM:
EPSG: 102716 - NAD 1983 STATE PLANE
NEW YORK CENTRAL FIPS 3102



TO THE BEST OF MY KNOWLEDGE, THE AS-BUILT DOCUMENTATION PROVIDED IN THESE PLANS IS AN ACCURATE REPRESENTATION OF THE CONDITION OF THE PROJECT AFTER CONSTRUCTION.

SIGNATURE 11/20/2025 DATE

PRINT NAME: Kevin Tweedy
TITLE: Project Engineer
AFFILIATION Ecosystem Engineering, LLC

AS-BUILT SURVEY DATA AND POINTS PROVIDED BY:
JB's EXCAVATION SERVICES INC.
AND 108 CONSULTING LLC

AS-BUILT PLANS 11/20/25

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLAN	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLAN	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE
3817 LUKER ROAD
CORTLAND, NY 13045

GIAN DODICI
PROJECT MANAGER

PREPARED BY:
ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511
NY LICENSE # = 099293

AUGUST 2025
CONSTRUCTION COMPLETION DATE:

KEVIN TWEEDY, PE
PROJECT ENGINEER

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · 099293 · LICENSED PROFESSIONAL ENGINEER

Kevin Tweedy 2025.11.20 14:31:05-05'00' P.E.

SIGNATURE:

STREAM CONVENTIONAL SYMBOLS

PROPOSED ROCK VANE (RV)

PROPOSED BOULDER CLUSTER

PROPOSED TOEWOOD PROTECTION & SOIL LIFT (TW)

PROPOSED SOIL LIFT WITH STONE TOE (ST)

EXISTING RIFFLE

PROPOSED CONSTRUCTED RIFFLE (CR)

—498— EXISTING MINOR CONTOUR

—500— EXISTING MAJOR CONTOUR

EXISTING TOP OF BANK

EXISTING WATER SURFACE

EXISTING CHANNEL

— SF — SAFETY FENCE

— TP — TREE PROTECTION

— ||| — SILT FENCE

—X— EXISTING FENCE

—CE— CONSERVATION EASEMENT

— CL — ROAD CENTERLINE

10+00 STREAM THALWEG

STREAM TOP OF BANKS

TEMPORARY STREAM CROSSING

TRANSPLANTED VEGETATION

TREE REMOVAL

EXISTING THALWEG

**NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

CONSTRUCTION SEQUENCE

PROJECT # EPR0064 | SHEET NO. 1A

SYMBOLOGY / NOTES

1. ALL PERMITS ARE IN PLACE FOR THE SALMON RIVER PHASE 3 PROJECT.
2. CONTACT THE USFWS TO CONDUCT OR CONFIRM SITE LAYOUT AND FLAGGING BEFORE BEGINNING GROUND DISTURBANCE.
3. IDENTIFY AND PREPARE STAGING AREAS AND EQUIPMENT ENTRY AND EXIT AREAS FOR STREAM ACCESS.
4. INSTALL SEDIMENT FENCES AS NEEDED TO PROTECT SENSITIVE AREAS AND DIRECT STORM WATER RUN OFF.
5. INSTALL E&SC MEASURES AT ANY AREAS USED FOR CONTRACTOR EQUIPMENT STAGING.
6. ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES MAY BE REQUIRED BY THE USFWS OR OWNER IF DEEMED NECESSARY.
7. REDISTRIBUTE 6'' OF TOPSOIL IN ALL GRADED AREAS TO ACHIEVE FINAL DESIGN GRADE.
8. AFTER SITE IS STABILIZED. REMOVE ALL TEMPORARY MEASURES, FINE GRADE DISTURBED AREAS, PLANT PERMANENT VEGETATION AND APPLY MULCH AS SPECIFIED IN THE PLANS.
9. REMOVE ALL REMAINING TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES UPON COMPLETION AND STABILIZATION OF PROJECT.

<u>WORKING IN WATER</u>

1. WORK SHALL TAKE PLACE IN THE WET WITH EXCAVATOR AND OTHER MACHINERY OPERATIONS IN ACCORDANCE WITH THE FOLLOWING PROCEDURES:
   - A. LIMIT THE NUMBER OF INGRESS AND EGRESS POINTS TO THE RIVER.
   - B. MOVE MACHINERY ABOVE BANK-FULL, (OR HIGHER AS WEATHER FORECASTS DICTATE) AT THE END OF EACH DAY'S WORK.
   - C. IN CONSULTATION WITH THE USFWS AND THEIR REPRESENTATIVES, OPERATORS SHALL AT ALL TIMES SEEK TO MINIMIZE DISTURBANCE TO THE SITE.
   - D. CONTRACTORS, WITH APPROVAL FROM USFWS OR THEIR REPRESENTATIVE MAY USE EXCESS NATURAL MATERIALS TO TEMPORARILY DIVERT FLOWS AWAY FROM CERTAIN ONGOING CONSTRUCTION, (E.G. DURING TOE-WOOD CONSTRUCTION).

GENERAL NOTES

1. THE CONTRACTOR WILL COMPLY WITH OSHA AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS GOVERNING WORKER HEALTH AND SAFETY. THE USFWS REPRESENTATIVE SHALL NOT BE RESPONSIBLE FOR ENSURING CONSTRUCTION CONTRACTOR COMPLIANCE OR IDENTIFICATION OF HAZARDS ON SITE. COSTS ASSOCIATED WITH THE CONTRACTOR'S HEALTH AND SAFETY COMPLIANCE, INCLUDING BUT NOT LIMITED TO THE REQUIREMENTS OF THIS NOTE, SHALL BE INCLUDED WITHIN THE CONTRACTOR'S BID.
2. THE CONTRACTOR IS REQUIRED TO CALL "DIG SAFE NY" AT LEAST 72 HOURS PRIOR TO WORK. ALL UTILITIES SHALL BE LOCATED PRIOR TO EXCAVATION.
3. SHOULD UTILITIES BE ENCOUNTERED DURING CONSTRUCTION WHICH INTERFERE WITH THE WORK AND FOR WHICH PROVISIONS ARE NOT PROVIDED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE USFWS REPRESENTATIVE OF THEIR EXISTENCE AND EXTENT OF CONFLICT WITH THE WORK.
4. LOCATION OF UTILITIES, PUBLIC AND/OR PRIVATE, INDICATED AS EXISTING AND/OR TO BE CONSTRUCTED AS SHOWN IN THE DRAWINGS, ARE APPROXIMATE ONLY. THEIR EXACT LOCATION SHALL BE DETERMINED IN THE FIELD. ADDITIONAL UTILITY LINES, WHETHER ABANDONED OR IN SERVICE, MAY EXIST AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONDUCT THEIR OPERATIONS AND TAKE THE NECESSARY PRECAUTIONS TO PREVENT INTERFERENCE WITH OR DAMAGE TO THESE OR OTHER FACILITIES DURING THE COURSE OF CONSTRUCTION.
5. SPECIAL CARE SHALL BE TAKEN TO AVOID DAMAGING EXISTING UTILITIES. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE USFWS.
6. THESE DRAWINGS INCLUDE THE TECHNICAL REQUIREMENTS FOR THE PROJECT, AND GENERAL CONTRACT REQUIREMENTS TOGETHER WITH THE USFWS CONTRACT DOCUMENTS.
7. VERIFY ALL EXISTING FIELD CONDITIONS, DIMENSIONS, AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.
8. CONSTRUCTION CONTRACTOR IS RESPONSIBLE FOR CONFIRMING DIMENSIONS, ELEVATIONS, QUANTITIES AND EXISTING CONDITIONS.
9. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE TO EXISTING FACILITIES CAUSED BY OPERATIONS WHICH ARE NOT INCLUDED AS PART OF THE INTENDED WORK. ALL DAMAGE TO EXISTING FACILITIES, WHICH IS NOT PART OF THE INTENDED WORK, SHALL BE REPAIRED BY THE CONTRACTOR WITHOUT COST TO THE PROJECT OR CLIENT, AND TO THE SATISFACTION OF THE USFWS REPRESENTATIVE.
10. THE CONTRACTOR SHALL BE SUPPLIED WITH A COPY OF THE GENERAL PERMIT ISSUED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC). THE CONTRACTOR SHALL INSURE THAT ALL WORK IS PERFORMED IN COMPLIANCE WITH THE PERMIT. IF THE CONTRACTOR BECOMES AWARE OF ANY WORK REQUIREMENTS NOT IN COMPLIANCE WITH PERMIT CONDITIONS, THE CONTRACTOR SHALL INFORM USFWS SUPERVISOR IMMEDIATELY.

AS-BUILT PLAN 11/20/25

REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

Kevin Tweedy
Kevin Tweedy
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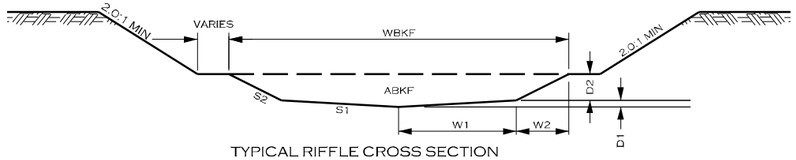
BENHALL

PROJECT # EPR0064 | SHEET NO. 1B

TYPICAL SECTIONS

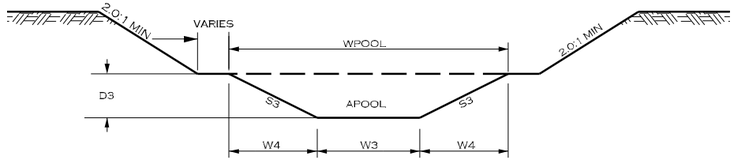
NOTE:

HABITAT ENHANCEMENT WORK WILL PRIMARILY INVOLVE IN-STREAM STRUCTURES AND BANK GRADING. TYPICAL DESIGN SECTIONS AND BANKFULL INFORMATION ARE PROVIDED FOR REFERENCE ONLY - SEE DESIGN CROSS-SECTIONS STARTING ON SHEET 7 FOR DESIGN INFORMATION.



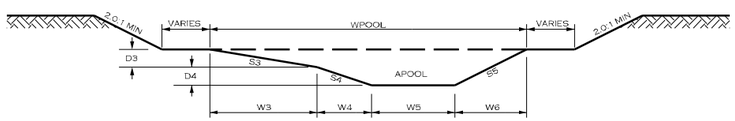
TYPICAL RIFFLE CROSS SECTION

TYPICAL RIFFLE CROSS SECTION DIMENSIONS									
Stream	Station	ABKF (SF)	WBKF (FT)	W1 (FT)	W2 (FT)	D1 (FT)	D2 (FT)	S1 (FT/FT)	S2 (FT/FT)
Salmon River	ALL RIFFLE AREAS	707.1	124.6	50.8	11.5	1.12	5.75	45:1	2:1



TYPICAL "B CHANNEL" POOL CROSS SECTION

TYPICAL "B CHANNEL" POOL CROSS SECTION DIMENSIONS							
Stream	Station	APOOL (SF)	WPOOL (FT)	W3 (FT)	W4 (FT)	D3 (FT)	S3 FT/FT)
Salmon River	ALL POOLS IN STRAIGHT REACHES	1107.2	150.0	116.8	16.6	8.30	2:1



TYPICAL "C CHANNEL" POOL CROSS SECTION

TYPICAL "C CHANNEL" POOL CROSS SECTION DIMENSIONS											
Stream	Station	APOOL (SF)	WPOOL (FT)	W3 (FT)	W4 (FT)	W5 (FT)	W6 (FT)	D3 (FT)	D4 (FT)	S3 FT/FT)	S4 (FT/FT)	S5 (FT/FT)
Salmon River	ALL POOLS IN RIVER BENDS	1068.1	149.5	39.9	10.0	79.7	19.9	4.98	4.98	8:1	2:1	2:1

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
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4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

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STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

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11/20/2025
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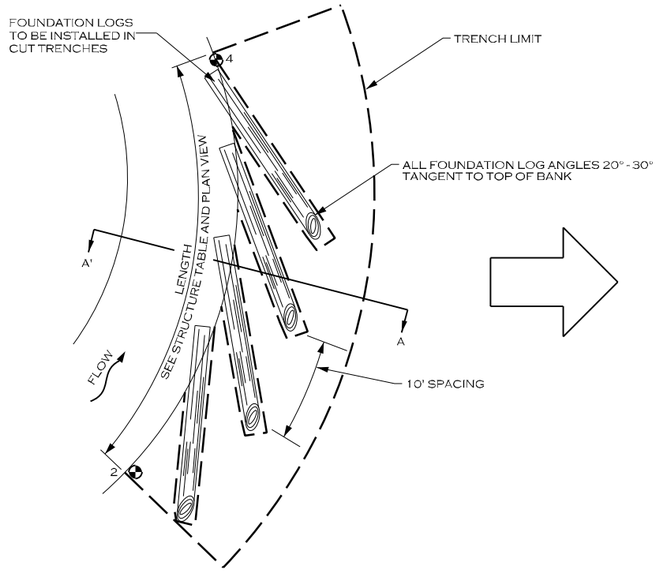
DEWHALT

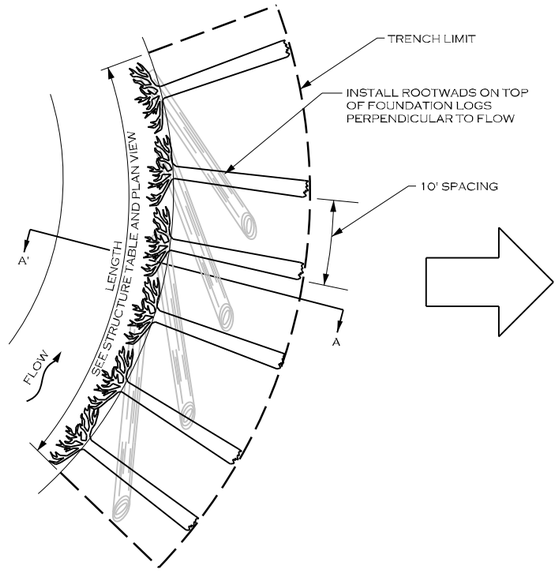
TOE WOOD PROTECTION STRUCTURE

PROJECT # EPR0064 | SHEET NO. 2

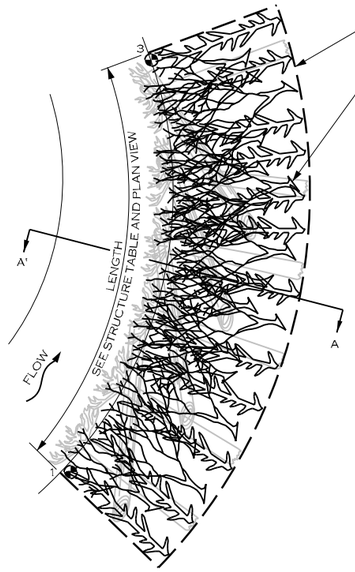
DETAILS



PLAN VIEW - 1
FOUNDATION LOG INSTALLATION



PLAN VIEW - 2
ROOTWAD INSTALLATION



PLAN VIEW - 3
BRUSH LAYER INSTALLATION

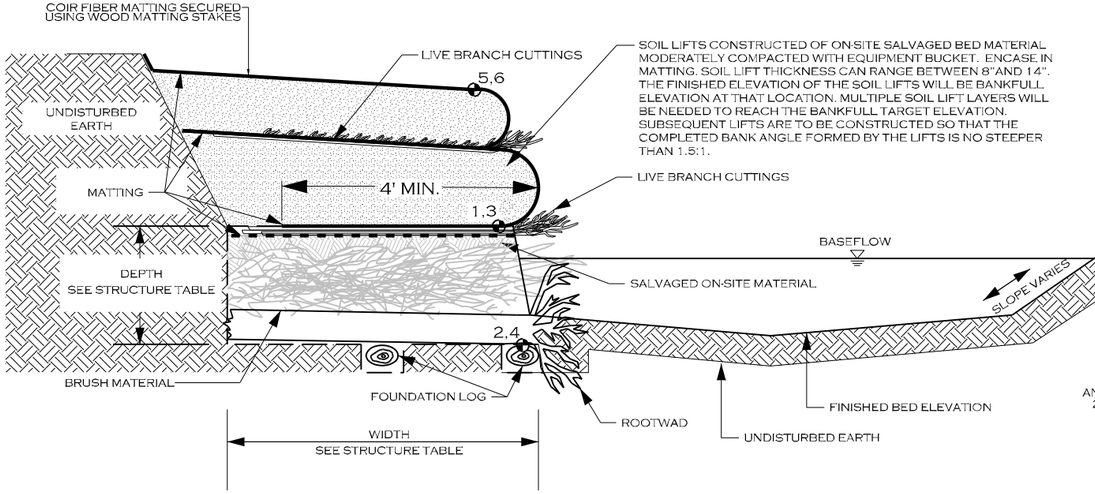
- ELEVATION POINT (SEE STRUCTURE TABLES)

TOE WOOD PROTECTION STRUCTURE SPECIFICATIONS

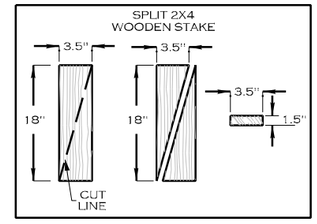
MATERIALS:	SPECIFICATIONS:
BRUSH MATERIAL	TYPE: LIMBS, BRANCHES AND SMALL LOGS SIZE: 5' - 10' LENGTH, MIN 1" DIAMETER
ROOTWAD	TYPE: HARDWOOD OR SOFTWOOD SIZE: LENGTH = 30'; 18" DIAMETER
FOUNDATION LOGS	TYPE: HARDWOOD OR SOFTWOOD SIZE: LENGTH = 30'; 18" DIAMETER
COIR FIBER MATTING	TYPE: GSM 700
LIVE BRANCH CUTTINGS	TYPE: LIVE STAKE SPECIES IDENTIFIED IN PLANTING NOTES SIZE: 5' - 10' LENGTH, 0.5" - 2.5" DIAMETER

NOTES:

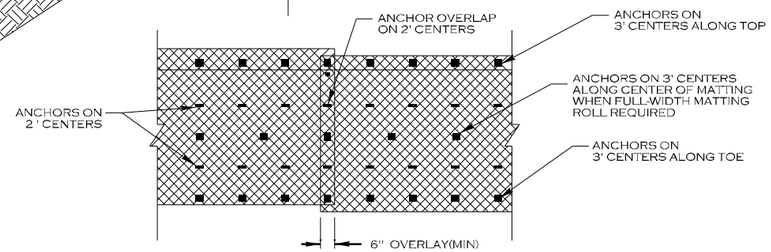
1. STRUCTURE DIMENSIONS AND MEASUREMENTS ARE SHOWN ON THE STRUCTURES TABLE SHEET.
2. DIG A TRENCH ALONG BANK WHERE TOE WOOD IS TO BE INSTALLED, TO THE DEPTH AND WIDTH SPECIFIED IN THE DETAILS AND STRUCTURES TABLE. IF TOE WOOD IS BEING PLACED IN A LOCATION WHERE THERE IS NOT EXISTING GROUND, PLACE FILL MATERIAL AND COMPACT TO FORM THE TRENCH FOR THE TOE WOOD MATERIALS.
3. FOUNDATION LOGS SHALL BE STRAIGHT, AND NOT ROTTEN. PLACE FOUNDATION LOGS AS SHOWN IN THE DETAIL TO FORM A FOUNDATION FOR THE TOE WOOD MATERIALS TO LAY UPON.
4. TOE WOOD LAYERS SHALL CONSIST OF WOODY MATERIALS INCLUDING BRANCHES, LOGS, BRUSH, AND ROOT WADS THAT ARE NOT ROTTEN. LARGE MATERIALS AND SMALL MATERIALS SHALL BE MIXED, PLACED IN LAYERS NO MORE THAN 1 FOOT DEEP, COVERED IN A THIN LAYER OF ONSITE ALLUVIUM, AND COMPACTED BEFORE PLACING THE NEXT LAYER OF TOE WOOD MATERIAL. CONTINUE PLACING MATERIALS TO FORM A DENSE LAYER OF WOODY MATERIALS AND ONSITE ALLUVIUM TO THE DEPTH AND ELEVATIONS SPECIFIED.
5. PLACE A LAYER OF COIR FIBER MATTING OVER THE TOP OF THE COMPLETED TOE WOOD LAYER, AND THEN CONSTRUCT GEOLIFTS OR PLACE TRANSPLANTS (AS SPECIFIED OR DIRECTED BY THE ENGINEER) TO REBUILD THE STREAMBANK ABOVE THE TOE WOOD LAYER.



SECTION VIEW A - A'



ANCHOR OPTIONS



SOIL LIFT STAKE LAYOUT

AS-BUILT PLAN 11/20/25

REVISIONS				
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PREPARED FOR:

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Kevin Tweedy
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11/20/2025
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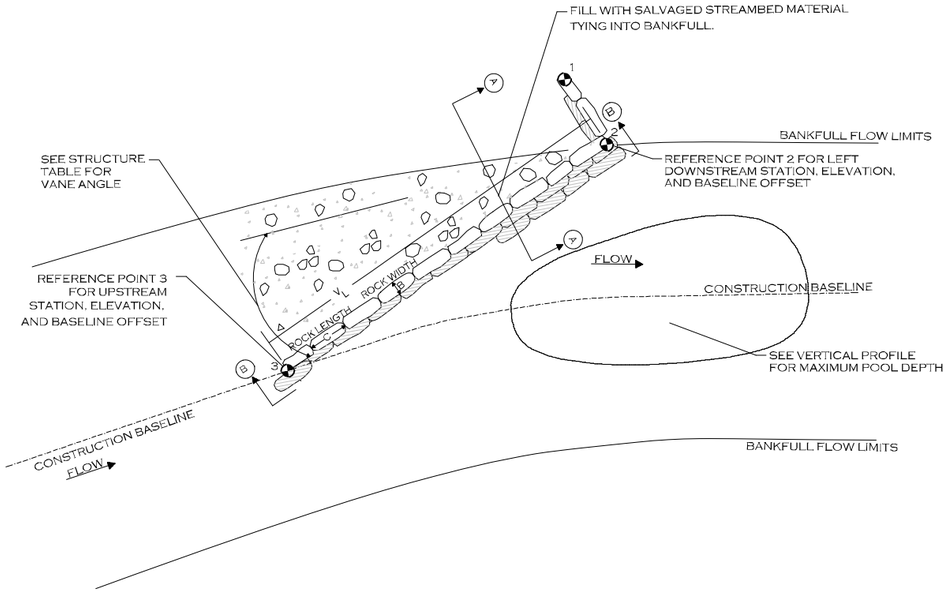
KEVIN.TWEEDY

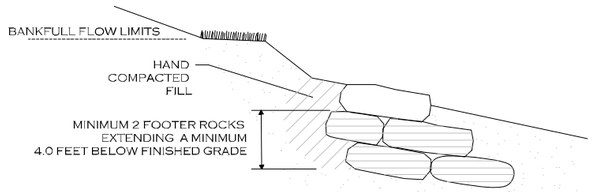
ROCK VANE

PROJECT # EPR0064 | SHEET NO. 2A

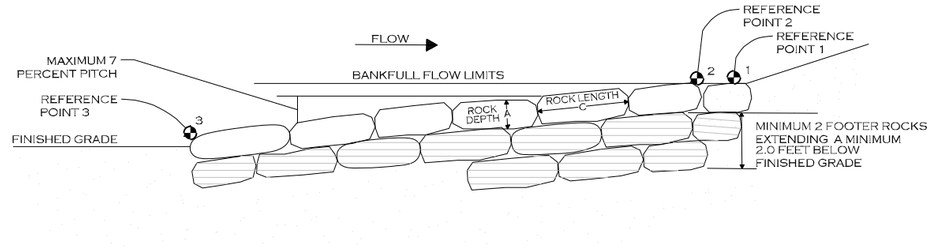
DETAILS



ROCK VANE
PLAN VIEW
NOT TO SCALE



ROCK VANE
SECTION A-A
NOT TO SCALE

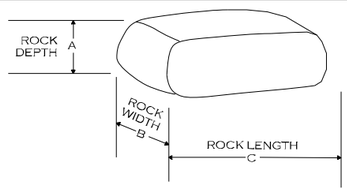


ROCK VANE ARM
SECTION B-B
NOT TO SCALE

- ELEVATION POINT (SEE STRUCTURE TABLES)

ROCK VANE NOTES:

1. ALL ROCKS (EXCEPT BOTTOM LAYER OF FOOTER ROCKS) SHALL BE SUPPORTED BY A FOOTER ROCK AND SHINGLED UPSTREAM OR INTO STREAM BANK. ALL ROCKS SHALL BE INTERLOCKED AND SHALL NOT ROCK OR ROTATE IN PLACE.
2. ALL ROCKS SHALL BE PLACED WITH THE PARALLEL FACES ORIENTED UP AND DOWN WITH THE TOP FACE TILTING UP FROM THE BED AT 5 TO 15 DEGREES TO THE DIRECTION OF FLOW ON THE CROSSOVER AND VANE ARMS.
3. ALL ROCKS (EXCEPT TOP LAYER OF CROSSOVER) SHALL BE PLACED TO FIRMLY ABUT ADJACENT ROCKS LEAVING NO GAPS BETWEEN ROCKS. GAPS SHALL BE LEFT BETWEEN THE TOP LAYER OF THE CROSSOVER ROCKS AS SHOWN IN PLANS.
4. STRUCTURE SHALL BE CONSTRUCTED SUCH THAT ROCKS FORM A CONTINUOUS, UNIFORM SLOPE WITH A MINIMUM OF STEEP, HIGH, OR LOW SPOTS ALONG THE TOP FINISHED SURFACE.
5. CHANNEL STATION AND ELEVATION REFERENCE MAY NOT ALWAYS FALL ON BASELINE OF CONSTRUCTION, THALWEG, OR CHANNEL INVERT.
6. STREAM BOTTOM AROUND STRUCTURE SHALL BE BACKFILLED WITH SALVAGED STREAMBED MATERIAL TO MEET FINISHED GRADE.
7. SEE STRUCTURE TABLE, PROFILE, AND GEOMETRY SHEET FOR ALL DIMENSIONS.



DETAIL FOR ROCK DIMENSIONS
(SEE ROCK SIZE TABLE)
NOT TO SCALE

ROCK DIMENSIONS		
A	B	C
3' (MIN.)	3' (MIN.)	5' (MIN.)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PE · 099293 · ENGINEER

Kevin Tweedy 2025.11.20 14:30:04-05'00'

11/20/2025
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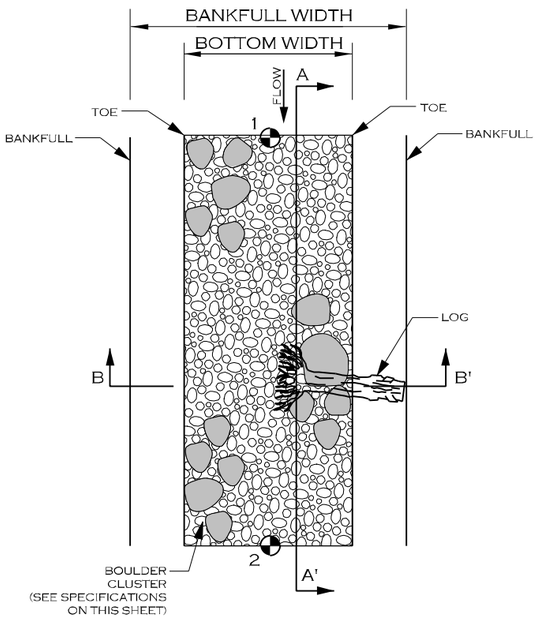
DEWHALL

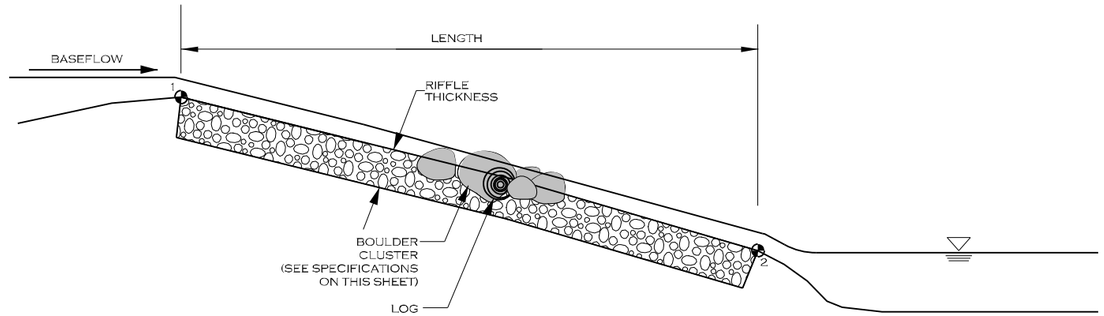
CONSTRUCTED RIFFLE WITH BOULDER CLUSTERS

PROJECT # EPR0064 | SHEET NO. 2B

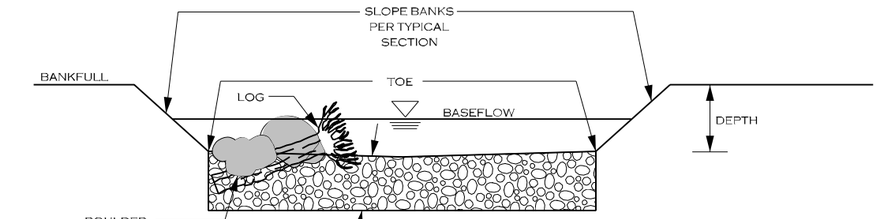
DETAILS



PLAN VIEW
(NOT TO SCALE)



PROFILE A - A'
(NOT TO SCALE)



SECTION B - B'
(NOT TO SCALE)

- ELEVATION POINT (SEE STRUCTURE TABLE)

CONSTRUCTED RIFFLE SPECIFICATIONS

MATERIALS:	SPECIFICATIONS:
CONSTRUCTED RIFFLE MIX	TYPE: SALVAGED ON-SITE COARSE COBBLE MATERIAL. THICKNESS: 24" - 30" MIN.

NOTES
1. GRADE STREAMBED AND BANKS TO PROPOSED DIMENSIONS.
2. EXCAVATE APPROXIMATELY 18" BELOW PROPOSED GRADING.
3. PLACE BOULDER CLUSTERS PER SPECIFICATIONS.
4. FILL STREAM BED WITH COMPACTED STONE TO FINAL DESIGN PROPOSED GRADES.

BOULDER CLUSTERS SPECIFICATIONS

MATERIALS:	SPECIFICATIONS:
BOULDER	TYPE: LIMESTONE SIZE: 2 FT X 3 FT X 3 FT
LOG	SIZE: LOG TO BE A 20FT IN LENGTH AND 12"-18" IN DIAMETER

NOTES
1. BOULDERS TO BE PLACED 1 CLUSTER PER 50-75 FT ON THE OUTER ONE THIRD OF THE CHANNEL AND NOT WITHIN THE THALWEG.
2. BOULDER PLACEMENT SHOULD BE PLACED BY ALTERNATING SIDES OF THE CHANNEL.
3. BOULDER CLUSTERS ARE TO COMPRISE OF 5 TO 8 BOULDERS PER CLUSTER.
4. 50% OF BOULDER CLUSTERS TO HAVE ONE LOG PLACED WITH STONE.
5. BOULDERS ARE TO BE PLACED 12" TO 18" INTO STREAMBED.
6. BOULDERS ARE NOT TO BE TOUCHING WHEN PLACED ALLOWING FOR GAPS.

AS-BUILT PLAN 11/20/25

REVISIONS

NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
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4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

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Kevin Tweedy 2025.11.20 14:30:04-05'00'

11/20/2025
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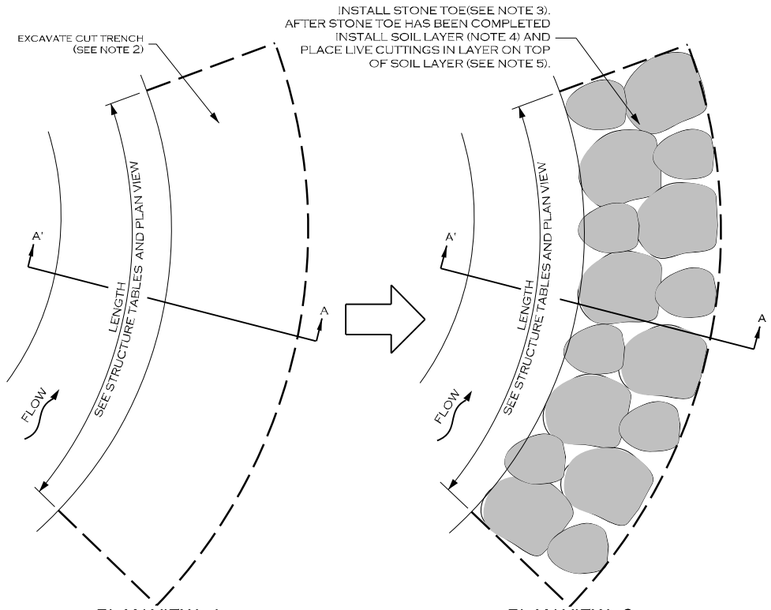
DESWALT

PROJECT # EPR0064 | SHEET NO. 2C

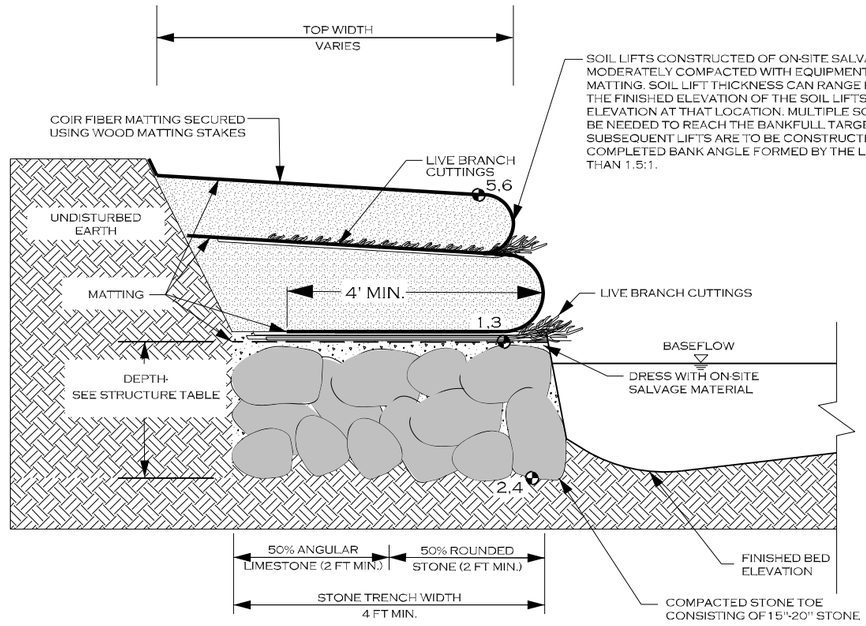
DETAILS

SOIL LIFT WITH STONE TOE PROTECTION



PLAN VIEW - 1
TRENCH EXCAVATION

PLAN VIEW - 2
STONE INSTALLATION



SECTION VIEW

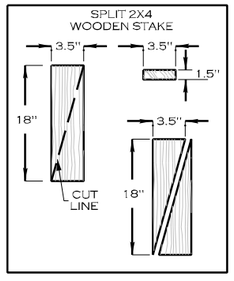
- ELEVATION POINT (SEE STRUCTURE TABLES)

SOIL LIFT WITH STONE TOE SPECIFICATIONS

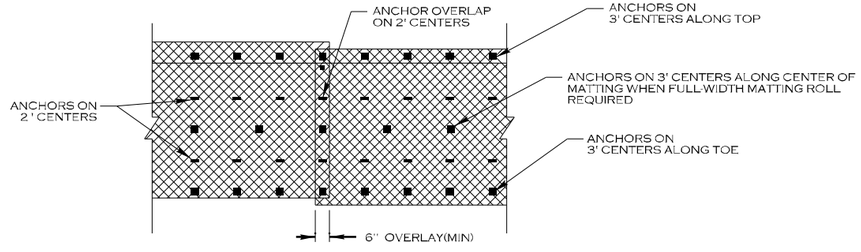
MATERIALS:	SPECIFICATIONS:	
STONE TOE MATERIAL	TYPE:	50% ANGULAR LIMESTONE & 50% ROUNDED STONE
	SIZE:	ANGULAR LIMESTONE 15"-18" ROUNDED STONE 18"-20"
COIR FIBER MATTING	TYPE:	GSM 700

NOTES:

1. STRUCTURE DIMENSIONS AND MEASUREMENTS ARE SHOWN ON THE STRUCTURE TABLE SHEET.
2. DIG A TRENCH ALONG BANK WHERE TOE WOOD IS TO BE INSTALLED, TO THE DEPTH AND WIDTH SPECIFIED IN THE DETAILS AND STRUCTURE TABLE. IF STONE TOE IS BEING PLACED IN A LOCATION WHERE THERE IS NOT EXISTING GROUND, PLACE FILL MATERIAL AND COMPACT TO FORM THE TRENCH FOR THE FOUNDATION MATERIALS.
3. INSTALL STONE TOE FOUNDATION TO THE DEPTH SPECIFIED IN THE STRUCTURE TABLE.
4. PLACE AN UNCONSOLIDATED LAYER OF SOIL AND COBBLE ON TOP OF STONE TOE. STONE TOE FOUNDATION/SOIL COBBLE LAYER SHOULD EXTEND APPROXIMATELY 0.5 FT ABOVE THE TYPICAL BASEFLOW ELEVATION.
5. INSTALL LIVE CUTTINGS AT LEAST 5 FEET IN LENGTH, AND AT LEAST 1 INCH IN DIAMETER.
6. CONSTRUCT GEOLIFTS TO REBUILD THE STREAMBANK ABOVE THE STONE TOE.



ANCHOR OPTIONS



SOIL LIFT STAKE LAYOUT

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
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4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

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CORTLAND, NY 13045

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OSWEGO COUNTY, NY

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STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PE · 099293 · ENGINEER

Kevin Tweedy
2025.11.20
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11/20/2025
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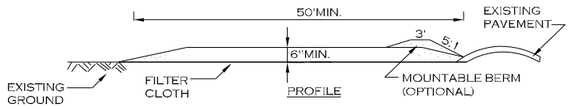
DEWHALL

PROJECT # EPR0064 | SHEET NO. 2D

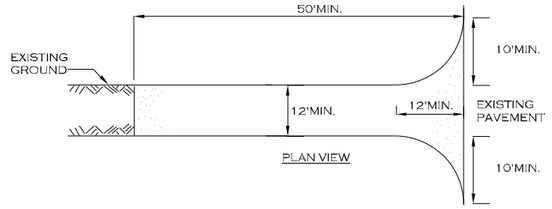
DETAILS

GRAVEL CONSTRUCTION ENTRANCE



CONSTRUCTION SPECIFICATIONS

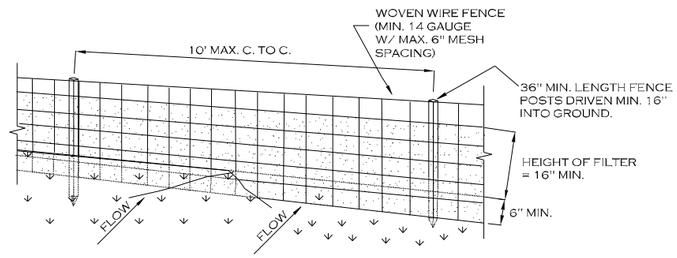
1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.



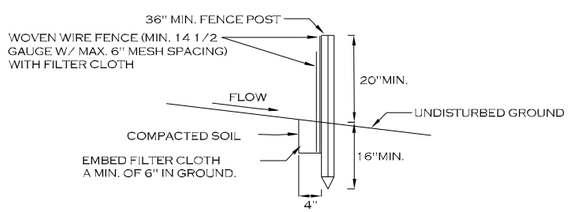
PLAN VIEW

NOTE:
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TEMPORARY SILT FENCE



PERSPECTIVE VIEW



SECTION VIEW

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

NOTE:
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

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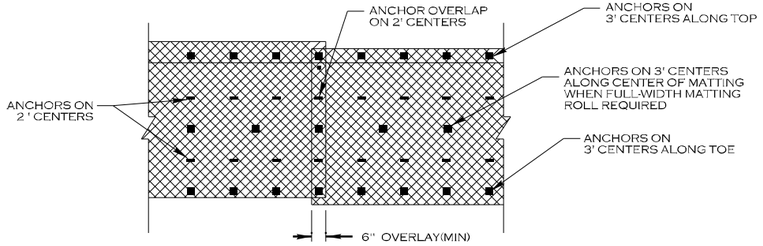
DREWHALL

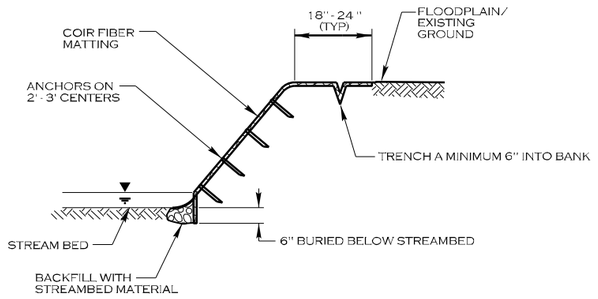
COIR FIBER MATTING

PROJECT # EPR0064 | SHEET NO. 2E

DETAILS



PLAN VIEW

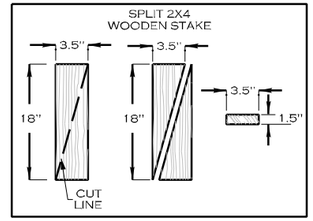


TYPICAL CROSS SECTION

COIR FIBER MATTING SPECIFICATIONS	
MATERIALS:	SPECIFICATIONS:
COIR FIBER MATTING	TYPE: GSM 700
ANCHORS	REFER TO ANCHOR OPTIONS

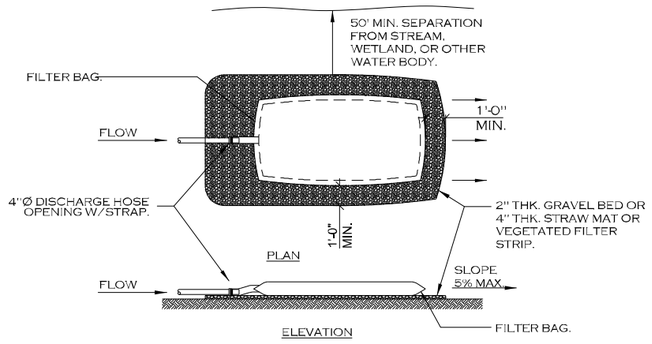
NOTES:

1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. WOODEN STAKES ARE PREFERRED. USE OF STAPLES AS SMALL ANCHORS MUST BE PREAPPROVED BY THE ENGINEER PRIOR TO INSTALLATION.



ANCHOR OPTIONS

TYPICAL GEOTEXTILE FILTRATION BAG DETAIL



CONSTRUCTION SPECIFICATIONS

1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., GRAVEL, STRAW MAT OR VEGETATED FILTER STRIP) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12" FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATION, AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. THE BAG IS CONSIDERED FULL WHEN REMAINING BAG FLOW AREA HAS BEEN REDUCED BY 75%. AT THIS POINT IT SHOULD BE REPLACED WITH A NEW BAG.
5. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
6. USE NONWOVEN GEOTEXTILE WITH A DOUBLE NEEDLE MACHINE USING HIGH STRENGTH THREAD, DOUBLE STITCHED "JOE" TYPE CAPABLE OF MINIMUM ROLL STRENGTH OF 100 LBS/INCH (ASTM D4884). SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4" DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) FOR THE FOLLOWING:

MIN. GRAB TENSILE	200 LBS.
MIN. GRAB TENSILE ELONGATION	50%
MIN. TRAPEZOID TEAR STRENGTH	80 LBS.
MULLEN BURST STRENGTH	380 PSI
MIN. PUNCTURE.	130 LBS.
APPARENT OPENING SIZE (AOS)	40-80 US SIEVE
MIN. UV RESISTANCE	70%
MIN. FLOW THRU RATE	70 GPM/FT²

7. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

AS-BUILT PLAN 11/20/25

REVISIONS				
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1	30% DESIGN PLAN	KLT	KLT	12/20/24
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PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

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PROJECT ENGINEER

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Kevin Tweedy
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11/20/2025
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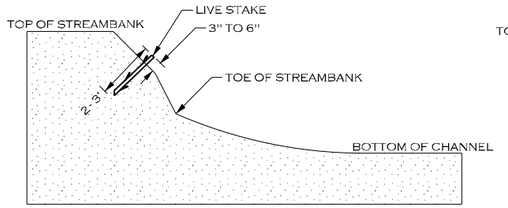
BRYHALL

LIVE STAKING

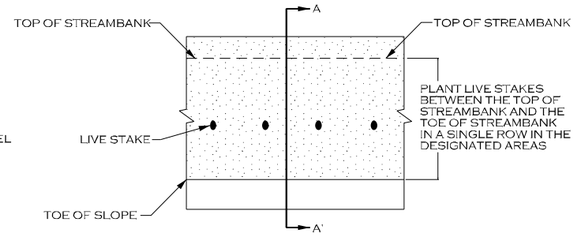
PROJECT # EPR0064 | SHEET NO. 3

PLANTING DETAILS

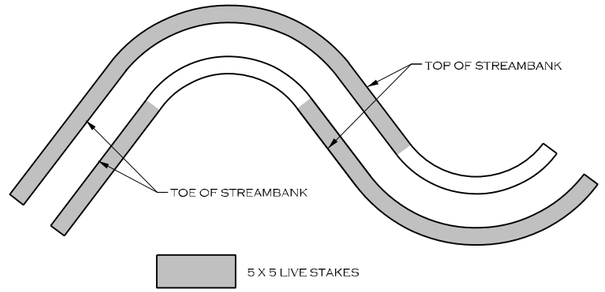


SECTION A - A'

NOTES:
1. IF STAKES ARE BEING HARVESTED NEAR THE SITE, STAKES SHOULD BE CUT AND INSTALLED ON THE SAME DAY.
2. KEEP STAKES COOL AND MOIST WHILE ON THE JOB SITE AND PRIOR TO INSTALLATION.
3. DO NOT INSTALL STAKES THAT HAVE BEEN SPLIT.
4. STAKES MUST BE INSTALLED WITH BUDS POINTING UPWARDS.
5. STAKES SHALL BE INSTALLED PERPENDICULAR TO BANK.
6. STAKES SHALL BE 1/2 TO 2 INCHES IN DIAMETER AND 2 TO 3 FT LONG.
7. STAKES SHALL BE INSTALLED LEAVING 1/5 OF STAKE ABOVE GROUND.

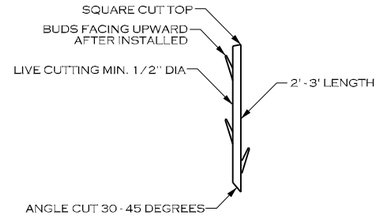


PLAN VIEW



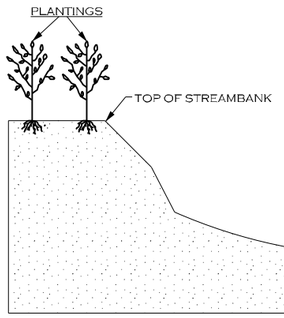
SEE PLAN VIEW SHEET FOR LIVE STAKING LOCATIONS

TYPICAL LIVE STAKING AREA PLAN VIEW



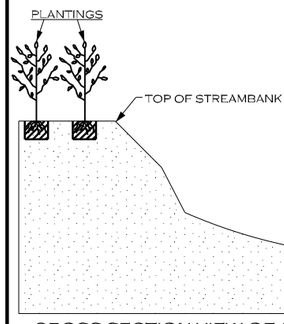
LIVE STAKE DETAIL

PLANTING SPECIFICATIONS



CROSS SECTION VIEW OF BARE ROOT PLANTING

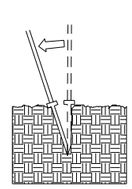
NOTES:
1. ALLOW FOR 6-10 FEET BETWEEN PLANTINGS, DEPENDING ON SIZE.
2. LOOSEN COMPACTED SOIL.
3. PLANT IN HOLES MADE BY A MATTOCK, DIBBLE, PLANTING BAR, OR OTHER APPROVED MEANS.
4. PLANT IN HOLES DEEP AND WIDE ENOUGH TO ALLOW THE ROOTS TO SPREAD OUT AND DOWN WITHOUT J-ROOTING.
5. KEEP ROOTS MOIST WHILE DISTRIBUTING OR WAITING TO PLANT BY MEANS OF WET CANVAS, BURLAP, OR STRAW.
6. HEEL-IN PLANTS IN MOIST SOIL OR SAWDUST IF NOT PROMPTLY PLANTED UPON ARRIVAL TO PROJECT SITE.



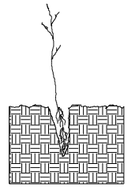
CROSS SECTION VIEW OF CONTAINER PLANTING

NOTES:
1. WHEN PREPARING THE HOLE FOR A POTTED PLANT OR SHRUB DIG THE HOLE 8-12 INCHES LARGER THAN THE DIAMETER OF THE POT AND THE SAME DEPTH AS THE POT.
2. REMOVE THE PLANT FROM THE POT. LAY THE PLANT ON ITS SIDE IF NECESSARY TO REMOVE THE POT.
3. IF THE PLANT IS ROOTBOUND (ROOTS GROWING IN A SPIRAL AROUND THE ROOT BALL), MAKE VERTICAL CUTS WITH A KNIFE OR SPADE JUST DEEP ENOUGH TO CUT THE NET OF ROOTS. ALSO MAKE A CRISS-CROSS CUT ACROSS THE BOTTOM OF THE BALL.
4. PLACE THE PLANT IN THE HOLE.
5. FILL HALF OF THE HOLE WITH SOIL (SAME SOIL REMOVED FOR BACKFILL).
6. WATER THE SOIL TO REMOVE AIR POCKETS AND FILL THE REST OF THE HOLE WITH THE REMAINING SOIL.

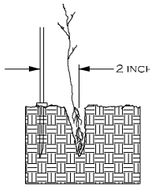
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



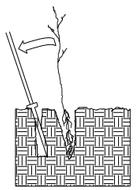
1. INSERT PLANTING BAR AS SHOWN AND PULL HANDLE TOWARD PLANTER.



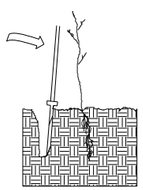
2. REMOVE PLANTING BAR AND PLACE SEEDING AT CORRECT DEPTH.



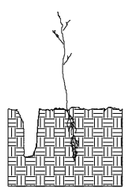
3. INSERT PLANTING BAR 2 INCHES TOWARD PLANTER FROM SEEDING.



4. PULL HANDLE OF BAR TOWARD PLANTER, FIRMING SOIL AT BOTTOM.



5. PUSH HANDLE FORWARD FIRMING SOIL AT TOP.



6. LEAVE COMPACTION HOLE OPEN. WATER THOROUGHLY.

PLANTING NOTES:

PLANTING BAG

DURING PLANTING, SEEDLINGS SHALL BE KEPT IN A MOIST CANVAS BAG OR SIMILAR CONTAINER TO PREVENT THE ROOT SYSTEMS FROM DRYING.

KBC PLANTING BAR

PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.

ROOT PRUNING

ALL SEEDLINGS SHALL BE ROOT PRUNED, IF NECESSARY, SO THAT NO ROOTS EXTEND MORE THAN 10 INCHES BELOW THE ROOT COLLAR.

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · 099293 · LICENSED ENGINEER

Kevin Tweedy 2025.11.20 14:30:04-05'00'

11/20/2025
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DREWHALL

PROJECT # EPR0064 | SHEET NO. 3A

PLANTING NOTES

PLANTING NOTES

PROJECT HAS NOT BEEN PLANTED AS OF THE COMPLETION OF THESE AS-BUILTS PLAN DOCUMENTS.
PLANTING TO OCCUR IN SPRING (APRIL/MAY) OF 2026.

PLANTING & SEEDING GENERAL NOTES

1. Seeding of toe wood benches and soil lifts must take place as part of construction.
2. All other seeding and planting shall take place when target planting areas will no longer be disturbed, no sooner than September 1, no later than November 1.
3. Plants should be planted within 72 hours of delivery from nursery supplier.
4. Prior to planting, protect plants from adverse weather conditions, keeping roots of bareroot species from drying out.
5. Install plants according to plan specifications on sheet 3 and nursery recommendations.
6. Mulch plants with appropriate weed and additive free mulch.
7. Water plants thoroughly after planting.
8. USFWS will monitor the planting site for success and will follow up in subsequent year with additional plantings as indicated.

SEEDING

Materials: Grass seed: USFWS Conservation mix

To be broadcast or hand applied on toe wood benches, soil lists and all other disturbed areas. Ensure sub-species and ecotype specificity in all purchases.

Mix composition includes 6 species at indicated percentage of 100%:

- Ryegrass, Annual Centurion – *Lolium multiflorum* – 40%
- Timothy, Climax – *Phleum pratense* – 20%
- Orchard Grass, Extend – *Dactylis glomerata* - 20%
- Red Top – *Agrostis gigantea* – 10%
- Clover, Dutch White – *Trifolium repens* – 5%
- Trefoil, Norcen – *Lotus corniculatus* – 5%

Application rate = 1lb/1,000 square foot.

Seeding on toe wood and stone toe soil lift:

Seed must be applied as part of the toe wood and stone toe construction process. As each section of soil lift coir wrapping is completed, apply seed directly to soil of the topmost coir wrapped lift prior to pulling over the top fabric layer. Apply by hand seeding or broadcast at the specified rate of 1lb/1,000 sf. Lightly tamp or roll seeded area before wrapping final coir layer over. Light watering of soil lift on completion is recommended.

Seeding in all other areas:

On all other areas – disturbed banks, upland areas, staging areas – apply seed by hand or with a broadcast spreader at a specified rate. Some seed may have difficulty moving through the broadcast hopper regulator. In these cases, a flow enhancing regulator (such as wood-based kitty litter) mixed with the seed will aid in uniformity.

Broadcast half the seed horizontally and the remainder vertically. If the soil is dry, rolling or tracking the seed will aid in good soil to seed contact. Dry areas shall be lightly watered every 3 days until project end. Dry straw mulch, with no rot, un-chopped, free of weeds shall be applied immediately over seeded areas as a light cover – ½ to 1 inch.

Temporary Seeding

If temporary seeding is required, clean, weed free annual rye may be applied at 1lb. per 1000 sq. ft.

PLANTING

Materials:

Shrub Species.

On all other areas - above toe wood on banks and terraces at and above bankfull, and all other disturbed areas, install15", #1 container shrubs. Shrub species must include at least 4 of the following. Substitutions can be authorized prior to installation. Shrubs shall be 18 inches to 2 feet in height. Plant shrubs at 30" O.C. Ensure sub-species specificity in all purchases. Contact the USFWS, New York Office if any specific species has limited availability.

Plant list:

a) Alternate Leaf Dogwood (*Cornus alternifolia)*
b) Black Chokeberry (*Aronia melanocarpa*)
c) Buttonbush (*Cephlanthus occidentalis*)
d) Canadian Elderberry (*Sambucus canadensis*)
e) Peach-Leaved Willow (*Salix amygdaloides*)
f) Red-Osier Dogwood (*C. stolonifera*)
g) Roundleaf Dogwood (*C. rugosa*)
h) Silky Dogwood (*C. amomum*)
i) Spicebush (*Lindera benzoin*)

Live Stakes:

Live stakes are to be planted on all disturbed and/or stabilized stream banks. Plantings on soil lifts are to be live stakes **only**. Two foot live stakes should be inserted or gently tapped 1- to 1.5-feet into the toewood.

Plant live stake plants in the following mix for every 1000 sq. ft. spacing at 4-6'.

- 12 red-osier dogwood
- 12 silky dogwood

Tree Species:

On all other areas - above soil lifts on banks and terraces at and above bankfull, and all other disturbed areas, install bareroot plants using the dibble or similar method ensuring the hole is deep enough for roots. Keep the bulb area at the base of the stem, just above the point of root spread, at or just above ground. Plant the following tree species 4', containerized planted randomly at 10' O.C.

- American sycamore (*Platanus occidentalis)*
- Red maple (*Acer rubrum)*
- Slippery elm (*Ulmus rubra)*
- Common hackberry (*Celtis occidentalis)*

Mulch all plants and water every 3-4 days (if it does not rain) until project completion.

TOPSOIL

Topsoil is required as a mix in soil lifts along the banks of the Salmon River and may be used to dress/fill/smooth staging areas post construction. All topsoil shall be clean, drawn from local sources, and be free of invasive species.

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. Fish & Wildlife Service
New York Field Office

3817 Luker Road
Cortland, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

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CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

Kevin Tweedy
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DEWEAT

STRUCTURE TABLE

STRUCTURE TABLE

Constructed Riffle With Boulder Clusters

Structure Count	Point 1		Point 2		Bottom Width	Length	Slope
	TW Station	Elevation	TW Station	Elevation			
CR-1	08+86.25	498.27	14+68.09	496.38	103.0	581.8	0.32%
CR-2	37+16.35	491.97	41+39.33	491.43	106.0	423.0	0.13%

Toe Wood Protection Structure

Structure #	Toe Wood Dimensions					Elevation (ft)					
	Width (ft)	Bank Length (ft) *	River Location	Begin TW Station (ft)	End TW Station (ft)	Pt 1	Pt 2	Pt 3	Pt 4	Pt 5	Pt 6
TW-1	15.0	641.0	Left	00+45.48	06+60.10	502.22	496.66	501.02	495.42	505.66	504.37
TW-2	15.0	250.0	Left	14+83.10	17+30.41	498.84	494.83	498.19	493.99	502.65	502.13
TW-3	15.0	152.0	Left	20+49.42	21+85.79	497.35	492.03	496.99	493.05	498.26	497.90
TW-4	15.0	327.0	Right	31+69.16	34+80.62	495.13	490.96	494.75	490.24	498.81	498.45
TW-5	15.0	192.0	Left	34+92.78	36+82.63	494.74	490.26	494.51	490.45	498.25	498.03
TW-6	15.0	246.0	Right	41+92.20	44+37.90	493.81	489.76	493.28	488.99	496.96	496.44
TW-7	15.0	273.0	Left	43+45.63	45+96.40	493.48	489.28	492.93	488.48	496.63	496.11

* - Bank length is the measure of the proposed structure length. In many cases the bank and thalweg do not run parallel to one another and due to this measure different lengths.

Soil Lift With Stone Toe Protection Structure

Structure #	Stone Toe Dimensions				Elevation (ft)					
	Bank Length (ft) **	River Location	Begin TW Station (ft)	End TW Station (ft)	Pt 1	Pt 2	Pt 3	Pt 4	Pt 5	Pt 6
ST-1 *	687.0	Left	07+97.73	14+83.10	500.65	497.74	498.84	496.33	501.90	500.36
ST-2	226.0	Right	28+11.57	30+32.42	495.50	493.23	495.25	492.60	499.86	499.60
ST-3	603.0	Right	36+12.53	41+92.20	494.59	491.89	493.81	491.26	498.34	497.56
ST-4 *	485.0	Left	36+82.63	41+95.92	494.51	491.95	493.81	491.25	498.02	495.53

* - Soil lift not built to bankfull elevation

** - Bank length is the measure of the proposed structure length. In many cases the bank and thalweg do not run parrallel to one another and due to this are measured at different lengths.

Rock Vanes

Structure Number	Arm			Sill	TW Station (ft)			Elevation (ft)		
	Length (ft)	Angle (deg)	Slope (%)	Length (ft)	Pt 1	Pt 2	Pt 3	Pt 1	Pt 2	Pt 3
RV-1	95.0	26°	5.1%	5.0	19+64.01	19+64.01	18+70.65	500.11	499.91	495.02
RV-2	90.0	27°	6.7%	5.0	21+90.47	21+90.47	21+08.66	500.01	499.81	493.76
RV-3	120.0	20°	4.7%	5.0	47+04.91	47+04.91	45+88.11	495.80	495.60	490.01
~~RV-4~~	~~90.0~~	~~27°~~	~~6.3%~~	~~5.0~~	~~48+36.19~~	~~48+36.19~~	~~47+56.38~~	~~495.38~~	~~495.18~~	~~489.48~~
~~RV-5~~	~~108.0~~	~~23°~~	~~6.6%~~	~~5.0~~	~~50+14.70~~	~~50+14.70~~	~~49+14.30~~	~~495.94~~	~~495.74~~	~~488.66~~

ELEVATION (FT)		
PT1	PT2	PT3
-	500.11	494.97
-	499.87	494.02
-	495.92	490.56

RV-4 AND RV-5 NOT CONSTRUCTED DUE TO BUDGETARY RESTRICTIONS.

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
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OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · 099293 · LICENSED PROFESSIONAL ENGINEER

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DREWHALL

PROJECT # EPR0064 | SHEET NO. 5

DESIGN PLAN

PROP. SOIL LIFT WITH STONE TOE. TIE-IN ELEVATIONS AND LOCATIONS TO BE DETERMINED BY ENGINEER IN THE FIELD.

PROP. CONSTRUCTED RIFFLE. RIFFLE TO BE CONSTRUCTED USING SALVAGED ON-SITE MATERIAL.

PROP. TOE WOOD PROTECTION & SOIL LIFT. TIE-IN ELEVATIONS AND LOCATIONS TO BE DETERMINED BY ENGINEER IN THE FIELD.

PROP. BOULDER CLUSTER

APPROXIMATE LOCATION OF EX. SIDE CHANNEL

EX. TOP OF BANK

EX. TRIBUTARY

EX. TOE

EX. TOP OF BANK

EX. THALWEG

PROP. THALWEG

EX. SIDE CHANNEL

FLOW

TW 1

ST 1

CR 1

TW1 BENCH ELE 505.73

0+00 497.36

1+00 497.88

2+00 497.89

3+00 497.21

4+00 496.94

5+00 497.33

6+00 497.29

7+00 497.44

8+00 497.65

9+00 496.25

10+00 498.25

503.60

504.99

MATCHLINE SHEET 5A

NAD 83

50 25 0 50 100

SCALE (FT)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
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5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

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CORTLAND, NY 13045

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910 GREENWOOD CIRCLE
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STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

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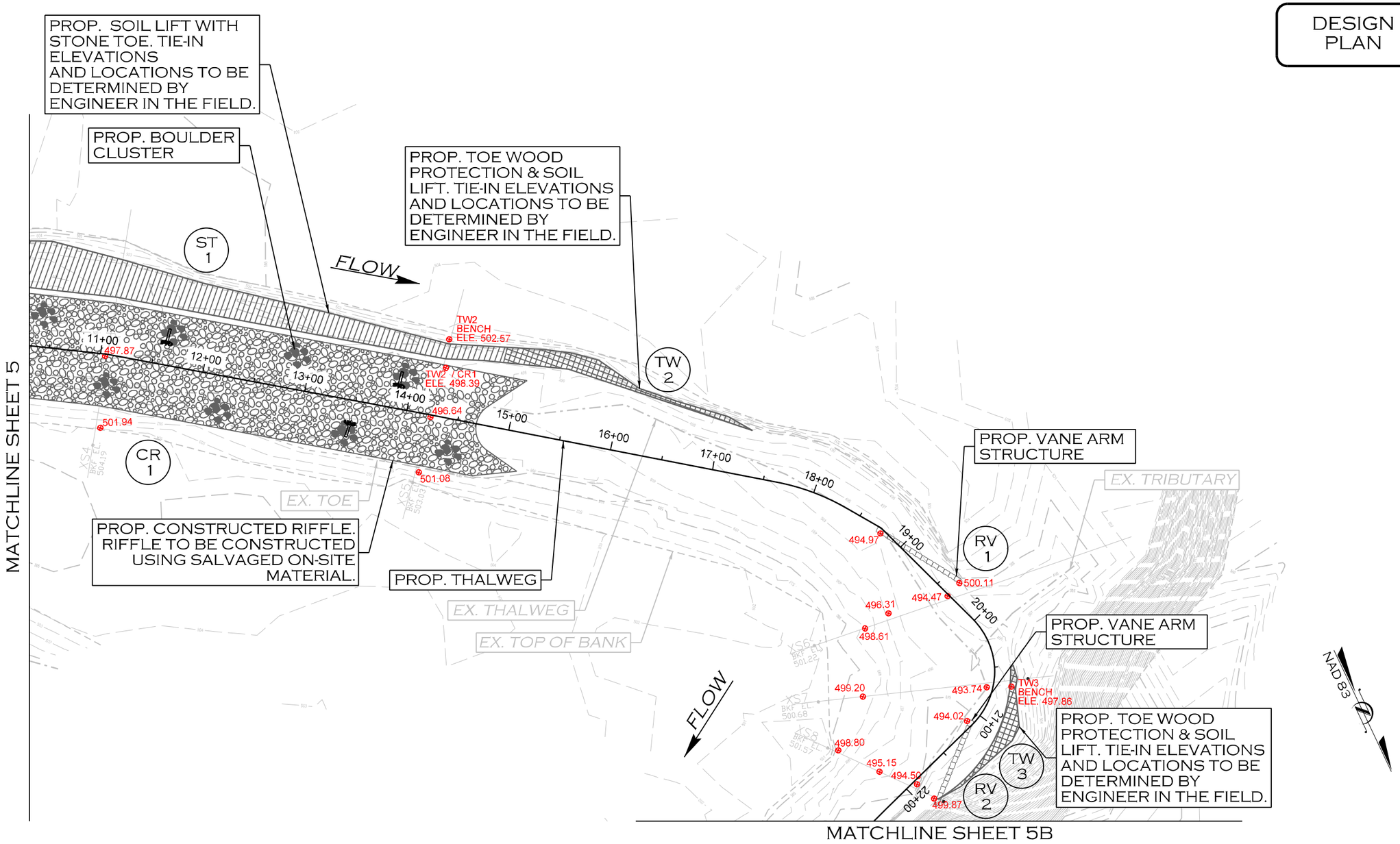
PROJECT # EPR0064 | SHEET NO. 5A

DESIGN PLAN



AS-BUILT PLAN 11/20/25

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4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
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PREPARED FOR:

U.S. Fish & Wildlife Service
New York Field Office

3817 Luker Road
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OSWEGO COUNTY, NY

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DREWHALL

PROJECT # EPR0064 | SHEET NO. 5B

DESIGN PLAN

MATCHLINE SHEET 5A

MATCHLINE SHEET 5C

PROP. BOULDER CLUSTER

EX. REFERENCE RIFFLE

EX. THALWEG

PROP. THALWEG

EX. TOP OF BANK

23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00

493.25

491.49

TW4 ELE 493.94

ST 2

TW 4

PROP. SOIL LIFT WITH STONE TOE. TIE-IN ELEVATIONS AND LOCATIONS TO BE DETERMINED BY ENGINEER IN THE FIELD.

PROP. TOE WOOD PROTECTION & SOIL LIFT. TIE-IN ELEVATIONS AND LOCATIONS TO BE DETERMINED BY ENGINEER IN THE FIELD.

EX. TOP OF BANK

EX. SIDE CHANNEL

FLOW

NAD 83

50 25 0 50 100

SCALE (FT)

AS-BUILT PLAN 11/20/25

11/20/2025
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DREWHALL

REVISIONS				
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4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

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STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PE · 099293

Kevin Tweedy
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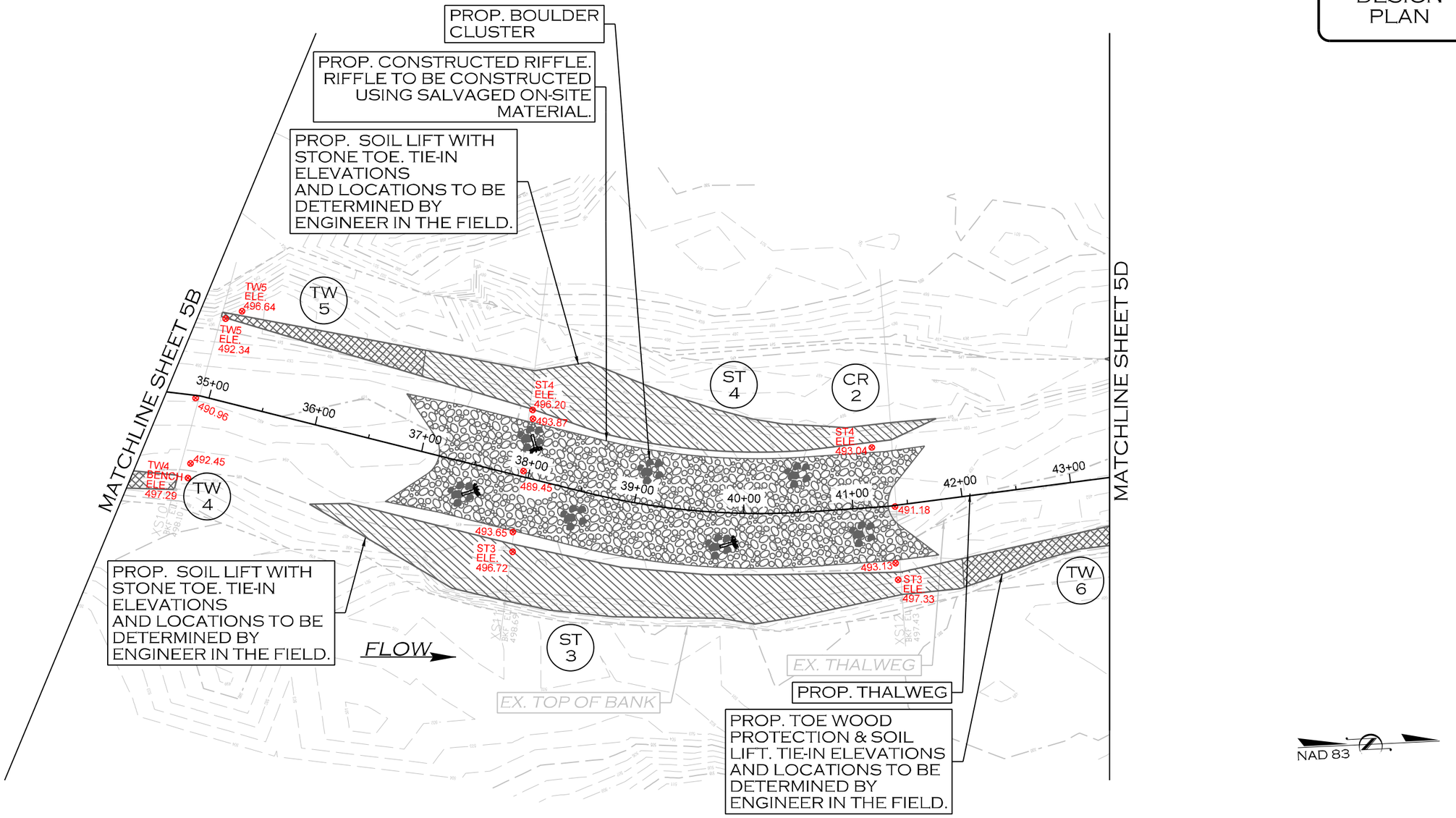
PROJECT # EPR0064 | SHEET NO. 5C

DESIGN PLAN



AS-BUILT PLAN 11/20/25

REVISIONS				
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CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

Kevin Tweedy
2025.11.20
14:30:04-05'00'

11/20/2025
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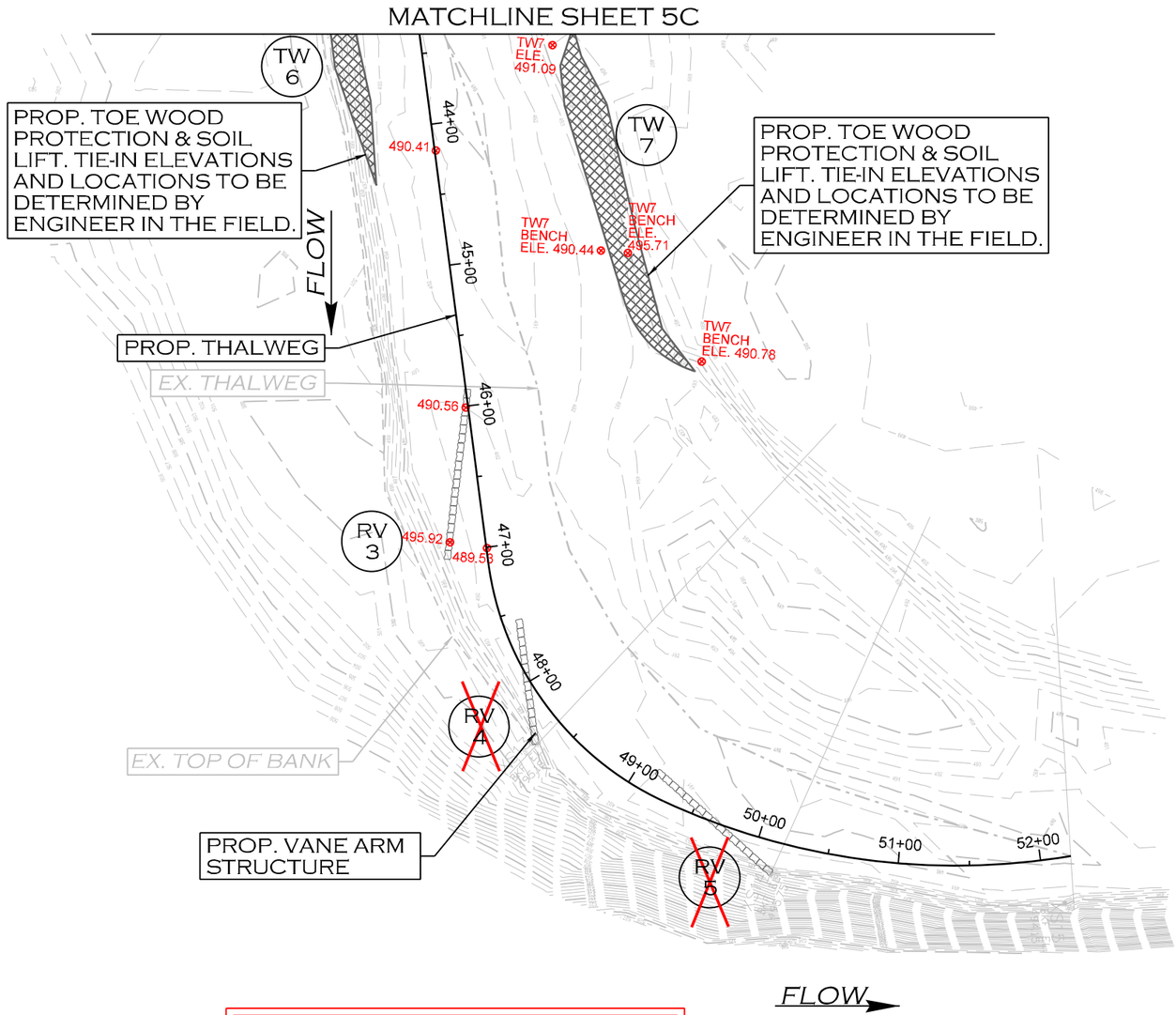
DEWHALL

PROJECT # EPR0064 | SHEET NO. 5D

DESIGN PLAN



RV-4 AND RV-5 WERE NOT INSTALLED DUE TO BUDGETARY RESTRICTIONS.

50 25 0 50 100
SCALE (FT)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

Kevin Tweedy
2025.11.20
14:30:04-05'00'

11/20/2025
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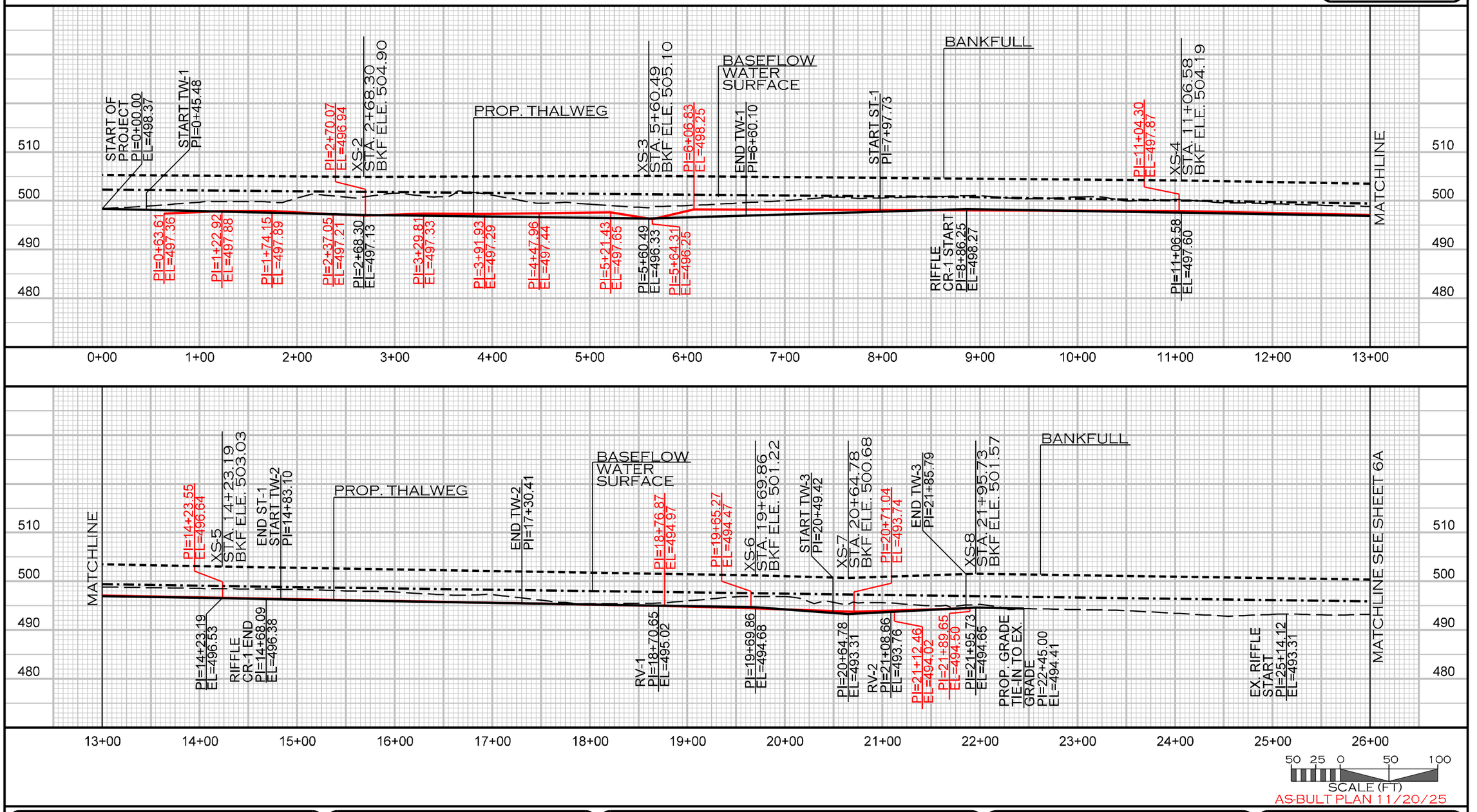
DEWHALL

PROJECT # EPR0064 | SHEET NO. 6

DESIGN PROFILE



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SCALE (FT)

AS-BULT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV.	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. Fish & Wildlife Service
New York Field Office

3817 Luker Road
Cortland, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

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Kevin Tweedy
2025.11.20
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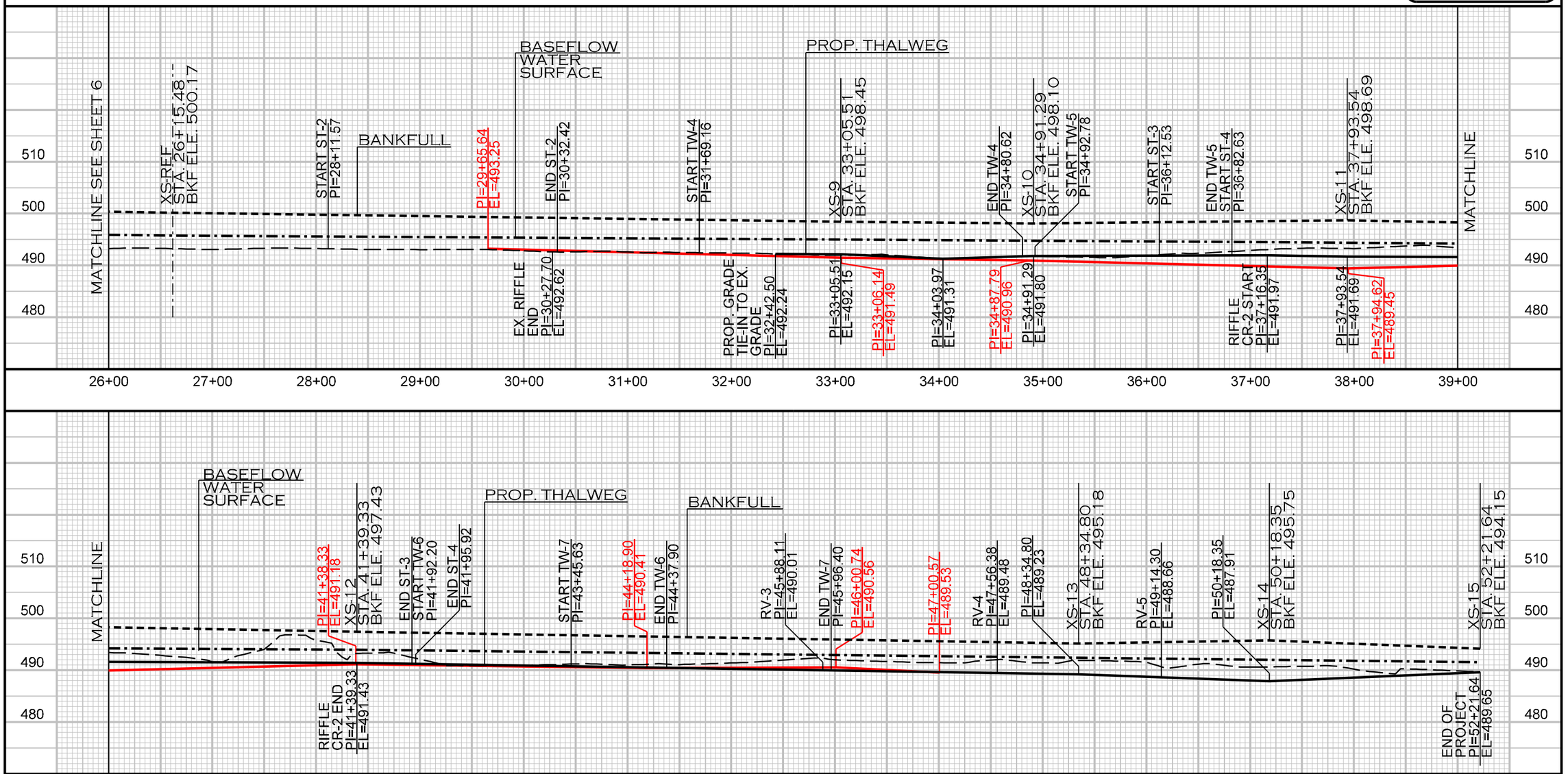
DREWFAT

PROJECT # EPR0064 | SHEET NO. 6A

DESIGN PROFILE



50 25 0 50 100

SCALE (FT)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. Fish & Wildlife Service
New York Field Office

3817 Luker Road
Cortland, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

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Kevin Tweedy
2025.11.20
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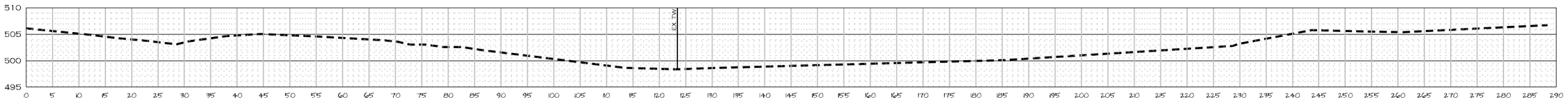
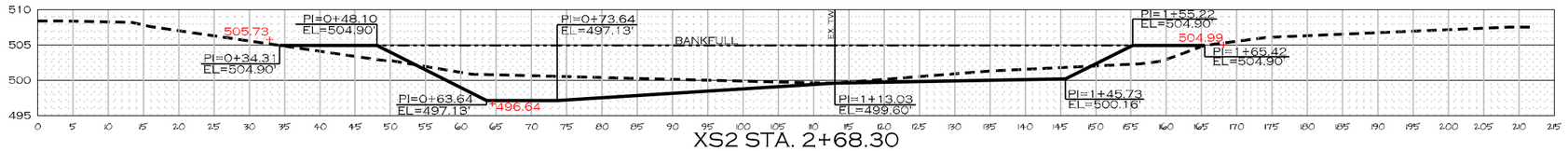
DREWHALL

PROJECT # EPR0064 | SHEET NO. 7

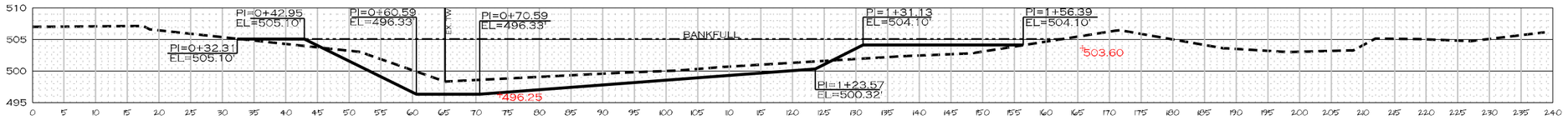
DESIGN CROSS SECTIONS



XS1 STA. 0+00
RUN

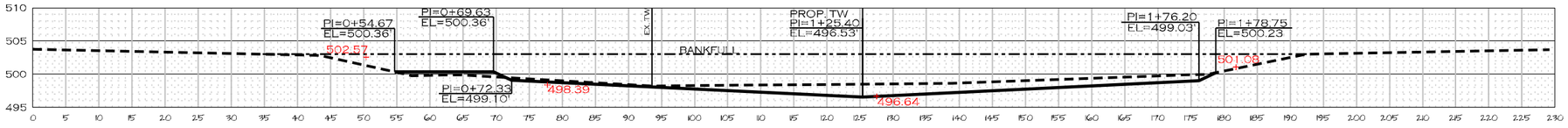


XS2 STA. 2+68.30
POOL



XS3 STA. 5+60.49
POOL

XS4 STA. 11+06.58
RIFFLE



XS5 STA. 14+23.19
RIFFLE

10 5 0 10 20
SCALE (FT)

AS-BULT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED · 099293 · PROFESSIONAL ENGINEER

Kevin Tweedy
2025.11.20
14:30:04-05'00'

11/20/2025
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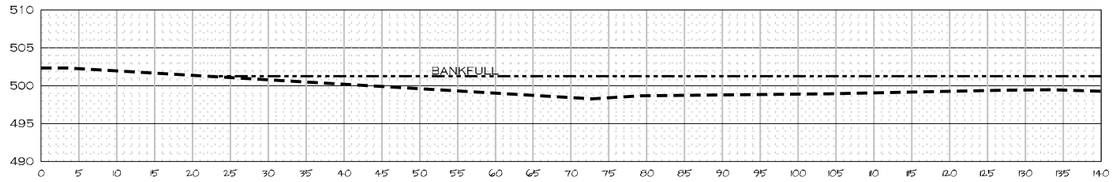
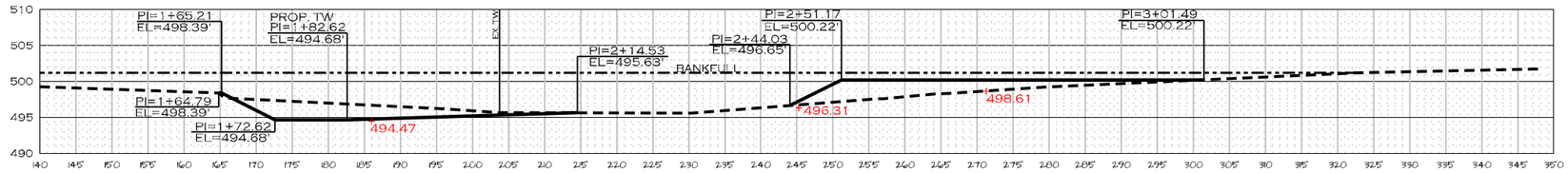
-53.27.EM

PROJECT # EPR0064 | SHEET NO. 7A

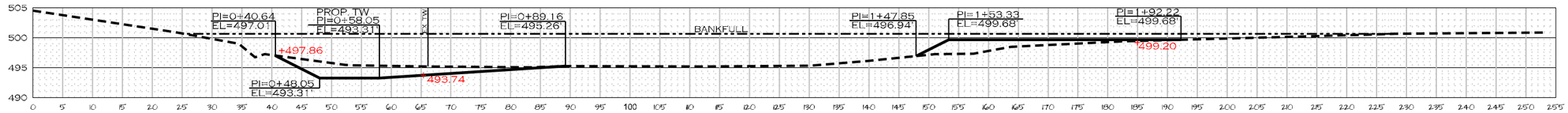
DESIGN CROSS SECTIONS



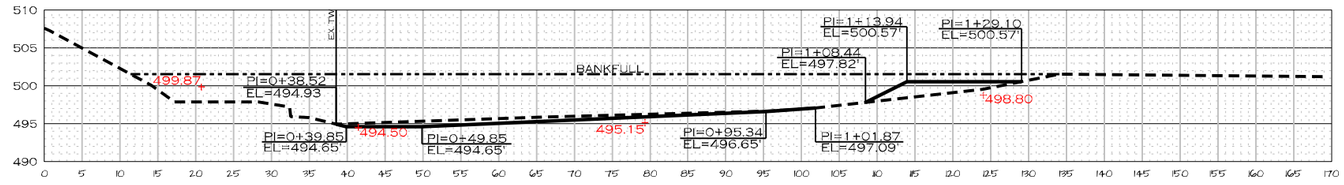
XS6 STA. 19+69.86
POOL



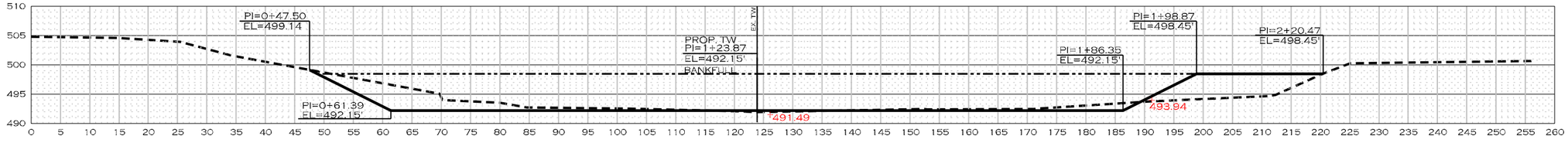
XS6 STA. 19+69.86 CON'T
POOL



XS7 STA. 20+64.78
POOL



XS8 STA. 21+95.73
POOL



XS9 STA. 33+05.51
RIFFLE

10 5 0 10 20
SCALE (FT)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

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Kevin Tweedy
2025.11.20
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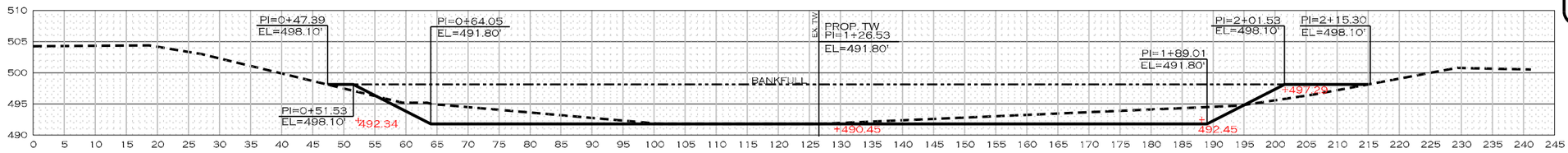
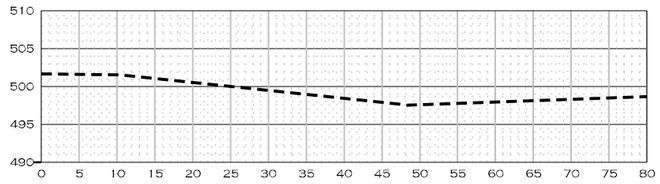
PROJECT # EPR0064 | SHEET NO. 7B

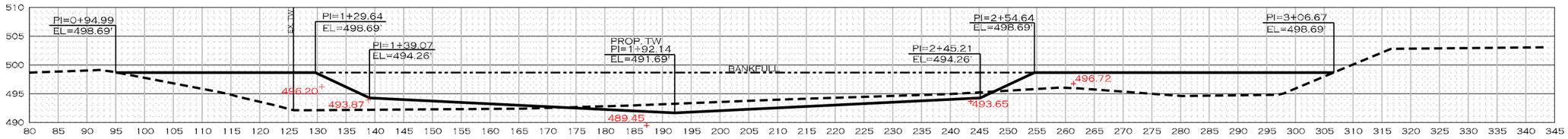
DESIGN CROSS SECTIONS



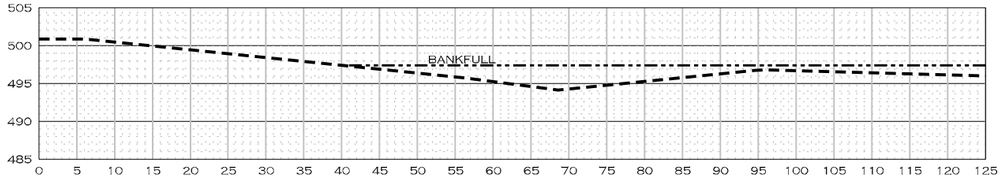
XS10 STA. 34+91.29
POOL



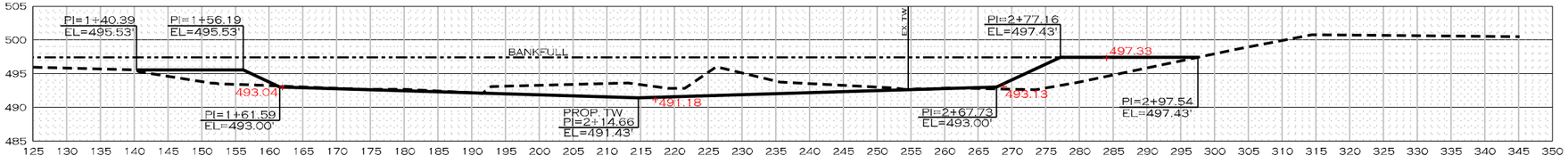
XS11 STA. 37+93.54
RIFFLE



XS11 STA. 37+93.54 CON'T
RIFFLE



XS12 STA. 41+39.33
RIFFLE



XS12 STA. 41+39.33 CON'T
RIFFLE

10 5 0 10 20
SCALE (FT)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE
NEW YORK FIELD OFFICE

3817 LUKER ROAD
CORTLAND, NY 13045

SALMON RIVER PHASE 3
HABITAT ENHANCEMENT PLAN
OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

STATE OF NEW YORK · KEVIN LEE TWEEDY · LICENSED PROFESSIONAL ENGINEER · 099293

Kevin Tweedy
2025.11.20
14:30:04-05'00'

11/20/2025
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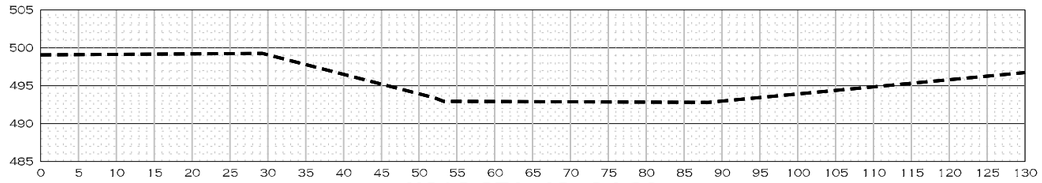
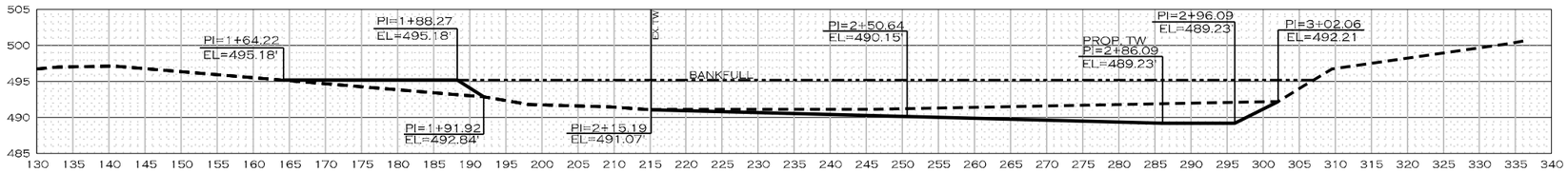
53.24 SW

PROJECT # EPR0064 | SHEET NO. 7C

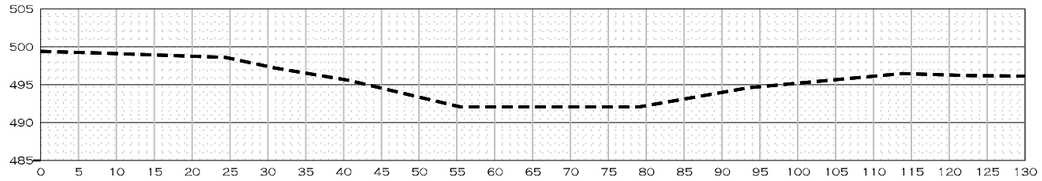
DESIGN CROSS SECTIONS



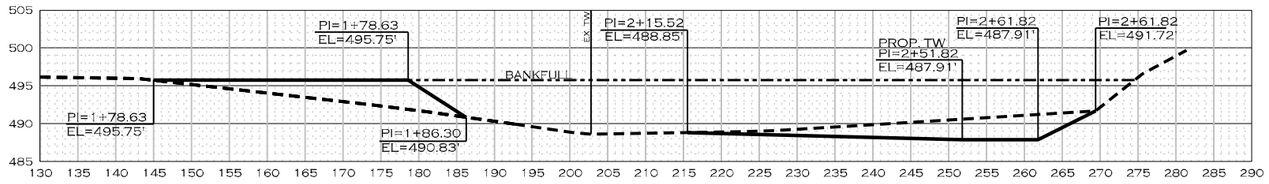
XS13 STA. 48+34.80
POOL



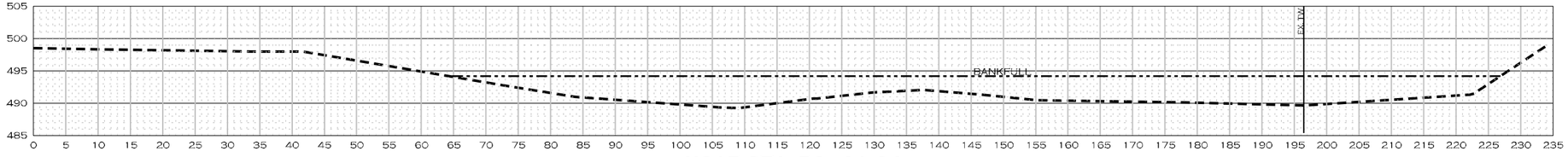
XS13 STA. 48+34.80 CON'T
POOL



XS14 STA. 50+18.35
POOL



XS14 STA. 50+18.35 CON'T
POOL



XS15 STA. 52+21.64
GLIDE

10 5 0 10 20
SCALE (FT)

AS-BUILT PLAN 11/20/25

REVISIONS				
NO.	DESCRIPTION	ENGR.	APPROV	DATE
1	30% DESIGN PLAN	KLT	KLT	12/20/24
2	SOIL LIFT STONE TOE-DTL	KLT	KLT	1/22/25
3	DRAFT 100% DESIGN PLANS	KLT	KLT	5/2/25
4	FINAL 100% DESIGN PLANS	KLT	KLT	6/18/25
5	AS-BUILT PLAN	KLT	KLT	11/20/25

PREPARED FOR:

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SALMON RIVER PHASE 3
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OSWEGO COUNTY, NY

PREPARED BY:

ECOSYSTEM ENGINEERING
910 GREENWOOD CIRCLE
CARY, NC 27511

NY LICENSE # = 099293

PROJECT ENGINEER

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Kevin Tweedy
2025.11.20
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11/20/2025
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53.38 SW