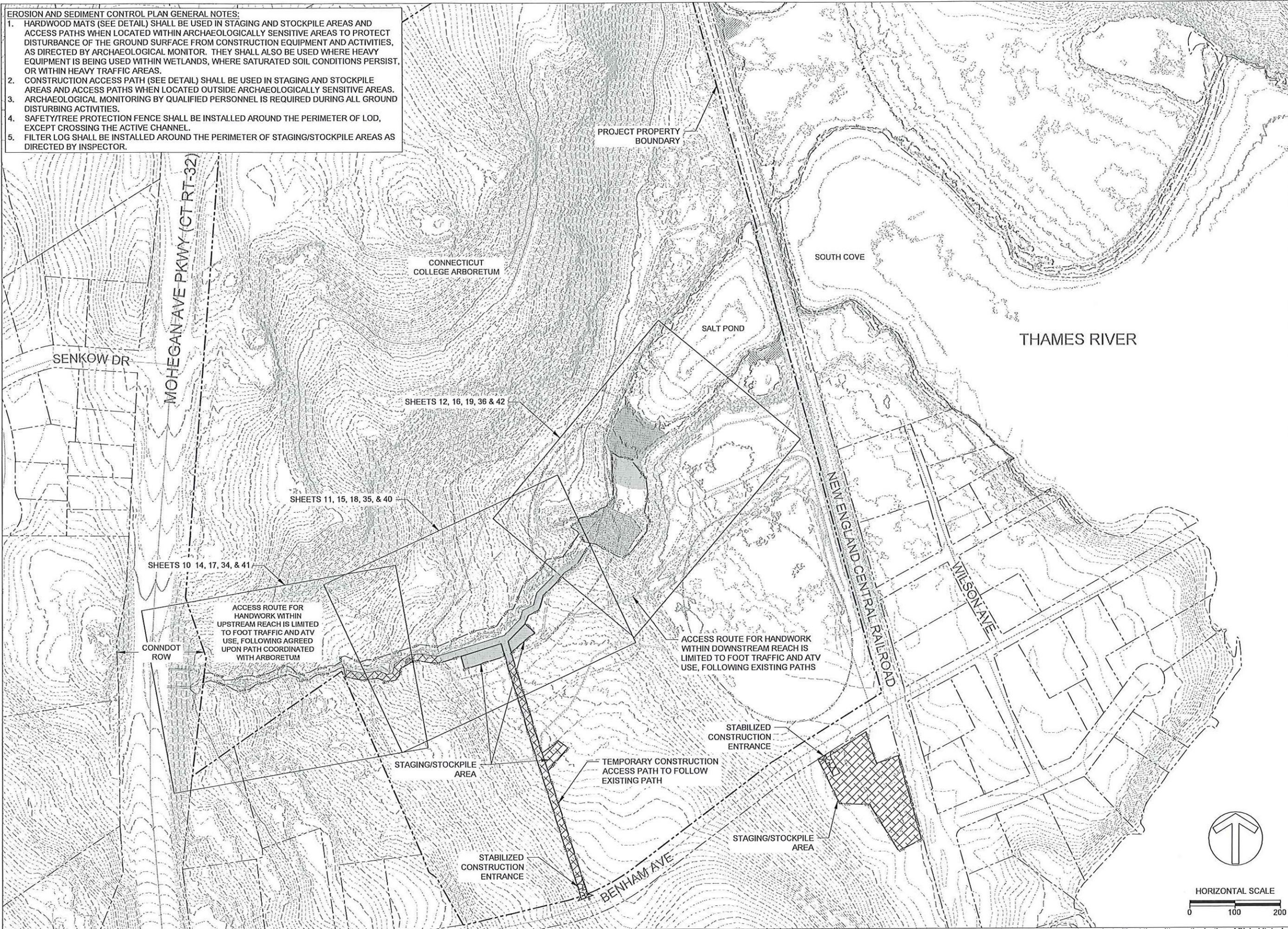




- EROSION AND SEDIMENT CONTROL PLAN GENERAL NOTES:
1. HARDWOOD MATS (SEE DETAIL) SHALL BE USED IN STAGING AND STOCKPILE AREAS AND ACCESS PATHS WHEN LOCATED WITHIN ARCHAEOLOGICALLY SENSITIVE AREAS TO PROTECT DISTURBANCE OF THE GROUND SURFACE FROM CONSTRUCTION EQUIPMENT AND ACTIVITIES, AS DIRECTED BY ARCHAEOLOGICAL MONITOR. THEY SHALL ALSO BE USED WHERE HEAVY EQUIPMENT IS BEING USED WITHIN WETLANDS, WHERE SATURATED SOIL CONDITIONS PERSIST, OR WITHIN HEAVY TRAFFIC AREAS.
 2. CONSTRUCTION ACCESS PATH (SEE DETAIL) SHALL BE USED IN STAGING AND STOCKPILE AREAS AND ACCESS PATHS WHEN LOCATED OUTSIDE ARCHAEOLOGICALLY SENSITIVE AREAS.
 3. ARCHAEOLOGICAL MONITORING BY QUALIFIED PERSONNEL IS REQUIRED DURING ALL GROUND DISTURBING ACTIVITIES.
 4. SAFETY/TREE PROTECTION FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF LOD, EXCEPT CROSSING THE ACTIVE CHANNEL.
 5. FILTER LOG SHALL BE INSTALLED AROUND THE PERIMETER OF STAGING/STOCKPILE AREAS AS DIRECTED BY INSPECTOR.

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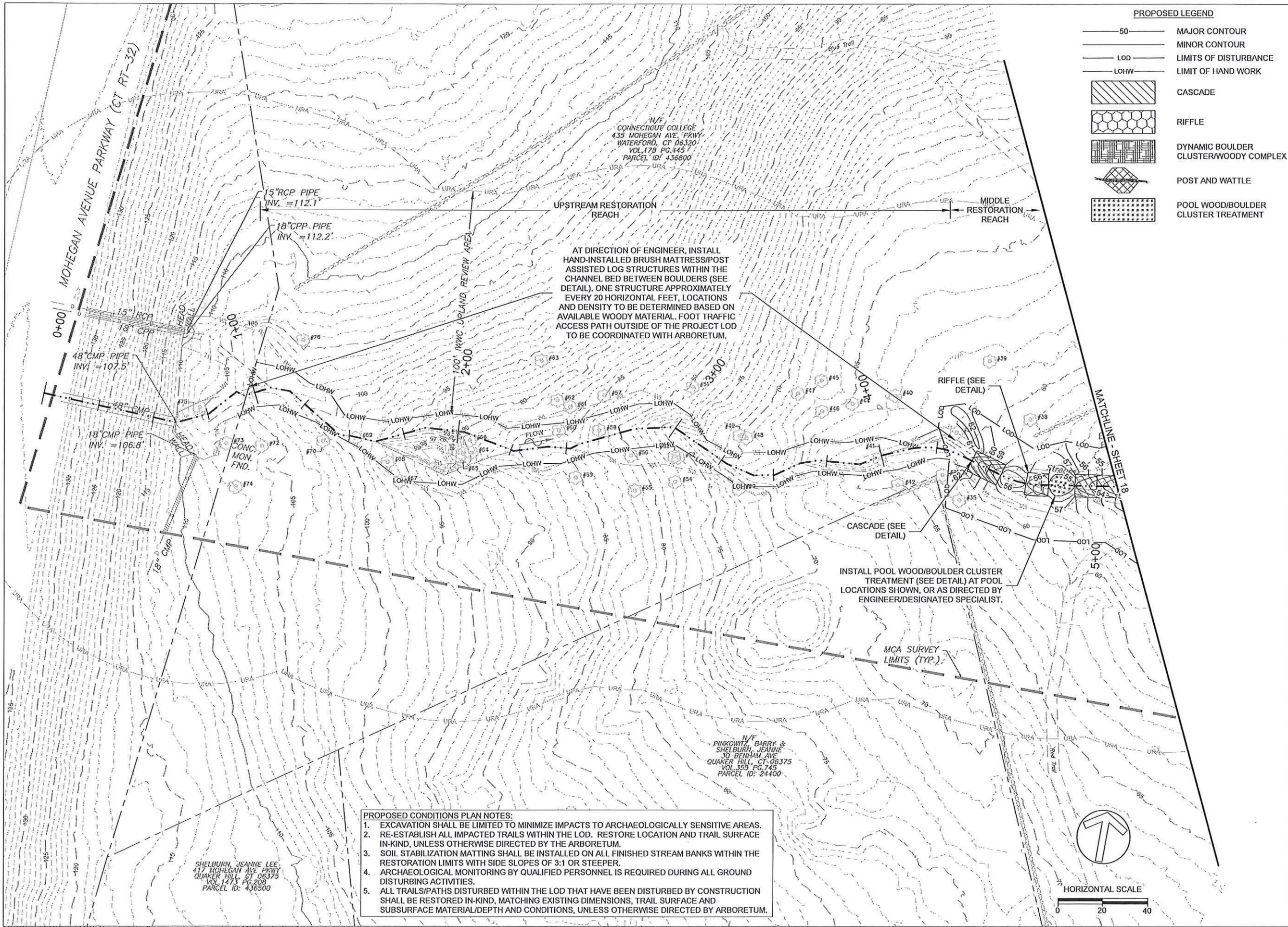


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MAMACOCKE BROOK
OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

SHEET LAYOUT

PROJECT NO.:	25201.01	SCALE:	1" = 100'
SEAL:		By:	EB, TB
		CHECK:	DS
		DWG. NO.:	
			8 OF 42



PROPOSED LEGEND	
	50 MAJOR CONTOUR
	MINOR CONTOUR
	LOD LIMITS OF DISTURBANCE
	LOHW LIMIT OF HAND WORK
	CASCADE
	RIFFLE
	DYNAMIC BOULDER CLUSTER/WOODY COMPLEX
	POST AND WATTLE
	POOL WOOD/BOULDER CLUSTER TREATMENT

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MAMACOKE BROOK
OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

TITLE

PROPOSED
CONDITIONS

PROJECT NO.: 25201.01

SCALE: 1" = 20'

SEAL:

BY: EB,TB

CHECK DS

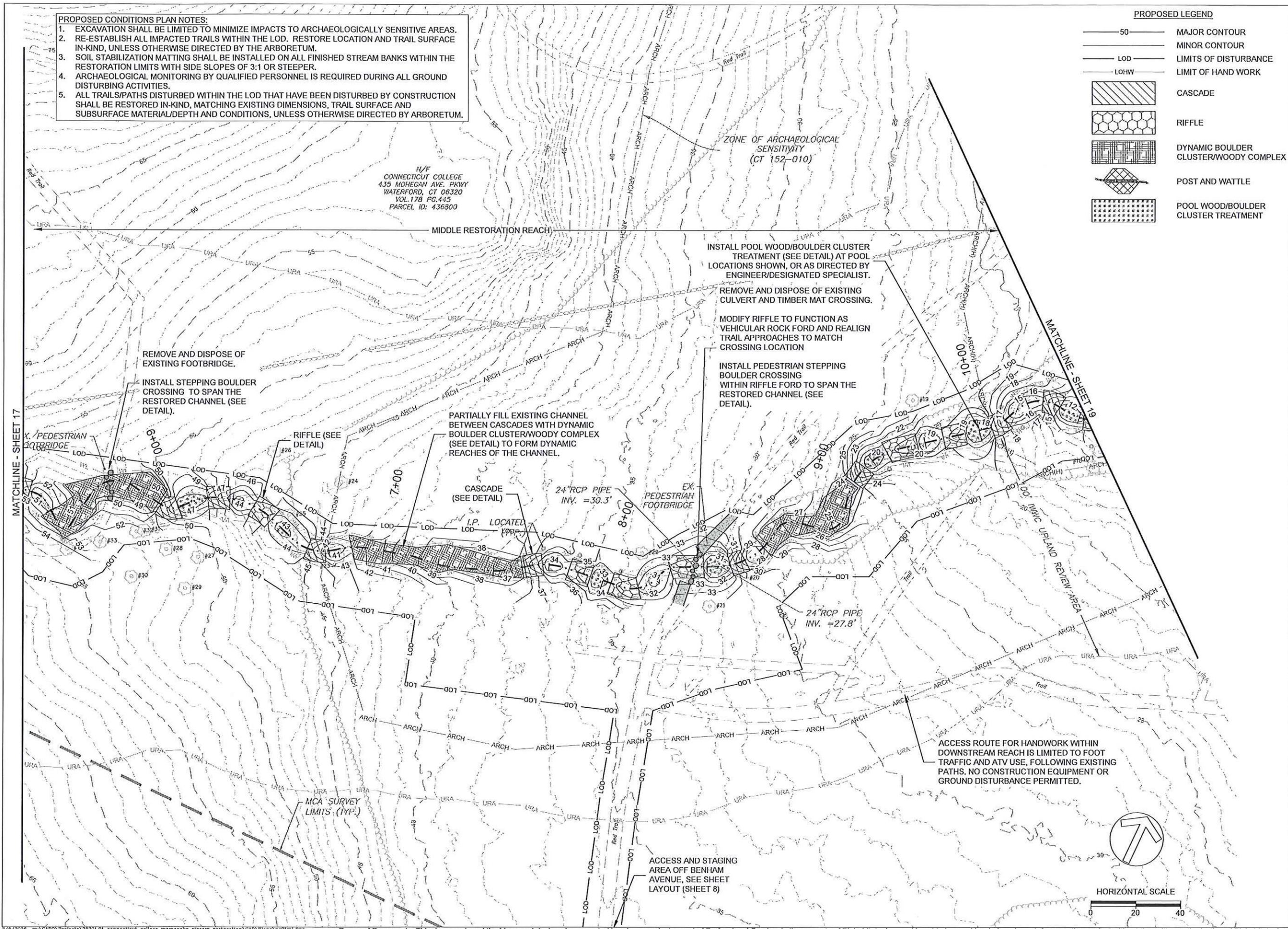
DWG. NO.:

17 OF 42

PROPOSED CONDITIONS PLAN NOTES:

1. EXCAVATION SHALL BE LIMITED TO MINIMIZE IMPACTS TO ARCHAEOLOGICALLY SENSITIVE AREAS.
2. RE-ESTABLISH ALL IMPACTED TRAILS WITHIN THE LOD. RESTORE LOCATION AND TRAIL SURFACE IN-KIND, UNLESS OTHERWISE DIRECTED BY THE ARBORETUM.
3. SOIL STABILIZATION MATTING SHALL BE INSTALLED ON ALL FINISHED STREAM BANKS WITHIN THE RESTORATION LIMITS WITH SIDE SLOPES OF 3:1 OR STEEPER.
4. ARCHAEOLOGICAL MONITORING BY QUALIFIED PERSONNEL IS REQUIRED DURING ALL GROUND DISTURBING ACTIVITIES.
5. ALL TRAILS/PATHS DISTURBED WITHIN THE LOD THAT HAVE BEEN DISTURBED BY CONSTRUCTION SHALL BE RESTORED IN-KIND, MATCHING EXISTING DIMENSIONS, TRAIL SURFACE AND SUBSURFACE MATERIAL/DEPTH AND CONDITIONS, UNLESS OTHERWISE DIRECTED BY ARBORETUM.

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MAMACOCKE BROOK OUTFALL CHANNEL STABILIZATION AND RESTORATION

PROPOSED CONDITIONS

PROJECT NO.: 25201.01

SCALE: 1" = 20'

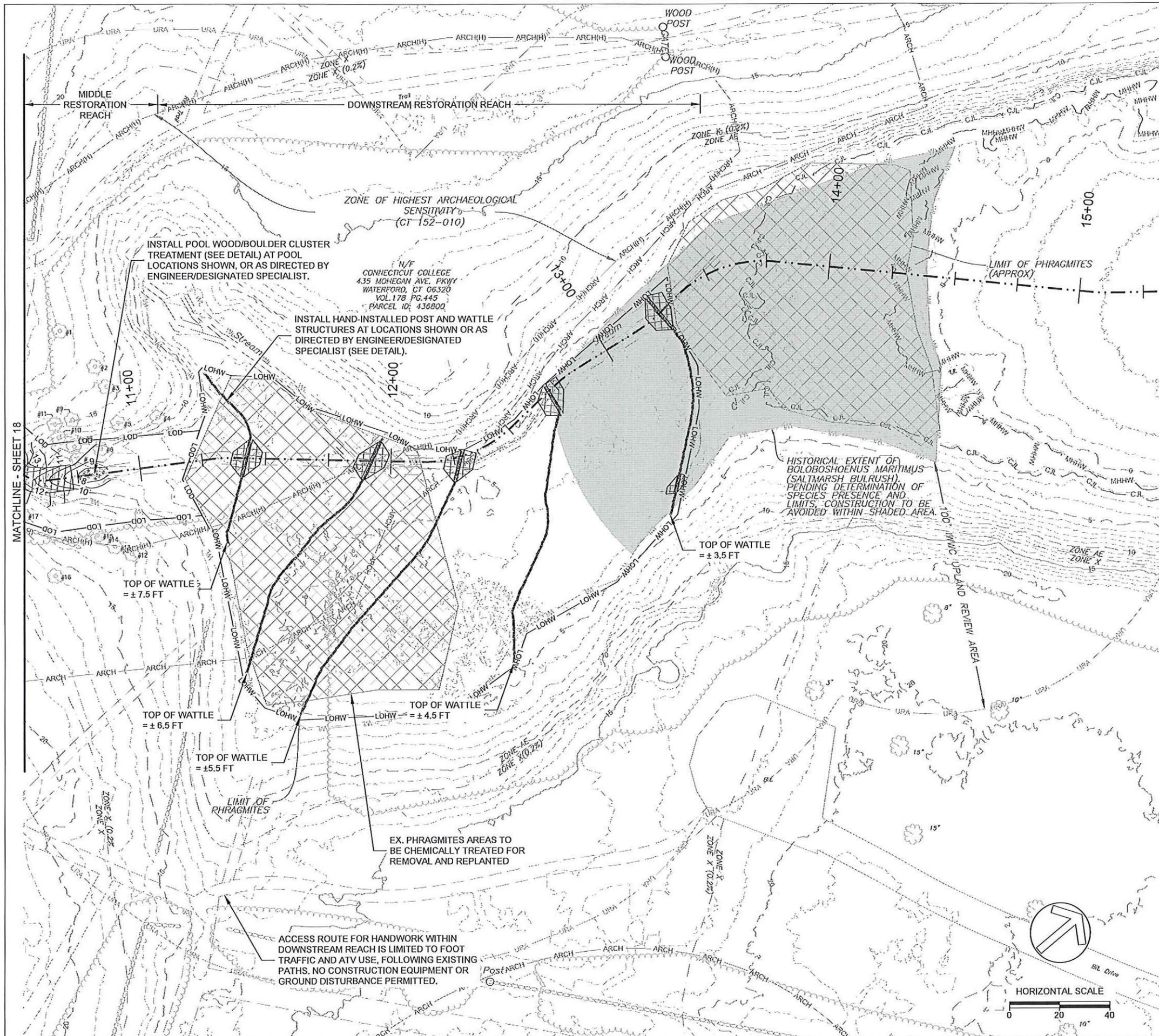
SEAL:

BY: EB, TB

CHECK: DS

DWG. NO.:

18 OF 42



- PROPOSED CONDITIONS PLAN NOTES:
1. EXCAVATION SHALL BE LIMITED TO MINIMIZE IMPACTS TO ARCHAEOLOGICALLY SENSITIVE AREAS.
 2. RE-ESTABLISH ALL IMPACTED TRAILS WITHIN THE LOD.
 3. RESTORE LOCATION AND TRAIL SURFACE IN-KIND, UNLESS OTHERWISE DIRECTED BY THE ARBORETUM.
 4. SOIL STABILIZATION MATTING SHALL BE INSTALLED ON ALL FINISHED STREAM BANKS WITHIN THE RESTORATION LIMITS WITH SIDE SLOPES OF 3:1 OR STEEPER.
 5. ARCHAEOLOGICAL MONITORING BY QUALIFIED PERSONNEL IS REQUIRED DURING ALL GROUND DISTURBING ACTIVITIES.
 6. ALL TRAILS/PATHS DISTURBED WITHIN THE LOD THAT HAVE BEEN DISTURBED BY CONSTRUCTION SHALL BE RESTORED IN-KIND, MATCHING EXISTING DIMENSIONS, TRAIL SURFACE AND SUBSURFACE MATERIAL/DEPTH AND CONDITIONS, UNLESS OTHERWISE DIRECTED BY ARBORETUM.

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MAMACOKE BROOK
OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

TITLE

PROPOSED CONDITIONS

PROJECT NO.: 25201.01

SCALE: 1" = 20'

SEAL:

By: EB,TB

CHECK DS

DWG. NO.:

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MAMACOCKE BROOK
OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

UPSTREAM
RESTORATION
REACH DETAILS

PROJECT NO.: 25201.01 SCALE: NTS
BY: EB,TB CHECK: DS
DWG. NO.:

23 OF 42

HAND-INSTALLED BRUSH MATTRESS/POST ASSISTED LOG
STRUCTURE (PALS) EXECUTION:

1. AT DIRECTION OF ENGINEER, INSTALL HAND-INSTALLED BRUSH MATTRESS/POST ASSISTED LOG STRUCTURES WITHIN THE CHANNEL BED BETWEEN EXISTING BOULDERS. ONE STRUCTURE APPROXIMATELY EVERY 20 HORIZONTAL FEET, LOCATIONS AND DENSITY TO BE DETERMINED BASED ON AVAILABLE WOODY MATERIAL.
2. HARVEST WOODY MATERIAL ON-SITE THAT COMPLIES WITH THE MATERIAL SPECIFICATIONS. HARVEST MATERIAL AS PART OF THE CLEARING, TREE SALVAGING, AND HABITAT MATERIAL SALVAGING AND STOCKPILING OPERATIONS ONSITE, LEAVING AS MUCH OF THE BRANCHING AND ROOT FAN INTACT AS POSSIBLE. MATERIALS SHALL BE HANDLED AND STORED IN A MANNER SO AS TO MINIMIZE DAMAGE TO BRANCHING AND ROOT FANS.
3. INSTALL KEY LOGS ORIENTED STREAM-WISE AND FACE THE BUTT-END OR BRANCHING/ROOT WAD END UPSTREAM TO MAXIMIZE WIDTH OF BLOCKAGE THAT WILL CREATE DIVERGENT FLOW PATHS AROUND IT. KEY LOGS CAN BE SUPPLIED TO THE CHANNEL VIA "CHOP AND DROP" OF TREES ALONG THE TOP OF BANK, WITH PRIOR APPROVAL FROM ARBORETUM.
4. INSTALL CROSSING KEY LOGS ORIENTED PARALLEL TO FLOW, PUSHING ENDS INTO TOE OF BANK. USE A MIX OF VARIOUS SIZE WOOD AND TANGLE TOGETHER WITH BRANCHES OF PARALLEL KEY LOGS.
5. BACKFILL AROUND KEY LOGS WITH BRUSH MATTRESS AND SALVAGED STREAMBED MATERIAL MATERIAL IN 1 FOOT COMPACTED LIFTS TO FORM DENSE BRUSH MATTRESS CORE INTERWOVEN WITHIN THE KEY LOGS.
6. WHERE POSSIBLE, DRIVE POSTS INTO BED ANGLED INWARDS TO WEDGE KEY LOGS/BRUSH MATTRESS AND PREVENT THEM FROM RAFTING UP AND FLOATING AWAY IN HIGH FLOWS. POST SPACING IS 2.5' ON-CENTER, ALTERNATING SIDES. DRIVE AT LEAST 1/4 TO 1/3 FINISHED LENGTH OF POST INTO BED. MEANS OF ANCHORING MAY VARY BASED ON SITE CONDITIONS AND UNDERLYING GEOLOGY. IF ALTERNATE ANCHORING IS REQUIRED, IT SHALL BE DETERMINED BY ENGINEER.
7. INSTALL BRUSH MATTRESS TAILOUTS ON UP AND DOWNSTREAM SIDES OF STRUCTURE, WEAVING BRUSH MATTRESS WITHIN VERTICAL IN 1 FOOT HAND-COMPACTED LIFTS. ENSURE SUFFICIENT BRUSH MATTRESS TAILOUT IS PROVIDED ON DOWNSTREAM SIDE TO MINIMIZE VERTICAL PLUNGING FLOWS
8. ONCE PALS ARE CONSTRUCTED, IMMEDIATELY STABILIZE ALL DISTURBED TIE-IN LOCATIONS AS SPECIFIED.
9. THE NUMBER AND LENGTH OF KEY LOGS MAY VARY PER STRUCTURE, DEPENDING ON THE EXISTING CHANNEL WIDTH AND DEPTH. SUFFICIENT MATERIAL IS NECESSARY TO ACHIEVE SPECIFIED GRADE, SECTION, AND DENSITY TO INFLUENCE WATER SURFACE ELEVATION SO THAT IT IS FLOWING OVERTOP OF STRUCTURE DURING STORM EVENTS.
10. WHERE POSSIBLE, ALL MATERIAL SHALL BE DRIVEN OR PUSHED INTO STREAM BED AND BANKS TO DEPTHS SPECIFIED WITH MINIMAL EXCAVATION. SHARPEN ENDS OF LOG WITH A CHAINSAW AND DRIVE SHARPENED INTO GROUND AS DIRECTED BY THE ENGINEER/DESIGNATED SPECIALIST.
11. ALL EXPOSED LOG ENDS SHALL HAVE BROKEN OR ROUGHENED END, RATHER THAN SAW CUT END WHEN POSSIBLE.
12. THIS DETAIL DEPICTS THE TYPICAL PREFERRED COMPOSITION AND CONFIGURATION OF LOG MEMBERS. ALTERATION OF THIS COMPOSITION/CONFIGURATION DUE TO ISSUES OBTAINING NECESSARY MATERIALS OR OTHER REASON IS ACCEPTABLE ONLY WITH PRIOR APPROVAL FROM THE ENGINEER/DESIGNATED SPECIALIST. FINISHED GRADE OF ALTERED STRUCTURES SHALL REMAIN AS SPECIFIED ON THE PLANS.

HAND-INSTALLED BRUSH MATTRESS/POST ASSISTED LOG
STRUCTURE (PALS) MATERIALS:

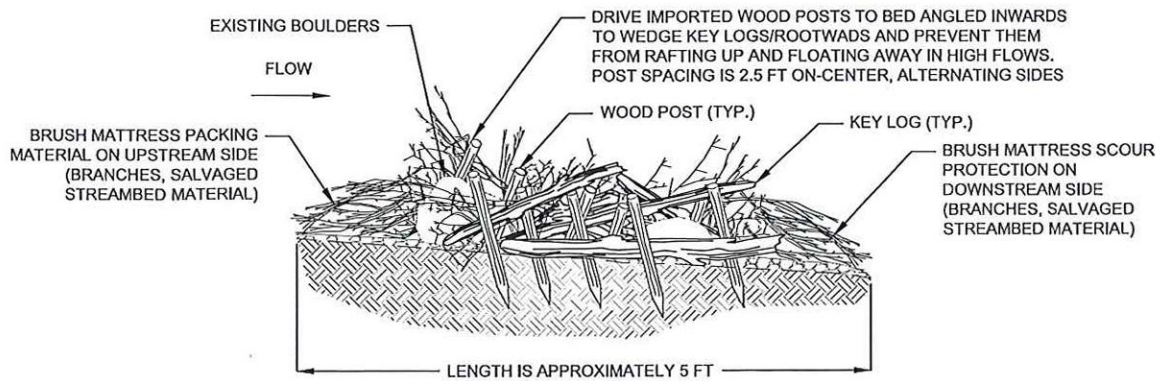
1. KEY LOGS SHALL BE COMPOSED OF LIMBS, TRUNKS, ROOTWADS WITH A MINIMUM OF 4 INCHES DIAMETER CUT TO A LENGTH OF APPROXIMATELY 1.5 X CHANNEL WIDTH.
2. BRUSH MATTRESS SHALL BE COMPOSED OF 50% BRUSH, SMALL LIMBS AND ROOTWAD BETWEEN 1 TO 2 INCHES IN DIAMETER AND 3 TO 5 FOOT LONG, MIXED EVENLY WITH 50% SMALLER DIAMETER AND LENGTH BRUSH AND ON-SITE FILL MATERIAL.
3. WOOD POSTS SHALL BE MIN OF 4" DIAMETER SALVAGED OR FURNISHED WOOD POSTS, 4 FEET LONG.
4. ALL WOODY MATERIAL SHALL BE OBTAINED ONSITE TO MAXIMUM EXTENT POSSIBLE. ROT-RESISTANT SPECIES ARE PREFERRED FOR USE IF AVAILABLE. BUT ANY WOOD FREE OF DEFECTS, MAJOR DAMAGE AND DECAY CAN BE USED AS AVAILABLE.

SUBMITTAL REQUIREMENTS:

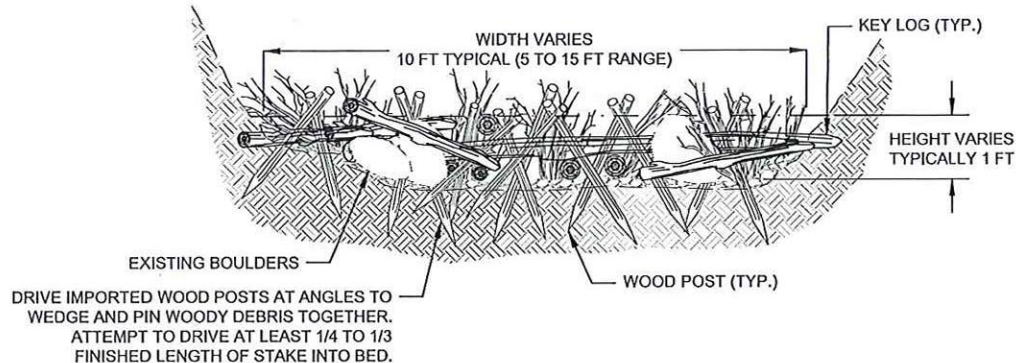
1. KEY LOGS: NA
2. BRUSH MATTRESS: NA
3. WOOD POSTS: SUBMITTAL APPROVAL REQUIRED IF IMPORTED

INSPECTION REQUIREMENTS:

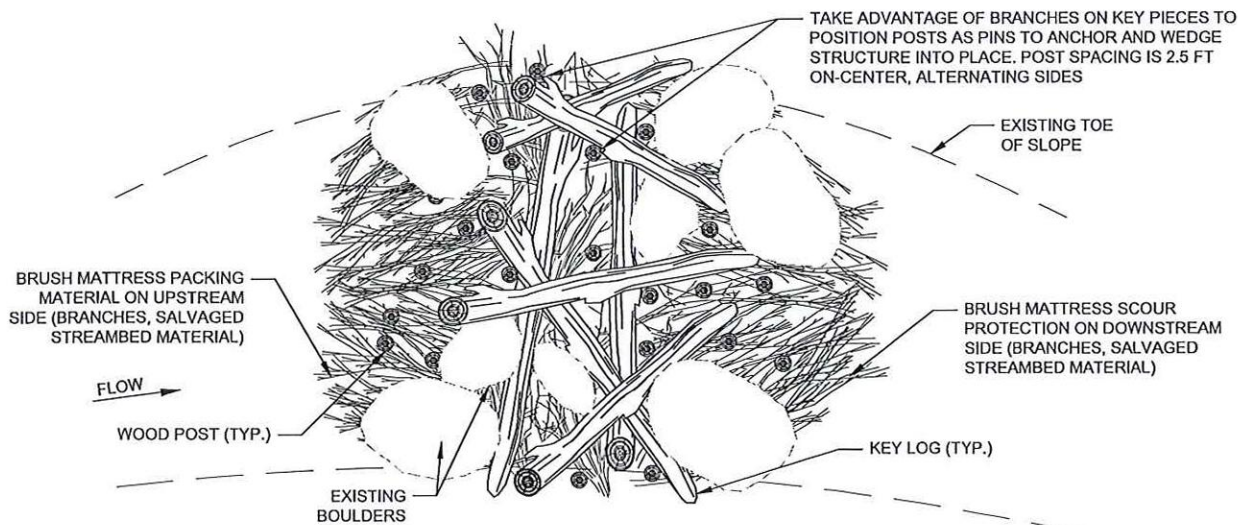
1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
2. ENGINEER/DESIGNATED SPECIALIST TO VISUALLY INSPECT AND PROVIDE FINAL ACCEPTANCE OF EACH STRUCTURE BASED ON SITE INSPECTOR OR CONTRACTOR PROVIDED DOCUMENTATION (PHOTOS, ELEVATIONS).



PROFILE



SECTION

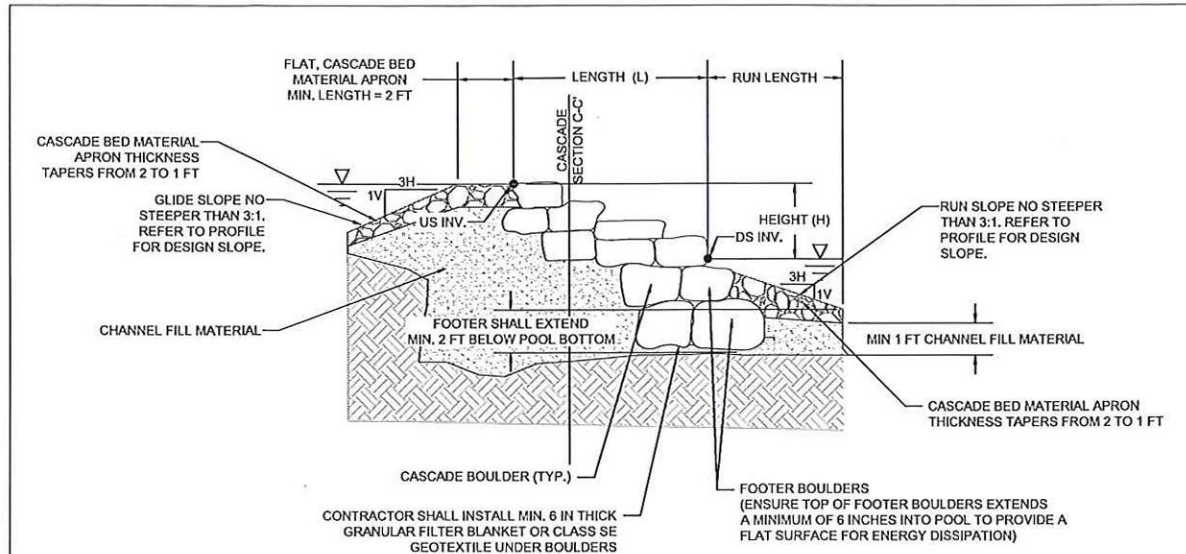


ADAPTED FROM CHANNEL-SPANNING PALS DETAIL, UTAH STATE LOW TECH PROCESSED BASED RESTORATION MANUAL

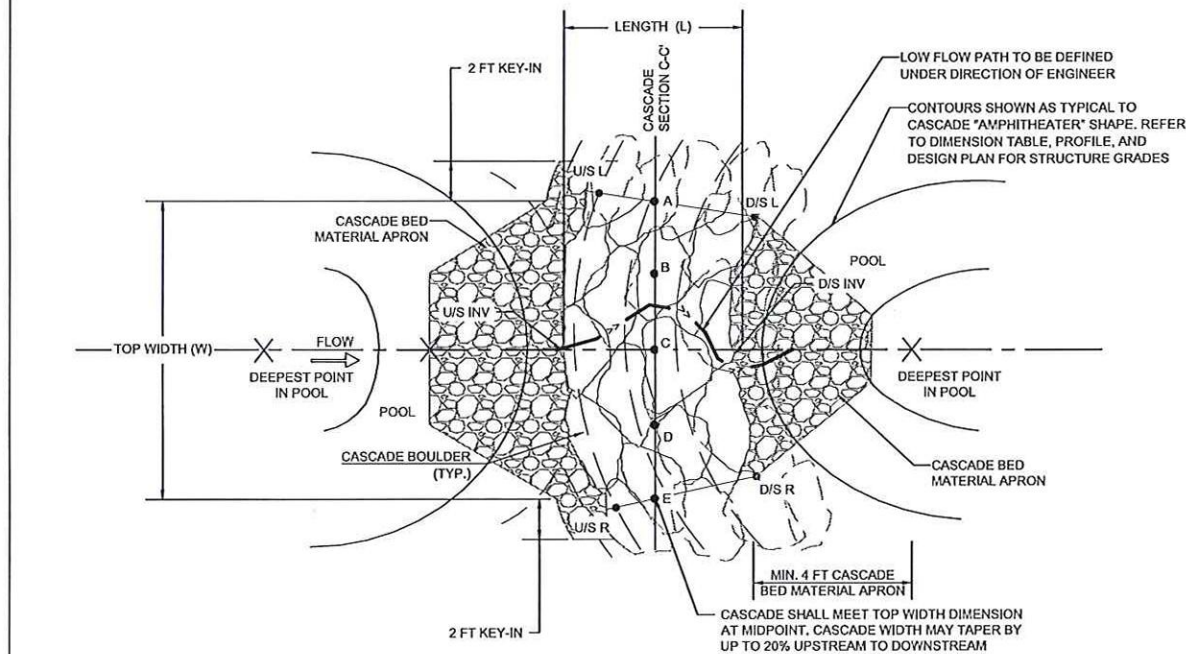
PLAN

HAND-INSTALLED BRUSH MATTRESS/POST ASSISTED LOG STRUCTURE (PALS)

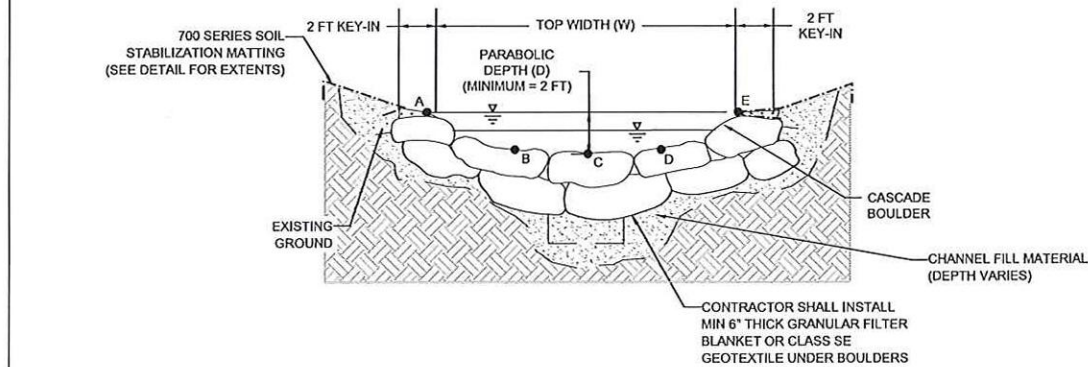
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PROFILE



PLAN



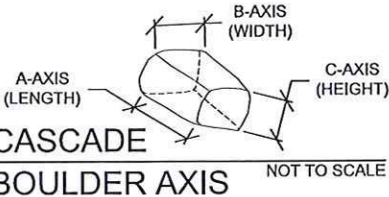
SECTION C-C'

CASCADE

CASCADE EXECUTION:

1. BOULDERS SHALL BE SUBANGULAR MATERIAL AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA. ANGULAR RIP RAP MATERIAL WITH SHARP EDGES IS NOT ACCEPTABLE.
2. SALVAGING BOULDERS FROM OUTSIDE THE EXISTING CHANNEL IS NOT ALLOWED.
3. BOULDERS AS DISPLAYED REFLECT VARIABILITY IN STONE DIMENSION WITHIN THE MINIMUM SIZE REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR SELECTING APPROPRIATE MATERIAL TO MEET THE LENGTH, WIDTH, DEPTH, AND SLOPE REQUIREMENTS AS OUTLINED ON THIS SHEET. THE NUMBER OF BOULDERS AND THEIR CONFIGURATION MAY VARY FROM THIS PLAN.
4. ALL BOULDERS SHALL BE PLACED WITH EDGES ALIGNED TIGHTLY TO MINIMIZE VOID SPACE.
5. THE CROSS SECTION SHALL BE CONSTRUCTED IN A PARABOLIC SHAPE BETWEEN GIVEN NODES.
6. NATURAL CHANNEL MATERIAL MAY BE HARVESTED ON-SITE PRIOR TO INSTALLATION OF CASCADE WEIR IF IT MEETS THE SPECIFICATIONS FOR USE AS WASH-IN OR RIFFLE MIX.
7. TIE-OUT BOULDER SHALL EXTEND PAST THE DOWNSTREAM CORNER NODES A & E A MIN. OF ONE BOULDER LENGTH (B-AXIS) INTO EXISTING BANK. WHERE THIS CONFLICTS WITH EXISTING TREE ROOTS OR BEDROCK, TIE-OUT BOULDER MAY BE ELIMINATED OR ADJUSTED AT DIRECTION OF ENGINEER.
8. CHANNEL WASH-IN MATERIAL SHALL BE REPEATEDLY WORKED INTO FULL DEPTH OF THE RIFFLE MIX AND CASCADE BOULDER TO FILL VOIDS.
9. TRIM ALL GEOTEXTILE AT OR BELOW FINISHED GRADE, IF USED.
10. ONCE CASCADE WEIR IS CONSTRUCTED, STABILIZE ALL DISTURBED LOCATIONS AS SPECIFIED.
11. CONTOURS ARE PROVIDED TO REPRESENT TYPICAL PARABOLIC SHAPE, AND DO NOT REFLECT DESIGN CONTOURS. REFER TO STRUCTURE TABLE AND PLAN VIEW FOR DIMENSIONS.
12. SEE STRUCTURE TABLES ON SHEET 33 FOR NODE LOCATION INFORMATION.
13. SEE PROFILE FOR UPSTREAM AND DOWNSTREAM INVERT NODES (U/S-INV AND D/S-INV).

BOULDER DIMENSIONS (FT) (± 0.25 FT)			
BOULDER TYPE	A-AXIS	B-AXIS	C-AXIS
CASCADE/FOOTER	2.5	2.5	1.5



CASCADE BED MATERIAL GRADATION TABLE	
CUMULATIVE % FINER	SIZE (IN)
	RSC REACH
10	5.2
15	6.1
30	8.6
50	12.0
85	17.0
100	19.2

CASCADE MATERIALS:

1. CHANNEL FILL MATERIAL SHALL BE COMPOSED OF 80% IMPORTED OR ON-SITE SALVAGED MATERIAL MIXED WITH 20% HARDWOOD MULCH BY VOLUME. IMPORTED MATERIAL SHALL CONSIST OF SAND, LOAMY SAND, SANDY LOAM AND LOAM TEXTURES, AS DEFINED BY USDA. MATERIAL GRADATION SHALL BE UP TO 20% CLAY (<0.002 MM) UP TO 50% SILT (0.002 MM TO 0.05 MM), 30% TO 100% SAND (0.05 MM TO 2.0 MM), AND UP TO 5% GRAVEL (2.0MM TO 2.0 IN). SALVAGED MATERIAL SHALL ONLY BE GENERATED FROM APPROVED ON-SITE GRADING ACTIVITIES AND MEET THE SPECIFICATIONS FOR IMPORTED MATERIAL. HARDWOOD MULCH SHALL CONSIST OF NATURAL UNCOMPOSTED WOOD AND BARK FROM HARDWOOD TREES THAT HAVE BEEN MILLED TO A MINIMUM PARTICLE SIZE OF 1 X 1/2 X 1/4 INCH AND MAXIMUM PARTICLE SIZE OF 4 X 4 X 2 INCH WITH LESS THAN 20% SAWDUST.
2. GEOTEXTILE SHALL BE NON-WOVEN CLASS 2 GEOTEXTILE FABRIC.
3. GRANULAR FILTER BLANKET SHALL BE COMPOSED OF AN EVENLY MIXED COARSE SAND AND NO 57 STONE, WITH 50% NO 57 STONE AND 50% COARSE SAND.
4. BOULDERS SHALL MEET THE DIMENSIONS PROVIDED ON THIS DETAIL. BOULDERS SHALL BE SUBANGULAR MATERIAL AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA (E.G. GLACIAL FLUVIAL AND TILL DEPOSITS). ANGULAR RIP RAP MATERIAL WITH SHARP EDGES IS NOT ACCEPTABLE.
5. CASCADE BED MATERIAL SHALL MEET THE GRADATIONS SHOWN IN TABLE AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA (E.G. GLACIAL FLUVIAL AND TILL DEPOSITS). CASCADE BED MATERIAL SHALL BE COMPOSED OF A COMBINATION OF APPROXIMATELY 70% COBBLE, RANGING FROM ROUNDED TO SUB-ANGULAR SHAPED, AND UP TO 30% ANGULAR COBBLE THAT MEETS THE SIZE GRADATIONS SHOWN.
6. WASH-IN MATERIAL SHALL BE COMPOSED OF EVENLY MIXED SAND AND GRAVEL MATERIAL, WITH 50% BANKRUN GRAVEL AND 50% COARSE SAND.
7. SOIL STABILIZATION MATTING SHALL BE COMPOSED OF 700 GRAM/SQ METER 100% NATURAL BIODEGRADABLE COCONUT FIBERS HAVING A MINIMUM LONGEVITY OF 4 YEARS. THICKNESS SHALL BE AT LEAST 0.35 INCHES, WITH OPEN AREA OF 50%.

SUBMITTAL REQUIREMENTS:

1. CHANNEL FILL MATERIAL: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
2. GEOTEXTILE: SUBMITTAL APPROVAL REQUIRED
3. GRANULAR FILTER BLANKET: SUBMITTAL APPROVAL REQUIRED
4. BOULDERS: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
5. CASCADE BED MATERIAL: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
6. WASH-IN MATERIAL: SUBMITTAL APPROVAL REQUIRED
7. SOIL STABILIZATION MATTING: SUBMITTAL APPROVAL REQUIRED

INSPECTION REQUIREMENTS:

1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
2. ENGINEER/DESIGNATED SPECIALIST TO VISUALLY INSPECT AND PROVIDE FINAL ACCEPTANCE OF EACH STRUCTURE BASED ON SITE INSPECTOR OR CONTRACTOR PROVIDED DOCUMENTATION (PHOTOS, ELEVATIONS).

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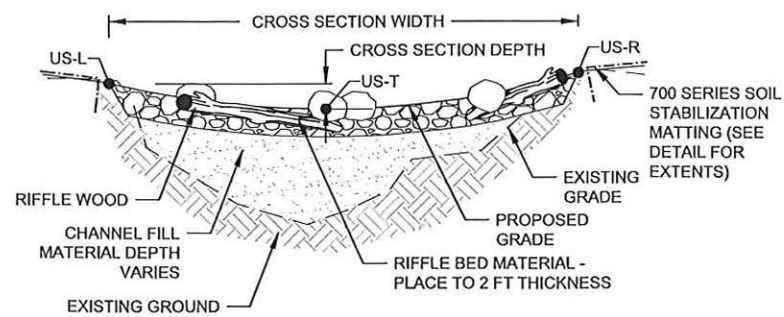
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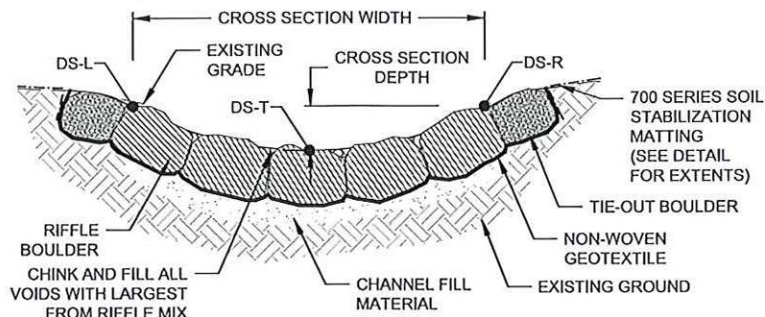
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OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

MIDDLE
RESTORATION
REACH DETAILS

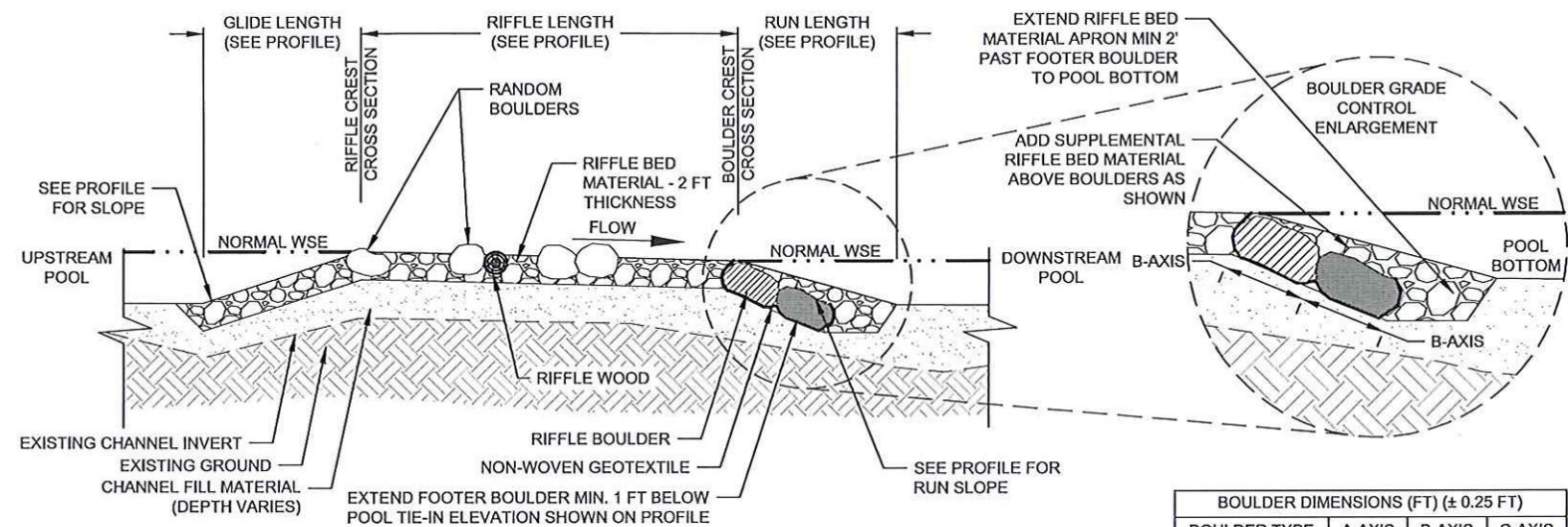
PROJECT NO.: 25201.01 SCALE: NTS
BY: EB, TB CHECK: DS
DWG. NO.:



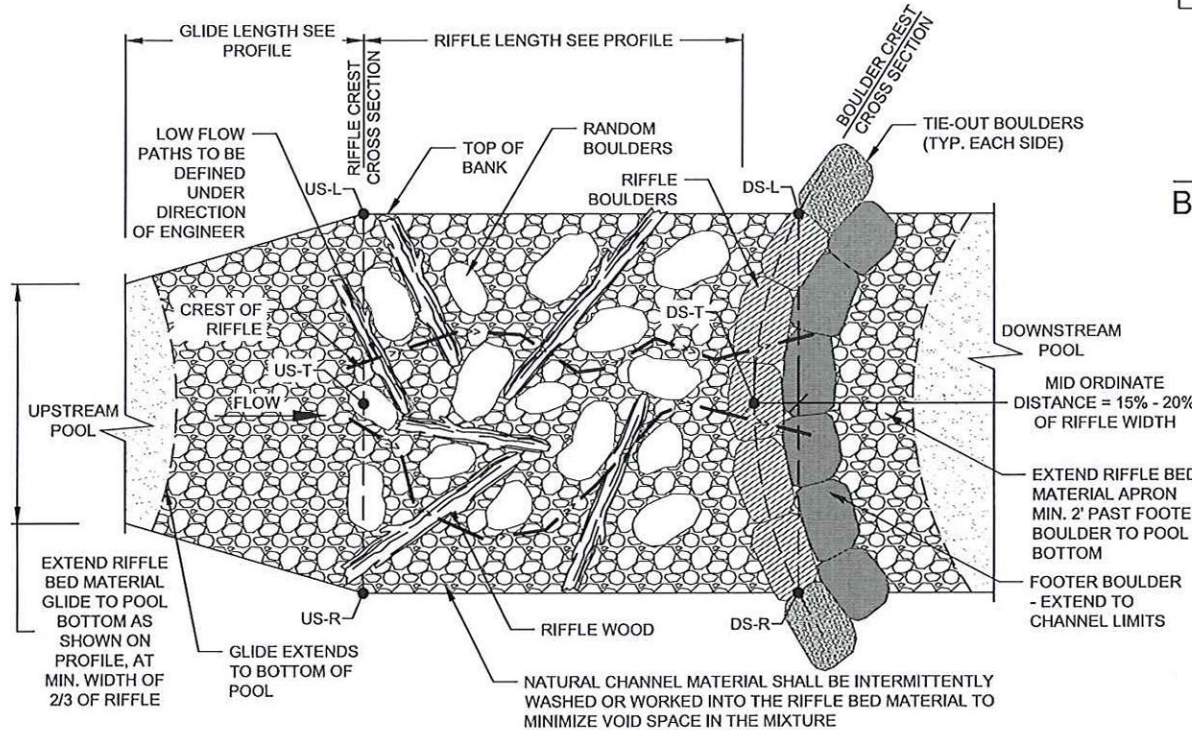
RIFFILE CREST CROSS SECTION



BOULDER CROSS SECTION



PROFILE



PLAN

RIFFILE

NOT TO SCALE

RIFFILE EXECUTION:

1. INSTALL RIFFILE STRUCTURES AT LOCATIONS SHOWN ON PLAN AND PROFILE. SEE STRUCTURE TABLES ON SHEET 33 FOR NODE LOCATIONS. SEE PROFILE FOR UPSTREAM AND DOWNSTREAM INVERT NODES (U/S-INV AND D/S-INV).
2. SALVAGE EXISTING BOULDERS AND STREAMBED MATERIAL WITHIN THE EXISTING CHANNEL FOR RE-USE WHEN IT MEETS THE SPECIFICATIONS AND IS LOCATED WITHIN PROPOSED GRADING LIMITS. SALVAGING BOULDERS FROM OUTSIDE THE EXISTING CHANNEL IS NOT ALLOWED. MATERIALS SHALL BE HANDLED AND STORED IN A MANNER SO AS TO MINIMIZE DAMAGE.
3. WHEN CONSTRUCTED IN AREAS OF FILL, EXISTING STREAM CHANNEL TO BE FILLED IN 8" LIFTS WITH CHANNEL FILL MATERIAL TO REACH SUBGRADE ELEVATION DEFINED BY PROFILE. WHEN CONSTRUCTED IN AREAS OF CUT, CHANNEL FILL MATERIAL UNDER BOULDERS AND STREAMBED MATERIAL IS NOT NEEDED. IN CASES OF SHALLOW BEDROCK, FOOTER BOULDERS MAY BE ELIMINATED WITH APPROVAL FROM ENGINEER/DESIGNATED SPECIALIST.
4. AS NEEDED, EXCAVATE THE DOWNSTREAM TIE OUT AREA FOR FOOTER BOULDERS AND INSTALL THE BOULDER GRADE CONTROL FOOTERS AND RIFFILE BOULDERS, INSTALLING A CONTINUOUS SHEET OF GEOTEXTILE OR GRANULAR FILTER BLANKET UNDER ALL BOULDERS. TOP FACE OF RIFFILE BOULDERS SHALL BE PARABOLIC IN SHAPE BETWEEN NODES AND MEET FINISHED GRADE DEFINED BY STRUCTURE TABLE NODES AND CROSS SECTION. THE NUMBER OF BOULDERS VARIES DEPENDING ON TYPICAL SECTION WIDTH AND BOULDER DIMENSIONS.
5. THE BOULDERS SHALL BE TILTED DOWNSTREAM AS SHOWN ON THE DETAIL AND NOT STACKED. STAGGER SEAMS OF BOULDERS BETWEEN EACH ROW. ALL BOULDERS SHALL BE PLACED WITH EDGES ALIGNED TIGHTLY TO MINIMIZE VOID SPACE. INSTALL RIFFILE BED MATERIAL APRON TO BLEND INTO DOWN STREAM POOL AS SHOWN ON DETAIL.
6. TIE-OUT BOULDER SHALL EXTEND PAST THE CORNER NODES DS-R & DS-L A MINIMUM OF ONE BOULDER LENGTH (B-AXIS) INTO EXISTING BANK. WHERE THIS CONFLICTS WITH EXISTING TREE ROOTS OR BEDROCK, TIE-OUT BOULDER MAY BE ELIMINATED OR ADJUSTED AT DIRECTION OF ENGINEER/DESIGNATED SPECIALIST.
7. RIFFILE BOULDERS AND RIFFILE WOOD SHALL BE INCORPORATED IN A RANDOM PLACEMENT WITHIN THE RIFFILE FOOTPRINT. RANDOM BOULDERS AND RIFFILE WOOD SHALL COVER APPROXIMATELY 40% OF THIS SURFACE AREA. TOP OF BOULDER AND WOOD SHALL BE SET FLUSH OR UP TO 4 INCHES ABOVE FINISHED GRADE OF RIFFILE BED MATERIAL.
8. PLACE RIFFILE BED MATERIAL UPSTREAM OF THE BOULDER GRADE CONTROL TO THE FINISHED GRADES, COMPRESSING MATERIALS TO MAINTAIN PARABOLIC CROSS SECTION SHAPE.
9. GRAVEL WASH-IN MATERIAL SHALL BE REPEATEDLY WORKED INTO FULL DEPTH OF THE RIFFILE BED MATERIAL TO FILL VOIDS.
10. EXCAVATE UPSTREAM POOL AND INSTALL RIFFILE BED MATERIAL GLIDE AS SHOWN ON DETAIL.
11. TRIM ALL EXPOSED GEOTEXTILE AT OR BELOW FINISHED GRADE.
12. PERFORM TIE-OUT GRADING AND INSTALL SOIL STABILIZATION MATTING.
13. ONCE RIFFILE IS CONSTRUCTED, STABILIZE ALL DISTURBED TIE-IN LOCATIONS AS SPECIFIED.

ROCK FORD / STEPPING STONE MODIFICATION:

1. FOR LOCATION WHERE THE TRAIL CROSSES THE CHANNEL AT A PROPOSED RIFFILE, THE CONFIGURATION OF RANDOM BOULDERS AND RIFFILE WOOD SHALL BE MODIFIED TO ALLOW RIFFILE TO BE USED AS BOTH ROCK FORD FOR VEHICULAR CROSSINGS AND PEDESTRIAN CROSSING
2. ROCK FORD MODIFICATION - RANDOM BOULDERS AND RIFFILE WOOD SHALL BE INSTALLED FLUSH WITH RIFFILE BED MATERIAL. TRANSITION RIFFILE MATERIAL UP SIDESLOPES TO ENSURE STABLE CROSSING.
3. STEPPING BOULDERS - SEE STEPPING BOULDER DETAIL FOR INSTALLATION

RIFFILE MATERIALS:

1. CHANNEL FILL MATERIAL SHALL BE COMPOSED OF 80% IMPORTED OR ON-SITE SALVAGED MATERIAL MIXED WITH 20% HARDWOOD MULCH BY VOLUME. IMPORTED MATERIAL SHALL CONSIST OF SAND, LOAMY SAND, SANDY LOAM AND LOAM TEXTURES, AS DEFINED BY USDA. MATERIAL GRADATION SHALL BE UP TO 20% CLAY (<0.002 MM) UP TO 50% SILT (0.002 MM TO 0.05 MM), 30% TO 100% SAND (0.05 MM TO 2.0 MM), AND UP TO 5% GRAVEL (2.0MM TO 2.0 IN). SALVAGED MATERIAL SHALL ONLY BE GENERATED FROM APPROVED ON-SITE GRADING ACTIVITIES AND MEET THE SPECIFICATIONS FOR IMPORTED MATERIAL. HARDWOOD MULCH SHALL CONSIST OF NATURAL UNCOMPOSTED WOOD AND BARK FROM HARDWOOD TREES THAT HAVE BEEN MILLED TO A MINIMUM PARTICLE SIZE OF 1 X 1/2 X 1/4 INCH AND MAXIMUM PARTICLE SIZE OF 4 X 4 X 2 INCH WITH LESS THAN 20% SAWDUST.
2. GEOTEXTILE SHALL BE NON-WOVEN CLASS 2 GEOTEXTILE FABRIC.
3. GRANULAR FILTER BLANKET SHALL BE COMPOSED OF AN EVENLY MIXED COARSE SAND AND NO 57 STONE, WITH 50% NO 57 STONE AND 50% COARSE SAND.
4. BOULDERS SHALL MEET THE DIMENSIONS PROVIDED ON THIS DETAIL. BOULDERS SHALL BE SUBANGULAR MATERIAL AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA (E.G. GLACIAL FLUVIAL AND TILL DEPOSITS). ANGULAR RIP RAP MATERIAL WITH SHARP EDGES IS NOT ACCEPTABLE.
5. RIFFILE WOOD SHALL BE COMPOSED OF LIMBS AND TRUNKS BETWEEN 8 AND 12 INCHES DIAMETER, CUT TO A LENGTH OF APPROXIMATELY 0.5 X CHANNEL WIDTH.
6. RIFFILE BED MATERIAL SHALL MEET THE GRADATIONS SHOWN IN TABLE AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA (E.G. GLACIAL FLUVIAL AND TILL DEPOSITS). RIFFILE BED MATERIAL SHALL BE COMPOSED OF A COMBINATION OF APPROXIMATELY 70% COBBLE, RANGING FROM ROUNDED TO SUB-ANGULAR SHAPED, AND UP TO 30% ANGULAR COBBLE THAT MEETS THE SIZE GRADATIONS SHOWN.
7. WASH-IN MATERIAL SHALL BE COMPOSED OF EVENLY MIXED SAND AND GRAVEL MATERIAL, WITH 50% BANKRUN GRAVEL AND 50% COARSE SAND.
8. SOIL STABILIZATION MATTING SHALL BE COMPOSED OF 700 GRAM/SQ METER 100% NATURAL BIODEGRADABLE COCONUT FIBERS HAVING A MINIMUM LONGEVITY OF 4 YEARS. THICKNESS SHALL BE AT LEAST 0.35 INCHES, WITH OPEN AREA OF 50%.
9. ALL WOODY MATERIAL SHALL BE OBTAINED ONSITE TO MAXIMUM EXTENT POSSIBLE. ROT-RESISTANT SPECIES ARE PREFERRED FOR USE IF AVAILABLE. BUT ANY WOOD FREE OF DEFECTS, MAJOR DAMAGE AND DECAY CAN BE USED AS AVAILABLE.

SUBMITTAL REQUIREMENTS:

1. CHANNEL FILL MATERIAL: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
2. GEOTEXTILE: SUBMITTAL APPROVAL REQUIRED
3. GRANULAR FILTER BLANKET: SUBMITTAL APPROVAL REQUIRED
4. BOULDERS: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
5. RIFFILE WOOD: NA
6. RIFFILE BED MATERIAL: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
7. WASH-IN MATERIAL: SUBMITTAL APPROVAL REQUIRED
8. SOIL STABILIZATION MATTING: SUBMITTAL APPROVAL REQUIRED

INSPECTION REQUIREMENTS:

1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
2. ENGINEER/DESIGNATED SPECIALIST TO VISUALLY INSPECT AND PROVIDE FINAL ACCEPTANCE OF EACH STRUCTURE BASED ON SITE INSPECTOR OR CONTRACTOR PROVIDED DOCUMENTATION (PHOTOS, ELEVATIONS).

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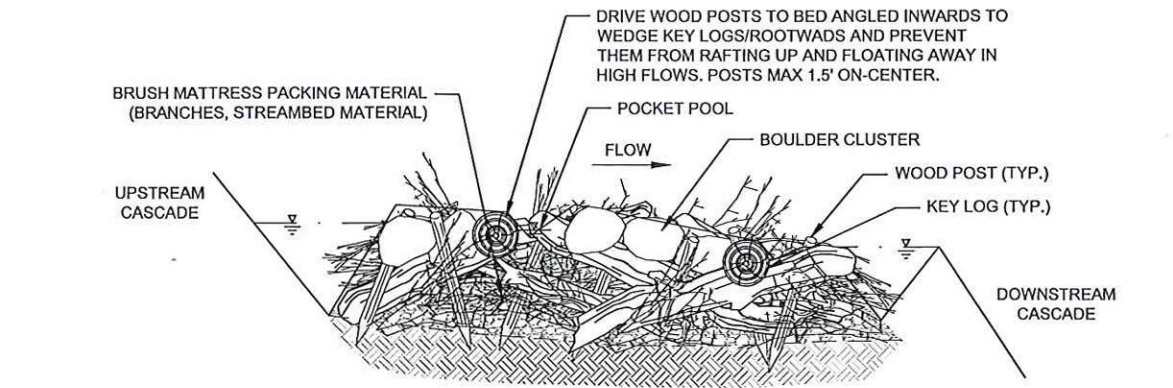
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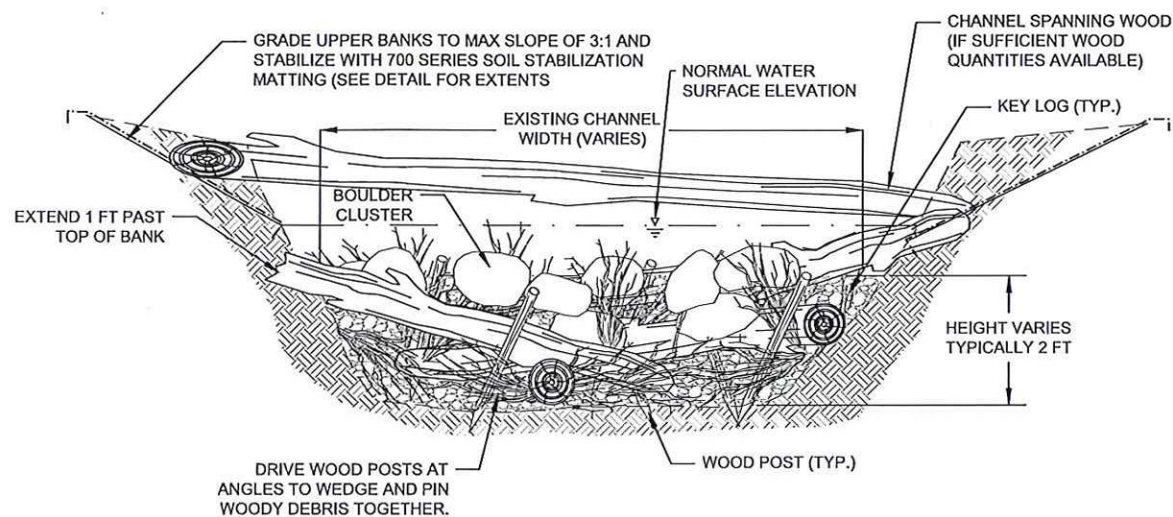
MAMACOCKE BROOK
OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

MIDDLE
RESTORATION
REACH DETAILS

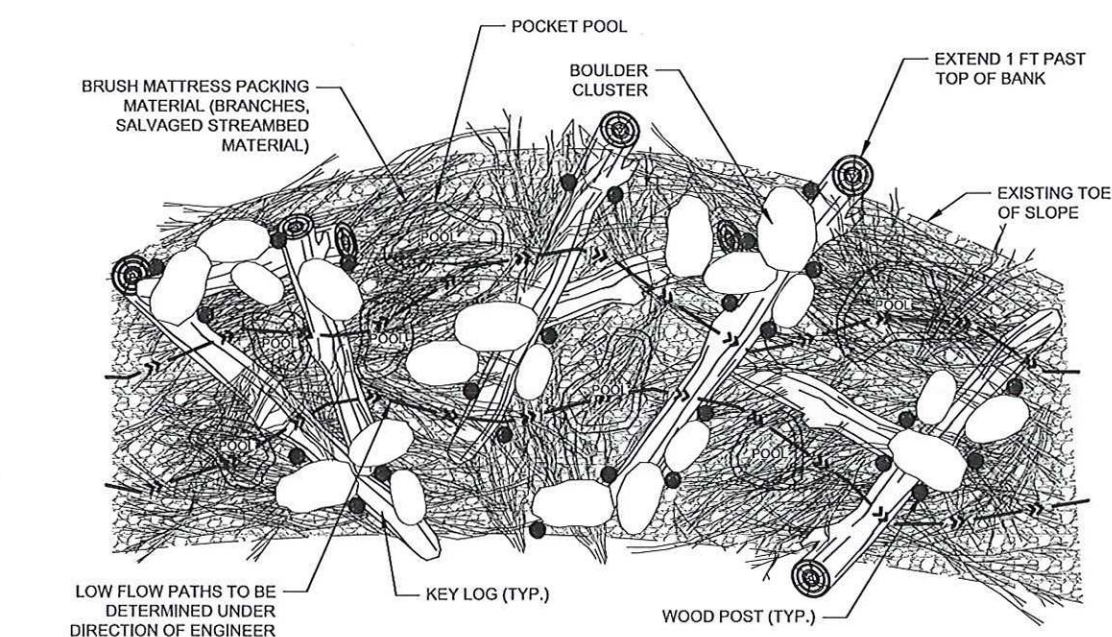
PROJECT NO.: 25201.01 SCALE: NTS
SEAL: Bt: EB, TB CHECK: DS
DWG. NO.:



PROFILE



SECTION



PLAN

DYNAMIC BOULDER CLUSTER/WOODY COMPLEX

DYNAMIC BOULDER CLUSTER/WOODY COMPLEX EXECUTION:

1. INSTALL DYNAMIC BOULDER CLUSTER/WOODY COMPLEX AT LOCATIONS AND ELEVATIONS SHOWN ON PLAN AND PROFILE, PARTIALLY FILLING THE EXISTING CHANNEL BETWEEN GRADE CONTROL STRUCTURES.
2. SALVAGE EXISTING BOULDERS AND STREAMBED MATERIAL WITHIN THE EXISTING CHANNEL FOR RE-USE WHEN IT MEETS THE SPECIFICATIONS AND IS LOCATED WITHIN PROPOSED GRADING LIMITS. SALVAGING BOULDERS FROM OUTSIDE THE EXISTING CHANNEL IS NOT ALLOWED. MATERIALS SHALL BE HANDLED AND STORED IN A MANNER SO AS TO MINIMIZE DAMAGE.
3. HARVEST WOODY MATERIAL ON-SITE THAT COMPLIES WITH THE MATERIAL SPECIFICATIONS. HARVEST MATERIAL AS PART OF THE CLEARING, TREE SALVAGING, AND HABITAT MATERIAL SALVAGING AND STOCKPILING OPERATIONS ON-SITE, LEAVING AS MUCH OF THE BRANCHING AND ROOT FAN INTACT AS POSSIBLE. MATERIALS SHALL BE HANDLED AND STORED IN A MANNER SO AS TO MINIMIZE DAMAGE TO BRANCHING AND ROOT FANS.
4. INSTALL KEY LOGS, MINIMUM EVERY 10 FT, ORIENTED DIAGONALLY ACROSS THE CHANNEL, PUSHING ENDS INTO TOE OF BANK. USE A MIX OF VARIOUS SIZE WOOD AND TANGLE TOGETHER WITH BRANCHES OF PARALLEL KEY LOGS.
5. INSTALL BOULDERS IN CLUSTERS AROUND THE KEY LOGS TO PROVIDE BALLAST AND A DIVERSITY OF FLOWPATHS. SPACE CLUSTERS APPROXIMATELY EVERY 10 FT IN CHANNEL LENGTH, WITH 3 BOULDERS PER CLUSTER.
6. BACKFILL AROUND KEY LOGS/ROOT WADS AND BOULDER CLUSTERS WITH SALVAGED STREAMBED MATERIAL IN 1 FOOT COMPACTED LIFTS TO FORM DENSE BRUSH MATTRESS CORE INTERWOVEN WITHIN THE KEY LOGS.
7. WHERE POSSIBLE, DRIVE POSTS INTO BED ANGLED INWARDS TO WEDGE KEY LOGS/BRUSH MATTRESS AND PREVENT THEM FROM RAFTING UP AND FLOATING AWAY IN HIGH FLOWS. POST SPACING IS 2.5' ON-CENTER, ALTERNATING SIDES. DRIVE AT LEAST 1/4 TO 1/3 FINISHED LENGTH OF POST INTO BED. MEANS OF ANCHORING MAY VARY BASED ON SITE CONDITIONS AND UNDERLYING GEOLOGY. IF ALTERNATE ANCHORING IS REQUIRED, IT SHALL BE DETERMINED BY ENGINEER.
8. ONCE CONSTRUCTED, IMMEDIATELY STABILIZE ALL DISTURBED TIE-IN LOCATIONS AS SPECIFIED.
9. THE NUMBER AND LENGTH OF KEY LOGS MAY VARY PER STRUCTURE, DEPENDING ON THE EXISTING CHANNEL WIDTH AND DEPTH. SUFFICIENT MATERIAL IS NECESSARY TO ACHIEVE SPECIFIED GRADE, SECTION, AND DENSITY TO INFLUENCE WATER SURFACE ELEVATION SO THAT IT IS FLOWING OVERTOP OF STRUCTURE DURING STORM EVENTS.
10. WHERE POSSIBLE, ALL MATERIAL SHALL BE DRIVEN OR PUSHED INTO STREAM BED AND BANKS TO DEPTHS SPECIFIED WITH MINIMAL EXCAVATION. SHARPEN ENDS OF LOG WITH A CHAINSAW AND DRIVE SHARPENED INTO GROUND AS DIRECTED BY THE ENGINEER/DESIGNATED SPECIALIST.
11. ALL EXPOSED LOG ENDS SHALL HAVE BROKEN OR ROUGHENED END, RATHER THAN SAW CUT END WHEN POSSIBLE.
12. THIS DETAIL DEPICTS THE TYPICAL PREFERRED COMPOSITION AND CONFIGURATION OF LOG MEMBERS. ALTERATION OF THIS COMPOSITION/CONFIGURATION DUE TO ISSUES OBTAINING NECESSARY MATERIALS OR OTHER REASON IS ACCEPTABLE ONLY WITH PRIOR APPROVAL FROM THE ENGINEER/DESIGNATED SPECIALIST. FINISHED GRADE OF ALTERED STRUCTURES SHALL REMAIN AS SPECIFIED ON THE PLANS.

DYNAMIC BOULDER CLUSTER/WOODY COMPLEX MATERIALS:

1. KEY LOGS SHALL BE COMPOSED OF LIMBS, TRUNKS, ROOTWADS WITH A MINIMUM OF 18 INCHES DIAMETER CUT TO A LENGTH OF APPROXIMATELY 1.5 X CHANNEL WIDTH.
2. BRUSH MATTRESS SHALL BE 50% BRUSH MIXED WITH 50% SALVAGED OR IMPORTED BED MATERIAL WITH A D50 OF 6". THE BRUSH COMPONENT SHALL BE COMPOSED OF AN EVEN MIX OF SMALL LIMBS AND ROOTWAD BETWEEN 4 TO 8 INCHES IN DIAMETER AND 3 TO 6 FOOT LONG, MIXED EVENLY WITH SMALLER DIAMETER AND LENGTH BRUSH.
3. BOULDERS SHALL MEET THE DIMENSIONS PROVIDED ON THIS DETAIL. BOULDERS SHALL BE SUBANGULAR MATERIAL AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA (E.G. GLACIAL FLUVIAL AND TILL DEPOSITS). ANGULAR RIP RAP MATERIAL WITH SHARP EDGES IS NOT ACCEPTABLE.
4. WOOD POSTS SHALL BE MIN OF 4" DIAMETER SALVAGED OR FURNISHED WOOD POSTS, 4 FEET LONG.
5. ALL WOODY MATERIAL SHALL BE OBTAINED ONSITE TO MAXIMUM EXTENT POSSIBLE. ROT-RESISTANT SPECIES ARE PREFERRED FOR USE IF AVAILABLE. BUT ANY WOOD FREE OF DEFECTS, MAJOR DAMAGE AND DECAY CAN BE USED AS AVAILABLE.

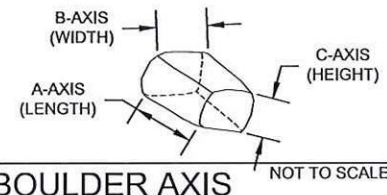
SUBMITTAL REQUIREMENTS:

1. KEY LOGS: NA
2. BRUSH MATTRESS: NA, EXCEPT FOR IMPORTED BED MATERIAL, WHICH REQUIRES SUBMITTAL APPROVAL. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
3. BOULDERS: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
4. WOOD POSTS: SUBMITTAL APPROVAL REQUIRED IF IMPORTED

INSPECTION REQUIREMENTS:

1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
2. ENGINEER/DESIGNATED SPECIALIST TO VISUALLY INSPECT AND PROVIDE FINAL ACCEPTANCE OF EACH STRUCTURE BASED ON SITE INSPECTOR OR CONTRACTOR PROVIDED DOCUMENTATION (PHOTOS, ELEVATIONS).

BOULDER DIMENSIONS (FT) (± 0.25 FT)			
BOULDER TYPE	A-AXIS	B-AXIS	C-AXIS
CLUSTER BOULDER	2.0	1.5	1.5



CLIENT

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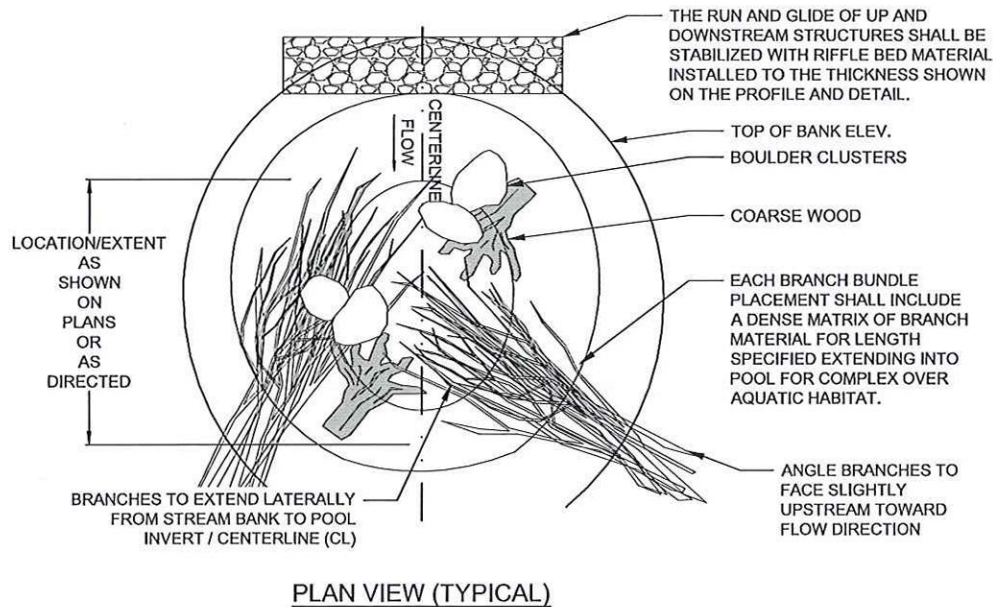
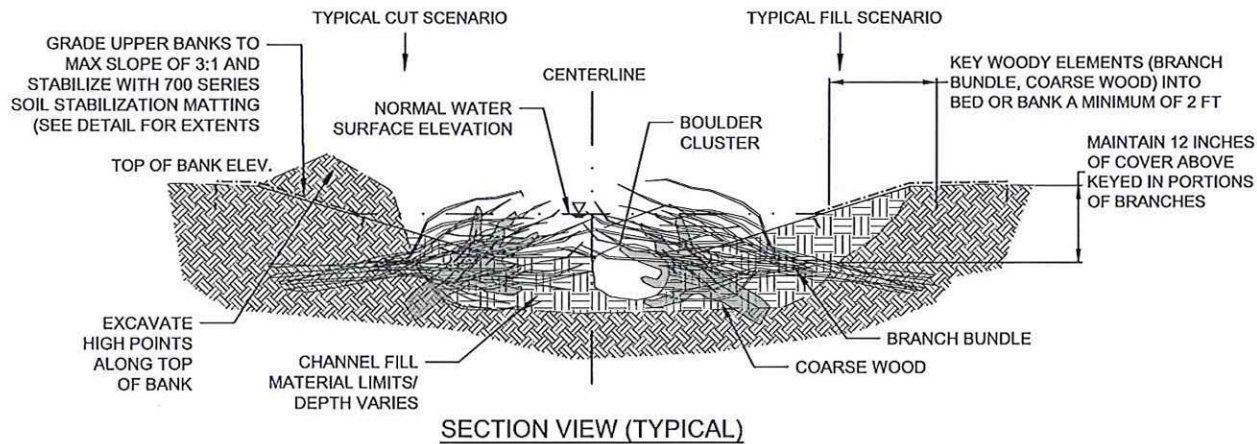
MAMACOCKE BROOK OUTFALL CHANNEL STABILIZATION AND RESTORATION

MIDDLE RESTORATION REACH DETAILS

PROJECT NO.: 25201.01 SCALE: NTS
BY: EB, TB CHECK: DS
DWG. NO.:

27 OF 42

NOT TO SCALE



POOL WOOD/BOULDER CLUSTER TREATMENT EXECUTION:

1. INSTALL POOL WOOD/BOULDER CLUSTER TREATMENT AT POOL LOCATIONS SHOWN ON THE GRADING PLAN, OR AT DIRECTION OF ENGINEER BASED ON AVAILABLE WOODY MATERIAL. EACH TREATMENT SHALL INCLUDE A MINIMUM OF TWO BRANCH BUNDLE COMPLEXES, TWO COARSE WOOD ELEMENTS AND TWO BOULDER CLUSTERS, UNLESS OTHERWISE DIRECTED BY ENGINEER.
2. HARVEST WOODY MATERIAL ON-SITE THAT COMPLIES WITH THE MATERIAL SPECIFICATIONS. HARVEST MATERIAL AS PART OF THE CLEARING, TREE SALVAGING, AND HABITAT MATERIAL SALVAGING AND STOCKPILING OPERATIONS ONSITE, LEAVING AS MUCH OF THE BRANCHING AND ROOT FAN INTACT AS POSSIBLE. MATERIALS SHALL BE HANDLED AND STORED IN A MANNER SO AS TO MINIMIZE DAMAGE TO BRANCHING AND ROOT FANS.
3. INSTALL BRANCH BUNDLES AND COARSE WOOD AS SHOWN. GENERAL ORIENTATION IS BRANCHING/ROOT WAD FACING UPSTREAM BUT MULTIPLE CONFIGURATIONS IS DESIRABLE. ENSURE WOODY ELEMENTS (BRANCH BUNDLE, COARSE WOOD) ARE KEYED INTO BED OR BANK A MINIMUM OF 2 FT AND THAT BRANCHING DOES NOT EXTEND MORE THAN 0.5 FT ABOVE THE NORMAL WATER SURFACE ELEVATION OF THE POOL.
4. WHERE POSSIBLE, ALL MATERIAL SHALL BE DRIVEN OR PUSHED INTO THE BED AND BANKS TO DEPTHS SPECIFIED WITH MINIMAL EXCAVATION. SHARPEN ENDS OF LOG AND DRIVE SHARPENED INTO GROUND.
5. ALL EXPOSED LOG ENDS SHALL HAVE BROKEN OR ROUGHENED END, RATHER THAN SAW CUT END WHEN POSSIBLE.
6. INSTALL BOULDER CLUSTERS AS SHOWN, WITH A MINIMUM OF TWO CLUSTERS PER POOL TREATMENT. EACH BOULDER SHALL BE PARTIALLY BURIED BELOW FINISHED GRADE A MINIMUM OF 1 FT, AND EXTEND ABOVE FINISHED GRADE A MINIMUM OF 1 FT.
7. BACKFILL AROUND WOODY ELEMENTS AND BOULDER CLUSTERS WITH CHANNEL FILL MATERIAL AS NEEDED TO MEET POOL GRADES SHOWN ON PROFILE.
8. ONCE A POOL BRANCH TREATMENT IS CONSTRUCTED, IMMEDIATELY STABILIZE ALL DISTURBED TIE-IN LOCATIONS AS SPECIFIED.
9. THIS DETAIL DEPICTS THE TYPICAL PREFERRED COMPOSITION AND CONFIGURATION OF POOL WOOD AND BOULDER CLUSTER ELEMENTS. ALTERATION OF THIS COMPOSITION/CONFIGURATION DUE TO ISSUES OBTAINING NECESSARY MATERIALS OR OTHER REASON IS ACCEPTABLE ONLY WITH PRIOR APPROVAL FROM THE ENGINEER/DESIGNATED SPECIALIST. FINISHED GRADE OF ALTERED STRUCTURES SHALL REMAIN AS SPECIFIED ON THE PLANS.

ROCK FORD / STEPPING STONE MODIFICATION:

1. FOR LOCATION WHERE THE TRAIL CROSSES THE CHANNEL AT A PROPOSED RIFFLE, THE CONFIGURATION OF RANDOM BOULDERS AND RIFFLE WOOD SHALL BE MODIFIED TO ALLOW RIFFLE TO BE USED AS BOTH ROCK FORD FOR VEHICULAR CROSSINGS AND PEDESTRIAN CROSSING
2. ROCK FORD MODIFICATION - RANDOM BOULDERS AND RIFFLE WOOD SHALL BE INSTALLED FLUSH WITH RIFFLE BED MATERIAL. TRANSITION RIFFLE MATERIAL UP SIDESLOPES TO ENSURE STABLE CROSSING.
3. STEPPING BOULDERS - SEE STEPPING BOULDER DETAIL FOR INSTALLATION

POOL WOOD/BOULDER CLUSTER TREATMENT MATERIALS:

1. CHANNEL FILL MATERIAL SHALL BE COMPOSED OF 80% IMPORTED OR ON-SITE SALVAGED MATERIAL MIXED WITH 20% HARDWOOD MULCH BY VOLUME. IMPORTED MATERIAL SHALL CONSIST OF SAND, LOAMY SAND, SANDY LOAM AND LOAM TEXTURES, AS DEFINED BY USDA. MATERIAL GRADATION SHALL BE UP TO 20% CLAY (<0.002 MM) UP TO 50% SILT (0.002 MM TO 0.05 MM), 30% TO 100% SAND (0.05 MM TO 2.0 MM), AND UP TO 5% GRAVEL (2.0MM TO 2.0 IN). SALVAGED MATERIAL SHALL ONLY BE GENERATED FROM APPROVED ON-SITE GRADING ACTIVITIES AND MEET THE SPECIFICATIONS FOR IMPORTED MATERIAL. HARDWOOD MULCH SHALL CONSIST OF NATURAL UNCOMPOSTED WOOD AND BARK FROM HARDWOOD TREES THAT HAVE BEEN MILLED TO A MINIMUM PARTICLE SIZE OF 1 X 1/2 X 1/4 INCH AND MAXIMUM PARTICLE SIZE OF 4 X 4 X 2 INCH WITH LESS THAN 20% SAWDUST.
2. COARSE WOOD SHALL BE COMPOSED OF LIMBS, TRUNKS, OR ROOTWADS BETWEEN 12 AND 24 INCHES DIAMETER, CUT TO A LENGTH OF APPROXIMATELY 4 TO 6 FT.
3. BRUSH BUNDLES SHALL BE COMPOSED OF BRUSH AND SMALL LIMBS BETWEEN 2" TO 4" DIAMETER AND 3 TO 6 FOOT LONG WITH COMPLEX BRANCHING. MATERIAL TO BE TIGHTLY BUNDLED TOGETHER INTO BUNDLES OF APPROXIMATELY 2 FT DIAMETER PRIOR TO INSTALLATION.
4. BOULDERS SHALL MEET THE DIMENSIONS PROVIDED ON THIS DETAIL. BOULDERS SHALL BE SUBANGULAR MATERIAL AND MATCH THE APPEARANCE/COMPOSITION OF MATERIALS NATIVE TO THIS AREA (E.G. GLACIAL FLUVIAL AND TILL DEPOSITS). ANGULAR RIP RAP MATERIAL WITH SHARP EDGES IS NOT ACCEPTABLE.
5. ALL WOODY MATERIAL SHALL BE OBTAINED ONSITE TO MAXIMUM EXTENT POSSIBLE. ROT-RESISTANT SPECIES ARE PREFERRED FOR USE IF AVAILABLE. BUT ANY WOOD FREE OF DEFECTS, MAJOR DAMAGE AND DECAY CAN BE USED AS AVAILABLE.

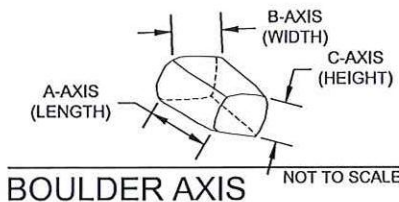
SUBMITTAL REQUIREMENTS:

1. CHANNEL FILL MATERIAL: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY
2. COARSE WOOD: NA
3. BRUSH BUNDLES: NA
4. BOULDERS: SUBMITTAL APPROVAL REQUIRED. INCLUDE PHOTOS OR SAMPLE FROM QUARRY/MATERIAL SUPPLIER PRIOR TO DELIVERY

INSPECTION REQUIREMENTS:

1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
2. ENGINEER/DESIGNATED SPECIALIST TO VISUALLY INSPECT AND PROVIDE FINAL ACCEPTANCE OF EACH STRUCTURE BASED ON SITE INSPECTOR OR CONTRACTOR PROVIDED DOCUMENTATION (PHOTOS, ELEVATIONS).

BOULDER DIMENSIONS (FT) (± 0.25 FT)			
BOULDER TYPE	A-AXIS	B-AXIS	C-AXIS
CLUSTER BOULDER	2.0	1.5	1.5



BOULDER AXIS

NOT TO SCALE

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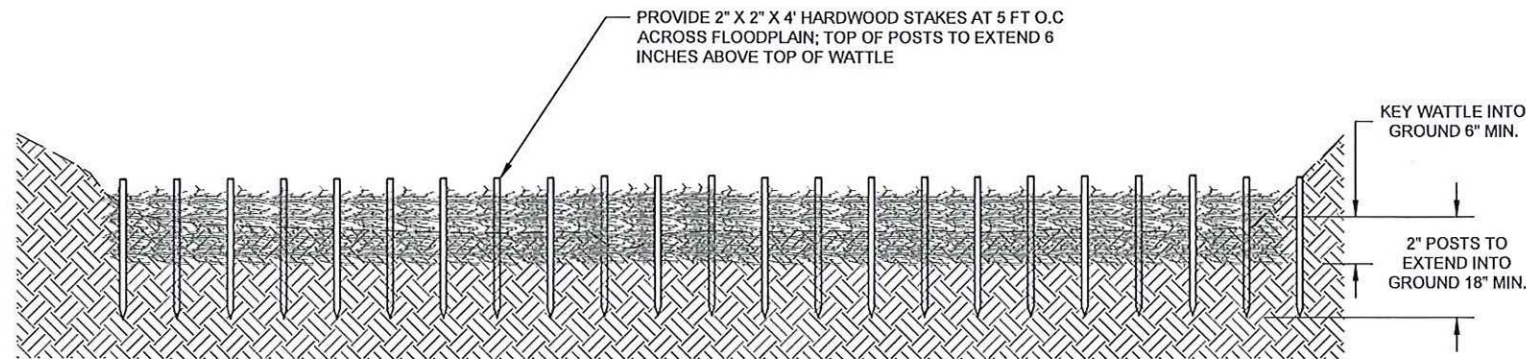
MAMACOCKE BROOK OUTFALL CHANNEL STABILIZATION AND RESTORATION

MIDDLE RESTORATION REACH DETAILS

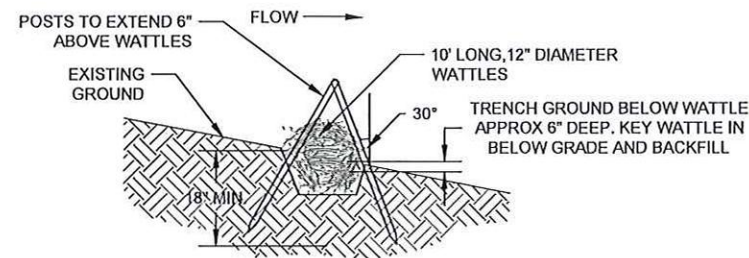
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SEAL: BT: EB, TB CHECK: DS

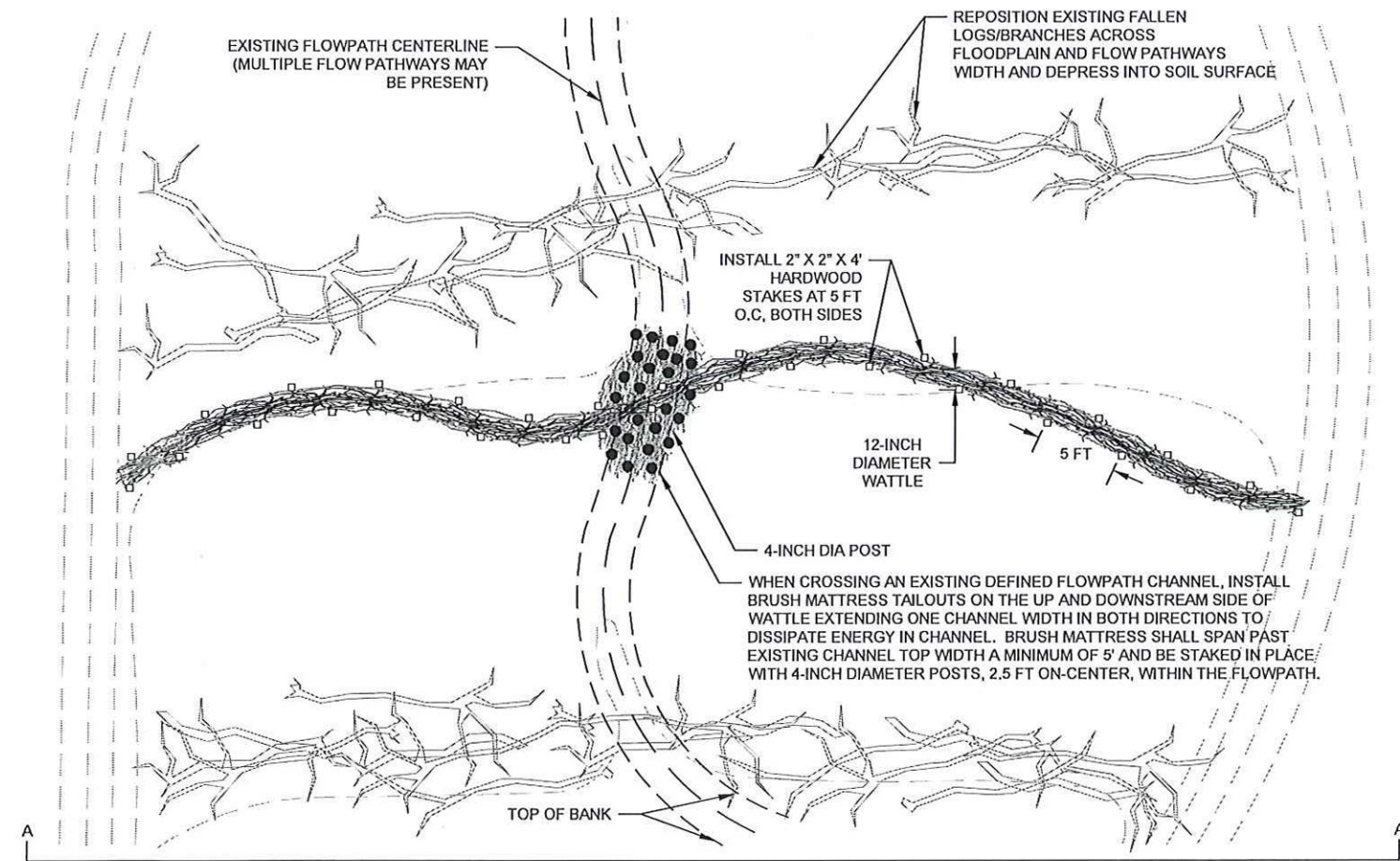
DWG. NO.:



SECTION A-A'



PROFILE



PLAN

POST AND WATTLE

POST AND WATTLE EXECUTION:

1. INSTALL POST AND WATTLE STRUCTURES AT LOCATIONS AND ELEVATIONS SHOWN ON PLAN AND PROFILE, OR AS DIRECTED BY ENGINEER/DESIGNATED SPECIALIST.
2. HARVEST WOODY MATERIAL ON-SITE THAT COMPLIES WITH THE MATERIAL SPECIFICATIONS. HARVEST MATERIAL AS PART OF THE CLEARING, TREE SALVAGING, AND HABITAT MATERIAL SALVAGING AND STOCKPILING OPERATIONS ONSITE, LEAVING AS MUCH OF THE BRANCHING AND ROOT FAN INTACT AS POSSIBLE. MATERIALS SHALL BE HANDLED AND STORED IN A MANNER SO AS TO MINIMIZE DAMAGE TO BRANCHING AND ROOT FANS.
3. HAND EXCAVATE A SHALLOW 5" DEPTH TRENCH ACROSS THE FLOODPLAIN AT LOCATIONS SHOWN. LAY WATTLES WITHIN TRENCH AND BACKFILL WITH EXCAVATED MATERIAL.
4. INSTALL WOODEN STAKES AT 5 FT ON-CENTER, BOTH SIDES, ALTERNATING STAKE LOCATIONS.
5. WHEN CROSSING AN EXISTING DEFINED FLOWPATH CHANNEL, INSTALL BRUSH MATTRESS TAILOUTS ON THE UP AND DOWNSTREAM SIDE OF WATTLE EXTENDING ONE CHANNEL WIDTH IN BOTH DIRECTIONS TO DISSIPATE ENERGY IN CHANNEL. BRUSH MATTRESS SHALL SPAN PAST EXISTING CHANNEL TOP WIDTH A MINIMUM OF 5' AND BE STAKED IN PLACE WITH 4-INCH DIAMETER POSTS, 2.5 FT ON-CENTER, WITHIN THE FLOWPATH.
6. BETWEEN WATTLES, CONTRACTOR SHALL REPOSITION EXISTING FALLEN LOGS/BRANCHES ACROSS FLOODPLAIN AND FLOW PATHWAYS WIDTH AND DEPRESS INTO SOIL SURFACE AS FEASIBLE.
7. ONCE CONSTRUCTED, IMMEDIATELY STABILIZE ALL DISTURBED TIE-IN LOCATIONS AS SPECIFIED.
8. WHERE POSSIBLE, ALL MATERIAL SHALL BE DRIVEN OR PUSHED INTO STREAM BED AND BANKS TO DEPTHS SPECIFIED WITH MINIMAL EXCAVATION. SHARPEN ENDS OF LOG WITH A CHAINSAW AND DRIVE SHARPENED INTO GROUND AS DIRECTED BY THE ENGINEER/DESIGNATED SPECIALIST.

POST AND WATTLE MATERIALS:

1. WATTLES SHALL CONSIST OF GREEN BRANCH CUTTINGS/BRUSH COMPOSED OF 1 TO 2 INCH DIAMETER MATERIALS, 5 TO 10 FEET LONG, WOVEN, COMPRESSED, AND BUNDLED TOGETHER TO FORM A MINIMUM OF 10 FT OF WATTLE. MATERIAL SHALL BE COMPRESSED USING A RATCHET STRAP OF SIMILAR METHOD AND TIED WITH A NATURAL FIBER ROPE.
2. BRUSH MATTRESS SHALL BE 50% BRUSH MIXED WITH 50% SALVAGED OR IMPORTED BED MATERIAL WITH A D50 OF 2". THE BRUSH COMPONENT SHALL BE COMPOSED OF AN EVEN MIX OF SMALL LIMBS AND ROOTWAD BETWEEN 4 TO 8 INCHES IN DIAMETER AND 3 TO 6 FOOT LONG, MIXED EVENLY WITH SMALLER DIAMETER AND LENGTH BRUSH.
3. WOOD STAKES SHALL BE 2" X 2" HARDWOOD STAKES, 4 FEET LONG.
4. WOOD POSTS SHALL BE MIN OF 4" DIAMETER SALVAGED OR FURNISHED WOOD POSTS, 4 FEET LONG.
5. ALL WOODY MATERIAL SHALL BE OBTAINED ONSITE TO MAXIMUM EXTENT POSSIBLE. ROT-RESISTANT SPECIES ARE PREFERRED FOR USE IF AVAILABLE. BUT ANY WOOD FREE OF DEFECTS, MAJOR DAMAGE AND DECAY CAN BE USED AS AVAILABLE.

SUBMITTAL REQUIREMENTS:

1. WATTLES: SUBMITTAL APPROVAL REQUIRED IF IMPORTED
2. BRUSH MATTRESS: NA
3. WOOD STAKES: SUBMITTAL APPROVAL REQUIRED IF IMPORTED
4. WOOD POSTS: SUBMITTAL APPROVAL REQUIRED IF IMPORTED

INSPECTION REQUIREMENTS:

1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
2. ENGINEER/DESIGNATED SPECIALIST TO VISUALLY INSPECT AND PROVIDE FINAL ACCEPTANCE OF EACH STRUCTURE BASED ON SITE INSPECTOR OR CONTRACTOR PROVIDED DOCUMENTATION (PHOTOS, ELEVATIONS).

CLIENT

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DATE: 02/09/2028 ISSUES / REVISIONS

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Restore the Earth & Inspire Ecological Stewardship

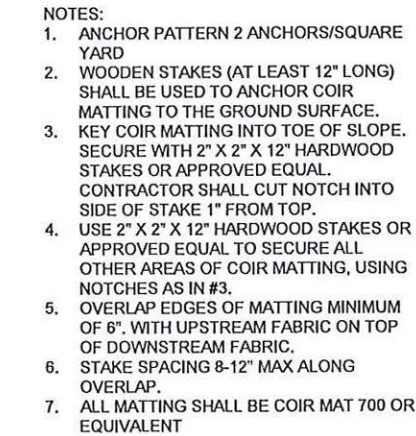
MAMACKE BROOK
OUTFALL CHANNEL
STABILIZATION AND
RESTORATION

DOWNSTREAM
RESTORATION
REACH DETAILS

PROJECT NO.: 25201.01 SCALE: NTS

SEAL: BY: EB, TB CHECK: DS

DWG. NO.:



1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.
2. FILL LOG NETTING UNIFORMLY WITH COMPOST (IN ACCORDANCE WITH SECTION H-1 MATERIALS), OR OTHER APPROVED BIODEGRADABLE MATERIAL TO DESIRED LENGTH SUCH THAT LOGS DO NOT DEFORM.
3. INSTALL FILTER LOGS PERPENDICULAR TO THE FLOW DIRECTION AND PARALLEL TO THE SLOPE WITH THE BEGINNING AND END OF THE INSTALLATION POINTING SLIGHTLY UP THE SLOPE CREATING A "J" SHAPE AT EACH END TO PREVENT BYPASS.
4. FOR UNTRENCHED INSTALLATION BLOW OR HAND PLACE MULCH OR COMPOST ON UPHILL SIDE OF THE SLOPE ALONG LOG.
5. STAKE FILTER LOG EVERY 4 FEET OR CLOSER ALONG ENTIRE LENGTH OF LOG OR TRENCH LOG INTO GROUND A MINIMUM OF 4 INCHES AND STAKE LOG EVERY 8 FEET OR CLOSER.
6. USE STAKES WITH A MINIMUM NOMINAL CROSS SECTION OF 2X2 INCH AND OF SUFFICIENT LENGTH TO ATTAIN A MINIMUM OF 12 INCHES INTO THE GROUND AND 3 INCHES PROTRUDING ABOVE LOG.
7. WHEN MORE THAN ONE LOG IS NEEDED, OVERLAP ENDS 12 INCHES MINIMUM AND STAKE.
8. REMOVE SEDIMENT WHEN IT HAS ACCUMULATED TO A DEPTH OF $\frac{1}{2}$ THE EXPOSED HEIGHT OF LOG AND REPLACE MULCH. REPLACE FILTER LOG IF TORN. REINSTALL FILTER LOG IF UNDERMINING OR DISLODGING OCCURS. REPLACE CLOGGED FILTER LOGS. FOR PERMANENT APPLICATIONS, ESTABLISH AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

1. SOIL STABILIZATION MATTING SHALL BE INSTALLED ON ALL FINISHED STREAMBANKS WITHIN THE RESTORATION LIMITS WITH SIDESLOPES OF 3:1 OR STEEPER.
2. PRIOR TO INSTALLING MATTING, SEED AND STRAW MULCH UNDER THE MATTING USING TEMPORARY AND PERMANENT SEED.
3. LAY SOIL STABILIZATION MATTING ALONG THE SIDESLOPES STARTING AT THE TOE OF SLOPE, EXTENDING UPSLOPE TO 5' PAST THE TOP OF BANK. IF MULTIPLE ROWS ARE NEEDED, OVERLAP WITH UPSLOPE/UPSTREAM FABRIC ON TOP A MINIMUM OF 6 INCHES, WITH WOOD STAKE SPACING 12 INCH MAXIMUM ALONG OVERLAP.
4. INSTALL WOOD STAKES ANCHORS THROUGHOUT MATTING, USING ANCHOR PATTERN SHOWN (MIN 2 ANCHORS PER SQUARE YARD).
5. KEY IN THE MATTING ALONG THE TOE OF SLOPE AND UPSLOPE EDGE AS SHOWN.

1. SOIL STABILIZATION MATTING SHALL BE 700 SERIES SOIL STABILIZATION MATTING COMPOSED OF 700 GRAM/SQ METER 100% NATURAL BIODEGRADABLE COCONUT FIBERS HAVING A MINIMUM LONGEVITY OF 4 YEARS. THICKNESS SHALL BE AT LEAST 0.35 INCHES, WITH OPEN AREA OF 50%.
2. WOOD STAKES SHALL BE 2" X 2" HARDWOOD STAKES, 1 FOOT LONG. STAKES SHALL HAVE NOTCH CUT INTO SIDE OF STAKE 1 INCH FROM THE TOP.

1. SOIL STABILIZATION MATTING: SUBMITTAL APPROVAL REQUIRED
2. WOOD STAKES: SUBMITTAL APPROVAL REQUIRED

1. CONTRACTOR SHALL PERFORM INITIAL QC ON ALL MATERIALS.
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NOT TO SCALE

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TITLE	EROSION AND SEDIMENT CONTROL DETAILS
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PROJECT NO.:	25201.01
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By: ER TB

Fig. 10.

DMS, NO.:

31 OF 42