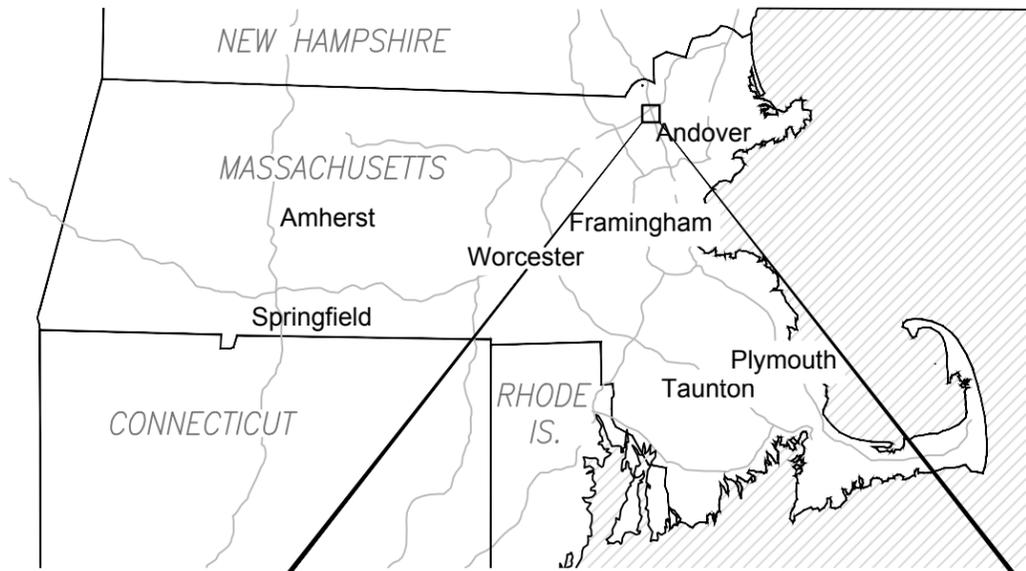


## APPENDIX B

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### **Proposed Project Engineering Designs**

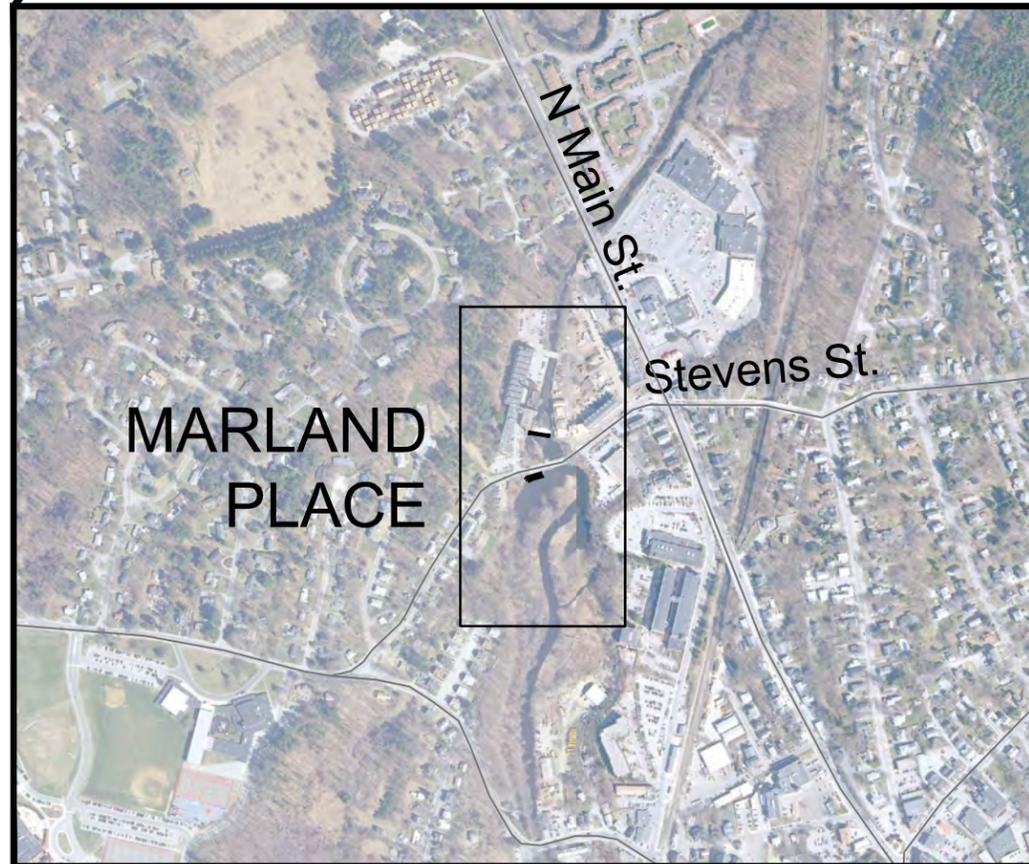


LOCATION MAP  
STATE OF MASSACHUSETTS

# SHAWSHEEN RIVER RESTORATION MARLAND PLACE DAM REMOVAL ANDOVER, MA 100% DRAWINGS

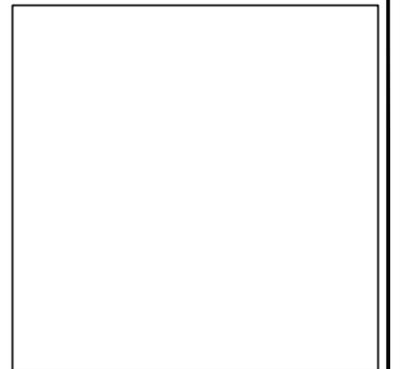
## SHEET INDEX

1. PROJECT LOCATION AND SHEET INDEX
2. EXISTING CONDITIONS & CONSTRUCTION STAGING PLAN
3. PROPOSED GRADING PLAN AND PROFILE
4. PROPOSED TREATMENT PLAN
5. CROSS SECTIONS
6. TYPICAL CROSS SECTIONS
7. VEGETATION PLAN
8. PERMITTING SHEET
9. PERMITTING SHEET
10. PERMITTING SHEET
11. EROSION AND SEDIMENT CONTROL
12. FABRIC PLACEMENT
13. FABRIC ENCAPSULATED SOIL (FES) LIFTS



SITE MAP

"RESERVED FOR ENGINEER'S STAMP"



NO.	DATE	REVISION DESCRIPTION

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BN	11-11-15	15-05-04
APPROVED	DATE	PROJECT

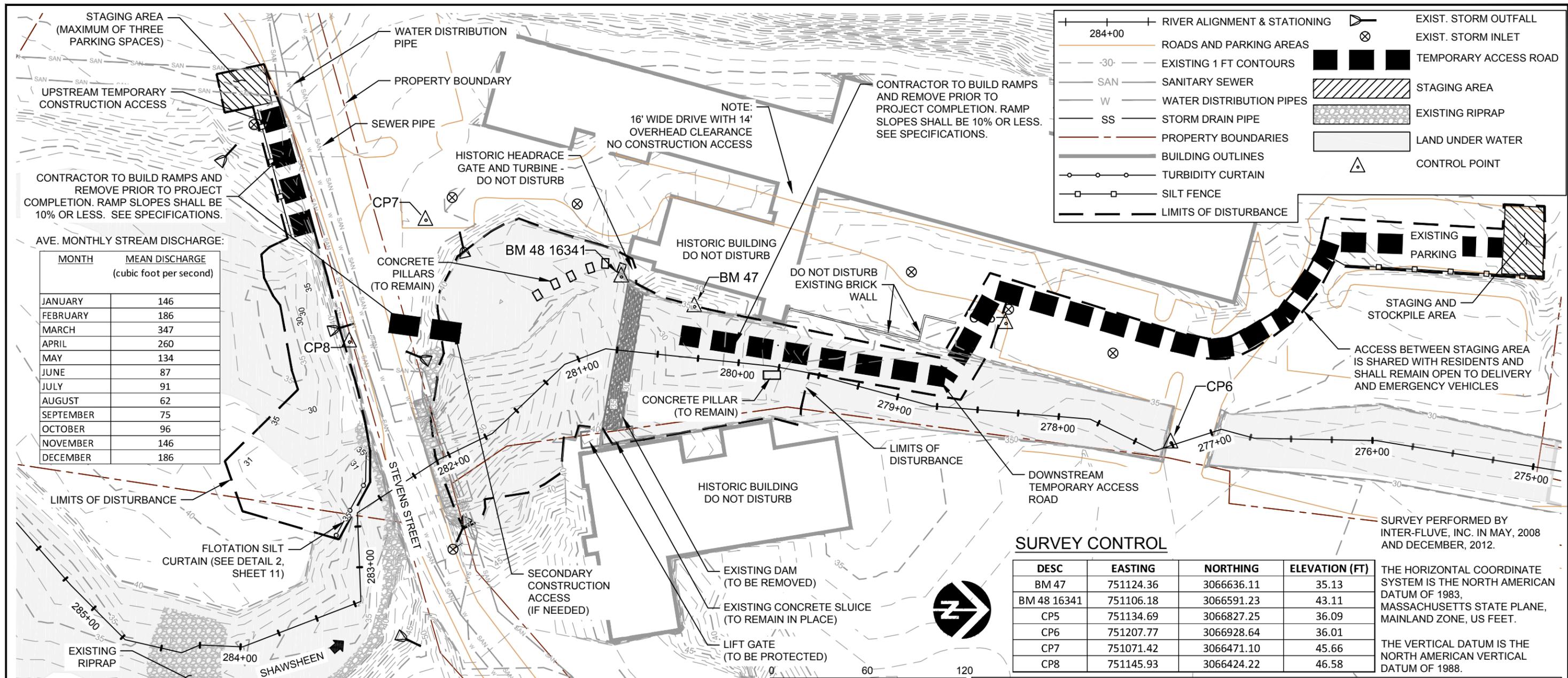
Shawsheen River  
Marland Place Dam Removal  
Andover, MA



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Cambridge, MA 02138  
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Project Location  
and Sheet Index

SHEET  
1 OF 13



**NOTES:**

PROTECTION REQUIRED AT ALL INLETS, SEE SPECIFICATIONS.

SUGGESTED WATER CONTROL PLAN SEQUENCING, FOR THE PURPOSES OF PROJECT BIDDING, ARE AS FOLLOWS:

- USE GATE ON RIVER RIGHT TO DRAW DOWN IMPOUNDMENT;
- USE METHODS (I.E. BULK BAGS, SILT CURTAINS, ETC.) TO SEPARATE ACTIVE FLOW FROM THE WORK AREA;
- BEGIN REMOVING DAM AND IMPOUNDED MATERIAL;
- BUILD RIFFLE. USE PUMPS AND PIPING AS NECESSARY TO FACILITATE RIFFLE CONSTRUCTION; AND
- REMOVE EQUIPMENT ONCE DAM REMOVAL, DREDGING AND RIFFLE CONSTRUCTION IS COMPLETE.

THE CONTRACTOR SHALL SUBMIT A WATER CONTROL PLAN (PLAN) FOR APPROVAL BY THE ENGINEER PRIOR TO MOBILIZATION. THE PLAN CAN FOLLOW STEPS LISTED ABOVE, OR THE CONTRACTOR MAY SUBMIT AN ALTERNATE PLAN. OVERALL, THE PLAN WILL BE THE CONTRACTOR'S

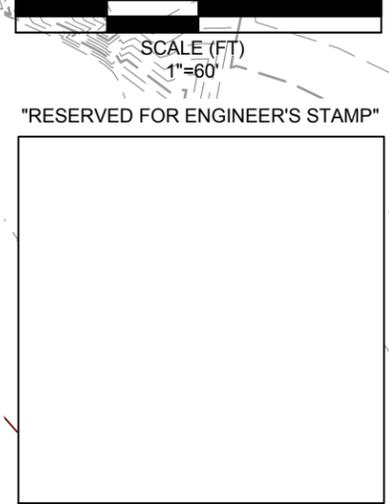
PLAN THAT MEETS ALL PERMIT REQUIREMENTS AND IS SUBJECT TO APPROVAL BY THE ENGINEER. SEE SPECIFICATIONS.

ALL PERMITS RELEVANT TO THE PLAN ARE LOCATED IN THE PROJECT MANUAL.

THE CONTRACTOR SHALL PHASE WORK AND CONTROL WATER DURING ALL PHASES SO AS TO CONDUCT WORK OUT OF THE ACTIVE FLOW OF THE RIVER AND LIMIT DOWNSTREAM MOBILIZATION OF SEDIMENT.

THE CONTRACTOR'S MEANS AND METHODS FOR WATER CONTROL MUST BE SUITABLE TO MANAGE THE SHAWSHEEN RIVER FLOWS. AVERAGE MONTHLY STREAM DISCHARGE IS PROVIDED IN THE TABLE ON THIS SHEET. ACTUAL FLOWS DURING CONSTRUCTION MAY VARY FROM THESE AVERAGES.

THE CONTRACTOR WILL MONITOR THE WEATHER, RAINFALL, AND STORM WARNINGS ISSUED BY THE NATIONAL WEATHER SERVICE THROUGHOUT THE PROJECT AND WILL REMOVE ALL EQUIPMENT AND MATERIALS THAT MAY BE AFFECTED BY FLOOD FLOWS FROM THE SHAWSHEEN RIVER.



- SUGGESTED SEQUENCING**
- PLACE TEMPORARY EROSION CONTROL:
    - SILT FENCE
    - STORM WATER INLET PROTECTION
  - CONSTRUCT THE DOWNSTREAM TEMPORARY ACCESS ROAD
  - NOTCH DAM TO LOWER IMPOUNDMENT SURFACE
  - REMOVE DAM STRUCTURE
  - EXCAVATE CHANNEL, BANK AND FLOODPLAIN SEDIMENTS
  - CONSTRUCT RIFFLE AND INSTALL RIPRAP
  - CONSTRUCT STREAM BANKS
  - REMOVE DOWNSTREAM ACCESS ROAD
  - RE-VEGETATE DISTURBED AREAS
  - PLACE UPSTREAM EROSION CONTROL:
    - SILT FENCE
    - STORM WATER INLET PROTECTION
    - TURBIDITY CURTAIN
  - CONSTRUCT UPSTREAM TEMPORARY ACCESS ROAD
  - EXCAVATE SEDIMENT
  - PLACE RIPRAP
  - REMOVE UPSTREAM ACCESS ROAD
  - RE-VEGETATE DISTURBED AREAS
  - REMOVE EROSION CONTROL

NO.	DATE	REVISION DESCRIPTION

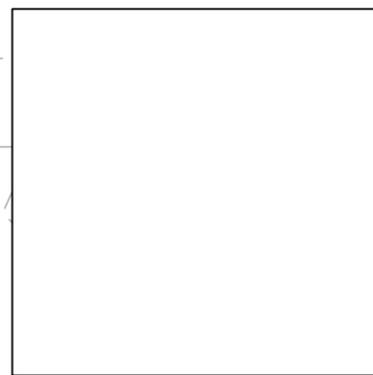
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BN	11-11-15	15-05-04
APPROVED	DATE	PROJECT

**Shawsheen River  
Marland Place Dam Removal  
Andover, MA**



**Marland Place - Existing Conditions &  
Construction Staging Plan**

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SILT FENCE

EXCAVATE PER GRADING PLAN AND CROSS SECTIONS PROVIDE FOR 0.5% SLOPE PERPENDICULAR TO CHANNEL CENTERLINE. SEE TYPICAL SECTION 1, SHEET 6.

HISTORIC BUILDING DO NOT DISTURB

EXISTING BRICK WALL DO NOT DISTURB

SALVAGE EXCAVATED MATERIAL AND PLACE TO FINAL GRADE FOLLOWING RIPRAP PLACEMENT SEE SECTION 2, SHEET 6 AND SPECIFICATIONS

LIMITS OF DISTURBANCE

**LEGEND**

- LIMITS OF DISTURBANCE
- LIMITS OF DISTURBANCE
- ROADS AND PARKING AREAS
- PROPOSED EXCAVATION CONTOURS
- PROPOSED 1 FT CONTOURS
- BUILDINGS/STRUCTURES
- TURBIDITY CURTAIN
- SILT FENCE
- TEMPORARY CONSTRUCTION ACCESS
- PLACED EXCAVATED MATERIAL
- EXISTING STORM OUTFALL
- EXISTING STORM INLET

EXCAVATE TO ELEVATION = 30.5 FT

STEVENS STREET

CONCRETE PILLARS (TO REMAIN)

HISTORIC HEADRACE GATE AND TURBINE - DO NOT DISTURB

DAM REMOVAL CUT LINES

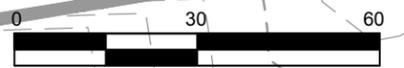
CONCRETE PILLAR (TO REMAIN)

LIMITS OF DISTURBANCE

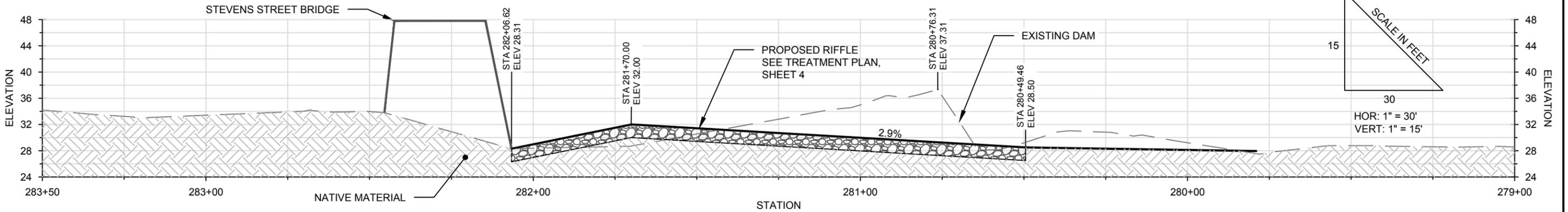
HISTORIC BUILDING DO NOT DISTURB

EXISTING SLUICE BOX REMAINS IN PLACE AND IS FILLED WITH SALVAGED MATERIAL

EXISTING RIPRAP



SCALE (FT)  
1"=30'



BN

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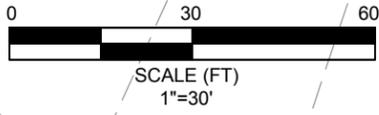
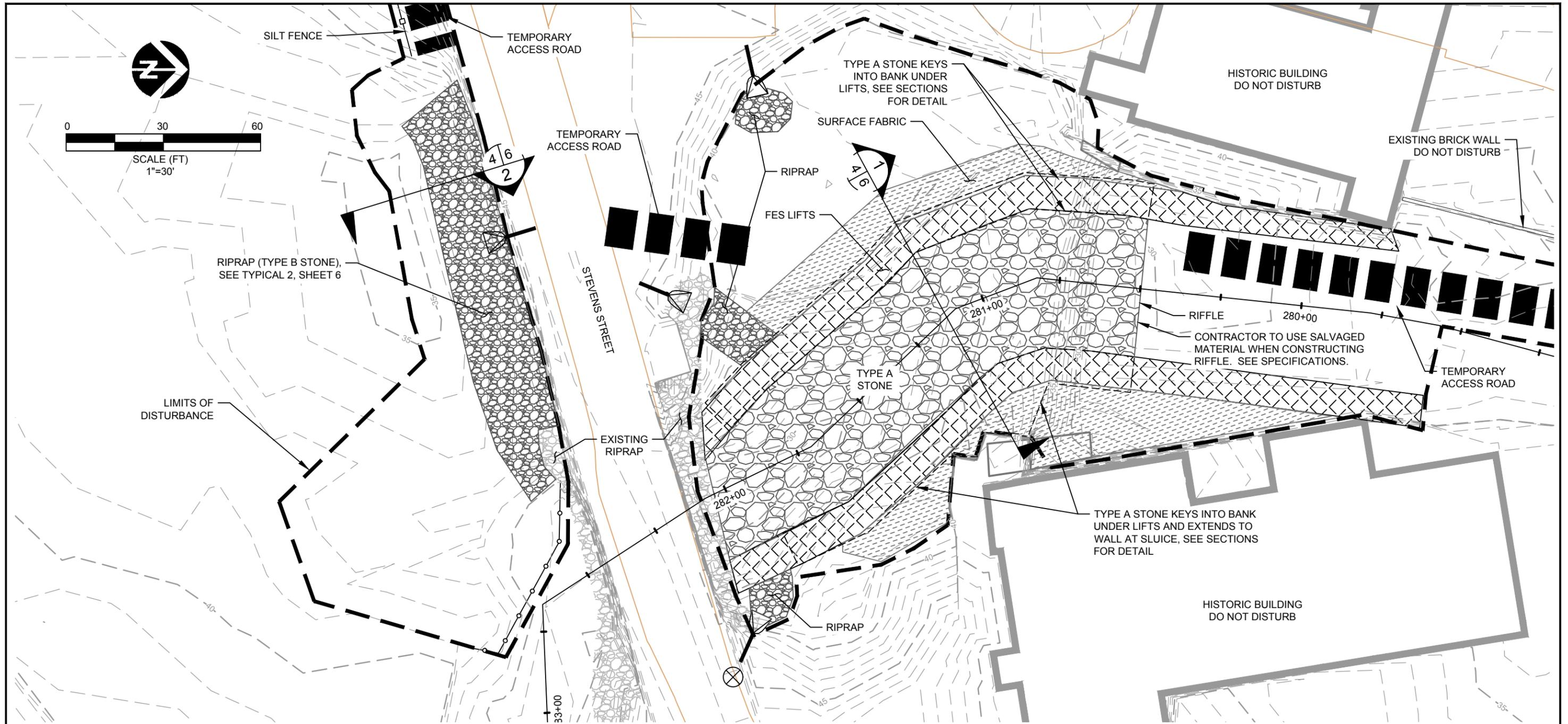
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Marland Place  
Proposed Grading Plan and Profile

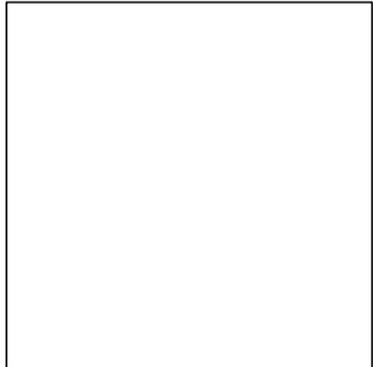
SHEET  
3 OF 13



**LEGEND**

- LIMITS OF DISTURBANCE
- ROADS AND PARKING AREAS
- EXISTING 1 FT CONTOURS
- BUILDINGS/STRUCTURES
- TURBIDITY CURTAIN
- SILT FENCE
- SURFACE FABRIC
- FES LIFTS
- PROPOSED RIFFLE (TYPE A STONE)
- TEMPORARY CONSTRUCTION ACCESS
- RIPRAP TYPE B STONE
- EXISTING RIPRAP
- EXISTING STORM OUTFALL
- EXISTING STORM INLET

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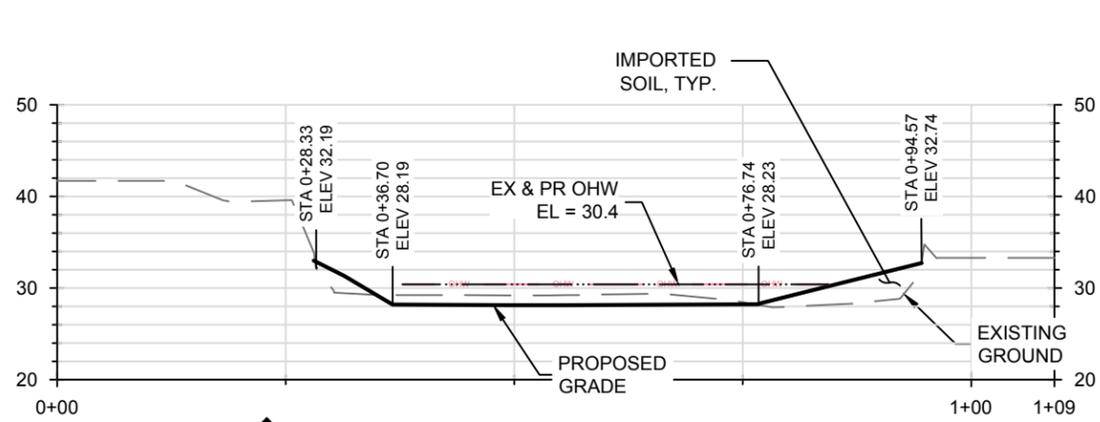
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**Marland Place Dam Removal**  
**Andover, MA**

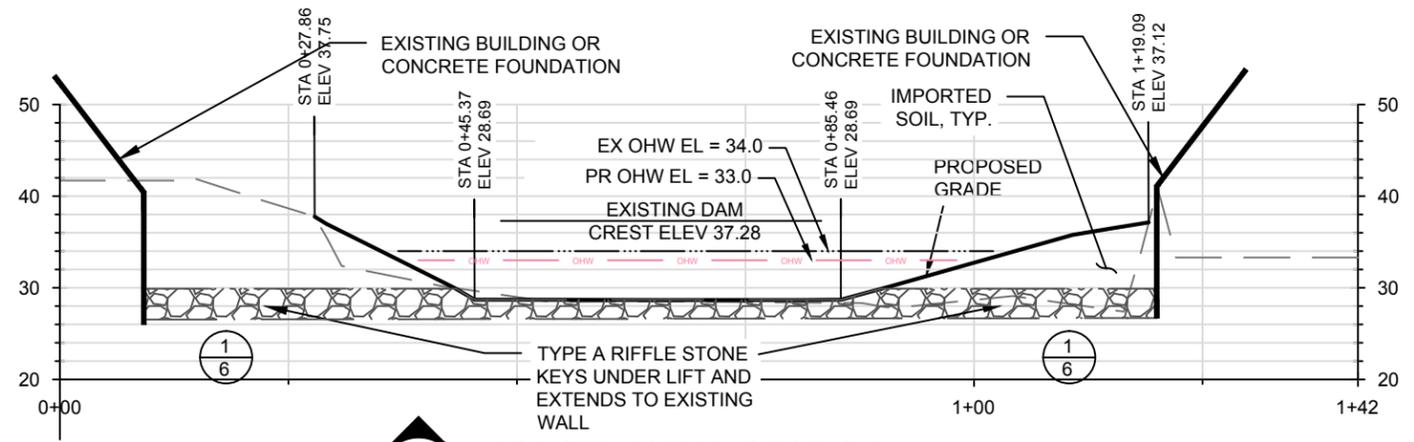


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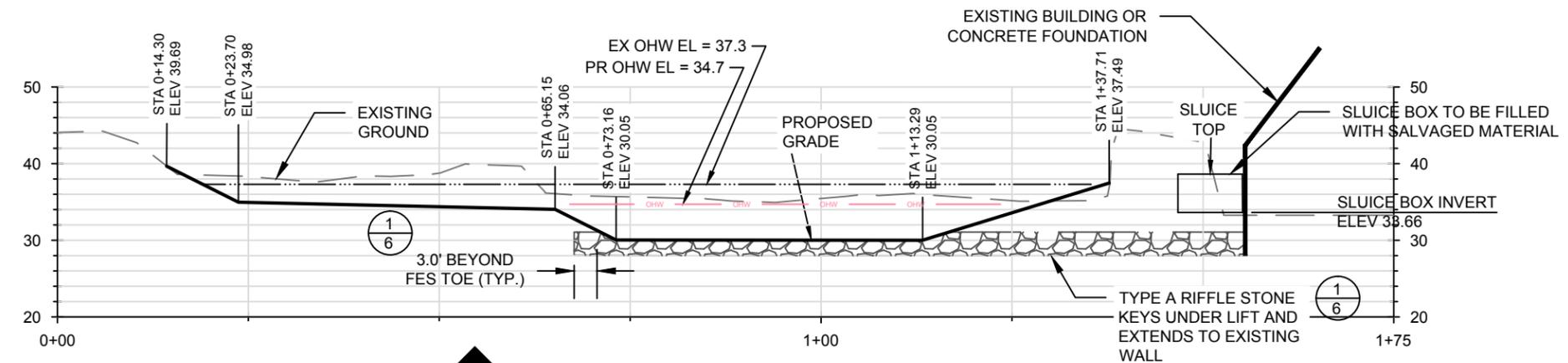
**Marland Place**  
**Proposed Treatment Plan**



**MP1** CONSTRUCTION SECTION  
MARLAND PLACE STA 280+00



**MP2** CONSTRUCTION SECTION  
MARLAND PLACE STA 280+55

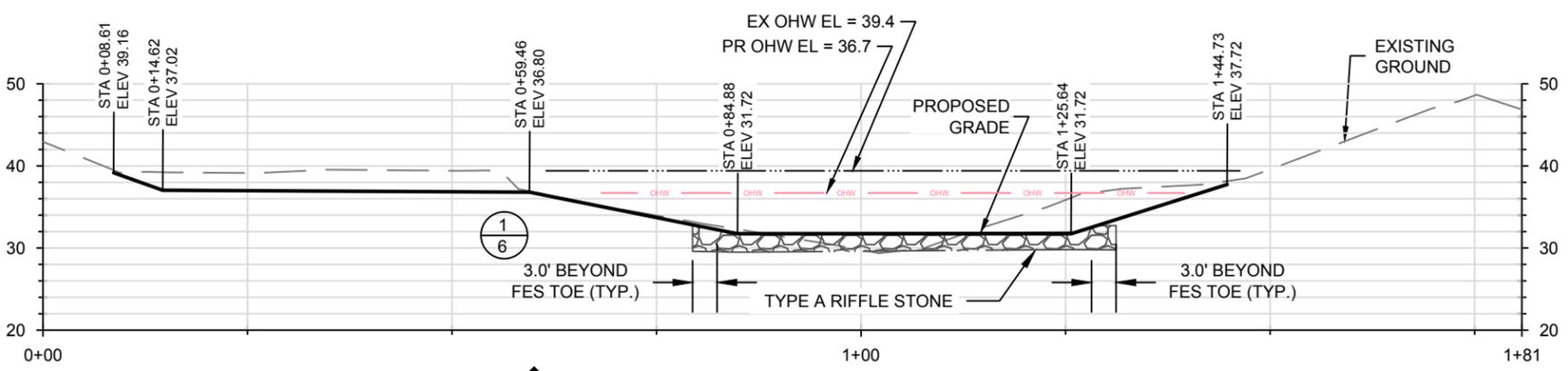


**MP3** CONSTRUCTION SECTION  
MARLAND PLACE STA 281+00

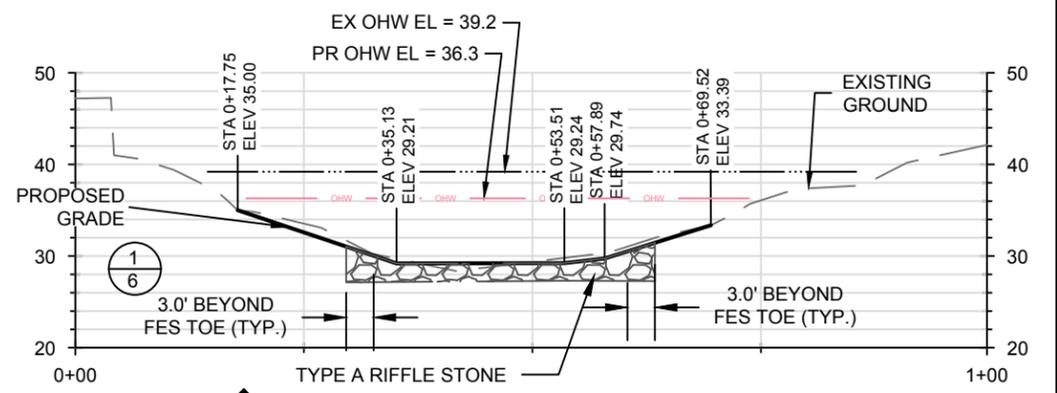
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SCALE IN FEET  
20  
20  
HOR: 1" = 20'  
VERT: 1" = 20'

- NOTES:**
- CROSS SECTIONS FACE DOWNSTREAM.



**MP4** CONSTRUCTION SECTION  
MARLAND PLACE STA 281+63



**MP5** CONSTRUCTION SECTION  
MARLAND PLACE STA 282+00

NO.	DATE	REVISION DESCRIPTION

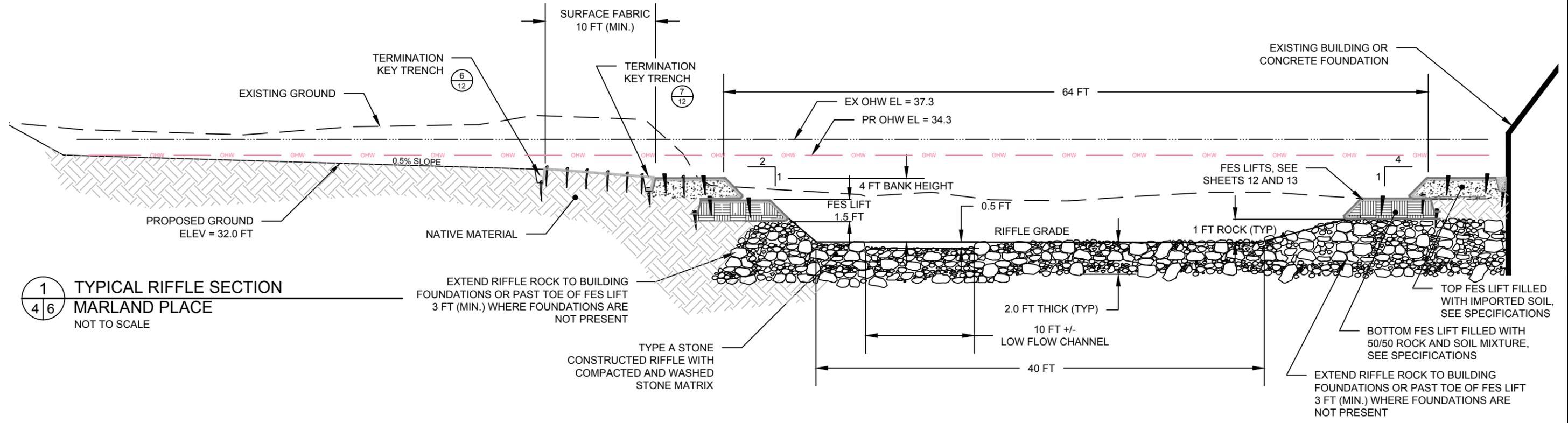
SJ,BL,RP	BL,NN	BN
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APPROVED	DATE	PROJECT

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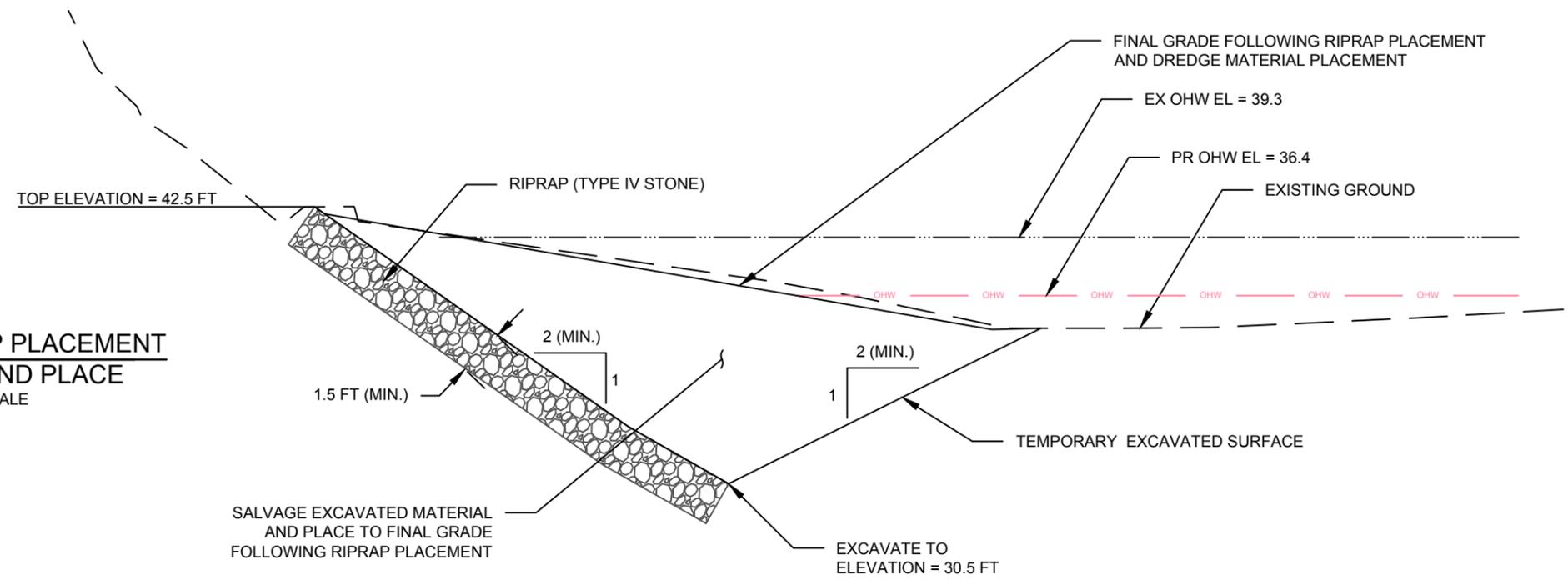


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Marland Place  
Cross Sections



**1**  
4/6 **TYPICAL RIFFLE SECTION**  
MARLAND PLACE  
NOT TO SCALE



**2**  
4/6 **RIPRAP PLACEMENT**  
MARLAND PLACE  
NOT TO SCALE

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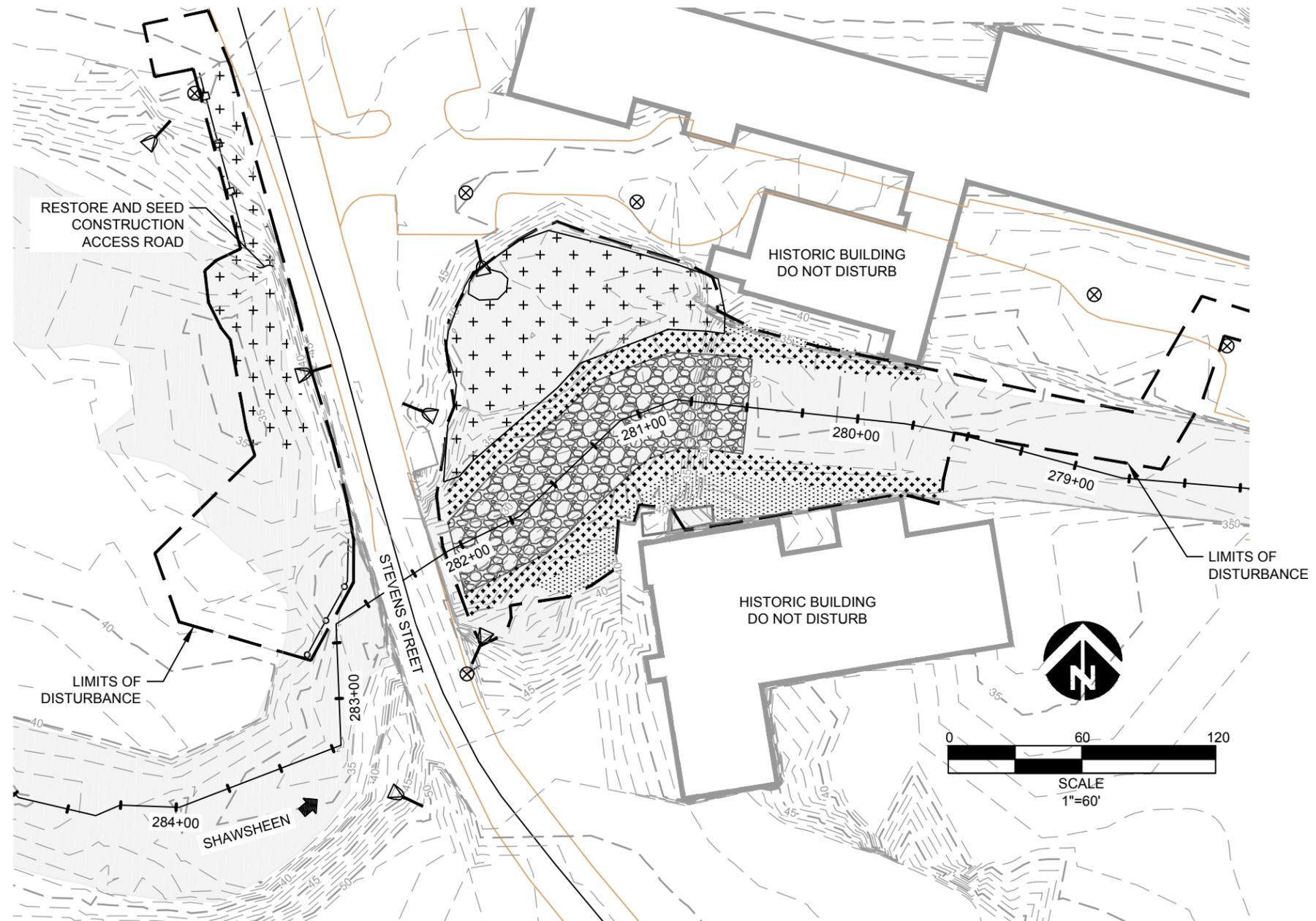
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Marland Place  
Typical Cross Sections

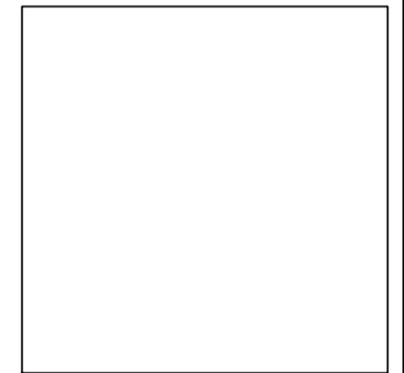


MARLAND PLACE PLANTING TABLE		Floodplain / Wetland	Channel Bank
New England Conservation Mix			x
New England Wetland Mix		x	
<b>Wetland Plugs</b>			
Goldenrod	<i>Solidago</i>	100	
Swamp Aster	<i>Aster puniceus</i>	100	
Sensitive fern	<i>Onclea sensibilis</i>	100	
Tall Meadow-rue	<i>Thalictrum pubescens</i>	100	
Tear-thumb	<i>Polygonum sagittatum</i>	100	
<b>Trees</b>			
Red Maple	<i>Acer rubrum</i>	5	
American Elm	<i>Ulmus americana</i>	5	5
Yellow Birch	<i>Betula alleghaniensis</i>	5	5
Black willow	<i>Salix nigra</i>		5
<b>Shrubs</b>			
Sweet Pepperbush	<i>Clethra alnifolia</i>	10	
Red Osier Dogwood	<i>Cornus stolonifera</i>	5	5
Buttonbush	<i>Cephalanthus occidentalis</i>	10	
Grey dogwood	<i>Cornus foemina</i>	5	5
Elderberry	<i>Viburnum lentago</i>	5	5

**LEGEND**

- LIMITS OF DISTURBANCE
- EXISTING ROADS
- EXISTING 1 FT CONTOURS
- BUILDINGS/STRUCTURES
- SILT FENCE
- EXISTING STORM OUTFALL
- EXISTING STORM INLET
- SEED
- TURF GRASS SOD
- FLOODPLAIN / WETLAND: REPLANT DISTURBED AREA WITH WETLAND PLUGS, NATIVE SHRUB, AND TREE SPECIES (SEE TABLE, THIS SHEET)
- CONSTRUCTED CHANNEL BANKS: RESEED WITH NATIVE WET RESTORATION SEED MIX UNDER LIFT FABRIC AND PLANT WITH TREES AND SHRUBS (SEE TABLE, THIS SHEET AND TECHNICAL SPECIFICATIONS)
- PROPOSED RIFFLE

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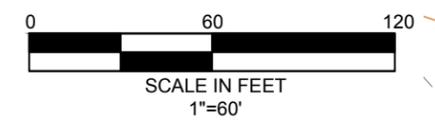
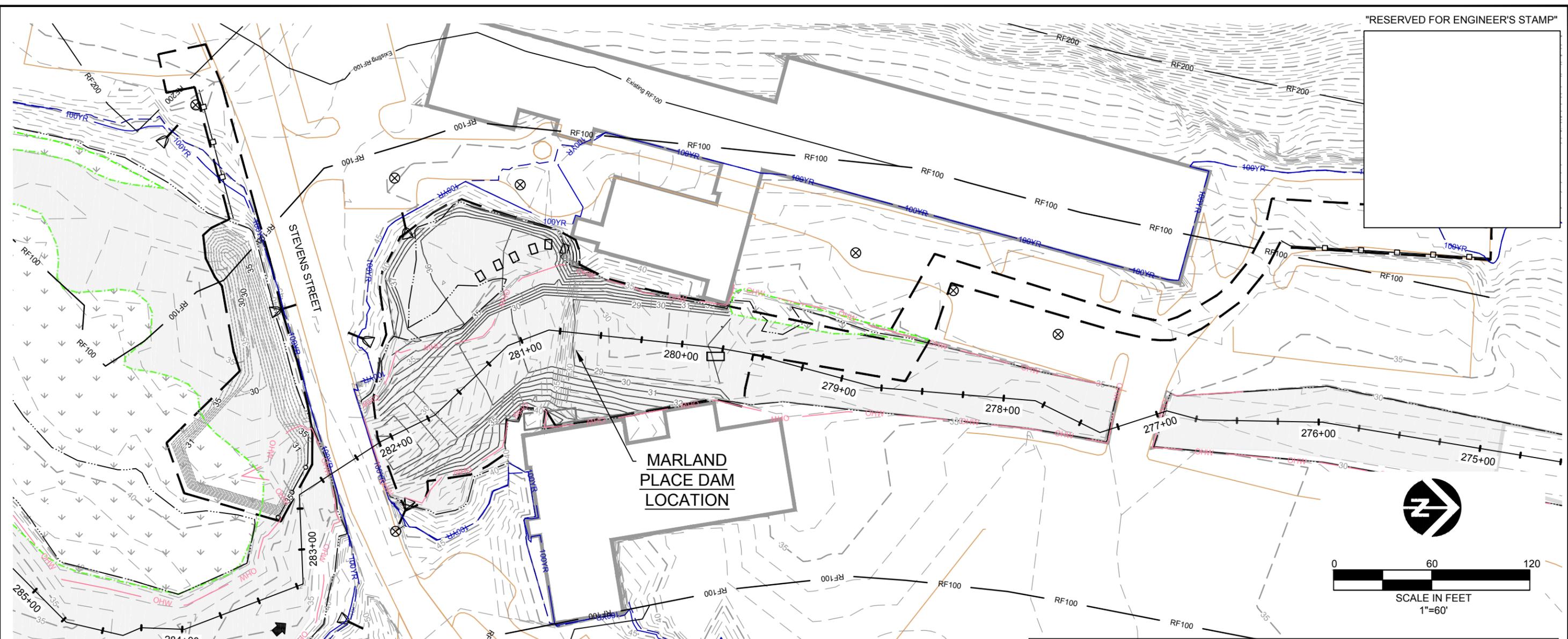
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**Marland Place  
Vegetation Plan**



**LEGEND**

- ROADS AND PARKING AREAS
- LIMITS OF DISTURBANCE
- SILT FENCE
- EXISTING 1 FT CONTOURS
- PROPOSED 1 FT CONTOURS
- EXISTING BUILDINGS
- TURBIDITY CURTAIN
- RIVER ALIGNMENT AND STATIONING
- LAND UNDER WATER
- Existing RF100
- Existing RF200
- RF100
- RF200
- ORDINARY HIGH WATER (UNDER EXISTING CONDITIONS \*)
- OHW
- ORDINARY HIGH WATER (UNDER PROPOSED CONDITIONS \*)
- 100 YEAR FLOOD INNUNDATION (UNDER EXISTING CONDITIONS \*)
- 100YR
- 100 YEAR FLOOD INNUNDATION (UNDER PROPOSED CONDITIONS \*)
- \* FROM HYDRAULIC MODEL
- BORDERING VEGETATED WETLAND BOUNDARY DELINEATED ON SEPT. 29, 2012
- EXIST. STORM OUTFALL
- ⊗ EXIST. STORM INLET
- 100' RIVERFRONT BUFFER (UNDER EXISTING CONDITIONS)
- 200' RIVERFRONT BUFFER (UNDER EXISTING CONDITIONS)
- 100' RIVERFRONT BUFFER (UNDER PROPOSED CONDITIONS)
- 200' RIVERFRONT BUFFER (UNDER PROPOSED CONDITIONS)

**NOTE:**  
 THE APPROXIMATE FLOOD INNUNDATION EXTENTS SHOWN ARE BASED ON THE FLOOD FREQUENCY ESTIMATES USED FOR ANALYSIS AND DESIGN SIMULATED WITH THE FINAL PROJECT HYDRAULIC MODEL, AND ARE INCLUDED FOR INFORMATIONAL PURPOSES ONLY. SEE FINAL DESIGN REPORT FOR FURTHER DETAIL ON THE FLOOD FREQUENCY ESTIMATES AND HYDRAULIC MODELING. FLOOD INNUNDATION EXTENTS INCLUDED HEREIN SHOULD UNDER NO CIRCUMSTANCE BE SUBSTITUTED FOR OR INTERPRETED TO REPRESENT PREVAILING REGULATORY FLOODPLAIN MAPPING COMPLETED UNDER THE JURISDICTION AND DIRECTION OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

**RESOURCE AREA IMPACTS**

RESOURCE AREAS	PROPOSED MAXIMUM DISTURBANCE	PERMANENT CHANGES
BANK	510 LF	-60 LF
BORDERING VEGETATED WETLAND	2,210 SF	+11,340 SF
BORDERING LAND SUBJECT TO FLOODING	24,150 SF	-240 SF
LAND UNDER WATER	30,010 SF	-12,680 SF
RIVERFRONT AREA - 200 FT	370,054 SF	+29,531 SF
RIVERFRONT AREA - 100 FT	191,020 SF	+18,890 SF

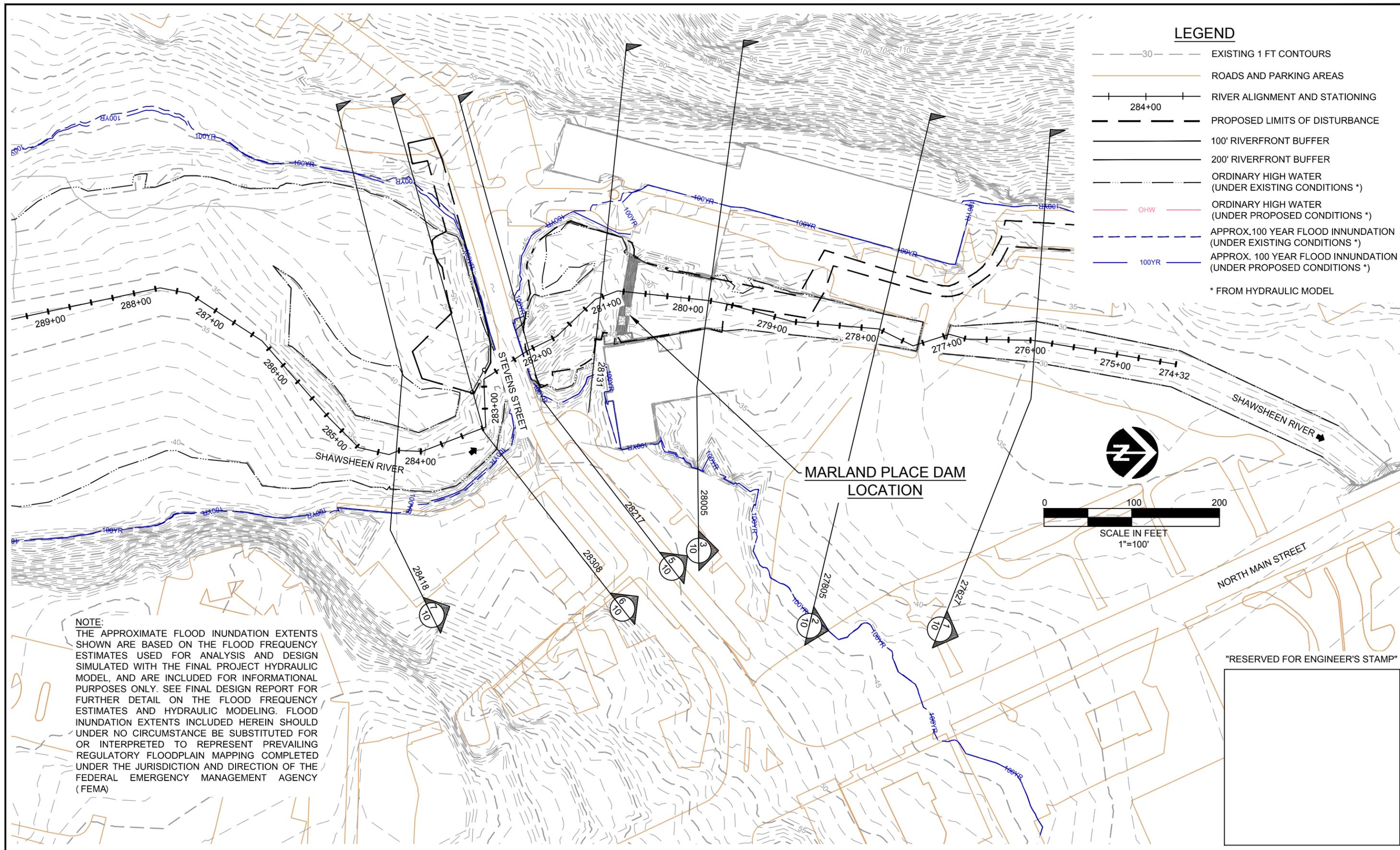
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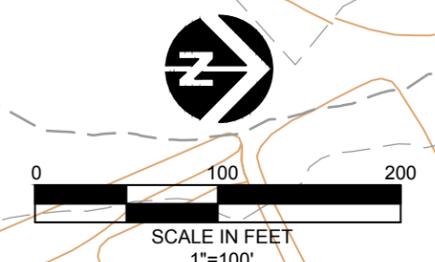


**LEGEND**

- 30- EXISTING 1 FT CONTOURS
- ROADS AND PARKING AREAS
- RIVER ALIGNMENT AND STATIONING
- 284+00
- PROPOSED LIMITS OF DISTURBANCE
- 100' RIVERFRONT BUFFER
- 200' RIVERFRONT BUFFER
- ORDINARY HIGH WATER (UNDER EXISTING CONDITIONS \*)
- OHW ORDINARY HIGH WATER (UNDER PROPOSED CONDITIONS \*)
- APPROX. 100 YEAR FLOOD INNUNDATION (UNDER EXISTING CONDITIONS \*)
- 100YR APPROX. 100 YEAR FLOOD INNUNDATION (UNDER PROPOSED CONDITIONS \*)

\* FROM HYDRAULIC MODEL

**NOTE:**  
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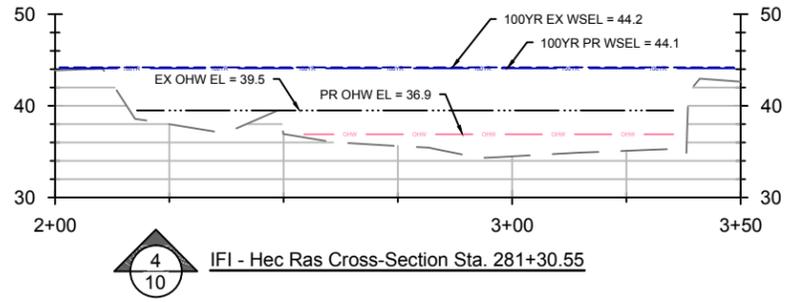
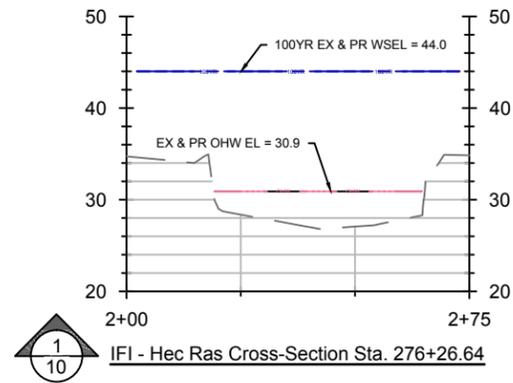
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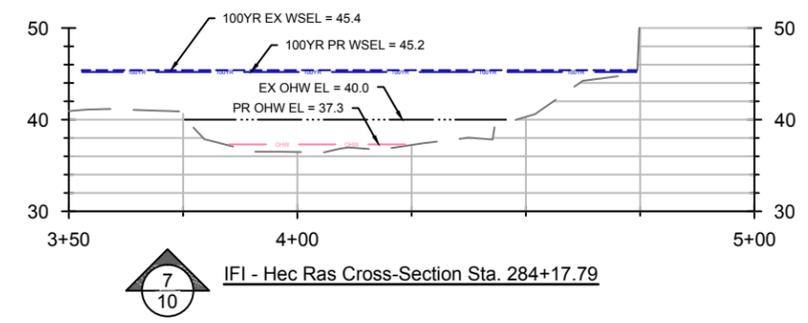
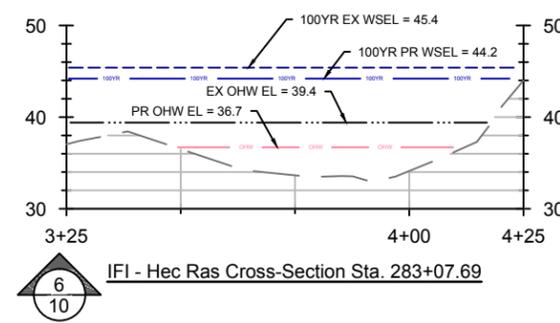
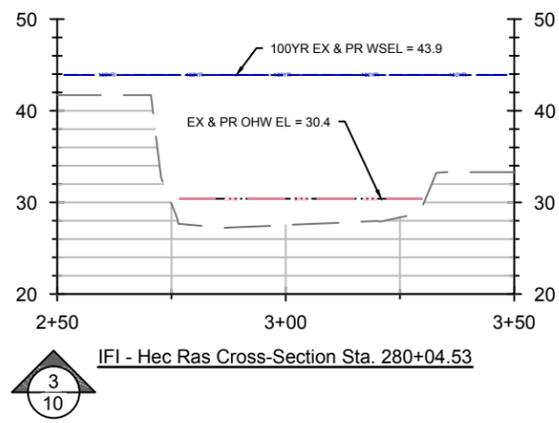
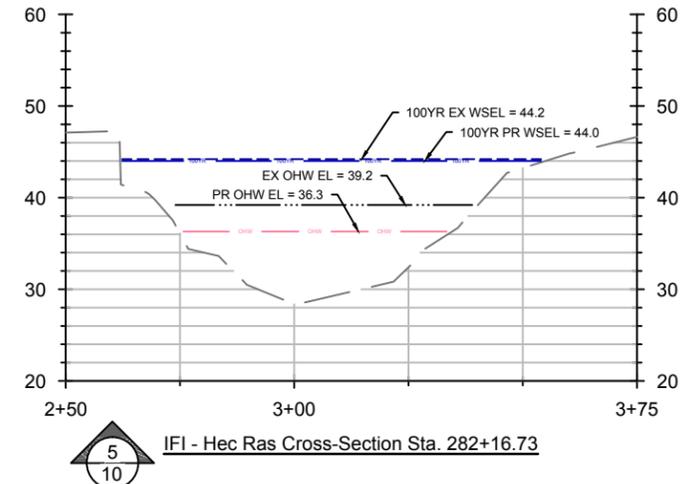
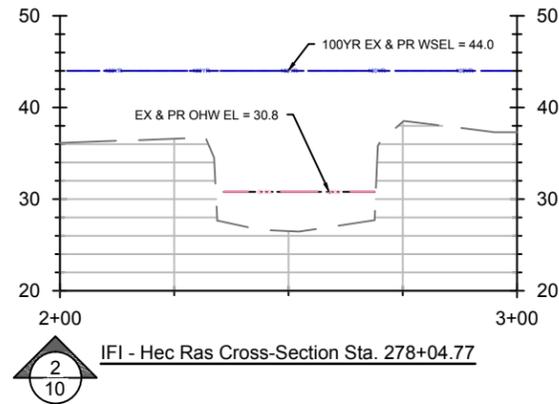


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Flood Inundation

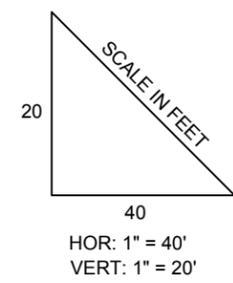


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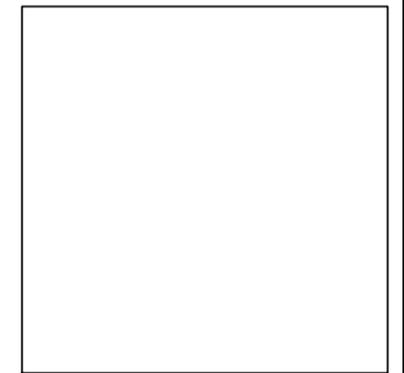


**LEGEND**

- ORDINARY HIGH WATER (UNDER EXISTING CONDITIONS \*)
  - - - ORDINARY HIGH WATER (UNDER PROPOSED CONDITIONS \*)
  - - - APPROX. 100 YEAR FLOOD INUNDATION (UNDER EXISTING CONDITIONS \*)
  - - - APPROX. 100 YEAR FLOOD INUNDATION (UNDER PROPOSED CONDITIONS \*)
- \* FROM HYDRAULIC MODEL



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APPROVED	DATE	PROJECT

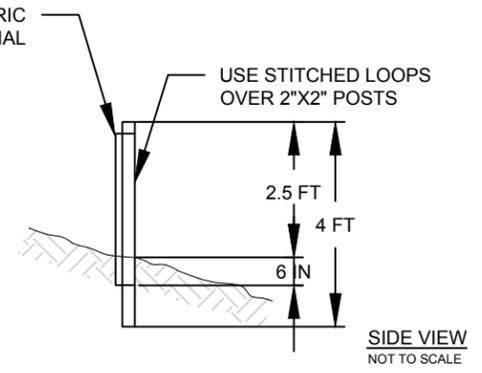
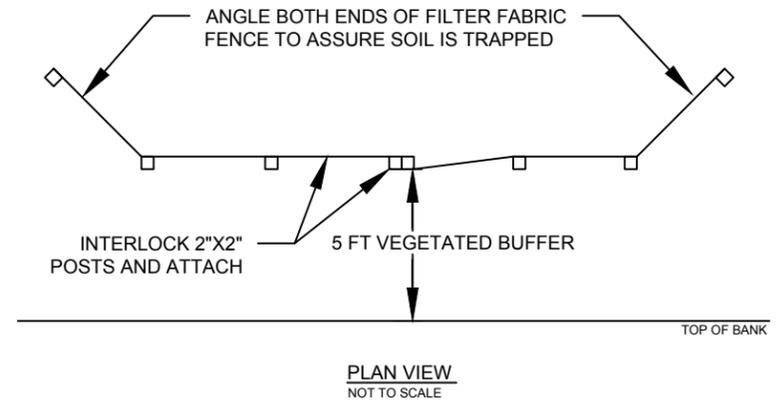
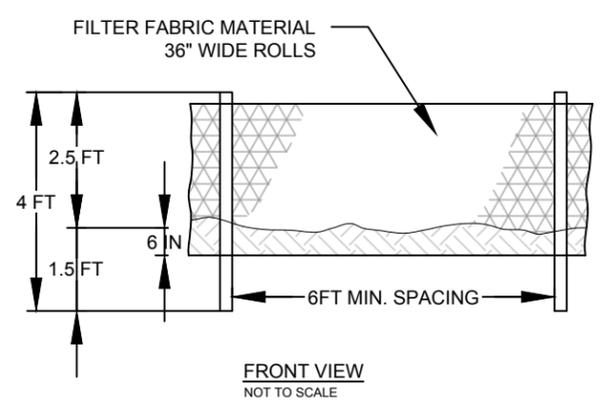
**Shawsheen River**  
 Marland Place Dam Removal - Permitting Information  
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Permitting Cross Sections

"RESERVED FOR ENGINEER'S STAMP"

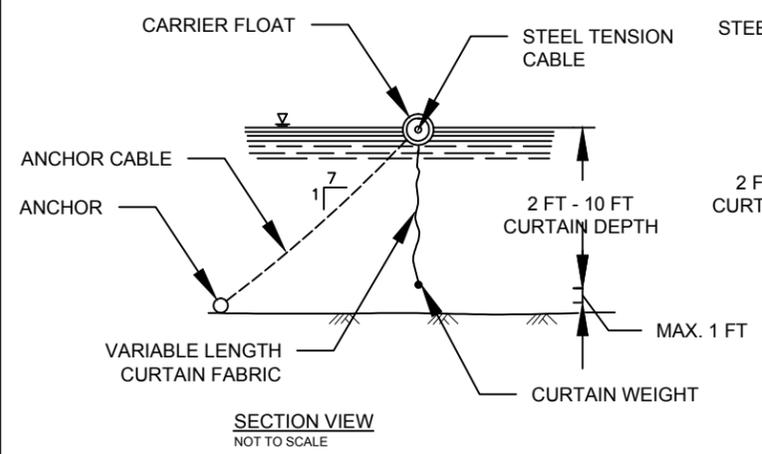


1 TYPICAL DETAIL  
11 SILT FENCE  
NOT TO SCALE

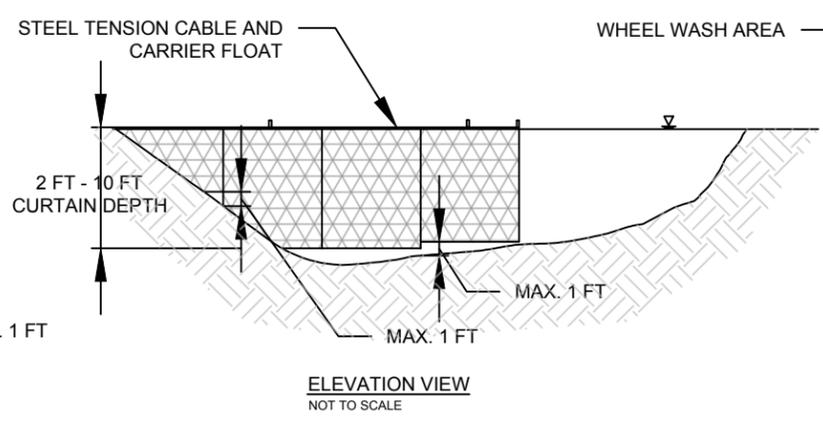
**SILT FENCE NOTES**

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6 INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST. ALTERNATIVELY, OVERLAP AND INTERLOCK TWO POSTS WITH ATTACHED FABRIC AS APPROVED BY THE OWNER'S REPRESENTATIVE.
2. THE SILT FENCE IS TO BE INSTALLED AT LOCATIONS SHOWN ON THE PLAN ALONG THE DOWNHILL PERIMETER OF DISTURBED AREAS. THE FENCE POST SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES APART.

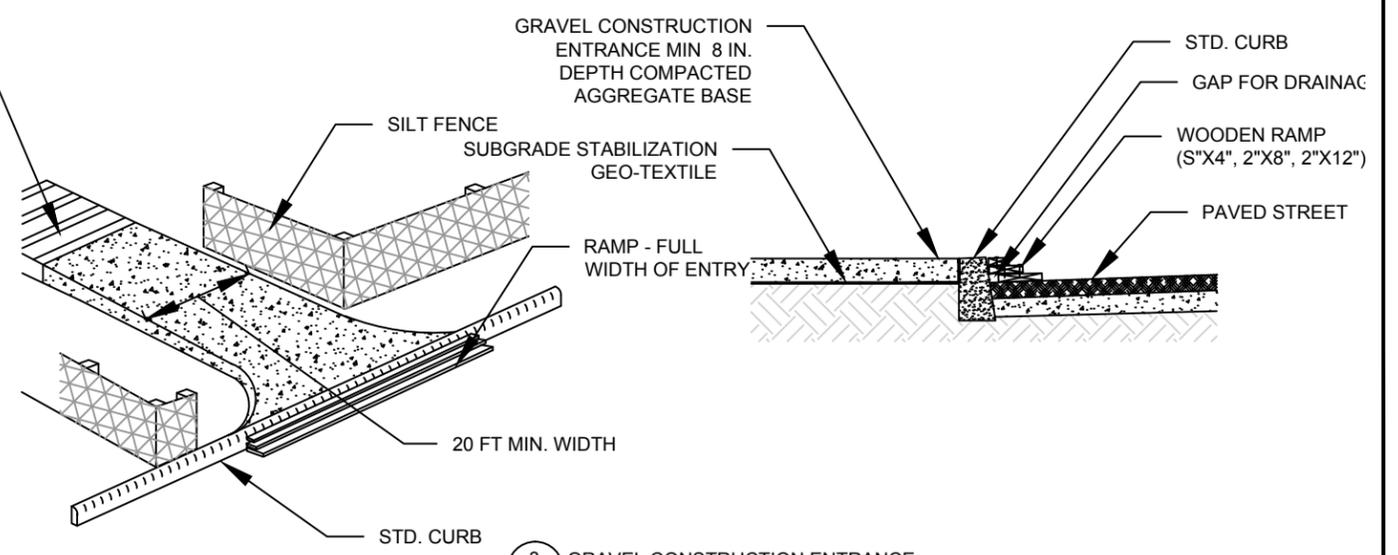
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM SILT FENCE INSTALLATION SHALL BE BACK-FILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY SILT FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2 INCHES X 2 INCHES POST INSTALLATION.
5. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED, OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.



2 TYPICAL DETAIL  
11 FLOTATION SILT CURTAIN  
NOT TO SCALE



**SILT CURTAIN NOTES**  
SEE NOTES ON SHEET 2 REGARDING USE OF SILT CURTAINS AND WATER CONTROL PLAN.



3 GRAVEL CONSTRUCTION ENTRANCE  
11 NOT TO SCALE

NO.	DATE	REVISION DESCRIPTION

SJ,BL,RP	BL,NN	BN
DRAWN	DESIGNED	CHECKED
BN	11-11-15	15-05-04
APPROVED	DATE	PROJECT

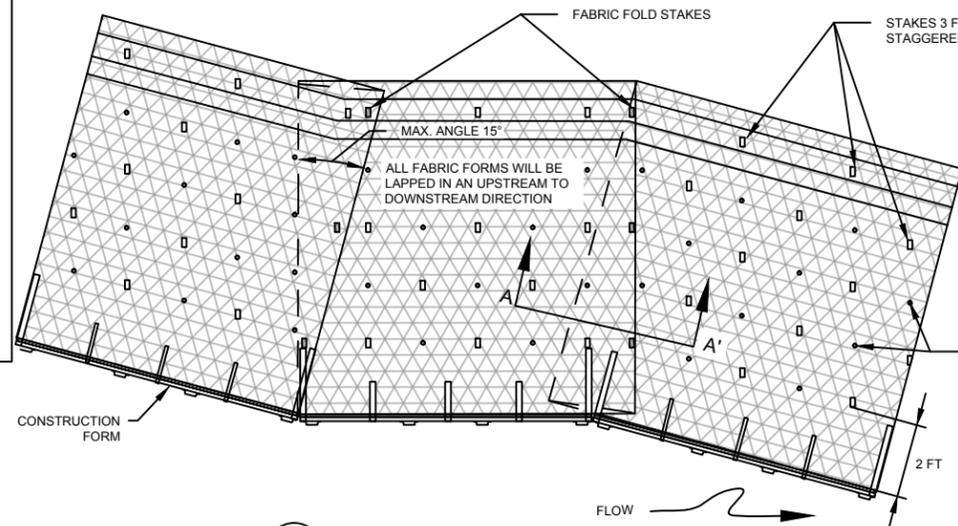
Shawsheen River  
Marland Place Dam Removal  
Andover, MA



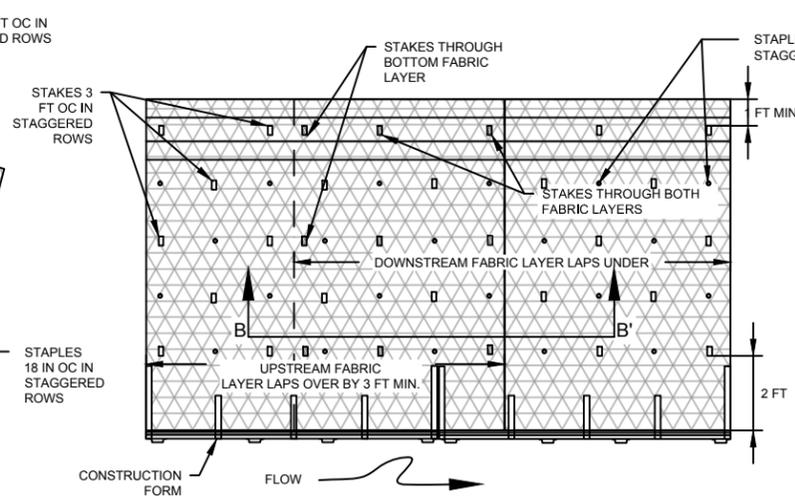
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Typical Details  
Erosion and Sediment Control

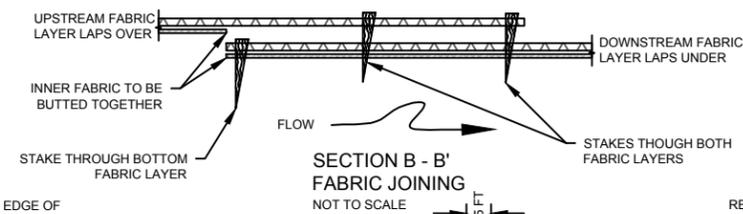
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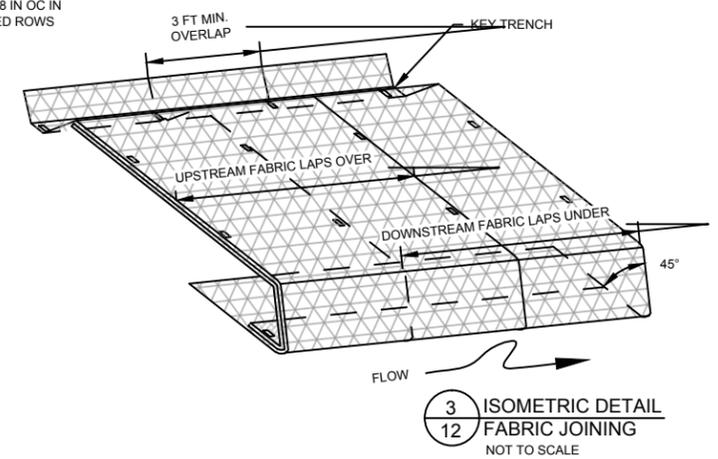
1 TYPICAL DETAIL  
12 FOLDING OF OUTER FABRIC  
NOT TO SCALE



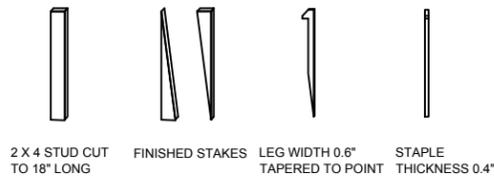
2 TYPICAL DETAIL  
12 FABRIC JOINING  
NOT TO SCALE



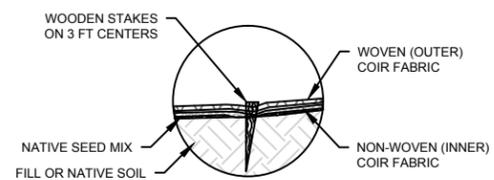
SECTION B - B'  
12 FABRIC JOINING  
NOT TO SCALE



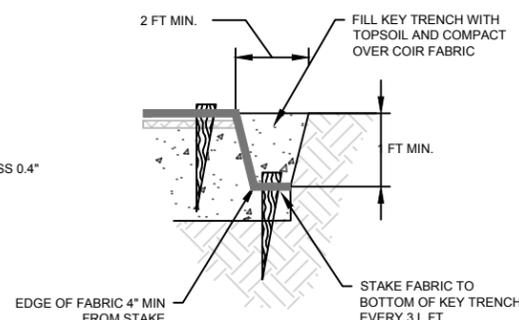
3 ISOMETRIC DETAIL  
12 FABRIC JOINING  
NOT TO SCALE



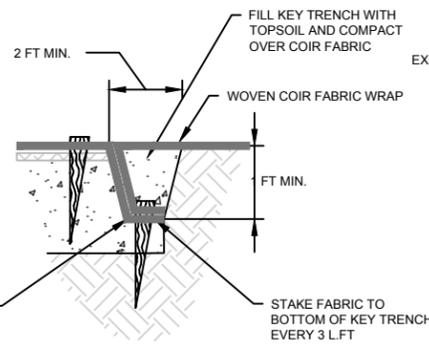
4 WOODEN STAKE AND STAPLES  
12 FABRICATING DETAIL  
NOT TO SCALE



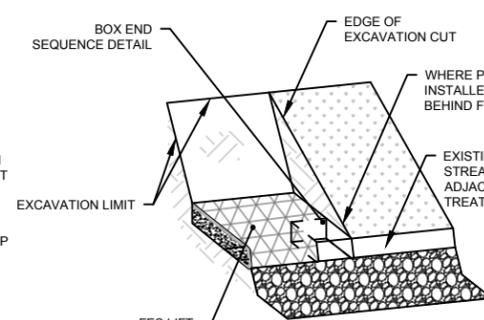
5 TOE DETAIL  
12 BIODEGRADABLE FABRICS AND STAKES  
NOT TO SCALE



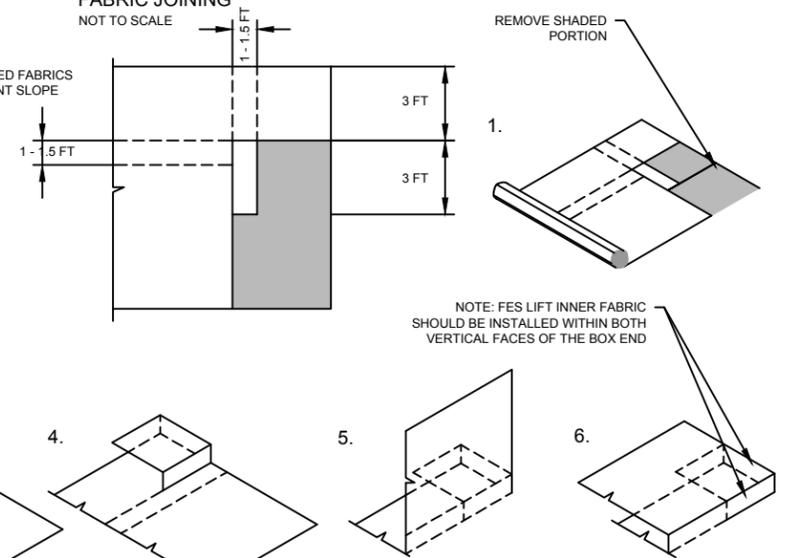
6 KEY TRENCH DETAIL  
12 TERMINATION TRENCH  
NOT TO SCALE



7 KEY TRENCH DETAIL  
12 TRANSITION TRENCH  
NOT TO SCALE

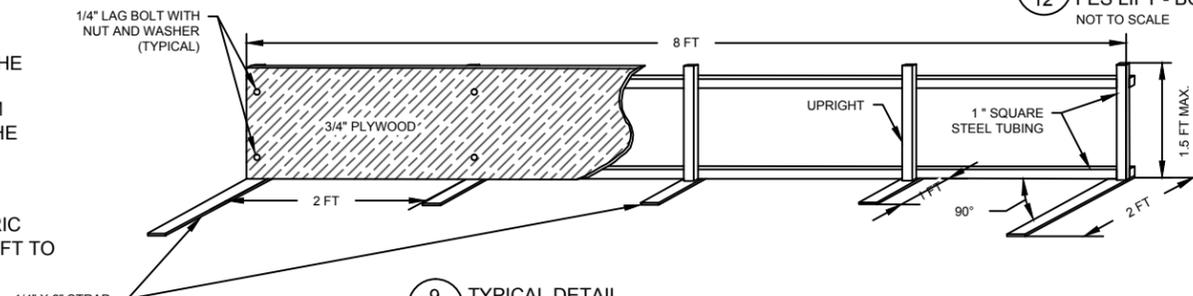


8 SUGGESTED CONSTRUCTION SEQUENCE  
12 FES LIFT - BOX ENDS  
NOT TO SCALE

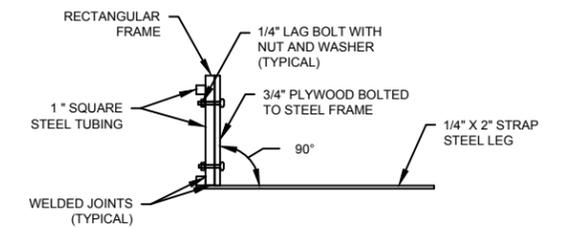


**GENERAL NOTES ON SECURING COIR FABRIC**

1. SECURE THE OUTER FABRIC (WOVEN, WHERE APPLICABLE), WITH A WOODEN STAKE THROUGH THE FABRIC ON 3 FT CENTERS (SEE DETAIL VIEWS 1 & 2)  
NOTE: THE HOLES FOR STAKES SHALL NOT BE PRECUT. ALLOW THE STAKE TO BREAK THE MINIMUM NUMBER OF STRANDS AS IT IS BEING DRIVEN IN. DRIVE STAKES SO THAT 2" TO 3" OF THE TOP OF THE STAKE IS LEFT EXPOSED.
2. OUTER FABRIC ENDS SHALL BE JOINED BY LAPPING THE UPSTREAM PIECE OF FABRIC OVER THE DOWNSTREAM PIECE AS SHOWN IN DETAIL X. OVERLAPS SHALL BE A MINIMUM OF 3 FT, INNER FABRIC ENDS SHALL BE BUTTED TOGETHER, NOT OVERLAPPED. OVERLAPS SHALL BE STAGGERED FROM LIFT BY A MINIMUM OF 15 FT.
3. STAKING SPACING IS DEFINED IN SPECIFICATIONS FOR FES LIFT AND SURFACE FABRIC.



9 TYPICAL DETAIL  
12 STREAM BANK CONSTRUCTION FORM - FES LIFT  
NOT TO SCALE



10 TYPICAL DETAIL  
12 STREAM BANK CONSTRUCTION FORM - FES LIFT  
NOT TO SCALE

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Typical Details  
Fabric Placement

