FOCUSED FEASIBILITY STUDY REPORT
FOR
40TH AVENUE PROJECT AREA
IN THE ST. LOUIS RIVER AREA OF CONCERN

August 28, 2015

APPENDIX L. DESIGN DETAILS

Presented in this Appendix are proposed and existing bathymetry exhibits, a concept overview exhibit, island and shoal slope protection construction details and island and shoal section view drawings.

Figure No.

Appendix L - Figure 1

Title

40th Ave Preferred Ecological Design Concept

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by XXX on 2014-11-21
Technical Review by XXX on 2014-XX-XX

100 250 500 Feet
1:9,600 (At original document size of 11X17)

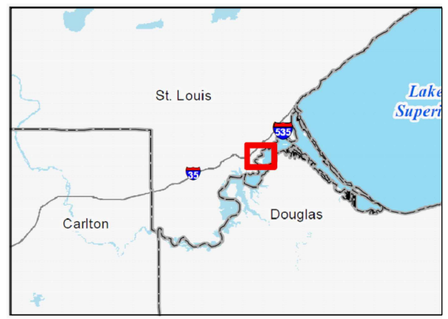
N

Legend

ISLAND OR SHOAL

CUT AREA

FILL AREA



Notes
1. Coordinate System: NAD83 MN State Plane North

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U.S. FISH & WILDLIFE SERVICE

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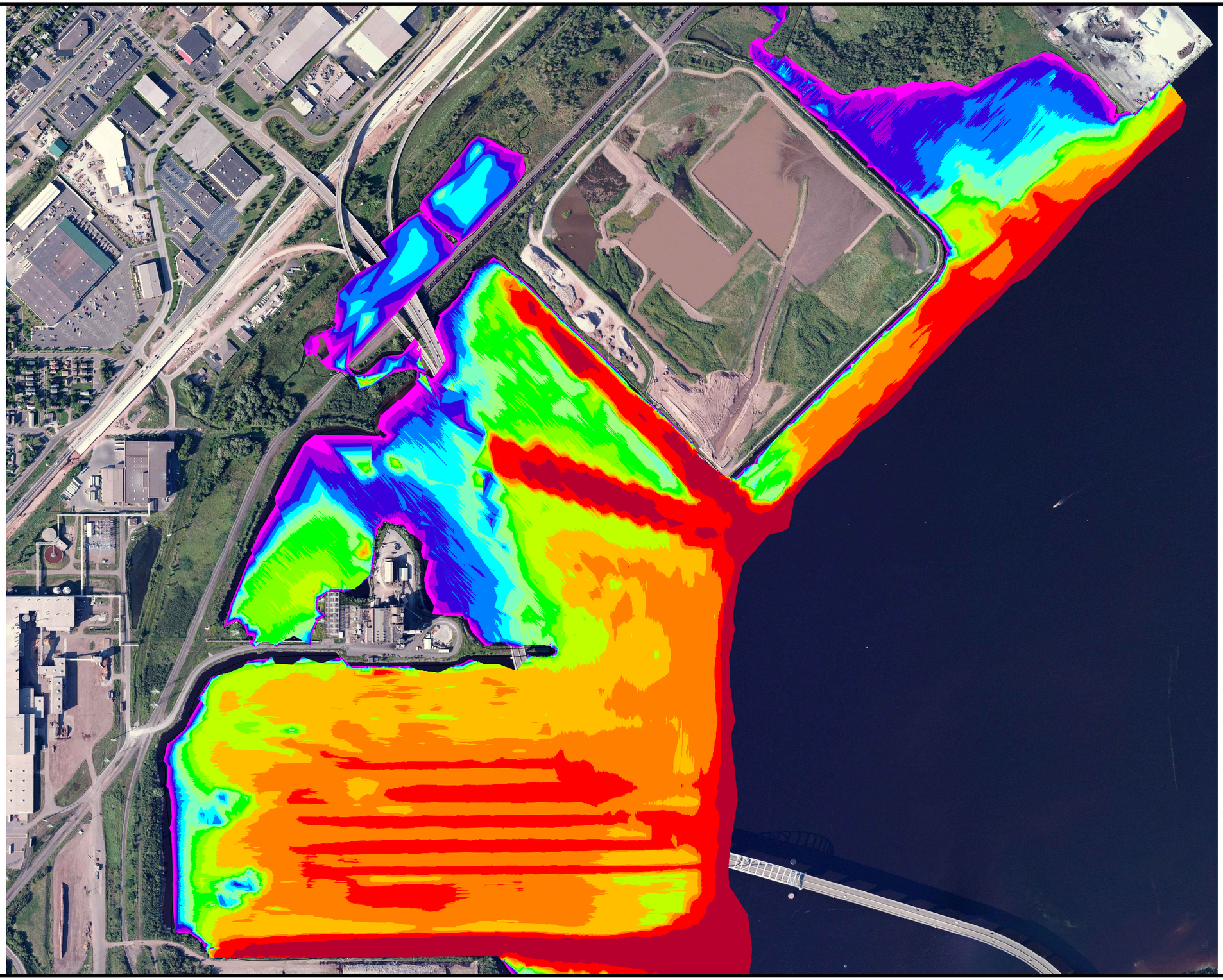


Figure No.

Appendix L - Figure 2

Title

40th Ave West Existing Bathymetry

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by TJB
Technical Review by EGL

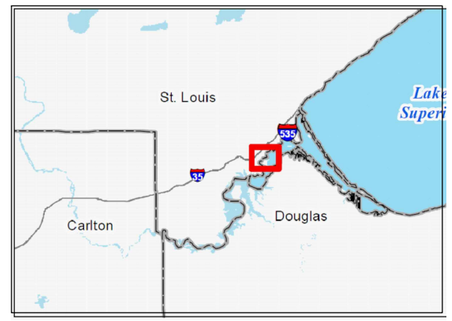
100 300 600 Feet
1:9,600 (At original document size of 11X17)

N

Legend

Existing Water Depth Based on Water Surface at Elevation 601.1'

0.0' - 0.5'	
0.5' - 1.0'	
1.0' - 1.5'	
1.5' - 2.0'	
2.0' - 2.5'	
2.5' - 3.0'	
3.0' - 3.5'	
3.5' - 4.0'	
4.0' - 4.5'	
4.5' - 5.5'	
5.5' - 6.5'	
6.5' - 8.0'	
8.0' - 14.0'	
14.0' - 30.5'	



Notes
1. Coordinate System: NAD83 MN State Plane North

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Figure No.

Appendix L - Figure 3

Title

40th Ave West Proposed Bathymetry

Client/Project

U.S. Fish and Wildlife Service
40th Avenue West
Remediation to Restoration Project
St. Louis River Estuary

Project Location

T49N, R14W, S07; 08; 17; 18
C of Duluth, St. Louis Co., MN

Prepared by TJB
Technical Review by EGL

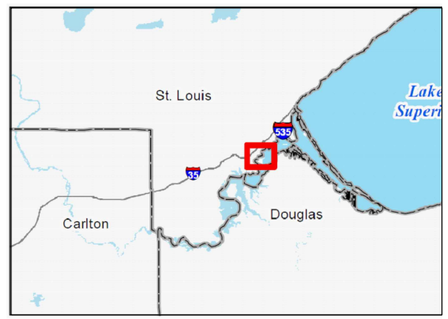
100 300 600 Feet
1:9,600 (At original document size of 11X17)

N

Legend

Proposed Water Depth Based on Water Surface at Elevation 601.1'

-3.0' - 0.0'	
0.0' - 0.5'	
0.5' - 1.0'	
1.0' - 1.5'	
1.5' - 2.0'	
2.0' - 2.5'	
2.5' - 3.0'	
3.0' - 3.5'	
3.5' - 4.0'	
4.0' - 4.5'	
4.5' - 5.5'	
5.5' - 6.5'	
6.5' - 8.0'	
8.0' - 14.0'	
14.0' - 30.5'	



Notes
1. Coordinate System: NAD83 MN State Plane North

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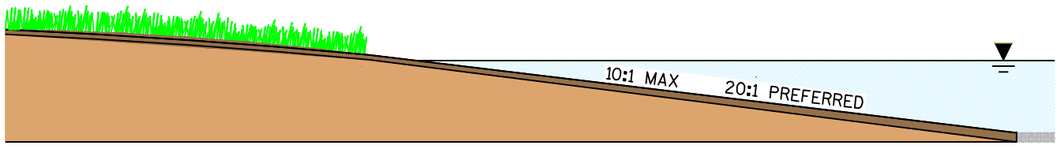


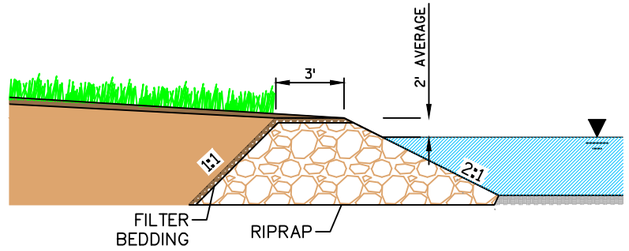
DREDGE MATERIAL SIDESLOPES

ADVANTAGES

- NATURAL APPEARANCE
- POTENTIAL LOWER COST BASED ON MATERIAL AVAILABILITY
- POTENTIAL FOR ADDITIONAL VEGETATIVE ESTABLISHMENT
- ADDITIONAL HABITAT VARIATION
- COULD COVER UNHEALTHY BIOACTIVE SUBSTRATES WITH BETTER MATERIAL

DISADVANTAGES

- LESS RESISTANCE TO EROSION FROM EXTREME EVENTS
- MORE MATERIAL REQUIRED
- MAY COVER HEALTHY BIOACTIVE ZONE
- SLOPE IN STABILITY/MATERIAL DRIFT DURING PLACEMENT



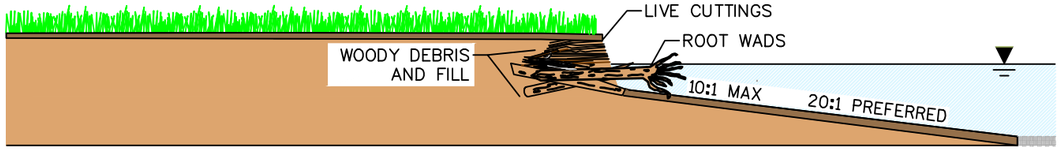
RIPRAP SLOPE PROTECTION

ADVANTAGES

- MORE STABILITY
- LESS MATERIAL DRIFT DURING PLACEMENT
- PROTECTS ESTABLISHED PLANTINGS OR HABITAT FEATURES

DISADVANTAGES

- LESS NATURAL APPEARANCE
- COST



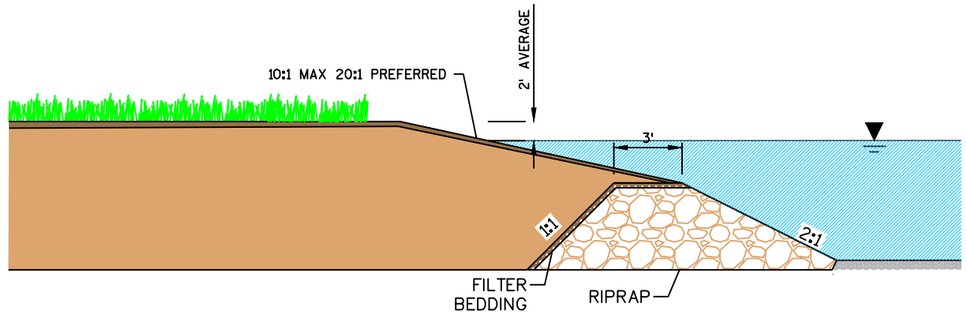
TOE WOOD SLOPE PROTECTION

ADVANTAGES

- NATURAL APPEARANCE
- POTENTIAL LOWER COST BASED ON MATERIAL AVAILABILITY
- POTENTIAL FOR ADDITIONAL VEGETATIVE ESTABLISHMENT
- ADDITIONAL HABITAT VARIATION
- CAN BE COMBINED WITH OTHER MEASURES SUCH AS RIPRAP TOE PROTECTION

DISADVANTAGES

- LESS RESISTANCE TO EROSION FROM EXTREME EVENTS
- PLACED AFTER ISLAND CONSTRUCTION SO DOES NOT ASSIST WITH SLOPE IN STABILITY/MATERIAL DRIFT DURING PLACEMENT



RIPRAP TOE PROTECTION

ADVANTAGES

- LESS MATERIAL DRIFT DURING PLACEMENT
- PROTECTION FROM SCOUR
- ADDITIONAL PROTECTION FOR ESTABLISHED PLANTINGS OR HABITAT FEATURES
- MORE NATURAL APPEARANCE AT WATERS EDGE

DISADVANTAGES

- COST
- UNNATURAL CONDITIONS AT TOE OF ISLAND OR SHOAL

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U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

US FISH AND WILDLIFE SERVICE
FOCUSED FEASIBILITY STUDY FOR
40TH AVENUE WEST
REMEDIATION TO RESTORATION PROJECT
ST. LOUIS RIVER ESTUARY

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Date
5/1/2015

Drawing Name
ISLAND/ SHOAL FETCH SIDE SLOPE PROTECTION

Sheet No.
APPX. L - FIG. 4

Jewell Project Number
U18010

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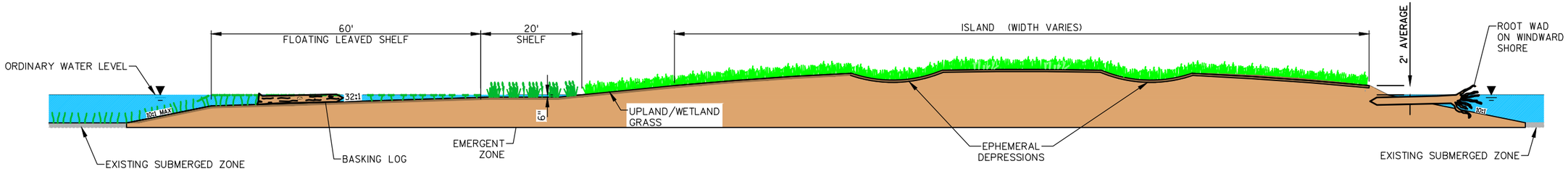

SECTION VIEW THROUGH ISLAND
SECTION A-A

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7/14/2015

Drawing Name
SECTION VIEW THROUGH ISLAND 1 10:1 SLOPE

Sheet No.
APPX. L - FIG. 5

Jewell Project Number
U18010

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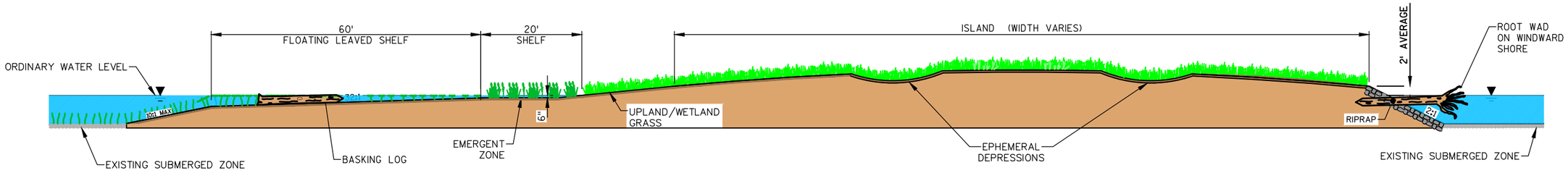

SECTION VIEW THROUGH ISLAND
SECTION A-A

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Drawing Name
SECTION VIEW THROUGH ISLAND RIPRAP SLOPE

Sheet No.
APPX. L - FIG. 6

Jewell Project Number
U18010

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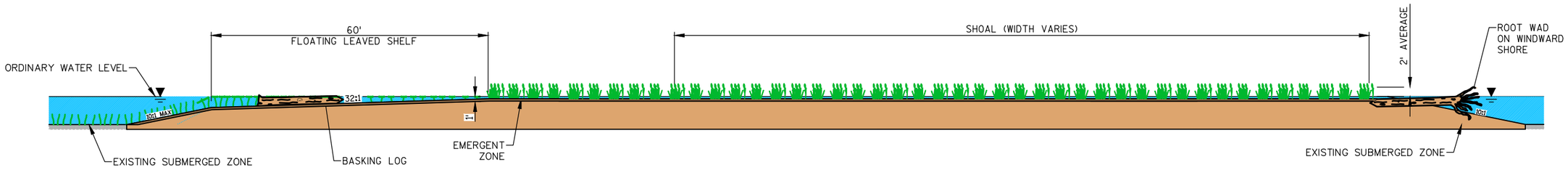

SECTION VIEW THROUGH SHOAL
SECTION A-A

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Drawing Name
SECTION VIEW THROUGH SHOAL ALTERNATIVE

Sheet No.
APPX. L - FIG. 7

Jewell Project Number
U18010

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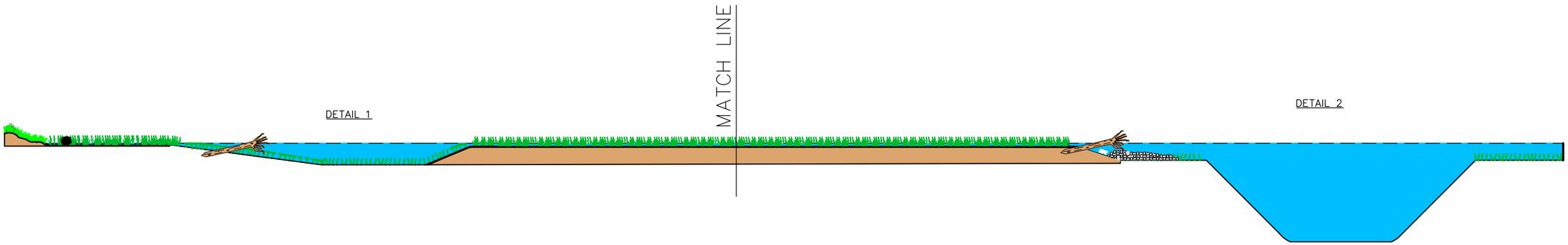
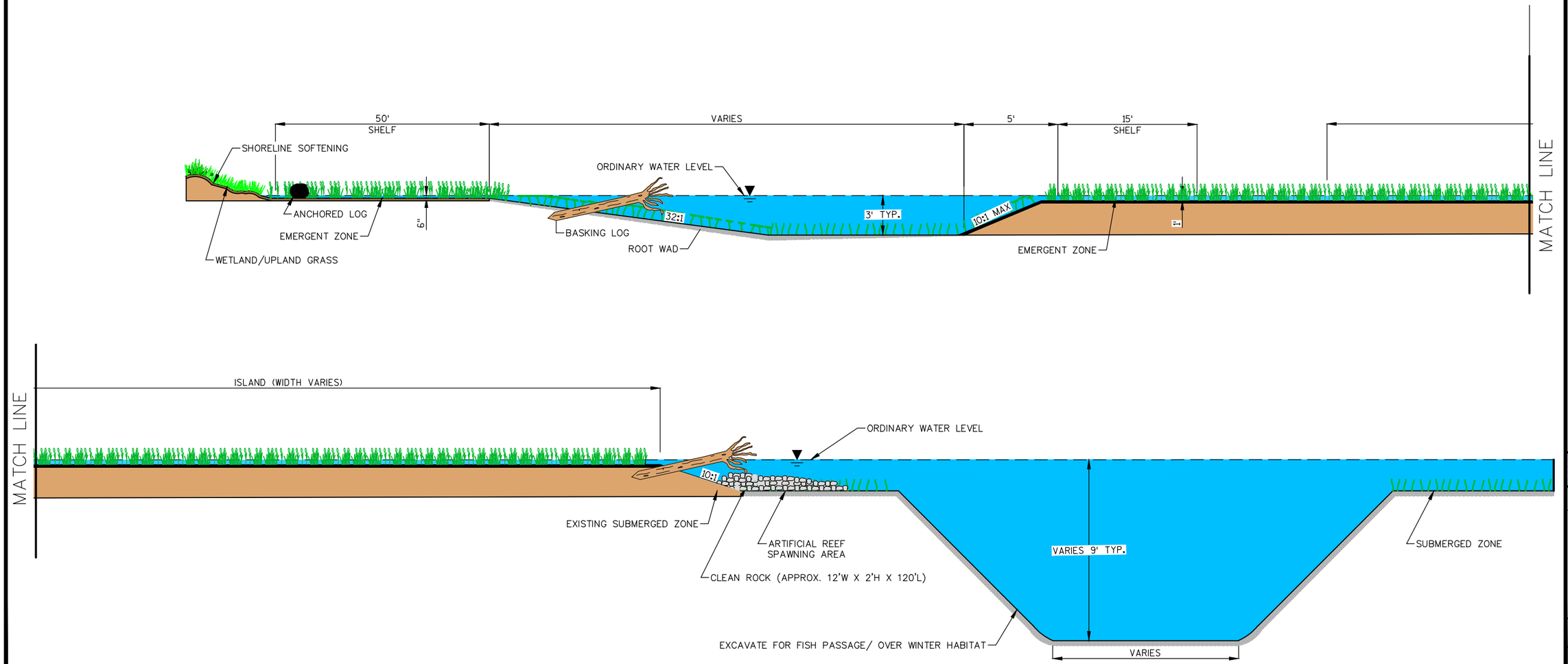


SECTION VIEW THROUGH SHOAL, SHORELINE, AND FISH PASSAGE CHANNEL
SECTION B-B



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Date
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Drawing Name
SECTION VIEW THROUGH SHOAL 6

Sheet No.
APPX. L - FIG. 8

Jewell Project Number
U18010

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