

Horseshoe Falls Dam Fish Passage Project

Public Informational Meeting
Richmond/Charlestown, RI



Wood-Pawcatuck Watershed Association



September 21, 2010

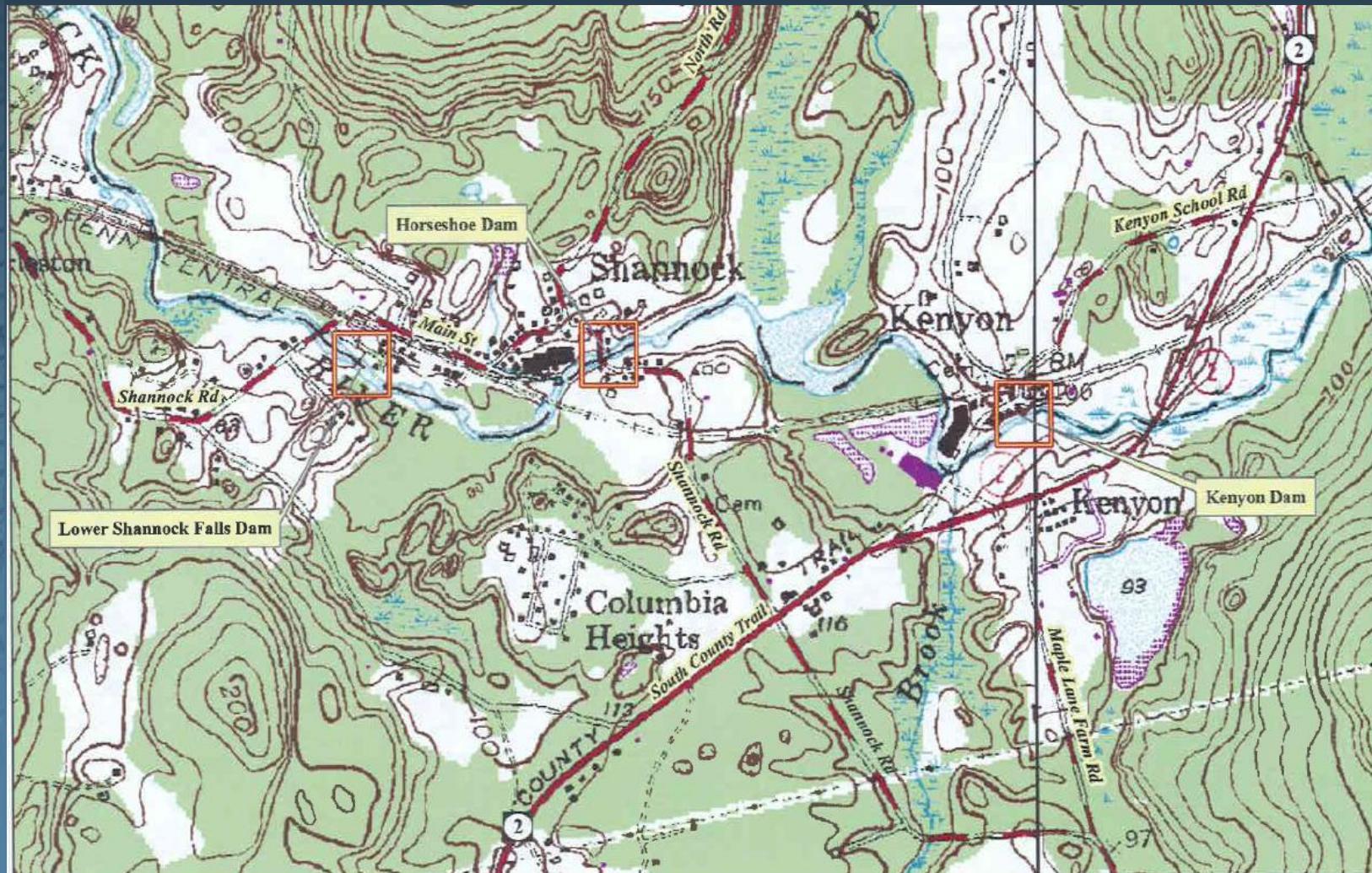
Agenda

Horseshoe Falls Dam Fish Passage

- Introduction
- Project Background
- Project Description
 - *Site Description*
 - *Previous Dam Assessments and Current Condition*
 - *Feasibility Study Alternatives Evaluations*
 - *Fish Passage Target Species*
 - *Fish Passage Design Alternatives*
 - *Final Design and Construction Sequence*
- Questions and Discussion

Site Description

Horseshoe Falls Dam Fish Passage



USGS Site Location Map

Site Description

Horseshoe Falls Dam Fish Passage

Wood Pawcatuck Watershed Association Fish Passage Projects

- Lower Shannock Falls Dam Removal and Fish Passage – Completed 2010
- Horseshoe Falls Dam Fish Passage – Permitting Completed, Design 70% Complete
- Kenyon Mills Fish Passage – Design 20% Complete, Permitting Underway

Site Description

Horseshoe Falls Dam Fish Passage

Richmond

- 1759 - Saw & Grist Mills (Jeffrey Wilcox)
- 1771 - Bought by Clarke Family, Added a Woolen Mill
- 1848 - Added additional Stone Cotton Mill, Five Mill Houses and Store (Clarke Family)
- 1925 - Horseshoe Dam Spillway Raised, Original Waterwheel Replaced with Hydroelectric Turbine
- 1964 - Mill Closed, 1972 Clark Family Sold Mill Holdings

Site Description

Horseshoe Falls Dam Fish Passage

Charlestown

- 1845 – Linen and Wool Goods Factory (Knowles Family)
- 1848 Bought by Samuel A. Hoxie, Converted to Cotton Mill
- Mill Burned in 1856

Site Description

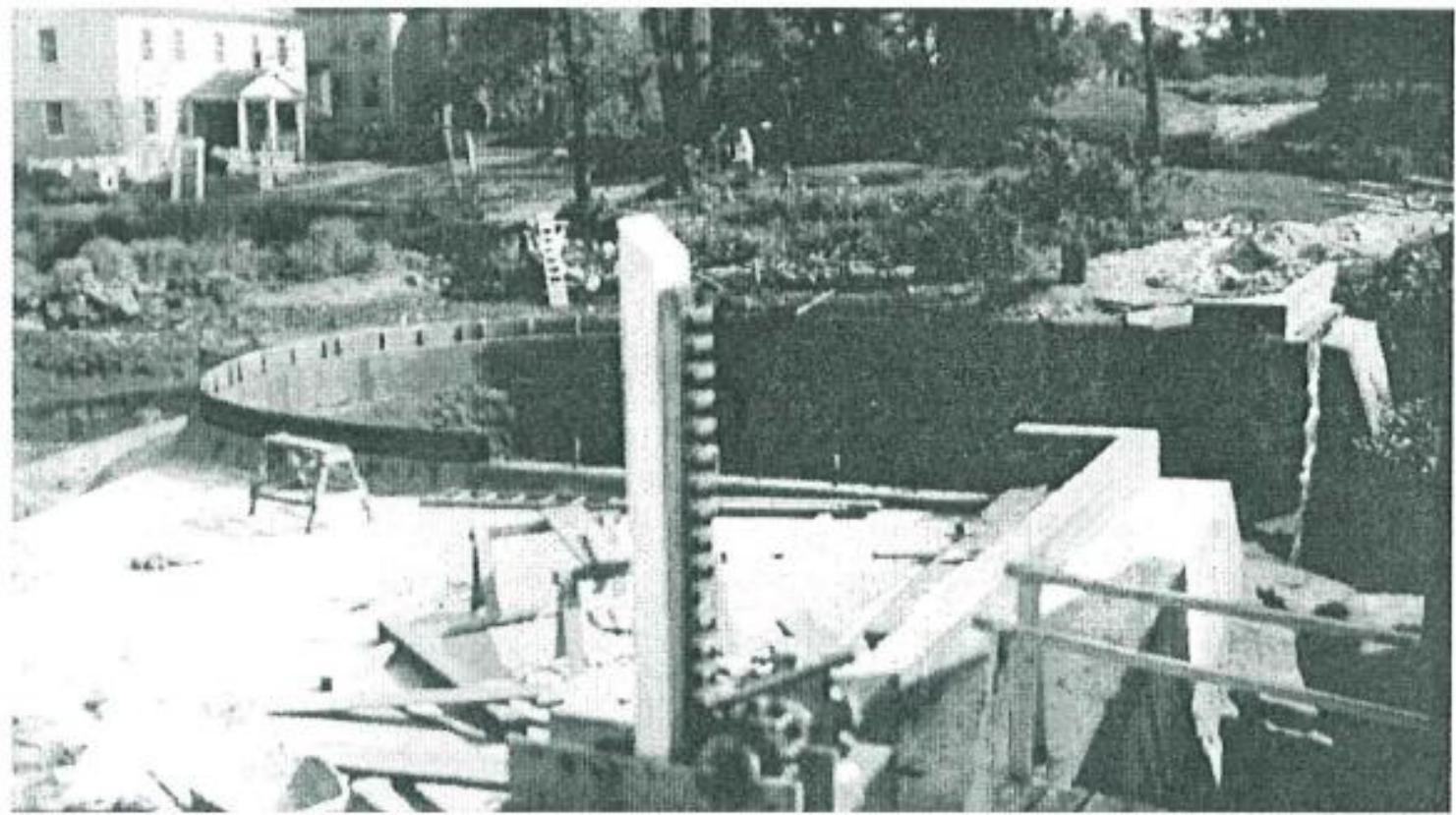
Horseshoe Falls Dam Fish Passage



Figure 5-12. Ca. 1942 aerial photograph of Upper Shannock Falls village (source: www.driftways.com).

Site Description

Horseshoe Falls Dam Fish Passage



Dam Reconstruction Drawing (1945)

Site Description

Horseshoe Falls Dam Fish Passage



Source: Bing Maps; bing.com

Aerial Site Location Map

Agenda

Horseshoe Falls Dam Fish Passage

Previous Dam Assessments
and Current Condition

Previous Dam Assessments and Current Condition Horseshoe Falls Dam Fish Passage

- 1984 Dam Inspection Report (RIDEM)
 - *Concrete Crest of Spillway in Fair Condition*

Previous Dam Assessments and Current Condition Horseshoe Falls Dam Fish Passage

- 1993 Raceway Mechanism Failed
 - 1993 - *State Ordered Repairs to Raceway*
 - 1997 - *Plans were submitted and approved, repairs were never made*
 - 1998 & 2000 - *Stop logs placed in headgate*

Previous Dam Assessments and Current Condition Horseshoe Falls Dam Fish Passage

- Current Dam Inspection



Horseshoe Dam Structural Inspection – February, 2010

Previous Dam Assessments and Current Condition

Horseshoe Falls Dam Fish Passage

- Current Dam Condition
 - *Spillway Remains in FAIR Condition*
 - *Cracks/Leakage in Concrete Apron Behind Spillway*
 - *Voids on Stone Masonry Spillway Face*
 - *Embankment Walls in Fair Condition*
 - *Left Wall to be removed during construction*
 - *Damage/Deficiencies Noted on Raceway Walls*

Previous Dam Assessments and Current Condition Horseshoe Falls Dam Fish Passage

Current Site Photographs



Horseshoe Dam – June, 2010

Previous Dam Assessments and Current Condition Horseshoe Falls Dam Fish Passage

Current Site Photographs



Raceway – June, 2010

Previous Dam Assessments and Current Condition Horseshoe Falls Dam Fish Passage

Current Site Photographs



Left Embankment Wall – February 2010

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Horseshoe Falls Dam Fish Passage

**2007 Feasibility Study
Alternatives Evaluation**

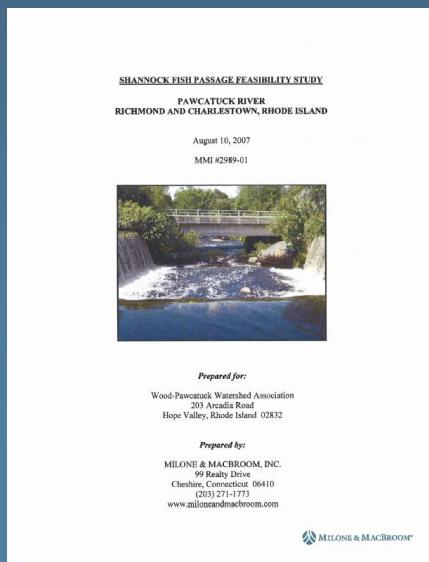
2007 Feasibility Study Alternatives Evaluation

Horseshoe Falls Dam Fish Passage

Feasibility Study Alternatives

TABLE 5-1
Summary of Alternatives Considered

<i>Upper Shannock Horseshoe Falls Dam</i>	
H-1	No Action
H-2a	High Gradient Riffles at Right Raceway
H-2b	Fish Ladders at Raceway
H-3	Fish Ladder at Left Abutment

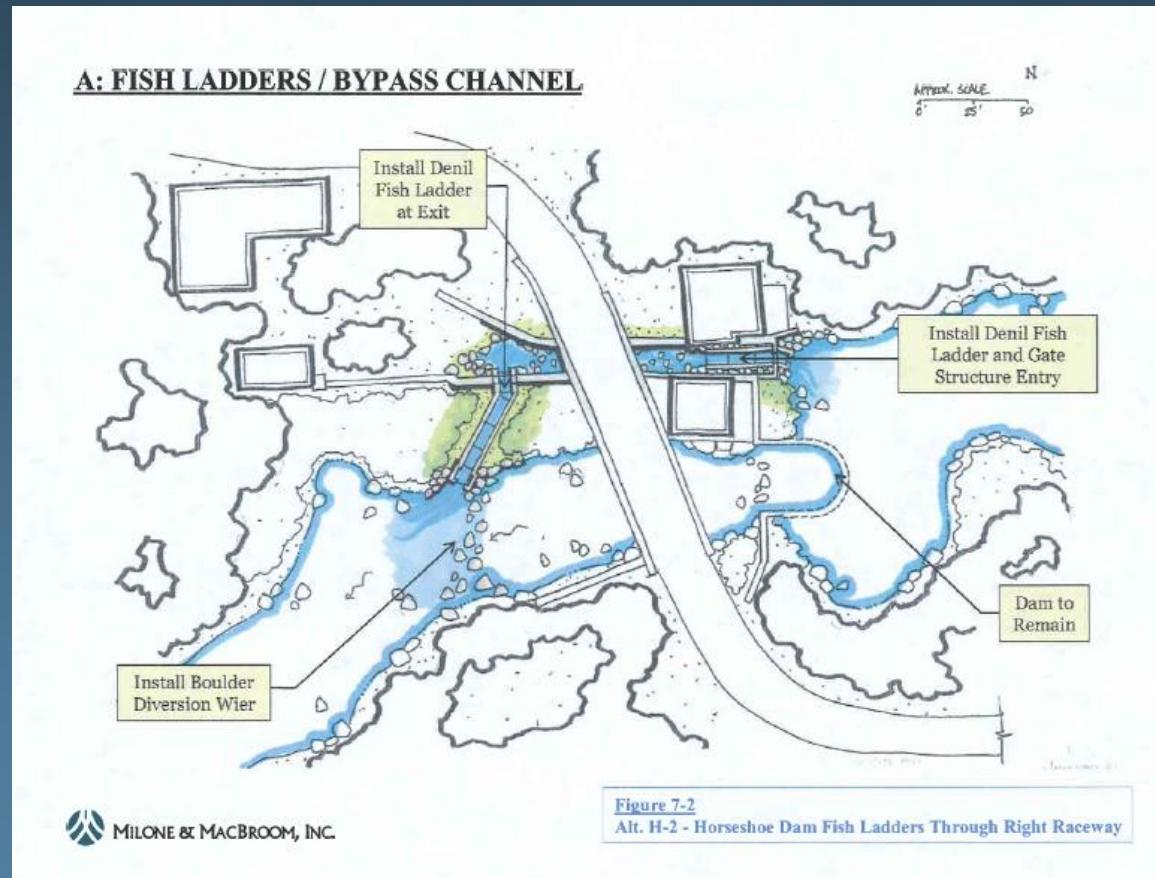


Source: August 2007
Malone and MacBroom Feasibility Study

2007 Feasibility Study Alternatives Evaluation

Lower Shannock Falls Dam Removal and Fish Passage

Fish Ladder Through Right Raceway



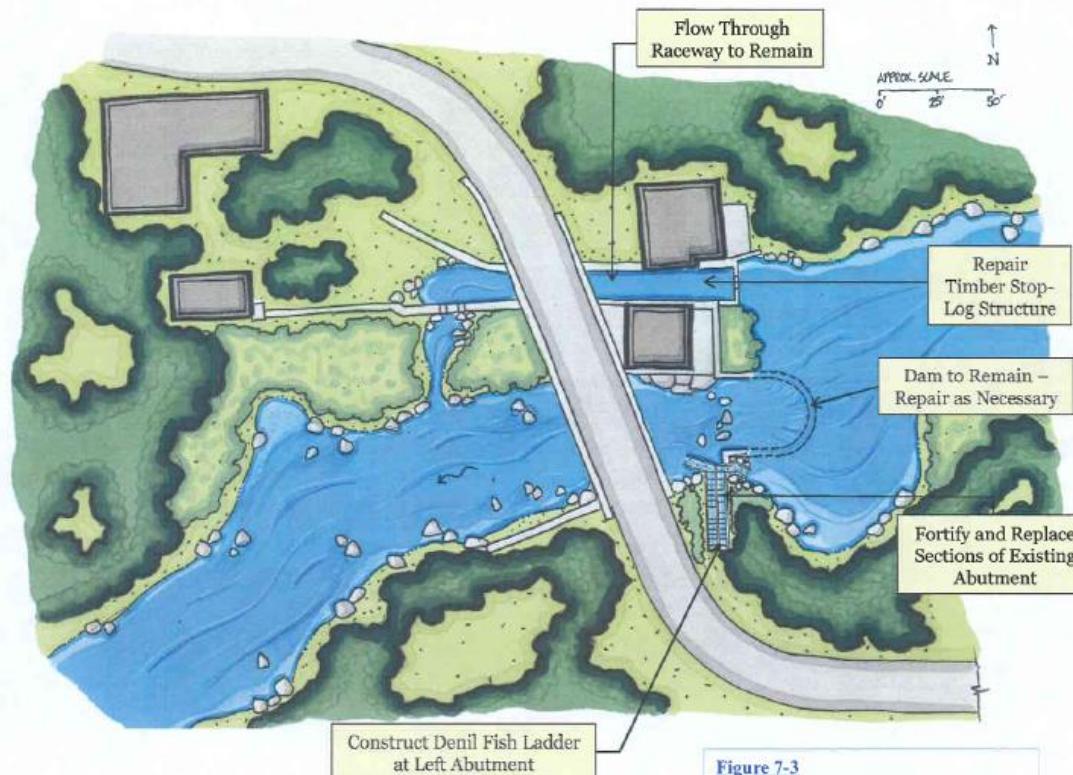
Source: August 2007

Malone and MacBroom Feasibility Study

2007 Feasibility Study Alternatives Evaluation

Horseshoe Falls Dam Fish Passage

Fish Ladder At Left Abutment



 MILONE & MACBROOM, INC.

Figure 7-3
Alternate H-3 - Horseshoe Dam Fish
Ladder at Left Abutment

Source: August 2007

Malone and MacBroom Feasibility Study

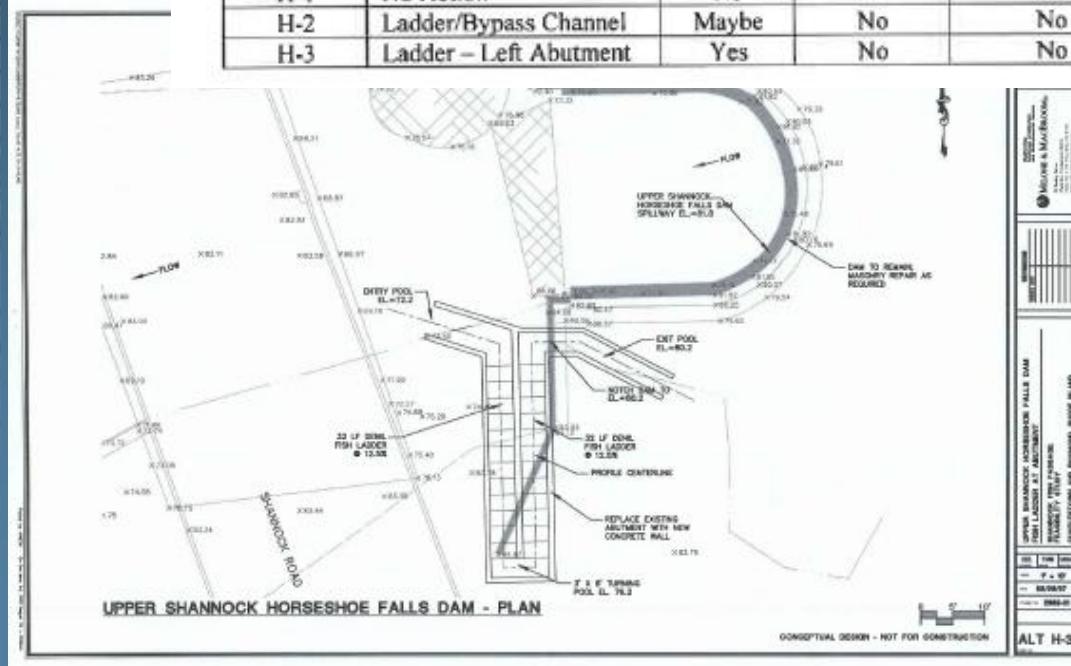
2007 Feasibility Study Alternatives Evaluation

Horseshoe Falls Dam Fish Passage

Alternatives Evaluation Summary Table

TABLE 7-2
Summary of Alternatives at Upper Shannock Horseshoe Falls Dam

Alternative	Description	Achieves Fish Passage?	Improves Habitat Conditions?	Minimizes Long Term Dam Maintenance?	Potential for Impact to Historic Resources?	Prudent and Feasible Alternative?
H-1	No Action	No	No	No	No	No
H-2	Ladder/Bypass Channel	Maybe	No	No	Yes	No
H-3	Ladder – Left Abutment	Yes	No	No	Yes	Yes



Source: August 2007

Malone and MacBroom Feasibility Study

2007 Feasibility Study Alternatives Evaluation

Horseshoe Falls Dam Fish Passage

Denil Fish Ladder



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Horseshoe Falls Dam Fish Passage

Fish Passage Target Species

Fish Passage Target Species

Horseshoe Falls Dam Fish Passage

- Historic Passage
 - *Atlantic Salmon* (*possible*)
 - *Salter Brook Trout*
 - *American Shad*
- Alewife
- Blueback Herring
- Rainbow Smelt
- Brown Trout
- Brook Trout
- American Eel

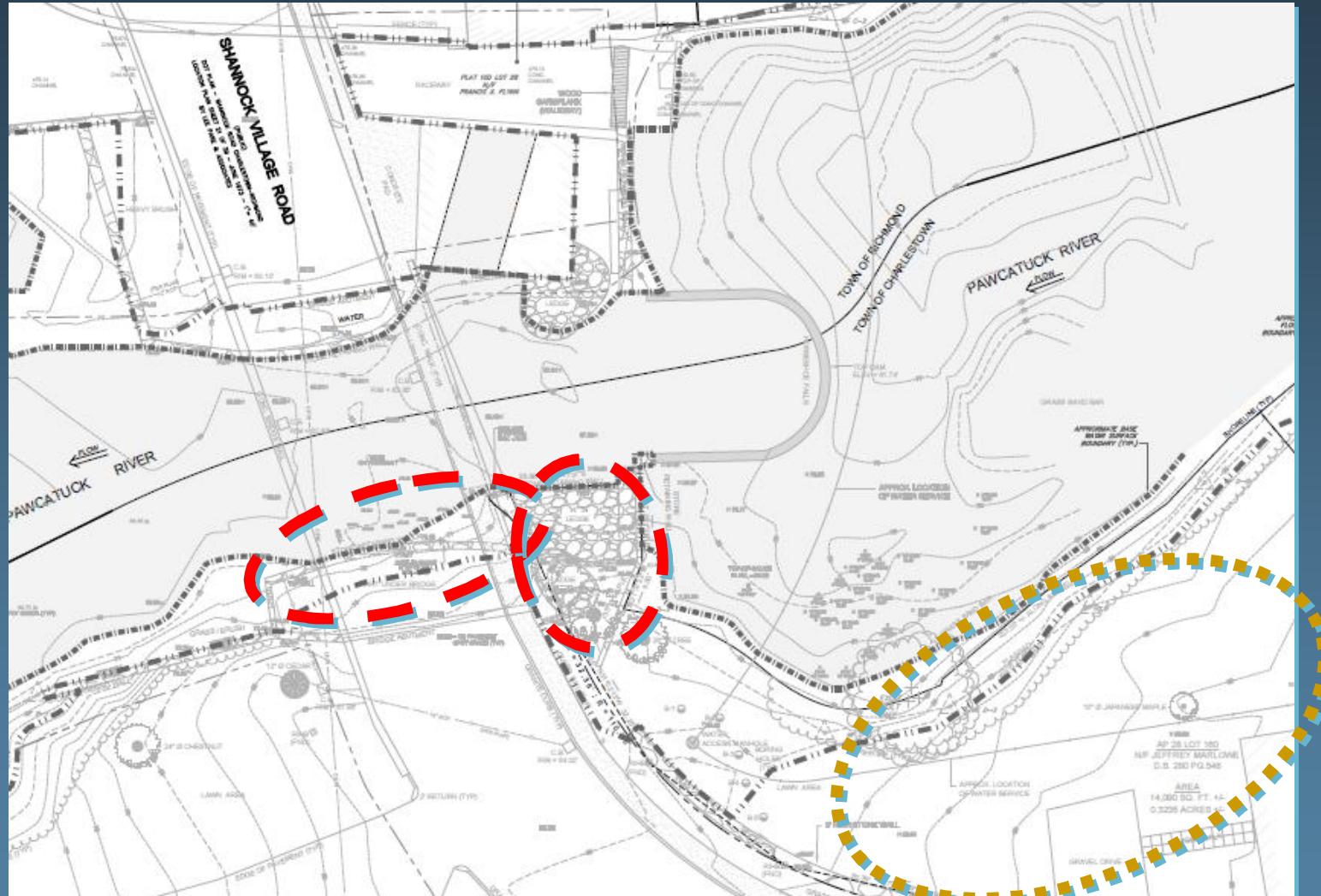
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Horseshoe Falls Dam Fish Passage

Fish Passage Alternatives

Fish Passage Alternatives

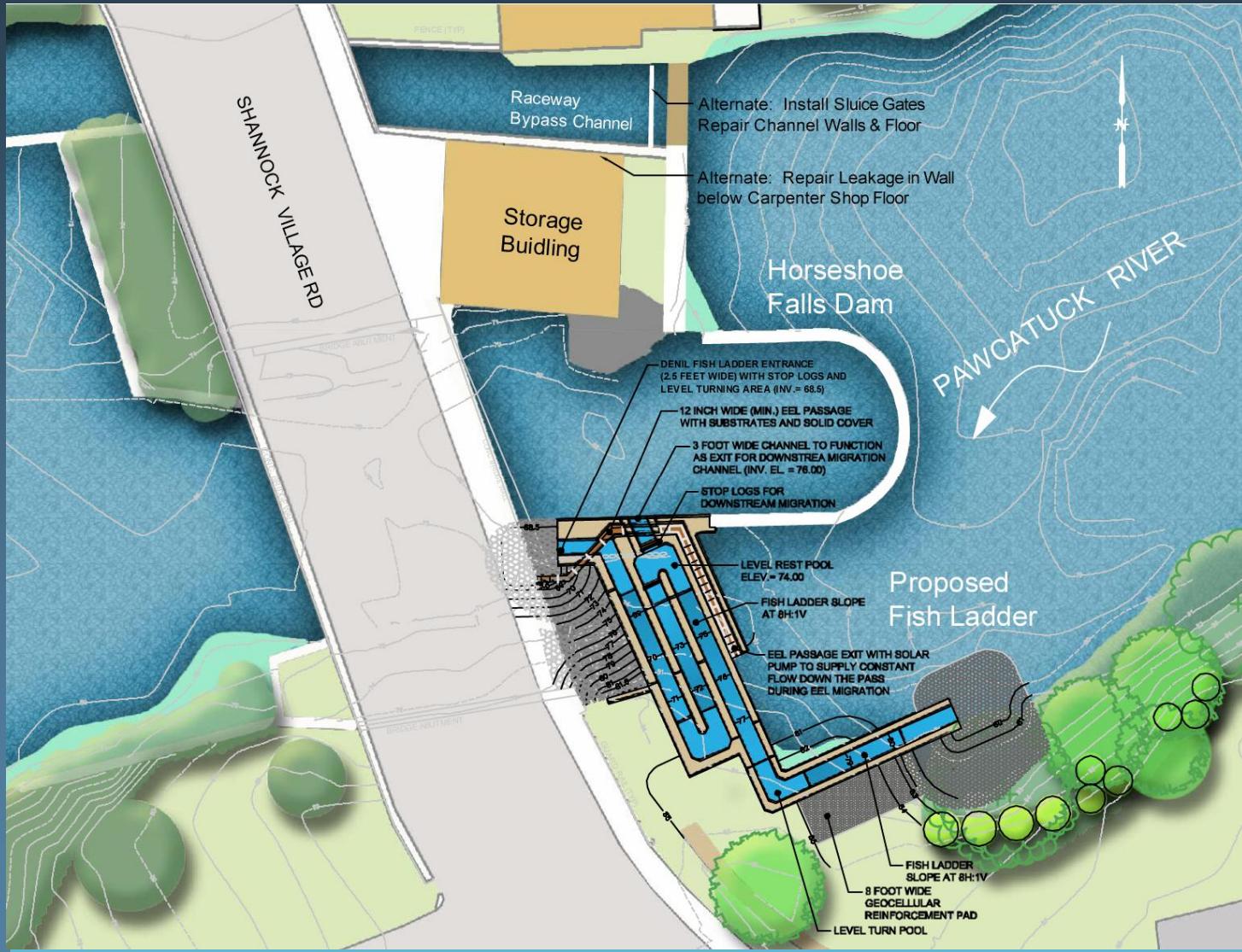
Horseshoe Falls Dam Fish Passage



Final Design Considerations

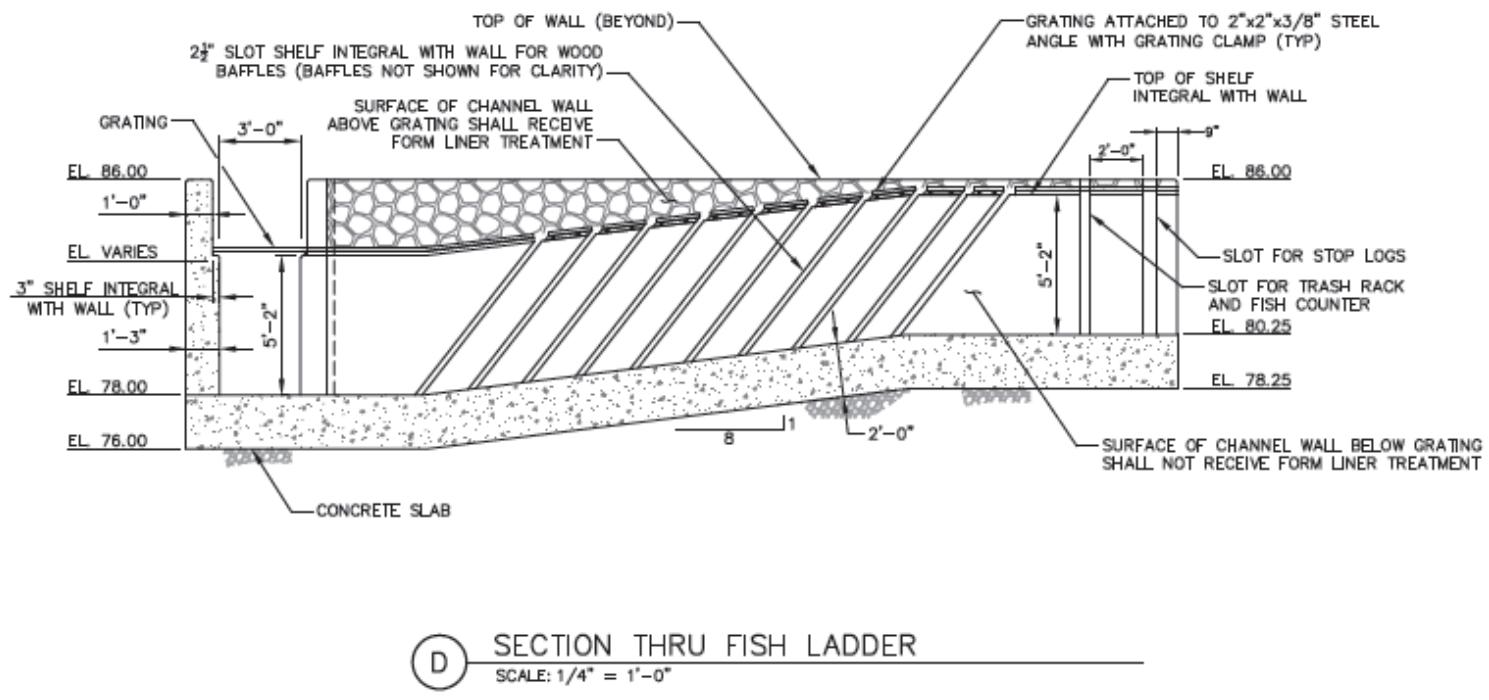
Fish Passage Alternatives

Horseshoe Falls Dam and Fish Passage



Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage



Fish Ladder

Final Design Alternative – Fish Ladder at Left Abutment

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Horseshoe Falls Dam Fish Passage

Final Design and
Construction Sequence

Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage

Proposed Temporary Site Modifications

- *Construction Entrances*
- *Perimeter Erosion and Sedimentation Controls*
- *Temporary Cofferdam Next to Existing Dam*
- *Open Raceway*
- *In-Channel Access and Work Areas*
 - *Heavy Equipment in River*
- *Expected 120 Day Construction Period*
 - *Potential Lane Closures, Sidewalk Remains Open*

Final Design and Construction Sequence

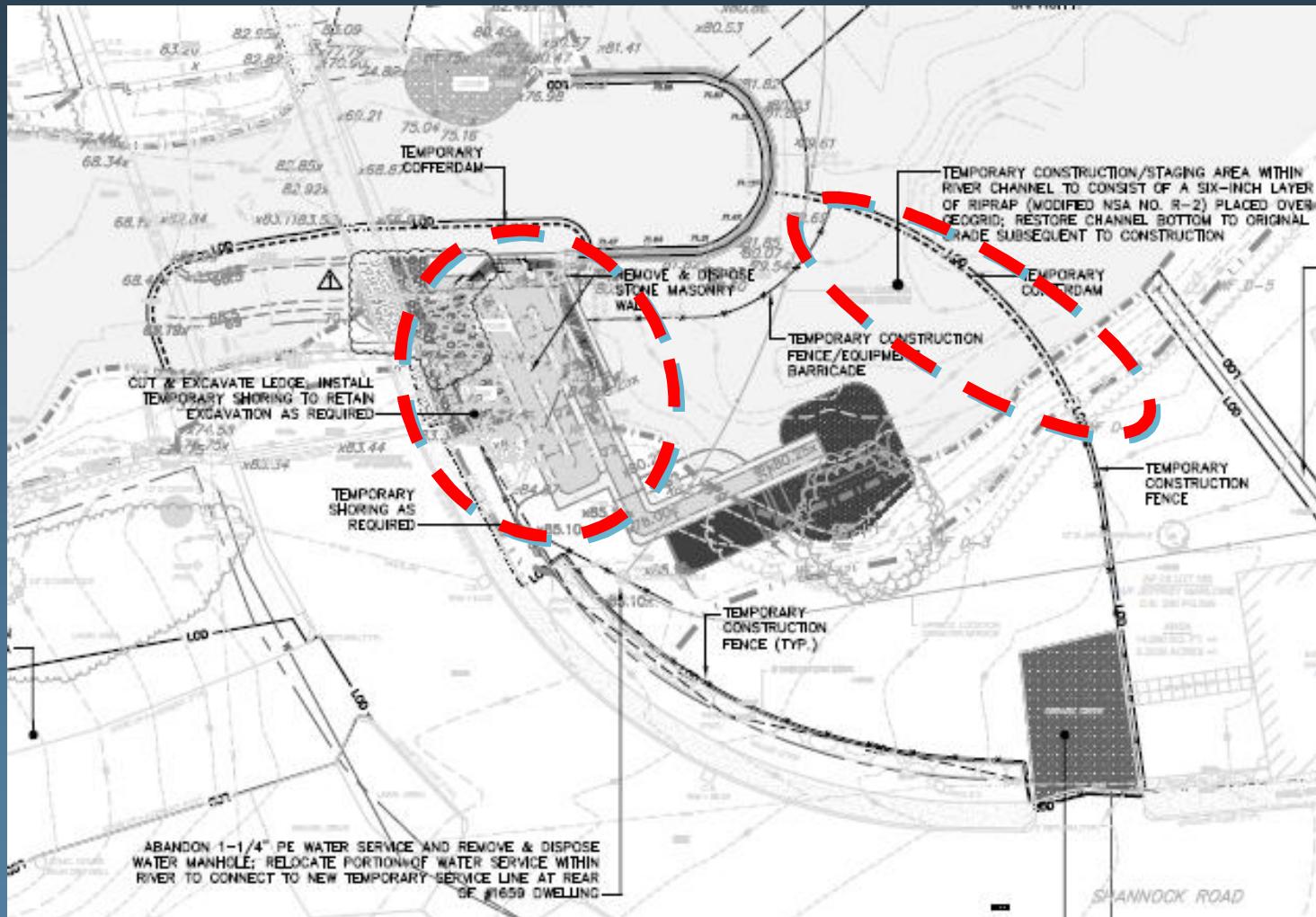
Horseshoe Falls Dam Fish Passage

Proposed Permanent Site Modifications

- *Bedrock Removal*
 - *Area Between Bridge and Left Embankment*
 - *Heavy Equipment/Potential Blasting*
- *Fish Ladder*
 - *Area Between Bridge and Left Embankment*
 - *Limited Riverbed Grading Under Bridge*

Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage



Construction Activities and Sequence

Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage



Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage



Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage



Final Design and Construction Sequence

Horseshoe Falls Dam Fish Passage



Agenda

Horseshoe Falls Dam Fish Passage

Questions and Discussion