Pawcatuck River and the Potter Hill Mill Site

River Ecology, Flood Resiliency and Public Access Improvements

Westerly Town Council
October 28, 2024

Presentation Outline

- Project goals and funding parameters
- Alternatives presented in January
- What we have heard
- Refined flood resilience modelling
- Proposed new alterative for consideration
- Next steps

This Project is About Shared Community Goals

Restore fish passage and natural river processes

- Provide efficient passage migratory and resident fish species
- Improve water quality
- Afford natural sediment transport
- Sustain wetlands and eco-services and values

Provide flood resiliency and public safety

- Eliminate Town liability of potential structure failure, sudden release of water
- Reduce upstream flooding
- Avoid increased downstream flooding, minimize flood risk
- Remove spill and hydraulics as safety hazard

This Project is About Shared Community Goals

Maintain and enhance recreational boating, other public recreation

- Improve canoe and kayak uses, take-out and put-in and portage route
- Create public park with all-persons trail, other amenities

Minimize liability and costs to the Town of Westerly

- Eliminate liability with a poor-condition dam
- Remove decrepit mill building as public nuisance and safety hazard
- Minimize costs for project repairs, operation and maintenance

Address potential effects to landowners

- Predict waterfront changes
- Identify Hopkinton properties with recommended well replacement

Project Focus and Funding Parameters

NOAA fish passage grants

- Funds are available for removing dams and other river barriers, and not repairing barriers.
- NOAA funds are highly competitive, nationwide.
- Dam removal is the NOAA preferred alternative for migratory fish passage.
- Less preferred are in-river nature-like fishways, due to fish passage delays and natural predation concerns.
- Structural fishways (fish ladders) and bypass channels are low-priority alternatives for NOAA, due to low fish passage efficiency or effectiveness, a required agreement for operation and maintenance, and little to no community resilience benefits.

Structural Fishway design

- Fuss & O'Neill was hired by the Town to assess dam removal alternatives, not to assess construction of a structural fishway and repairing the dam.

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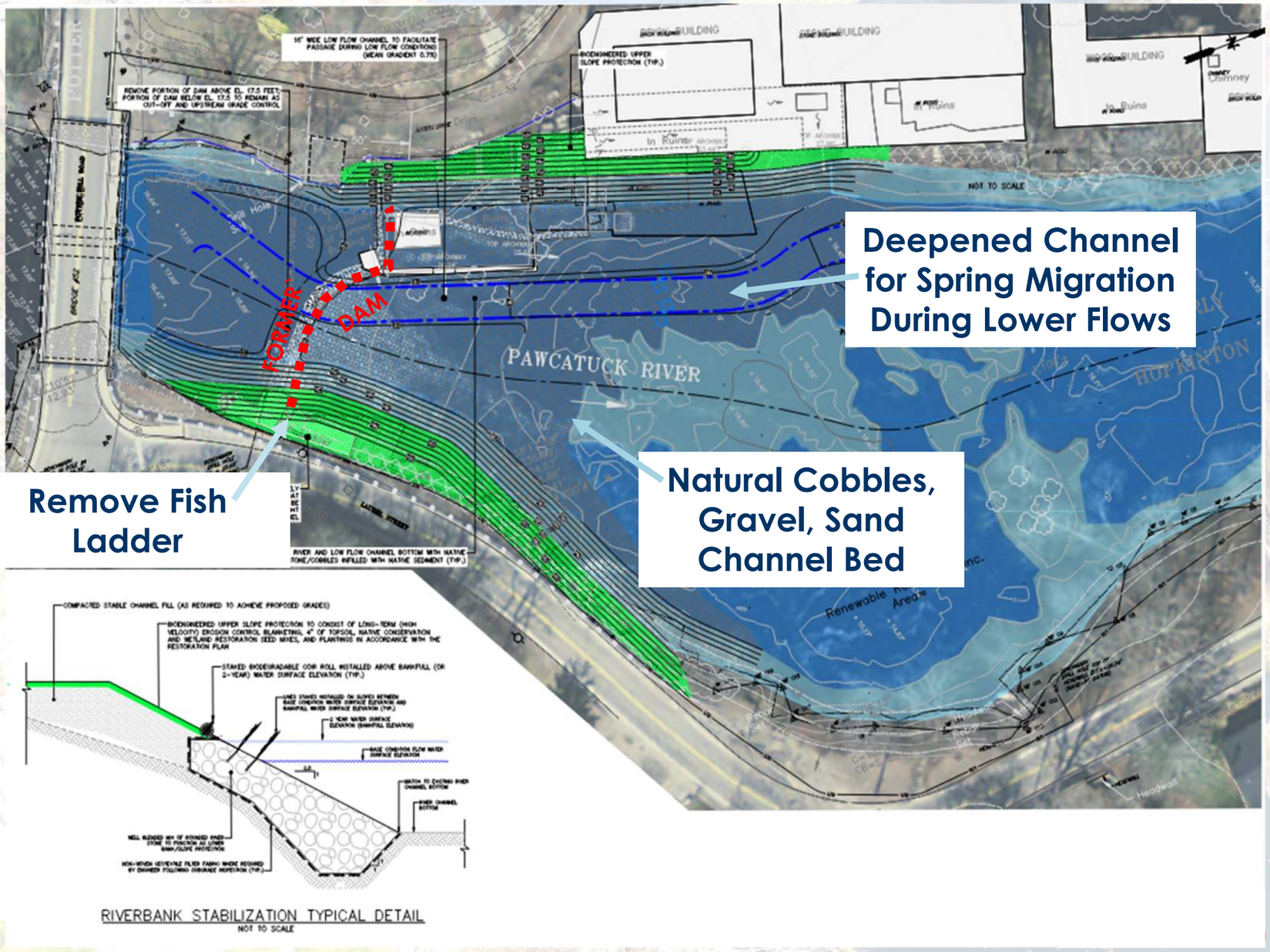
Pawcatuck River Restoration Alternatives

ALTERNATIVE	HEADPOND DROP	FISHWAY/ PORTAGE LENGTH
Alternative A (Former Alt. 1)	6.8 feet	175-ft In-River Improvements No Portage
Alternative B (Former Alt. 2)	6.0 feet	160 - 225 feet
Alternative C	5.0 feet	200 - 300 feet
Alternative D	4.25 feet	240 - 350 feet
Alternative E (Former Alt. 4)	**3.5 feet**	**280 – 400 feet**
Alternative F	2.75 feet	320 – 490 feet
Alternative G	2.0 feet	360 – 570 feet
Alternative H (Former Alt. 3)	0.5 feet	500 - 700 feet

Alternative A *(6.8-Foot Normal Headpond Reduction)*



- **Full dam removal with minimal in-river structures**
  - **Low flow channel to provide fish passage during lower flows and stabilizing channel side-slopes**

Alternative B *(6-Foot Normal Headpond Reduction)*

Natural Cobbles over Buried Boulders at Riffles

POOL

LOW FLOW CHANNEL

RIFFLE

ENHANCE CANOE/KAYAK PORTAGE AREA ON WESTERLY LAND TRUST PROPERTY

NATURE-LIKE RIFFLE-POOL FISHWAY TO CONSIST OF SERIES OF RIFFLES AND POOLS WITH A 25' WIDE LOW FLOW CHANNEL TO FACILITATE PASSAGE DURING LOW FLOW CONDITIONS (MEAN GRADIENT 1.1%)

ABANDON, FILL, AND BURY EXISTING FISH LADDER; SELECTIVELY REMOVE AND DISPOSE SECTIONS OF EXISTING FISH LADDER THAT WILL EXTEND ABOVE THE PROPOSED SLOPE; CARE MUST BE TAKEN NOT TO DISTURB EXISTING WALL ON RIVER RIGHT BETWEEN EDGE OF ROADWAY AND RIVER CHANNEL

RIFFLE #1
TOP OF RIFFLE EL.=20.5±
LOW FLOW CHANNEL INV. EL.=18.7±

RIFFLE #2
TOP OF RIFFLE EL.=19.8±
LOW FLOW CHANNEL INV. EL.=18.0±

RIFFLE #3
TOP OF RIFFLE EL.=19.1±
LOW FLOW CHANNEL INV. EL.=17.3±

RIFFLE #4
TOP OF RIFFLE EL.=18.4±
LOW FLOW CHANNEL INV. EL.=16.6±

POTTER HILL ROAD

BRIDGE #52

Flood Zone C

Flood Zone B

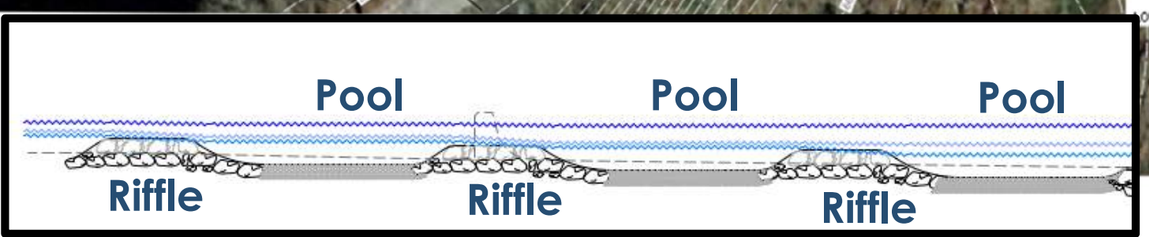
Potter Hill Rd

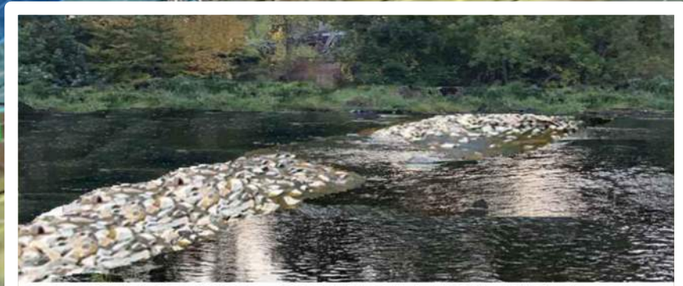
MAXSON STREET

River Rd

Laurel St

Pawcatuck River





RIFFLE–POOL SYSTEM ILLUSTRATION
NOT TO SCALE

MIN. OPERATING TAILWATER WSE = 20.8±

8' RIFFLE CREST (TYP.)

POOL VARIES (45' MIN.)

LOW FLOW CHANNEL INV. EL.=16.6±

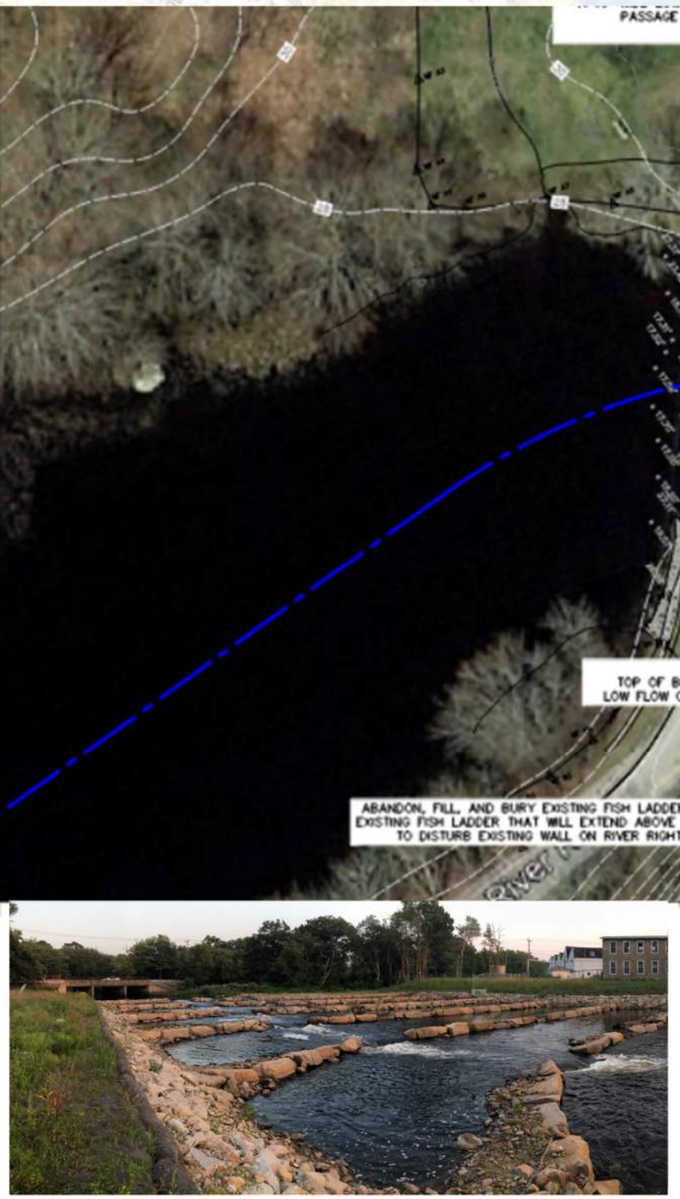
MAX. OPERATING TAILWATER WSE = 23.5±

NORM. OPERATING TAILWATER

Alternative E *(3.5-Foot Normal Headpond Reduction)*

Boulder Weirs (Alt. to Riffle Weirs)

Natural Cobbles, Gravel, Sand/Silt in Pools



Boulder Weir Pool Example (Bradford Fishway)

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What We Heard - Prior Questions and Concerns

What are the Costs for the Alternatives?

- What will available funding allow?
- What is permittable?

River Access and Safety

- Watercraft access conditions at Route 3 bridge
- Fire rescue and water supply
- Impact of drought flows

Environment and Wetlands/Wildlife

- Wetland changes and rare species habitat
- NPS Wild and Scenic River qualities and protection
- Sediment quality and redistribution

Fish Passage

- Why not a design similar to Bradford fishway?
- Fish migration species, populations and recent conditions

Property Owner Concerns

- Private well impacts
- Land exposed by lowered impoundment and river access, invasive plants

Flood Resilience

- Flood modeling methods and analysis
- Aguntaug Swamp flood storage
- Downstream Flooding

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Refined Hydraulic Model Analysis

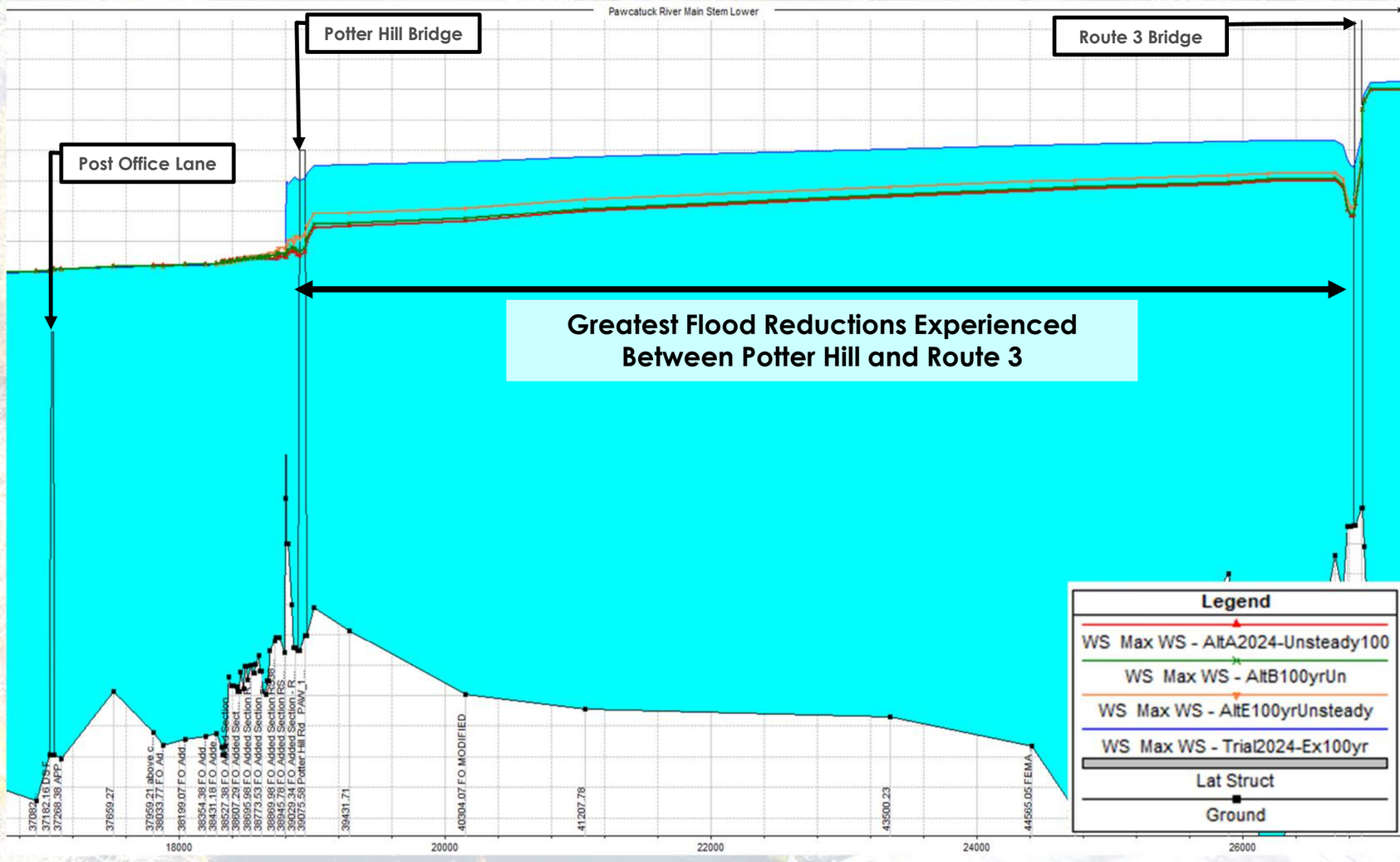
Upstream Flood Elevation Changes

Upstream Flood Reduction Benefits for Alternatives A, B, and E

Greatest flood reductions occur upstream of Potter Hill dam, between the dam and Route 3 Bridge.

During the 100-year flood, maximum flood reductions are:

- 2.1-feet for Alternative A
- 2.0-feet for Alternative B
- 1.6-feet for Alternative E



Refined Hydraulic Model Analysis
Downstream Flood Elevation Changes

- **Alternatives A, B, and E will result in minimal flood elevation increases downstream.**
- Alternatives A, B, and E result in the following increases in downstream flood elevations:
  - +0.10 feet (≈1 inch) or less for the 10-Year Flood;
  - +0.06 feet (≈3/4 inch) or less for the 50-Year Flood;
  - +0.03 feet (≈1/3 inch) or less for the 100-Year Flood; and
  - +0.06 feet (≈3/4 inch) or less for the 500-Year Flood.

For reference purposes:

A pencil or I-Phone is 1/3" thick;

A quarter is 1" in height.

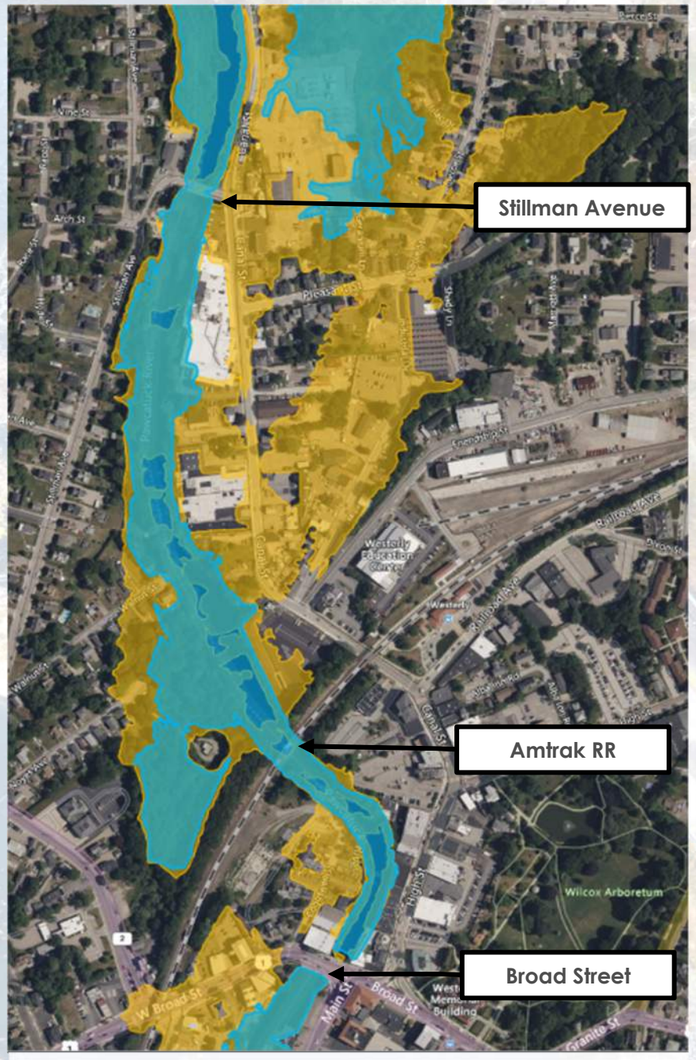
Location	10-Yr Increase (ft.)			50-Yr Increase (ft.)			100-Yr Increase (ft.)			500-Yr Increase (ft.)		
	Alt A	Alt B	Alt E	Alt A	Alt B	Alt E	Alt A	Alt B	Alt E	Alt A	Alt B	Alt E
End of Fishway to Post Office Lane	0.10	0.10	0.09	0.06	0.06	0.06	0.03	0.03	0.02	0.06	0.06	0.02
Post Office Lane to Boombridge				0.06	0.06	0.06				0.06	0.06	0.03
Boombridge to White Rock Road/Bridge Road				0.05	0.05	0.05				0.06	0.06	0.03
White Rock Road/Bridge Road to Route 78				0.04	0.04	0.04				0.03	0.02	0.01
Route 78 to Stillman Avenue				0.04	0.04	0.04				0.02	0.02	0.01
Stillman Avenue to Amtrak RR				0.04	0.04	0.04				0.03	0.02	0.00
Amtrak RR to Route 1 (Broad Street)	0.03	0.03	0.03	0.02	0.02	0.01				0.02	0.02	0.00

Orange: Change ≥0.05 feet Blue: Change ≤ 0.05 feet Green: No change

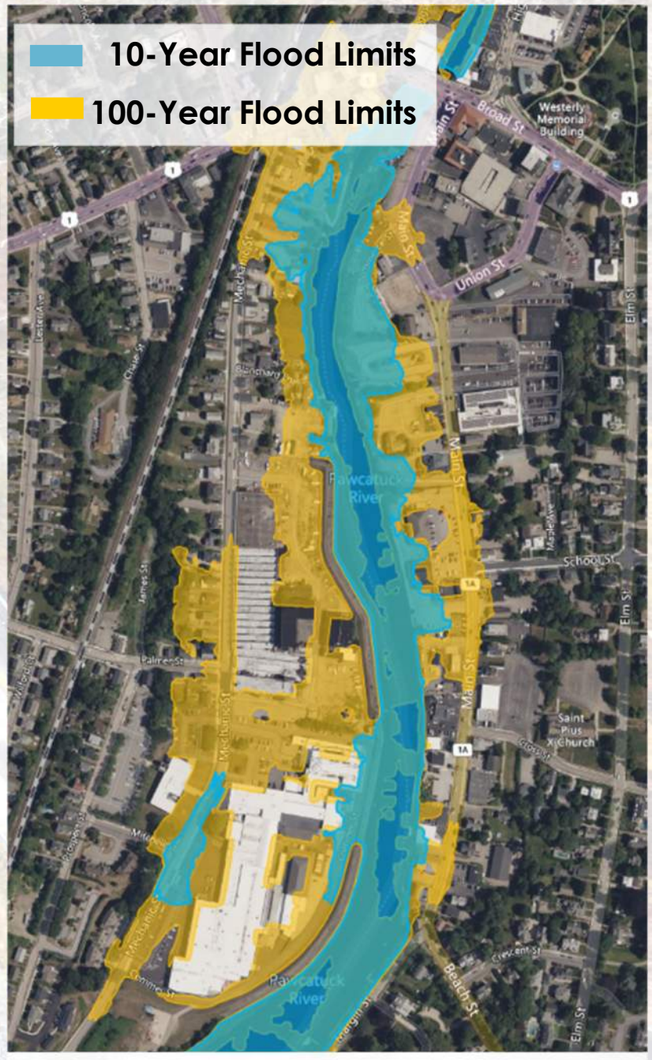
Refined Hydraulic Model Analysis

Compliance Implications to Downstream Flood Elevation Increases

- Projects with 100-year flood increases greater than 0.00 feet require FEMA review prior to construction, with submission of a Conditional Letter of Map Revision (CLOMR, 44CFR 60.3(3))
- CLOMRs would be required for any of the three alternatives (A, B, or E)
- CLOMR submissions require:
  - Public notification (letters and newspaper notice) to predicted affected property owners (acceptance of these changes is not required).
  - Concurrence by the affected community CEOs.
  - Certification by Engineer of Record that no structures would be affected by the increases.



10- and 100-Year Flood Extents Upstream of Broad Street



10- and 100-Year Flood Extents Downstream of Broad Street

Refined Hydraulic Model Analysis

Example: Modified Alternative E, Avoid Downstream Flood Change

- Modifications to Alternative E would avoid increases downstream to 100-year flood water surface elevations and lesser floods.

  Orange: Change ≥0.05 feet
  Blue: Change ≤ 0.05 feet
  Green: No change

  - +0.05 feet ≈ 1/2 inch
  - +0.04 feet = 1/2 inch
  - +0.02 feet ≈1/4 inch

Alt E2 avoids 50, 100, and 500-year flood increases downstream of project site and limits increases for 10-year to 0.01 feet or less

Alt E1 avoids 100-Year Flood Increases Downstream of Project Site

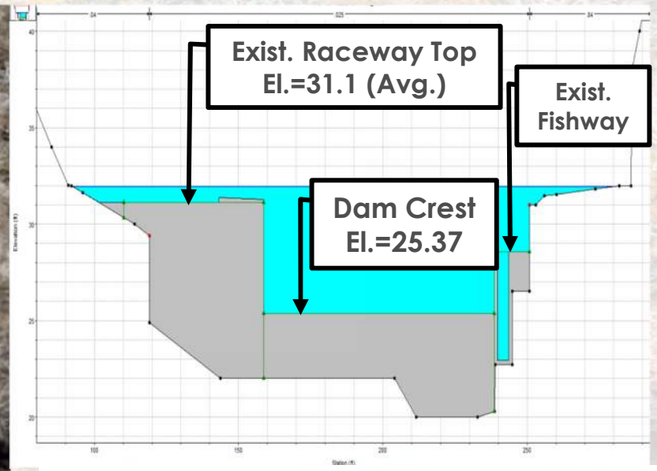
Alternative E1

Location	10-Yr Increase (ft.)	50-Yr Increase (ft.)	100-Yr Increase (ft.)	500-Yr Increase (ft.)
	Alt E1 Mod	Alt E1 Mod	Alt E1 Mod	Alt E1 Mod
End of Fishway to Post Office Lane	0.05	0.03	0.00	0.02
Post Office Lane to Boombridge	0.05	0.03	0.00	0.01
Boombridge to White Rock Road/Bridge Road	0.05	0.03	0.00	0.01
White Rock Road/Bridge Road to Route 78	0.04	0.02	0.00	0.00
Route 78 to Stillman Avenue	0.04	0.02	0.00	0.00
Stillman Avenue to Amtrak RR	0.03	0.02	0.00	0.00
Amtrak RR to Route 1 (Broad Street)	0.02	0.01	0.00	0.00

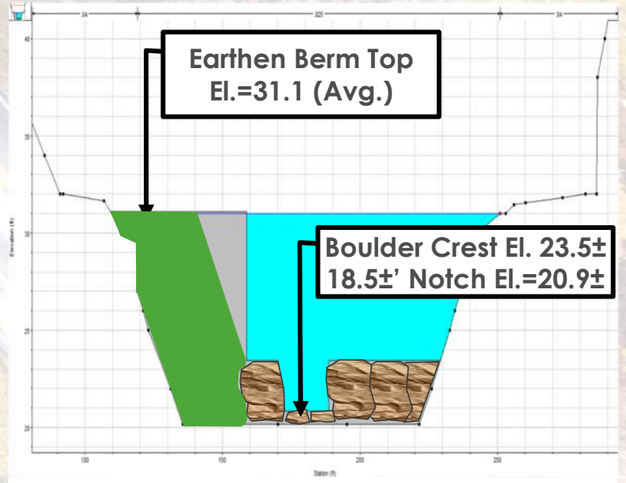
Alternative E2

Location	10-Yr Increase (ft.)	50-Yr Increase (ft.)	100-Yr Increase (ft.)	500-Yr Increase (ft.)
	Alt E2 Mod	Alt E2 Mod	Alt E2 Mod	Alt E2 Mod
End of Fishway to Post Office Lane	0.01	0.00	0.00	0.00
Post Office Lane to Boombridge	0.01	0.00	0.00	0.00
Boombridge to White Rock Road/Bridge Road	0.01	0.00	0.00	0.00
White Rock Road/Bridge Road to Route 78	0.01	0.00	0.00	0.00
Route 78 to Stillman Avenue	0.01	0.00	0.00	0.00
Stillman Avenue to Amtrak RR	0.00	0.00	0.00	0.00
Amtrak RR to Route 1 (Broad Street)	0.00	0.00	0.00	0.00

Modified Alternative E1– Nature-Like Fishway

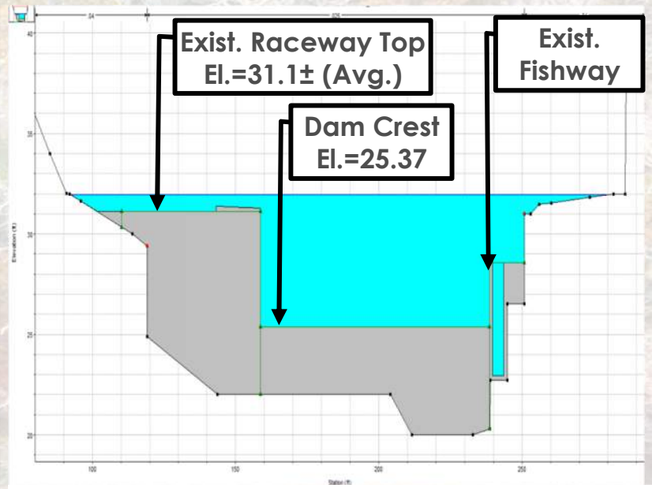


Existing Dam Configuration

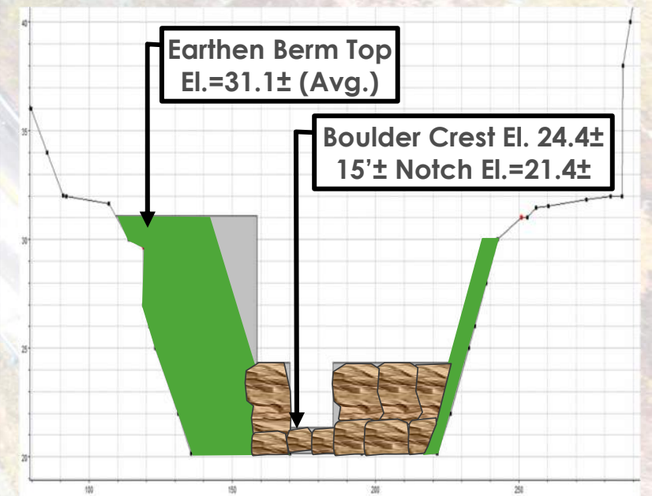


Approx. New Upstream Weir Configuration

Modified Alternative E2 – Nature-Like Fishway



Existing Dam Configuration



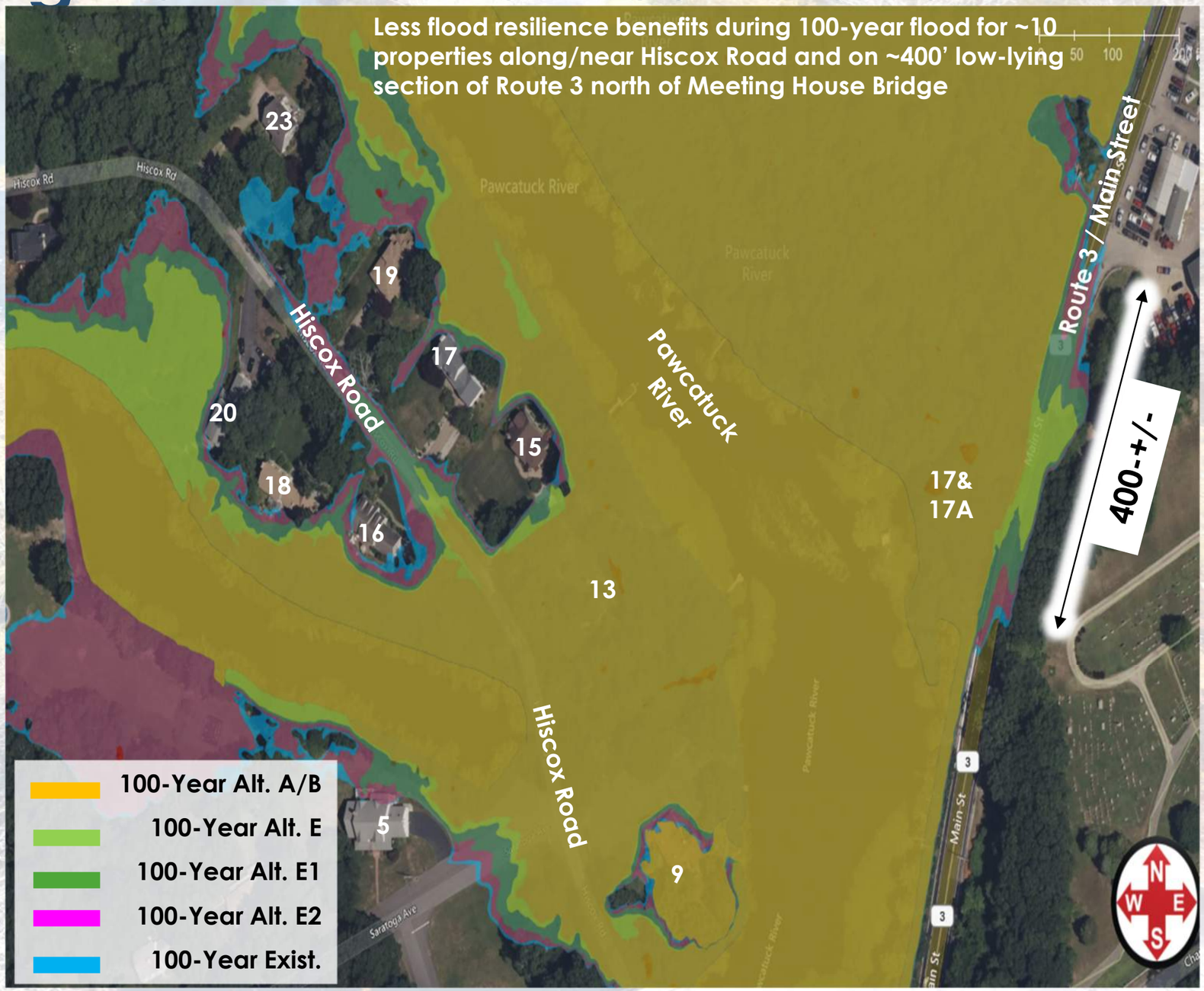
Approx. New Upstream Weir Configuration

Trade-offs Resulting from Alternatives E1 and E2

- Avoiding increases downstream will result in less flood elevation reductions upstream primarily between Potter Hill dam and Route 3.

Alternative	Max. 10-Year Flood Reduction In Feet	Max. 100-Year Flood Reduction In Feet
Alt. A	3.1 feet	2.1 feet
Alt. B	3.0 feet	2.0 feet
Alt. E	2.6 feet	1.6 feet
Modified Alt. E1	1.4 feet	0.7 feet
Modified Alt. E2	0.7 feet	0.3 feet

- More weir structures result in lower fish passage efficiency and more significant future maintenance and repair requirements and costs.



Other Assessments Completed Since January

- River channel conditions and anticipated changes
- Anticipated boating conditions
- River geomorphic assessment
- Groundwater investigation and well assessment
- Wetland/Wildlife field investigations and assessments

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Approval to Complete Design for Alternative E

- This process has resulted in development of a modified version of Alternative E that will be further refined to:
  - Avoid increases in downstream flood elevations and provide upstream resilience benefits
  - Maximize fish passage efficiency and water quality improvements
  - Minimize impacts to recreational boating
  - Minimize impacts to private wells and other property owner and public safety concerns
  - Sustain wetlands, wildlife habitat and other eco-benefits
- Propose continuation of project activities to complete development of a design based on Alternative E that is **permittable and fundable**

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Final Design - Responsible Actions

- Impacts Associated with Each Alternative will be Identified, Assessed and Mitigated to the Extent Practicable
  - Private Wells: Replace Affected Wells with Deeper Wells
  - Watercraft Access at Bridges and Shallow River Segments: Alter Riverbed Locations to Increase Depths and Reduce Velocities
  - Exposed Riverbeds and Channel Banks: Prevent Invasives and Stabilize Riverbanks to Avoid Impacts to Adjacent Structures
  - Private Docks and Shoreline Infrastructure: Alter Permitted Docks and Waterfront Improvements to Lower/Narrower River
  - Emergency Fire and Rescue: Provide Emergency Watercraft Launch and Dry Hydrants in Affected River Reach

Public Outreach and Communication

- Town has contracted Lighthouse Consulting Group to assist with public outreach and facilitation of meetings in support of continuing assessments and future project activities.
- Planning small group stakeholder and property owner meetings to:
  - Share information about assessment and design
  - Gather feedback and comments
- New website under development to enhance providing regular project updates to the public and receipt/ response to questions and concerns from the public.

Lighthouse Consulting Group

Q&A Slides

For submission to Town Clerk

Summary of River Restoration Alternatives Evaluation Criteria

Evaluation Criteria	Alt. A (Frmr Alt. 1) 6.8' Lower Headpond	Alt. B (Frmr Alt. 2) 6.0' Lower Headpond	Alt. C 5' Lower Headpond	Alt. D 4.25' Lower Headpond	Alt. E (Frmr Alt. 4) 3.5' Lower Headpond	Alt. F 2.75' Lower Headpond	Alt. G 2' Lower Headpond	Alt. H (Frmr Alt. 3) 0.5' Lower Headpond
Fish Passage	Most Improved Fish Passage and Ecological Continuity		Requires Most Adaptations to Avoid Property/Bridge Impacts			Infeasible Due to Potter Hill Road Bridge	Least Improved Fish Passage and Ecological Continuity	
Flood Resiliency	Most Flood Resiliency Improvements						Least/No Flood Resiliency Improvements	
Fishway Size / Construction Cost	Shortest Fishway and Lowest Construction Cost						Longest Fishway and Highest Construction Cost	
Property Owner/Fire Dept. Concerns and Adaptation Costs	Most Significant Monitoring, Impact Adaptations and Private Well Replacements						Least Significant Monitoring, Impact Adaptations and Private Well Replacements	
Wetland/Wildlife Habitat Restoration	Greatest Area of Wetlands and Wildlife Habitat Changed/Restored						Least Wetlands and Fish and Wildlife Habitat Changed/Restored	
O&M Requirements and Costs	Least/No Operation & Maintenance Requirements/Costs						Highest Potential Operation & Maintenance Requirements/Costs	
Length of Portage	No/Shortest Portage Required						Longest Portage Required	
Recreational Boating Safety	Greatest Improvement to Recreational Boating Safety						Least Improvement to Recreational Boating Safety	
Ability to Secure Grant Funding	Most Likely to Secure Grant Funding						Least Likely to Secure Grant Funding	

NOAA BIL Grant Award

Year 1 Grant Funding ($682K, Awarded August 1, 2024)

- Outreach: Public engagement, technical group discussions (Lighthouse)
- Assessment and Design: Private wells and homeowner meetings and assistance (F&O, URI)
- Design: River restoration and public river access improvements (F&O)
- Assessment and Design: Riverbank stabilization and other restoration improvements (F&O)
- Consultations: Section 106 historic and cultural resources with RIHPHC, Tribes (PAL, NOAA)
- Assessment: Wetland assessment (URI)

Years 2 and 3 Grant Funding (August 1, 2025 - September 30, 2027)

- Permitting: Review and authorizations by RIDEM and Army Corps of Engineers (F&O)
- Design:100% Plans, specifications, construction bid package (F&O)
- Construction: Well installations (Contractor with F&O oversight)
- Construction: River restoration, public access improvements and project amenities
- Compliance: FEMA LOMR, invasive plant monitoring, other potential permit stipulations