The Mayo Mill Dam Feasibility Study
Recommendation Report

Prepared By:

Town of Dover-Foxcroft Steering Committee

January 4, 2023

Table of Contents

Executive Summary

This steering committee was charged by the town to consider options and alternatives for the future of the Mayo Mill dam and powerhouse. We have spent almost a year gathering enough information to come to informed conclusions and to make a recommendation to the town for future action.

1. There was general agreement that the original purpose of the dam for hydroelectric generation was no longer viable.
2. There was also agreement that repairing and retaining the dam in order to support the traditional water level in the river impoundment was not appropriate. Support for maintaining at least some of the impoundment was voiced by several Steering Committee members, since that view of the river is what Dover-Foxcroft residents have known for over a century. However…
3. In the end, we believe that returning the Piscataquis River to its natural, free-flowing state, and working to create a riverfront park as part of downtown revitalization efforts will be the best solution for the community.
4. Among the many reasons include the need to reduce flooding dangers; improvement of the ecology of the area including enhanced fish passage; and the availability of both public and private funding for dam removal resulting in minimal or no net implementation costs to the town.

Thus, we unanimously recommend removal of the dam and extensive landscaping to create a new and exciting meeting place for the downtown area.

Besides the materials in this report a set of the presentations, reports and meeting notes are on the project website https://www.mayomilldamstudy.com/

We understand that there is a sense of urgency because of the one-time abundance of Federal funding available for projects such as this. While there is a lot of competition for these funds, the project contemplated here likely stands a good chance of approval if we act in the next few months.

We appreciate the opportunity to have served on this committee, are grateful for the excellent, professional support of our consultants and facilitators and are prepared to continue our activities at least through a public forum in the near future and further as you may direct.

Description of Project

The Town of Dover-Foxcroft is considering a range of actions at the Mayo Mill Dam, aligned with its Downtown Revitalization Plan (2003) and Town Comprehensive Plan (2016) objectives and in compliance with state and federal regulations. Key objectives include:

- Reducing the burden of long-term management of the dam;
- Restoring river connectivity to benefit fish, wildlife, and ecological processes; and
- Enhancing the role that the site and adjoining areas play in the community experience.

The Feasibility Study was commissioned in late 2022 to allow a committee of local people to consider the present condition of the dam and powerhouse, to evaluate a series of options for them, and to make its recommendations to the Select Board based on that evaluation. For each alternative option, the committee assessed a number of factors including flood control, dam structure, public access, fish passage, historical, upfront and life cycle costs, constructability and life cycle costs. This report and its recommendations are the result of that project.

Background

For some years the town has been faced with the necessity, driven in large part by FERC (the Federal Energy Regulatory Commission), of doing something about the deteriorating state of the dam and related powerhouse. Restart of the hydro was explored and pursued concurrently with the mill redevelopment project beginning in 2011. Kruger Energy was engaged by the developer as a potential investor/operator of the facility. Kruger determined at that time that the output potential was too small to warrant an investment in its rehabilitation.

Subsequently the developer, Jonathan Arnold engaged a consultant, Natel Energy, to design a rehabilitation project for the hydro facility and submit an amendment to the FERC exemption from licensure that the town holds for the site. This exemption application was filed with FERC in November of 2020. In July of 2021 prior to FERC ruling the developer notified the town that they would no longer pursue a hydro project at the site and requested that the town terminate the lease of the site held by Mayo Mill Holdings LLC. The developer subsequently facilitated another conversation with Kruger Energy (owners and operators of the Brown's Mill Dam) about taking a second look at the site as something that they might consider in conjunction with the town. Kruger did not opt to re-examine this in terms of a project. The developer then facilitated the collaboration between the town and Natel Energy in terms of the potential redevelopment of the site by the town.

In 2018 FERC in its 5-year dam safety inspection identified deficiencies at the site and required the town to submit proposed corrective actions and timelines. This was addressed by incorporating the work into the rehabilitation project proposed by the developer. The town periodically updated its anticipated schedule for completion as the rehabilitation project timeline as necessary.

After the developer requested the termination of the lease, the town subsequently gave tours of the site to energy companies that either operate or rehabilitate hydro facilities. These were Dichotomy Sebec Lake Hydro, LLC and Fairbanks Mill headquartered in Vermont. These tours did not result in the pursuit of a project by

either company. The town then determined that it was necessary to issue a publicly competitive Request for Proposal (RFP) for the redevelopment of the site for either the purpose of generating electricity or for another purpose.

The town hired Natel Energy and developed an RFP for the redevelopment of the site. The RFP was public and was posted on the town's website in May 2022; the RFP was also sent to select, potentially interested groups including Dichotomy Sebec Lake Hydro, LLC., Fairbanks Mill, Kruger, The Nature Conservancy, and The University of Maine, USGS, Maine Cooperative Fish and Wildlife Research Unit.

The only response to the RFP was from Atlantic Salmon Federation (ASF) and The Nature Conservancy in Maine proposing the current community-based feasibility study and alternatives analysis project. The Town interviewed the group in August and the town proceeded to enter into a contract with ASF and TNC in the fall of 2022.

In 2023, in a FERC's dam safety inspection report, FERC cited structural deficiencies that the town needs to address many of which they described as "not able to be deferred until the submittal of a surrender plan by the town" The cost of addressing the deficiencies identified by FERC are estimated at between $2 and $2.5M and the deadline is imminent. This cost is in addition to the requirements of the Endangered Species Act to improve the fishway and provide safe, timely, and effective fish passage and any other regulatory requirements that may be required by state and federal agencies. These additional requirements are estimated to be $4-6M, for a combined total of $6-8M.

The Team

In November of 2022, the town's Select Board entered into a partnership agreement with ASF to conduct the community-based feasibility study with TNC as a key co-partner organization. They in turn hired Inter-Fluve, a well-established engineering firm, to their team. TNC also acquired private funds to set up a part-time position to support the Town staff for this project. The Town hired Alsina Brenenstuhl after a publicly competitive search. Multiple staff from each organization are involved in the project. However, the key staff from each of these organizations working on our project were:

The Atlantic Salmon Federation	Maranda Nemeth (overall lead project manager)
The Nature Conservancy in Maine	Eileen Bader Hall
Inter-Fluve, Engineer	Mike Burke, P.E.
Facilitator	Lucy VanHook
Project Coordinator for the Town	Alsina Brenenstuhl
Town Manager	Jack Cluckey

The select board chose as the Steering Committee six local citizens to work on the project. They were:

Tom Lizotte	Select Board
Cindy Freeman-Cyr	Select Board
Mike Sutton	Select Board
Denise Buzzeli	Chamber of Commerce
Norton True	Civil Engineer
Chris Maas	Historical Society and Planning Board

All the members of the committee either live or work near the Mayo Mill dam and represent various Town entities including the Promotions and Development Committee, Historical Society, Select Board, Chamber of Commerce, Monument Square Redevelopment group, Planning Board, and Climate Action Committee

This core working group worked together all year. They were joined periodically by representatives from other organizations, including:

- The Maine Downtown Center,
- Maine Department of Parks,
- Maine Department of Marine Resources,
- NOAA Restoration Center,
- Gomez and Sullivan Engineers,
- VHB Engineers,
- Alden Laboratories,
- Viewshed, Licensed Landscape Architect.

Activities

All of the major activities of the core working group have been posted to a project website.[1] These included meeting agendas and minutes, presentations and documents.

The entire core working group met monthly from January of 2023 through December of 2023 (bar October). All of the meetings were open to the public and most meetings had several members of the public actively in attendance. This group also enjoyed three field trips:

- In May they joined a crew from the State to watch and assist with the fry stocking of Atlantic Salmon in Kingsbury Stream.
- In August the group traveled to Farmington to visit the site of a dam that was removed about a year previously. They met with local officials to discuss the process and their level of satisfaction with the project.
- In October the group visited a recent project to provide a natural fish bypass for the large dam in Howland.

In June the group conducted a public forum at Central Hall with approximately 60 people in attendance. (Public Forum PowerPoint Presentation)[2].

Throughout the project, the group produced notices, press releases and other "outreach" materials. Through the course of the project, the group learned a lot to increase awareness of the project. These learning experiences will be useful in coming phases of the project.

Over the course of the year, the project team produced a host of presentations and documents. A list of the major ones is in Appendix A.

[1] https://www.mayomilldamstudy.com/
[2] https://www.mayomilldamstudy.com/_files/ugd/f03677_5a4185c6beaf4ca193356046f80338ba.pdf

Key Documents

Over the course of the project the committee received over a dozen useful informative presentations, reports and other documents. The following documents have been particularly helpful in informing our work.

The Baseline Conditions Report[3]

A draft of this 113-page report was submitted to the Committee in June. A final version was presented in November.

The Report provided baseline information on these topics:

- Site History & Historical Resources
- Site Context & Watershed Description
- Dam and Powerhouse Facilities
- River Channel and Impoundment
- Adjacent Features and Infrastructure
- Piscataquis River Flow Patterns (including Flooding, the Floodplain, Hydrologic Analysis and Climate Change and Resilience Considerations)
- Ecological Resources
- Recreational Resources
- Property Ownership and Land Use Zoning
- Concurrent Community Planning and Revitalization Initiatives
- Powerhouse Inspection and Dam Stability Analysis

From the Executive Summary:

> "The Piscataquis River is a tributary to the Penobscot River, the largest watershed in Maine with the greatest potential for recovery of Atlantic salmon and other native sea-run fish. The Piscataquis River is a key to recovery in the Penobscot and in Maine, having more viable Atlantic salmon habitat than the other areas of the watershed. Restoration of fish passage at the site is seen as a potential major step in the watershed for the ecological benefits it would provide.
>
> Historical and Current Conditions: This report provides a detailed description of past and current conditions of the Mayo Mill Dam site and the Piscataquis River in the area of the site. Review of the historical role and management of the river, combined with field observations and existing data review, lead to interpretation of the condition of the river and dam site as it exists today. In addition to data collected by Inter-Fluve on the topographic and bathometric conditions of the site, a structural inspection and stability analysis of the dam was conducted by Gomez and Sullivan.
> The structural analysis of the dam site indicated that there are substantial structural condition issues with the dam and powerhouse building and that the dam did not meet FERC dam safety criteria for some of the loading cases evaluated.

[3] https://www.mayomilldamstudy.com/_files/ugd/f03677_f18c3fd8188c4bfc9e9ea83ebc0ab41d.pdf

Flooding Patterns: Nestled along the river, Dover-Foxcroft has experienced notable floods periodically through its history. Due to the hazards that these periodic floods present, the Federal Emergency Management Agency (FEMA) established a regulatory floodplain along the river to limit development, reduce damage, and protect the public in these flood prone areas.

Inter-Fluve evaluated the hydrologic characteristics of the Piscataquis River and the contributing watershed, and the associated flow patterns near Mayo Mill Dam. As part of their analysis InterFluve reviewed hydrologic evaluations published in flood insurance studies, conducted water level monitoring at the site, and developed a detailed hydraulic model to represent current conditions and to understand flood levels, erosion forces, and water levels in the impoundment area.

Mayo Mill Dam has a direct impact on flood profiles upstream of the dam. The hydraulic evaluation performed by Inter-Fluve indicates that the impact of the dam extends upstream approximately 1.7 miles to the former Waterworks Dam location. The hydraulic modeling results also demonstrate that even small flood events interface with existing infrastructure and private property along the Piscataquis River. Model results estimate that the Mill Street parking lot may begin to inundate during the 2-year event, South Street may begin to inundate during the 10-year event, and overland flow may bypass the dam entirely during the 50-year event. These events are likely to occur more frequently in future years due to climate change (MCC STS 2020), increasing strain on infrastructure near the river.

Ecological Resources: The Piscataquis River is a major tributary to the Penobscot River and the focal point of a regionally important 1,459 square mile watershed which provides habitat for a diverse assemblage of native flora and fauna. The 62-miie-long river has been afforded federal and state protections to maintain water quality and habitat to support a diverse community of aquatic and terrestrial species. Much of the Piscataquis River is designated an outstanding river segment, and as such is afforded special protection under the Natural Resources Protection Act (NRPA).

Within the Mayo Mill project area, the hydrology of the Piscataquis River is controlled by the Mayo Mill dam which impacts the stream habitat present. Species of particular interest present within the project area include freshwater mussels, American eel (Anguilla rostrata), sea lamprey (Petromvzon marinus), Eastern brook trout (Salvelinus fontinalis), and the endangered Atlantic salmon (Salmo salar). Atlantic salmon migrations along the Piscataquis River are impeded by dams such as Brown's Mill Dam, Mayo Mill Dam and Guilford Dam. In addition to creating passage constraints which lead to passage delays and associated delayed mortality, the impoundments formed by these dams reduce potential critical rearing and spawning habitat availability. The impoundments also create habitat conditions that favor invasive species over native fish.

Recreational Resources and Community Planning: There are currently two primary public access points to the Piscataquis River within the impoundment area that include a seasonal dock and an MDIFW boat launch. Recreational opportunities on the river itself focus primarily on the impoundment area upstream of the dam and include flatwater paddling, swimming and recreational sport fishing for resident game fish. Additionally, seaplanes may periodically use the impoundment for landings and takeoffs. The Town hopes to enhance public access and recreational opportunities in the future, particularly in the downtown area.

The Town of Dover-Foxcroft has been proactively pursuing downtown revitalization adjacent to and within the study area for two decades, starting with the 2003 Downtown Revitalization Plan (WBRC 2003). The revitalization plan included a master plan for the South Street/Pine Street corridor, which among other improvements enhanced greenspace and pedestrian connectivity between the boat ramp area and Main Street.

Subsequent efforts by the Town in conjunction with Maine DOT seek to further develop the connectivity and gateway along South Street to Main Street and across the river to the Mill and Riverfront Park area."

Fish Passage Presentation[4]

In May we received a presentation on fish species in our watershed and various fish passage options. There are currently about a dozen "sea-run" species of fish that spend at least part of their life cycles in freshwater habitats – of which the Penobscot River watershed is a prime location being the largest river in Maine. These species migrate from their freshwater spawning sites to the open ocean, and then back again to spawn. Fish Passages provide safe, timely and effective upstream and downstream movement of fish past a barrier.

There are two main types of fish passage options: Nature-Like passages include Step Pool and Roughened Channel; Technical passages include Chutes, Pool-Type and Mechanical. Chute types include Denil Fishways, an example of which is currently part of the Mayo Mill dam. These present some real issues. They have moderate biological capacity. Attraction is challenging. They require resting pools and some fish species won't use them at all. Pool-Types have a larger footprint than Denil Fishways; so they provide better resting areas between hydraulic drops. Thus, they usually provide a larger biological capacity. Vertical Slot Fishways afford even more capacity. Finally, there are various Mechanical fish lifts. All of these are artificial fish passages. The least efficient (but usually easiest and least expensive to build and maintain) are the Denil Fishways such as the one in our dam. Of course, the most efficient passage is almost always the natural flow of the river. While not quantified, our current fish passage efficiency is rated as poor to fair. Any meaningful rehabilitation work on the dam would almost certainly include replacement of the current denil fishway with another more efficient fish passage mechanism.

The presentation also made clear that fish passage is required at the dam which is within designated federal critical habitat for Atlantic salmon and also within designated state habitat for specific species. The definition of fish passage is providing safe, timely, and effective upstream and downstream movement of fish past a barrier.

Dam/Powerhouse Inspection and Dam Stability Analysis

The engineering firm of Gomez and Sullivan conducted a thorough analysis of these facilities and presented their 22-page report in November. They outlined a whole series of deficiencies in the dam and powerhouse – including those identified by FERC. They then outlined their own dam stability analysis; the conclusion of which is that while the dam is in little danger of imminent failure, *"it does not meet minimum FERC safety factors. Remedial measures are required to bring the structure into compliance with FERC stability criteria."* The firm provided rough estimates for the costs to address the dam and powerhouse deficiencies in a range of $2,030,000 to $2,465,000. These, together with other issues identified by FERC (most recent communication in August of this year) indicate that the total cost of repairs may be in the range of $4,300,000 to $4,800,000.[5]

Summary Statement on Key documents:
These documents, among others, provided the committee with adequate technical, environmental and ecological information to allow us to consider meaningful options and alternatives.

[4]https://3cd65599-fb1f-4e92-9a2a-a1d59f1efa1f.filesusr.com/ugd/f03677_238d00dcbb0143d4a0fbba0f72c34de8.pdf
[5] Alternatives Analysis Report, page 23

The Preliminary Matrix Tables

In July Inter-Fluve presented us with a set of 23 preliminary project options and a screening matrix. The options represented a range of potential project alternatives. There were six major categories, each with two or more sub-categories:

1. (HP1 – HP2) Restore Power Generation, Retain the Dam, Maintain Impoundment at Current levels, Technical Fishways (2 options)
2. (F1-F4) Retire FERC Exemption (no Power Generation), Retain Dam, Maintain Impoundment at Current levels, Technical Fishways (4 options)
3. (M1-M4) Retire FERC Exemption (no Power Generation), Modify Dam, Maintain Impoundment at Current levels, Technical Fishways (4 options)
4. (L1-L4) Retire FERC Exemption (no Power Generation), Modify Dam, Lower Impoundment, Technical Fishways (4 options)
5. (N1-N7) Retire FERC Exemption (no Power Generation), Replace Dam with Nature-Like Fishways, either Maintain or Lower Impoundment (7 options)
6. (R1-R2) Retire FERC Exemption (no Power Generation), Remove Dam, Human-made Impoundment Removed (2 options)

A second table contrasted the options against project objectives. The objectives included:

- Hydropower Generation
- Impoundment Water Level
- Flooding and Resiliency
- Dam Structure and Facilities
- Impacts to Facilities and Infrastructure
- Fish Passage Effectiveness
- Ecology and Water Quality
- Public Access and use
- Historical & Educational value
- Community Plans & Aesthetic
- Relative Construction Cost
- Long-Term Life Span Costs
- Key Uncertainties and Focus Factors

This was an initial list of options and project objectives, with rough, but directionally correct, estimates of relative values for each. It did not include details, including dollar amounts for initial or ongoing costs.

Given this set of options and an evaluation matrix, we were tasked to do our own evaluation and, at the next meeting (August) to narrow the options to 3-5 for further, deeper analysis.[6]

[6] One of us worked through the matrix – providing very rough values (guesses?) for each of the objectives against 17 of the options, including an option of "Doing Nothing". Those at the top of the results were R1/R2 (complete dam removal), N7, N6, and L1.

At our August meeting, we were asked to choose 3-5 for further review. After much discussion, we chose M1, L1, N6, N7 and R1/R2 for further research. Our primary considerations included:

- Cost avoidance for the Town with existing environment
- Flooding
- Fish passage and Ecology in general
- Possibility of landscaping to make this an even better meeting place.
- Possibility of Support in on-going phases of the project
- Likelihood of funding sources covering much or all of costs
- Likelihood of lessened long-term costs

The Alternatives Analysis Report

In our November meeting, our consultants provided a 114-page report with detailed information on each of the chosen options. This report provided design considerations relating to the condition of the dam, power generation, flood management, fish passage restoration, sediment management, landscape management and vegetation restoration.

From the Executive Summary:

"To identify sensitive ecological and cultural resources in the project area, Inter-Fluve reviewed previous consultations and submitted initial inquiries to various state and federal agencies. A federal threatened and endangered species review indicated that there are potentially federal threatened and endangered species in the project area, including Atlantic salmon. The project area is within the mapped area of two Maine Threatened species of freshwater mussels and two rare plant species have been documented downstream of the dam. The MHPC determined that the project will likely be determined to have an Adverse Effect on the local historic district due to the potential impacts to the existing powerhouse structure. The regulatory compliance pathways were identified for various general alternatives to provide fish passage. To implement any the evaluated alternatives, compliance will generally involve surrendering the FERC exemption, and obtaining necessary federal, state, and local regulatory authorizations. These Federal actions will require formal consultation under Section 7 of the Endangered Species Act, which will set specific conditions and performance requirements on any proposed alternative. To evaluate potential physical site constraints related to the proposed alternatives, features and infrastructure within the resource area, buildings, roadways, homes, and other infrastructure within the regulated 100-year floodway were identified.

***Preliminary Design Considerations**:*Prior to evaluating specific project alternatives, several overarching design considerations were evaluated that apply to the range of alternatives, including potential for power generation, dam rehabilitation recommendations, flood resilience impacts, fish passage, sediment management, and landscape enhancements, and riparian vegetation restoration.

***Power Generation*:** The Study Team reviewed the potential to restore power generation at the site. The study indicated that the long-term economic viability of a profitable hydropower development is low. This finding is consistent with previous evaluations of the feasibility of redeveloping the site for hydroelectric power generation. A limiting factor is the capital expenditure necessary for the structural rehabilitation at the dam and powerhouse. The baseline conditions evaluation further indicated that the spillway does not

meet FERC's current required factors of safety for stability. The spillway will require structural alterations to meet the necessary stability factors of safety if it will remain under the proposed alternatives.

Flood Resiliency Benefits: The flood hazard evaluation determined that the dam increases the flood hazard along the Piscataquis River, and selected areas of downtown Dover-Foxcroft are vulnerable to flooding as a result. The dam does not attenuate flooding as a run-of-the river dam. However, the dam elevates the water surface level in the river upstream of the dam and during extreme flood events, the banks of the river are likely to overtop, resulting in potential property and public infrastructure damage. Flooding on South Street may pose public safety concerns. The 100-year flood mitigation benefits were evaluated with several potential permanent pond levels ranging from 2 feet to 8 feet lower than the current pond level. These reduced impoundment levels would be implemented through strategies which retain the dam spillway and install a technical fishway or replace the dam with a nature-like fishway that extends upstream from the dam location. The resilience benefits of these strategies were contrasted with the resilience benefits associated with dam removal. The results indicated that the 100-year flood resilience benefits of the strategy which retains the dam are marginal. The results indicated that the nature-like fishway strategy may provide meaningful 100-year flood resilience benefits in the downtown area, but more marginal benefits in the vulnerable South Street-Pine Street area. Finally, the results indicated that the dam removal strategy will provide the greatest 100-year flood resilience benefit in both the downtown and South Street-Pine Street areas. With this strategy, the model results indicate 100-year flood water surface elevations may be reduced to the extent that the buildings in these vulnerable areas would no longer be in zone of inundation.

Fish Passage Strategies: Four general potential fish passage restoration approaches were identified and evaluated for the Mayo Mill Dam, including Technical Fish Passages, Nature-like Fishways, dam removal, and a no-action alternative. Several configurations within each general category were evaluated with respect to flow capacity, target and non-target species effectiveness, geometric feasibility, and other factors. Based on the Mayo Mill dam site characteristics, target fish species, and population estimates, the optimal fish passage approach would entail dam removal. Other feasible fish passage improvements include a full channel width nature-like fishway as the next most effective approach, followed by vertical slot technical fishway.

Landscape Enhancement: Conceptual public landscape enhancement designs were developed to support the downtown revitalization objectives. The conceptual enhancement designs were developed for each alternative considering the potential opportunities for public space creation within the current upland area and within the current impoundment area that is subject to be dewatered under several alternatives. The landscape enhancement designs were developed within a framework of short-term goals for near-term implementation and long-term goals for potential longer-term transformational strategies. The proposed enhancements in the short-term goals framework include circulation improvements, river access, walking paths, benches, docks, and enhanced vegetation. Potential long-term transformational strategies include enhanced public amenities such as pedestrian bridges, a boardwalk, additional open spaces, an amphitheater, and a public parking lot."

The bulk of the report provides an in-depth analysis of a number of factors listed above. This table from page 5 summarizes the results:

Table 2. Qualitative relative benefits of five action alternatives in addressing six key criteria.

Criteria	Dam Removal (R1/R2)	2% Nature-Like Fishway (N7)	3% Nature-Like Fishway (N7)	Vertical Slot Fishway with 5′ Lower Pond (L1)	Vertical Slot Fishway with Current Pond (M1)
Fish Passage	Best	Good	Favorable	Moderate	Moderate
Flooding Resiliency	Best	Favorable	Moderate	Limited	Limited
Landscape Amenities	Most Opportunity	Good Opportunity	Moderate Opportunity	Moderate Opportunity	Least Opportunity
Dam & Fish Passage Construction Costs	Lowest	High	Highest	Moderate	Moderate
Grant Funding	Best	Favorable	Moderate	Low	Low
Operation & Maintenance	Least	Low	Moderate	Greatest	Greatest

The committee was in good agreement with this analysis and its results. It is clear that, even before cost considerations, dam removal would be the preferred option.

Cost Estimates

The report provided a reasonably detailed set of cost estimates. **At this early "discussion stage" these estimates should not be considered as definitive**. However, they are useful for gaining a sense of the overall scope of a project of this nature. In addition, they provide a good relative weighting of the probable costs for each of the alternatives. To develop these estimates, the author used assumptions for Sediment Management, Mitigation of Potential Feature and Infrastructure Impacts and potential Life Cycle Costs. The results for the recommended options, for both dam removal and landscaping follow. The total estimated cost for both are slightly over $20,000,000. The dam removal portion is the lowest of the options. The landscaping portion is the highest of the options, reflecting plans to develop a really good public gathering place for the entire community.

Table 12. Summary of estimated cost analysis for dam and fish passage project elements, rounded. Includes total initial costs and does not include landscape costs. See Appendix F for detailed cost analysis.

Alternatives	Total Estimated Initial Costs	Estimated Lifespan Cost
	Construction Costs* + Project Delivery Cost**	Total Aggregated Lifespan Cost*** (4.2% Inflation over 50 years)
	($)	($)
Alternative M1		
Dam and Fishway†	$7,693,800	$1,704,300
Alternative L1		
Dam and Fishway	$7,751,200	$1,704,300
Alternative N6		
Dam and Nature-Like Fishway	$12,462,200	$0 - $953,200
Alternative N7		
Dam and Nature-Like Fishway††	$10,368,400	$0 - $709,500
Alternative R1		
Dam Removal (No Ledge Removal) ††	$5,979,700	$0 - $364,800
Alternative R2		
Dam Removal (With Ledge Removal) ††	$6,308,500	$0 - $364,800

7

A detailed cost breakdown for dam removal is at Appendix C.

No matter which option we select, there will need to be significant landscaping requirements. A summary from page 112 of those for each of the options is here:

Table 13. Summary of estimated cost analysis for landscape enhancement project elements, rounded. Includes total costs and does not include dam or fish passage project element costs.. See Appendix G for detailed cost analysis.

Alternatives	Total Estimated Costs	Estimated Lifespan Cost
	Construction Costs* + Project Delivery Cost**	Total Aggregated Lifespan Cost*** (4.2% Inflation over 50 years)
	($)	($)
Alternative M1		
Landscape Framework: Short-Term and Long-Term Goals	$5,404,200	$10,614,100
Alternative L1		
Landscape Framework: Short-Term and Long-Term Goals	$6,548,600	$10,193,900
Alternative N6		
Landscape Framework: Short-Term and Long-Term Goals	$6,548,600	$8,111,300
Alternative N7		
Landscape Framework: Short-Term and Long-Term Goals	$6,108,400	$9,536,300
Alternative R1/R2		
Landscape Framework: Short-Term and Long-Term Goals	$13,800,300	$15,016,900

[7] While the committee liked the Nature-Like Fishway options (N6 and N7), costs are another significant factor in preferring the Dam Removal.

A detailed cost breakdown is at Appendix D
A drawing of the Conceptual Goals for the project, including Landscaping is at Appendix E.

Grant Funding

These very significant costs, no matter which option is chosen, reinforce the need to finance most or all of this entire project with grants. As the report notes:

> "In addition to the raw costs for construction of the alternatives, it is important to consider the eligibility and competitiveness of each alternative to gain external funding, as these funding sources may dramatically reduce the net cost to the Town. Presently, there are unprecedented, once-in-a generation levels of funding available, often with little local match requirement, for holistic, mutually beneficial projects with resilience, fish passage, and ecological restoration objectives, including multiple grant programs from the Federal Infrastructure Bill, NOAA, U.S. Fish and Wildlife Service, and the National Fish and Wildlife Foundation (NFWF). There is also significant potential funding available for proactive flood hazard abatement through FEMA's Building Resilient Infrastructure and Communities (BRIC) and other programs. The requirements, complexities, and competition for funding through each of these programs varies.
>
> There also appear to be potential funding opportunities for downtown revitalization and outdoor recreation opportunities, through partners such as Maine DOT, Maine Department of Conservation, and the Maine Downtown Center.
>
> In contrast, even though there are some funds available that focus specifically on aging infrastructure, this funding is often reserved for high hazard dams or other essential infrastructure, especially if they are also able to in part contribute to climate resilience (e.g., viable hydropower facilities). Based on these factors, *the highest likelihood of near complete funding for managing the dam and fish passage elements of the project rests with Alternative R1/R2, while Alternative M1 likely has the least potential for external funding. Between these two endpoints, Alternatives N7, N6, and L1 are ordered in diminishing likelihood of gaining external funding*."

Evidence of partnerships is an important ingredient in grants. We understand that the Penobscot Nation is also particularly interested in the Piscataquis River as a major part of the entire Penobscot watershed. We hope to work closely with them and any other interested parties to seek grants.

The November Steering Committee Meeting

The Steering Committee met on Nov. 16 for the sole purpose of finalizing a recommendation on the long-term management of the Mayo Mill dam site on the Piscataquis River in downtown Dover-Foxcroft. The intent was to develop a recommendation that would be considered and acted upon in early 2024 by the town Select Board, which has the ultimate decision-making authority for the dam facility.

In order to ensure that a recommendation would be reached by the Steering Committee alone, the meeting was conducted without the presence or participation of the town's project partners and consultants: Atlantic Salmon Federation (ASF), The Nature Conservancy in Maine (TNC) and Inter-Fluve.

Attending were Steering Committee members Norton True, Chris Maas and Tom Lizotte (in person), and Cindy Freeman-Cyr and Denise Buzzelli (via Zoom). Steering Committee member Mike Sutton was unable to attend. Also in attendance were Steering Committee support staff members Jack Clukey, Town Manager, and Alsina Brenenstuhl, project coordinator. Audience members included Emery Cox, Piscataquis County EMA Director Jaeme Duggan, Dave and Sandy Perkins, and William Erspamer.

The Steering Committee received the draft alternatives analysis report on the dam feasibility study at its Nov. 9 meeting, at which time members were able to review the final five options that were considered viable alternatives from the original list of 23 choices presented to committee members in July, 2023. Based on discussions from the Nov. 9 meeting, the consensus of the Steering Committee members on Nov. 16 was that two alternatives best met the specific objectives of the dam study initiative, and those two alternatives would be the focus of the committee's discussions. The two finalists were:

-Dam removal (R1/R2), with the FERC exemption to be surrendered. Under this option, the dam and powerhouse would be removed down to the ledge beneath the existing dam structures, and the riverbed and upstream impoundment would revert to a natural, free-flowing condition. This option would restore safe, timely and effective fish passage. The model results indicate that flood resilience benefits for the dam removal strategy would exceed the benefits of all other alternatives. The removal of the dam would also offer many opportunities for habitat restoration, recreational amenities and riverside landscaping as the existing impoundment's character transitioned from flatwater to a free-flowing river that would generally be narrower with swifter currents. Dam removal would largely eliminate operation and maintenance requirements at the site, and both the construction costs and grant funding available would be optimal. A cost analysis estimates dam removal would be in the $6 million range, and that both removal and associated landscaping enhancements could be funded with little cost to the town.

-Installation of 2% grade, bank to bank Nature-Like Fishway (NLF), with lower upstream impoundment, dam replaced and FERC exemption surrendered (N7). This option would replace the function of the dam and fishway through installation of a bank-to-bank NLF with a 2% slope that would extend approximately 430 feet upstream from the existing dam location. The impoundment water-level control function would be moved from the dam to the upstream end of the NLF, and the level would be maintained at 5 feet lower than the current conditions. Improvement to fish passage performance and flood resilience benefits would be expected, although not to the extent of a straight dam removal. The character of the river along the length of the NLF would convert from an impounded area to resemble a boulder cascade or riffle. Although this alternative would result in surrender of the FERC license exemption, the fishway structure would still be considered a dam, and ongoing repairs and maintenance will be required to meet water-level goals. A cost analysis estimates the NLF construction cost would be considerably higher than dam removal, at $10.3 million, with grant funding favorable.

With discussions of project alternatives narrowed to a final two, each Steering Committee member was asked individually to state their preference, keeping in mind the project objectives such as compliance with FERC licensing, construction cost and funding availability, flood resilience, improved fish passage, downtown revitalization, and enhancement of public access to the river corridor.

There was general agreement that the original purpose of the dam for hydroelectric generation was no longer viable. A hydropower analysis conducted by Gomez and Sullivan engineers showed that relicensing the dam and rebuilding the derelict powerhouse would be very expensive and time consuming. "I can't see hydropower as being remotely feasible," stated engineer Mark Wamser at the Nov. 9 meeting where the report was discussed in detail.

There was also agreement that repairing and retaining the dam in order to support the traditional water level in the river impoundment was not necessary since the Nature Like Fishway option (N7) would also maintain most of the impoundment while also providing environmental benefits such as improved flood resilience and fish passage. Support for maintaining at least some of the impoundment was voiced by several Steering Committee members, since that view of the river is what Dover-Foxcroft residents have known for over a century.

In the end, returning the Piscataquis River to its natural, free-flowing state, and working to create a riverfront park as part of downtown revitalization efforts, was seen as the best solution for the community. Steering Committee members cited the need to reduce flooding dangers (this was a month prior to the flood of Dec. 18-19), improvement of fish passage, and the availability of both public and private funding for dam removal as the most compelling reasons for recommending this action to the Select Board.

Before taking a formal vote on the recommendation, the committee asked all members of the public in attendance for their input. All said they understood the value of removing the dam and cited clear benefits to the community from that action.

A vote to support removal of the dam and in favor of creating a riverfront park along the restored river corridor was unanimously approved, 5-0. The Steering Committee recommendation will be presented at a public forum in early 2024, and it is expected the Select Board will make its decision in February.

Next Steps

No matter which option is chosen, a lot of work will need to be done before any construction begins. Some of those activities are:

- Finalizing Partnership Agreements
- Organize Community Participation and Communication
- Significant detailed initial and final Engineering Designs
- Funding Arrangements
- Permitting – some of the agencies that will need to be consulted with include:
  - Federal Energy Regulatory Commission (FERC)
  - National Environmental Policy Act
  - Maine Department of Environment Protection (DEP)
  - Maine Department of Fish & Wildlife
  - Maine Stormwater Management Law
  - U.S. Army Corps of Engineers
  - U.S. Fish and Wildlife Service
  - National Marine Fisheries Service
  - Consultation with Tribal Historic Preservation Offices
  - Maine Historic Preservation Commission
  - Town of Dover-Foxcroft (Demolition, Shoreland Zoning, etc.)

A Timeline for activities – from "Agreement" to project conclusion might be something like this:

Finalize partnership agreement	90 days to complete in 2024
Organize Community Participation	90 days to complete in 2024
Fundraising	Ongoing
Permitting and final design	3 years to complete between 2024-2028
Construction	2 years to complete between 2028-2030
Streambank restoration & Park Development	1-2 years to complete in 2030-2031

A key milestone in the project will be at the confluence of the initial design and initial funding efforts. Though we would begin with the working assumption that project costs to the town would be zero; with design and funding efforts in hand, there is a fair chance that there will be a gap. That presents the opportunity for all parties to re-assess the project – to set priorities and to consider other funding sources including perhaps from the town itself. Throughout the course of any project of this magnitude, adjustments to scope and costs will be necessary.

Continuing Assistance Needed

We realize that a complex multi-year project such as this is far beyond the time, expertise or resources of our town. Thus, we will need long-term assistance from outside resources. This support will likely come from a variety of sources as the project progresses. However, we would hope that our current partners, The Atlantic Federation, The Nature Conservancy and Inter-Fluve would be given first priority. Upon approval of the project the very next steps should be to negotiate agreements with them for further partnerships – at least through the design and funding phases and, hopefully, through the construction and follow-up phases as well.

Community Participation

Any project of this scope and impact needs to have extensive community participation. Because of the many efforts that the core project team has made so far, we have learned a lot about additional efforts that can be made to ensure that the project is conducted in as transparent a manner as possible. For example, these efforts should include:

Broadening the stakeholders participation
More frequent community forums
Workshops for design development
Better use of social media
Collecting questions and providing timely responses

Appendices

Appendix A – Documents and Presentations

Date	Author	Name
June 27, 2022	Atlantic Salmon Foundation (ASF); The Nature Conservancy (TNC)	Proposal for the Mayo Mill Dam & Appurtenant Facilities
September 12, 2022	Town & ASF, TNC	Partnership Agreement
April 6, 2023	ASF & TNC	Presentation – Feasibility & Alternatives Study
March 16, 2023	Maine Downtown Center	Presentation
March 16, 2023	MDF, Maine Bureau of Parks and Lands, NOAA	Partnership Funding Options
April, 2023	Inter-Fluve	Presentation – Piscataquis Riverflow
May, 2023	ASF, TNC, Inter-Fluve	Presentation – Fish Passage
June, 2023	Inter-Fluve, Gomez & Sullivan, VHB	Baseline Conditions Report (Interim Draft)
June, 2023	ASF, TNC, Town of DF	Presentation at Public Forum
July 14, 2023	Inter-Fluve	Preliminary Options Summary & Screening Matrix
October, 2023	Gomez and Sullivan	Dam/Powerhouse Inspection and Dam Stability Analysis
October, 2023	Inter-Fluve, Gomez & Sullivan, VHB	Baseline Conditions Report (Final)
October, 2023	Inter-Fluve, Alden Laboratories, Gomez & Sullivan, VHB, Viewshed	Draft – Alternatives Analysis Report
November, 2023	NOAA Restoration Center	Federal Funding Considerations
November, 2023	ASF & TNC	Future Partnership Considerations

Appendix B – Meetings

January

- Introductions and Organizing
- Overview of project process
- Initial vision/expectations of committee members
- Objectives/Benefits
- Cost and other concerns

February

- Outline of steps in following months
- Brainstorming on public engagement
- Reviewed draft objectives and summary of concerns from initial meeting

March

- Partnership Funding Options
  - Maine Downtown Center
  - Bureau of Parks and Lands (State)
  - NOAA – (Federal)
- Communications and Outreach Action items

April

- Discussion of Public Meeting (at Central Hall)
- Mike Burke on Piscataquis River Flow
- Discussion on final recommendations
- Communications and Outreach

May

- Plan for Kingsbury Stream Field Trip
- Overview of life cycle of Salmon
- Discussion of types of fish passages
- Fish to exclude?
- Experience with different types of fish passages

June

- Project Progress overview
- FERC requirements
- Fish passage Discussion
- Public Forum on the 27th of June
- Communications and Outreach

July

- Reviewed public Forum
- Discuss field trips
- To Farmington
- Our own dam and environs
- Preliminary matrix table (Appendix)
- Objectives and Benefits
- Costs (Constraint)

August

- Tour of Mayo Mill powerhouse/dam
- Discuss Farmington Field Trip

Overview of the project phase
Selected 5 alternatives for in-depth research

September

Assessment of existing dam and powerhouse (Gomez & Sullivan)
Howland Field Trip
Discussed potential opportunities for landscaping (Eamonn Hutton)
River water levels and flooding risks for each alternative (Mike) (appendix)
Review of process
Discuss Howland Field Trip

November - 9

Presentation of Baseline Conditions Report (Mike and Gomez & Sullivan)
Presentation of (Draft) Alternatives Analysis Report
Appendices
Hydropower Pre-Feasibility Cost Assessment
Dam Modifications and Fish Passage schematics
Landscape Enhancement plans and Renderings
Detailed Alternatives Summary Table
Detailed Cost Summary cost tables – Dam & Fishway
Detailed Cost Summary - Landscape
Discussion
Hydropower Analysis Report (Gomez and Sullivan)
Six alternative renderings (Mike)
NOAA – three potential funding opportunities
ASF and TNC discuss continuing partner possibilities
Private Spending

November 16

Steering Committee met (without consultants)
Lots of discussion
Objectives/Benefits
Costs
Some reservations
Decision to choose dam removal option

December

Discussion of Committee's recommendation
Concerns raised about community awareness & participation
Discussion of Next Community Forum

Appendix C – Conceptual Cost Estimate for Dam Removal

Table R2A. Conceptual Cost Estimate Analysis for *Mayo Mills Dam, Dam Removal, with Bedrock Removal*

Estimated Initial Project Costs						
Construction Cost Items						
No.	**Item**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Notes**
Direct Costs						
1	Mobilization	1	LS	$ 499,600	$ 499,600	15% of other items; includes clearing and grubbing; traffic control as necessary
2	Water Control	1	LS	$ 150,000	$ 150,000	Recent bids, Engineer's Judgement
3	Erosion and Pollution Control	1	LS	$ 30,000	$ 30,000	Misc. Control Activities
Site Work						
4	Dam Removal	1	LS	$ 175,000	$ 175,000	Removal of Concrete, Log Sluice, Gatehouse, etc. to River Bed/Bedrock
5	Gatehouse Abatement	1	LS	$ 50,000	$ 50,000	Asbestos Abatement
6	Wall Retrofits	1	LS	$ 20,000	$ 20,000	Wall Stabilization at right retaining wall.
7	Building Retrofits	1	LS	$ 40,000	$ 40,000	Foundation Repair
8	Bedrock Removal	1,380	CY	$ 160	$ 220,800	Potential bedrock excavation to promote connectivity
9	Sediment Removal and Disposal	16,500	TON	$ 70	$ 1,155,000	Potential sediment management includes excavation and disposal to an in-state facility, large quantity pricing
10	Sediment Removal Contingency	7,000	TON	$ 70	$ 490,000	Potential sediment management includes excavation and disposal to an in-state facility, large quantity pricing, conservative contingency
11	Remove Timber Crib	1	LS	$ 40,000	$ 40,000	Remove legacy timber crib structure
12	Channel Work DS/at Dam	100	LF	$ 500	$ 50,000	Tailwater Riffle, Boulder Placement
13	Restore Passage at US Legacy Dam	1	LS	$ 40,000	$ 40,000	Shape Existing Boulders, Minor Supplements
14	Bank Stabilization	1,000	LF	$ 1,000	$ 1,000,000	May include fabric encapsulated soil lift, toe stone, fabric, other bank restoration in LA estimate
15	Fencing, Signage, and Appurtenances	1	LS	$ 50,000	$ 50,000	Estimated, Needs Advanced Design to Optimize
Site Landscape & Restoration						
16	Site Enhancement					See LA Opinion of Cost
				Construction Subtotal	$ 4,010,400	
				Contingency (30%)	$ 1,203,100	
				Project Construction Total	**$ 5,213,500**	

Initial Project Delivery Costs			
Item	**Estimated % of Construction Cost**	**Total Cost**	**Notes**
Project Management	2.0%	$104,300	
Permitting	2.0%	$104,300	
Engineering Design	10%	$521,400	
Construction Contract Administration	2.0%	$104,300	
Construction Observation	5.0%	$260,700	
Initial Project Delivery Costs Total	**21%**	**$1,095,000**	
Total Initial Project Costs		**$6,308,500**	

Lifespan Costs - 50-year planning horizon					
Item	**Event Cost (2023 dollars)**	**Intervals**	**Total Cost (2023 dollars)**	**Total Aggregated Cost (Escalated for 4.2% Inflation over 50 years)**	**Total Capitalized Cost (2023 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)**
Annual Operation and Maintenance Estimated Cost (Every Year, On Average)	$1,000	50	$50,000	$162,500	$31,800
Repair and Rehabilitation Estimated Cost (Every 10 Years)	$10,000	5	$50,000	$202,300	$29,100
Total Lifespan Costs			**$100,000**	**$364,800**	**$60,900**

Appendix D – Landscape Enhancement Costs for Dam Removal

Table R1B/R2B. Conceptual Cost Estimate Analysis for *Mayo Mill Dam, Landscape Site Enhancements, Dam Removal*

Estimated Initial Project Costs						
Construction Cost Items						
No.	**Item**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Notes**
Direct Costs (Near Term, Baseline)						
1	Demolition	1.95	AC	$ 10,000	$ 19,500	General demolition within the project area.
2	Erosion Control	2,000	LF	$ 10	$ 20,000	Temporary erosion control/silt fence. Includes construction entrance.
3	Rough Grading	1.95	AC	$ 6,500	$ 12,700	
Circulation (Near Term, Baseline)						
4	Walking Path	10,000	SF	$ 8	$ 80,000	Dense grade or gravel path, 5' wide
5	Furnishings	2,000	LF	$ 30	$ 60,000	Bench every 100', assumed waste can, bike rack
6	Signage	1	LS	$ 60,000	$ 60,000	four kiosks and small ped signs, potential for interpretive artwork, lighting, and/or parking signage.
Special Construction (Near Term, Baseline)						
7	Paved Plazas	1,200	SF	$ 30	$ 36,000	
8	Cantilevered Boardwalk	1,400	SF	$ 500	$ 700,000	175' long, 8' Wide, boardwalk to the café, contingent on agreement with the mill owner
9	Overlooks	6	EA	$ 300	$ 90,000	5'x10' with railing, benches and substructure, pressure treated wood, baseline item does not include alternative specific outlooks in line 16.
10	Docks	2	EA	$ 75	$ 22,500	5'X30', pressure treated wood
11	Boat Ramp	1,000	SF	$ 15	$ 15,000	100' long rebuild. Concrete. 10' wide.
Planting (Near Term, Baseline)						
12	Shade trees	30	EA	$ 1,300	$ 39,000	15 gal. potted trees
13	Riverbank Restoration	20,000	SF	$ 18	$ 360,000	10' wide zone at all river edges, erosion control mat with native seed
14	Lawn/Park	95,000	SF	$ 3	$ 285,000	Seeded with occasional groundcovers and ornamental planting
Additional Site Improvements For Alternative R1B/R2B, Near Term						
15	Boat Ramp	1,000	SF	$ 15	$ 15,000	100' of additional boat ramp, concrete, 10' wide
16	New Path at Chamber	250	LF	$ 8	$ 2,000	Dense grade, gravel path
17	Overlooks	1	EA	$ 15,000	$ 15,000	5'x10' with railing, benches and substructure, pressure treated wood, alternative specific overlooks are in addition to the baseline overlooks.
18	Riverbank Restoration	40,000	SF	$ 18	$ 720,000	Additional 40' wide zone at all river edges, erosion control mat with native seed.
19	Water Access at DOT	400	SF	$ 200	$ 80,000	
20	Restoration at the Cove	80,000	SF	$ 18	$ 1,440,000	Erosion control mat with native seed, occasional/strategically placed native plugs
21	Lawn/Park	60,000	SF	$ 3	$ 180,000	Seeded with occasional groundcovers and ornamental planting
22	Pedestrian Bridge	150	LF	$ 22,000	$ 3,300,000	
Long Term Additions, Baseline - Amphitheater, New Road, and Boardwalk						
23	Demolition	1.2	AC	$ 10,000	$ 12,000	For Monument Square improvements, amphitheater and parking expansion, general demolition.
24	Erosion Control	1,000	LF	$ 10	$ 10,000	Temporary erosion control/silt fence. Includes construction entrance.
25	Rough Grading	1.95	AC	$ 6,500	$ 12,700	Excavation playground area, paths/trails, and field (+/- 1.5 acres)
26	Amphitheater	25,000	SF	$ 18	$ 450,000	Monument Square
27	Parking Expansion	25,000	SF	$ 13	$ 325,000	Monument Square
28	New Road	8,600	SF	$ 13	$ 111,800	Monument Square
29	Cantilevered Boardwalk	600	SF	$ 500	$ 300,000	8' Wide, extend boardwalk 75' from the café to the bridge, contingent on near term boardwalk construction.
				Construction Subtotal	$ 8,773,200	
				Contingency (30%)	$ 2,632,000	
				Baseline Project Construction Total	**$ 11,405,200**	

Initial Project Delivery Costs			
Item	**Estimated % of Construction Cost**	**Total Cost**	**Notes**
Project Management	2.0%	$228,100	
Permitting	2.0%	$228,100	
Site Enhancement Design	10.0%	$1,140,500	
Construction Contract Administration	2.0%	$228,100	
Construction Observation	5%	$570,300	
Initial Project Delivery Costs Total	**21%**	**$2,395,100**	
Total Initial Project Costs		**$13,800,300**	

Lifespan Costs - 50-year planning horizon					
Item	**Event Cost (2023 dollars)**	**Intervals**	**Total Cost (2023 dollars)**	**Total Aggregated Cost (Escalated 4.2% inflation over 50 years)**	**Total Capitalized Cost (2023 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)**
Annual Operation and Maintenance Estimated Cost (Every Year, On Average)	$82,200	50	$4,110,000	$13,354,000	$2,615,900
Repair and Rehabilitation Estimated Cost (Every 10 Years)	$82,200	10	$822,000	$1,662,900	$239,600
Total Lifespan Costs			**$4,932,000**	**$15,016,900**	**$2,855,500**

Appendix E – Conceptual Goals: Dam Removal

Note: The long-term goals shown here feature more substantial investments in riverfront infrastructure and connectivity. However, the Framework - Long-Term Goals strategy includes enhancements on properties that are not presently publicly-owned or owned by partner-stakeholders, or may have more notable uncertainty associated with their implementation (such as a pedestrian bridge across the river). This strategy is considered similar to a long-term 'Master Plan' visioning of potential.