Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA

PDF 1. Project Summary & Project Narrative

For: National Oceanic and Atmospheric Administration (NOAA)
Department of Commerce

By: Town of Exeter, New Hampshire

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1 Project Summary

1. Applicant Organization. Town of Exeter, New Hampshire

2. Project Title. Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam

3. Site Location. Pickpocket Dam is located within the Exeter River, along the municipal boundary between the towns of Exeter and Brentwood, NH. The Dam site is ~7.5 river miles upstream from the former Great Dam site in downtown Exeter. The Great Dam was successfully removed in 2016 with the support of NOAA and others. The Exeter is a major tributary of the Great Bay, one of the largest, most ecologically significant estuaries on the East Coast, with an area of approximately 6,000 acres.

4. Brief Project Description. The Pickpocket Dam is an earth embankment dam with a concrete spillway with end walls, and was last repaired/rebuilt in 1969. The dam is 15 feet high (from dam toe to top of abutments), 230 feet in total length, and the main spillway length is approximately 130 feet. The dam structure also includes an inefficient fish ladder along the left abutment, and lower training weir. After years of discussion and evaluation of alternatives, the Town has decided dam removal is the best way to address deficiencies at the dam, while also improving fish habitat, remediating water quality issues, and addressing flooding and safety concerns both upstream and downstream of the dam. The proposed project would involve eliminating the entire existing dam structure, including the fish ladder and lower training weir. It would also entail reshaping the river channel by removing accumulated sediment to ensure a stable streambed and conditions favorable to upstream fish passage.

Project goals include:

Goal 1: Advance restoration efforts for diadromous fish populations by eliminating a barrier to upstream fish passage. The Exeter River provides habitat for nine fish species of concern listed in New Hampshire's Wildlife Action Plan, including ecologically important native diadromous fish species: the anadromous blueback herring (*A. aestivalis*), rainbow smelt (*Osmerus mordax*), and alewife (*Alosa pseudoharengus*), and the catadromous American eel (*Anguilla rostrata*). Removal of the Pickpocket Dam will reconnect an additional approximately 6.2 miles of free-flowing mainstem habitat along the Exeter River from the lower training weir to Crawley Falls as well as 7.9 river miles of tributaries to a free-flowing condition. As a result, diadromous fish species would be able to successfully ascend the exposed restoration reach, supporting a self-sustaining fish run.

Goal 2: Improve the Exeter River's declining water quality and strengthen the Exeter River's natural ecosystem. Listed as impaired for low dissolved oxygen, benthic-macroinvertebrate bioassessment for aquatic life integrity, *Escherichia coli*, and pH for aquatic life related in part to stagnant water conditions above Pickpocket Dam, the Exeter River is included on New Hampshire's Section 303(d) priority list of impaired water bodies. Returning the Pickpocket Dam impoundment to a free-flowing state would dramatically improve the river's aquatic environment. There would be a substantial net benefit on fishery resources in this reach of the Exeter River and—by extension—the Great Bay Estuary and the Gulf of Maine.

Goal 3: Increase the Exeter River's flood resilience and reduce vulnerability to the growing risk of fluvial flooding. The removal of the dam will also increase the overall resiliency of the region by lowering the 100-year floodplain upstream, creating or increasing the freeboard to existing upstream development and infrastructure, and take properties out of the inundation area in event of a dam breach.

Goal 4: Increase public safety by eliminating unsafe dam infrastructure. The New Hampshire Department of Environmental Services (NHDES) Dam Bureau has identified safety deficiencies with the Pickpocket Dam. Most notably, the dam does not meet regulations for high-hazard dams to safely withstand the design storm of 2.5 times the 100-year storm event. On July 25, 2019, NHDES issued a revised Letter of Deficiency designating Pickpocket Dam as a High Hazard dam. The failure of Pickpocket Dam during the 100-year storm event is predicted to cause the overtopping of Cross Road and NH Route 111 and has the potential for loss of life. Removal of Pickpocket Dam would eliminate this risk to the community's well-being that could result from dam break failure.

Regional and Watershed Context.

The Exeter River begins in the town of Chester and flows east through the towns of Sandown, Raymond, Fremont and Brentwood to Exeter. The project site is situated at the town line between Brentwood and Exeter. Below the Pickpocket Dam, the Exeter River flows through downtown Exeter, by the former Great Dam removal project, and then becomes the Squamscott River and continues northward through Stratham and Newfields before discharging into Great Bay. Together, the Exeter and Squamscott Rivers drain approximately 125 square miles, including broad wetlands, forested riverbanks and gently flowing waters. The river system plays an essential role in maintaining the overall health of the Great Bay National Estuarine Reserve, is home to a number of rare and endangered species, and is an important scenic resource. For these reasons, the rivers have been recognized not only by the New Hampshire Rivers Management and Protection Program (RMPP), but also as part of the New Hampshire Resource Protection Project. The upper 33.3 miles of the Exeter River, from its headwaters to its confluence with Great Brook in Exeter, were designated into the RMPP in 1995, while the remaining 2.2 miles of the lower Exeter and the 6.3-mile Squamscott River were added in 2011.

Timeline.

Data collection and preliminary design began in October 2022, with a final report to be completed by June 2024. If this grant is awarded, final design and permitting would begin in July 2024. We envision an 18-month design and permitting phase. The project would be bid to potential contractors in the winter of 2025. Construction (i.e., removal of the dam and restoration of the river channel) is expected to begin in July 2026 and end by November 2026. Following dam removal, the Town will initiate a Letter of Map Revision (LOMR) application process with FEMA to update the Flood Insurance Rate Maps. We also anticipate an adaptive management phase the following year (2027) to enhance the channel as necessary to improve fish passage and expect 3 years of post-removal monitoring and reporting.

5. Landowner and Stakeholder Outreach.

Pickpocket Dam has been the focus of multiple studies (evaluation of dam compliance, and feasibility of rehab or removal) since 2017, immediately following the removal of the Great Dam. During these studies, the project team met with Town committees, state and federal resource agencies, and the public to solicit feedback and discuss questions and concerns about the project. At these meetings, the project team provided updates about the scope of the project and its current status. Each of the municipal meetings was broadcast on local public access television, and recordings of the meetings and presentations were posted to the Exeter municipal website. The most recent public meeting was a Town Select Board meeting held on October 2, 2023, where the select board voted unanimously that removal of the Pickpocket Dam was the Town's preferred alternative, and thus voted to submit this grant application.

6. Funding Request. The Town of Exeter is requesting $1,992,000 to support the project through NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA.

2 Project Narrative

1. Importance and Applicability

By removing the Pickpocket Dam, the Exeter River Herring Run Restoration Project would restore as much as 14.1 river miles of the Exeter River and its tributaries to a free-flowing condition, eliminating a barrier to migrating anadromous fish, improving water quality, and reducing flooding from coastal storms. This dam removal is particularly important to Exeter, because this is the last barrier on the Exeter River in Town, and will fully restore the river to its free flowing condition. Therefore, its removal would greatly enhance anadromous fish habitat, and the entire Exeter River watershed and Great Bay Estuary would benefit from this proposed project.

The Pickpocket Dam is a run-of-river dam on the Exeter River where it flows through the Town of Exeter, New Hampshire, prior to its discharge into the Great Bay approximately 15 miles downstream. The dam forms an approximately 3.5-mile impoundment, impacting the river flow to just downstream of Haigh Rd in Brentwood, NH. The Pickpocket Dam is an earth embankment dam with a concrete spillway with end walls and was last repaired/rebuilt in 1969. The dam is 15 feet high (from dam toe to top of abutments), 230 feet in total length, and the main spillway length is approximately 130 feet. The dam structure includes an inefficient fish ladder along the left abutment, a lower training weir, and a 4-foot by 6-foot low level outlet, which is leaking and inoperable. The NH Fish and Game Department (NHFGD) installed and operates the fish ladder to help diadromous fish reach spawning and nursery habitat; however, the fish ladder is inefficient at allowing upstream fish passage.

The proposed project would involve eliminating the entire existing dam structure within the riverbanks, including the fish ladder and lower weir. It would also entail reshaping approximately 500 linear feet of the river channel within the footprint of the existing dam and immediately downstream and upstream using a natural channel design approach based on sound engineering and fluvial geomorphic principles. It would also involve removing approximately 2,750 cubic yards of sediment from the upstream impoundment.

The removal of the Pickpocket Dam is a priority for the community and the State of New Hampshire for many reasons:

- The Pickpocket Dam is the last barrier on the Exeter River within Exeter and will continue the work of fully restoring the river following the successful removal of the Great Dam in 2016. It will further the goal of enhancing the diadromous fish run, by helping them as they travel from the marine environment of the Gulf of Maine (via the Great Bay Estuary) to the freshwater spawning and nursery habitat present in the Exeter River system. Its removal would open as much as 14.1 river miles of stream habitat.
- The Exeter River is one of five main tributaries that flow together in the New Hampshire coastal plain to form the Great Bay. It is one of the largest and most important tidal estuaries on the East Coast.
- Dam removal has been identified as the most effective restoration method to restore aquatic species and habitat in the Pickpocket Dam impoundment and remove this reach of Exeter River from the Section 303(d) list of impaired waters.

- Dam removal will significantly enhance the Exeter River's flood resilience, giving the Town of Exeter the nature-based capacity to withstand future storms and adapt to climate change.
- The proposal to remove the dam comes after years of engineering and scientific study and public discussion. The Town of Exeter commissioned a detailed Feasibility Study in 2022 that is studying alternatives for addressing water quality and dam safety issues. The studies completed to date have demonstrated that the removal of the Pickpocket Dam is technically feasible and would have a variety of positive ecological and community effects.

1.a Priority for Migratory Fish.

Through the removal of the Pickpocket Dam, this proposed river restoration project prioritizes conservation and restoration measures for migratory fish. Based on analysis of the Town of Exeter's consultant, VHB, in its studies and analysis, as well as VHB's direct consultation with fisheries managers at state and federal agencies, the presence of this run-of-the-river dam adversely impacts the river herring population in the Exeter River, and removal would benefit this important resource. Additionally, the presence of dams along the rivers is a primary factor in the local decline of the diadromous fish population due to the loss of habitat connectivity and declining water quality in their impoundments. Additionally, dams were cited by fisheries managers as an important factor in the observed decline in the herring run. As was the case during the removal design for the Great Dam on the Exeter River, Sawyer Mill Dam on the Bellamy River and Mill Pond Dam on the Oyster River, the design will use river herring as the target species for restoration design at the Pickpocket Dam. River herring were selected as a conservative design target due to their migratory capabilities and sensitivities to velocities and changes in channel elevation.

According to NH's "River Herring Sustainable Fishing Plan" river herring in NH are managed as a statewide management unit. With the exception of return estimates produced in 1979, the number of river herring returning to spawn in the Great Bay management unit peaked in the early 1990's at nearly 300,000 fish but has since gradually declined to a level approaching 100,000 fish. While 2012-2016 yielded greatly increased returns of river herring to some of the rivers in the Great Bay estuary, returns declined again in the period between 2017 and 2020. Long-term population recovery is still limited by lack of access to quality upstream freshwater habitats that are blocked by numerous dams in the region. River herring harvest in Great Bay accounts for 95-100% of the statewide harvest. The primary harvest of river herring in New Hampshire is for personal use as bait by anglers and lobster harvesters. The annual river herring harvest numbers from the Great Bay Indicator Stock (stocks of river herring returning to the Great Bay Estuary system as an indicator of statewide river herring abundance) have ranged from approximately 1,900 fish to 44,400 fish. Due to declining return numbers, the fishery-independent sustainability targets established in NH's "River Herring Sustainable Fishing Plan" were not met and the NHF&G was required to close the river herring fishery in 2020, prohibiting all harvest or river herring in state waters.

NHFGD has been actively working to restore river herring in the Exeter River since the early 1970s with the goal of establishing self-sustaining populations. Following removal of the Great Dam, NHFGD has seen increased Herring counts at the former dam location. The herring stack up at the base of the fish ladder at the Pickpocket Dam, but the counts there are not as good as they could be given the inefficient ladder. Dam removal would eliminate this impediment. The dam's removal would open at least 14.1

river miles of stream habitat to the estuary below. This represents valuable spawning habitat for anadromous fish.

Dam removal would also help address the Exeter River's water quality issues related, in part, to stagnant water conditions and nutrient loading in Pickpocket impoundment. If the impoundment were restored to a free-flowing condition, the resultant improved dissolved oxygen levels and lower water temperatures would positively affect habitat conditions for diadromous fish.

Further, removal of the Pickpocket Dam aligns with numerous regional environmental plans such as:

- *NHF&G Wildlife Action Plan* (2015). Specifically, the WAP identifies dam removal as high priority Management Actions and Conservation Actions, as follows:
    - Management Action #1407: Restore Natural Flow Regimes
    - Management Action #1408: Restore and Maintain Watershed Connectivity
    - Conservation Action # 3225: Initiate on-the-ground strategies to facilitate movement through wildlife linkages identified through modeling.

- *River Herring Sustainable Fishing Plan 2020*. The Atlantic States Marine Fisheries Commission Amendment 2 to the Interstate Fishery Management Plan for Shad and River Herring (ASMFC 2009) identifies loss and degradation of spawning and nursery habitat due to development of dams and other obstructions (e.g., road crossings and culverts) as the "major causative factors for population declines." In response to Amendment 2, the New Hampshire Fish and Game Department established a Sustainable Fishery Management Plan (SFMP) for river herring in 2011, which was most recently updated in 2020. The SFMP establishes both fishery dependent and fishery independent targets for the river herring populations in New Hampshire waters to maintain a sustainable population.

- The *2010 Piscataqua Region Comprehensive Conservation and Management Plan* (CCMP) (unh.edu). Specifically, the CCMP identifies culvert upgrades and dam removal as high priority activities in the "Living Resources and Habitat Action Plan Management" and "Water Resource" Actions, as follows: Objective 1.4. Restore native diadromous fish access to 50% of their historical range by 2020 and improve habitat conditions encountered throughout their life cycle.

- The 2020-2024 New Hampshire Non-Point Source Management Program Plan, specifically that dams and culverts are noted as hydrologic and habitat modifications that can result in impairment of aquatic life use. The NPS Plan identifies goals, objectives, and milestones for correcting hydrologic and habitat modifications. According to the New Hampshire NPS Management Program Plan, priority dams and barriers identified for removal must meet the following criteria:
    - The structure impounds or diverts water.
    - The waterbody for which it is located must be on New Hampshire's 303(d) list, as impaired for at least one of the following parameters: Chlorophyll-a , Dissolved oxygen, Cyanobacteria hepatotoxic microcystins.
    - The dam or barrier owner has contacted the NHDES River Restoration Program to express their interest in removal.

1.b Enhancing Community Resilience to Climate Hazards and Providing Other Co-Benefits.

Along with restoration of critical fish habitat and addressing dam safety concerns, the Pickpocket Dam removal/herring run project will furnish the Town of Exeter with a robust, sustainable, and forward-looking solution to build the community's flood resilience and help it adapt to a changing climate. The

project is expected to deliver a host of beneficial outcomes to the human and natural ecosystem, including:

- Increase the Exeter River's flood resilience.
- Lower the mapped FEMA Base Flood Elevations upstream of the Dam, by as much as 8-feet tapering to no change approximately 4- miles upstream.
- Reduce the flood risk due to dam breach to multiple residential structures, and a downstream mobile home park.
- Reduce the chance of overtopping State Route 111 (Kingston Road), a Class II roadway.
- Stabilize the river channel and improve the stability and ecological integrity of the upstream area by reconstructing the channel and removing sediment from the impoundment.
- Create a destination for anglers, birdwatchers, kayakers, and others seeking to enjoy the restored Exeter River in Exeter

1.c Regional and Watershed Context.

The Exeter River is a tributary to the Great Bay Estuary, a 6,000 acre drowned river valley estuarine system receiving freshwater input from a 1,000 square mile drainage area via 7 major river systems. Great Bay is an estuary of national importance as recognized by EPA's National Estuary Program, NOAA's National Estuarine Research Reserve network and USFWS' Refuge System. Overall, the imperiled anadromous fishery in the Exeter River is one component of a critical regional resource that supports the larger Little/Great Bay estuary and the Gulf of Maine as a whole. In removing a barrier for migratory fish and contributing to the restoration of what historically was one of the largest herring runs in all of New Hampshire's coastal rivers, this proposed project directly aligns with the National Oceanic and Atmospheric Administration (NOAA) and the National Marine Fisheries Service (NMFS) regional efforts to restore commercial and recreational fisheries in the Gulf of Maine.

The Exeter and Squamscott rivers are a single river system with two names. The Exeter River is the upstream, freshwater segment while the Squamscott River is the downstream, tidally influenced segment. The Exeter River begins in the town of Chester and flows east through the towns of Sandown, Raymond, Fremont and Brentwood to Exeter. The project site is situated at the town line between Brentwood and Exeter. Below the Pickpocket Dam the Exeter River Flows through downtown Exeter, by the former Great Dam removal project, and then becomes the Squamscott and continues northward through Stratham and Newfields before discharging into Great Bay. Together, the Exeter and Squamscott Rivers drain approximately 125 square miles, including broad wetlands, forested riverbanks and gently flowing waters. The river system plays an essential role in maintaining the overall health of the Great Bay National Estuarine Reserve, is home to a number of rare and endangered species, and is an important scenic resource. For these reasons, the rivers have been recognized not only by the New Hampshire Rivers Management and Protection Program (RMPP), but also as part of the New Hampshire Resource Protection Project. The upper 33.3 miles of the Exeter River, from its headwaters to its confluence with Great Brook in Exeter, were designated into the RMPP in 1995, while the remaining 2.2 miles of the lower Exeter and the 6.3-mile Squamscott River were added in 2011.

Pickpocket Dam is located approximately 7.8 river miles above the former Great Dam in downtown Exeter. The Great Dam was removed successfully in 2016 (**Exeter River Lives Free Again | NOAA Fisheries**). Removal of the Pickpocket Dam will fully restore the Exeter River and its tributaries within Exeter, NH to their original, free-flowing conditions. This will further contribute to the restoration of this

important migrating herring fish run. Other sea-run species that could benefit from unobstructed passage include the Exeter River's declining American eel population and brook trout.

The contributing drainage area to Pickpocket Dam is approximately 74 square miles. The landcover within the watershed consists predominately of forested, agricultural, and residential. The watershed is hilly with a well-defined river channel and bordering wetlands. The River maintains a sinuous and meandering pattern with an average slope of 0.05 % upstream of the dam and 0.04 % downstream of the dam. The river depth upstream of the dam ranges from 1 foot to 10 feet.

In total, the critical and diverse habitat of the Exeter River watershed is home to 18 known fish species, including nine species of special conservation concern listed in New Hampshire's Wildlife Action Plan (New Hampshire Fish and Game Department, 2015). A designation of "special concern" indicates that the species has the potential to become threatened if no conservation actions are taken. Among the listed native Exeter River diadromous fish species are blueback herring, alewife, rainbow smelt, American eel, and American shad.

Restoring a more natural profile of the Exeter River at and immediately above the dam would give river herring the ability to successfully ascend the restoration reach that would be exposed following dam removal, supporting a self-sustaining river herring run. This ability of anadromous fish to readily ascend the project reach is consistent with the historic evidence that these species commonly ascended the river prior to dam construction.

Removal of the Pickpocket Dam and restoration of its Exeter River impoundment aligns well with other dam removal/river restoration projects in the Great Bay watershed, all of which support NOAA's Gulf of Maine fishery restoration efforts:

- Removal of head-of-tide Great Dam on Exeter River, Exeter, NH
- Removal of head-of-tide Winnicut River Dam, Greenland, NH
- Installation of fish passage facilities on Wiswall Dam on Lamprey River, Exeter, NH
- Removal of Upper and Lower Sawyer Mills Dams on Bellamy River, Bellamy, NH
- Pending removal of the Mill Pond Dam on the Oyster River, Durham, NH

1.d Providing Benefit to Underserved Communities.

If the Pickpocket Dam were to fail, a mobile home community downstream would be heavily impacted with the highest potential for loss of life. Typically, mobile home communities consist of lower income families, many of whom would not have the means to move, even temporarily, in the event of a severe storm when dam breach is most likely. Bringing the dam into compliance through removal prioritizes the safety of the people in this low-income neighborhood.

2. Technical and Scientific Merit

The proposed project would remove the existing Pickpocket Dam spillway, fish ladder, and lower training weir. Portions of the abutments and remnants of the former tailrace may be retained as evidence that there was once a dam there and help mitigate potential historic impacts. The channel would be reshaped to have a roughly 70-foot bank full width, incorporating a v-shape channel to allow sufficient depths during low-flow to provide fish passage under low flow conditions. The active restoration of the Exeter River channel upstream of the dam removal site would involve channel shaping approximately 500 feet upstream of the location of the dam to stabilize the channel and remove

approximately 2,750 cubic yards of sediment that has built up behind the dam. This would minimize potential sediment impacts downstream, as well as improve the stability and ecological integrity of the upstream area following dam removal.

2.a Project Site Characteristics and Methods.

With the Town of Exeter Select Board having decided that removal of the Pickpocket Dam and restoration of the river to allow for herring passage is their preferred alternative, remaining project phases include completion of the feasibility studies, final design, environmental permitting, construction, post construction monitoring, and a Letter of Map Revision (LOMR) with FEMA. The following timeline depicts the project milestones that have been achieved to date, and the Town of Exeter maintains a webpage with past and current information regarding the dam removal project and analyses related to the Pickpocket Dam conducted thus far.

Milestone	Date
Pre-Feasibility Studies Initiated (VHB Team)	2017
Feasibility Study Initiated (VHB Team)	October 2022
Pickpocket Dam Environmental and Hydraulic Impact analysis Completed	June 2023
Select Board Votes to Proceed with Dam Removal	October 2023

- **The history, original purpose, age, current use and condition of the dam or barrier.**

The Pickpocket Dam is owned and operated by the Town of Exeter. The Dam is an earth embankment dam with a reinforced concrete gravity spillway with end walls, and was last repaired/rebuilt in 1969. The dam structure also includes an inefficient fish ladder along the left abutment, and lower training weir. The dam is in satisfactory condition but does have a Letter of Deficiency issued by the New Hampshire Department of Environmental Services Dam Bureau. The dam was reclassified as a High-Hazard Dam in 2019 and does not meet the dam safety requirements to pass 2.5 times the 100-year flow with 1-foot of freeboard. The letter of deficiency calls for reconstruction of the dam to bring it into compliance with Env-Wr 303.12 by December 1, 2027. The dam was gifted to the town in approximately 1980 by Milliken Industries, Inc. The dam's only current use is for recreation (paddling and swimming) in the impoundment above, although public access is very limited.

- **Dam or barrier dimensions (e.g., height, width) and impoundment area and volume.**

The Pickpocket Dam is an earth embankment dam with a reinforced concrete gravity spillway founded on ledge. It measures 15 feet high (from dam toe to top of abutments), 230 feet in total length, and the main spillway length is approximately 130 feet. Downstream of the main spillway is a training weir that is a reinforced-concrete gravity structure with a hydraulic height of 4-feet. Between the lower weir and the main spillway along the left abutment is an inefficient fish ladder. The dam's permanent impoundment covers approximately 22 acres and impounds approximately 75 acre-feet.

- **Extent of historic and/or anticipated fish passage at the site.**

Fish passage at the project site is currently restricted to an inefficient fish ladder that is operated by NHFGD. Following removal of the dam and restoration on the river bottom we anticipate this stretch of the river will no longer be a barrier to fish passage. The river will be restored to match the slope of the river profile downstream of the current dam. Maximum river slopes will be less than 1%. Channel configuration will include a v-shaped channel to allow for sufficient depths during low flow and include boulder clusters to allow resting places for fish.

- **Potential changes to hydrology and flooding regimes as a result of the restoration activities, both upstream and downstream.**

Dam removal would lower the hydraulic control of the river at the dam site by approximately 12.5 feet. The normal impoundment currently extends upstream approximately 3.5 miles to just below Haigh Rd in Brentwood. Following removal, this stretch will be a free-flowing river with water levels being reduced by approximately 10 feet at the current dam site, tapering down to no impact downstream of Haigh Rd.

The current dam is a run of the river dam, hydrology and hydraulics are not expected to change downstream of the dam. Removal will take several residential structures and a mobile home development out of the dam breach inundation area and increase the overall safety of homes and bridges along the Exeter River downstream of the dam.

- **The amount and characterization of sediments behind the barrier and potential sources of sediment contamination within the watershed.**

Sediment sampling of the Exeter River in the vicinity of Pickpocket Dam was completed in accordance with the procedures outlined in a March 2023 Sediment Sampling and Analysis Plan (SAP), approved by NHDES. Five (5) sediment samples were collected, including three discrete upstream samples identified as SED-1, SED-2, and SED-5 as well as two composite downstream samples identified as SED-3 and SED-4. Additionally, one field duplicate sample was submitted for SED-2 (i.e., SED-2 FD) for quality control purposes. The five sediment samples and one field duplicate sediment sample were submitted for laboratory analysis of priority pollutant 13 metals, manganese, iron, pesticides, PCBs, and semi-volatile organic compounds (sVOCs). Additionally, SED-1 was also submitted for laboratory analysis of VOCs due to the proximity of the groundwater management zone associated with the Cross Road Landfill.

Based on the sediment analytical results, only metals and PAHs were detected in sediment samples both upstream and downstream of Pickpocket Dam. Based on the risk classification resulting from the NHDES threshold effect concentrations and probably effect concentrations hazard quotients calculation, the concentrations of PAHs detected in sediment samples downstream of the dam have a moderate potential to adversely impact ecological receptors; however, concentrations of PAHs upstream of the dam have a low potential to impact ecological receptors. Concentrations of arsenic both upstream and downstream have a moderate potential to impact ecological receptors; however, based on the distribution and concentrations of arsenic detected in the sediment samples, the concentrations of arsenic identified are likely naturally-occurring. The levels of PAHs detected are typical of urban/suburban areas.

No concentrations of contaminants were detected in excess of the NH Soil Remediation Standards (SRS) within the sediment samples with the exception of arsenic detected in SED-2 FD (12.4 mg/kg) and SED-5 (13.9 mg/kg), which were both collected upstream of Pickpocket Dam. Concentrations of arsenic for all sediment samples ranged between 4.69 to 13.9 mg/kg with the mean concentrations of arsenic calculated at 9.88 mg/kg. Based on the narrow range of arsenic concentrations reported just above and below the SRS, the detections appear to be indicative of a naturally occurring background conditions. Nevertheless, the concentrations of arsenic exceeding the SRS generally suggest risk mitigation is warranted since the dam removal and river restoration includes some excavation of submerged sediment.

Overall, the ecological screening and human health screening results indicate that low levels of PAHs and arsenic are present in sediments both downstream and upstream of Pickpocket Dam.

- **The likelihood of historic and cultural resources in the area.**

The Pickpocket Dam was built in 1914 and therefore meets the age requirement for inclusion in the National Register of Historic Places. The dam was later rehabbed in 1969 and a fish ladder was added to the structure in the late 1970s. The dam has not been previously surveyed and included in the NH Division of Historical Resources (NHDHR) Inventory of Historic Places. A Historic Resources Inventory form for the dam would need to be completed for NHDHR to determine the eligibility of the structure.

The only previously surveyed resource in the vicinity of the project is the adjacent Cross Road Bridge, which was determined not eligible for listing in the National Register of Historic Places in 2018 by NHDOT and NHDHR concurred in 2022.

The history of mills along the Exeter River dates back to 1639 and the first known mill to be constructed at the Pickpocket Dam location was in 1652, therefore it is likely the dam site, and up and down river will be determined archaeologically sensitive for both pre- and post-contact activities.

It can be assumed based on previous dam removal projects in Exeter that the proposed project would include active participation in the Section 106 consultation process by the town, ACOE, NHDHR, and other consulting parties including Native American Tribal representation.

- **Safety considerations (e.g., structural integrity of the barrier, likelihood of failure, attractive nuisance conditions).**

Structurally deficient, the dam does not meet NHDES dam safety standards, which require “high-hazard” dams to pass 2.5 times the 100-year storm event with at least one foot of freeboard between the water surface and the top of the dam abutments. The Town was notified of these problems in multiple Letters of Deficiency (LOD), most recently in July 2019. Dam removal would fully resolve this concern.

- **Issues and potential control strategies regarding aquatic invasive species**

The risk posed by the potential spread of invasive species is difficult to predict, considering every ecosystem is different. To minimize the potential spread of invasive species spread, and to aid in the restoration and protection of native plant diversity, the project team will develop an Integrated Vegetation Management (IVM) Plan to manage the invasive species along the Pickpocket impoundment post removal. This approach could entail mechanical, cultural, biological, and chemical methods over a 3- to 5-year period and include actions before and after dam removal. Immediately following drawing down the impoundment, the newly exposed areas will also be seeded with native seed species to help limit invasive from coming in and getting established.

- **How the preferred alternative for barrier removal was determined by the stakeholders and the process that was or will be used to achieve common agreement.**

The Pickpocket Dam has been the subject of a long history of technical studies and public debate. After evaluating preliminary alternatives presented multiple times to the Exeter River Advisory Committee and Select Board, both the Advisory Committee and Select board voted unanimously to move forward with dam removal as the preferred alternative. The feasibility study report will be completed by June of 2024. The process will progress and there will be multiple opportunities for more public engagement to aid in the final design for dam removal.

2.b Project Description and Milestones.

The timeline below identifies the key project milestones. Design and permitting will start following funding approval. Major work at the dam site is expected to be completed by November 2026. No project element to date has triggered a formal NEPA review, but we note that the proposed project team has extensive NEPA experience if needed.

Task #	Title		
1	**Data Collection**	The Town of Exeter and the consulting team will collect final topographic, bathymetric, and sediment surveys. This will include a detailed wetland delineation within the project area, as well as collection of detailed wetland functional evaluation data required for permitting. Additionally, the consulting team will perform Phase IB archaeological surveys within the project Area of Potential Effect.	July 2024 – September 2024
2	**Final Design**	The Town and its consulting team will complete the final design of the project, including removal of the Pickpocket Dam and the fish ladder and reconfiguration of the river channel to ensure long-term stability and fish passage. The consultant will develop a basis of design memo, design plans, quantities and construction cost estimate, and technical specifications for the removal of the Dam, including work associated with stabilizing or retrofitting adjacent structures if necessary. The design and associated plans will be developed over the course of up to four submittals: 10% Design, 50% Design (Permitting), 90% Design (Final), and 100% Design (Construction).	September 2024 – December 2025
3	**Environmental Permitting**	Under this task, the Town and consulting team will: • Consult with the NH Natural Heritage Bureau and the NH Fish and Game Department to identify recommended conservation measures. • Develop an Integrated Vegetation Management Plan to minimize the threat of invasive species spread and to aid in the restoration and protection of native plant diversity. • Develop an NHDES Wetlands Bureau permit application according to RSA 482-A. A single permit application would address all components of the project, i.e., dam removal, stream restoration, and structure stabilization. • Coordinate with the US Army Corps of Engineers (USACE) to obtain approval of the project through the NH Statewide General Permit • Develop an NHDES Shoreland Protection permit application pursuant to RSA 483-B This task will include coordination meetings as well as response to technical comments. Permit applications will be based on 50% design plans.	January 2025– December 2025
4	**Cultural Resources**	The Town and consulting team will continue the Section 106 consultation process that will be started in the fall of 2023 during the Feasibility Study, if the dam is determined eligible for listing. This will involve working with the USACE (assumed lead federal agency), the Town, and the NH Division of Historical Resources to complete a determination of effects, as well as a Memorandum of Agreement that will stipulate project mitigation measures.	January 2025– December 2025
5	**Bid Phase**	The Town and consulting team will prepare bid documents that include construction plans and specifications, and, following a public bid solicitation process, will award a contract to the Selected Contractor (TBD) to implement the construction phase plans.	December 2025–March 2026
6	**Construction Phase**	The selected contractor will implement the dam removal and river restoration, and the first phase of the Integrated Vegetation Management Plan. The Town and consulting team will oversee the selected contractor throughout the progression of the dam removal and subsequent river restoration efforts.	March 2026– November 2026

Task #	Title		
7	**Meetings and Coordination**	**Internal Coordination** • Kick-off meeting to discuss project scope, schedule, and regulatory coordination • Five design phase team meetings to review interim submissions • Pre-bid conference • Additional meetings as needed to discuss Section 106 or other regulatory tasks **Public Involvement** • Regular meetings with the River Advisory Committee, abutters, or other stakeholders to provide status updates during the project duration **Regulatory** • Up to two meetings with USACE, NHDES, and their state and federal partners • Up to two meetings with New Hampshire Division of Historical Resources (NHDHR) and any consulting parties	July 2024 – December 2026
8	**Adaptive Management**	The selected contractor will implement potential adaptations of the channel to enhance fish passage or removal of sediment that migrated post dam removal. The Town and consulting team will oversee the selected contractor throughout the progression of this phase, working with stakeholders and regulators	July 2027 – August 2027
9	**Post Construction Phase**	The Town and its consulting team will initiate a LOMR with FEMA to revise the Flood Insurance Rate Maps (FIRMs) post dam removal. We also anticipate at least 3-years of post-removal monitoring and reporting being required as part of the regulatory approval conditions.	July 2027 – December 2029

2.c Fish Passage Implementation Monitoring and Evaluation.

An Implementation Monitoring Plan that comprehensively assesses fish passage with metrics specific to this proposed project's removal of the Pickpocket Dam has been included in the Supplemental Materials. The project team is willing to work with NOAA to adjust the plan, if needed, to ensure that it meets NOAA's requirements.

2.d Sustainability.

The Town has determined that the significant expenditure of resources required to maintain the Pickpocket Dam is not sustainable. This dam removal/herring run restoration project proposes an ecological solution that aligns with its sustainable benefits. When the Pickpocket Dam is removed, the restoration of natural flows in the river will not only have positive impacts on water quality, helping to restore migratory fish and wildlife habitat, but also eliminate the costs associated with continued upkeep of dam infrastructure. Hydraulic modeling indicates dam removal will enhance ecosystem resilience at the project site by decreasing storm impacts in all flow conditions analyzed.

To ensure the ongoing effectiveness of the project's restoration efforts, an Implementation Monitoring Plan will evaluate fish passage of the target species, river herring. The project will also include a multi-year Integrated Vegetation Management Plan with a goal of ensuring that a native plant community succeeds and becomes established in the project area.

2.e Data Management Plan.

A Data Management Plan that addresses this project's proposed removal of the Pickpocket Dam in alignment with NOAA's Data Management Guidance has been included in the Supplemental Materials.

3. Overall Qualifications of Applicants

The project is being managed by Paul Vlasich, PE, Public Works Director/Town Engineer. The Town has hired an engineering consultant, VHB, of Bedford, NH, to assist with feasibility studies, and anticipates continuing to work with VHB for the engineering design and permitting process. VHB was hired based on an open competitive qualifications-based selection process as required by state law. All key personnel dedicated to this project—resumes for whom are included in the Supplemental Materials—are thoroughly qualified to support it. Paul brings extensive municipal infrastructure project management experience, and also was the Town lead for the Great Dam removal project in 2016. The other team members, Peter J. Walker, Jacob San Antonio, PE, and David Cloutier, PE, are experts in ecological restoration through dam removal, river restoration, and flood plain management, with experience from other New Hampshire dam projects directly relevant to this proposed project, including:

- Removal of Homestead Woolen Mills Dam on Ashuelot River, Swanzey, NH
- Removal of Upper and Lower Sawyer Mills Dams on Bellamy River, Bellamy, NH
- Removal of head-of-tide Great Dam on Exeter River, Exeter, NH
- Removal of head-of-tide Mill Pond Dam on the Oyster River, Durham, NH
- Ecological and hydraulic modeling of West Street Dam on Ashuelot River, Keene, NH

3.a Fish Passage and Conservation Background.

The interdisciplinary project team collectively offers all the necessary experience and areas of expertise to successfully complete every phase of the proposed project. Project Manager Paul Vlasich, PE, will be supported by a dedicated core team comprising VHB's river restoration specialists and backed by VHB's corporate resources. As a multidisciplinary firm with a long history of delivering successful solutions for similar projects, included those listed above, VHB has the capacity to move a complex project forward despite challenges.

While the Project Team has robust experience with dam removal and fish passage projects, the Project Scope will include consultations with the broader Natural Resource Agency Team. The Agency Team will include: Kevin Lucey - Habitat Coordinator, NHDES Coastal Program, Bill Thomas - River Restoration Coordinator, NHDES Dam Bureau, Kevin Sullivan, Fisheries Biologist at NHFGD, Jaime Masterson, Fish Biologist at USFWS Central New England Fish and Wildlife Conservation Office. The Agency Team will be convened to review the Design Drawing iterations and as part of pre-permitting consultation.

3.b Management Capacity.

Combining resources of the Town and VHB, the management team has extensive experience successfully manage federal grant awards. In particular, the Town of Exeter has the necessary resources to manage the requested funds, effectively maintain financial and administrative records, and fulfill all reporting requirements.

4. Project Costs

The project team has made every effort to create a budget that realistically reflects the project's needs and timeframe, as depicted in the Budget Narrative included with this proposal.

4.a Budget Detail.

The total budget for the proposed project is $1,992,000. The Town is requesting the full balance of $1,992,000 under this NOAA funding opportunity to support the proposed project. Please refer to the SF-424A and the Budget Narrative submitted with this proposal for further details around budgeting.

4.b Funding Allocation and Cost-effectiveness.

The Budget Narrative included with this proposal delineates how the majority of the requested federal funds will support the proposed fish passage project. Considering the Town's objectives and timeframe for the project, the Town is confident that this project will yield significant benefits at a reasonable cost.

4.c Cost-sharing and Leveraging Federal Funds.

Exeter has spent over $500,000 studying and analyzing options to bring this dam into compliance and decided on dam removal as the preferred option. This includes funding from the Town, NHDES Coastal Program, and SRF Grants. Exeter is now requesting full funding for this project, to fund the design, permitting, construction, and post construction activities.

5. Outreach and Education

5.a Stakeholder Support.

The proposed dam removal/herring run restoration project enjoys a broad base of stakeholder support from diverse parties. Letters of support include:'

- Town of Exeter Select Board
- NHDES Dam Removal and River Restoration Program
- Town of Exeter Conservation Commission
- NHDES Watershed Assistance Section and Clean Water State Revolving Fund Loan Program
- NHDES Coastal Program (NHCP)
- U.S. Fish and Wildlife Service Central New England Fish and Wildlife Conservation Office (FWCO)
- NH Fish and Game Department (NHFGD)
- Piscataqua Region Estuaries Partnership (PREP)
- Town of Exeter River Advisory Committee
- The Nature Conservancy

Copies of these letters are included in the Supplemental Materials.

5.b Inclusive Planning and Engagement.

Town of Exeter officials have sought buy-in from public stakeholders in the matter of the Pickpocket Dam and its NHDES-noted deficiencies. From the onset, officials have sought to make sure the project and process are transparent—and that the public has an opportunity to provide commentary and/or ask

questions. With the goal of upholding transparency, Town officials have maintained a webpage containing the Pickpocket Dam Studies and Analysis, and other details relevant to the proposed dam project on the Town's website. To ensure continued transparency and inclusive stakeholder engagement, the project team will hold up to four meetings with the Town Council, abutters, or other stakeholders to provide status updates during the project duration.

Moving forward, the project team plans to hold up to four additional public meetings including the Town Council, abutters, representatives from Brentwood, or other stakeholders such as the Exeter Historic District/Heritage Commission, the Conservation Commission, the Exeter River Local Advisory Committee, and the Parks and Recreation Department. It is critical to continue to be transparent and provide opportunities for these Town boards/committees and the general public to continue to ask questions.

5.c Community Outreach and Education.

Given the visibility of the project site, the Town of Exeter intends to make efforts to incorporate an educational component about fish passage and migratory fish restoration into the proposed project, similar to what was done with the Town's previous removal project at the Great Dam.

Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA

PDF 2. Budget Narrative

For: National Oceanic and Atmospheric Administration (NOAA)
Department of Commerce
By: Town of Exeter, New Hampshire

October 16, 2023

Budget Narrative

The total budget for this project is $1,992,000 including the following items:

- Engineering Design costs covering consulting engineering firm services for the following project elements:
  - Pre-construction survey and engineering design;
  - Environmental and cultural resource permitting;
  - Preparation of construction documents including plans, specifications, and bid phase support;
  - Construction-phase support services;
  - Project Management, coordination, and support.
  - Federal Emergency Management (FEMA) Letter of Map Revision (LOMR) following construction completion.
- Construction-phase contractor costs for the following project elements:
  - Removal of the Pickpocket Dam and accumulated sediments within the upstream impoundment;
  - Restoration of the river channel and floodplain through the removal of the dam;
  - Adaptive Management following removal, could include minor changes to stream grading, or removal of sediment that has migrated and is impacting hydraulics for fish passage.

- Annual Post-construction monitoring (3 -years) for native vegetation and fish passage, and river changes.

The total budget for the proposed project is $1,992,000, and the Town is requesting the full amount to be applied to engineering design services, contractor costs for the physical removal of the Pickpocket Dam and Exeter River Restoration, and post construction monitoring and reporting. The funds requested fall into the following Form SF-424A Section B Budget Categories:

Budget Breakdown:

F. Contractual Engineering Design and permitting for Pickpocket Dam Removal and Exeter River Restoration Project Management and Coordination Letter of Map Revision	$587,000

G. Construction Construction for Pickpocket Dam Removal and Exeter River Restoration	$1,405,000

Assumptions and Explanation

Cost estimates for the Pickpocket Dam Removal Project were developed to support Pickpocket Dam Feasibility Analysis prepared by VHB, a consultant to the Town of Exeter.

The estimate is based on preliminary conceptual engineering, and were based on the following data and assumptions:

- An understanding of the dam and surroundings based on field survey, data collection, field visits and measurements.
- Preliminary conceptual design elements for the Dam Removal Alternative
- Costs for similar projects in New Hampshire and other states
- Commercial estimating databases such as RS Means, Site Work & Landscape Cost Data, 2020 Edition
- Recent vendor quotes for similar items

Funding Sources

During the Select Board Meeting on October 2, 2023, the Town voted to remove the Pickpocket Dam and progress the effort for funding sources. The Town experienced significant success through the removal of Great Dam along the Exeter River which was supported through the NOAA Coastal Ecosystem Resiliency Grants Program.

The Pickpocket Dam Feasibility Study has been evaluated by the Town through two other granted funded programs: the NHDES Clean Water State Revolving Fund (CWSRF) and the New Hampshire Coastal Program (NHCP) Coastal Resiliency Grant funding programs. In November 2022, the Town was notified of an award from the CWSRF grant in the amount of $100,000 (ARPA funds) to evaluate modification and removal alternatives for Pickpocket Dam. In October 2022, the Town was notified of an award from the NHCP in the amount of $40,000 to support components of the feasibility study on Pickpocket Dam. These two funding sources have supported the investigations leading to the determination to remove Pickpocket Dam.

NHDES CLEAN WATER STATE REVOLVING FUND (CWSRF) (federal funding)	$100,000
New Hampshire Coastal Program (NHCP) Coastal Resiliency Grant (federal funding)	$40,000

Rationale

Ineligible Activities

All components of the project are anticipated to be eligible for funding and therefore there are no ineligible activities.

Eligible Activities

Dam Removal and Fish Passage Channel Engineering Design, Permitting, and Cultural Resources	$587,000
Pickpocket Dam Removal Construction	$1,405,000
Total	**$1,992,000**

Grant Calculation

Eligible Activities	$1,992,000
(Minus pending award funding)	($0)
Grant Request	**$1,992,000**

Funding Schedule

The anticipated schedule for the components of the project is provided in the table below:

Year	Activity	Funding Amount
2024	• Dam Removal and Fish Passage Channel Engineering Design, Permitting, and Cultural Resources	$100,000
2025	• Dam Removal and Fish Passage Channel Engineering Design, Permitting, and Cultural Resources	$181,000
2026	• Pickpocket Dam Removal and Fish Passage Channel Construction	$1,456,000
2027- 2029	• Adaptive Management • FEMA Letter of Map Revision • Post-construction monitoring for native vegetation and fish passage	$160,000 $50,000 $45,000
	Total	**$1,992,000**

Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA

PDF 3. Supplemental Materials and Project Designs

For: National Oceanic and Atmospheric Administration (NOAA)
Department of Commerce

By: Town of Exeter, New Hampshire

October 16, 2023

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- U.S. Fish and Wildlife Service Central New England Fish and Wildlife Conservation Office (FWCO)
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1 | Site Location

Figure 1: Site Location and Local Area Map

Pickpocket Dam | Brentwood and Exeter, New Hampshire

Source: USGS Topo Map

2 | Key Personnel Resumes

Paul J. Vlasich, PE

Town Engineer

Education

BS, Civil Engineering, University of New Hampshire, 1983

Registrations

Professional Engineer (Civil) NH, 1988

Paul is a Town Engineer for Exeter, New Hampshire and also a registered Professional Engineer. He has worked for the Town of Exeter for the past seven years in the Public Works Department. Prior to working for the Town of Exeter, Paul was the City Engineer for Dover, New Hampshire for over 20 years.

40 years of professional experience

Qualifications and Experience

- Investigates, formulates and plans long range operational and capital improvement programs
- Meets with other administrators, contractors, engineers, state agency officials, utility companies and the public for review and coordination of projects and grant funding
- Designs and prepares specifications, and provides contract administration for municipal projects consisting of sewer, water, drainage and roadway improvements
- Maintains analysis programs pertaining to sewer collection capacities, water distribution hydraulics, and storm water runoff calculations
- Provides engineering support and assistance to Town Departments as needed, reviews and prepares plans, provides direction on technical issues, prepares Request for Proposals
- Provides technical advice to the Planning Board on proposed major subdivisions and site plans
- Familiar with the capabilities of Geographic Information System (GIS) for facility mapping and management
- Assists the Public Works Director in any matters relating to the department and assumes the responsibilities of the Director in her absence

Education

BS, Environmental Engineering, Montana Tech, 2001

Registrations

Professional Engineer (Civil), MA, 06/2022

Professional Engineer (Civil), CT, 01/2023

OSHA 40-Hour HAZWOPER Certificate (HAZWOPER)

Affiliations/Memberships

Environmental Business Council of New England

Jacob San Antonio, PE

Engineering Design and QA/QC | 22 years of professional experience

VHB's Chief Engineer of Water Resources, Jake specializes in surface water infrastructure design, modeling, and permitting. Working tirelessly to broaden VHB's water resource engineering practice, he manages a national team of environmental planners, scientists, and engineers with technical skills that are highly sought after. In his role, Jake helps reinforce VHB's resilient strategy and integrate sustainability and technology throughout the water resources practice. Jake has a broad range of experience, including use of riverine models and GIS to evaluate flood impacts to support his engineering design projects. He has led the design, permitting, and construction administration for several dam removals including the removal of the Great Dam in Exeter, NH.

RELEVANT PROJECTS

- Durham Mill Pond Dam Removal, Durham, NH
- Great Dam Removal Final Design and Letter of Map Revision (LOMR), Exeter, NH
- Sawyer Mill Upper Dam Removal and Bellamy River Restoration, Post-Construction Monitoring, and Adaptive Management, Dover, NH
- Pickpocket Dam Feasibility Study, Exeter, NH
- China Lake Outlet Dam Proposed Fishway Improvements, Vassalboro, ME
- NHDOT, Policy Brook Restoration Final Design, Salem, NH
- NHDOT, Railway Brook Stream Restoration, Newington, NH
- Hop Brook Restoration/Relocation, Northeast Utilities, Manchester, CT
- Center Falls Dam Fishway, Winchester, MA

Education

MS, Biology, University of Vermont, 1997

BA, Biology and Environmental Studies, Williams College, 1991

Affiliations/Memberships

American Water Resources Association, 2005

Peter J. Walker

Project Manager | 31 years of professional experience

A Principal with VHB's Environmental Services group in Bedford, New Hampshire, Pete specializes in natural resource and planning investigations, stream and wetland restoration studies, and environmental permitting and documentation. His experience includes some of the largest stream restoration and dam removal projects in the Northeast. Previously, he was an administrator with the New Hampshire Department of Environmental Services (NHDES) Water Division, where he oversaw the technical review of projects affecting rivers and streams throughout the state, including supervising wetlands and shoreland protection permitting and resources staff.

RELEVANT PROJECTS

- Mill Pond Dam Dam Removal, Durham, NH
- Great Dam Removal Feasibility and Impact Analysis, Exeter, NH
- Sawyer Mill Upper Dam Removal and Bellamy River Restoration, Dover, NH
- West Street Dam, Hydraulic Modeling and Wetlands Analysis, Keene, NH
- Homestead Woolen Mills Dam Removal, West Swanzey, NH
- Browns River Restoration, Seabrook, NH
- Policy Brook Restoration, Salem, NH
- Railway Brook Restoration, Newington, NH
- Portsmouth Street Culvert Replacement, Concord, NH
- Black Brook Restoration, Gilford, NH
- Hodgson Brook Restoration Assessment and Design, Portsmouth, NH
- Merrimack River Watershed Wetland Restoration Master Plan, Northfield to Pelham, NH
- Cains Brook Salt Marsh Restoration, Seabrook, NH

Education

BS, Civil & Environmental Engineering, Cornell University, 2004

Registrations/Certifications

Professional Engineer, ME, 12/2023

Professional Engineer, NH, 01/2023

Professional Engineer, MA, 06/2024

Professional Engineer, RI, 06/2023

Professional Engineer (Civil), CA, 12/2022

David W. Cloutier, PE

Engineering Design Manager | 19 years of professional experience

Dave is a Senior Water Resources Engineer on VHB's Maine Environmental team where he specializes in hydraulic and hydrologic modeling and analysis. He has extensive experience in bridge hydraulic design, bridge scour analysis, and countermeasure design. Dave has a wide background of experience throughout New England in fluvial geomorphologic evaluations and stream simulation designs, including USFWS Aquatic Organism Passage (AOP) and MaineDOT Habitat Connectivity Design (HCD). In addition, he has multiple dam removal and river restoration design projects, including post-construction monitoring and adaptive management.

RELEVANT PROJECTS

- Mill Pond Dam Dam Removal, Durham, NH
- Town of Exeter, Great Dam Removal Post-Construction Monitoring and Letter of Map Revision (LOMR), Exeter, NH
- Sawyer Mill Upper Dam Removal and Bellamy River Restoration, Post-Construction Monitoring, and Adaptive Management, Dover, NH
- China Lake Outlet Dam Proposed Fishway Improvements, Vassalboro, ME
- Presque Isle Bypass Clark Brook and Tributary to Merritt Brook stream relocation and restoration design; six (6) HCD stream crossing culvert designs, Presque Isle, ME
- Snow Brook AOP stream design and culvert replacement, Sedgwick, ME
- Prestile Brook HCD stream design and culvert replacement, Caribou, ME
- Clark Brook AOP stream design and culvert replacement, Buckland, MA
- Heath Brook AOP stream design and culvert replacement, Tewksbury MA
- Baxter State Park, AOP stream design and culvert replacements, Millinocket, ME

Education

BS, Civil Engineering, Northeastern University, 2015

Registrations

Professional Engineer, MA 06/2024

Professional Engineer, ME, 12/2023

Professional Engineer, NH, 04/2024

Affiliations/Memberships

Environmental Business Council of New England

Annique Fleurock, PE

Engineering QA/QC | 8 years of professional experience

Annique is a water resources engineer in VHB's Bedford, New Hampshire, office. Her work has focused on surface hydrology, hydraulic modeling, stormwater management, and stream restoration. Her design and field experience includes projects focusing on flood mitigation, ecological restoration, innovative stormwater designs, Annique's experience has also included the research and implementation of sea level rise adaptation, resiliency studies, and coastal flood risk modeling.

RELEVANT PROJECTS

- Durham Mill Pond Dam Feasibility Study, Durham, NH
- Pickpocket Dam Feasibility Study, Exeter, NH
- NHDOT, Exit 4A Contract A Wheeler Pond Stream Restoration, Derry, NH
- NHDOT, Exit 4A Contract B Shields Brook Stream Crossing, Derry, NH
- NHDOT, Exit 4A Contract C Tributary E Stream Crossing & Restoration, Derry, NH
- NHDOT, Policy Brook Restoration Final Design, Salem, NH
- Great Bay Living Shoreline Project, Great Bay Estuary, NH
- RIDOT, Road-Stream Crossing Manual, Rhode Island

3 | Letters of Support

TOWN OF EXETER, NEW HAMPSHIRE

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 777-1514
www.exeternh.gov

October 16, 2023

NOAA Restoration Center, NOAA Fisheries
(F/HC3), 1315 East West Highway, Rm. 14853
Silver Spring, MD 20910

Re: Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

To Whom It May Concern,

During the Select Board's October 2nd meeting, the Board was briefed on a funding opportunity for the removal of Pickpocket Dam through NOAA's Restoring Fish Passage through Barrier Removal Grants program. After discussing this opportunity, the Board voted unanimously to authorize the Department of Public Works to pursue grant funding through NOAA for the removal of Pickpocket Dam.

The Select Board unanimously supports removal of Pickpocket Dam, as the Town has successfully removed other dams in the past. In 2016 Exeter removed its Great Dam located in the center of town, thereby restoring the riverbed to its natural state and increasing annual fish populations. The Select Board looks forward to similar success when removing Pickpocket Dam, and appreciates the opportunity to apply for grant funding through NOAA.

Sincerely,

Niko Papakonstantis
Chairman of the Select Board
Town of Exeter, New Hampshire

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

October 11, 2023

NOAA Restoration Center, NOAA Fisheries
(F/HC3),1315 East West Highway, Rm. 14853,
Silver Spring, MD 20910

RE: Support for NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA (NOAA-NMFS-HCPO-2023-2008056) application for "Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH."

To Whom it May Concern,

The NH Department of Environmental Services, Dam Removal and River Restoration Program (Program) is pleased to support the Town of Exeter's application to NOAA's Restoring Fish Passage through Barrier Removal Grants funding opportunity to help with costs associated with the design and removal of the Pickpocket Dam located on the Exeter River. Removal of the dam will restore aquatic connectivity to an additional 6.2 mainstem river miles and 7.9 miles of tributaries adding to the restoration success already achieved from the removal of Exeter's Great Dam in 2016. Additionally, removal of this dam will help facilitate other potential aquatic connectivity projects in the watershed.

In addition to our written support, our Program is committed to providing technical and permitting assistance to ensure the success of the project.

We look forward to our continued partnership and working with you and other partners on this project. Thank you for your commitment to the project and please feel free to contact me if you need any further assistance with the application.

Sincerely,

William A. Thomas

William A. Thomas, CWS
River Restoration Coordinator
NH Department of Environmental Services, Water Division
Dam Bureau, Dam Removal and River Restoration Program

TOWN OF EXETER, NEW HAMPSHIRE

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 772-4709

www.exeternh.gov

October 11th, 2023

Paul Vlasich, Public Works Director
Town of Exeter
13 Newfields Road
Exeter, NH 03833

RE: NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA
(Funding Opportunity: NOAA-NMFS-HCPO-2023-2008056)

Dear Mr. Vlasich,

On behalf of the Exeter Conservation Commission, I am pleased to submit this letter in support of the Town of Exeter's grant application to the NOAA Restoring Fish Passage through Barrier Removal grant program.

The Exeter Conservation Commission was a strong advocate for removal of the Great Dam in town and witnessed first-hand the resulting improvements to the water quality of the Exeter River, the extension of available upstream freshwater habitat, improvements to the function of the floodplain, and the dramatic return of anadromous fish to the river following its removal. While Great Dam removal has created these tangible improvements, the presence of the Pickpocket Dam still serves as a barrier to fish and a negative influence on water quality within the Exeter river. Removal of this dam would provide a significant expansion of free-flowing natural river habitat and extension of these ecosystem benefits.

In recognition of this, on October 10th, the Exeter Conservation Commission voted unanimously in full support of the removal of Pickpocket Dam and efforts to restore the Exeter River to a naturally functioning ecosystem. On behalf of the Exeter Conservation Commission, please accept this letter in support of the Town's grant application.

Sincerely,

Andrew Koff
Chair, Exeter Conservation Commission

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

October 13, 2023

NOAA Restoration Center, NOAA Fisheries
(F/HC3),1315 East West Highway, Rm. 14853,
Silver Spring, MD 20910.

Re: Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

To Whom It May Concern,

On behalf of the New Hampshire Department of Environmental Services' (NHDES) Watershed Assistance Section and Clean Water State Revolving Fund (CWSRF) Loan Program, I am pleased to provide you with this letter of support in consideration of the Town of Exeter's proposal to the NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA (NOAA-NMFS-HCPO-2023-2008056) for the removal of the Pickpocket Dam located on the Exeter River. If funded, this project will greatly benefit on-going efforts to restore diadromous fish and improve water quality and flooding concerns in the Great Bay Watershed, in the Exeter community. This effort falls on the heels of the removal of the Exeter River Great Dam that was completed a few years ago.

In 2021, the Town of Exeter submitted a pre-application under the NHDES CWSRF Loan Program for consideration of funding under the planning category to develop a feasibility study for the removal of the Pickpocket Dam. The project ranked #1 in this category based on the merits and mission of the NHDES CWSRF Loan Program which include projects that seek to address water quality issues, sustainability, flooding, and public health. As a result of their ranking, the Town of Exeter was awarded an American Rescue Plan Act (ARPA) grant through the NHDES CWSRF Loan Program to complete a dam removal feasibility study. The full feasibility study was supported financially through this program, NHDES Coastal Program's Coastal Resiliency Grant, and Town of Exeter. Over the past fifteen years, NHDES has committed both technical and financial assistance to the removal of the Exeter River Great Dam and most recently supporting the Town of Exeter with the necessary resources to complete a feasibility study for the Pickpocket Dam alternatives. The feasibility study contains all of the essential components necessary to address dam removal elements and advance it to preliminary design. The full feasibility study report is anticipated to be completed in April 2024.

The very recent decision to pursue the removal of the Pickpocket Dam by the Town of Exeter Board of Selectmen, and their decision to pursue this funding source, supports the commitment from the town. In addition, NHDES staff from a variety of programs will continue to support the town on this journey. This project is another great example of collaboration with the multitude of local, state, and federal agencies to work collectively to meet a common environmental goal. The removal of the Pickpocket Dam will continue the restoration efforts of the Exeter River and open up an additional 6.2 miles of the mainstem and 7.9 miles of tributaries, and provide passage for diadromous fish. It will also improve water quality, reduce flooding, and allow for a sustainable environmental and economic system.

I am especially honored to provide this letter of support because I was involved with assisting the Town of Exeter years ago with the decision-making of the ultimate removal of the Exeter River Dam during my tenure as the NHDES Dam Removal and River Restoration Program Coordinator; and currently assisting them with the information to assist with the removal of the Pickpocket Dam. I strongly support the Town of Exeter in their efforts to remove the Pickpocket Dam and hope that you too will see the merits of awarding them the funding to do so.

Sincerely,

Deborah Loiselle, Stormwater Coordinator
NH Department of Environmental Services
Watershed Assistance Section
29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
Tel (603) 271-1352

cc: Paul Vlasich, P.E., Exeter Town Engineer

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

October 12, 2023

NOAA Restoration Center, NOAA Fisheries
(F/HC3),1315 East West Highway, Rm. 14853
Silver Spring, MD 20910

Re: Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

To Whom it May Concern,

The New Hampshire Department of Environmental Services' (NHDES) Coastal Program (NHCP) is pleased to offer this letter in support of the Town of Exeter's proposal to the NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA (NOAA-NMFS-HCPO-2023-2008056) for the removal of the Pickpocket Dam on the Exeter River. If funded, this project will greatly benefit on-going efforts to restore diadromous fish and improve water quality in the Great Bay Watershed, as well as reduce flood hazards in the Exeter community.

The NHCP is one of 34 federally approved coastal programs authorized under the Coastal Zone Management Act and is administered by NHDES. NHCP protects clean water, restores coastal habitats, and helps make communities more resilient to flooding and other natural hazards through staff assistance and funding to 42 coastal towns and cities as well as other local and regional groups. Over the past 15 years, NHCP has supported the Town of Exeter with financial and technical assistance as the Town considered the fate of multiple dams along the Exeter River, including the highly successful 2016 removal of the Great Dam in heart of Exeter's historic downtown.

In 2021, the Town of Exeter was selected to receive a Coastal Resilience Grant (CRG) from NHCP to study dam safety compliance alternatives for the Pickpocket Dam. Evaluation of the Pickpocket Dam was selected for CRG funding not only for the potential benefit to diadromous and resident fish, but also due to the flood risk posed by a potential dam failure on a downstream community of mobile homes. The CRG funding enabled the Town to conduct sediment analysis, topographic and bathymetric surveys, hydrologic and hydraulic analysis, and conduct stakeholder engagement. The CRG funding specifically enabled the Town to consider dam alternatives through the lens of climate change, including evaluating future increases of rainfall to help understand the future performance of the dam and associated regulatory implications.

The recent decisions by the Exeter Selectboard, Exeter River Study Committee, and Exeter Conservation Commission to pursue removal of the Pickpocket Dam reflects a community that has already been through a decade of difficult deliberation about the future of the Great Dam and is now experiencing the benefit of that dam removal project, including increased returns of river herring, lower flood elevations, and cleaner water.

The NHCP fully supports the Town of Exeter in its efforts to seek funding for removal of the Pickpocket Dam and will support the Town as it works through dam removal design, permitting, construction.

Sincerely,

Kevin Lucey, Habitat Coordinator
New Hampshire Department of Environmental Services - Coastal Program
222 International Drive- Suite 175
Portsmouth, NH 03801
Kevin.Lucey@des.nh.gov
603-559-0026

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Central New England Fish and Wildlife Conservation Office
151 Broad Street
Nashua, New Hampshire 03063

October 12, 2023

NOAA Restoration Center, NOAA Fisheries
(F/HC3),1315 East West Highway, Rm. 14853,
Silver Spring, MD 20910

Re: Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

To Whom it May Concern,

The Central New England Fish and Wildlife Conservation Office (FWCO) fully supports the Town of Exeter in seeking funds through NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA for the removal of the Pickpocket Dam on the Exeter River.

The Pickpocket Dam is the most-downstream barrier to anadromous fish passage on the Exeter River system. When implemented, the project will reconnect an additional 6.2 mainstem river miles and 7.9 miles of tributaries for the benefit of alewife, blueback herring, American eel, and historically American shad. This project will support efforts to restore fish passage already made by NOAA with the removal of the Great Dam in 2016.

Since 1999, USWFS has worked with over 2,000 communities across the country via the National Fish Passage Program to remove and bypass critical barriers to fish passage. USFWS has directly supported the State of New Hampshire and NOAA on restoration efforts within the Exeter River and will continue to help with this endeavor.

Thank you for your hard work on these vital conservations efforts and please feel free to contact me with any questions or concerns. The U.S. Fish and Wildlife Service are a proud partner and supporter of these efforts.

Sincerely,

Keith McGilvray
Project Leader

New Hampshire
Fish and Game Department

HEADQUARTERS: 11 Hazen Drive, Concord, NH 03301-6500
(603) 271-3421
FAX (603) 271-1438

www.WildNH.com
e-mail: info@wildlife.nh.gov
TDD Access: Relay NH 1-800-735-2964

October 10, 2023

NOAA Restoration Center
NOAA Fisheries (F/HC3)
1315 East West Highway, Rm 14853
Silver Spring, MD 20910

ATTN: Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH

To Whom It May Concern:

The NH Fish and Game Department (NHFGD) would like to express support for the Town of Exeter's application to the "NOAA's Restoring Fish Passage Through Barrier Removal Grants Under the BIL and IRA (NOAA-NMFS-HCPO-2023-2008056)" to assist with funding the removal of the Pickpocket Dam on the Exeter River.

While the NHFGD owns the associated fish ladder and weir and expends much time and money to assure fish passage is available for diadromous and resident fish species we are more interested in improving riverine processes, connectivity, and habitat for fish and wildlife. In order to achieve this we often work collaboratively with federal and state agencies, municipalities, and dam owners to remove dams.

The Exeter River sustains a valuable population of diadromous fish, including river herring (alewife and blueback herring), American eels, and rainbow smelt. Some of these species are "Species of Concern" for both NOAA Fisheries and the State of New Hampshire. River herring have been monitored by NHFGD annually on the Exeter/Squamscott River since the early 1970's. This river is one of the four river systems considered as the Great Bay Indicator Stock in New Hampshire's River Herring Sustainable Fishing Plan that accounts for greater than 80% of the anadromous fish annual returns enumerated annually on New Hampshire coastal rivers.

The removal of the head-of-tide Great Dam and associated fishway in 2016 restored approximately 7.4 river miles and improving fish habitat and water quality up to the next barrier. With the removal of the Pickpocket Dam, an additional 6.2 miles of unobstructed essential fish habitat will become available. By removing these barriers, the Exeter River's restored connectivity will provide improved habitat for fish and wildlife populations and an ecosystem closer to its natural state. Thereby, ultimately assisting the NHFGD in reaching goals of sustainable populations of resident and migratory fish and wildlife in the state. We continue to support the Town of Exeter in their process of removing Pickpocket Dam with the understanding that it includes removing NHFGD's associated fish ladder and weir.

REGION 1
629B Main Street
Lancaster, NH 03584-3612
(603) 788-3164
FAX (603) 788-4823
email: reg1@wildlife.nh.gov

REGION 2
PO Box 417
New Hampton, NH 03256
(603) 744-5470
FAX (603) 744-6302
email: reg2@wildlife.nh.gov

REGION 3
225 Main Street
Durham, NH 03824-4732
(603) 868-1095
FAX (603) 868-3305
email: reg3@wildlife.nh.gov

REGION 4
15 Ash Brook Court
Keene, NH 03431
(603) 352-9669
FAX (603) 352-8798
email: reg4@wildlife.nh.gov

As always, we look forward working with you, the Town of Exeter, and project partners with dam removal at the Pickpocket Dam. Please feel free to contact me (cheri.patterson@wildlife.nh.gov) or Conor O'Donnell (conor.odonnell@wildlife.nh.gov) at the Region 3 Office in Durham, NH, (603) 868-1095, if you have further questions or need assistance.

Sincerely,

Cheri Patterson

Cheri Patterson
Chief of Marine Fisheries

cc: Scott Mason, Executive Director
Renee Zobel, Supervisor of Marine Programs
Kevin Sullivan, Marine Biologist II
Conor O'Donnell, Marine Biologist I
John Magee, Inland Fisheries Program Supervisor

October 12, 2023

NOAA Restoration Center, NOAA Fisheries
(F/HC3),1315 East West Highway, Rm. 14853,
Silver Spring, MD 20910.

RE: NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA
(Funding Opportunity: NOAA-NMFS-HCPO-2023-2008056)

To Whom it May Concern,

On behalf of the Piscataqua Region Estuaries Partnership (PREP), I am writing to express our strong support for the application entitled: '*Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH*.' This project will greatly increase community and ecosystem resilience by removing a High Hazard dam and restoring over 14 miles of migratory fish habitat in the Great Bay watershed.

PREP is one of 28 US EPA designated National Estuary Programs, whose mission is to protect, restore, and monitor the health of the Great Bay and Hampton-Seabrook estuaries and their associated watersheds that encompass 42 municipalities in New Hampshire and 10 in Maine. PREP works with partners to advance the actions in our Comprehensive Conservation and Management Plan (CCMP), which outlines strategies that are expected to collectively protect the estuarine resources of the Piscataqua Region. The proposed project supports a priority restoration action plan within the CCMP and a recommendation within our 2020 CCMP Climate Change Vulnerability Assessment that call for the removal of non-essential dams on streams and rivers in the Piscataqua Region Watershed.

The Pickpocket Dam on the Exeter River is just over 7 miles upstream from the site of the former Great Dam in Exeter, NH. A major head-of-tide dam, the Great Dam was successfully removed in 2016. Since then, migratory river herring, blueback herring (*Clupea aestivalis*) and alewife (*Clupea pseudoharengus*), have responded dramatically, with 2021 and 2022 having subsequent years of the highest returns ever recorded on the Exeter River since counts began in the 1970s. The river also provides critical habitat for other species of concern, including rainbow smelt (*Osmerus mordax*) and American eel (*Anguilla rostrata*). The removal of the Pickpocket Dam would increase the availability of quality habitat for these local, diadromous species, while simultaneously enhancing the flood resilience of the community by reducing risk to multiple residential structures and roadways downstream.

Thank you for your consideration and we are hopeful the Town of Exeter's proposal is received favorably. Please feel free to reach out for any additional information.

Sincerely,

Trevor Mattera
Habitat Program Manager
Piscataqua Region Estuaries Partnership
Trevor.Mattera@unh.edu

TOWN OF EXETER, NEW HAMPSHIRE

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 772-4709
www.exeternh.gov

October 9, 2023

Paul Vlasich PE
Town Engineer
13 Newfields Rd
Exeter, NH 03833

Hi Paul,

As the current chairman of the River Advisory Committee of Exeter NH, I would like to express my support for the ongoing effort to apply for a grant to fund the removal of the Pickpocket Dam to restore further fish passage.

At the meeting of the River Advisory Committee held on September 21st, information about the possibility of applying for a grant to provide funding to remove the Pickpocket Dam was presented. It was unanimous among the attending committee members to support going ahead with the application for the funding. On October 2nd, our Exeter Select Board approved moving forward with an application. Exeter has a growing history of the successful outcomes of a dam removal. The Great Dam of Exeter was removed back in 2016 and the number of Alewife fish that swim upstream to spawn has grown enormously. The town of Exeter celebrates an Alewife Festival at the former location of the dam in mid-May to synchronize with the coming of the Alewife. Clouds of seagulls fly overhead to sample some of the fish.

I am hopeful that even more Alewife fish will be able to spawn with this additional Pickpocket barrier removed.

Richard Huber
Chaiman of the River Advisory Committee of Exeter

The Nature Conservancy in New Hampshire
22 Bridge Street, 4th Floor
Concord, New Hampshire 03301-4987

tel [603] 224.5853
fax [603] 228.2459
nature.org/newhampshire

October 12, 2023

NOAA Restoration Center
NOAA Fisheries (F/HC3)
1315 East West Highway, Rm 14853
Silver Spring, MD 20910

RE: Letter of Support for Restoration of the Exeter River Herring Run through Removal of the Pickpocket Dam, Exeter, NH (Funding Opportunity – NOAA-NMFS-HCPO-2023-2008056)

To Whom It May Concern:

I am writing this letter in support of the grant proposal by the Town of Exeter to assist with the removal of the Pickpocket dam located on the Exeter River. The Nature Conservancy supports this application and believes the funding is essential for completing the restoration project to improve fish passage in the Exeter River, especially positively impacting River Herring runs, as well as improving the water quality of the Exeter River.

The primary goal of this project is to restore and maintain naturally reproducing diadromous fish populations within the Exeter River and its tributaries through the removal of the Pickpocket dam. The Exeter River supports viable populations of diadromous and other non-migratory fish. Migratory fish, many of which are listed as "species of concern", that will benefit include blueback herring, alewife, rainbow smelt, and American eels. This river is one of four rivers identified as critical to the sustainable fishing management plan for New Hampshire's River herring population.

Removing the Pickpocket dam combined with a history of efforts to restore the ecological integrity of the Exeter River will increase resilience within the river and for the communities that live in and depend on a healthy Exeter River Watershed. This project is vital to the ecological resources of the watershed, and I strongly encourage you to support this project. Thank you for your consideration.

Sincerely,
Charles DeCurtis

Charles DeCurtis
Freshwater Program Manager
The Nature Conservancy
Concord, NH

4 | Data Management Plan

4 Data Management Plan

Pre- and post-dam removal monitoring and data collection will be essential to help demonstrate the success of the proposed project. The Pickpocket Dam Removal Project partners and Town of Exeter officials have had discussions with state agencies, primarily the New Hampshire Department of Environmental Services (NHDES) and the New Hampshire Fish and Game (NHF&G), who have worked on similar projects to help determine appropriate parameters that are both relevant to the project and that will yield verifiable and quantifiable results.

Specifically, NHDES will monitor water quality data throughout the dam removal process using the 05-OYS Environmental Monitoring Site located within the Exeter River near the Pickpocket Dam impoundment. Pre- and post-dam removal, NHFG will continue river herring monitoring by conducting visual assessments at 2-3 locations to determine river herring presence/absence. Visual observation will be conducted by NHFG Biologists according to established time count methodologies. NHFG biologists will also observe river herring behavior through the restored channel to determine the primary zones of passage (ZOP). This qualitative observation will occur over the range of flows that are typical during the river herring migration season as the ZOP may change based on varying river discharge.

The main elements of the data sharing plan are outlined as follows:

- The Data/Information Sharing Plan (DISP) will be finalized in consultation with NOAA. Procedures regarding data security, availability, and access will be determined by local, state, and federal agency representatives including NOAA and will be included in the DISP. VHB will use prior experience developing the Exeter Great Dam Removal Data Sharing Plan to help make such data readily available for this project.
- The Town of Exeter maintains a website with access to the Town's River Advisory Committee details, reports, and studies, including past and current information regarding the Pickpocket Dam analyses conducted thus far, such as components of *Pickpocket Dam Feasibility Study* completed to date, design documents, meeting notes etc. This website will be the primary method by which environmental data will be shared with the public.
- Once approved, the DISP (and any subsequent revisions or updates) will be posted on the River Advisory Committee Website, maintained by the Town.
- The Town of Exeter will post environmental data and information collected under this grant on the Town Website within three months of the final completed of the data collection and reporting effort.
- The Town website will be maintained for a period of at least one year following project completion.
- Data to be posted will include monitoring reports required by environmental permits.
- Monitoring reports will also be submitted to the NHDES Wetlands Bureau and the US Army Corps of Engineers as required and maintained by those agencies.
- If requested by any party, monitoring reports or data will be made available in hard copy at cost.

5 | Implementation Monitoring Plan

5 Implementation Monitoring Plan

As part of the Pickpocket Dam Removal Project, the Town and project partners plan to conduct pre- and post-dam removal monitoring of parameters that evaluate short-term structural changes, the presence of target fish species, enhancement of the surrounding community, and elimination of safety hazards. Specific functional parameters and target values will be established to demonstrate the success of the proposed project and will be re-evaluated within approximately one year after project implementation. Parameters may include channel restoration, photo stations, water quality components such as dissolved oxygen, diadromous fish passage assessment, and socioeconomic benefits. The Town and project partners will also determine other appropriate parameters that are both relevant to the project and that will yield verifiable and quantifiable results (e.g., measuring the consequences associated with the reduction of flooding that is expected as a result of the proposed project). Monitoring efforts will utilize the *Gulf of Maine Stream Barrier Removal Monitoring Guide*, published in December 2007, to address many of the monitoring techniques and protocol.

After consultation with NOAA, a formal plan would be submitted to NOAA within the first quarter of an award. To implement the monitoring plan, Town officials will work with local, state, and Federal agency representatives, local community partners, and interested parties. NHDES will continue to monitor water quality data throughout the dam removal process and NHFGD will continue to monitor fish assessments and counts along the Exeter River post-dam removal. Project performance will be demonstrated through the continued interaction and communication with state and federal agency representatives throughout the duration of this project.

Agency representatives will be invited to attend regular project meetings with Town officials, the contractor, and the consultant representative. Updates will be discussed, along with the work planned for the following week and any ad hoc concerns/issues that need to be addressed. Comparison of as-built conditions to final designs will be completed in order to verify the project was constructed in accordance with the plans. The consultant representative will provide regular on-site construction monitoring and will manage the weekly meetings to ensure the project meets expectations. Pre- and post-implementation data will be reported as part of the standard NOAA progress reporting process.

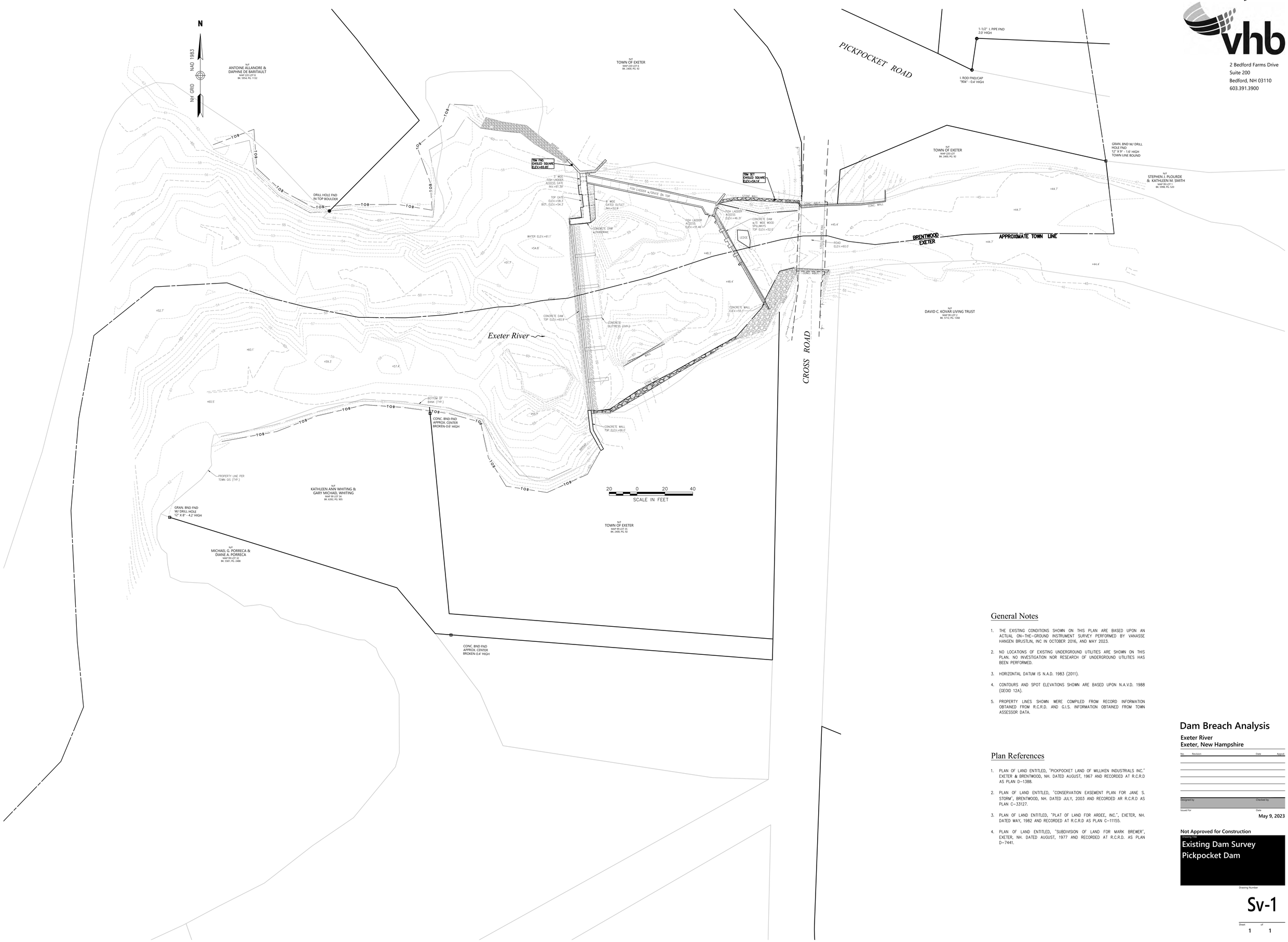
In accordance with NOAA's guidelines for the monitoring and evaluation of fish passage barrier removal projects, the following Tier 1 Metrics will be addressed as part of the Implementation Monitoring Plans.

Tier 1 Metrics	Target Measure	Target Year	Pre-Implementation	Target Post-Implementation	Description/Notes
Site Passability: Channel Width	Increase fish passage through the removal of the dam barrier.	2026	Dam in Place	Approximately 70-foot bankfull width with v-notch channel to allow for sufficient low-flow depth	Minimum channel width during low flow conditions, with greater widths during normal fish passage flows; width will be measured at each cross section, and at pinch-points if identified in restored reach, during low flows (greater than 95% exceedance probability flow).
Site Passibility: Channel Gradient	Increase fish passage through the removal of the dam barrier	2026	Dam in Place	1.0% (typical)	Slope determined from longitudinal profile through the restored reach.

Tier 1 Metrics	Target Measure	Target Year	Pre-Implementation	Target Post-Implementation	Description/Notes
Site Passibility: Max Jump Height	Increase fish passage through the removal of the dam barrier	2026	Dam in Place	6 inches	Maximum jump height under normal flow conditions should not exceed 6 inches; jump height will be measured at each cross section, and problem areas if identified within the restored reach, during low flows (greater than 95% exceedance probability flows).
Presence of Diadromous Fish Species	Strengthen the natural ecosystem of the Exeter River and allow for upstream fish passage to benefit the diadromous fish population	2027	Fish count <5% of those seen at the peak from 1990-1992.	Create 6.2 miles of the Exeter River and 7.9 miles of tributary of free-flowing stream habitat.	As a result of dam removal, diadromous fish species would be able to successfully ascend the restoration reach that would be exposed following dam removal, supporting a self-sustaining river run. Post dam removal, New Hampshire Fish and Game (NHFG) will continue river herring monitoring by conducting visual assessments at 3-4 locations to determine river herring presence/absence. Visual observation will be conducted by NHFG Biologists according to established time count methodologies. NHFG biologists will also observe river herring behavior through the restored channel to determine the primary zones of passage (ZOP). This qualitative observation will occur over the range of flows that are typical during the river herring migration season as the ZOP.
Water Quality	Improve the overall water quality of the Exeter River with the reduction or elimination of water quality impairments, especially dissolved oxygen	2027	%DO saturation levels <75% threshold.	%DO saturation levels >75% threshold.	Higher %DO saturation levels will be obtained by returning the Exeter River to its free-flowing state and eliminating algal build-up and increased water temperatures within the impoundment area. NHDES will continue to monitor water quality data throughout the dam removal process using the 05-OYS Environmental Monitoring Site located within the Exeter River near the Pickpocket Dam impoundment.
Annual Operating, Maintenance, and Liability Costs	Eliminate annual operating, maintenance, costs associated with dam stabilization and restoration	2026	$ 2,145,000	$0	The preliminary costs of stabilizing Pickpocket Dam to a state that would sufficiently address the safety hazards listed by the NHDES Dam Bureau would equate to over $2.1 million as shown in the 2023 feasibility analysis. After dam removal, the annual operating and maintenance costs would account for monitoring for 3 years.
Safety Hazards	Removal of unsafe dam infrastructure	2026	The NHDES Dam Bureau has identified safety problems with structural integrity and stability of the Pickpocket Dam.	Dam removal would eliminate safety hazards and concerns.	The dam does not meet current NHDES dam safety standards which require it to have sufficient discharge capacity to pass the runoff generated by the 2.5 X 100-year storm event with one foot of freeboard and without manual operations. Based on hydraulic modeling results, the dam would be overtopped by these flood waters, which is an unsafe condition. NHDES has determined that the dam is appropriately classified as a “High Hazard Structure” based upon the potential impacts that dam failure may have on adjacent Dam downstream properties.

Tier 1 Metrics	Target Measure	Target Year	Pre-Implementation	Target Post-Implementation	Description/Notes
Community Enhancement and Socioeconomic Benefits.	The return on investment for removing the Pickpocket Dam would take several forms, including: › Improvements in fish habitat quality › Improvements in water quality › Avoided costs related to future flood damages › Avoided costs related to the maintenance and operation of dam	2026	Existing Pickpocket Dam permanent impoundment covers approximately 22 acres and impounds approximately 75 acre-feet	Lower the hydraulic control of the river at the dam site by approximately 12.5 feet and reduce water levels by approximately 10-feet. Re-establish 3.5 miles of free-flowing river between the existing dam location and Haigh Road.	As part of the 2023 feasibility study, a HEC-RAS hydraulic model of the Exeter River was updated. Dam removal would lower the hydraulic control of the river by approximately 12.5 feet. Modeling showed that the removal of the Pickpocket Dam would increase the Exeter River's flood resilience in all of the flow conditions analyzed. Once the dam is removed and the natural flow of the river is restored, the Town and Consultant will monitor floodplain restoration of the dewatered area within the existing current location of Pickpocket Dam.

6 | Excerpts from Feasibility Studies



General Notes

1. THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY VANASSE HANGEN BRUSTLIN, INC IN OCTOBER 2016, AND MAY 2023.
2. NO LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN ON THIS PLAN. NO INVESTIGATION NOR RESEARCH OF UNDERGROUND UTILITIES HAS BEEN PERFORMED.
3. HORIZONTAL DATUM IS N.A.D. 1983 (2011).
4. CONTOURS AND SPOT ELEVATIONS SHOWN ARE BASED UPON N.A.V.D. 1988 (GEOID 12A).
5. PROPERTY LINES SHOWN WERE COMPILED FROM RECORD INFORMATION OBTAINED FROM R.C.R.D. AND G.I.S. INFORMATION OBTAINED FROM TOWN ASSESSOR DATA.

Plan References

1. PLAN OF LAND ENTITLED, "PICKPOCKET LAND OF MILLIKEN INDUSTRIALS INC." EXETER & BRENTWOOD, NH. DATED AUGUST, 1967 AND RECORDED AT R.C.R.D AS PLAN D-1388.
2. PLAN OF LAND ENTITLED, "CONSERVATION EASEMENT PLAN FOR JANE S. STORM", BRENTWOOD, NH. DATED JULY, 2003 AND RECORDED AR R.C.R.D AS PLAN C-33127.
3. PLAN OF LAND ENTITLED, "PLAT OF LAND FOR ARDEE, INC.", EXETER, NH. DATED MAY, 1982 AND RECORDED AT R.C.R.D AS PLAN C-11155.
4. PLAN OF LAND ENTITLED, "SUBDIVISION OF LAND FOR MARK BREWER", EXETER, NH. DATED AUGUST, 1977 AND RECORDED AT R.C.R.D. AS PLAN D-7441.

vhb.com
vhb
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Dam Breach Analysis

Exeter River
Exeter, New Hampshire

No.	Revision	Date	Appvd.

Designed by | Checked by

Issued for | Date

May 9, 2023

Not Approved for Construction

Drawing Title

Existing Dam Survey
Pickpocket Dam

Drawing Number

Sv-1

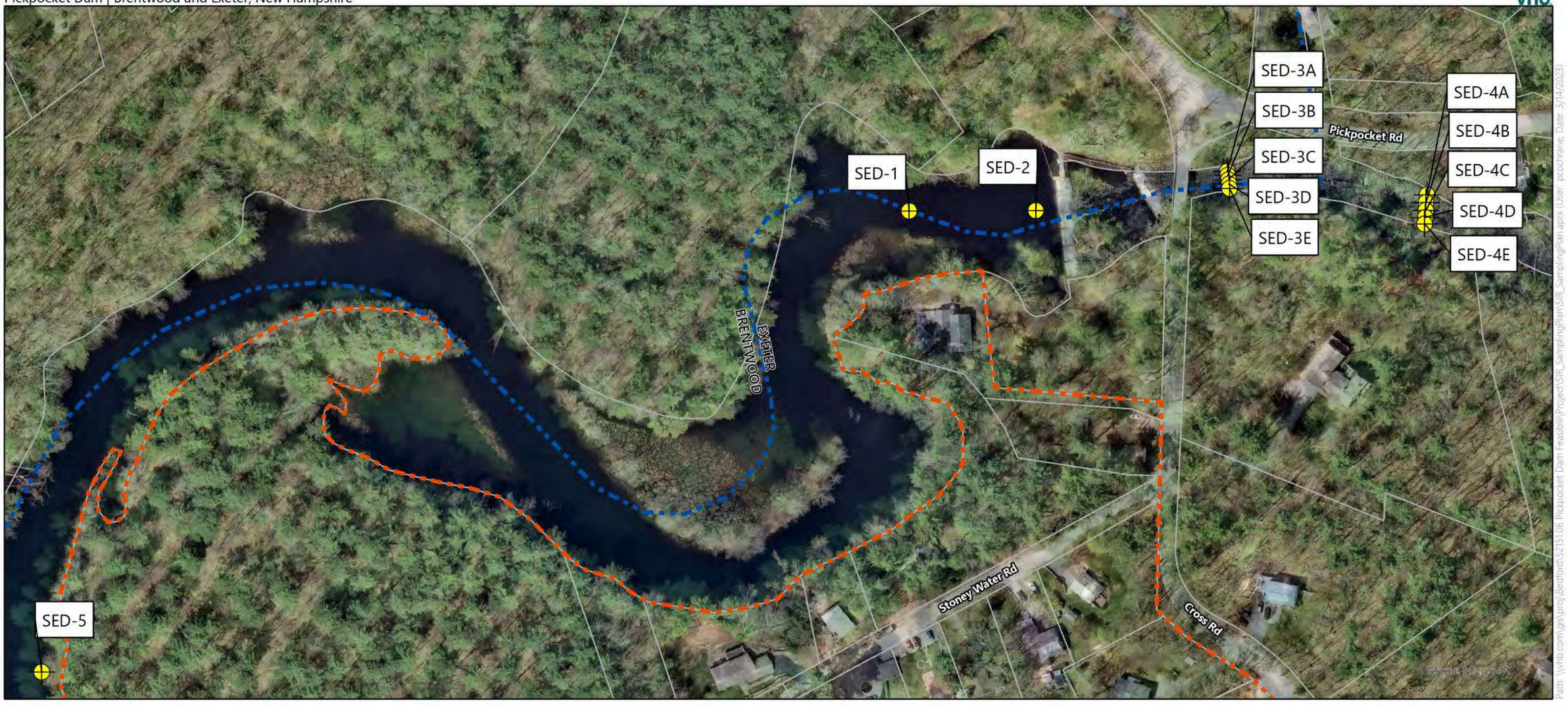
Sheet 1 of 1

Project Number

52151.06

Figure 2: Sampling Plan

Pickpocket Dam | Brentwood and Exeter, New Hampshire



0 100 200 300 US Feet

Proposed Sediment Sample Location

Parcels

Cross Road Landfill - GMZ

Town Boundary

Source: NearMap Imagery, NHDOT Roads

Path: \\vhb.com\gis\proj\Bedford\32151.06 Pickpocket Dam Feasibili\Project\SIR_SamplingPlan\SIR_SamplingPlan.aprx (User: pcochrane; Date: 3/14/2023)

Memorandum

To: NHDES

Date: June 7, 2023
Project #: 52151.06

From: Paige Cochrane, VHB
Katherine Kudzma, VHB

Re: Summary of Sediment Sampling and Analysis
Pickpocket Dam
Exeter, New Hampshire

VHB has prepared this memorandum to summarize the results of the sediment sampling conducted on behalf of the town of Exeter, New Hampshire (the Client) as part of a Feasibility Study (the Study) to evaluate existing sediment conditions within Pickpocket Dam, also identified as New Hampshire Department of Environmental Services (NHDES) Dam 029.7, located off Cross Road in Brentwood and Exeter, New Hampshire and hereinafter referred to as the "Site" as depicted in **Figure 1**. The sediment sampling outlined in this memorandum was conducted in accordance with the Sediment Sampling Analysis Plan (SAP) prepared for Pickpocket Dam by VHB in March 2023.

Summary of Sediment Sampling Activities

On April 18, 2023, Paige Cochrane and Eric Sirkovich of VHB mobilized to the Site to collect sediment samples upstream and downstream of Pickpocket Dam. Three discrete grab samples were collected upstream and two composite sediment samples were collected downstream. All sediment samples were collected manually with hand tools such as a hand auger.

The three discrete sediment samples identified as SED-1, SED-2 and SED-5 were collected upstream from a small, motorized boat. The hand auger was manually advanced through the soft sediments until refusal was encountered and the sample was then retrieved from the auger. The two downstream samples identified as SED-3 and SED-4 were composited from five sediment cores (identified as A through E) collected across the river from the top one-foot interval of sediment. Once collected, the core sample(s) were visually observed for sediment texture, color, and debris content. All core samples for a given location were transferred to a clean, stainless-steel bowl and mixed either to homogenize the discrete sediment sample location (i.e., SED-1, SED-2 and SED-5), or to composite discrete sample locations (i.e., SED-3 and SED-4). The homogenized sediment material was then immediately transferred into clean, unused, laboratory-supplied sample containers. The containers were packed in coolers with bagged ice and delivered directly to the analytical laboratory under standard chain-of-custody protocols. All equipment that came into direct contact with the sediment was properly decontaminated between sample locations using Alconox® and water. The field sampling activities were documented using field data sheets provided as **Attachment A**. The sediment sample locations are depicted in **Figure 2**.

The five sediment samples as well as one field duplicate collected at SED-2 were submitted to Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (Phoenix) for laboratory analysis of priority pollutant 13 (PP-13) metals as well as manganese and iron, pesticides, polychlorinated biphenyls (PCBs), semi-volatile organic compounds (sVOCs) and grain size via ASTM D422 and D7928. Additionally, based on the findings of the due diligence review documented in the March 2023 Sediment SAP, SED-1 was submitted for laboratory analysis of volatile organic compounds (VOCs) due to the proximity to the groundwater management zone (GMZ) associated with the Cross Road Landfill (NHDES Site #198401081). A summary of the sediment analytical results is provided in **Table 1**. The laboratory analytical report is provided as **Attachment B**.

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Sediment Analytical Results

Ecological Screening Assessment

The sediment analytical results were compered to the NHDES recommended threshold effect concentrations (TECs) and probable effect concentrations (PECs) to evaluate whether the sediment quality may pose a risk to aquatic and benthic organisms. As noted in the NHDES guidance:

- TECs represent the estimated chemical concentration threshold below which adverse effects on ecological receptors are unlikely; and
- PECs represent the estimated chemical concentration threshold above which adverse effects on ecological receptors is likely.

TEC and PEC thresholds for freshwater sediments were considered in this analysis. The NHDES recommended screening thresholds were obtained from NHDES (2016).[1]

Following NHDES guidance, hazard quotients (HQs) were calculated for all detected constituents in each sample by dividing the constituent concentration by the screening threshold value (i.e., either the TEC or PEC). A HQ calculated with a TEC (HQ-TEC) of 1 or greater indicates the possibility that exposure to the sediment may adversely affect ecological receptors. An HQ calculated with a PEC (HQ-PEC) of 1 or greater indicates the likelihood that exposure to the sediment will adversely affect ecological receptors. Based on the calculated HQs, each constituent was assigned a risk classification as follows:

- HQ-TEC<1 was qualified as low risk;
- HQ-TEC>1 was qualified as moderate risk; and
- HQ-PEC>1 was qualified as high risk.

The calculated HQs, assigned risk classifications for fresh water screening thresholds, and the ecological screening results are provided in **Table 2**. The ecological risk was determined to be low for all detected concentrations of metals and PAHs in the sediment samples with the exception of arsenic in SED-2 FD, SED-4, and SED-5 as well as five PAHs in SED-3 and SED-4. No concentrations of VOCs, PCBs, or pesticides were detected in sediment samples in excess of the laboratory detection limit.

These screening results suggest that sediments downstream are impacted with concentrations of five PAHs identified as benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, and pyrene that have a moderate potential to adversely effect ecological receptors. Sediments both upstream and downstream are impacted with concentrations of

[1] NHDES Memorandum from Matt Wood to Gregg Comstock, PE entitled *"Updated TEC and PEC sediment thresholds"* dated January 8, 2016.

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arsenic that have a moderate to low potential to impact ecological receptors. PAHs and metals are commonly found in urban environments and may be the result of anthropogenic or naturally occurring non-point sources.

Human Health Screening Assessment

If sediments are removed as part of a restorative alternative, sediments would become classified as soils and are the subject to review in accordance with NHDES Contaminated Sites Risk Characterization and Management Policy (RCMP). The RCMP provides a process to determine if detected contaminant concentrations constitute a direct contact risk to humans or a potential risk to groundwater quality. Therefore, to preliminarily assess the sediment quality conditions at Pickpocket Dam relative to these risks, the sediment analytical results were compared to the current RCMP Method 1 Soil Category S-1 Direct Contact Risk-based Concentrations or Soil Remediation Standards (SRS).[2] The results of this comparison are detailed in **Table 3**.

No concentrations of contaminants in sediment were detected in excess of the SRS with the exception of arsenic, which was detected in SED-2 FD and SED-5 at 12.4 milligrams per kilogram (mg/kg) and 19.9 mg/kg, respectively. The SRS for arsenic (i.e., 11 mg/kg) is based on typical background concentrations found in soils in the State of New Hampshire (SHA, 1998). However, it is not uncommon to identify naturally-occurring arsenic greater than the arsenic SRS, particularly in southeastern New Hampshire.

Findings

A summary of the findings of the sediment sampling activities and sediment analytical results completed in accordance with the March 2023 Sediment SAP is provided below:

- On April 18, 2023, VHB completed the sediment sampling at Pickpocket Dam in accordance with the procedures outlined in the March 2023 Sediment SAP.
- Five (5) sediment samples were collected during the sediment sampling event, including three discrete upstream samples identified as SED-1, SED-2, and SED-5 as well as two composite downstream samples identified as SED-3 and SED-4. Additionally, one field duplicate sample was submitted for SED-2 (i.e., SED-2 FD) for quality control purposes.
- The five sediment samples and one field duplicate sediment sample were submitted for laboratory analysis of PP-13 metals, manganese, iron, pesticides, PCBs, and sVOCs. Additionally, SED-1 was also submitted for laboratory analysis of VOCs due to the proximity of the GMZ associated with the Cross Road Landfill.
- Based on the sediment analytical results, only metals and PAHs were detected in sediment samples both upstream and downstream of Pickpocket Dam. Based on the risk classification resulting from the NHDES TECs

[2] The NHDES S-1 standards are based upon sensitive uses of property and accessible soils, either currently or in the reasonably foreseeable future, and are equivalent to the Soil Remediation Standards (SRSs) established in the New Hampshire Code of Administrative Rules Chapter Env-Or 600, Contaminated Site Management.

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and PECs HQ calculation, the concentrations of PAHs detected in sediment samples downstream have a moderate potential to adversely impact ecological receptors; however, concentrations of PAHs upstream have a low potential to impact ecological receptors. Concentrations of arsenic both upstream and downstream have a moderate potential to impact ecological receptors; however, based on the distribution and concentrations of arsenic detected in the sediment samples, the concentrations of arsenic identified are likely naturally-occurring. The levels of PAHs detected are typical of urban/suburban areas.

- No concentrations of contaminants were detected in excess of the SRS within the sediment samples with the exception of arsenic detected in SED-2 FD (12.4 mg/kg) and SED-5 (13.9 mg/kg), which were both collected upstream of Pickpocket Dam. Concentrations of arsenic for all sediment samples ranged between 4.69 to 13.9 mg/kg with the mean concentrations of arsenic calculated at 9.88 mg/kg. Based on the narrow range of arsenic concentrations reported just above and below the SRS, the detections appear to be indicative of a naturally occurring background conditions. Nevertheless, the concentrations of arsenic exceeding the SRS generally suggest additional assessment and/or risk mitigation may be warranted should excavation/dredging of sediment be proposed as a selected alternative.
- Overall, the ecological screening and human health screening results indicate that low levels of PAHs and arsenic are present in sediments both downstream and upstream of Pickpocket Dam.

Attachments:

Table 1 – Summary of Sediment Analytical Results
Table 2 – Sediment Risk Assessment Summary Table
Table 3 – Sediment Human Health Assessment Table
Figure 1 – Site Location and Local Area Map
Figure 2 - Sediment Sample Plan
Attachment A – Sediment Sampling Data Sheets
Attachment B – Laboratory Analytical Report

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Table 1
Summary of Sediment Analytical Results
Pickpocket Dam
Exeter, New Hampshire

LABORATORY IDENTIFICATION COLLECTION DATE CLIENT ID	Units	CN87690 04/18/2023 SED-1		CN87691 04/18/2023 SED-2		CN87692 04/18/2023 SED-2 FD		CN87693 04/18/2023 SED-3		CN87694 04/18/2023 SED-4		CN87695 04/18/2023 SED-5	
		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Miscellaneous/Inorganics													
Chloride	mg/kg	< 147	147	< 156	156	< 152	152	< 57	57	< 61	61	< 139	139
Nitrogen Tot Kjeldahl	mg/Kg	**2880**	413	**3470**	438	**3370**	425	**401**	163	**447**	197	**2110**	441
Percent Solid	%	**34**		**32**		**33**		**88**		**82**		**36**	
Metals Total													
Antimony	mg/Kg	< 3.3	3.3	< 3.6	3.6	< 3.1	3.1	< 1.2	1.2	< 1.1	1.1	< 3.3	3.3
Arsenic	mg/Kg	**9.64**	0.67	**7.92**	0.73	**12.4**	0.62	**4.69**	0.24	**10.7**	0.22	**13.9**	0.65
Beryllium	mg/Kg	**0.6**	0.27	**0.56**	0.29	**0.59**	0.25	**0.18**	0.1	**0.31**	0.09	**0.7**	0.26
Cadmium	mg/Kg	**0.49**	0.33	**0.44**	0.36	**0.6**	0.31	**0.16**	0.12	**0.28**	0.11	**0.47**	0.33
Chromium	mg/Kg	**23.8**	0.33	**23.3**	0.36	**23.1**	0.31	**21.6**	0.12	**35.5**	0.11	**24.1**	0.33
Copper	mg/kg	**8.5**	0.7	**8.7**	0.7	**9.2**	0.6	**5.3**	0.2	**6.9**	0.2	**8.9**	0.7
Iron	mg/Kg	**15000**	50	**11700**	55	**12500**	46	**10700**	18	**20300**	17	**13600**	49
Lead	mg/Kg	**29**	0.33	**32.2**	0.36	**33.3**	0.31	**10.9**	0.12	**9.41**	0.11	**31.3**	0.33
Manganese	mg/Kg	**496**	3.3	**341**	3.6	**396**	3.1	**577**	12	**713**	11	**379**	3.3
Mercury	mg/Kg	< 0.07	0.07	< 0.08	0.08	< 0.07	0.07	< 0.03	0.03	< 0.03	0.03	< 0.06	0.06
Nickel	mg/Kg	**14.9**	0.33	**13.6**	0.36	**14.3**	0.31	**12.3**	0.12	**13.3**	0.11	**14.7**	0.33
Selenium	mg/Kg	< 1.3	1.3	< 1.5	1.5	< 1.2	1.2	< 0.5	0.5	< 0.4	0.4	< 1.3	1.3
Silver	mg/Kg	< 0.33	0.33	< 0.36	0.36	< 0.31	0.31	< 0.12	0.12	< 0.11	0.11	< 0.33	0.33
Thallium	mg/Kg	< 3.0	3	< 3.3	3.3	< 2.8	2.8	< 1.1	1.1	< 1.0	1	< 2.9	2.9
Zinc	mg/Kg	**70**	0.7	**62**	0.7	**72.4**	0.6	**28.4**	0.2	**43.9**	0.2	**61.1**	0.7
Oxygenates & Dioxane - SW8260C (OXY)													
1,4-Dioxane	mg/kg	< 0.29	0.29	-	-	-	-	-	-	-	-	-	-
Di-isopropyl ether	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Diethyl ether	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
Ethyl tert-butyl ether	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
tert-amyl methyl ether	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Pesticides - SW8081B													
4,4' -DDD	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
4,4' -DDE	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
4,4' -DDT	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
a-BHC	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Alachlor	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Aldrin	mg/kg	< 0.014	0.014	< 0.01	0.01	< 0.015	0.015	< 0.0037	0.0037	< 0.0039	0.0039	< 0.014	0.014
b-BHC	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Chlordane	mg/kg	< 0.14	0.14	< 0.1	0.1	< 0.15	0.15	< 0.037	0.037	< 0.039	0.039	< 0.14	0.14
d-BHC	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Dieldrin	mg/kg	< 0.014	0.014	< 0.01	0.01	< 0.015	0.015	< 0.0037	0.0037	< 0.0039	0.0039	< 0.014	0.014
Endosulfan I	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Endosulfan II	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Endosulfan sulfate	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Endrin	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Endrin aldehyde	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Endrin ketone	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
g-BHC	mg/kg	< 0.0057	0.0057	< 0.0041	0.0041	< 0.0061	0.0061	< 0.0015	0.0015	< 0.0016	0.0016	< 0.0055	0.0055
Heptachlor	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Heptachlor epoxide	mg/kg	< 0.028	0.028	< 0.02	0.02	< 0.03	0.03	< 0.0074	0.0074	< 0.0079	0.0079	< 0.027	0.027
Hexachlorobenzene	mg/kg	< 0.014	0.014	< 0.01	0.01	< 0.015	0.015	< 0.0037	0.0037	< 0.0039	0.0039	< 0.014	0.014
Methoxychlor	mg/kg	< 0.14	0.14	< 0.1	0.1	< 0.15	0.15	< 0.037	0.037	< 0.039	0.039	< 0.14	0.14
Toxaphene	mg/kg	< 0.57	0.57	< 0.41	0.41	< 0.61	0.61	< 0.15	0.15	< 0.16	0.16	< 0.55	0.55
Polychlorinated Biphenyls - SW8082A													
PCB-1016	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1221	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1232	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1242	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1248	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1254	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1260	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1262	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
PCB-1268	mg/kg	< 0.71	0.71	< 0.51	0.51	< 0.76	0.76	< 0.37	0.37	< 0.39	0.39	< 0.69	0.69
Semivolatiles - SW8270D													
1,1-Biphenyl	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
1,2,4,5-Tetrachlorobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
1,2,4-Trichlorobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
1,2-Dichlorobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
1,2-Diphenylhydrazine	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
1,3-Dichlorobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
1,4-Dichlorobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,2'-Oxybis(1-Chloropropane)	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,4,5-Trichlorophenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,4,6-Trichlorophenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,4-Dichlorophenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,4-Dimethylphenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,4-Dinitrophenol	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
2,4-Dinitrotoluene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2,6-Dinitrotoluene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2-Chloronaphthalene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2-Chlorophenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2-Methylnaphthalene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2-Methylphenol (o-cresol)	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
2-Nitroaniline	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
2-Nitrophenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
3&4-Methylphenol (m&p-cresol)	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
3,3'-Dichlorobenzidine	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
3-Nitroaniline	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
4,6-Dinitro-2-methylphenol	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
4-Bromophenyl phenyl ether	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
4-Chloro-3-methylphenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
4-Chloroaniline	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
4-Chlorophenyl phenyl ether	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
4-Nitroaniline	mg/kg	< 2.7	2.7	< 3.3	3.3	< 3.4	3.4	< 0.6	0.6	< 0.63	0.63	< 3	3
4-Nitrophenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Acenaphthene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Acenaphthylene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Acetophenone	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Aniline	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Anthracene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Benz(a)anthracene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Benzidine	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Benzo(a)pyrene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	**0.27**	0.26	< 0.28	0.28	< 1.3	1.3
Benzo(b)fluoranthene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	**0.29**	0.26	**0.3**	0.28	< 1.3	1.3
Benzo(ghi)perylene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Benzo(k)fluoranthene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3

Table 1
Summary of Sediment Analytical Results
Pickpocket Dam
Exeter, New Hampshire

LABORATORY IDENTIFICATION COLLECTION DATE CLIENT ID	Units	CN87690 04/18/2023 SED-1		CN87691 04/18/2023 SED-2		CN87692 04/18/2023 SED-2 FD		CN87693 04/18/2023 SED-3		CN87694 04/18/2023 SED-4		CN87695 04/18/2023 SED-5	
		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Benzoic acid	mg/kg	< 3.4	3.4	**5.3**	4.2	< 4.3	4.3	< 0.75	0.75	< 0.79	0.79	< 3.7	3.7
Benzyl butyl phthalate	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Bis(2-chloroethoxy)methane	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Bis(2-chloroethyl)ether	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Bis(2-ethylhexyl)phthalate	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Carbazole	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Chrysene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Di-n-butylphthalate	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Di-n-octylphthalate	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Dibenz(a,h)anthracene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Dibenzofuran	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Diethyl phthalate	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Dimethylphthalate	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Fluoranthene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	**0.44**	0.26	**0.35**	0.28	< 1.3	1.3
Fluorene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Hexachlorobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Hexachlorobutadiene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Hexachlorocyclopentadiene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Hexachloroethane	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Isophorone	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
N-Nitrosodi-n-propylamine	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
N-Nitrosodimethylamine	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
N-Nitrosodiphenylamine	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Naphthalene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Nitrobenzene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Pentachloronitrobenzene	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Pentachlorophenol	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Phenanthrene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	**0.32**	0.26	< 0.28	0.28	< 1.3	1.3
Phenol	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	< 0.26	0.26	< 0.28	0.28	< 1.3	1.3
Pyrene	mg/kg	< 1.2	1.2	< 1.5	1.5	< 1.5	1.5	**0.34**	0.26	**0.36**	0.28	< 1.3	1.3
Pyridine	mg/kg	< 1.7	1.7	< 2.1	2.1	< 2.1	2.1	< 0.38	0.38	< 0.4	0.4	< 1.9	1.9
Volatiles - SW8260C													
1,1,1,2-Tetrachloroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
2-Hexanone	mg/kg	< 0.073	0.073	-	-	-	-	-	-	-	-	-	-
2-Isopropyltoluene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	mg/kg	< 0.073	0.073	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	< 0.29	0.29	-	-	-	-	-	-	-	-	-	-
Acrylonitrile	mg/kg	< 0.029	0.029	-	-	-	-	-	-	-	-	-	-
Benzene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Carbon Disulfide	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
m&p-Xylene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Methyl Ethyl Ketone	mg/kg	< 0.073	0.073	-	-	-	-	-	-	-	-	-	-
Methyl t-butyl ether (MTBE)	mg/kg	< 0.029	0.029	-	-	-	-	-	-	-	-	-	-
Methylene chloride	mg/kg	< 0.029	0.029	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
o-Xylene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	< 0.91	0.91	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Tetrahydrofuran (THF)	mg/kg	< 0.029	0.029	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Total Xylenes	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	< 1.8	1.8	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Trichlorotrifluoroethane	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	< 0.015	0.015	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = milligram per kilogram
< = below laboratory reporting limit depicted to the right
Bolded values are detections above the laboratory reporting limit.

Table 2
Sediment Risk Assessment Summary Table
Pickpocket Dam
Exeter, New Hampshire

Client Id	Units	NHDES - FRESHWATER		SED-1			SED-2					SED-2 FD					SED-3					SED-4					SED-5				
Lab Sample Id				CN87690			CN87691					CN87692					CN87693					CN87694					CN87695				
Collection Date				04/18/2023			04/18/2023					04/18/2023					04/18/2023					04/18/2023					04/18/2023				
SCREENING CRTIERIA		TEC	PEC	RISK-FRESH	RESULTS		HQ-TEC	HQ-PEC	RISK-FRESH	RESULTS		HQ-TEC	HQ-PEC	RISK-FRESH	RESULTS		HQ-TEC	HQ-PEC	RISK-FRESH	RESULTS		HQ-TEC	HQ-PEC	RISK-FRESH	RESULTS		HQ-TEC	HQ-PEC	RISK-FRESH	RESULTS	
					RESULT	DL				RESULT	DL				RESULT	DL				RESULT	DL				RESULT	DL				RESULT	DL
Metals Total																															
Arsenic	mg/Kg	9.79	33	Low	9.64	0.67	0.809	0.240	Low	7.92	0.73	1.267	0.376	Mod	12.4	0.62	0.479	0.142	Low	4.69	0.24	1.093	0.324	Mod	10.7	0.22	1.420	0.421	Mod	13.9	0.65
Cadmium	mg/Kg	0.99	4.98	Low	0.49	0.33	0.444	0.088	Low	0.44	0.36	0.606	0.120	Low	0.6	0.31	0.162	0.032	Low	0.16	0.12	0.283	0.056	Low	0.28	0.11	0.475	0.094	Low	0.47	0.33
Chromium	mg/Kg	43.4	111	Low	23.8	0.33	0.537	0.210	Low	23.3	0.36	0.532	0.208	Low	23.1	0.31	0.498	0.195	Low	21.6	0.12	0.818	0.320	Low	35.5	0.11	0.555	0.217	Low	24.1	0.33
Copper	mg/Kg	31.6	149	Low	8.5	0.7	0.275	0.058	Low	8.7	0.7	0.291	0.062	Low	9.2	0.6	0.168	0.036	Low	5.3	0.2	0.218	0.046	Low	6.9	0.2	0.282	0.060	Low	8.9	0.7
Lead	mg/Kg	35.8	128	Low	29	0.33	0.899	0.252	Low	32.2	0.36	0.930	0.260	Low	33.3	0.31	0.304	0.085	Low	10.9	0.12	0.263	0.074	Low	9.41	0.11	0.874	0.245	Low	31.3	0.33
Nickel	mg/Kg	22.7	48.6	Low	14.9	0.33	0.599	0.280	Low	13.6	0.36	0.630	0.294	Low	14.3	0.31	0.542	0.253	Low	12.3	0.12	0.586	0.274	Low	13.3	0.11	0.648	0.302	Low	14.7	0.33
Zinc	mg/Kg	121	459	Low	70	0.7	0.512	0.135	Low	62	0.7	0.598	0.158	Low	72.4	0.6	0.235	0.062	Low	28.4	0.2	0.363	0.096	Low	43.9	0.2	0.505	0.133	Low	61.1	0.7
Semivolatiles - SW8270D																															
Benzo(a)pyrene	mg/kg	0.15	1.45	-	< 1.2	1.2	-	-	-	< 1.5	1.5	-	-	-	< 1.5	1.5	1.800	0.186	Mod	0.27	0.26				< 0.28	0.28	-	-		< 1.3	1.3
Benzo(b)fluoranthene	mg/kg	0.0272	13.4	-	< 1.2	1.2	-	-	-	< 1.5	1.5	-	-	-	< 1.5	1.5	10.662	0.022	Mod	0.29	0.26	11.029	0.022	Mod	0.3	0.28	-	-		< 1.3	1.3
Fluoranthene	mg/kg	0.423	2.23	-	< 1.2	1.2	-	-	-	< 1.5	1.5	-	-	-	< 1.5	1.5	1.040	0.197	Mod	0.44	0.26	0.827	0.157	Low	0.35	0.28	-	-		< 1.3	1.3
Phenanthrene	mg/kg	0.204	1.17	-	< 1.2	1.2	-	-	-	< 1.5	1.5	-	-	-	< 1.5	1.5	1.569	0.274	Mod	0.32	0.26				< 0.28	0.28	-	-		< 1.3	1.3
Pyrene	mg/kg	0.195	1.52	-	< 1.2	1.2	-	-	-	< 1.5	1.5	-	-	-	< 1.5	1.5	1.744	0.224	Mod	0.34	0.26	1.846	0.237	Mod	0.36	0.28	-	-		< 1.3	1.3

Table Notes:

1.) All concentrations are expressed in micrograms per kilogram (mg/kg); only analytes detected in at least one sample are shown in the table.

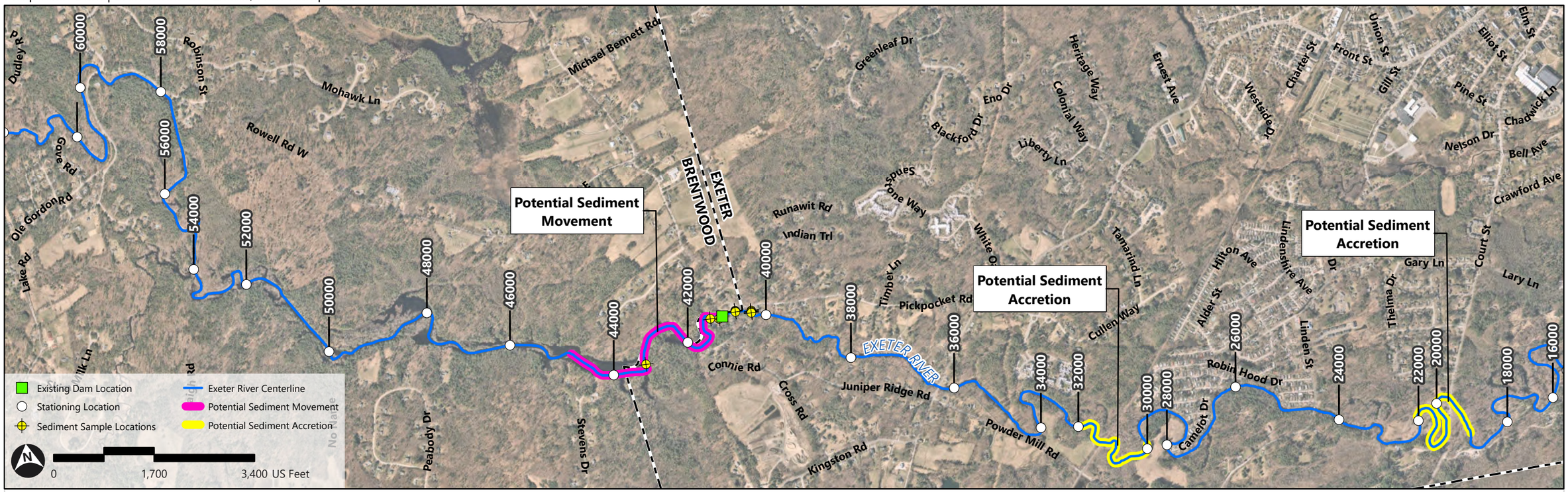
2.) "<" indicates target analyte not detected at a concentration greater than the detection limit (DL) shown to the right of the sample

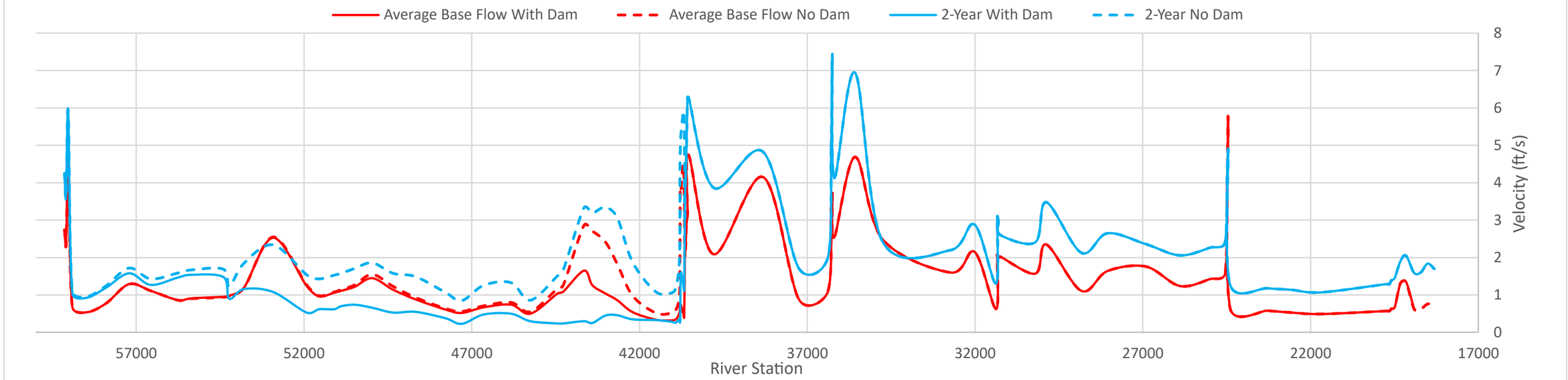
3.) "J" indicates an estimated concentration.

4.) New Hampshire Department of Environmental Services (NHDES) freshwater and marine screening thresholds were obtain from from a Draft NHDES Memorandum dated January 8, 2016.
"TEC" indicates threshold effect concentration; and
"PEC" indicates probable effect concentration.

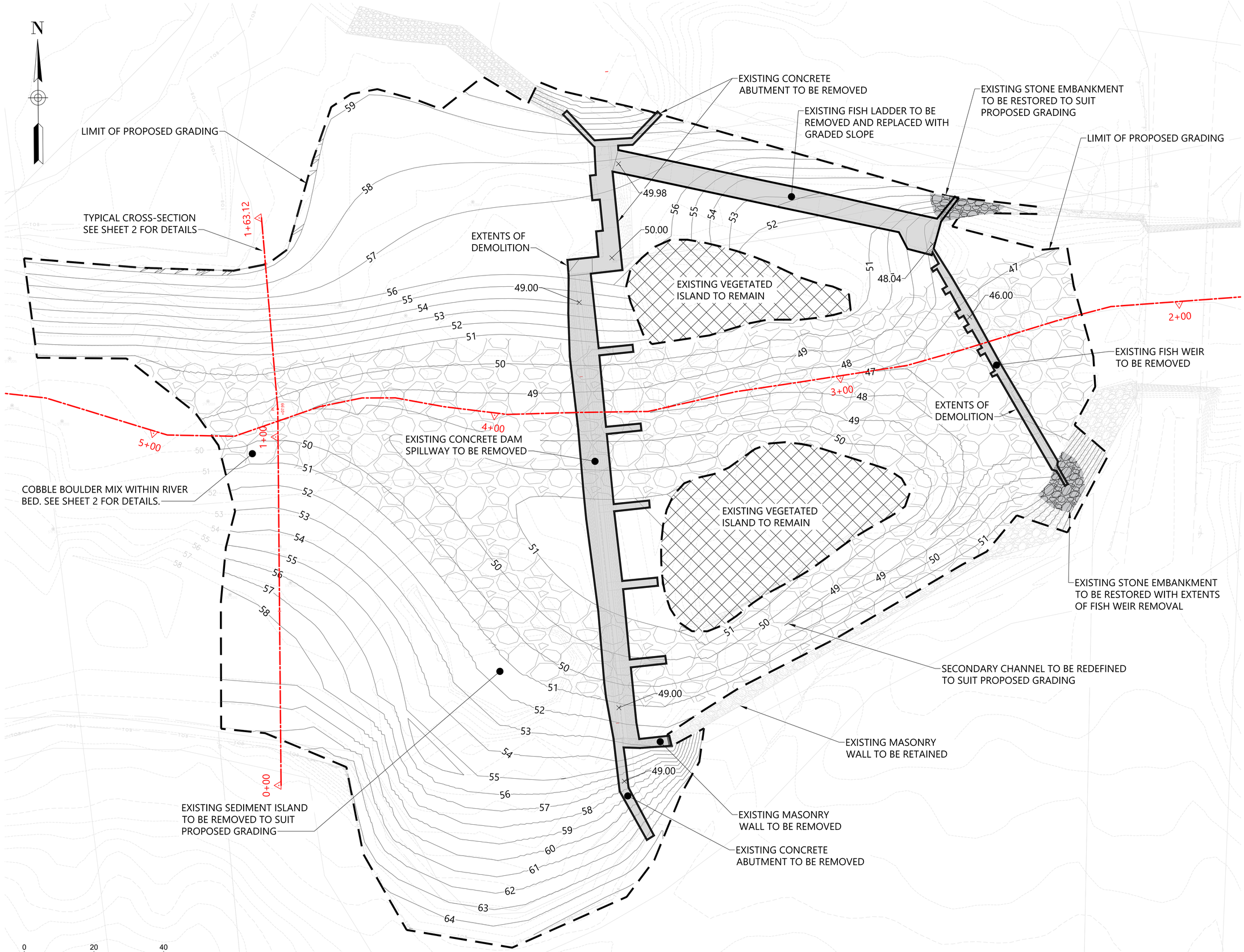
Figure 4: Sediment Transport Analysis

Pickpocket Dam | Brentwood and Exeter, New Hampshire





Source: NearMap Imagery, NHDOT Roads



vhb
101 Walnut Street
Watertown, MA 02472
(617) 924-1770

No.	Revision	Date	Appvd.

Designed by TLD | Checked by JSA

Issued for

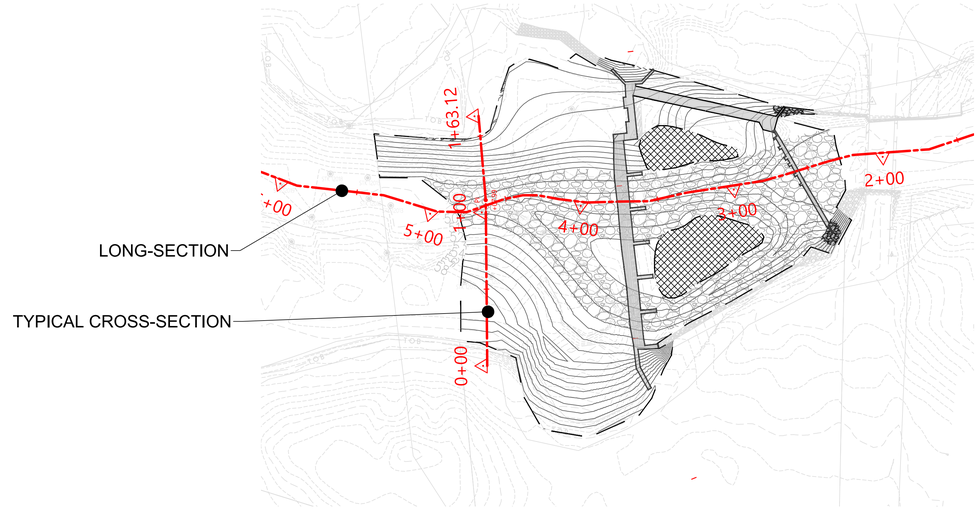
Date 10/16/2023

PICKPOCKET DAM REMOVAL

SHEET 1 - PLAN

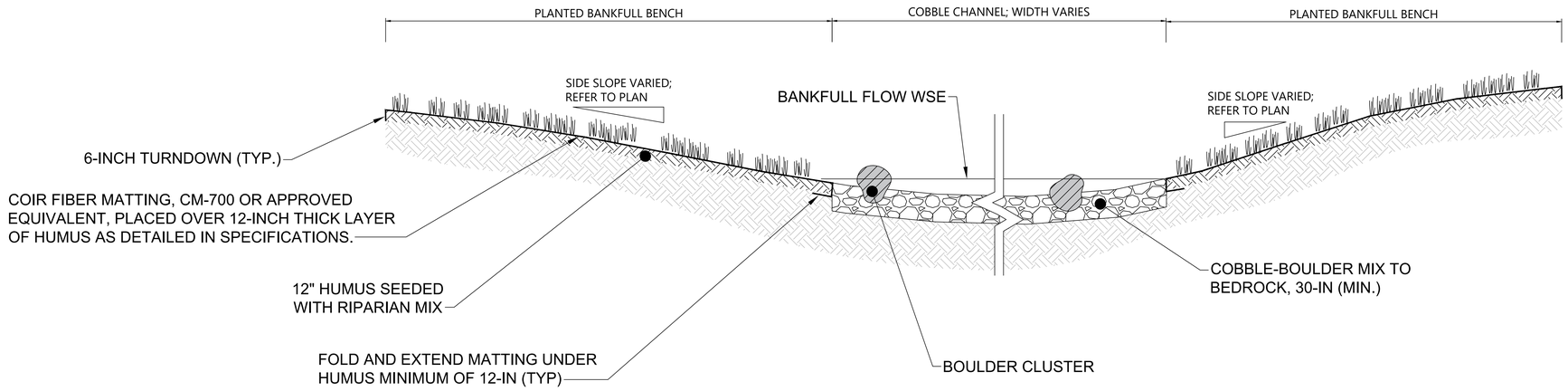
Sheet 1 of 2

Project Number 52151.06

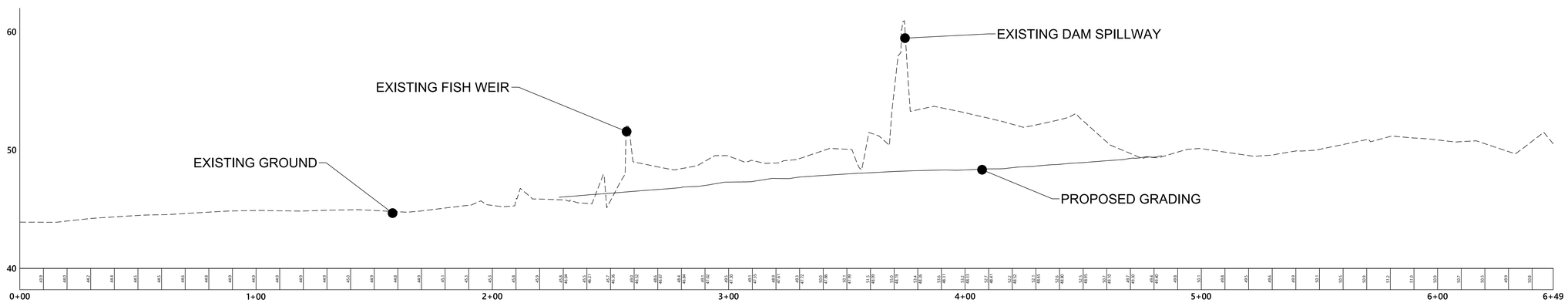


vhb
101 Walnut Street
Watertown, MA 02472
(617) 924-1770

TYPICAL CROSS-SECTION
SCALE 1" = 5'



LONG-SECTION
SCALE 1" = 20'



No.	Revision	Date	Appvd.

Designed by TLD | Checked by JSA
Issued for | Date 10/16/2023

PICKPOCKET DAM REMOVAL

SHEET 2 - DETAILS

Sheet 1 of 2

Project Number 52151.06

CONCEPTUAL COST ESTIMATE - Alt. 3 Dam Removal

Item	Quantity	Unit	Unit Price	Total
General Bid Items				
Project Superintendent	3	MON	$ 8,200.00	$ 24,600.00
QC Plans	1	LS	$ 3,000.00	$ 3,000.00
Submittals	1	EA	$ 10,000.00	$ 10,000.00
Schedules	1	EA	$ 500.00	$ 500.00
Weekly Construction Meetings	15	EA	$ 150.00	$ 2,250.00
Portable Toilets	3	MON	$ 150.00	$ 450.00
Subtotal				**$ 40,800.00**
Mobilization & Demolition				
Mobilization	1	LS	$ 45,000.00	$ 45,000.00
Demobilization	1	LS	$ 22,000.00	$ 22,000.00
Subtotal				**$ 67,000.00**
Erosion & Sediment Control				
Turbidity Barriers	250	LF	$ 50.00	$ 12,500.00
Hay Blaes/Silt Fence	1000	LF	$ 10.00	$ 10,000.00
Maintenance	1	LS	$ 5,000.00	$ 5,000.00
Subtotal				**$ 27,500.00**
Control of Water				
Engineering Design	1	LS	$ 15,000.00	$ 15,000.00
Cofferdam / Diversions	1	LS	$ 100,000.00	$ 100,000.00
Dewatering	1	LS	$ 5,000.00	$ 5,000.00
Subtotal				**$ 120,000.00**
Dam Removal				
Dam Spillway Removal	350	CY	$ 300.00	$ 105,000.00
Abutments Removal	200	CY	$ 300.00	$ 60,000.00
Fish Ladder Removal	135	CY	$ 300.00	$ 40,500.00
Fish Wier Removal	50	CY	$ 300.00	$ 15,000.00
Sediment Removal (inc. island)	2750	CY	$ 100.00	$ 275,000.00
Stream Bed Construction	1500	CY	$ 75.00	$ 112,500.00
Subtotal				**$ 495,500.00**
Restoration				
Seeding of dewatered impoundment banks	1	LS	$ 20,000.00	$ 20,000.00
Section 106 Stipulations	1	LS	$ 45,000.00	$ 45,000.00
Bank/upland restoration and planting/seeding	1	LS	$ 100,000.00	$ 100,000.00
Subtotal				**$ 165,000.00**
Adaptive Management				
2nd Mobilization	1	LS	$ 20,000.00	$ 20,000.00
Re-working of restored channel to enhance fish passage	1	LS	$ 100,000.00	$ 100,000.00
Subtotal				**$ 120,000.00**
CONSTRUCTION COST SUBTOTAL				**$ 1,036,000.00**
Construction Contingency				
Contract Bonds	1	LS	$ 10,000.00	$ 10,000.00
Contingency	1	LS	$ 262,000.00	$ 262,000.00
Cost Escalation (2026 Construction, 3% per year)	1	LS	$ 97,000.00	$ 97,000.00
Subtotal				**$ 369,000.00**
CONSTRUCTION COST GRAND TOTAL				**$ 1,405,000.00**
Engineering Design Costs				
Engineering, Design, and Permitting	1	LS	$ 281,000.00	$ 281,000.00
Construction Phase Services Budget	1	LS	$ 211,000.00	$ 211,000.00
FEMA Letter of Map Revision	1	LS	$ 50,000.00	$ 50,000.00
Post-Construction Monitoring and Reporting (3 - years)	3	Year	$ 15,000.00	$ 45,000.00
Subtotal				**$ 587,000.00**
ENGINEERING & CONSTRUCTION COST GRAND TOTAL				**$ 1,992,000.00**

GRANTS.GOV™

WORKSPACE FORM

1-800-518-4726
SUPPORT@GRANTS.GOV

This Workspace form is one of the forms you need to complete prior to submitting your Application Package. This form can be completed in its entirety offline using Adobe Reader. You can save your form by clicking the "Save" button and see any errors by clicking the "Check For Errors" button. In-progress and completed forms can be uploaded at any time to Grants.gov using the Workspace feature.

When you open a form, required fields are highlighted in yellow with a red border. Optional fields and completed fields are displayed in white. If you enter invalid or incomplete information in a field, you will receive an error message. Additional instructions and FAQs about the Application Package can be found in the Grants.gov Applicants tab.

OPPORTUNITY & PACKAGE DETAILS:

Opportunity Number:	NOAA-NMFS-HCPO-2023-2008056
Opportunity Title:	NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA
Opportunity Package ID:	PKG00282718
CFDA Number:	
CFDA Description:	
Competition ID:	3172817
Competition Title:	Restoring Fish Passage through Barrier Removal Grants
Opening Date:	07/31/2023
Closing Date:	10/16/2023
Agency:	Department of Commerce
Contact Information:	Melanie Gange Competition Manager E-mail: fish.passage.grants@noaa.gov Phone: 301-427- 8664

APPLICANT & WORKSPACE DETAILS:

Workspace ID:	WS01198489
Application Filing Name:	Town of Exeter, New Hampshire
UEI:	X2M6NS6QR567
Organization:	TOWN OF EXETER
Form Name:	Application for Federal Assistance (SF-424)
Form Version:	4.0
Requirement:	Mandatory
Download Date/Time:	Oct 16, 2023 01:02:55 PM EDT
Form State:	No Errors

FORM ACTIONS:

OMB Number: 4040-0004
Expiration Date: 11/30/2025

Application for Federal Assistance SF-424

* 1. Type of Submission:	* 2. Type of Application:	* If Revision, select appropriate letter(s):
☐ Preapplication	☒ New	
☒ Application	☐ Continuation	* Other (Specify):
☐ Changed/Corrected Application	☐ Revision	

* 3. Date Received:	4. Applicant Identifier:
Completed by Grants.gov upon submission.	

5a. Federal Entity Identifier:	5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:
	New Hampshire

8. APPLICANT INFORMATION:

* a. Legal Name:	Town of Exeter, New Hampshire

* b. Employer/Taxpayer Identification Number (EIN/TIN):	* c. UEI:
026000268	X2M6NS6QR567

d. Address:

* Street1:	10 Front Street
Street2:	
* City:	Exeter
County/Parish:	Rockingham
* State:	NH: New Hampshire
Province:	
* Country:	USA: UNITED STATES
* Zip / Postal Code:	03833-2782

e. Organizational Unit:

Department Name:	Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:		* First Name:	Corey
Middle Name:			
* Last Name:	Stevens		
Suffix:			

Title:	Finance Director

Organizational Affiliation:
Town of Exeter, New Hampshire

* Telephone Number:	6037736109	Fax Number:	

* Email:	cstevens@exeternh.gov

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

C: City or Township Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Department of Commerce

11. Catalog of Federal Domestic Assistance Number:

CFDA Title:

*** 12. Funding Opportunity Number:**

NOAA-NMFS-HCPO-2023-2008056

* Title:

NOAA's Restoring Fish Passage through Barrier Removal Grants Under the BIL and IRA

13. Competition Identification Number:

3172817

Title:

Restoring Fish Passage through Barrier Removal Grants

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Restoration of the Exeter Herring Run Through Removal of the Pickpocket Dam

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: NH-001 * b. Program/Project: NH-001

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 07/01/2024 * b. End Date: 12/31/2029

18. Estimated Funding ($):

* a. Federal	1,992,000.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	1,992,000.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☒ a. This application was made available to the State under the Executive Order 12372 Process for review on 10/16/2023.

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☐ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name: Corey

Middle Name:

* Last Name: Stevens

Suffix:

* Title: Finance Director

* Telephone Number: 603-773-6109 Fax Number:

* Email: cstevens@exeternh.gov

* Signature of Authorized Representative: Completed by Grants.gov upon submission. * Date Signed: Completed by Grants.gov upon submission.