

SOUHEGAN SUPPLEMENTAL WATERSHED PLAN NO. 5 AND ENVIRONMENTAL ASSESSMENT

SITES 12A NORTH AND SOUTH, SITE 25B AND SITE 26

Towns of Temple and Wilton, Hillsborough County, New Hampshire

June 2026



Prepared by:

USDA Natural Resource Conservation Service

In Cooperation with

New Hampshire Department of Environmental Services (formerly referred to as the New Hampshire Water Resources Board)

In coordination With:

Hillsborough County Soil Conservation District, New Hampshire, Middlesex County Soil Conservation District, Massachusetts, Towns of Greenville, New Hampshire, and Town of Milford, New Hampshire

Supplemental Watershed Plan No.5 & Environmental Assessment

Rehabilitation of Souhegan Dam Sites 12A North and South, Site 25B and Site 26 of the Souhegan River Watershed, Hillsborough County, New Hampshire State

Prepared By:

Federal Lead Agency: U.S. Department of Agriculture, Natural Resources Conservation Service and the
Cooperating Agency: New Hampshire Department of Environmental Services (formerly referred to as the New Hampshire Water Resources Board)

In coordination With:

Hillsborough County Soil Conservation District, New Hampshire, Middlesex County Soil Conservation District, Massachusetts, Towns of Greenville, New Hampshire, and Town of Milford, New Hampshire

AUTHORITY

The original watershed work plan was prepared, and works of improvements have been installed under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666) as amended. The rehabilitation of Souhegan Dam Sites 12A North and South, Site 25B and Site 26 are authorized under the Watershed Protection and Flood Prevention Act (Public Law 83-566).

ABSTRACT

Souhegan Dam Sites 12A North and South, Site 25B, and Site 26 were constructed between 1967 and 1971 as a part of a series of thirteen floodwater retarding structures within the Souhegan River Watershed, Hillsborough County, New Hampshire and Middlesex County, Massachusetts. Sites 12A North and South were constructed as a multipurpose structure providing flood control and drinking water to the Town of Greenville. Sites 25B and Site 26 were built as single purpose flood retarding structures. All four dams are classified as high-hazard structures.

Dam Assessments in 2016 and 2021 noted several deficiencies which include: inadequate conveyance capacity, auxiliary spillway integrity, aging internal seepage collection and conveyance systems including potential material compatibility concerns, slope stability factors of safety, and the 10-day drawdown requirement of the Natural Resources Conservation Service (NRCS). Consequently, the four dams do not meet current NRCS or New Hampshire Department of Environmental Services (NHDES) dam design safety and engineering criteria and performance standards for high hazard dams.

The preferred alternative is to rehabilitate the four dams to address the identified safety deficiencies and maintain the current level of flood protection for the surrounding communities and drinking water supply for the Town of Greenville. The preferred alternative includes the addition of internal seepage collection and conveyance systems (typical for all dam sites), flattening the downstream embankment slopes (typical for all dam sites), modifying the Site 12A South principal spillway riser and replacing the Site 25B and Site 26 principal spillway risers, armoring the Site 12A South crest and downstream embankment face with Roller Compacted Concrete (RCC) and the addition of cutoff walls within the Site 25B and Site 26 auxiliary spillways to prevent a breach of the dam through the auxiliary spillways.

Total project installation cost is estimated to be \$38,491,847, of which \$27,626,079 will be paid by NRCS and \$10,865,768 from Sponsor Funds.

Comments and inquiries must be received by [enter date].

Submit comments and inquiries to:

[name]

United States Department of Agriculture
Natural Resources Conservation Service

[address]

Phone:

Email:

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Ancestral Land Acknowledgment

Tribal consultation was conducted in accordance with the National Historic Preservation Act (NHPA) of 1966 and Executive Order 13175. Tribal Ancestral Lands Consultation (TALC) was initiated by NHDES on October 19, 2021. Letters were sent to the SHPO and Native American Tribes with ancestrally affiliated lands located within the study area. A copy of the letter to the Abenaki Nation of New Hampshire can be found in Appendix A. The same letter was sent to the tribes listed below. None of the tribes responded to initial correspondence. The following Native American Tribes may have interest in the project:

- Abenaki Nation of New Hampshire
- Golden Hill Indian Reservation
- Schaghticake Tribal Nation
- Nulhegan Band of the Coosuk Abenaki Nation
- Eastern Pequot Reservation
- Paucatuck Eastern Pequot Tribe
- Koasek of the Koas of the Abenaki Nation
- Sovereign Abenaki Nation of Missisquoi, St. Francis/Sokoi Band
- Cowasuck Band Pennacook/Abenaki People
- Koasek (Cowasuck) Traditional Band of the Sovereign Abenaki Nation
- Koasek (Cowasuck) Traditional Band of the Abenaki Nation
- Laconia Indian Historical Association LIHA, Inc
- NH Intertribal Native American Council
- Tribal Historic Preservation Office (THPO), Penobscot Indian Nation
- Tribal Chief, Penobscot Indian Nation
- THPO, Wampanoag Tribe of Gay Head-Aquinnah
- Mashantucket Pequot Tribal Nation, Eastern Area Office
- Mohegan Tribal Council, Eastern Area Office
- THPO, Narragansett Indian Tribe
- THPO, Passamaquoddy Tribe

The NRCS NH sent finding of effect consultation packages to the Narragansett Indian Tribe and Wampanoag Tribe at Gay Head (Aquinnah) on August 5, 2025. No responses were received regarding the NRCS NH's finding of "No Adverse Effect" (Appendix A).

**SOUHEGAN SUPPLEMENTAL WATERSHED
PLAN AGREEMENT NO. 5**

between the

**New Hampshire Department of Environmental Services, Hillsborough County Soil Conservation
District, New Hampshire, Middlesex County Soil Conservation District, Massachusetts, New
Hampshire Water Resources Board, Towns of Greenville, New Hampshire, and Town of Milford,
New Hampshire
(Referred to herein as Sponsors)**

and the

**UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
(Referred to herein as NRCS)**

Whereas, the watershed Work Plan Agreement for the Souhegan River Watershed, States of New Hampshire and Massachusetts, executed by the sponsoring local organizations named therein and the Service, became effective on the 8th day of September 1961; and

Whereas, Supplemental Watershed Work Plan Agreement No.1 for said watershed, executed by the sponsoring local organizations named therein and the Service, became effective on the 28th day of April, 1966; and

Whereas, Supplemental Watershed Work Plan Agreement No.2 for said watershed, executed by the sponsoring local organizations named therein and the Service, became effective on the 9th day of December 1969; and

Whereas, Supplemental Watershed Work Plan Agreement No.3 for said watershed, executed by the sponsoring local organizations named therein and the Service, became effective on the 16th day of May, 1972; and

Whereas, Supplemental Watershed Work Plan Agreement No. 4 for said watershed, executed by the sponsoring local organization named therein and the Service, became effective in October 1981; and

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsors for assistance in preparing a plan for works of improvement for the Souhegan Watershed, State of New Hampshire, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsors and NRCS a watershed project plan and environmental assessment for works of improvement for the Souhegan River Watershed, State of New Hampshire, hereinafter referred to as the watershed project plan or plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsors hereby agree on this watershed project plan and that the works of improvement for this

project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this plan and including the following:

1. **Term.** The term of this agreement is for the installation period and evaluated life of the project (105 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.
2. **Costs.** The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.
3. **Real property.** The sponsor has land rights in place (either ownership or easements) covering each dam, auxiliary spillway and reservoir areas located below the auxiliary spillway crest elevation except for lands owned by Marth M. Scott along the east side of the Site 12A reservoir. However, the property in question is listed as a conservation easement, restricting development of the property.

The sponsors agree that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The sponsors hereby agree to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsors are legally unable to comply with the real property acquisition requirements, it agrees that, before any Federal financial assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.
5. **Cost-share for Watershed Work Plan.** The following table shows cost-share percentages and amounts for Watershed Work Plan implementation.

Tables below show the cost share percentages for sites 12A, 25B and 26 separately.

Cost-share Table for Watershed Operation or Rehabilitation Project- Site 12A

Works of Improvement Cost-Shareable Items	NRCS		Sponsors		Total Cost
	Percent	Cost	Percent	Cost	
Rehabilitation of Souhegan Sites 12A (Construction Costs)	66	\$7,089,625	34	\$3,652,939	\$10,742,564
Relocation, Replacement in kind	--	\$0	--	\$0	\$0
Relocation, Required Decent, Safe, Sanitary	--	\$0	--	\$0	\$0
Mitigation	100	\$45,000	0	\$0	\$45,000
Real Property Acquisition Cost	--	N/A	--	\$0	\$0
Sponsors Planning Costs	--	N/A	--	\$0	\$0
Sponsors Project Administration Costs	0	N/A	100	\$188,782	\$188,782
Sponsors Engineering Costs	--	N/A	--	\$0	\$0

Subtotal: Cost-Sharable Costs	65	\$7,134,625	35	\$3,841,721	\$10,976,346
Non-Cost-Sharable Items ^{1/}					
NRCS Technical Assistance/Engineering	100	\$2,373,264	0	\$0	\$2,373,264
Project Administration ^{2/}	100	\$350,596	0	\$0	\$350,596
Water, Mineral and Other Resource Rights	--	\$0	--	\$0	\$0
Real Property Rights	--	\$0	--	\$0	\$0
Relocation, Beyond Required Decent, Safe, Sanitary	--	\$0	--	\$0	\$0
Federal/State/Local Permits	0	\$0	100	\$52,938	\$52,938
Subtotal: Non-Cost-Share Costs	98	\$2,723,860	2	\$52,938	\$2,776,798
Total:	72	\$9,858,485	28	\$3,894,659	\$13,753,144

Cost-share Table for Watershed Operation or Rehabilitation Project- Site 25B

Works of Improvement	NRCS		Sponsors		Total
Cost-Sharable Items	Percent	Cost	Percent	Cost	Cost
Rehabilitation of Souhegan Sites 25B (Construction Costs)	66	\$4,742,317	34	\$2,468,778	\$7,211,095
Relocation, Replacement in kind	--	\$0	--	\$0	\$0
Relocation, Required Decent, Safe, Sanitary	--	\$0	--	\$0	\$0
Mitigation	100	\$79,500	0	\$0	\$79,500
Real Property Acquisition Cost	--	N/A	--	\$0	\$0
Sponsors Planning Costs	--	N/A	--	\$0	\$0
Sponsors Project Administration Costs	0	N/A	100	\$127,585	\$127,585
Sponsors Engineering Costs	--	N/A	--	\$0	\$0
Subtotal: Cost-Sharable Costs	65	\$4,821,817	35	\$2,596,363	\$7,418,180
Non-Cost-Sharable Items ^{1/}					
NRCS Technical Assistance/Engineering	100	\$1,603,931	0	\$0	\$1,603,931
Project Administration ^{2/}	100	\$236,944	0	\$0	\$236,944
Water, Mineral and Other Resource Rights	--	\$0	--	\$0	\$0
Real Property Rights	--	\$0	--	\$0	\$0
Relocation, Beyond Required Decent, Safe, Sanitary	--	\$0	--	\$0	\$0
Federal/State/Local Permits	0	\$0	100	\$52,938	\$52,938
Subtotal: Non-Cost-Share Costs	98	\$1,840,875	2	\$36,453	\$1,877,328
Total:	72	\$6,662,692	28	\$2,632,816	\$9,295,508

Cost-share Table for Watershed Operation or Rehabilitation Project- Site 26

Works of Improvement	NRCS		Sponsors		Total
Cost-Shareable Items	Percent	Cost	Percent	Cost	Cost
Rehabilitation of Souhegan Sites 26 (Construction Costs)	66	\$8,248,152	34	\$4,243,803	\$12,491,955
Relocation, Replacement in kind	--	\$0	--	\$0	\$0
Relocation, Required Decent, Safe, Sanitary	--	\$0	--	\$0	\$0
Mitigation	100	\$40,500	0	\$0	\$40,500
Real Property Acquisition Cost	--	N/A	--	\$0	\$0
Sponsors Planning Costs	--	N/A	--	\$0	\$0
Sponsors Project Administration Costs	0	N/A	100	\$219,318	\$219,318
Sponsors Engineering Costs	--	N/A	--	\$0	\$0
Subtotal: Cost-Shareable Costs	65	\$8,288,652	35	\$4,463,121	\$12,751,773
Non-Cost-Shareable Items ^{1/}					
NRCS Technical Assistance/Engineering	100	\$2,757,140	0	\$0	\$2,757,140
Project Administration ^{2/}	100	\$407,305	0	\$0	\$407,305
Water, Mineral and Other Resource Rights	--	\$0	--	\$0	\$0
Real Property Rights	--	\$0	--	\$0	\$0
Relocation, Beyond Required Decent, Safe, Sanitary	--	\$0	--	\$0	\$0
Federal/State/Local Permits	0	\$0	100	\$62,662	\$62,662
Subtotal: Non-Cost-Share Costs	98	\$3,164,445	2	\$62,662	\$3,227,107
Total:	72	\$11,453,097	28	\$4,525,783	\$15,978,880

1/ If actual non-cost-shareable item expenditures vary from these figures, the responsible party will bear the change.

2/ The sponsors and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.

6. **Land treatment agreements.** The sponsors will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed
7. **Floodplain Management.** Before construction of any project for flood prevention, the sponsors must agree to participate in and comply with applicable Federal floodplain management and flood

insurance programs. The sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsor entering into a construction contract.

8. **Water and mineral rights.** The sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement.
9. **Permits.** The sponsors will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement.
10. **NRCS assistance.** This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
11. **Additional agreements.** A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
12. **Amendments.** This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsors having specific responsibilities for the measure involved.
13. **Prohibitions.** No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.
14. **Operation and Maintenance (O&M).** The sponsors will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be entered into before Federal funds are obligated and will continue for the project life (100 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.
15. **Emergency Action Plan.** Prior to construction, the sponsors must prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may cause loss of life or as required by state and local regulations. The EAP must meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. EAPs must be reviewed and updated by the sponsors annually.

16. **Nondiscrimination Provisions.** In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

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17. **Certification Regarding Drug-Free Workplace Requirements** (7 CFR Part 3021). By signing this Watershed Agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsors certify that they will or will continue to provide a drug-free workplace by—

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about—

- (a) The danger of drug abuse in the workplace;
- (b) The grantee's policy of maintaining a drug-free workplace;
- (c) Any available drug counseling, rehabilitation, and employee assistance programs; and
- (d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must—

- (a) Abide by the terms of the statement; and
- (b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice must include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted—

- (a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
- (b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The sponsors may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

C. Agencies will keep the original of all disclosure reports in the official files of the agency.

18. Certification Regarding Lobbying (7 CFR Part 3018) (for projects > \$100,000)

A. The sponsors certify to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The sponsors must require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by U.S. Code, Title 31, Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

19. Certification Regarding Debarment, Suspension, and Other Responsibility Matters—Primary Covered Transactions (7 CFR Part 3017).

A. The sponsors certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph A(2) of this certification; and

(4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary sponsors is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20. Clean Air and Water Certification.

A. The project sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (____), is not (X) listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

B. The project sponsoring organizations signatory to this agreement agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term “Air Act” means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term “Water Act” means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term “clean air standards” means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42

U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412).

- (4) The term “clean water standards” means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317).
- (5) The term “facility” means any building, plant, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

21. Assurances and Compliance. As a condition of the grant or cooperative agreement, the sponsors assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State, Local, and Indian Tribal Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

22. Examination of Records. The sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures.

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

By:

Robert R. Scott, Commissioner

Date: _____

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by:

Travis Thomason, Acting State Conservationist
New Hampshire Natural Resources Conservation Service
273 Locust Street
Dover, NH 03820

Date: _____

HILLSBOROUGH COUNTY SOIL CONSERVATION DISTRICT, NEW HAMPSHIRE

By:

Title:

Date: _____

MIDDLESEX COUNTY SOIL CONSERVATION DISTRICT, MASSACHUSETTS

By:

Title:

Date: _____

TOWN OF GREENVILLE, NEW HAMPSHIRE

By:

Title:

Date: _____

TOWN OF MILFORD, NEW HAMPSHIRE

By:

Title:

Date: _____

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SUMMARY (OFFICE OF MANAGEMENT AND BUDGET FACT SHEET)

**Supplemental Watershed Plan No.5- Environmental Assessment
for
Souhegan Sites 12A North and South, 25B and 26
Souhegan River Watershed, Hillsborough County, New Hampshire
2nd Congressional District**

Authorization for Original Work Plan: Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666) as amended

Authorization for Rehabilitation/Supplemental Work Plan: Watershed Protection and Flood Prevention Act (Public Law 83-566).

Sponsors: New Hampshire Department of Environmental Services; In coordination with: Hillsborough County Soil Conservation District, New Hampshire, Middlesex County Soil Conservation District, Massachusetts, New Hampshire Water Resources Board, Towns of Greenville, New Hampshire, and Town of Milford, New Hampshire

Proposed Action: Rehabilitation of Souhegan Sites 12A North and South, 25B and 26

Purpose and Need for Action: The purpose of the federal action is to 1) maintain flood protection for residential, commercial, and agricultural structures and transportation infrastructure in the study area, 2) maintain adequate water storage capacity and quality for drinking water supply for the Town of Greenville, and 3) manage river water flow conditions consistent with the state's Souhegan River Water Management Plan instream flow targets.

The needs of the project are as follows:

Safety: The existing Sites 12A North, 12A South, 25B, and 26 dams are classified as High Hazard dams. This hazard classification is based on the prevalence of population, roads and buildings located within the dam breach inundation zone that would be exposed to potential loss of life in the unlikely event of dam failures. Based on the latest dam failure hydraulic analysis, a total of 332 properties with structures fell within the inundation limits of the Breach event floodplain, 283 properties with structures fell within the inundation limits of the 500-year without-dam flood event and, and a total of 176 properties with structures fell within the inundation limits of the 100-year without-dam flood event. By protecting against the risk of dam failure, the proposed action provides protection for 97 people in the study area based on flood protection offered to 39 residences. Based on prior dam assessments, the sites do not comply with NRCS current performance and safety standards for high-hazard dams. Deficiencies include inadequate conveyance capacity and integrity of auxiliary spillway (erodibility concerns).

Flood Damage Reduction: Flood damage reduction is a major resource problem that led to the development of the 1961 Watershed Work Plan. Flood damage to crop and pastureland, industrial and residential areas, and other fixed improvements periodically caused high damage and inconvenience to the public. At the time of the 1961 report, the average annual benefit of the project was valued at \$70,229 (\$738,774 in 2024 dollars).. Additional downstream development has occurred since the dams were constructed. Under the current analysis, average annual flood damage reduction from the presence of the dams (compared to the No Action condition) is estimated at \$55,625.

Maintain Water Supply: The Sites 12A North and South reservoir (Tobey/Greenville Reservoir) serves as a public water supply for the Town of Greenville. This community water system which includes a raw water intake and pumping station at Tobey Reservoir serves domestic and fire flow to about 440 connections and a population of approximately 1,100. In addition, the reservoir provides water to Pilgrim Foods to aid in industrial processes to produce canned/bottled food products (NHDES, 2015). There is a need to maintain drinking water supply for the town and industrial users.

Water Quality Management: The Souhegan River, from its south and west branch confluences in New Ipswich downstream to the Merrimack River, was listed as a Designated River under the New Hampshire Rivers Management Protection Program Act (RSA 483) in 1988. The designation acknowledges the river as important to the state for its outstanding natural and cultural resources. In 2002, the state legislature directed the NHDES to establish protected instream flows and a watershed management plan for the Souhegan River. A protected instream flow is the amount of water needed to support the human and natural uses that depend on the river, and the 2013 management plan details the actions to be implemented to maintain the protected flows (NHDES 2013). Site 12A does not currently have infrastructure that would allow dam operators to help achieve instream flow targets through two-day flow pulses to offset drought conditions.

Preferred Alternative: The preferred alternative is to rehabilitate the four dams to address safety deficiencies and maintain the current level of flood protection and drinking water supply for the Town of Greenville. The preferred alternative involves adding internal seepage collection and conveyance systems, flattening downstream embankment slopes, modifying or replacing the principal spillway risers, armoring the Site 12A South crest and downstream face with Roller Compacted Concrete (RCC), and installing cutoff walls in the Site 25B and Site 26 auxiliary spillways. Selection of the preferred alternative was done based on incremental analysis presented in section 6.11.

Resource Information:

- Latitude and Longitude: Site 12A North (40°48'06.56" N, 71°50'11.83" W), Site 12A South (40°47'45.88" N, 71°49'45.23" W), Site 25B (40°49'19.77" N, 71°49'08.29" W), and Site 26 (40°50'39.84" N, 71°49'59.11" W).
- Eight-Digit Hydrologic Unit Number: 01070006 (Merrimack River Subbasin)
- Climate and Topography: Humid continental climate with rolling topography
- Watershed Size (acres): 141,051 acres (Souhegan River Watershed)
- Land Uses: Land use in each study area is predominantly classified as forest and water.
 - Site 12A: 3-acres residential/commercial/industrial, 5-acres transportation, and 33-acres forested/undeveloped, and 132-acres water.
 - Site 25B: >1-acre transportation, 19-acres pastureland, 34-acres natural/undeveloped, and 9-acres water.
 - Site 26: 14-acres pastureland, 26-acres natural/undeveloped, and 6-acres water.
- Land Ownership:
 - Site 12A: 37.5% State/Local and 62.5% Private
 - Site 25B: 37.5% State/Local and 62.5% Private
 - Site 26: 20% State/Local and 80% Private

- Population and Demographics:

Demographics (2017 2022)	Demographic Study Area	Hillsborough County	New Hampshire
Population	21,669	422,733	1,379,610
Percent Minority	7%	15%	10%
Median Household Income	\$105,240	\$95,112	\$90,845
Poverty	6%	7%	8%

Scoping Concerns: The dams have been determined to be eligible for the National Register of Historic Places as part of the Souhegan River Flood Control Project Historic District, which includes nine other discontinuous sites. In addition, areas of archaeological sensitivity have been identified in proximity to the dams. Per Section 106 regulation, the federal agency, in consultation with relevant parties is required to: 1) take into account the effects of its undertakings on historic properties (36 CFR 800.1(a)); and develop and evaluate alternatives or modifications to the project that could avoid, minimize, and/or mitigate adverse effects to the historic properties in question (36 CFR 800.6(a)). Wetland and stream resources are present in the study area. Project alternatives will need to avoid or minimize impacts to water resources.

The Sites 12A North and South reservoir serves as public water supply for the Town of Greenville. Implementation of a selected alternative will need to consider maintenance of an adequate water supply for the Town during the construction phase and in the future.

Alternative Plans Considered:

No Action: The No Action Alternative assumes no work beyond routine operation and maintenance will be undertaken by the local sponsor, until such time that the dams are expected to fail. The dams will be assumed to operate under the existing performance until the recurrence rainfall event is reached which is expected to result in a dam breach under the existing conditions. As a simplification and considering the four dams as a unit, it is assumed that all four dams would fail at the event that would result in the most probable failure of the first dam. No Action would not meet the projects Purpose and Need.

No Federal Action: Based on coordination with NHDES, the owner of the dams and sponsor, it was determined that the Future Without Federal Investment (FWOFI) Alternative would be the same as the No Action Alternative. In the absence of federal funding, NHDES would not pursue a Sponsor funded project. The dams would be left in place with routine maintenance and the risk of a breach would remain with the same likelihood of occurrence.

Dam Decommissioning: As a simplification and considering the four dams as a unit, the decommissioning alternative would result in various impacts. First, the downstream flood protection benefits would be eliminated, requiring either new detention facilities for managing peak rates of runoff or mitigation of previously protected structures through relocation or floodproofing. Decommissioning would expose reservoir sediments, posing immediate erosion and downstream sedimentation risks or requiring advanced removal and/or stabilization of the sediment prior to decommissioning. Decommissioning would also eliminate Site 12A as a water source for the Town of Greenville, requiring

the establishment of alternate sources of raw water. Estimated construction costs for decommissioning all four dams exceed \$19 million.

Non-Structural Relocation or Floodproofing: Non-Structural measures could consist of flood proofing or relocating structures in the breach zone as determined under the No Action Alternative of the dam to remove the unacceptable safety risk for the 148 residences, 132 other structures and greater than 370 persons at risk in the breach inundation zone. High Hazard structures provide significant downstream flood damage reduction to homes, buildings, and transportation corridors. Flood proofing or relocating the 280 total breach zone structures that would experience damage would cost more than \$36.4 million based on the estimate of flood proofing costs discussed earlier. Relocating or elevating 14.5 miles of roads and 26 bridges, protected by the dams out of the inundation zone is judged to be impractical and would generate substantial adverse economic and environmental impacts within the watershed. Furthermore, the non-structural alternative would not address the need for rehabilitation of each dam to bring it into compliance with current dam safety standards.

Structural Rehabilitation Alternatives:

Site	Alternative No.	Alternative Description ¹	Cost Estimate
12A	1	Raise top of dam & add RCC auxiliary spillway drop structure.	\$14.8 million
	2C	RCC overtopping protection & backfill existing auxiliary spillway	\$13.0 million
	3	Release Pulse (to be considered in addition to the other Site 12A Alternatives)	--
25B	1B	Raise top of dam, replace principal spillway riser structure, add cutoff wall to auxiliary spillway & move control section downstream	\$8.9 million
	2B	Widen auxiliary spillway, replace principal spillway riser structure, add cutoff wall to auxiliary spillway & move control section downstream	\$10.0 million
26	1C	Raise top of dam, replace principal spillway riser structure, add stepped RCC cutoff wall at auxiliary spillway control section	\$15.3 million
	2C	Widen auxiliary spillway, replace principal spillway riser structure, add stepped RCC cutoff wall at auxiliary spillway control section	\$16.0 million

Rehabilitation costs are:

Public Law 83 566 Funds	Percentage	Other Funds	Percentage	Total
\$27,974,275	72%	\$11,053,258	28%	\$39,027,533

Project Costs	Federal Assistance	Other Funds	Total
Construction	\$20,080,095	\$10,365,519	\$30,445,614
Engineering	\$6,734,335	\$0	\$6,734,335
Project Administration	\$994,845	\$535,686	\$1,530,531
Mitigation	\$165,000	\$0	\$165,000
Federal/State/Local Permits	\$0	\$152,053	\$152,053
Total	\$27,974,275	\$11,053,258	\$39,027,533
Annual O&M Costs	0	\$30,000	\$30,000

Benefits:

Number of Direct Beneficiaries/Population at Risk (PAR): The preferred alternative maximizes public benefits by lowering risk of flood damage for structures, infrastructure and by enhancing life safety for population in the area. The project directly benefits 39 residential structures and X miles of roadways with Y number of bridges. The PAR includes at least 97 residents across 39 homes, along with 59 other structures that would otherwise be exposed to potentially catastrophic flood impacts in the event of dam failure.

Benefits of the Proposed Action include:

- Reduction in the potential for loss of life by reducing the possibility of dam failure
- Reduction in the sponsor's liability associated with the operation of a flood retarding structure which does not meet current dam safety engineering and performance criteria
- Reduce the probability of risk to human life and property resulting from the operation of high hazard dams.
- Maintain flood protection to downstream properties, and protection of real estate values.
- Continue the provision of drinking water supply in sufficient quantity and quality for the Town of Greenville and Pilgrim Foods.
- Advance the achievement of instream flow targets under the state Souhegan River Water Management Plan.

Benefit Cost Ratio: 0.4

Net Beneficial Effects: -\$804,323 (Net average annual equivalent benefits of \$460,768 -\$1,265,091 in average annual equivalent costs)

Period of Analysis: 105 years (two years for planning, three years for construction)

Project Life: 100 years

Funding Schedule: Estimated 2026, Allocating two years for design and permitting and estimating three years for construction results in construction between 2029 and 2031.

Environmental Effects: Earth disturbances are expected. Permanent soil impacts include RCC structure construction at Sites 25B and 26, and soil inundation around reservoir rims due to higher pool elevations. Construction emissions from equipment and vehicles will be short-term and limited to the construction period. Fish and wildlife impacts will be minor and temporary. Spring construction may disrupt bird migration and breeding, while aquatic species may temporarily disperse from affected areas. Natural areas may be minimally disturbed for access and staging but will be restored post-construction. Riparian areas near principal spillways may face temporary impacts. At Site 12A South Dam, 65± linear feet of riparian vegetation will be permanently affected due to conduit alterations. Forest resources will be minimally affected. Tree clearing is estimated at: Site 12A: 0.5± acre, Site 25B: minimal and Site 26: 0.7± acre.

Controversial Issues: No issues of controversy identified to date.

Issues to be resolved: None

Evidence of Unusual Congressional or Local Interest: None

Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? Yes_X__ No ____

CHANGES REQUIRING A SUPPLEMENTAL PLAN-ENVIRONMENTAL ASSESSMENT

Designed between 1965 and 1969, Sites 12A North, 12A South, 25B and 26 were originally classified as High Hazard (Class C) structures. In 2016, NHDES completed Rehabilitation Assessment Reports for the four dams, which documented that all four dams fail to meet current NRCS safety and performance standards and are currently out of compliance with NRCS hydraulic performance criteria. Specifically, during their spillway design floods, each dam would experience early activation of the auxiliary spillway; and, during the freeboard hydrograph events, each dam is at risk of overtopping and integrity concerns could potentially result in a breach through the auxiliary spillway. Dam inspections conducted in 2020 and reported in 2021, give a condition assessment rating of Fair to each dam. Results of additional detailed planning-level investigations that are documented in this Supplemental Watershed Plan-Environmental Assessment (Plan-EA) further confirm potential deficiencies at each dam via hydrologic and hydraulic analysis, geotechnical exploration and analysis, sediment studies, and environmental investigations. This is the fifth Supplemental Watershed Plan-EA since the original 1961 plan.

Because the subject sites do not comply with NRCS current performance and safety standards for high-hazard dams, they need to be brought into compliance, either through rehabilitation or decommissioning.

1 WATERSHED PLANNING BACKGROUND

1.1 Authority

This Plan-EA is being prepared for the four flood control dams in Temple within the Souhegan River Watershed (Souhegan Sites 12A North, 12A South, 25B and 26) under the Authority of the Federal Watershed Protection and Flood Protection Act (PL 83-566). An amendment to PL 83-566, the Watershed Rehabilitation Amendments of 2000 (PL 106-472), Section 313, authorizes financial and technical assistance to rehabilitate or remove dams under the USDA Watershed Rehabilitation Program. Modification of the four sites is authorized under this amendment. The format of this document follows the plan format outline for all Watershed Project Plans as outlined in the NRCS National Watershed Program Manual (NWPM) Parts 500 through 506 (NRCS 2024). The Plan-EA assists NRCS in determining if the selected alternative would have a significant impact on the quality of the environment and if preparation of an Environmental Impact Statement (EIS) is required.

This Plan-EA has also been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, and the NRCS 7 CFR 650 and the Nat'l Env Compliance Handbook; the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (March 10, 1983) established pursuant to the Water Resources Planning act of 1965 (PL-89-80) as amended by Executive Order 12322 (September 17, 1981); and NRCS policy and guidelines (NRCS 2010 and 2011), Principles, Requirements, and Guidelines (PR&G) and implementation guidance in DM 9500-013; and NRCS Circular 290-21-1 (NRCS, 2021).

This environmental document was initiated using the 40 CFR 1500-1508 (April 2022) and 7 CFR 650 regulations, which were recently rescinded (interim final rule in February 25, 2025) and replaced with USDA regulations found under 7 CFR 1b. In a good-faith effort to fulfill NEPA's requirements, the agency decided to continue to use 40 CFR 1500-1508 (April 2022) and 7 CFR 650. The Federal Register notice said: "To ensure an orderly transition without undue impact on the USDA mission, USDA subcomponents have discretion to continue using the versions of USDA and agency-specific NEPA regulations in place before publication of this interim final rule, as well as the 2020 version of the CEQ NEPA regulations, where it makes sense for proposals that are at a certain stage in the applicable NEPA process (categorical exclusion, environmental assessment, or environmental impact statement)." 90 FR 29644 (July 3, 2025). In the NRCS's expert opinion, it has thoroughly considered the factors mandated by the statute and the regulatory frameworks it used; and that, in the responsible federal official's judgment, the analysis contained herein is adequate to inform and reasonably explain findings regarding the proposed action and selected alternative.

1.2 Sponsor

The local project sponsors are the State of New Hampshire Department of Environmental Services (NHDES), Hillsborough County Soil Conservation District, New Hampshire, Middlesex County Soil Conservation District, Massachusetts, New Hampshire Water Resources Board, Towns of Greenville, New Hampshire, and Town of Milford, New Hampshire. NHDES manages and maintains the dams.

1.3 Cooperating Agencies

NRCS is the lead agency with the responsibility for completing this Plan-EA. Based on the project scope no other agencies requested to be a cooperating agency. Agencies can still be involved as coordinating agencies through the planning and design phases of the project. There are no controversial elements of this plan that would require other agencies to participate as a cooperating agency.

1.4 Planning Area

1.4.1 Selected Watershed

The project is within the Souhegan River Hydrologic Unit Code (HUC) 10 (0107000609) that encompasses 141,051 acres. The project area contains one HUC12: Blood Brook (010700060902). See Appendix B- Figure 1.

The Souhegan Site 12A North and Site 25B Dams are located within the Temple Brook Watershed, which is a tributary to Blood Brook. The Souhegan Site 26 Dam is located within the Blood Brook Watershed, which ultimately drains to the Souhegan River. The Souhegan Site 12A South Dam is located within the Souhegan River Watershed. All four dams ultimately drain to the Souhegan River, which is a tributary to the Merrimack River.

1.4.2 Study Area

The study area includes three separate areas that encompassed the four dams: Site 12A North and South, 25B, and 26.

Site 12A: The study area encompassed 169.5 acres and consisted of the Souhegan Site 12A North and South Dams, the Greenville Reservoir, Temple Brook, Gambol Brook, Richardson Brook, one unnamed tributary to the Souhegan River, and mowed and maintained areas around the dams, upland forest, and access roads from Senator Tobey Highway/Route 45. See Appendix B- Figure 2.

Site 25B: The study area encompassed 61.5 acres and consisted of the Souhegan Site 25B Dam and its sediment pool, Temple Brook and its floodplain downstream of the dam and upstream of the sediment pool, mowed areas downstream of the dam, and adjoining forested slopes and wetlands. The project study area also included the existing access road from General Miller Highway. The project study area was bordered primarily by forested slopes and rural residential properties. See Appendix B- Figure 3.

Site 26: The study area encompassed 47.5 acres and consisted of the Souhegan Site 26 Dam and its sediment pool, Blood Brook and its floodplain downstream of the dam and upstream of the sediment pool, fallow meadow in the dam's auxiliary spillway and headwater areas, mowed areas downstream of the dam, and adjoining forested slopes and wetlands. The project study area is located primarily on privately-owned property associated with the Timberdoodle Club, a private hunting and fishing club. The area downstream of the dam is used as a sporting clays and shooting range. The study area also included the existing access road from Gibbons Highway (Route 101) and the existing access roads associated with the hunting club property. The study area was bordered by forested slopes, fallow fields and meadows, and rural commercial properties. See Appendix B- Figure 4.

1.4.3 Areas(s) of Potential Effects for NHPA Section 106 Compliance

The NRCS defines the area of potential effect (APE), as an area that includes all Project construction and excavation activity required to construct, modify, improve, or maintain any facilities; any right-of-way or easement areas necessary for the construction, operation, and maintenance of the Project; all areas used for excavation of borrow material and habitat creation; all construction staging areas, access routes, utilities, spoil areas, and stockpiling areas. Impacts that come from the undertaking at the same time and place with no intervening causes, are considered “direct” regardless of its specific type (e.g., whether it is visual, physical, auditory, etc.). “Indirect” effects to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable.

The APE for direct and indirect effects includes the entirety of the study areas for Sites 12A North and South, Site 25B and Site 26 as noted above.

1.5 Planning Process and Study Scope

1.5.1 Stepwise Planning Process

The watershed planning process is a formalized framework that guides plan development from the beginning stages through final implementation and evaluation of the project. There are three interrelated planning processes, each with its own specific goals and requirements, that contribute to the development of a watershed project plan.

1. NRCS’s nine-step planning process (described in 180 National Planning Procedures Handbook (NPPH), Part 600) focuses on developing and implementing plans that protect, conserve, and enhance natural resources.
2. PR&G outlines a similar eight-step planning process that provides more information for plan development and emphasizes an ecosystem service framework. The NRCS Chief’s decision memo approved on April 18, 2018, requires all Pub. L. No. 83-566 projects implement PR&G regardless of cost but take costs into consideration for commensurate level of detail for the analysis.
3. The NEPA planning process ensures that federal agencies consider the environmental consequences of proposed actions prior to implementation and provide the public an opportunity to comment. The goal of the watershed planning process is to identify the most economically, socially, and environmentally beneficial means of achieving the projects’ purpose.

1.5.2 Ecosystem Services Framework

In accordance with the PR&G guidelines, an ecosystem service framework is used in the Plan-EA. Ecosystem services are a way to characterize the comprehensive set of benefits that people receive from nature. Ecosystem services can be described as ecological goods and services provided by a healthy, functioning environment (USDA 2017). This framework applies an integrative and holistic approach to evaluate benefits and costs associated with alternatives considered for the analysis. Changes to ecosystem services can be represented in monetary and non-monetary terms using appropriate practices for quantifying affected services.

The period of analysis is 105 years which includes two years for planning, three years for construction and 100 years of expected useful life. The service life of 100 years was used in compliance with the NWPM 506.60.FF.

1.5.3 Project Scope

The scope of this project is to develop a Supplemental Watershed Plan-EA for the modification of the existing Souhegan River Watershed Flood Control Dam Sites 12A North, 12A South, 25B, and 26 to bring them into compliance with current NRCS dam safety standards. The authority for preparation of the Plan-EA is the Watershed Protection and Flood Prevention Act (Public Law 83-566), and the project will address the following PL 83-566 authorized project purposes – Flood Prevention (Flood Damage Reduction), Municipal and Industrial Water Supply, and Water Quality Management. The project includes 1) investigating potential deficiencies at each dam via hydrologic and hydraulic analysis, geotechnical exploration and analysis, and sediment studies, 2) environmental investigations to identify resource concerns, 3) development and evaluation of alternatives, 4) analysis of environmental consequences, 5) selection of a preferred alternative 6) avoidance, minimization and mitigation of potential impacts, and 6) public involvement in decision-making.

1.5.4 External Scoping

The scoping process generally followed the scoping procedures contained in the NRCS National Watershed Program Manual (June 2024). External scoping is to be used early in the planning process to aid in identifying issues, concerns, and potential impacts that require a detailed analysis.

Early coordination letters were mailed and/or emailed to 103 regulatory and resource agencies, government officials, local stakeholders, tribal nations and residents on October 19, 2021. The letter provided a summary of the proposed project, location maps, and asked for comments regarding relevant environmental concerns. Recipients were also invited to participate in the public scoping meeting. A scoping notice announcing the scoping period, and the public scoping meeting was posted in the Monadnock Ledger Transcript newspaper (print and online) on October 21, 2021. A public scoping meeting was held virtually at 2 PM on October 28, 2021. The project team delivered project information via a PowerPoint presentation. Attendees were able to ask questions and provide comments during the presentation for the project team to address prior to the end of the meeting. A webpage located on the NHDES website was launched on October 28, 2021, to include information on the Souhegan Supplemental Watershed Plan-EA. Additionally, the public meeting notice, sample public scoping meeting invite letter and attachments, public scoping presentation slides and a video of the public scoping meeting can be access via the webpage link. Additional details on the scoping process can be found in Appendix A.

1.6 Related Projects and Studies

The 2013 Souhegan River Water Management Plan implements the protected flows described in the Instream Flow Report with input from affected users through a stakeholder advisory committee. See Chapter 3, Regional Water Resource Plans for more information.

2 PURPOSE AND NEED

2.1 Purpose

The authority for preparation of the Plan-EA is the Watershed Protection and Flood Prevention Act (Public Law 83-566), and the project will address the following PL 83-566 authorized project purposes – Flood Prevention (Flood Damage Reduction), Municipal and Industrial Water Supply, and Water Quality Management.

The purpose of the federal action is to 1) maintain flood protection for residential, commercial, and agricultural structures and transportation infrastructure in the study area, 2) maintain adequate water storage capacity and quality for drinking water supply for the Town of Greenville, and 3) manage river water flow conditions consistent with the state's Souhegan River Water Management Plan instream flow targets.

2.1.1 Federal Objective

As stated in NWPH 601.12 (8) regarding the Federal Objective and Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G): "Water resource projects are developed utilizing the P&G." The P&G states that, 'The Federal Objective of water and related land resources project planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements' (P&G, Principles Section 2)."

This project must also follow PR&G which states: "The Federal Objective, as set forth in the Water Resources Development Act of 2007, specifies that Federal water resources investments shall reflect national priorities, encourage economic development, and protect the environment by:

- (1) seeking to maximize sustainable economic development;
- (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
- (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems."

Finally, the USDA NRCS Department Manual 9500-13 states: "Under the PR&G, Federal investments are evaluated with respect to the Federal Objective and Guiding Principles. By contrast, under NEPA, the PR&G Federal Objective and Guiding Principles are not incorporated into the purpose and need contained in an EIS. The lead agency's purpose and need for the proposed action frames the NEPA analysis and is not part of the PR&G analysis. The Federal Objective may overlap the purpose and need, but the Federal Objective should be stated separately and not incorporated into the purpose and need statement in the EIS." The Federal Objective as stated in this section of the Plan-EA overlaps with this project's purpose and need statement which is presented in Section 2.1.2.

2.1.2 Project Objective

The project objectives are to

1. Comply with dam design and safety criteria established by NRCS and NHDES.

2. Minimize the potential for loss of life associated with dam failures and otherwise contribute to protection of human health and safety.
3. Provide continued flood protection downstream agricultural land, houses, business, property and infrastructure with appropriate cost consideration.
4. Provide fish and wildlife development for the Souhegan River Watershed.

2.1.3 Constraints and Considerations

Please see Table 3.1 Summary of Resource Concerns for a comprehensive list of planning constraints. Key constraints identified include:

- The dams have been determined to be eligible for the National Register of Historic Places as part of the Souhegan River Flood Control Project Historic District, which includes nine other discontinuous sites. In addition, areas of archaeological sensitivity have been identified in proximity to the dams. Project alternatives will need to avoid or minimize adverse effects to cultural resources.
- Wetland and stream resources are present in the study area. Project alternatives will need to avoid or minimize impacts to water resources.
- The Sites 12A North and South reservoir serves as public water supply for the Town of Greenville. Implementation of a selected alternative will need to consider maintenance of an adequate water supply for the Town during the construction phase and in the future.

2.2 Need

2.2.1 Problems

Safety: The existing Sites 12A North, 12A South, 25B, and 26 dams are classified as High Hazard dams. This hazard classification is based on the prevalence of population, roads and buildings located within the dam breach inundation zone that would be exposed to potential loss of life in the unlikely event of dam failures. Based on the latest dam failure hydraulic analysis, a total of 332 properties with structures fell within the inundation limits of the Breach event floodplain, 283 properties with structures fell within the inundation limits of the 500-year without-dam flood event and, and a total of 176 properties with structures fell within the inundation limits of the 100-year without-dam flood event. Based on prior dam assessments, the sites do not comply with NRCS current performance and safety standards for high-hazard dams. Deficiencies include inadequate conveyance capacity and integrity of auxiliary spillway (erodibility concerns).

Flood Damage Reduction: Flood damage reduction is a major resource problem that led to the development of the 1961 Watershed Work Plan. Flood damage to crop and pastureland, industrial and residential areas, and other fixed improvements periodically caused high damage and inconvenience to the public. At the time of the 1961 report, the average annual benefit of the project was valued at \$70,229 (\$738,774 in 2024 dollars). Additional downstream development has occurred since the dams were constructed. Under the current analysis, average annual flood damage reduction from the presence of the dams (compared to the No Action condition) is estimated at \$55,625.

Maintain Water Supply: The Sites 12A North and South reservoir (Tobey/Greenville Reservoir) serves as a public water supply for the Town of Greenville. This community water system which includes a raw water intake and pumping station at Tobey Reservoir serves domestic and fire flow to about 440 connections and a population of approximately 1,100. In addition, the reservoir provides water to Pilgrim Foods to aid in industrial processes to produce canned/bottled food products (NHDES, 2015). There is a need to maintain drinking water supply for the town and industrial users.

Water Quality Management: The Souhegan River, from its south and west branch confluences in New Ipswich downstream to the Merrimack River, was listed as a Designated River under the New Hampshire Rivers Management Protection Program Act (RSA 483) in 1988. The designation acknowledges the river as important to the state for its outstanding natural and cultural resources. In 2002, the state legislature directed the NHDES to establish protected instream flows and a watershed management plan for the Souhegan River. A protected instream flow is the amount of water needed to support the human and natural uses that depend on the river, and the 2013 management plan details the actions to be implemented to maintain the protected flows (NHDES 2013). Site 12A does not currently have infrastructure that would allow dam operators to help achieve instream flow targets through two-day flow pulses to offset drought conditions.

2.2.2 Opportunities

The following is a general list of opportunities that will be recognized through the implementation of this Plan-EA.

- Reduce the probability of risk to human life and property resulting from the operation of high hazard dams.
- Maintain flood protection to downstream properties, and protection of real estate values.
- Continue the provision of drinking water supply in sufficient quantity and quality for the Town of Greenville and Pilgrim Foods.
- Advance the achievement of instream flow targets under the state Souhegan River Water Management Plan.

3 AFFECTED ENVIRONMENT: CURRENT AND FUTURE CONDITIONS

The following sections describe the existing ecological, physical, biological, economic, and social environments of the study areas. Resource features of Sites 12A North and South, 25B and 26 were inventoried to establish the current resource setting and context within the study areas, and to provide a baseline for assessment of environmental impacts in accordance with NEPA, the NRCS Watershed Planning process, and New Hampshire Dam Safety regulations and guidance.

Detailed field investigations were completed within a natural resource study area, which was defined based on the hydrology and hydraulic modeling for the project, to encompass the area of potential impact associated with the proposed project. Sites 12A North and South comprise one study area of 169.6 acres, with two dams impounding one 121-acre reservoir (Appendix B, Figure 1). The Site 25B study area is 61.5 acres, with one dam impounding one 8-acre reservoir (Appendix B, Figure 2). The Site 26 study area is 47.5 acres with one dam impounding one 6-acre reservoir (Appendix B, Figure 3). Land use in each study area is predominantly natural, with various classifications of forest and water as further described in this Section.

Field investigations focusing on the identification and characterization of natural resources in the study area were completed in October 2021. Summary information and results of the field work are included in Appendix D.

The APE for direct and indirect effects to cultural resources consists of the footprint of the entire dam structures including the earthen dams and their appurtenant structures and a small amount of the streambed up and downstream from the dams and their structures, and limits of disturbance of the proposed action as noted in Section 1.4.3. The affected environment includes the drainage areas for each Site, with Sites 12A North and South sharing one drainage area. The demographic study area is defined by sixteen census block groups located within the boundary of the 500-year floodplain under existing conditions, and includes communities, structures, and infrastructure.

3.1 Resource Categories of Concern

Table 3.1 summarizes the resource categories to be evaluated in accordance with Title 390 National Watershed Program Manual (NWPM) Subpart D, as well as concerns highlighted during the scoping process for Souhegan Sites 12A North and South, 25B and 26.

In accordance with the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G), this EA utilizes an ecosystem services framework to characterize affected environmental resources. The ecosystem services framework provides an important link between ecological function and social well-being within the context of a proposed action, incorporating natural and social benefits that may not be inherently associated with a monetary value. The framework provides an integrated approach to identify, describe, and quantify environmental impacts through the lens of ecosystem services that both directly and indirectly result from a proposed action (USDA, 2017).

There are four federally identified ecosystem service categories (USDA, 2017):

- (1) Provisioning Services – tangible goods provided for direct human use and consumptions (i.e., food, fiber, water, timber, or biomass)
- (2) Regulating Services – services that maintain a world possible for people to live, providing benefits that buffer against environmental catastrophe (i.e., flood and disease control, water filtration, carbon sequestration, climate stabilization, crop pollination)
- (3) Supporting Services – underlying processes maintaining conditions for life on Earth (i.e., nutrient cycling, soil formation, primary production, plant and animal habitat, maintenance of genetic and biological diversity)
- (4) Cultural Services – services that make the world a place in which people want to live (i.e., recreational use, spiritual, aesthetic viewsheds, tribal values)

Table 3.1. Summary of Resource Concerns

Resource Concern	Relevant to Proposed Action?		Rationale
	Yes	No	
SOILS RELATED CONCERNS			
Soil Resources	X		The proposed action will need to consider the potential for impacts to soil resources if soil inundation levels change in the reservoir, fringe, or upland portions of the study areas.
Prime and Unique Farmland, and Farmland of Statewide or Local Importance	X		Based on a review of the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Web Soil Survey, there are soils within the study areas classified as Prime Farmland and Farmlands of Local Importance.
WATER RELATED CONCERNS			
Sole Source Aquifers (SSA)		X	There are no SSAs mapped by the United States Environmental Protection Agency (USEPA) in New Hampshire.
Water Quality	X		Souhegan Site 12A North and South is a water supply reservoir for the Town of Greenville.
Floodplain Management	X		Souhegan Sites 12A North and South, 25B, and 26 provide flood protection for downstream properties.

			There are critical facilities per 7 CFR 650.25 located in the existing 500-year floodplain.
Coastal Zone Management Areas		X	Souhegan Sites 12A North and South, 25B, and 26 are not located within a National Oceanic and Atmospheric Administration (NOAA) designated Coastal Zone Management Area.
Waters of the U.S., Wetlands, & Special Aquatic Sites	X		Project activities may require a Clean Water Act Section 404 permit. Waterways and wetlands are present within the study areas and were identified and delineated in October 2021.
Coral Reefs		X	The Souhegan watershed is a freshwater system and does not contain coral reef habitat.
Regional Water Resource Plans	X		The Souhegan River Water Management Plan was developed in 2013 to advance actions to implement protected instream flows for the river during low flow conditions.
Wild and Scenic Rivers		X	The National Wild and Scenic Rivers System does not include Souhegan River as a Wild or Scenic River.
AIR RELATED CONCERNS			
Air Quality (Clean Air Act)	X		USEPA National Ambient Air Quality Standards identified Hillsborough County as in attainment for all NAAQS criteria. Although the County is in attainment, short-term air quality during construction will be considered in the development of the proposed action.
PLANTS AND ANIMAL RELATED CONCERNS			
Endangered and Threatened Species	X		Service (USFWS) and the New Hampshire Natural Heritage Bureau (NHB) identified federally endangered and threatened species that may be present within the study areas.
Migratory Birds	X		Migratory birds could occur within the study areas.

Bald and Golden Eagles	X		The study areas are within the known range of Bald eagles and Golden eagles. Coordination with NHB identified a known Bald Eagle nest located within 0.5-miles from Sites 12A.
Essential Fish Habitat		X	A review of the NOAA Essential Fish Habitat (EFH) Mapper and coordination with the NHB did not identify EFH within the study areas.
Ecologically Critical Areas	X		Ecologically critical areas were not identified during coordination with NHB, however the presence or potential presence of protected species could designate critical habitat areas within the study areas. All three study sites include Supporting Landscapes for NH Highest Ranked Wildlife Habitat. Site 26 also contains grassland habitat categorized as the highest ranked habitat in its biological region, and Site 25B intersects habitat categorized as the highest ranked habitat in its biological region.
Invasive Species	X		Invasive species were observed in the study areas and documented within the watershed consisting of invasive plants, insects, mussels, and fish species.
Fish and Wildlife	X		The presence of a permanent pool at each site provides a lacustrine habitat which is capable of supporting aquatic species year-round. Further, the permanent pool provides a consistent water source for wildlife species within and adjacent to the study areas. The landscape surrounding the reservoirs is generally comprised of forests and maintained meadows, which provide adequate habitat to support survivorship of local wildlife species.
Natural Areas	X		No federal or state designated Natural Areas are present within or near the study areas. A privately owned natural area, known as the Heald Tract, is located 0.3 miles east of the Site 12A South study area. The tract is open for public recreation. Undeveloped land is present within and adjacent to the study areas. The study areas are primarily forested, with some shrub-scrub and grassland habitats present. Natural areas are fragmented by residential and transportation features.

			The dam embankments are regularly maintained to prevent the establishment of woody vegetation.
Riparian Areas	X		Riparian habitat is present along Blood Brook (Site 26) and Temple Brook (Site 25B). Riparian habitat is also present downstream of the 12A North Dam along Temple Brook and downstream 12A South Dam along an unnamed tributary to the Souhegan River. Riparian habitat in the study areas is primarily forested.
Forest Resources	X		Land use in the study areas includes mixed and deciduous forest areas, primarily owned by the State of New Hampshire, with scattered residential parcels along the study areas' borders.
HUMANS USE RELATED CONCERNS			
Cultural Resources/ Historic Properties and Tribal Consultation	X		Four dams are present within the study area (Souhegan Sites 12A North and South, 25B and 26). These dams were constructed as a part of the Souhegan River Flood Control Project, constructed in the 1960s and 1970s. Due to the age of the dams, they are considered eligible resources for the National Register of Historic Places. Twenty federally or state-recognized tribes were identified that may have historic or cultural interest in the region.
Civil Rights	X		Populations containing high levels, in comparison to the study area, of minority and low-income residents are present in the downstream community of Milford.
Social Issues	X		Potential effects to communities and socioeconomic conditions will be evaluated. The four dams currently provide flood protection to four downstream communities.
Local, Regional, and National Economy	X		Sites 12A North and South provide drinking water to the Town of Greenville and Pilgrim Foods Manufacturing Plant.
Public Health and Safety	X		Souhegan Sites 12A North and South, 25B and 26 provide flood protection to the downstream communities of Temple, Wilton, Greenville, and Milford. The structures do not meet current safety standards for high hazard dams. Dam breach hydraulic analyses

			identified over 300 structures within the downstream inundation zone. In addition, Site 12A North and South provides drinking water to the Town of Greenville.
Scenic Beauty	X		The dams are not open to the public for recreation, although the natural viewsheds surrounding and encompassing the three Sites provide an aesthetic value for permanent residents and travelers along adjacent state routes.
Parklands (including National Parks, Monuments, and Historical Sites)		X	No parkland resources are located within the study areas.
Significant Scientific Resources		X	No recognized scientific resources are located within the study areas.
Land Use	X		The surrounding land use is mostly rural with residential, and commercial/ industrial use closer to town centers. An assessment of current and future land use will inform the development of the proposed action.
CLIMATE			
Climate Resiliency	X		The durability of the proposed action will be considered in the context of factors, including varying temperature, frequency of severe storms, precipitation, and changes in local hydrologic conditions.
HAZARDOUS WASTE RELATED CONCERNS			
Hazardous Materials	X		The Sites 12A North and South water supply reservoir is classified as an Environmental Monitoring Site and managed to ensure public health. The potential for hazardous facilities and sites in the study areas will be evaluated during the proposed action's development.
ECOSYSTEM SERVICES			
Provisioning Services	X		The provisioning services of food, water quality and water quantity were identified as relevant to the analysis. Sites 12A North and South provide drinking water to the Town of Greenville and Pilgrim Foods Manufacturing Plant.

Regulating Services	X		The regulating service of flood damage reduction was identified as relevant to the analysis due to the flood protection provided by the dams. The vegetative communities at each site also provide additional regulating services, including carbon sequestration and the regulation of local air, water, and soil quality. Wetlands located at each site also provide additional flood protection by dissipating flood water energy.
Supporting Services	X		The supporting services of nutrient cycling, soil formation, plant and animal habitat, primary production, and the maintenance of genetic and biologic diversity are present at all three study sites. Ecological communities provide plant and animal habitat and support nutrient cycling in the study areas. Soil formation could be affected if the proposed action changes sediment levels within the dams. The vegetative communities at each site provide primary production. Each site also contained NH Supporting Landscapes, which provide high quality habitat connectivity to support the migration and gene flow of plant and animal species.
Cultural Services	X		Cultural services including community cohesion, aesthetic viewsheds and spiritual and tribal values are supported by flood damage reduction and could be impacted by the proposed action. These services were identified as relevant to the analysis.

3.1.1 Soil-Related Concerns

3.1.1.1 Topography

According to the U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (Greenville, NH), the terrain of Sites 12A North and South is moderately sloping, with elevations ranging from 840 feet (NAVD88) along the toe of slope of the north dam to approximately 900 feet (NAVD88) along the southern portion of the study area. The terrain of Site 25B is moderately sloping, with elevations ranging from 740 feet (NAVD88) at the northern portion of the study area to about 850 feet (NAVD88) along the eastern portion. The terrain of Site 26 is moderately sloping, with elevations ranging from 850 feet (NAVD88) to the southeast of the study area and 940 feet (NAVD88) to the northern end of the study area.

3.1.1.2 Soil Resources and Farmland Soils

According to the USDA NRCS Web Soil Survey, dominant soils within the Sites 12A North and South study area include Monadnock (143C), and Lyman-Tunbridge (161C) soils. Monadnock soil consists of well drained fine sandy loam soils and are considered farmland of local importance. These soils primarily

underlie areas to the south of Sites 12A North and South reservoir. Lyman-Tunbridge soils consist of somewhat excessively drained rock outcrop complex. These soils primarily underlie areas to the east of Site 12A North and to the west of the reservoir. Hydric soils are shown in Appendix C, Figure 1a.

There are up to 15.6 acres of designated Prime and Unique Farmland protected under the Farmland Protection Policy Act (FPPA) located within the Site 12A North and South study area, which are primarily located near the Site 12A South dam embankment (Appendix C, Figure 2a).

Table 3.2. Sites 12A North and South Soils

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric Soil	Acres in PSA	Percent of PSA
22C	Colton gravelly sandy loam, 8 to 15 percent slopes	None	No	8.1	4.8%
77B	Marlow fine sandy loam, 0 to 8 percent slopes, very stony	Farmland of Local Importance	Yes	0.6	0.3%
77D	Marlow fine sandy loam, 15 to 35 percent slopes, very stony	None	Yes	6.6	3.9%
143B	Monadnock fine sandy loam, 0 to 8 percent slopes, very stony	Farmland of Local Importance	Yes	1.8	1.1%
143C	Monadnock fine sandy loam 8 to 15 percent slopes, very stony	Farmland of Local Importance	Yes	13.2	7.8%
143D	Monadnock fine sandy loam, 15 to 35 percent slopes, very stony	None	Yes	3.0	1.8%
161C	Lyman-Tunbridge Rock outcrop complex, 3 to 5 percent slopes	None	Yes	14.1	8.3%
161D	Lyman-Tunbridge Rock outcrop complex, 15 to 35 percent slopes	None	Yes	3.1	1.8%
247B	Lyme fine sandy loam, 0 to 8 percent slopes, very stony	None	Yes	0.1	0.1%
299	Udorthents, smoothed	None	No	0.9	0.5%
647B	Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony	None	Yes	0.4	0.2%
W	Water	None	No	117.7	69.4%
Totals for Area of Interest				169.6	100%

Dominant soils within the Site 25B study area include Monadnock soils (143B and 143D). Monadnock soil consists of well drained fine sandy loam soil and are considered farmland of local importance. These soils primarily underlie areas to the south of the Site 25B reservoir. Hydric soils are shown in Appendix C, Figure 1b.

There are up to 25.9 acres of Prime and Unique Farmland protected under the FPPA within the Site 25B study area, which mainly surrounds the reservoir on the east and west and north of the dam embankment (Appendix C, Figure 2b).

Table 3.3. Site 25B Soils

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric Soil	Acres in PSA	Percent of PSA
22C	Colton gravelly sandy loam, 8 to 15 percent slopes	None	No	0.7	1.2%
36B	Adams loamy sand, 3 to 8 percent slopes	Farmland of Local Importance	No	2.8	4.6%
36C	Adams loamy sand, 8 to 15 percent slopes	None	No	3.0	4.8%
36E	Adams loamy sand, 15 to 60 percent slopes	None	No	9.8	16.0%
143B	Monadnock fine sandy loam, 0 to 8 percent slopes, very stony	Farmland of Local Importance	Yes	23.2	37.8%
143D	Monadnock fine sandy loam, 15 to 35 percent slopes, very stony	None	Yes	9.1	14.8%
298	Pits, gravel	None	No	3.6	5.8%
299	Udorthents, smoothed	None	No	3.3	5.4%
W	Water	None	No	6.0	9.6%
Totals for Area of Interest				61.5	100%

Dominant soils in the Site 26 study area include the Marlow soils (77C and 77D). Marlow soils consist of well drained loamy soils. 77C is considered farmland of local importance. 77D is not classified as prime farmland or farmland of local importance. This soil is located northeast of the Site 26 reservoir. Hydric soils are shown in Appendix C, Figure 1c.

Table 3.4. Site 26 Soils

Map Unit Symbol	Map Unit Name	Farmland Classification	Hydric Soil	Acres in PSA	Percent of PSA
22C	Colton gravelly sandy loam, 8 to 15 percent slopes	None	No	1.7	3.7%
76B	Marlow fine sandy loam, 3 to 8 percent slopes	Prime Farmland	Yes	5.6	11.8%
77B	Marlow fine sandy loam, 0 to 8 percent slopes, very stony	Farmland of Local Importance	Yes	3.2	6.6%
77C	Marlow fine sandy loam, 8 to 15 percent slopes, very stony	Farmland of Local Importance	No	6.7	14.1%
77D	Marlow fine sandy loam, 15 to 35 percent slopes, very stony	None	No	7.2	15.1%
143C	Monadnock fine sandy loam 8 to 15 percent slopes, very stony	None	Yes	4.3	9.0%
143D	Monadnock fine sandy loam, 15 to 35 percent slopes, very stony	None	Yes	5.2	10.9%
161C	Lyman-Tunbridge Rock outcrop complex, 3 to 5 percent slopes	None	Yes	1.0	2.1%
161D	Lyman-Tunbridge Rock outcrop complex, 15 to 35 percent slopes	None	Yes	0.3	0.7%
247B	Lyme fine sandy loam, 0 to 8 percent slopes, very stony	None	Yes	2.9	6.0%
299	Udorthents, smoothed	None	No	5.0	10.5%
W	Water	None	No	4.5	9.4%
Totals for Area of Interest				47.5	100%

There are up to 15.5 acres of designated Prime and Unique Farmland protected under the FPPA located within the Site 26 study area, primarily found northeast of the reservoir (Appendix C, Figure 2c).

Site 12A South, Site 25B, and Site 26 dam embankments are underlain with Udorthents (299) soils. Typically, Udorthents soils are considered disturbed urban-land complexes. In addition, Site 12A South dam embankment is underlain by Lyman-Tunbridge (143C) soils and Site 12A North dam embankment is underlain with Colton (22C) and Lyme soils (247B). Colton soils are not considered prime farmland soils or hydric soils. Typically, Colton soils consist of very deep, excessively drained soils formed in glacio-fluvial deposits located near outwash terraces. Lyme soils are not considered prime farmland soils or hydric soils. Typically, Lyme soil consists of very deep, poorly drained soils that formed in loamy melt-out till in glaciated uplands. Udorthents soils are not considered prime farmland soils and are an unranked hydric soil (USDA NRCS, 2022b).

3.1.1.3 Geology

According to the Ground Water Atlas of the United States, the sites are located in the New England Upland Section Physiographic of New Hampshire (USGS, 1995a). According to USGS, Sites 12A North and South are underlain by the Lower part of the Rangeley Formation (NHSrl;0) consisting of gray, thinly laminated metapelite containing local lentils of turbidites and thin quartz conglomerates from the Lower Silurian (Llandoveryan) period (Appendix C, Figure 3a). Site 25B is underlain by the Upper part of the Rangeley Formation (NHSru;0) consisting of metasandstone and local coarse-grained metasandstone lentils from the Lower Silurian (Llandoveryan) period (Appendix C, Figure 3b). Site 26 is underlain by Spaulding Tonalite and Perry Mountain Formation. Spaulding Tonalite (NHDs1-6;0) consists of weakly foliated to nonfoliated, spotted biotite quartz diorite, tonalite, granodiorite, and granite; garnet and muscovite may or may not be present from the Early Devonian period. Perry Mountain Formation (NHSp;0) is underlain by sharply interbedded quartzites, light gray non-graphitic metapelite, and “fast-graded” meta-turbidities from the Lower or Middle Silurian period (Appendix C, Figure 3c) (Lyons et al, 1997).

3.1.2 Water- Related Concerns

3.1.2.1 Water Resources and Water Quality

The drainage area and its contributing tributaries for Sites 12A North and South, Site 25B and Site 26 are all located within the Merrimack River Watershed (HUC8) and the Souhegan River Watershed (HUC10). Blood Brook, Temple Brook, and their tributaries flow into the Souhegan River, which then flows into the Merrimack River to the west.

The USGS identified the Sites 12A North and South reservoir as an impoundment on Temple Brook. The reservoir is approximately 121-acres in size at normal pool elevation. USGS identified Temple Brook, Gambol Brook, Richardson Brook, and one unnamed tributary (UNT) to the Souhegan River as perennial watercourses within the study area. Gambol Brook and Richardson Brook are tributaries to Temple Brook, which is a tributary to the Souhegan River.

According to NHDES Surface Water Quality Assessment for 2020/2022, the Sites 12A North and South reservoir (Tobey/Greenville Reservoir), Temple Brook, Gambol Brook, Richardson Brook, and the UNT to the Souhegan River were identified as Category 2 and meet the water quality standards associated with the state’s Potential Drinking Water Supply Designated Use (NHDES, 2022b). However, the Sites 12A North and South reservoir and Temple Brook were identified as Category 4A and do not meet the water quality standards for the state’s Fish Consumption Designated Use. A fish consumption advisory for

mercury is listed for the Blood Brook / Temple Brook Watershed. The Sites 12A North and South reservoir is marginally impaired and is listed as Category 5 due to its inability to meet aquatic life integrity standards. Temple Brook, Richardson Brook, Gambol Brook, and the UNT to the Souhegan River were listed as Category 3 due to insufficient information to make an assessment decision for Aquatic Life Integrity, Primary and Secondary Contact Recreation, and Wildlife Designated Uses (NHDES, 2022c).

New Hampshire Fish and Game Department (NHFGD) does not stock the Sites 12A North and South reservoir or the tributaries upstream of the impoundment and downstream of the dams. NHFGD stocks eastern brook trout in a 1.5-mile section of Temple Brook beginning downstream of Caswell Pond, which is approximately 0.7 miles downstream of the Site 12A North dam (NHFGD, 2022). The Sites 12A North and South reservoir is not open to the public for fishing or boating.

The Sites 12A North and South reservoir (Tobey/Greenville Reservoir) serves as a public water supply for the Town of Greenville. Greenville Water Department pumps, treats, and distributes water from the reservoir to residential, industrial/commercial, and municipal facilities within the Town. In addition, the reservoir provides water to Pilgrim Foods to aid in industrial processes for the production of canned/bottled food products (NHDES, 2015).

The USGS Identified the Site 25B reservoir as an impoundment on Temple Brook. The reservoir is approximately 7 acres in size at normal pool elevation. USGS identified Temple Brook as a perennial watercourse. Temple Brook generally flows from west to east and begins the reservoir flowing south at the southern end of the reservoir. According to the NHDES Surface Water Quality Assessment for 2020/2022, the Site 25B reservoir and Temple Brook were identified Category 2 and meet the water quality standards associated with the state's Potential Drinking Water Supply Designated Use. However, the Site 25B reservoir and Temple Brook were identified as Category 4A and do not meet the water quality standards for the state's Fish Consumption Designated Use. A fish consumption advisory for mercury is listed for the Blood Brook / Temple Brook watershed. The Site 25B reservoir and Temple Brook were listed as Category 3 due to insufficient information to make an assessment decision for Aquatic Life Integrity, Primary and Secondary Contact Recreation, and Wildlife Designated Uses. NHFGD stocks eastern brook trout in a 1.5-mile section of Temple Brook which terminates at the Site 25B dam. NHFGD identifies this section of Temple Brook as a warm/cool water fishery. NHFGD does not stock the section of Temple Brook downstream of the dam to its confluence with Blood Brook.

The USGS identified Site 26 reservoir as an impoundment on Blood Brook. The reservoir is approximately 5 acres in size at normal pool elevation. USGS identified Blood Brook as a perennial watercourse that enters the reservoir from the west. According to the NHDES Surface Water Quality Assessment for 2020/2022, the Site 26 reservoir and Blood Brook were identified as Category 2 and meet the water quality standards associated with the state's Potential Drinking Water Supply Designated Use. However, the Site 26 reservoir and Blood Brook were identified as Category 4A and do not meet the water quality standards for the state's Fish Consumption Designated Use. A fish consumption advisory for mercury is listed for Blood Brook / Temple Brook watershed. The Site 26 reservoir and Blood Brook were listed as Category 3 due to insufficient information to make an assessment decision for Aquatic Life Integrity, Primary and Secondary Contact Recreation, and Wildlife Designated Uses. NHFGD does not stock fish in the Site 26

reservoir or Blood Brook in the study area. The Site 26 dam and impoundment are on private property associated with the Timberdoodle Hunting Club and are not open to the public for fishing or boating.

3.1.2.2 Groundwater

The Site 12A North dam and Site 25B are within the Temple Brook Watershed, a tributary to Blood Brook and ultimately drains to the Souhegan River, a tributary to the Merrimack River. Site 12A South dam is in the Souhegan River Watershed. The Site 26 dam is in the Blood Brook Watershed, which drains to the Souhegan River. According to USGS, all four dams are in the Middle Merrimack River Basin in south-central New Hampshire. The Middle Merrimack River Basin has a drainage area of 469 square miles, of which approximately 21% are discontinuously underlain by stratified drift aquifers (USGS, 1995b). The stratified drift aquifers in this locality are characteristically thin and may not be useful for municipal supply, but are adequate for domestic supply (USGS, 1994). According to USGS, the portions of Sites 12A North and South, Site 25B and Site 26 study areas are underlain by a stratified drift aquifer consisting of coarse-grained sorted sediments of medium sand to cobble gravel that were deposited by or in glacial meltwaters (USGS, 1994). Within this stratified drift aquifer, the approximate water table at Sites 12A North and South was located at an elevation 860 feet above mean sea level (amsl) in the vicinity of the North dam. Groundwater flows in a north-northeast direction following the Temple Brook corridor downstream of the North dam. The approximate water table at Site 25B was located at an elevation 760 feet amsl in the vicinity of the headwaters of the impoundment. Groundwater flows in an eastern direction following the Temple Brook corridor. The approximate water table at Site 26 was located at an elevation of 860 feet amsl in the vicinity of the dam. Groundwater flows in a southeastern direction following the Blood Brook corridor.

3.1.2.3 Floodplain Management

EO 11988, Floodplain Management, requires federal agencies to minimize occupancy and modification of the floodplain. Specifically, EO 11988 prohibits federal agencies from funding construction in the 100-year floodplain unless there is no practical alternative (FEMA, 2022). FEMA's regulations for complying with EO 11988 are promulgated in 44 C.F.R. Part 9.

According to FEMA, Sites 12A North and South are located on FEMA Flood Insurance Rate Map (FIRM) Panel No. 33011C0440D (effective September 25, 2009). Site 26 and Site 25B are located on FEMA Flood Insurance Rate Map (FIRM) Panel No. 33011C0430D (effective September 25, 2009). Based on the current FIRM panel, none of the sites are located within a FEMA detailed study area (Appendix C, Figure 4). Therefore, the extents of floodplains or flood zones near Sites 12A North and South, Site 25B or Site 26, are beyond the limits of the detailed FEMA study. The FEMA study encompassed an area west of the Merrimack River to approximately 4.5 miles west of the Town of Wilton and therefore does not accurately depict potential flooding hazards around the project sites. New preliminary FEMA data was released on October 12, 2022. Sites 12A North and South are located on FIRM Panel No. 33011C0440E. Site 26 and Site 25B are located on FIRM Panel 33011C0430E. Consistent with effective study of September 25, 2009, none of the sites are located within a FEMA detailed study.

Due to the limited FEMA data, a Hydrologic and Hydraulic (H&H) analysis using the United States Army Corps of Engineers (USACE) Hydrologic Engineering Centers River Analysis System (HEC-RAS), was prepared to establish floodplain boundaries for the 100-year and 500-year flood events under existing conditions (Appendix C, Figure 5a, 5b and 5c).

Marmon Utility LLC, two utility substations, Early Learning Center of Milford, Primary Care of Milford, Monadnock Mountain Spring Water and Suburban Propane are considered critical facilities under 7 CFR 650.25, Floodplain Management, and are located within the 500-year floodplain for the three sites (Appendix C, Figure 6).

3.1.2.4 Waters of the U.S., Wetlands, and Special Aquatic Sites

October 2021 field investigations confirmed the impoundments at Sites 12A North and South, Site 25B and Site 26 as Lacustrine resources. Temple Brook was confirmed in the field as a perennial waterway downstream of the dam and upstream of the reservoir at Site 25B. Blood Brook was confirmed in the field as a perennial waterway downstream of the dam and upstream of the reservoir at Site 26.

Ten watercourses and 31 palustrine wetlands were identified and delineated within or immediately adjacent to the Sites 12A North and South study area. One additional watercourse and 17 palustrine wetlands were identified and delineated within or immediately adjacent to the Site 25B study area. Three additional watercourses and 12 palustrine wetlands were identified and delineated within or immediately adjacent to the Site 26 study area.

In May 2022, a certified New Hampshire wetland delineator field verified the delineated aquatic resource boundaries. The delineated aquatic resources are summarized in Table 3.5 and further described in Appendix D.

Table 3.5. Delineated Aquatic Resource Summary

	Sites 12A		Site 25B		Site 26	
Wetlands						
Feature Type	Number Present	Total Acres (AC)	Number Present	Total Acres (AC)	Number Present	Total Acres (AC)
PFO Wetlands	11	0.797+	8	2.412+	3	0.090+
PSS Wetlands	9	1.955+	1	0.377	3	2.350+
PEM Wetlands	7	0.738	3	0.786+	4	2.095+
PRB Wetland	-	-	1	0.002	-	-
PEM/PSS Wetland	1	0.091	-	-	-	-
PEM/PFO Wetlands	-	-	4	2.942	2	2.119+
PEM/PSS/PFO Wetland	-	-	-	-	-	-
PEM/PSS/PUB	1	2.196+	-	-	-	-

PEM/PUB	1	0.122	-	-	-	-
PFO/PUB	1	0.361	-	-	-	-
Waterbodies						
Lacustrine (LUBHh)	1	122 AC	1	7	1	5
Waterways						
Perennial Waterways	5	946+ LF	3	1,071 LF	5	1,270+ LF
Intermittent Waterway	5	675+ LF	2	147 LF	-	-

Note: + indicates that aquatic resources extended beyond the limits of the study area boundary. Only the area or length mapped within the study area boundary was calculated.

3.1.2.5 Regional Water Resource Plans

In May 2000, the Souhegan River, from its south and west branch confluences in New Ipswich downstream to the Merrimack River, was listed as a Designated River under the New Hampshire Rivers Management Protection Program Act (RSA 483). The designation acknowledges the river as important to the state for its outstanding natural and cultural resources. Designated rivers are managed by the state to protect these resources (NHDES 2013).

In 2002, the state legislature directed the NHDES to establish protected instream flows and a watershed management plan for Souhegan River. A protected instream flow is the amount of water needed to support the human and natural uses that depend on the river, and the management plan details the actions to be implemented to maintain the protected flows (NHDES 2013).

Protected instream flows for the Souhegan River are presented in the Final Souhegan River Protected Instream Flow Report published in 2008 by NHDES and updated in 2013. The 2013 Souhegan River Water Management Plan implements the protected flows described in the Instream Flow Report with input from affected users through a stakeholder advisory committee.

NHDES tracks the Souhegan River flows at the stream flow gages at the USGS 01093852 Souhegan River near Milford, NH for the upper Souhegan River and at USGS 01094000 Souhegan River at Merrimack, NH for the lower Souhegan River, comparing gage readings to the protected instream flows.

Management of flows is needed to prevent plan-designated catastrophic conditions. Dam Management Plans were developed as subsets of the overall plan to help offset the effects of catastrophic conditions. When low flows exceed the plan-defined allowable timeframe, it is deemed a persistent condition. When a third consecutive persistent condition occurs or the catastrophic duration is exceeded twice in ten years, a catastrophic condition has been reached, which activates the Dam Management Plans.

The primary component of the Dam Management Plans is a two-day flow pulse during catastrophic conditions to relieve stress in the river environment system. The purpose is to reset stream flow

conditions. This would be accomplished by mimicking a precipitation event through the release of a two-day “relief pulse” from affected dams. Two-day “relief pulses” would be managed across a selected group of impoundments to minimize the water level change within the dam impoundments. The resulting downstream flow benefit would be large enough to “reset” the system during low flow periods. Four dams were selected to manage low flow events by producing “relief pulses” for the Souhegan River, including Sites 12A. Of the four selected dams, only Waterloom Pond is currently configured for implementing the relief pulses.

3.1.3 Plant and Animal-Related Concerns

3.1.3.1 Endangered and Threatened Species

Coordination with the USFWS and the NHB was completed to determine if there were any known occurrences of threatened or endangered species within the study areas (Appendix A).

The USFWS IPaC online tool was used to identify federally listed wildlife species. Two (2) species were identified as may occur or could be potentially affected by activities at all three Sites: Northern Long-eared Bat (federally endangered), and Monarch Butterfly (federally-candidate). One (1) additional species, the Small Whorled Pogonia (federally threatened) was identified as potentially present or affected by activities at Site 12A North and South and Site 25B. No critical habitat was identified within the project study areas. The Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (DKey) was run and resulted in a Not likely to adversely affect determination for the Northern Long-eared Bat. The Northeast DKey was run for the Small Whorled Pogonia and resulted in a No Effect determination.

Coordination with the NHB was conducted for each project site in May 2022 and February 2026. The NH Natural Heritage Database was checked for records of rare species and exemplary natural communities near each project site. As of February 2026, the NH NHB had no recorded occurrences for sensitive species at Site 25B or Site 26. Two species of special concern, Bald Eagle and Wood Turtle, were identified at Sites 12A North and South. As a result, an ecological review was conducted with NHDES and conservation measures were recommended for each species.

3.1.3.2 Migratory Birds

Preliminary review of migratory bird species that may occur in the study areas was initiated through the USFWS IPaC system in September 2021. No migratory birds of conservation concern were identified in the IPaC Official Species List report. However, migratory bird species are likely to occur within the study areas at all three project sites. Approximately 85% of bird species commonly found in New Hampshire are migratory (New Hampshire Audubon, 2024). The diverse habitats within the project study areas, including grasslands, wetlands, mixed forest, and aquatic habitats support various migratory bird species.

3.1.3.3 Bald and Golden Eagles

Preliminary review of each study area was conducted through the USFWS IPaC system in September 2021. For all three project sites, the Bald Eagle (*Haliaeetus leucocephalus*) and the Golden Eagle (*Aquila chrysaetos*) were identified as not being Birds of Conservation Concern (BCC) in the area. No Critical Habitats for the bald eagle or golden eagle were identified at any of the project sites. According to USFWS, bald eagle presence in the area is from August through mid-November. Golden eagle presence in the area is from mid-September to November.

All three project areas provide potentially suitable habitat for bald eagles, which require a reliable food source, perching areas, and nesting sites. Bald eagles are typically found nesting near rivers, lakes, and marshes (USFWS, 2024).

Coordination with the NHB conducted in February 2026, identified a Bald Eagle nest over 600-feet from the proposed work areas at Sites 12A North and South but within 0.5-miles. Conservation measures have been recommended.

3.1.3.4 Ecologically Critical Areas

According to the 2015 New Hampshire State Wildlife Action Plan (SWAP) and the 2020 Wildlife Habitat Land Cover Map, the upland and freshwater habitats within the sites' study area include hemlock-hardwood-pine forests, grasslands, marsh and shrub wetlands, and open water (warmwater lake and ponds). The SWAP also ranks the relative condition of wildlife habitats in the state and maps the ranked habitats in the Highest Ranked Habitat by Ecological Condition Map (2020). The SWAP habitat rankings are based on three criteria: biologic data, landscape context, and impacts of human activities. Biologic data includes the available monitoring data for rare, threatened, and endangered species and natural communities. The landscape context was defined as the relative spatial arrangement of habitats, such as the total size of the habitat patch, its connectivity to other similar habitats, and landscape complexity (number of microclimates within a 100-acre buffer). The impacts of human activities relate to development, roadways, utilities, deforestation, pollutants, and other human-derived landscape modifications that negatively impact the ecological integrity of wildlife habitat. Ecological integrity describes an ecosystem's ability to provide ecosystem services in the present and into the future.

State habitats were ranked in descending ecological integrity order: Highest Ranked in the State (top 15% of each habitat type and rare habitats), Highest Ranked in the Biological Region (top 30% of each habitat not already included in the previous category) and Supporting Landscapes (the remainder top 50% of each habitat area). Supporting Landscapes are also part of the resilient and connected network by the Nature Conservancy.

Hemlock-Hardwood-Pine Forest is the most widely distributed forest type in New Hampshire and serves as habitat for 140 vertebrate species including amphibians, reptiles, birds, and mammals. The main forest community includes Eastern Hemlock (*Tsuga canadensis*), American Beech (*Fagus grandifolia*), Northern Red Oak (*Quercus rubra*), and White Pine (*Pinus strobus*). Each study site contains Hemlock-Hardwood-Pine Forest communities ranked as Supporting Landscapes by SWAP. Site 25B contains Hemlock-Hardwood-Pine Forest habitat which intersects a habitat area ranked as Highest Ranked Habitat in Biological Region.

In New Hampshire, grasslands serve as primary breeding and nesting habitat for bird species, some of which are sensitive and require large areas for nesting. In addition to birds, grassland communities serve as habitat for herptiles, a wide variety of insects like grasshoppers, butterflies, moths, and bees, and other invertebrates like spiders. Grassland vegetative communities are dominated by grasses, forbs, and sedges with generally less than 10% shrub or tree cover. Native plant species found in northeastern grasslands include Goldenrods (*Solidago spp.*), Asters (*Symphyotrichum spp.*), Big Bluestem (*Andropogon gerardii*), Little Bluestem (*Schizachyrium scoparium*), and Meadowsweet (*Spiraea alba*). Site 26 contains grassland habitat ranked as Highest Ranked Habitat in Biological Region.

Drainage marsh and shrub swamp systems are grouped into three broad habitat categories: meadow marshes (wet meadows), emergent marshes, and scrub-shrub wetlands. Wildlife associated with wetland systems include snakes, turtles, frogs, salamanders, and various birds. Numerous groups of invertebrates, including worms, snails, clams, mussels, crustaceans, and insects, use marsh and shrub wetlands for one or all life stages. These wetland types were confirmed present at each study site during the wetlands and waterways delineation efforts performed in October 2021, and most of these wetlands intersect habitat areas ranked as Supporting Landscapes. Site 25B also contains marsh and shrub wetland habitat that intersects a habitat patch ranked as Highest Ranked Habitat in Biological Region and is further described in Appendix D.

Warmwater lakes and ponds are found throughout New Hampshire, and they vary in size, shape, and depth. An important habitat aspect of most warmwater lakes is submerged aquatic vegetation along the shoreline and littoral areas. Submerged aquatic vegetation provides spawning and nursery habitat for fish species, nesting and foraging habitat for aquatic species, birds, reptiles, and some mammals. Site 12A contains a warmwater lake, while Sites 25B and 26 contain warmwater ponds according to the National Wetlands Inventory. These aquatic resources were confirmed in the field during wetlands and waterways delineation efforts in October 2021. Additional information on site habitats and natural communities and mapping is available in Appendix D.

Coordination with the NHB was conducted for each project site in May 2022. The NH Natural Heritage Database was checked for records of rare species and exemplary natural communities near each project site. As of May 2022, the NH NHB had no recorded occurrences for sensitive species at any of the project sites.

3.1.3.5 Invasive Species

The NH Department of Agriculture, Markets & Food (NHDAMF) and NH Department of Environmental Services (NHDES) developed the NH Comprehensive Invasive Plant List which includes terrestrial and aquatic species for the state. Each species has been listed as either "Prohibited" or "Watch." Further species that have exhibited invasive tendencies in the region and are likely to soon arrive or already occur in NH but have not yet fully established are listed as "Early Detection Rapid Response." Invasive species observed within each study area have been identified in Appendix D for each project site, along with the current jurisdictional status of the species.

A review of the NHDES Lake Information Mapper was performed to determine if any of the study areas were impacted by invasive species. According to the NHDES Lake Information Mapper, none of the project sites are currently impacted by aquatic invasive species.

3.1.3.6 Fish and Wildlife

All three study areas included Supporting Landscapes for NH Highest Ranked Wildlife Habitat. Site 26 also contained grassland habitat categorized as the highest ranked habitat in its biological region, and Site 25B intersects habitat categorized as the highest ranked habitat in its biological region.

A permanent pool at each site provided lacustrine habitat, which can support aquatic species year-round. Further, the permanent pool provided a consistent water source for wildlife species within and adjacent to the study areas. The landscape surrounding the reservoirs was generally comprised of forests and maintained meadows, which provide adequate habitat to support survivorship of local wildlife species.

3.1.3.7 Natural Areas

No federal or state designated Natural Areas were present within or near the study areas. Site 12A North and South was bordered to the east by a 75-acre parcel privately owned by the Monadnock Conservancy. A privately owned natural area comprised of 1,030 acres, known as the Heald Tract/Reservation, was noted 0.3 miles east of the Site 12A North and South study area and extended northward to abut the southern edge of Site 25B.

Site 12A North and South, 25B, and 26 were all identified as Conservation Areas on the online New Hampshire Topo Map.

Undeveloped land was present within and adjacent to the study areas. The study areas were primarily forested, with some shrub-scrub and grassland habitats present. Natural areas were fragmented by residential and transportation features. The dam embankments have been regularly maintained to prevent the establishment of woody vegetation.

Riparian Areas

Riparian areas were observed at each of the project sites. At Site 12A, two dams are present, both of which have outlet channels. At the 12A North dam, Temple Brook entered the reservoir from the north through a well-developed palustrine emergent/palustrine scrub-shrub wetland complex. At the 12A South dam, an unnamed tributary (UNT) to the Souhegan River was discharged south from the dam through a forested stream valley.

At Site 25B, Temple Brook entered the southern end of the reservoir from the east through a forested valley. From the outlet works on the downstream side of the dam, Temple Brook continued through a forested corridor and was bordered by small wetlands near the bank of the channel.

At Site 26, Blood Brook flows from west to east into the western side of the reservoir. As it approaches the reservoir, Blood Brook flows through a well-developed riparian corridor with a large palustrine scrub-shrub wetland complex. Blood Brook flows east from the outlet works on the downstream side of the dam where the riparian corridor is comprised of mowed meadow to the south and forested hillside to the north. As the channel continued east, the riparian areas transitioned entirely to forest.

Forest Resources

Land use in the study areas includes mixed and deciduous forest areas which are primarily owned by the State of New Hampshire, with scattered residential parcels along the study areas' borders. The forested areas consist of Hemlock-Hardwood-Pine forests identified as Supporting Landscapes by the 2015 SWAP. Site 25B also contains Hemlock-Hardwood-Pine Forest habitat, which intersects a habitat area ranked as Highest Ranked Habitat in Biological Region. The primary use of forests within the study areas is wildlife habitat. Forests within the study area also support various ecosystem services, including nutrient cycling, soil health, climate resiliency, water filtration, erosion reduction, and scenic viewsheds.

3.1.4 Air- Related Concerns

The United States Environmental Protection Agency (USEPA) sets National Ambient Air Quality Standards (NAAQS) in accordance with the Federal Clean Air Act. Based on a review of the current USEPA-designated attainment status, it was verified that Hillsborough County, where all three Sites are located, is considered in attainment for all NAAQS criteria pollutants (USEPA, 2022).

3.1.5 Climate

New Hampshire has a humid continental climate, with generally warm humid summers and cold snowy winters. Average annual precipitation in Hillsborough County is 49 inches, with an average seasonal snowfall of 81 inches. In winter, the mean average daily temperature is 25 degrees F, and the average daily minimum is 16 degrees F. In summer, the average daily temperature is 67 degrees F, and the average daily maximum is 91 degrees F (USDA NRCS 2022a).

New Hampshire climate data shows temperatures rising an average of 3 degrees F since 1901 and a 12 percent increase in annual precipitation over the past 120 years (Lemcke-Stampone, 2022). An increase in average temperature can affect the intensity and frequency of precipitation events over time (EPA, 2024). A warmer air temperature results in more water vapor being held in the atmosphere and therefore greater precipitation during heavy rainfall conditions. On average the total amount of precipitation falling during heavy events is expected to increase across the United States, including in New Hampshire, during winter and spring but is not expected to significantly change during the summer and fall. With an increase in heavy precipitation events comes an increase in the intensity and frequency of flood risk (USGCRP, 2024).

3.1.6 Human Use- Related Concerns

Sites 12A North and South, 25B, and 26 have the potential to affect human environments outside of the resource study areas. The affected environment includes the drainage areas for each site, with Sites 12A North and South sharing one drainage area. The demographic study area is defined by sixteen census block groups within the 500-year floodplain boundary under existing conditions and includes communities, structures, and infrastructure. Four block groups (019501.01, 016204.03, 016204.01 and 015200.02) were excluded from the analysis as no structures were affected by inundation during the 500-year flood event.

To characterize the social characteristics of each site, the 2018-2022 U.S. Census Bureau American Community Survey (ACS) 5-year estimate data was collected for census block groups within the 500-year existing conditions inundation boundary and compared with statistics from Hillsborough County and the State of New Hampshire. Census block groups are geographical units established by the U.S. Census Bureau for analyzing populations. A census block group generally contains between 300 and 6,000 people.

3.1.6.1 Demographics

Sites 12A North and South, 25B, and 26 are located in the Town of Temple, though Site 25B extends into the neighboring town of Wilton. Demographic data were analyzed for twelve census block groups within the 500-year existing conditions floodplain boundary that fall within the towns of Temple, Wilton, Greenville, and Milford, and have structures affected by the 500-year event (Table 3.6):

3.1.6.2 Population

The population of the demographic study area is 21,669 persons, accounting for five percent of the total population of Hillsborough County and two percent of the state population (U.S. Census Bureau, 2022).

3.1.6.3 Income

Median household income within the demographic study area is \$105,240, which is above the county median of \$95,112 and above the state median of \$90,845.

Five of the twelve block groups have an income lower than the median household income average. Block groups 019000.01, 018501.02, 016204.02, 016100.01 and 016203.03 fall between \$41,000 and \$81,000, which is well below the county and state average. (U.S. Census Bureau, 2022).

Table 3.6. Population, Race, and Income

Geographical Area (Census Block Groups)	Population	Percent Minority *	Median Household Income **	Percent Below Poverty (households)	Percent Below Poverty (individuals)	Per Capita Income **
022502.01	1,800	3%	\$96,161	8%	12%	\$49,542
022502.02	2,845	6%	\$91,250	3%	5%	\$37,198
019000.02	2,392	5%	\$115,833	2%	2%	\$47,971
019000.01	1,524	13%	\$49,944	14%	8%	\$45,258
018501.02	816	24%	\$80,875	8%	6%	\$23,783
016204.02	679	13%	\$76,000	0%	6%	\$36,864
016203.03	1,039	7%	\$41,719	20%	12%	\$38,086
016202.02	3,305	10%	\$138,500	2%	3%	\$51,095
016100.01	1,111	2%	\$75,781	4%	4%	\$41,518
016100.02	2,030	4%	\$117,344	6%	3%	\$45,944
015200.03	1,606	6%	\$166,667	0%	2%	\$80,233
015100.03	2,522	3%	\$142,583	4%	5%	\$92,896
Demographic Study Area Total	21,669	7%	\$105,240	6%	5%	\$52,339
Hillsborough County	422,733	15%	\$95,112	7%	7%	\$49,675
New Hampshire	1,379,610	10%	\$90,845	8%	7%	\$48,250

Source: U.S. Census Data 2022 ACS 5 year estimates

* % minority are those who identified as something other than White alone.

** in 2022 inflation adjusted dollars

3.1.6.4 Poverty

The 2023 poverty guideline for the 48 contiguous states is \$15,852 for individuals under the age of 65 and \$14,614 for individuals aged 65 or older (U.S. Census Data, 2023).

Approximately five percent of individuals and six percent of households are identified as having income below the poverty level within the demographic study area, which is lower than the poverty levels for both Hillsborough County and the State of New Hampshire. Block groups 016203.03 and 019000.01 are outliers with 12 percent and eight percent of individuals and 20 percent and 14 percent of households living below the poverty level. Block group 018501.02 has a higher rate of poverty per household at eight percent. Other poverty rates vary between household and individuals of each census block group with no discerning pattern but overall are lower than county and state averages (U.S. Census Bureau, 2022).

3.1.6.5 Race and Ethnicity

Race and ethnicity characteristics were obtained from U.S. Census Data. Minority residents are characterized as those who identified as anything other than "White Alone" on the Census Bureau ACS 5-year 2022 survey.

Minority residents comprise seven percent of the population, which is below the proportion of minority residents in the county and state. Block group 018501.02 has a higher proportion of minority residents, at 24 percent, than the county and the state (U.S. Census Bureau, 2022).

A minority population is defined as a readily identifiable group or groups of minority persons who live in geographic proximity. Minority persons include an individual who identifies as a Black or African American, Hispanic or Latino, Asian or Asian American, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, or who identifies as a multiracial individual. Low-income populations are defined as a readily identifiable group of persons whose income is at or below the poverty level, as determined by the U.S. Census Bureau.

Census data revealed that minority and low-income populations are present within the study area in the following census block groups: 022502.01, 018501.02, 019000.01, 016204.02, 016100.01 and 016203.03. Included within the downstream study area population is a 70-unit apartment building within the Town of Milford classified as low-income housing. Census block groups with identified as having high levels of minority or low-income populations relative to the study area are shown in Appendix C, Figure 7.

3.1.6.6 Land Use/Recreation

Land use/cover was analyzed for each Site's study area, watershed drainage basin (upstream of the dam), and the area downstream of the dam included within the 500-year existing conditions floodplain. These areas are provided in Table 3.7. Land use/cover types for each Site were obtained from the USGS National Land Cover Dataset 2019 (USGS, 2019), which is a consistent land cover data layer for the United States.

Table 3.7. Site Areas

Site	Study Area (acres)	Watershed Drainage Area (acres)	500 year Inundation Area Existing Conditions (acres)
12A North and South	169.6	3,561.7	4,331.8
25B	61.5	3,369.6	1,986.8
26	47.5	3,122.9	2,027.0

The Sites 12A North and South study area is predominantly open water with minimal land cover classified as natural land uses, such as pasture or hay and evergreen forest. There are parcels of land classified as transportation adjacent to Sites 12A North and South. To the east of Site 12A South is a natural area known as the Heald Tract. It is owned by The Society for the Protection of New Hampshire Forests, a private non-profit land conservation and sustainable forestry organization, and is open to the public for recreation (Appendix C, Figure 8a). Site 25B (Appendix C, Figure 8b) and Site 26 (Appendix C, Figure 8c) share a similar composition of land cover classifications including water, pasture or hay, and mixed forest.

The land use and cover in the Sites' upstream drainage areas are dominated by natural elements, with most land cover classified as mixed forest and deciduous forest, followed by smaller areas of pasture/hay, shrub/scrub, and woody wetlands. Within each Site's drainage area, there is minimal land cover identified as developed (i.e., developed open space or developed low, medium, or high intensity). Property ownership is primarily public at Site 12A North and South. The majority of the land within the study area is owned by the State of New Hampshire, with a small portion to the south owned by the Town of Temple. At Site 25B, the State of New Hampshire and New Hampshire Water Resource Division own the majority of land, with a few privately owned residential parcels along the study area edges. Site 26 is mostly privately owned by Fly Away Farms LLC with a section to the south owned by the State of New Hampshire.

Increased developed land coverage is found downstream of each Site. Each Site's 500-year existing condition floodplain boundary is either within areas classified as developed open space, developed medium intensity, and developed low intensity, or are adjacent to parcels with these designations. Other land cover types include pasture or hay, mixed forest, evergreen forest, and deciduous forest.

3.1.6.7 Visual Resources

Visual resources are the natural resources, landforms, vegetation, and manmade structures in the environment that contribute to the public's appreciative enjoyment of the landscape. The upstream drainage areas and Sites themselves are generally natural with little development and few roadways. Downstream areas contain more development up to a degree of medium intensity.

At each Site, outlet structures and similar appurtenances do not look natural, but the earthen dam embankment and auxiliary spillways naturally blend with the surrounding environment. Although the dams are not open to the public for recreation, the natural viewsheds surrounding and encompassing the three Sites provide an aesthetic value for the region for both permanent residents and people traveling along adjacent state routes.

3.1.6.8 Transportation and Infrastructure

Transportation within the study areas and downstream floodplains was analyzed with GIS mapping and compared to the New Hampshire Department of Transportation Road and Projects Viewer (NH DOT, 2015).

Transportation adjacent to the study area for Sites 12A North and South consists of Senator Tobey Highway/NH Route 45, running generally north to south directly west of the Site. Approximately 600 feet east is East Road running north to south. An unnamed access road south of Site 12A South extends from the Senator Tobey Highway to provide access to the reservoir (Appendix B, Figure 2).

Transportation adjacent to the study area for Site 25B consists of General Miller Highway, running southwest to northeast, which becomes Temple Road northeast of the study area. Birch Hill Road is approximately 700 feet west of the Site and runs north to south. There is no access road to Site 25B. The closest vehicle access point is from the General Miller Highway (Appendix B, Figure 3).

Transportation within the study area for Site 26 includes New Hampshire State Route 101, which runs generally northwest to southeast and borders the southern portion of the study area. Additional roads include Powers Road and McCrea Road to the west, both running generally north to south, and Stonegate Road to the east also running north to south. McCrea Road is the closest public road to the west of the Site; access paths to Site 26 off of McCrea Road are visible on aerial mapping (Appendix B, Figure 4).

Aside from the dam infrastructure and appurtenances, no other public or private infrastructure or utilities are present within or across the study area of each Site. Typical electrical and telephone lines are found along adjacent streets and roadways.

3.1.6.9 Noise

Although ambient noise in each study area has not been measured, the Sites are within rural surroundings, upland of more developed areas such as Temple, Greenville, Wilton, and Milford. Ambient noise in each study area includes typical state and local roadway activity on adjacent roadways and general commerce activities. Very few residences are within close proximity of each study area. All Sites are located within the town of Temple, NH, which has a Zoning Ordinance including guidance on construction activities. The ordinance directs construction activities to minimize noise impacts on residents and wildlife, and states that construction shall only be performed on weekdays between the hours of 7AM and 6PM unless waived by the town's planning board (Temple, 2019).

3.1.6.10 Hazardous Materials

Hazardous materials are any liquids, solids, gases, and sludges with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Online hazardous waste mapping sites from NHDES and the USEPA were reviewed to determine if any hazardous or solid waste sites are located within the study areas for Sites 12A North and South (Appendix C, Figure 9a), Site 25B (Appendix C, Figure 9b), and Site 26 (Appendix C, Figure 9c).

According to NHDES' OneStop Data Viewer, the Greenville Water Treatment Plant on NH Route 45 adjacent to Site 12A South is classified as a Remediation Site, with an outfall that has an NPDES permit. The Sites 12A North and South reservoir is classified as an Environmental Monitoring Site according to NHDES. There are no state-recognized hazardous or solid waste facilities and structures at or directly adjacent to any of the Sites (NHDES, 2022a).

The dams at Sites 12A North and South contribute to the Greenville Water Treatment Plant maintaining regulation compliance. As a remediation site with a NPDES permit, the plant is required to maintain a level of safety to ensure the public is protected from environmental catastrophe via contaminated water consumption. In compliance with its classification as an Environmental Monitoring Site, the Sites 12A North and South reservoir is monitored to ensure public health is maintained.

According to the EPA NEPAAssist Tool, there are no EPA-classified hazardous waste, air pollution, toxic release, superfund, brownfield, or TSCA sites within or directly adjacent to any of the Sites' study areas. There are four hazardous waste EPA-facilities upstream of the Sites, with the closest approximately 0.87 miles west of Sites 12A North and South (USEPA, 2022).

In addition, Environmental Data Resource (EDR) Radius Map Reports were obtained in July 2022 for each Site and reviewed for findings. The EDR Report is designed to assist in meeting the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312) and several ASTM standards. Sites 12A North and South and Site 25B were not listed in any of the databases searched by EDR. No mapped sites were found in EDR's search of available government records for Sites 12A North and South and Site 25B nor the 1-mile search radius for each Site.

Site 26 is also not listed in any of the databases searched by EDR. One site within 0.5 mile of Site 26 was found on the ALLSITES list as provided by EDR. ALLSITES provides information on sites in New Hampshire with activities that either have resulted in groundwater contamination or pose a potential hazard to groundwater supplies. The listed site, identified on the EDR Report as NHDOT-DIST 4 PS #414 (PS #414), is approximately 0.35 miles west-southwest of Site 26 study area. It was identified due to its elevation being higher than the study area. PS #414 (Facility ID 199702018) contains a registered non-hazardous, non-sanitary holding tank and a registered non-domestic wastewater system. The expiration dates for these registrations have not been reported.

According to the EDR Report, no Resource Recovery Conservation Act (RCRA) generators were identified within a 0.25 mile search radius from Site 12A N/S, Site 25B, or Site 26. No RCRA treatment, storage, and disposal (TSD) sites were identified within a 0.5 mile search radius, and no RCRA facilities undergoing corrective action (CORRACTS) were identified within a 1 mile search radius.

3.1.6.11 Public Health and Safety

Sites 12A North and South, Site 25B, and Site 26 were originally classified as High Hazard (Class C) dams. In 2016, NHDES completed Rehabilitation Assessment Reports for the dams, which documented that the four dams fail to meet current NRCS safety and performance standards and are currently out of compliance with NRCS hydraulic performance criteria.

Dam breach hydraulic analyses were performed for the Sites using USACE HEC-RAS modeling to determine the downstream inundation limits of the flood wave created by a dam breach at each Site. Inundation paths for each Site generally follow roadway patterns and converge at the approximate intersection of Greenville Road, Isaac Frye Highway, and Gibbons Highway. The flow then continues into the towns of Wilton and Milford, dissipating approximately 11.5 miles downstream of Sites 12A North and South, 10.75 miles downstream of Site 12B, and 11.5 miles downstream of Site 26.

Over 300 structures were identified within the downstream inundation zone, predominantly in the towns of Wilton and Milford and along Gibbons Highway. There is one residential structure 0.8 miles

downstream of Site 12A North, and no residences less than 1 mile downstream of Site 12A South. There are nine residential structures between 0.7 and 1 mile downstream of Site 25B. There is one residential structure along the border of the Site 26 study area, and four more residential structures less than or equal to 1 mile downstream of this Site. Critical facilities as defined per 7 CFR 60.25 are identified in Section 3.2.2 Floodplain Management.

The potential for human health and safety concerns exists if any of the three Sites experience dam failure. These risk factors include flooding, affecting the security of life or health; potential loss of human life, property, and essential public services due to structural failure; and other environmental effects such as changes to water quality.

3.1.7 Cultural Resources

3.1.7.1 Historic Resources

The New Hampshire Division of Historical Resources, State Historic Preservation Office (SHPO) was consulted early in the planning process of the proposed rehabilitation projects for Sites 12A North and South, Site 25B, and Site 26. To initiate this consultation, a Request for Project Review (RPR) was submitted to SHPO in May 2022, and is provided in Appendix A. A preliminary review of the history of the dams was also conducted, which found that the dams were originally designed and constructed in the 1960s and early 1970s as part of a system of 12 dams built under the Souhegan River Watershed Protection, Flood Protection, and Water Management Plan for Hillsborough County. Funding for the dams' construction was provided under the Watershed Protection and Flood Prevention Act of 1954. Similar systems were developed during the late 20th century in other New England watersheds.

The SHPO online mapping tool, Enhanced Mapping & Management Information Tool (EMMIT) was consulted to preliminarily assess potential historic cultural resources within Sites 12A North and South, Site 25B, and Site 26. Based on review of the EMMIT database, no previously identified historic structures are located within the three study areas of the four dams.

For the purposes of this EA Assessment the APE includes the entirety of the study areas for Site 12A North and South, Site 25B and Site 26. Both the identification efforts for the Phase 1A Archaeological Sensitivity Assessment and Historic District Area Form were conducted within the APE in accordance with 36 CFR 800.4 and as reflected in identification survey reports in Appendix A. The sensitivity assessments for each of the APEs of Site 12A North and South, Site 25B, and Site 26 consisted of background research and a walkover survey to assess and document past land uses, known archaeological sites, and current environmental conditions. As a result of the sensitivity assessment, large areas of disturbance were identified associated with the extensive earthmoving for the construction of the 1960s and 1970s dams and associated infrastructure. Where no further archaeological investigation was recommended. Additionally, area of high sensitivity for precontact and historic deposits were identified. Each of the areas of high sensitivity are to be avoided from both direct and indirect impacts during construction.

The Souhegan River Flood Control Project, constructed in the 1960s and 1970s consists of 12 dams and related infrastructure, intended to provide watershed protection, flood prevention, and fish and wildlife development for the Souhegan River Watershed. A Historic District Area Form was then prepared to evaluate resources associated with the Souhegan River Flood Control Project, with a focus on the four dams. The other eight dams in the system were evaluated based on their contribution to a possible historic district designation, and not on individual eligibility. Research conducted for the Area Form

confirmed that none of the four dams are individually significant resources. In consultation with the NH DHR, the NRCS NH determined that while the project only involves four dams, the larger Souhegan River Flood Control Project Historic District is eligible for listing in the National Register of Historic Places under Criterion A and C. Under Criterion A, the Historic District exemplifies the investments and efforts of federal, state, county and local entities to address ongoing flood issues in the Souhegan River Watershed. The Historic District is also eligible under Criterion C for its engineering significance, being an excellent example of flood control systems with typical features from the 1960s to 1970s.

3.1.7.2 Archaeological Sensitivity

As an additional element of early consultation with SHPO, a Phase IA Archaeological Sensitivity Assessment was completed in May 2022 for Sites 12A North and South, Site 25B, and Site 26. The Assessment is provided in Appendix A. The APE includes the entirety of the Sites 12A North and South, Site 25B, and Site 26 study areas assessed during the Phase 1A Archaeological Sensitivity Assessment. The identification efforts described in this section were conducted within the APE in accordance with 36 CFR 800.4 reflected in identification survey reports in Appendix A. The Phase IA consisted of background research and a walkover survey of the three Sites to assess and document past land uses, known archaeological sites, and current environmental conditions. This data was analyzed within relevant environmental and cultural contexts to determine the archaeological sensitivity of the studied areas and to provide recommendations regarding the need for additional archaeological investigations. Findings are depicted in Appendix C, Figures 10a, 10b, and 10c for Sites 12A North and South, 25B, and 26, respectively.

The Phase IA survey determined that all three areas studied (herein referred to as “study areas” for this subsection) contain large, disturbed areas related to severe earthmoving, including clearing and grubbing of vegetation and cutting and filling of soils for the construction of the dams and associated infrastructure in the 1960s and early 1970s. These previously disturbed areas are assigned a “no-low” sensitivity level for intact, potentially significant archaeological deposits.

All three study areas also contain upland landforms, including hillsides, hill or knoll tops and benches, and lower-lying terraces along the original brook drainages. These upland landforms contain well drained sandy soils and are assigned a “high” sensitivity level for primarily pre-contact cultural deposits. The theoretical discovery of pre-contact cultural deposits in these portions of the study areas could provide important information relating to Native American settlement patterns and subsistence systems in the upper Souhegan River drainage area. In addition, the Site 26 study area contains a sensitive wooded area on either side of Blood Brook (running generally east to west) where a sawmill is documented on historic town maps in the mid-nineteenth century. This section of the upstream drainage area could contain significant archaeological remains of mill building(s) and associated waterpower infrastructure.

The Phase IA assessment concludes that no further archaeological investigations are recommended for the previously disturbed areas assigned “no-low” archaeological sensitivity. A Phase IB intensive archaeological investigation is recommended for the areas assigned high sensitivity where ground disturbance may occur as part of the proposed project. Ground disturbance activities could include staging and storage areas, sediment reuse and disposal, and access roads. Construction alternatives were developed to avoid areas of high sensitivity identified from the Phase IA Archaeological Sensitivity Assessment. Because of continued consultation, these alternatives were determined to successfully avoid areas of high sensitivity and a Phase IB investigation was no longer warranted. If limits of disturbance

change and no longer avoid high sensitivity areas, a Phase IB archaeological investigation will be implemented to evaluate impacts for mitigation discussions on an adverse effect. The Phase IB investigation would consist of subsurface archaeological hand testing to locate and identify potentially significant archaeological resources in areas of proposed ground disturbances.

3.1.7.3 Tribal Ancestral Lands Consultation

During the scoping phase of the project, early coordination letters were sent to federally recognized tribes of New England and tribes recognized by the Commission on Native American Affairs, New Hampshire Department of Natural & Cultural Resources. Coordination was initiated with 20 tribes, notifying them of the project, providing a summary of the proposed project, location maps, and requesting comments regarding relevant environmental concerns. No comments, concerns, or questions were received.

In addition, during the NEPA public involvement process, NRCS NH sent Section 106 “No Adverse Effect” finding letters to the Narragansett Indian Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) on August 5, 2025, in accordance with 36 CFR 800.2(d)(3) and 36 CFR 800.3. No comments, concerns, or questions were received. Tribal correspondence and NRCS Record of NHPA Consultations is documented in Appendix A.

3.1.8 Ecosystem Services

In accordance with PR&G, where applicable, resource concerns identified during the scoping process are characterized within an ecosystem services framework. This framework was presented in Table 3.1 and is further detailed in Table 3.8. Incorporating ecosystem services helps to conceptualize the comprehensive set of benefits that people receive from nature. They can be characterized as the ecological goods and services provided by a healthy, functioning environment.

Table 3.8. Ecosystem Services Scoping Concerns

Ecosystem Service	Relevant to Proposed Action?		Rationale
	Yes	No	
Provisioning			
Food	X		The Site 12A North and South reservoir provides potable water supply to the Pilgrim Foods Manufacturing Plant. The facility produces fruit juice, vinegar, mustard, and other condiments.
Fiber		X	Not applicable to this project.
Water Quality and Quantity	X		The Site 12A North and South reservoir serves as a potable water supply source for the Town of Greenville. Water supply flow is directed to the adjacent Greenville

			Water Treatment Plant where drinking water is treated prior to its end destination.
Timber		X	Not applicable to this project.
Biomass		X	Not applicable to this project.
Regulating			
Flood and Disease Control	X		All four sites provide flood control for downstream life and property. Site 12A North and South provides disease control through environmental monitoring of the water supply.
Water Filtration	X		The wetlands and forested areas surrounding the study sites provide natural water filtration, sediment retention, and erosion control.
Climate Stabilization		X	Not applicable to this project.
Crop Pollination		X	Not applicable to this project.
Supporting			
Nutrient Cycling	X		Ecological communities in the study areas, upland areas, and freshwater habitats contribute to nutrient cycling in the region.
Soil Formation	X		The earthen dams retain sediment behind the impoundment and the proposed action could affect soil formation based on changes in inundation and exposure.
Primary Production	X		The vegetative communities at each site provide primary production.
Plant and Animal Habitat	X		Each site contains NH Supporting Landscapes, which provide high quality habitat connectivity to support the migration and gene flow of plant and animal species.
Cultural			
Community Cohesion and Quality of Life	X		Flood events impact community cohesion and quality of life by putting undue stress on residents and community facilities. The flood protection provided by the four dams

			reduces the risk of flooding and the associated social cost to community cohesion.
Recreational Experiences		X	Not applicable to this project.
Spiritual	X		Historic and archaeological resources may exist within the study areas.
Aesthetic Viewsheds	X		The four dams are within the natural viewshed of the Souhegan Watershed, which provides aesthetic value to the region.
Tribal Values	X		Historic and/or archaeological resources may be present within the study areas. There are 20 federally or state-recognized tribes that may have a potential historic or cultural interest in the region.

3.2 Forecast Future Conditions

In accordance with Title 390, National Watershed Program Manual, existing resources and conditions were evaluated for future foreseeable conditions for the life of the project. If no action is taken, the four dams will continue to deteriorate. The hydraulic analysis performed for a dam breach scenario found that the downstream inundation area extends approximately 12 to 14 miles downstream of the dams to the Town of Milford. A breach of one or more of the four dams would cause economic damage to the homes, bridges, and roads located within the towns of Temple, Wilton, Greenville, and Milford. Other economic costs resulting from a dam breach could include clean-up activities, damage to vehicles, and the possibility of increased flood damage due to the absence of the dam(s) and their flood protection benefits. Associated environmental impacts could include sediment deposition within the downstream channel and floodplain areas, loss of the ecosystem supported by the permanent pools within the reservoirs, and stream head cutting upstream of the dams resulting from the loss of the reservoirs.

The Town of Temple's Master Plan (2019) includes information on the three flood-control earthen dam structures in Temple, and a fourth on the town line of Wilton, built by the USDA, referencing that the dams were originally constructed to store water during major storm events to prevent flooding downstream.

According to the Plan, the population of Temple is projected to grow by 6.9% between 2019 and 2044, with a projected population of 1,475 by 2040. Two methods are evaluated to forecast future population conditions in Temple, which result in an estimated range of 47 to 126 additional housing units needed by 2040 for population forecasts. The Plan does not indicate future plans for major housing developments within Temple but does recognize that its three zoning districts permit a range of housing types which may help accommodate future housing needs.

In addition, the Temple Master Plan discusses planned actions and key implementation for future economic development in the town. These include utilizing Temple's location within the New Hampshire

Route 101 corridor, and analyzing both employment trends and commuting and infrastructure needs to help prioritize local projects.

The Town of Wilton's Master Plan (adopted in 2024) references the 2022 updates to New Hampshire's regional housing needs assessment, which sets regional and local housing development targets. Wilton is projected to grow at an annual rate of 0.63% until 2035, which equates to an increase of 387 residents within 15 years (2020 to 2035) and would bring the total population in Wilton to approximately 4,283 by 2035. At the adoption of this Plan, the average household size in Wilton was 2.52 people. Therefore, Wilton would need approximately 154 new dwellings to accommodate the projected population increase. The plan also considers a smaller household size of 1.7, which would equate to 229 new necessary dwellings by 2035. To plan for the increase in population, the Wilton Housing Opportunity Program Advisory Committee (HOPAC) offers various residential development strategies and is currently implementing the decrease of lot size requirements, reduction of age requirements in age-restricted housing, and creating overlay districts in downtown redevelopment.

The Wilton Master Plan's economic development section offers strategies currently being implemented, which include executing a parking study of Downtown Wilton, increasing tourism efforts, establishing programs for building façade and street improvements downtown, and evaluating tax relief benefits to encourage redevelopment of downtown buildings.

The Town of Greenville's Master Plan (2017) includes population projections from 2010 to 2040 based on the New Hampshire Office of State Planning data from 2013. The projections show a slight decline in population, followed by a level of stabilization. In 2010, Greenville's population was 2,105, and by 2040 it is expected to decline to 2,022, with a total decrease of 0.4%. The Plan's implementation section strategizes for future residential development to encourage diverse housing types, explore options for senior residential housing, and promote-energy efficient construction. The Plan also acknowledges that since 2010, approvals for new subdivisions have been granted, including a 39-lot parcel at Butternut Hill and a 67-lot parcel at Hemlock Hills. However, few houses have been built between 2010 and the publishing of this Master Plan in 2017.

Greenville aims to balance business opportunities to meet residential and visitor needs, creating an atmosphere supportive of existing businesses and encouraging of new ones. The Plan notes Greenville's potential for future economic development due to its utility system, infrastructure, and commuter options. The Greenville Master Plan Survey Report (Appendix A of the Plan) shows that residents desire growth in economic areas such as restaurants, retail stores, professional offices, and recreational facilities for Greenville.

The Town of Milford's Master Plan, adopted in 1999 and last updated in 2016, projected a population increase from 13,535 in 2000 to 16,850 in 2020 based on the New Hampshire Office of Energy and Planning 2006 population projections. This averages to approximately 1.45% population growth between 2000 and 2010, and 1% population growth per year between 2010 and 2020. Based on the 2006 average household size of 2.45 in Milford, the town anticipated adding 812 housing units between 2006 and 2020 to account for projected population increases. To achieve this, the town anticipated adding 471 single-family units and 341 multifamily units. The Plan acknowledges the need for progressing zoning and development policies to support a mix of housing types.

The Milford Master Plan strategizes several initiatives to promote economic development in the town. They include efforts to revitalize downtown Milford via the South Street Improvement Project, improvements to transportation infrastructure, encouraging industry and commercial development and associated zoning changes, protection of open space, and promoting residential developments with tax benefits. A unique asset in Milford is the Brox Property, which, according to the Plan, includes extensive undeveloped land. Plans for the Brox Property included extending roads and utilities to the area to make it more amenable to industrial, commercial, and/or residential development.

4 FORMATION OF ALTERNATIVES

4.1 Alternative Formulation Process

Formulation of alternatives for the four dams within the Souhegan River watershed (Site 12A North and South, Site 25B and Site 26) follows procedures outlined in the NRCS National Watershed Program Manual (NWPM). Other guidelines incorporated into the formulation process included the NRCS Principles and Guidelines for Water and Land Related Resources Implementation Studies, and the Economic Handbook, Part II for Water Resources, and other NRCS watershed planning policies.

4.1.1 Guiding Principles

The USDA NRCS Department Manual 9500-13 states: "Under the PR&G, Federal investments are evaluated with respect to the Federal Objective and Guiding Principles." See Chapter 1 for a discussion of the Federal Objective. The Guiding Principles under PR&G consist of the six principles listed below. A description of the alternative components that would meet these principles is provided:

- Healthy and Resilient Ecosystems – alternatives that protect and restore the functions of ecosystems.
- Sustainable economic development - alternatives that improve sustainability and economic well-being of the Nation for present and future generations.
- Floodplains - alternatives that avoid the unwise use of floodplains and flood prone areas.
- Public safety - alternatives that reduce risk to people, including life, injury, property, essential public services, and environmental threats.
- Environmental Justice - alternatives that provide for the fair treatment of all people including meaningful involvement in the public comment process. (This guiding principle is expected to be revised by NRCS in future in response to the rescission of environmental justice-related Executive Orders 12898, 14008, 14096, and 14091 in 2025).
- Watershed Approach - alternatives that utilize a systems-based framework that recognizes interconnectedness of physical, ecological, economic, and social/cultural systems.

4.1.2 Alternatives Formulation Criteria

The stated objectives of the Sponsors for the Souhegan Supplemental Watershed Plan are (1) to bring the dams into compliance with current New Hampshire Dam Bureau and NRCS dam safety and performance standards, (2) to maintain the level of flood protection currently being provided by the dams, (3), maintain water supply and (4) to address comments received during the scoping process about the potential to create a conservation release from Site 12A. Under the Watershed Rehabilitation Provisions of the Watershed Protection and Flood Prevention Act, NRCS is required to consider the technical, social, and economic feasibility of the locally preferred solution and other alternatives identified through the planning process.

Formulation of alternatives considered the following elements or criteria:

Purpose and Need

- 1) Authorized Project Purposes
- 2) Federal Objective
- 3) PR&G Guiding Principles
- 4) PR&G Criteria
- 5) Completeness, Effectiveness, Efficiency, and Acceptability

4.1.3 Risk and Uncertainty

The work of this planning study involves a certain degree of risk and uncertainty which is inherent to the analyses performed. Assumptions made during the planning process are based on the best available technology and information at the time of planning and those assumptions may change in the future as new information becomes available.

Future Land Use: Future land use introduces a degree of uncertainty, especially related to future water quality and quantity of runoff. Much of the contributing watershed to each dam is privately owned and therefore future land use is outside the control of NHDES and NRCS. While not anticipated due to terrain and the remoteness of the area, additional urbanization over the next 100+ years could cause increased peak rates and volumes of runoff, leading to increased erosion of waterways and increased sedimentation rates to each reservoir. Additionally, changes in land use and impervious coverage in the watershed and downstream areas may affect the extent of localized floodplain areas and the severity and frequency of flood events.

Environmental Conditions: Environmental conditions are not stagnant but continue to evolve over time. There is no guarantee that the presence or absence of environmental conditions, such as wetlands, waterways, and threatened and endangered species, will remain unchanged from the conditions encountered during the planning process.

Geologic: The work of this planning study is based on a limited geotechnical subsurface exploration program. Future subsurface exploration programs may identify conditions which are different from those on which the planning process is based. These could include the location of competent rock or unsuitable material that could impact the volume of excavation and/or fill needed to construct the proposed improvements.

Economic: The economic analysis includes risk and uncertainty associated with abbreviated procedures, simplifying assumptions used to estimate benefits, and uncertainty related to future changes in cost estimates as the engineering design progresses. The assumptions made represent the best methodology available within the scope of the analysis.

The planning study is based on a 100+ year period of analysis. The life expectancy of each structure is expected to meet the minimum requirements of the rehabilitation project, but it has not been confirmed that the structures would last for a longer period. As the service life is extended, there is an increased risk that assumptions and conditions will be different than predicted.

Estimated project costs are based on computed work quantities multiplied by the appropriate unit cost for that type of work. Unit costs are based on historical data from similar projects, published cost data, and engineering judgement and are indexed to current price levels. Costs and schedules can be

influenced by many factors that are beyond the control of the planning study and cannot be predicted with certainty. These factors include, but may not be limited to, fuel shortages, unforeseen labor and material shortages, natural disasters, and local/regional/global economics.

4.1.4 Formulation Process

Project goals and objectives were presented to the public and interested agencies during a public scoping period and at a public scoping meeting in October 2021. Comments received were considered during the formulation process. Development of alternatives began by considering general conceptual solutions or measures that could meet the purpose and need for the project and provide non-structural alternatives that would not require the rehabilitation of structures. The project team worked collaboratively to develop up to six initial conceptual solutions for each site that met one or more of the initial formulation criteria, which were then narrowed down to the preferred alternative. H&H analyses performed as part of the 2016 assessments were supplemented as needed to determine the most effective flood prevention measures that could be combined to meet the purpose and need for the project. An alternatives workshop was held in July 2024 with NHDES and NRCS to review and comment on conceptual solutions.

4.2 Alternatives Considered

4.2.1 No Action Alternative

National Instruction released in 2022 provided guidance on the identification and formulation of the No-Action alternative used for evaluating all reasonable alternatives considered for watershed rehabilitation plans. The NI supersedes NWPH 603.35.C.(1)(i) The No Action Alternative assumes no work beyond routine operation and maintenance will be undertaken by the local sponsor, until such time that the dams are expected to fail. The dams will be assumed to operate under the existing performance until the recurrence rainfall event is reached which is expected to result in a dam breach under the existing conditions. Once the first failure inducing event is determined for any one of the four dams, it is assumed that this event would cause a failure at all four dams.

The minimum rainfall depth causing failure at any of the four dams is that which will cause a headcut failure of the auxiliary spillway leading to a breach of the dam. Based on analyses completed, rainfall depth leading to headcut failure is less than rainfall leading to overtopping failure at each site; therefore the headcut failure is the most probable failure mode. The auxiliary spillway integrity analysis was performed using the previously developed SITES model for each individual dam, which included soil properties developed as part of this planning study. For each dam, the rainfall depth was incrementally increased by 0.5" until an event resulting in a breach was reached. The rainfall depths and approximate recurrence interval of the event leading to an auxiliary spillway breach are summarized in Table 4.1. The approximate recurrence interval for the failure precipitation depth was determined by extrapolating the NRCC (Northeast Regional Climate Center) rainfall frequency data.

Site 12A would fail due to head cutting during a 16.5" rainfall event. As all four dams are considered as a unit, inundation modeling was conservatively developed assuming that all four dams fail during the 16.5-inch storm (approach confirmed with NRCS).

Table 4.1. Estimated Rainfall Depths Which Induce Dam Failure for the No Action Alternative

Site	Auxiliary Spillway Crest (ft)	Rainfall event (in)	Frequency (yr)
12A North and South	872.4	16.5	2100
25B	801.8	18.0	3000 ¹
26	922.1	28.5	19300 ¹

¹For this study, it was assumed that all four dams would fail at the most frequent storm that causes failure at one of the dams. This simplified approach was adopted to accommodate study funding availability and was confirmed with the NRCS during scoping.

For the No Action Alternative dam breach analyses, the current HEC-RAS models were used as the base geometry for each dam's downstream reach. The inflow hydrograph from the SITES analysis was routed into a storage area for each respective dam in HEC-RAS. The breach parameters were developed based on previous experience, according to the dam type, and modified as needed to ensure model stability. Breach parameters are summarized in Table 4.2.

Table 4.2. Breach Parameters for the No Action Alternative

Site	Final Bottom Width (ft)	Side Slopes	Breach Formation Time (hr)	Breach Height (ft)
12A North and South	79	1:1	1	29.5
25B	235	1:1	1	56
26	185	1:1	1	69

The downstream inundation area resulting from a dam breach is shown on Figure 94 in Appendix C and Figures D.14 and D.15 in Appendix D and is used as the Economic Study Area Boundary.

4.2.2 Future Without Federal Investment

Based on coordination with NHDES, the owner of the dams and sponsor, it was determined that the Future Without Federal Investment (FWOFI) Alternative would be the same as the No Action Alternative. NHDES's most likely course of action, in the absence of federal funding, would be to leave the dams in place with routine maintenance. The risk of a breach would remain with the same likelihood of occurrence.

4.2.3 Action Alternatives

Various structural dam rehabilitation alternatives were considered to bring Sites 12A (North and South), 25B and 26 into compliance with current dam safety standards. Table 4.3 summarizes the structural alternatives considered and identifies whether the alternative was retained for detailed study.

Table 4.3. Structural Rehabilitation Alternatives Considered

Site	Alternative No.	Alternative Description ¹	Retained for Detailed Study?
12A	1	Raise top of dam and flatten downstream embankment face (North & South Dams). Add RCC auxiliary spillway drop structure (South Dam).	No
	2A	Flatten downstream embankment face (North & South Dams). Widen auxiliary spillway & add RCC auxiliary spillway drop structure (South Dam).	No
	2B	Flatten downstream embankment face (North & South Dams). Add labyrinth spillway with concrete chute within existing auxiliary spillway (South Dam).	No
	2C	Flatten downstream embankment face (North Dam). RCC overtopping protection & backfill existing auxiliary spillway (South Dam).	Yes
	3	Release Pulse (to be considered in addition to the other Site 12A Alternatives) (South Dam).	Yes
	1A	Raise top of dam, replace principal spillway riser structure, add cutoff wall and ACB armoring to auxiliary spillway	No
	1B	Raise top of dam, replace principal spillway riser structure, add cutoff wall to auxiliary spillway & move control section downstream	Yes
	2A	Widen auxiliary spillway, replace principal spillway riser structure, add cutoff wall and ACB armoring to auxiliary spillway	No
	2B	Widen auxiliary spillway, replace principal spillway riser structure, add cutoff wall to auxiliary spillway & move control section downstream	No
26	1A	Raise top of dam, replace principal spillway riser structure, add cutoff wall and ACB armoring to auxiliary spillway	No

	1B	Raise top of dam, replace principal spillway riser structure, add mass RCC cutoff wall at auxiliary spillway control section	No
	1C	Raise top of dam, replace principal spillway riser structure, add stepped RCC cutoff wall at auxiliary spillway control section	Yes
	2A	Widen auxiliary spillway, replace principal spillway riser structure, add cutoff wall and ACB armoring to auxiliary spillway	No
	2B	Widen auxiliary spillway, replace principal spillway riser structure, add mass RCC cutoff wall at auxiliary spillway control section	No
	2C	Widen auxiliary spillway, replace principal spillway riser structure, add stepped RCC cutoff wall at auxiliary spillway control section	No

¹All alternatives (not including the Site 12A Release Pulse) include flattening the downstream embankment face and addition of internal seepage collection and conveyance systems.

²Alternatives considered but eliminated from detailed study are described in Section 4.3 and alternatives retained for detailed study are described in Section 4.4.

4.3 Alternatives Considered but Eliminated from Analysis

Several alternatives considered in the planning process were eliminated from detailed consideration. The evaluation is summarized in the sections below.

4.3.1 Dam Decommissioning

Decommissioning describes an alternative which removes the flood detention capacity of the dam by removing a portion or all the existing embankment (i.e., a breach of the embankment) down to the valley floor. The bottom of the breach typically contains a pilot channel and left and right overbank areas to mimic the natural drainage patterns and floodplain that existed prior to the original construction of the dam. Should the decommissioning option be considered, a more detailed hydraulic analysis is recommended to establish the minimum breach cross section, including bottom widths, overbank configuration, and channel bottom and side slopes.

The breach of Sites 12A North, 12A South, 25B, and 26 would require removal and spoiling of approximately 16,000, 12,000, 78,000, and 129,000 cubic yards, respectively, of material as well as removal of the low-level dewatering system at Site 12A North and the principal spillway risers, outlet conduits and impact structures at Sites 12A South, 25B and 26. Excavated material would be spoiled both in the dewatered reservoirs and within the existing auxiliary spillways. The spoil areas would be provided with mild slopes to facilitate site stabilization and potentially future agricultural, livestock or recreational use.

Reconnection of the stream through each breach would allow upstream movement of aquatic species. Stream restoration may be required through the dewatered reservoirs of Sites 25B and 26, which appear to contain sediment accumulation of depths that obstruct the natural stream channel. To the greatest extent possible, stream restoration activities would mimic the original channels which existed prior to the original construction of the dam. While revegetation of the reservoir bottom is expected to occur naturally, a planting/vegetation plan would be recommended to quickly stabilize the reservoir bottom and prevent/minimize intrusion of invasive species. Refer to Appendix C, Figures 44, 45, 65 and 93 for conceptual plans showing the decommissioning alternative for Sites 12A South, 12A North, 25B and 26, respectively.

The decommissioning alternative would (1) eliminate the use of Site 12A as a source of water supply for the Town of Greenville, (2) expose the existing sediment contained within each reservoir providing an immediate threat of erosion and downstream sedimentation, (3) eliminate future sediment trapping capabilities, resulting in increased long-term downstream sedimentation rates, and (4) result in increased flow rates during more frequent storm events. The immediate release of sediment from each reservoir could be addressed by physically removing the accumulated sediment from each reservoir prior to breaching the dam. Increases in flow rates would be expected to result in changes to the downstream channels as the stream bed and banks respond to the increased flows. Mitigation of increased stream flows during more frequent storm events would not be possible without the installation of additional detention facilities located within the dewatered reservoir and/or within the headwaters of each watershed. Alternate sources for water would be required for the Town of Greenville.

If the dams are removed, the structures located within the breach zone would no longer be at risk from potential flooding caused by a dam failure leading to an uncontrolled release of the contents of the reservoir. However, downstream roads, bridges, homes and businesses would be at risk of more frequent, uncontrolled flooding during storm events due to the loss of flood control previously provided by the dams. To meet the purpose and need of the project, induced damages must be mitigated so that there would be no increase in the amount of damaged sustained by structures previously protected by the dams. Mitigation of induced damages includes relocation or flood proofing the impacted structures.

Construction costs associated with the decommissioning alternative (for all four dams) could exceed \$19 million. Table 4.4 lists major cost components associated with the decommissioning alternative.

Table 4.4. Estimated Costs Associated with Decommissioning

Work Item	Cost
Mobilization & Demobilization	\$1.2 million
Site Preparation & Surveys	\$0.7 million
Erosion and Sediment Control	\$1.0 million
Dam Breach Activities	\$11.5 million

Work Item	Cost
Environmental Mitigation	\$0.6 million
Contingency (30%)	\$4.5 million
Subtotal of Construction Costs:	\$19.5± million
Mitigation of Induced Damages to Downstream Homes (Floodproofing and/or Relocation)	\$22.9-\$124 million
Mitigation of Induced Damages to Downstream Infrastructure (Roads, Bridges, Utilities, Etc.)	Not estimated due to high cost and logistical impracticality
Total Cost of Dam Decommissioning:	\$42.4-\$143.5 million

Floodproofing or relocation of properties within the 100-year without-dam floodplain could cost in the range of \$22.9-\$124 million, bringing the total cost of decommissioning to more than \$42.4-\$143.5 million. This alternative would also have very high legal and financial consequences. Flood proofing costs were estimated based on a planning level analysis of structures in similar watersheds. Relocation costs were estimated using tax assessment valuation data from the Hillsborough County Tax Assessors Office (2023) for affected tax parcels within the 100-year floodplain without-dam inundation zone. The assessed value was used as a proxy for market value that would be paid to purchase each property and relocate residents. Actual relocation costs would likely exceed this figure, both because assessed value underrepresents market value and because of the administrative costs associated with acquiring the properties. Additional costs would also be expected to raise or otherwise protect impacted roads, bridges and utilities. Such improvements would be considered logistically impractical. Therefore, this alternative was not considered further.

4.3.2 Non-Structural- Relocation or Floodproofing

Non-Structural measures must be considered under NRCS policy (NWPM Part 505.35). Sites 12A (North & South), 25B and 26 were classified as high hazard structures when constructed between 1967 and 1971. Subsequent analysis performed as part of the 2016 dam assessments confirms the high hazard classification.

Non-Structural measures could consist of flood proofing or relocating structures in the breach zone as determined under the No Action Alternative of the dam to remove the unacceptable safety risk for the 148 residences, 132 other structures and greater than 370 persons at risk in the breach inundation zone. High Hazard structures provide significant downstream flood damage reduction to homes, buildings, and transportation corridors. Flood proofing or relocating the 280 total breach zone structures that would experience damage would cost more than \$36.4 million based on the estimate of flood proofing costs discussed earlier. Relocating or elevating 14.5 miles of roads and 26 bridges, protected by the dams out of the inundation zone is judged to be impractical and would generate substantial adverse economic and environmental impacts within the watershed. Furthermore, the non-structural alternative would not

address the need for rehabilitation of each dam to bring it into compliance with current dam safety standards. This alternative was determined not to be cost effective compared to the structural alternatives available to rehabilitate the dams (refer to Table 4.1). Therefore, the non-structural alternative was eliminated from further consideration.

4.3.3 Site 12A Alternative 1

Site 12A North: Raise top of dam to El. 882.0, flatten the downstream embankment slope to 3H:1V, add an internal seepage collection system and extend the low-level outlet conduit to the new downstream embankment toe.

Site 12A South: This alternative consists of increasing the conveyance capacity of Site 12A by raising the top of dam up to 3.4 feet to pass the freeboard hydrograph through the existing 144-foot-wide auxiliary spillway. The existing auxiliary spillway crest elevation (El. 872.4±) would remain unchanged to maintain the current level of flood protection and the top of dam would be raised from El. 879.4± (at 12A South) and El. 878.6± (at 12A North) to El. 882.0. To address auxiliary spillway integrity concerns, a Roller Compacted Concrete (RCC) drop structure would be constructed at the downstream end of the existing auxiliary spillway to convey auxiliary spillway flows to the downstream receiving channel (Richardson Brook), preventing erosion and head cutting of the auxiliary spillway. The crest of the RCC drop structure would be set at the existing auxiliary spillway crest elevation (El. 872.4±), moving the spillway control section downstream to the new RCC drop structure. A notch in the RCC spillway control section would allow localized drainage to pass through the new control section to the receiving waterway, and the left and right training dikes that approach the new RCC drop structure would be raised to match the new top of dam elevation. The stilling basin of the RCC drop structure would extend into Richardson Brook and could be treated in one of two ways to minimize environmental impacts. The first would involve allowing Richardson Brook to fill the stilling basin, creating open water within the stilling basin, and the second would involve backfilling the stilling basin with native material to reestablish the stream bed and banks through this area. Material placed within the stilling basin would be sacrificial and may be scoured out in the event the auxiliary spillway is activated. During construction of the RCC stilling basin, flow in Richardson Brook would be temporarily diverted to allow work to occur in the dry. Refer to Appendix C, Figures 23 through 27 for conceptual drawings of Site 12A Alternative 1.

The Site 12A Alternative 1 does not impact high sensitivity cultural resource areas but does alter both Site 12A North and Site 12A South which are NRHP-eligible dams. The project would restore the dams to a vegetated condition, minimizing visual impacts. Alternative 1 is expected to have environmental impacts, including 0.18± acres of permanent wetland disturbance, 205± linear feet of permanent stream disturbance, and 0.6± acres of tree clearing. This alternative also increases the storage volume of the Site 12A and would result in increased reservoir elevations during the freeboard hydrograph event as a result of raising the embankment, which could result in increased flooding of lands around the rim of the reservoir and may increase downstream consequences in the unlikely event of a dam failure. Currently, NHDES owns the land surrounding the reservoir to the east of Route 45, and according to the property deed, flowage easements are in place for lands up to El. 876.1 (NAVD88) located to the west of Route 45 along Richardson Brook and Miller Gamble Brook. Consequently, land rights are in place for all lands located below the auxiliary spillway crest elevation except for properties owned by Marta M. and Marck C. Scott located along the eastern side of the reservoir. These properties are identified as "Conservation Easements", restricting the type and extent of development which is allowed. Raising the Site 12A top of

dam elevation could increase the flooding on these properties during the freeboard hydrograph and may impound water onto Tobey Highway (Route 45) in several areas. Refer to Table 4.5 for a side-by-side comparison of the alternatives retained for detailed study.

Construction costs for Site 12A Alternative 1 to modify both Site 12A North and South, when combined with Alternative 3 for the dry weather release pulse, are estimated at \$12.1 million, which includes a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. Incorporating costs for Engineering, Permits, and Construction Management (assumed to be 10%, 0.5% and 12%, respectively, of the estimated construction costs), the total program costs for this alternative are estimated at \$14.8 million. Refer to Appendix D for additional information related to the estimated construction costs. In comparison to the preferred alternative, Alternate 1 increases stream impacts and increases construction costs due to factors including but not limited to increased volumes of earth fill and RCC. For these reasons, Site 12A Alternative 1 was not selected for detailed analysis.

4.3.4 Site 12A Alternative 2A

Site 12A North: Flatten the downstream embankment slope to 3H:1V, add an internal seepage collection system and extend the low-level outlet conduit to the new downstream embankment toe.

Site 12A South: This alternative consists of increasing the conveyance capacity of Site 12A by widening the auxiliary spillway from 144 feet to 280 feet to pass the freeboard hydrograph. The spillway widening would occur to the right of the existing auxiliary spillway, requiring excavation into the wooded hillside, which is identified as a high sensitivity cultural resource area. While the project would alter both Site 12A North and Site 12A South, which are NRHP-eligible dams, the dams would be restored to a vegetated condition, minimizing visual impacts. The existing auxiliary spillway crest elevation (El. 872.4±) would remain unchanged to maintain the current level of flood protection and the top of dam for both Sites 12A North and 12A South would remain unchanged. To address auxiliary spillway integrity concerns, a 280-foot-wide Roller Compacted Concrete (RCC) drop structure would be constructed at the downstream end of the auxiliary spillway to convey auxiliary spillway flows to the downstream receiving channel (Richardson Brook), preventing erosion and head cutting of the auxiliary spillway. The crest of the RCC drop structure would be set at the existing auxiliary spillway crest elevation (El. 872.4±), moving the spillway control section to the new RCC drop structure. A notch in the RCC spillway control section would allow localized drainage to pass through the new control section to the receiving waterway and the left and right training dikes that approach the new RCC drop structure would be raised to match the top of dam elevation. The stilling basin of the RCC drop structure would extend into Richardson Brook and could be treated in one of two ways to minimize environmental impacts. The first would involve allowing Richardson Brook to fill the stilling basin, creating open water within the stilling basin, and the second would involve backfilling the stilling basin with native material to reestablish the stream bed and banks through this area. Material placed within the stilling basin would be sacrificial and may be scoured out in the event the auxiliary spillway is activated. During construction of the RCC stilling basin, flow in Richardson Brook would be temporarily diverted to allow work to occur in the dry. New internal seepage collection and conveyance systems in the form of chimney and toe drains would be added to Site 12A North and Site 12A South and the downstream embankment face of each dam would be flattened to a slope of 3H:1V. Refer to Appendix C, Figures 28 through 32 for conceptual drawings of Site 12A Alternative 2A.

In comparison to Site 12A Alternative 1, the 280-foot-wide auxiliary spillway and associated RCC drop structure encroach into high sensitivity cultural resource areas, increase stream impacts, and increase construction costs due to the increased volume of required earthwork and RCC. For these reasons, Site 12A Alternative 2A was not selected for detailed analysis.

4.3.5 Site 12A Alternative 2B

Site 12A North: Flatten the downstream embankment slope to 3H:1V, add an internal seepage collection system and extend the low-level outlet conduit to the new downstream embankment toe.

Site 12A South: This alternative consists of increasing the conveyance capacity of Site 12A through the addition of a six-cycle labyrinth spillway with concrete chute and stilling basin to convey auxiliary spillway flows to the receiving channel. The existing auxiliary spillway crest elevation (El. 872. 4±) would remain unchanged to maintain the current level of flood protection and the top of dam for both Sites 12A North and 12A South would remain unchanged. The left auxiliary spillway training wall would be raised to match the existing top of dam elevation and the approach channel to the labyrinth spillway would be lowered to El. 865. 0. To address auxiliary spillway integrity concerns, a concrete chute and stilling basin would be constructed to convey flows from the labyrinth spillway to the downstream receiving channel (Richardson Brook), preventing erosion and head cutting of the auxiliary spillway. The crest of the labyrinth spillway would be set at the existing auxiliary spillway crest elevation (El. 872. 4±), moving the spillway control section to the new labyrinth spillway. New internal seepage collection and conveyance systems in the form of chimney and toe drains will be added to Site 12A North and Site 12A South and the downstream embankment face of each dam would be flattened to a slope of 3H:1V. Refer to Appendix C, Figures 33 through 37 for conceptual drawings of Site 12A Alternative 2B.

The Site 12A Alternative 2B does not impact high sensitivity cultural resource areas but does alter both Site 12A North and Site 12A South which are NRHP-eligible dams. The project would restore the dams to a vegetated condition, minimizing visual impacts. Labyrinth spillways require intricate formwork and contain a significant amount of steel reinforcing, both of which can increase the price per cubic yard of concrete. In comparison to the RCC spillway, which is part of Site 12A Alternate 1, the labyrinth spillway is expected to have higher costs and contain high walls and slopes that could create public safety concerns. For these reasons, Site 12A Alternative 2B was not selected for detailed analysis.

4.3.6 Site 25B Alternative 1A & 2A

Both of these alternatives involve armoring of the auxiliary spillway with Articulated Concrete Blocks (ACBs) and the addition of a conventional concrete cutoff wall near the downstream end of the auxiliary spillway to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway. For Alternative 1A the top of dam is raised by 0. 7 feet and the existing auxiliary spillway width is maintained at 350 feet. For Alternative 2A the existing top of dam is maintained, and the auxiliary spillway width is increased to 400 feet. For both alternatives, the existing auxiliary spillway crest elevation (El. 801. 8±) remains unchanged to maintain the current level of flood protection. A new principal spillway riser structure, capable of withstanding the maximum credible earthquake, would replace the existing riser. A new internal seepage collection and conveyance system in the form of a chimney and toe drain would be added and the downstream embankment face would be flattened to a slope of 3H:1V to address slope stability factors of safety. Refer to Appendix C, Figures 49 through 52 and Figures 57 through 60 for conceptual drawings of Site 25B Alternatives 1A and 2A, respectively.

Both Alternatives 1A and 2A avoid high sensitivity cultural resource areas. Both alternatives alter Site 25B which is a NRHP-eligible dam. The project would restore the dam embankment to a vegetated condition, minimizing visual impacts. The open cells of ACB lining within the auxiliary spillway could be swept with topsoil and seeded to reduce the visual impacts associated with the ACB system.

Site 25B Alternatives 1B and 2B are similar to Site 25B Alternatives 1A and 2A, respectively, but with the auxiliary spillway control section moved downstream to coincide with the proposed concrete cutoff wall. In doing so, the ACB armoring of the spillway can be eliminated, reducing construction costs. For this reason, Site 25B Alternatives 1A and 2A were not retained for detailed study.

4.3.7 Site 25B Alternative 2B

This alternative consists of increasing the auxiliary spillway width from 350 feet to 400 feet to pass the freeboard hydrograph. The existing auxiliary spillway crest elevation (El. 801.8±) would remain unchanged to maintain the current level of flood protection and the top of dam would remain at its current elevation (El. 808.3± at low point). To address auxiliary spillway integrity concerns, a concrete cutoff wall would be added at the control section to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway, and the control section would be moved downstream to a point beyond the toe of the downstream embankment to prevent auxiliary spillway flows from impacting the downstream right embankment groin. A conventional concrete cutoff wall is assumed due to the shallow depth to bedrock found during the limited subsurface exploration plan performed as part of this Plan-EA. Should future subsurface exploration programs performed during preliminary/final design determine competent rock is deeper in elevation, the use of RCC should be evaluated to determine the most economical construction material. Upstream of the new control section, the widened auxiliary spillway approach channel would be graded at a 1% slope towards the reservoir. Excess excavation material would be used to extend the left spillway training berm in a downstream direction to direct auxiliary spillway flows away from the dam embankment. Refer to Appendix C, Figures 61 through 64 for conceptual drawings of Site 25B Alternative 2B.

NHDES has determined the Site 25B principal spillway riser structure would be replaced due to inadequacy of the riser footer to withstand the maximum credible earthquake. Replacement of the riser would require dewatering the reservoir and diversion of water around the work area. To aid in management of water, the new riser can be constructed upstream of the existing riser, allowing diversion of water through the existing riser until the new riser is complete, at which time the existing riser may be abandoned.

The Site 25B Alternative 2B does not impact high sensitivity cultural resource areas but does alter Site 25B which is a NRHP-eligible dam. The project would restore the dam and the auxiliary spillway to a vegetated condition, minimizing visual impacts. Alternative 2B is expected to have environmental impacts, including 0.53± acres of permanent wetland disturbance, 75± linear feet of permanent stream disturbance and 0.9± acres of tree clearing. As discussed under Site 25B, Alternative 1B, in addition to lands owned by NHDES, Site 25B impounds water on lands owned by Lisa Beaudoin (Tax Parcel 6-59) and Timothy Fiske (Tax Parcels 6-61 and 6-62) within the Town of Temple and lands owned by the Greeley Family Trust (Tax Parcel E-6) and the Society for the Protection of New Hampshire Forests (Tax Parcel E-44) in the Town of Wilton. NHDES reports easements are in place for all lands located within the reservoir below the auxiliary spillway crest elevation. Alternative 2B would not increase flooding depths around the

rim of the reservoir. Refer to Table 4. 5 for a side-by-side comparison of the alternatives retained for detailed study.

Construction costs for Site 25B Alternative 2B are estimated at \$8. 2 million, which include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. Incorporating costs for Engineering, Permits, and Construction Management (assumed to be 10%, 0. 5% and 12%, respectively, of the estimated construction costs), the total program costs for this alternative are estimated at \$10. 0 million. Refer to Appendix D for additional information related to the estimated construction costs.

Site 25B Alternative 2B results in more tree clearing, earth disturbance, and higher construction costs in comparison to Site 25B Alternative 1B. For these reasons, Site 25B Alternative 2B was not selected as the preferred alternative.

4.3.8 Site 26 Alternative 1A & 2A

Both of these alternatives involve armoring of the auxiliary spillway with Articulated Concrete Blocks (ACBs) and the addition of a mass Roller Compacted Concrete (RCC) cutoff wall near the downstream end of the auxiliary spillway to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway. For Alternative 1A the top of dam is raised by 0. 4 feet and the existing auxiliary spillway width is maintained at 320 feet. For Alternative 2A the existing top of dam is maintained, and the auxiliary spillway width is increased to 350 feet. For both alternatives, the existing auxiliary spillway crest elevation (El. 822. 1±) remains unchanged to maintain the current level of flood protection. A new principal spillway riser structure, capable of withstanding the maximum credible earthquake, would replace the existing riser. A new internal seepage collection and conveyance system in the form of a chimney and toe drain would be added and the downstream embankment face would be flattened to a slope of 3H:1V to address slope stability factors of safety. Refer to Appendix C, Figures 69 through 72 and Figures 81 through 84 for conceptual drawings of Site 26 Alternatives 1A and 2A, respectively.

Both Alternatives 1A and 2A avoid high sensitivity cultural resource areas. Both alternatives alter Site 26 which is a NRHP-eligible dam. The project would restore the dam embankment to a vegetated condition, minimizing visual impacts. The open cells of ACB lining within the auxiliary spillway could be swept with topsoil and seeded to reduce the visual impacts associated with the ACB system.

Site 26 Alternatives 1A and 2A can be simplified by moving the mass RCC cutoff wall to coincide with the auxiliary spillway control sections (refer to Site 26 Alternatives 1B and 2B), eliminating the need for the ACB armoring and reducing construction costs. For this reason, Site 26 Alternatives 1A and 2A were not retained for detailed study.

4.3.9 Site 26 Alternative 1B & 2B

Both of these alternatives involve the addition of a mass Roller Compacted Concrete (RCC) cutoff wall at the auxiliary spillway control section to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway. For Alternative 1B the top of dam is raised by 0. 4 feet and the existing auxiliary spillway width is maintained at 320 feet. For Alternative 2B the existing top of dam is maintained, and the auxiliary spillway width is increased to 350 feet. For both alternatives, the existing auxiliary spillway crest elevation (El. 922. 1±) remains unchanged to maintain the current level of flood protection. A new principal spillway riser structure, capable of withstanding the maximum credible

earthquake, will replace the existing riser. A new internal seepage collection and conveyance system in the form of a chimney and toe drain will be added and the downstream embankment face will be flattened to a slope of 3H:1V to address slope stability factors of safety. Refer to Appendix C, Figures 73 through 76 and Figures 85 through 88 for conceptual drawings of Site 26 Alternatives 1B and 2B, respectively.

Both Alternatives 1B and 2B avoid high sensitivity cultural resource areas. Both alternatives alter Site 26 which is a NRHP-eligible dam. The project would restore the dam embankment to a vegetated condition, minimizing visual impacts. The crest of RCC cutoff wall would be visible within the auxiliary spillway; however, visual impacts could be reduced by lowering and covering the crest of the RCC with topsoil and seeding to create a vegetated condition. A less obtrusive conventional concrete weir, or curb, could be added to the crest of the RCC cutoff wall to set and maintain the auxiliary spillway crest elevation.

The mass RCC cutoff wall assumed under Site 26 Alternatives 1B and 2B can be optimized to reduce the amount of required excavation and RCC volume by constructing a stepped RCC structure (refer to Site 26 Alternatives 1C and 2C). For this reason, Site 26 Alternatives 1B and 2B were not retained for detailed study.

4.3.10 Site 26 Alternative 2C

This alternative consists of increasing the auxiliary spillway width from 320 feet to 350 feet to pass the freeboard hydrograph. The existing auxiliary spillway crest elevation (El. 922. 1±) would remain unchanged to maintain the current level of flood protection and the top of dam would remain at its current elevation (El. 928. 1± at low point). A RCC stepped cutoff wall with a 350-foot-wide control weir would be added at the auxiliary spillway control section to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway. Founded on bedrock, the RCC cutoff will be located below grade and will contain left and right training walls to ensure flows are directed over the structure. A RCC stepped cutoff wall is assumed due to the depth to bedrock found during the limited subsurface exploration plan performed as part of this Plan-EA. Should future subsurface exploration programs performed during preliminary/final design determine competent rock is higher in elevation, the use of conventional concrete should be evaluated to determine the most economical construction material. Disturbed areas within the auxiliary spillway would be restored to their current grades and stabilized with vegetation. Consequently, the proposed improvements would not impact the future use of the auxiliary spillway by the Timberdoodle Club. Refer to Appendix C, Figures 89 through 92 for conceptual drawings of Site 26 Alternative 2C.

NHDES has determined the Site 26 principal spillway riser structure will be replaced due to inadequacy of the riser footer to withstand the maximum credible earthquake. Replacement of the riser will require dewatering the reservoir and diversion of water around the work area. To aid in management of water, the new riser can be constructed upstream of the existing riser, allowing diversion of water through the existing riser until the new riser is complete, at which time the existing riser may be abandoned.

The Site 26 Alternative 2C does not impact high sensitivity cultural resource areas but does alter Site 26 which is a NRHP-eligible dam. The project would restore the dam and the auxiliary spillway to a vegetated condition, minimizing visual impacts. The crest of RCC cutoff wall would be visible within the auxiliary spillway; however, visual impacts could be reduced by lowering and covering the crest of the RCC with topsoil and seeding to create a vegetated condition. A less obtrusive conventional concrete weir, or curb, could be added to the crest of the RCC cutoff wall to set and maintain the auxiliary spillway crest elevation.

Alternative 2C is expected to have environmental impacts, including 0.27± acres of permanent wetland disturbance, 95± linear feet of permanent stream disturbance and 0.8± acres of tree cleaning. With the exception of the right abutment which is owned by NHDES, the remainder of the Site 26 dam and auxiliary spillway are located on lands owned by the Timberdoodle Club on which NHDES has an easement. The easement encompasses the dam, auxiliary spillway and sediment pool; however, at the auxiliary spillway elevation, Site 26 Dam impounds water beyond the easement on lands owned by Whitcomb & Trust, Randall H. Martin, James W. Quinn, Martin Connolly, an RT/Trust within the Town of Temple. NHDES reports easements are in place for all lands within the reservoir located below the auxiliary spillway crest elevation. Refer to Table 4.5 for a side-by-side comparison of the alternatives retained for detailed study.

Construction costs for Site 26 Alternative 2C are estimated at \$13.1 million, which includes a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. Incorporating costs for Engineering, Permits, and Construction Management (assumed to be 10%, 0.5% and 12%, respectively, of the estimated construction costs), the total program costs for this alternative are estimated at \$16.0 million. Refer to Appendix D for additional information related to the estimated construction costs. In comparison to Site 26 Alternative 1C, Alternative 2C increases construction costs due to the increased volume of required earthwork (i.e., excavation and fill) and RCC. For this reason, Site 26 Alternative 2C was not selected for detailed analysis.

4.4 Final Array of Alternatives

Sites 12A (North and South), 25B and 26 each contain similar deficiencies which will be addressed in the same manner for all alternatives. These include (1) material compatibility concerns and pipe deterioration associated with the internal seepage collection and conveyance systems, (2) embankment slope stability concerns with the reservoir at the flood surcharge elevation, and (3) the NRCS 10-day drawdown requirements are not met. The rehabilitation approach for each of these deficiencies at each dam is as follows:

Internal Seepage Collection and Conveyance and Embankment Slope Stability: The existing toe drain systems will be abandoned and a new toe drain system will be installed at the downstream toe of the existing dams. The new toe drain will consist of a dual aggregate filtering system designed to be compatible with the embankment soils and will contain a perforated non-corrosive plastic or HDPE pipe for collecting and conveying seepage to the downstream receiving channel. Weir boxes or other devices are recommended to allow accurate monitoring of seepage flow.

Additional seepage protection will be provided by the installation of a chimney (or blanket) drain on the downstream embankment face consisting of a fine aggregate designed to be compatible with the embankment soils. Topsoil and organic material will be stripped from the embankment to receive the chimney drain. The chimney drain will connect to the new toe drain system to allow collected seepage to be conveyed to the downstream toe of the dam. A filter diaphragm will be added around the principal spillway conduit which may be connected to the toe drain system.

Approved fill from project excavations will be used to cover the seepage collection system and flatten the downstream embankment slope to 3H:1V or flatter to improve slope stability and meet NRCS factors of safety.

Flattening the downstream embankment slope will require an extension of the principal spillway conduit, and, in the case of Site 12A North, an extension of the low-level outlet conduit. All pipe extensions will

be set on a concrete cradle. The existing energy dissipation feature at each principal spillway/low-level outfall (i. e. , either riprap-lined plunge pools or, in the case of Site 12A South, a concrete impact basin), will be reconstructed at the new outfall location. During the extension of the principal spillway conduits, base flow will be temporarily pumped around the dam to allow work to occur in the dry.

NRCS 10-Day Drawdown: **NRCS** requires the principal spillway to dewater at least 85 percent of the spillway hydrograph within 10-days following the 100-year storm event. The intent of this requirement is to reduce the frequency of activating the auxiliary spillway as flows in a vegetated earth auxiliary spillway can damage vegetation, make the auxiliary spillway vulnerable to erosion, and increase maintenance costs for the Sponsor(s). Typically, the elevation of the auxiliary spillway crest is set such that the frequency of activation is less than the one-percent chance flood event (i. e. , the 100-year event). Although the auxiliary spillway crest for Sites 12A, 25B and 26 are all set above the estimated 100-year water elevation, the NRCS 10-day drawdown criteria is not met due to the hydraulics of the principal spillway.

The 10-day drawdown requirement can be met by increasing the size or number of orifices in the principal spillway riser structures. Based on the 2016 Assessments, the existing orifice heights for Sites 12A, 25B and 26 would need to be increased by 7 inches, 10 inches, and 6 inches, respectively, to comply with the 10-day drawdown requirement. Modifications to Site 12A to accommodate the dry weather release pulse (such as raising normal pool), could eliminate the need to modify the orifice which sets normal pool. Depending upon how the dry weather release pulse is addressed, the need to modify the Site 12A orifice should be reevaluated during preliminary/final design.

Concerns associated with erosion and increased maintenance costs resulting from frequent activation of the auxiliary spillway would be reduced for alternatives involving a hardened spillway, such as Articulated Concrete Blocks or Roller Compacted Concrete. For alternatives that involve a hardened auxiliary spillway, the Sponsor may consider requesting a waiver of the 10-day drawdown requirement to maintain the existing dimensions of the orifices that set normal pool.

Based on the 2016 Assessments, Sites 12A South, 25B and 26 each have inadequate conveyance capacity and auxiliary spillway integrity concerns, meaning each dam is at risk of (1) being overtopped during the freeboard hydrograph event and (2) the auxiliary spillway is at risk of erosion during events which activate the auxiliary spillway. Both scenarios could lead to a breach of the dam resulting in an uncontrolled release of the reservoir. The following alternatives address conveyance capacity, spillway integrity and other identified deficiencies and include the rehabilitation options listed above for addressing internal seepage collection and conveyance, embankment stability and the NRCS 10-day drawdown requirements.

4.4.1 Site 12A Alternative 2C

This alternative consists of increasing the conveyance capacity of Site 12A by armoring the downstream embankment face of Site 12A South with RCC and allowing the freeboard hydrograph to overtop the dam. The existing auxiliary spillway crest elevation (El. 872. 4±) and the top of dam elevation (El. 878. 6± at Site 12A North) would remain unchanged to maintain the current level of flood protection and avoid upstream impacts around the rim of the reservoir. The embankment crest of Site 12A South would be lowered to match the auxiliary spillway elevation to create a minimum crest length of 280 feet to pass the freeboard hydrograph event without overtopping Site 12A North. This alternative places the existing water supply intake building within the approach channel to the RCC overtopping protection. While small

in comparison to the overall length of the RCC crest, the impact the water supply intake building may have on the hydraulic performance of the auxiliary spillway should be evaluated during preliminary/final design.

The RCC would be placed in one-foot-thick horizontal lifts to form steps (typically 1 to 2 feet high) having a slope of 3H:1V to cover the downstream embankment face. The RCC would extend beyond the downstream embankment toe to form a stilling basin. Due to the depth of bedrock in this area, a sheetpile cutoff wall will be installed along the downstream edge of the stilling basin to prevent potential scour and erosion within the downstream receiving channel from undermining the RCC structure. The left and right sidewalls of the RCC structure will be provided with a smooth finish and sloped at 2.5H:1V to direct overtopping flows into the stilling basin. The principal spillway conduit would be extended through the RCC overtopping protection, utilizing the RCC stilling basin to dissipate energy, eliminating the need for a separate impact basin. To avoid large areas of standing water within the stilling basin (which may be viewed as a safety concern), those portions of the stilling basin beyond the location of the principal spillway outfall could be backfilled with earth material. This material would be considered sacrificial and may be scoured out in the event the auxiliary spillway is activated. To reduce the visual impacts associated with the RCC overtopping protection, it is recommended the RCC steps and side walls be covered with topsoil and seeded. The 280-foot-long auxiliary spillway crest should remain exposed to create a uniform and stable crest elevation. Extension of the principal spillway conduit and the work associated with the RCC stilling basin would require base flows in Richardson Brook to be temporarily pumped over the dam to allow the work to occur in the dry. Excavated material from the RCC overtopping protection activities will be used to backfill the existing auxiliary spillway. Refer to Appendix C, Figures 38 through 41 for a conceptual plan of the RCC overtopping protection alternative.

The Site 12A Alternative 2C does not impact high sensitivity cultural resource areas but does alter Site 12A (North and South) which are NRHP-eligible dams. The project would restore Site 12A North to a vegetated condition, minimizing visual impacts. The RCC overtopping protection on the downstream face of Site 12A South will be covered with topsoil and seeded to create a vegetated condition, minimizing visual impacts. Coordination with the New Hampshire Department of Natural and Cultural Resources, Division of Historical Resources, has determined that this approach will result in "no adverse effect" on the resource (refer to Appendix A). Alternative 2C is expected to have environmental impacts, including 0.30± acres of permanent wetland disturbance, 65± linear feet of permanent stream disturbance, and 0.5± acres of tree clearing. This alternative will not result in increased reservoir elevations. Currently, NHDES owns the land surrounding the reservoir to the east of Route 45, and, according to the property deeds, flowage easements are in place for lands up to El. 876.1 (NAVD88) located to the west of Route 45 along Richardson Brook and Miller Gamble Brook. Consequently, land rights are in place for all lands located below the auxiliary spillway crest elevation except for properties owned by Marta M. and Marck C. Scott located along the eastern side of the reservoir. These properties are identified as "Conservation Easements", restricting the type and extent of development which is allowed. Refer to Table 4.5 for a side-by-side comparison of the alternatives retained for detailed study.

Construction costs for Site 12A Alternative 2C to modify both Sites 12A North and South are estimated at \$10.6 million, which include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. Incorporating costs for Engineering, Permits, and Construction Management (assumed to be 10%, 0.5% and 12%, respectively,

of the estimated construction costs), the total program costs for this alternative are estimated at \$13.0 million. Refer to Appendix D for additional information related to the estimated construction costs.

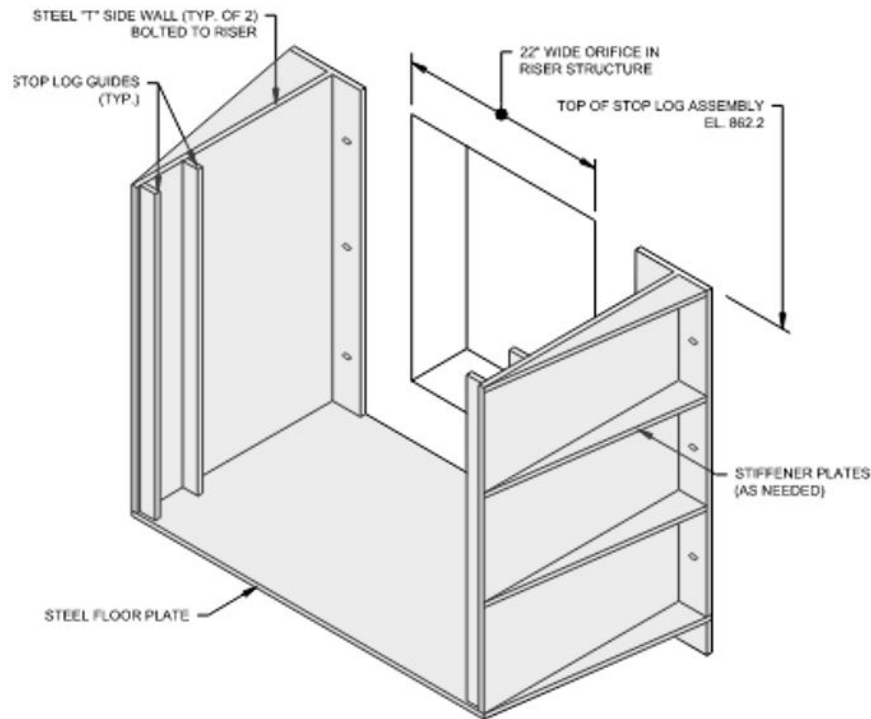
4.4.2 Site 12A - Release Pulse

During the scoping process, NHDES requested the Plan-EA consider modifications to Site 12A to dedicate two feet of reservoir storage for a two-day release of water into Richardson Brook during extreme drought conditions, targeting a release rate of 37 cfs to 47 cfs. This release, when coordinated with release pulses from other dams in the watershed, is intended to improve water quality and support aquatic life in the downstream reaches of the Souhegan River. While not required to bring Site 12A into compliance with current dam safety regulations, NHDES wishes to accommodate the release pulse to the greatest extent practicable.

The dedicated release pulse volume could be located below the normal pool elevation. Should this be considered, a safe yield study is recommended to evaluate the impact this will have on the water supply volume for the Town of Greenville. For this Plan-EA, it is assumed the normal pool elevation will be raised by two feet (i. e., from El. 860.2 to El. 862.2) to accommodate the release pulse volume, reducing the flood retarding volume of the reservoir. An evaluation of the 100-year storm event found the reservoir elevation would increase by approximately 1.6 feet (from El. 869.8 feet to El. 871.4 feet) due to the reduced flood retarding volume and would remain below the elevation of the auxiliary spillway crest (El. 872.4 feet). Consequently, modifications to the auxiliary spillway are not required as a result of raising the normal pool by two feet. When combined with Site 12A Alternative 2C, the increase in the normal pool elevation will not result in increased reservoir levels during the freeboard hydrograph. The increase in normal pool will impact approximately 0.9 acres of wetlands around the rim of the reservoir (refer to Appendix C, Figure 43).

Raising the normal pool elevation by 2 feet can be accomplished by modifying or replacing the Site 12A South principal spillway riser structure. As a cost savings to replacing the riser structure, a stop log system can be added in front of each orifice that sets normal pool to create the desired rise in water elevation (refer to Figure 4.1 and Appendix C, Figure 42). A robust trash rack is recommended that can prevent debris from clogging the orifices when the stoplogs are either in place or removed. To assist with installation and removal of the stop logs, a working platform is recommended that extends beyond the top of the principal spillway riser structure and over the stop log system to allow access from the top of the riser.

Figure 4. 1. Isometric View of Conceptual Stop Log Assembly (Typical of Two)



Note: Stop logs not shown for clarity.

The following options were evaluated for creating the 37 cfs to 47 cfs release from the reservoir during extreme drought conditions. Option 1 was selected by NHDES as a component of the preferred alternative.

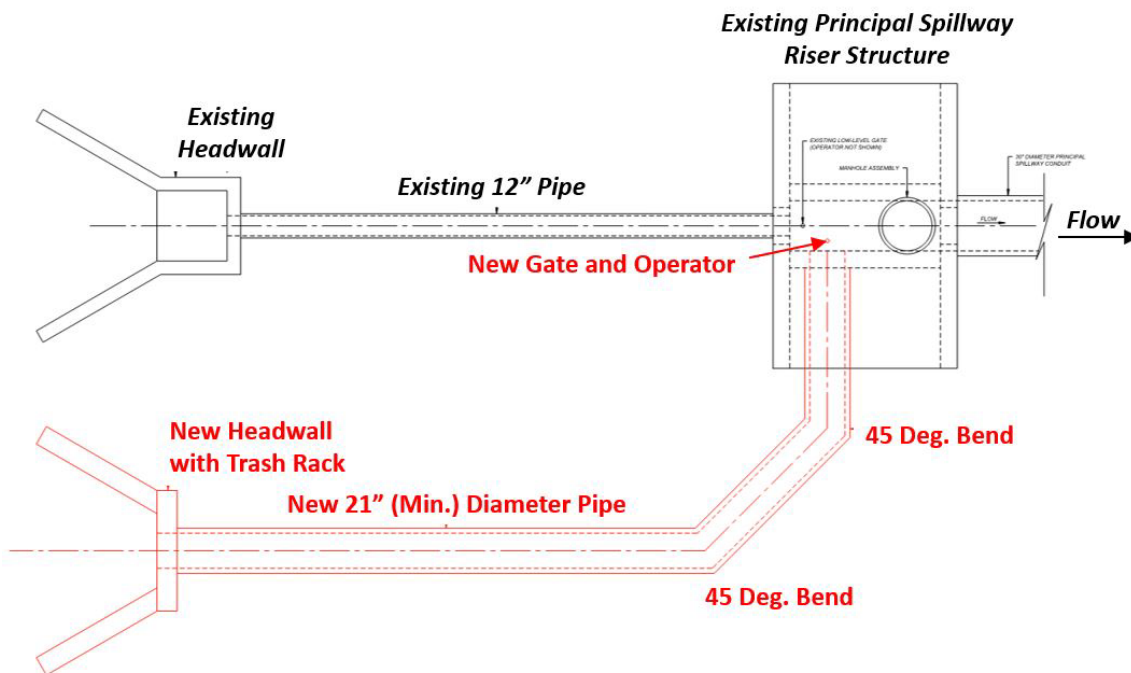
Option 1 (Operation of the Stop Log System): Permanently lower the invert of each orifice (2) that sets normal pool by 12 inches to increase the capacity of the system. Initiate the release pulse by removing all stop logs from one stop log bay which will produce a flow rate of approximately 46 cfs when combined with the operation of the existing low-level outlet works (assuming the reservoir is at normal pool). As the reservoir level falls the release rate will drop to approximately 36 cfs after the first day of operation, at which time the second set of stop logs can be removed to reestablish the release rate of approximately 46 cfs. Construction costs could range between \$100k and \$200k, depending upon the complexity and robustness of the stop log system and associated trash rack and working platform.

Option 1 is a simple and cost-effective approach to producing the desired release pulse from Site 12A. However, it relies on the reservoir being at the normal pool elevation at the start of the release pulse, which may or may not be the case depending upon the severity of the drought and water withdrawals from the reservoir. Options which pull water from the bottom of the reservoir would provide a more reliable means for ensuring the release pulse can be created (refer to Options 2 and 3).

Option 2 (Addition of Larger Low-Level Outlet System): The existing low-level outlet at Site 12A South is a 12" conduit controlled by a gate on the interior of the principal spillway riser structure. With the gate in the fully open position and with the reservoir at normal pool, the existing system can release approximately 14 cfs, approximately 30 percent of the target release rate. To achieve the target release

rates, a low-level outlet having a minimum diameter of 21 inches is required to produce flow rates of 40 cfs to 45 cfs with the reservoir between El. 860 feet and El. 862 feet, respectively. The new low-level outlet would parallel the existing system and enter either the left or right side of the principal spillway riser where a slide gate would control the operation of the system. Figure 4. 2 provides a conceptual layout of the new low-level outlet system with the new features shown in red. Construction of the new low-level outlet would require the reservoir to be drained, or a cofferdam and diversion of water system would be needed to perform the work in the dry. Excavation and backfilling activities for the new low-level outlet system should be carefully considered so as not to compromise the integrity of the dam embankment. Construction costs could range between \$300k and \$400k.

Figure 4. 2. Conceptual Layout of New Low-Level Outlet



Low-level outlet systems are subject to sedimentation, debris buildup, and gate failures which could reduce the effectiveness of the system in delivering the required flow rates, and in the case of Site 12A, a failure of the gate could inadvertently drain the reservoir, resulting in the loss of water supply volume for the Town of Greenville. The use of a siphon would eliminate the concern associated with inadvertently draining the reservoir (refer to Option 3).

Option 3 (Addition of Siphon System): Siphons can be an effective way to move water over low-height structures. For Site 12A South, a siphon having a diameter of at least 24 inches would be needed to produce the target release rates. In addition to the piping, the system would likely include a multiple port intake structure situated on the bottom of the reservoir immediately upstream of the dam embankment and priming/control valves located at the high point of the system and at the downstream end of the system. An energy dissipation structure should be included at the siphon outfall to ensure flows to not cause erosion of the receiving channel. The effectiveness of siphon systems can be reduced by

sedimentation and debris buildup; consequently, the siphon entrance should be cleared of all objectionable material prior to operation.

Construction of the upstream portion of the siphon system could be performed in the wet with dive crews, or a cofferdam system could be installed to isolate the work area from the reservoir to allow the work to be performed in the dry. The siphon can be added to Site 12A as a stand-alone system or it can be integrated into other improvements, such as the RCC overtopping option. Based on recently constructed siphon systems of similar size and length, the construction cost of the Site 12A siphon could range between \$500k and \$600k.

Option 4 (Portable Pumps): In lieu of constructing one or more permanent structures for the purpose of producing the release pulse, portable pumps could be mobilized to the site each time the release pulse is needed. It is estimated five Godwin Dri-Prime DPC300 standard diesel pumps with 12-inch suction and discharge lines would be required to produce the target release rates. Staging the pumps within the auxiliary spillway approach channel would be preferred over staging on the crest of the dam to reduce the pumping head that needs to be overcome. The pump discharge lines would discharge into the downstream receiving channel and be provided with adequate scour protection to prevent erosion.

Based on 2024 pricing from Xylem, the weekly rental rate for five pumps and their appurtenant features is approximately \$90k per week plus additional costs on behalf of NHDES to provide lifting equipment and manpower to assist with setup and breakdown of the pumping system. Purchase cost of the pumping equipment is approximately \$1 million.

4.4.3 Site 25B Alternative 1B

This alternative consists of increasing the conveyance capacity of Site 25B by filling low areas on the dam crest to pass the freeboard hydrograph through the existing 350-foot-wide auxiliary spillway. The embankment raising will be extended beyond the left abutment to tie into high ground. The existing auxiliary spillway crest elevation (El. 801.8±) would remain unchanged to maintain the current level of flood protection and the top of dam would be raised from El. 808.3± (existing low point) to El. 809.0. Note most of the dam crest is current at or above El. 809.0. To address auxiliary spillway integrity concerns, a concrete cutoff wall will be added at the control section to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway, and the control section will be moved downstream to a point beyond the toe of the downstream embankment to prevent auxiliary spillway flows from impacting the downstream right embankment groin. A conventional concrete cutoff wall is assumed due to the shallow depth to bedrock found during the limited subsurface exploration plan performed as part of this Plan-EA. Should future subsurface exploration programs performed during preliminary/final design determine competent rock is deeper in elevation, the use of RCC should be evaluated to determine the most economical construction material. Upstream of the new control section, the auxiliary spillway approach channel will be graded at a 1% slope towards the reservoir. Excess excavation material will be used to extend the left spillway training berm in a downstream direction to direct auxiliary spillway flows away from the dam embankment. Refer to Appendix C, Figures 53 through 56 for conceptual drawings of Site 25B Alternative 1B.

NHDES has determined the Site 25B principal spillway riser structure will be replaced due to inadequacy of the riser footer to withstand the maximum credible earthquake. Replacement of the riser will require dewatering the reservoir and diversion of water around the work area. To aid in management of water,

the new riser can be constructed upstream of the existing riser, allowing diversion of water through the existing riser until the new riser is complete, at which time the existing riser may be abandoned.

The Site 25B Alternative 1B does not impact high sensitivity cultural resource areas but does alter Site 25B which is a NRHP-eligible dam. The project would restore Site 25B to a vegetated condition, minimizing visual impacts. The auxiliary spillway would also be restored to a vegetated condition except for a narrow band of exposed concrete at the cutoff wall location. Coordination with the New Hampshire Department of Natural and Cultural Resources, Division of Historical Resources, has determined that this approach will result in "no adverse effect" on the resource (refer to Appendix A). Alternative 1B is expected to have environmental impacts, including 0.53± acres of permanent wetland disturbance and 75± linear feet of permanent stream disturbance. Minimal tree cleaning is required to construct the proposed improvements. In addition to lands owned by NHDES, Site 25B impounds water on lands owned by Lisa Beaudoin (Tax Parcel 6-59) and Timothy Fiske (Tax Parcels 6-61 and 6-62) within the Town of Temple and lands owned by the Greeley Family Trust (Tax Parcel E-6) and the Society for the Protection of New Hampshire Forests (Tax Parcel E-44) in the Town of Wilton. The filling of the low areas on the dam crest is expected to have a negligible impact on the reservoir elevation during the freeboard hydrograph. Refer to Table 4.5 for a side-by-side comparison of the alternatives retained for detailed study.

Construction costs for Site 25B Alternative 1B are estimated at \$7.3 million, which include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. Incorporating costs for Engineering, Permits, and Construction Management (assumed to be 10%, 0.5% and 12%, respectively, of the estimated construction costs), the total program costs for this alternative are estimated at \$8.9 million. Refer to Appendix D for additional information related to the estimated construction costs.

4.4.4 Site 26 Alternative 1C

This alternative consists of increasing the conveyance capacity of Site 26 by filling low areas on the dam crest to pass the freeboard hydrograph through the existing 320-foot-wide auxiliary spillway. The existing auxiliary spillway crest elevation (El. 922.1±) would remain unchanged to maintain the current level of flood protection and the top of dam would be raised from El. 928.1± (existing low point) to El. 928.5. Note most of the dam crest is current at or above El. 928.5. To address auxiliary spillway integrity concerns, a RCC stepped cutoff wall with a 320-foot-wide control weir will be added at the auxiliary spillway control section to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway. Founded on bedrock, the RCC cutoff will be located below grade and will contain left and right training walls to ensure flows are directed over the structure. A RCC stepped cutoff wall is assumed due to the depth to bedrock found during the limited subsurface exploration plan performed as part of this Plan-EA. Should future subsurface exploration programs performed during preliminary/final design determine competent rock is higher in elevation, the use of conventional concrete should be evaluated to determine the most economical construction material. Disturbed areas within the auxiliary spillway will be restored to their current grades and stabilized with vegetation. Consequently, the proposed improvements would not impact the future use of the auxiliary spillway by the Timberdoodle Club. Refer to Appendix C, Figures 77 through 80 for conceptual drawings of Site 26 Alternative 1C.

NHDES has determined the Site 26 principal spillway riser structure will be replaced due to inadequacy of the riser footer to withstand the maximum credible earthquake. Replacement of the riser will require dewatering the reservoir and diversion of water around the work area. To aid in management of water, the new riser can be constructed upstream of the existing riser, allowing diversion of water through the existing riser until the new riser is complete, at which time the existing riser may be abandoned.

The Site 26 Alternative 1C does not impact high sensitivity cultural resource areas but does alter Site 26 which is a NRHP-eligible dam. The project would restore Site 26 to a vegetated condition, minimizing visual impacts. The RCC cutoff wall in the auxiliary spillway would be backfilled and covered with topsoil and seeded to create a vegetated condition, minimizing visual impacts. Coordination with the New Hampshire Department of Natural and Cultural Resources, Division of Historical Resources, has determined that this approach will result in "no adverse effect" on the resource (refer to Appendix A). Alternative 1C is expected to have environmental impacts, including 0.27± acres of permanent wetland disturbance, 95± linear feet of permanent stream disturbance and 0.7± acres of tree cleaning. With the exception of the right abutment, which is owned by NHDES, the remainder of the Site 26 dam and auxiliary spillway are located on lands owned by the Timberdoodle Club on which NHDES has an easement. The easement encompasses the dam, auxiliary spillway and sediment pool; however, at the auxiliary spillway elevation, Site 26 Dam impounds water beyond the easement on lands owned by Whitcomb & Trust, Randall H. Martin, James W. Quinn, Martin Connolly, an RT/Trust within the Town of Temple. The filling of the low areas on the dam crest is expected to have a negligible impact on the reservoir elevation during the freeboard hydrograph. Refer to Table 4.5 for a side-by-side comparison of the alternatives retained for detailed study.

Construction costs for Site 26 Alternative 1C are estimated at \$12.5 million, which include a 30 percent contingency to account for unknowns and alterations of the design which may occur during the preliminary and final design phases. Incorporating costs for Engineering, Permits, and Construction Management (assumed to be 10%, 0.5% and 12%, respectively, of the estimated construction costs), the total program costs for this alternative are estimated at \$15.3 million. Refer to Appendix D for additional information related to the estimated construction costs.

Table 4. 5. Summary of Alternatives Preliminary Screening Evaluation

Plan Description	No Action	Decommissioning	Site 12A Alts Eliminated (1, 2A & 2B)	Site 25B Alts Eliminated (1A, 2A & 2B)	Site 26 Alts Eliminated (1A, 1B, 2A, 2B & 2C)	Site 12A Alt 2C, Site 25B Alt 1B, Site 26 Alt 1C
NEPA Purpose and Need	Partially meets purpose and need. Does not provide dry weather release pulse and does not bring structures into compliance with current	Partially meets purpose and need. Does not maintain flood protection, maintain water supply or provide dry weather release	Meets purpose and need.	Meets purpose and need.	Meets purpose and need.	Meets purpose and need.
Contribution to Planning Objectives						
Maintain Current Level of Flood Protection	Yes.	No. Removal of dams would eliminate current flood protection benefits.	Yes. No change in flood retarding volume. Normal pool & auxiliary spillway crest elevations remain unchanged.	Yes. No change in flood retarding volume. Normal pool & auxiliary spillway crest elevations remain unchanged.	Yes. No change in flood retarding volume. Normal pool & auxiliary spillway crest elevations remain unchanged.	Yes. No change in flood retarding volume. Normal pool & auxiliary spillway crest elevations remain unchanged.
Maintain Water Supply	Yes.	No. Removal of Site 12A North & South Dams would eliminate the storage capacity and associated water supply volume.	Yes. No change to normal pool.	N/A. Site 25B not used for water supply.	N/A. Site 26 not used for water supply.	Yes. Raise normal pool for Site 12A release pulse to avoid reducing water supply volume.
Contribution to Planning Objectives						
Provide Dry Weather Release Pulse	No. Existing low-level outlet at Site 12A South does not produce desired release rate and may be unreliable.	No. Removal of Site 12A North and South Dams would eliminate the storage capacity and the ability to provide a dry weather release pulse.	Yes. The release pulse can be implemented with each of the Alternatives.	N/A. Souhegan River Water Management Plan does not identify Site 25B as a candidate for a dry weather release pulse.	N/A. Souhegan River Water Management Plan does not identify Site 26 as a candidate for a dry weather release pulse.	Yes. Modify riser and raise normal pool by 2 feet to accommodate a dry weather release pulse.

Bring Structures Into Compliance with Current Safety Standards	No. Structures would be maintained but would not be brought into compliance with current safety standards.	Yes. Decommissioning would eliminate the need to comply with current dam safety standards.	Yes. Alternatives address identified dam safety deficiencies.	Yes. Alternatives address identified dam safety deficiencies.		Yes. Alternatives address identified dam safety deficiencies.
Response to Planning Constraints						
Avoid/Minimize Cultural Resource Impacts	No impacts to high sensitivity cultural resource areas. No impact to NRHP-eligible dams.	No impacts to high sensitivity cultural resource areas. All dams, which are NRHP-eligible, would be adversely impacted.	No impacts to high sensitivity cultural resource areas for Alts 1 and 2B. Alt 2A would require work in high sensitivity cultural resource areas. Visual impacts to NRHP-eligible dams could be mitigated by restoring each dam to a vegetated condition.	No impacts to high sensitivity cultural resource areas. Visual impacts to NRHP-eligible dams could be mitigated by restoring each dam to a vegetated condition.	No impacts to high sensitivity cultural resource areas. Visual impacts to NRHP-eligible dams could be mitigated by restoring each dam to a vegetated condition.	No impacts to high sensitivity cultural resource areas. Visual impacts to NRHP-eligible dams could be mitigated by restoring each dam to a vegetated condition.
Response to Planning Constraints						
Avoid/Minimize Water Resource Impacts	No impacts	The decommissioning alternative will create 4. 2± ac of direct wetland impacts. Additional indirect impacts would be expected around the perimeter of each normal pool. These impacts may be offset by new wetlands that may form within the dewatered reservoirs.	When combined with the Site 12A release pulse, these alternatives either match or exceed the water resource impacts of the preferred alternative.	When combined with the Site 12A release pulse, Site 25B Alternative 2B has similar water resource impacts when compared to the preferred alternative and Site 25B Alternatives 1A and 2A result in 0. 3± acres less wetland impacts when compared to the preferred alternative.	When combined with the Site 12A release pulse, Site 26 Alternatives 1B, 2B and 2C have similar water resource impacts when compared to the preferred alternative and Site 26 Alternative 1A and 2A have 0. 3± acres of additional wetland impacts when compared to the preferred alternative.	2. 0± ac wetland impacts 235± ft stream impacts

Maintain Water Supply	Yes.	No. Removal of Site 12A North & South Dams would eliminate the storage capacity and associated water supply volume.	Yes. No change to normal pool.	N/A. Site 25B not used for water supply.	N/A. Site 26 not used for water supply	Yes. Raise normal pool for Site 12A release pulse to avoid reducing water supply volume.
Plan Description	No Action	Decommissioning	Site 12A Alts Eliminated (1, 2A & 2B)	Site 25B Alts Eliminated (1A, 2A & 2B)	Site 26 Alts Eliminated (1A, 1B, 2A, 2B & 2C)	Preferred Alternative
Response to Evaluation Criteria						
Acceptability	Does not address known deficiencies, placing downstream property and individuals at increased risk of flooding from a dam failure.	Eliminates the flood attenuation capabilities of each structure, increasing the frequency and magnitude of downstream flooding.	Meets purpose and need.	Meets purpose and need.	Meets purpose and need.	Meets purpose and need and is preferred by the Sponsor NHDES.
Completeness	Complete. No outside action required to implement.	Partially complete. Public action required to implement downstream floodproofing.	Complete. No outside action required to implement.	Complete. No outside action required to implement.	Complete. No outside action required to implement.	Complete. No outside action required to implement.
Efficiency	Not evaluated as project does not fully meet the purpose and need.	Less Efficient. Total cost of decommissioning could exceed \$143 million (refer to Table 4. 2)	Partially efficient when compared to the cost of the preferred alternative.	Partially efficient when compared to the cost of the preferred alternative.	Partially efficient when compared to the cost of the preferred alternative.	Most efficient. The preferred alternative is the most cost-effective alternative evaluated.
Effectiveness	Partially meets purpose provide dry weather release pulse and does not bring structures into compliance with current	Partially meets purpose protection, maintain water supply or provide dry weather release	Meets purpose and need.	Meets purpose and need.	Meets purpose and need.	Meets purpose and need.

5 ENVIRONMENTAL CONSEQUENCES: EVALUATION OF ALTERNATIVES

5.1 Summary and Comparison of Alternatives- Planning Process

Table 5. 1. Summary and Comparison of Alternatives- Planning Process

Item or Concern	No Action Alternative	Site 12A Alt. 2C, Site 12A Alt. 3 Release Pulse, Site 25B Alt 1B, and Site 26 Alt 1C
Alternative Major Features/ Works of Improvement by Authorized Purpose		
Flood Prevention		
Maintain flood protection for residential, commercial, and agricultural structures and transportation infrastructure in the study area	Yes.	Yes. No change in flood retarding volume. Normal pool & auxiliary spillway crest elevations remain unchanged.
Municipal & Industrial Water Supply		
Maintain adequate water storage capacity and quality for drinking water supply for the Town of Greenville	Yes.	Yes. Raise normal pool for Site 12A Alternative 3 to avoid reducing water supply volume.
Water Quality Management		
Manage river water flow conditions consistent with the state's Souhegan River Water Management Plan instream flow targets.	No. Existing low-level outlet at Site 12A South does not produce desired release rate and may be unreliable.	Yes. Modify Site 12A riser and raise normal pool by 2 feet to accommodate a dry weather release pulse.
Project Objectives*		
Bring Structures Into Compliance with Current Safety Standards	No. Structures would be maintained but would not be brought into compliance with current safety standards.	Yes. Alternatives address identified dam safety deficiencies.

Constraints		
Avoid/Minimize Cultural Resource Impacts	No impacts to high sensitivity cultural resource areas or historic resources.	No impacts to high sensitivity cultural resource areas. No adverse effects to eligible historic resources.
Avoid/Minimize Water Resource Impacts	No impacts.	2. 0± ac wetland impacts 235± ft stream impacts
Maintain Water Supply	Yes.	Yes. Raise normal pool for Site 12A Alternative 3 to avoid reducing water supply volume.
Evaluation Criteria		
Completeness	Complete. No outside action required to implement.	Complete. No outside action required to implement.
Efficiency	Not evaluated as project does not fully meet the purpose and need.	Most efficient. The preferred alternative is the most cost-effective alternative evaluated.
Effectiveness	Partially meets purpose and need. Does not provide dry weather release pulse and does not bring structures into compliance with current dam	Meets purpose and need.
Acceptability	Does not address known deficiencies, placing downstream property and individuals at increased risk of flooding from a dam failure.	Meets purpose and need.
*Same as Alternative Major Features/ Works of Improvement by Authorized Purpose		

5.2 Summary and Comparison of Alternatives- Ecosystem Services

Chapter 3 presented ecosystem services (or resources of concern) to be considered in the analysis and described existing conditions for these services. Chapter 5 presents the analysis of environmental consequences for each ecosystem service. To quantify the change in ecosystem services over time, relevant indicators were identified. Using these relevant indicators, impacts to the flows of the ecosystem service and its consequences for human well-being are presented. The change in ecosystem service flows

resulting under each alternative is presented as a range to highlight the uncertainty involved in quantifying the flows. While considering impacts to ecosystem services, reasonably foreseeable changes within the study areas were taken into consideration. Table 5. 2 provides a summary of magnitude of effects for each ecosystem service.

Table 5. 2. Summary and Comparison of Alternative – Ecosystem Services Tradeoff Analysis

Criterion	No Action	Site 12A Alt. 2C, Site 12A Alt. 3 Release Pulse, Site 25B Alt 1B, and Site 26 Alt 1C
Alternative Identification		
Locally Preferred		X
Environmentally Preferred		X
Maximum Net Monetized Benefits Plan		X
Preferred Alternative (Maximum Net public benefits identified through trade off analysis)		X
Guiding Principles		
Healthy and Resilient Ecosystems	Does not meet guiding principles in the event of dam failure and resulting impact on ecosystem services in the study area	Meets guiding principles by maintaining and improving ecosystem functions in the long-term, but short-term impacts (during construction) will occur to some ecosystem service functions. Allowing a conservation release of water during low flow periods is beneficial to restoring ecosystem functions in the Souhegan River.
Sustainable Economic Development	Does not meet the guiding principle as the threat to human life and property for downstream residents and for	Meets the guiding principle as the threat to human life and property is reduced, and municipal water supply for the

	municipal water supply for the operation of high hazard dams, with known dam safety	town of Greenville is maintained. Flood protection to the study area is maintained.
Floodplains	Does not substantially affect current floodplain uses that have evolved since the dams were first constructed.	Does not substantially affect current floodplain uses that have evolved since the dams were first constructed.
Public Safety	No rehabilitation to meet dam safety standards. Continuation of threat to human life and ecosystem services in downstream communities from a dam failure event.	safety standards. Under this option threat from a dam failure ecosystem services in
Watershed Approach	Does not meet the guiding principle as flood damage risk to the watershed associated with dam failure event remains unchanged.	Meets the guiding principle as the alternative reduces the risk of flood damage by considering the four dams as an integrated system providing watershed flood protection and municipal water supply.
ECOSYSTEM SERVICES EFFECTS		
Provisioning Services		
Food (non monetized)	Maintains current level of protection for prime farmlands and drinking water supply, and thereby supports food provision until a dam failure event. In the event of a dam failure, potential for the farmland of prime importance in the study area to	Maintains current level of protection for prime farmlands and drinking water supply. Reduces risk of dam failure event. During drought conditions the release pulse will lead to improved aquatic health.

	support food provision will be adversely affected.	
Water Quality and Quantity	Risk to potable water supply for the Town of Greenville and water quality in the study area from a dam failure event remains unchanged. Monetized value of the drinking water supply \$405,143 remains at risk of loss.	Reduction in risk to potable water supply for the Town of Greenville and water quality in the study area from a dam failure event. Monetized value of the drinking water supply \$405,143 has a reduced risk of loss. Allowing a conservation release of water during low flow periods is beneficial for maintaining water quality in the study area during drought conditions..
Regulating Services		
Flood and Disease Control	Forgoes rehabilitation needed to meet federal dam safety standards that would reduce risk of dam failure to the study area. Flood control protection (damage potential of \$4,483,258) provided by all four sites remains at risk until a potential dam breach event. No reduction in risk to Site 12A North and South which provide disease control through environmental monitoring of the water supply.	Maintains current level of flood protection for the study area. Rehabilitation to state and federal dam safety requirements would reduce risk of potential dam failure and resulting impacts (damage potential of \$4,420,217). Disease control through environmental monitoring of the water supply provided at Site 12A North and South would continue.
Water Filtration	Natural water filtration, sediment retention, and erosion control supported by wetlands and forested areas remains at the same risk of disruption from dam failure. In the event of a dam failure, water filtration services would be affected negatively due to higher	Maintains the current level of natural water filtration, sediment retention, and erosion control supported by wetlands and forested areas, and reduces risk of disruption from dam failure. Short term disruption of water filtration services during construction would be

	turbidity and sediment deposition.	mitigated to minimize impacts. Addition of a release pulse would positively impact water filtration services provided during drought conditions
Cultural Services		
Community cohesion and quality of life	Does not reduce the risk of a dam failure event that would negatively impact quality of life and community cohesion.	Rehabilitation would reduce the risk of dam failure that would negatively impact quality of life and community cohesion.
Aesthetic Viewsheds	Maintains the current aesthetic value to the surrounding region.	Maintains the current aesthetic value to the surrounding region.
Supporting Services		
Nutrient Cycling	Nutrient cycling provided by the ecological resources in the study area remain at the same risk of disruption from a dam failure event.	Nutrient cycling provided by the ecological resources in the study area would have a reduced risk of disruption from a dam failure event. The addition of the release pulse for site 12A improves nutrient cycling during drought conditions.
Plant and Animal Habitat	Does not reduce risk of migration and gene flow of plant and animal species in the study area from a dam failure event.	Reduces risk of migration and gene flow of plant and animal species in the study area from a dam failure event.
ECONOMIC ANALYSIS		
Cost		
Total Project Investment		\$39,027,533
Annual Project Investment		\$1,235,091
Annual OM&R Costs	\$30,000	\$30,000
Total Annual Project Costs	\$30,000	\$1,265,091

Monetized Benefits for Ecosystem Services		
Provisioning		\$405,143
Regulating*		\$55,625
Cultural	Not Monetized	Not Monetized
Supporting	Not Monetized	Not Monetized
Total Annual Monetized Benefits	NA	\$460,768
Total Annual Monetized Costs	NA	\$1,265,091
Benefit Cost Ratio	NA	0.36
Annual Monetized Net Benefit	NA	\$(804,323)
*Flood damage protection offered under the No Action and the Preferred Alternative is an important regulating service provided by the dams. It is the reduction in flood damage potential achieved by the Preferred Alternative as compared to the No Action Alternative that is used for calculation of the benefit cost ratio.		

5.3 Effects of Individual Alternatives Relative to Resource Concerns

5.3.1 Soil-Related Concerns

5.3.1.1 Topography

No Action/FWOI Alternative –An eventual failure of the dams would cause changes to site topography at the dams and downstream areas. High velocity flows associated with uncontrolled breach events would erode the dams, their appurtenances, and adjacent areas. This would result in reduced elevation within the flood zone as surface sediments are transported downstream. It would also result in steep, eroded slopes at the border between the impacted flood zone and upland areas.

Preferred Rehabilitation Alternative – The anticipated impacts to site topography include flattening the dam embankments at each site to improve slope stability. At Site 12A, the embankment crest of Site 12A South would be lowered to match the auxiliary spillway elevation to create a crest length of 280 feet and the downstream embankment face would be armored with Roller Compacted Concrete (RCC) and covered with topsoil to pass the freeboard hydrograph event without overtopping Site 12A North.

At Site 25B, the dam crest will be raised 0.7 feet from El. 808.3 to El. 809.0, and the auxiliary spillway approach channel will be graded at a 1% slope towards the reservoir. Excess excavation material will be used to extend the left spillway training berm in a downstream direction to direct auxiliary spillway flows away from the dam embankment.

At Site 26, the dam crest will be raised by 0.4 feet to pass the freeboard hydrograph through the existing 320-foot-wide auxiliary spillway. The existing auxiliary spillway crest elevation (El. 922.1±) would remain unchanged to maintain the current level of flood protection and the top of dam would be raised from El. 928.1± to El. 928.5.

5.3.1.2 Soil Resources and Farmland Soils

No Action/FWOFI Alternative – Flooding associated with an eventual failure of the dam is likely to erode soils downstream of the impoundments and adjacent to the dams. Site 12A South Dam and the Site 25B Dam have areas classified by NRCS as farmland of local importance in or adjacent to these downstream areas that would likely be impacted by erosive forces. If the topsoil of these areas is washed away, they may no longer qualify as farmland soils. These areas are not currently being used as farmland, but dam failure may result in reducing the suitability of these soils for agricultural use in the future. Additionally, a loss of a pool would lower the water table and potentially convert hydric soils in fringe wetlands surrounding the reservoirs into non-hydric soils until the pools are restored.

Preferred Rehabilitation Alternative – Earth disturbances at Site 12A are anticipated to total 4.3± acres. At Site 25B, 6.7± acres of earth disturbance are anticipated. At Site 26, 3.7± acres of earth disturbance are anticipated. Appropriate erosion and sedimentation controls would be enacted at each site to protect soil resources during construction to minimize impacts. Permanent impacts to soil resources include the construction of RCC structures within the auxiliary spillways at Site 25B and Site 26 and inundating soils around the rims of the reservoirs under increased pool elevations. All dam embankments are currently classified as Udorthents, smoothed, which are man-made disturbed soils. Therefore, soil impacts from work on the dam embankments are minimal with appropriate erosion and sedimentation control measures in place.

5.3.1.3 Geology

No Action/FWOFI Alternative – Geological impacts under the No Action Alternative are unlikely to occur. However, it is possible that high-velocity floodwaters associated with a dam breach may scour away surface sediments and expose bedrock in areas within or adjacent to the dams and their appurtenances.

Preferred Rehabilitation Alternative – No geological impacts are anticipated under the Preferred Rehabilitation Alternative.

5.3.2 Water- Related Concerns

5.3.2.1 Water Resources and Water Quality

No Action/FWOFI Alternative – The principal spillway channels of each dam would be impacted by eventual dam failures associated with the No Action Alternative. These watercourses would be subject to highly erosive forces that would permanently alter the bed and banks of each channel. The streambanks would be overtopped, and new flow paths may be created. Sediment transported from upstream would be deposited in these waterways, thus temporarily increasing turbidity and reducing water quality. Following an uncontrolled breach event, water levels within the impoundments would reduce to an elevation equal to the breach, causing a reduction in water storage.

Preferred Rehabilitation Alternative – The Preferred Alternative would maintain existing water resources and water quality at all sites. Under the release pulse condition proposed at Site 12A, water resources and quality would be improved due to increased water storage at the Greenville Reservoir, which serves as a drinking water supply source. The release pulse is designed to improve water quality and aquatic habitat downstream of the reservoir during drought conditions.

5.3.2.2 Groundwater

No Action/FWOFI Alternative – The eventual failure of the dams would result in a lowering of the normal pool of their impoundments. This would affect groundwater levels adjacent to the dam, causing the water table to be lowered in the vicinity of the impoundments. This effect would be temporary if the dams were repaired.

Preferred Rehabilitation Alternatives – Temporary reservoir pool lowering during construction would cause the water table to be lowered in the vicinity of the impoundments. This effect would be temporary until the dams are rehabilitated.

5.3.2.3 Floodplain Management

No Action/FWOFI Alternative – Under this alternative, there would be no changes to the current levels of flooding or floodplain function in the existing floodplain as no substantial repairs or rehabilitation would occur. The risk of a dam failure would continue. There are 98 structures located within the 100-year flood hazard area and seven critical facilities within the 500-year flood hazard area downstream of the dams within the area of analysis under existing conditions.

Preferred Rehabilitation Alternative – Under this alternative, there would be no changes to the current levels of flooding or floodplain function in the existing floodplain. The risk of a dam failure is reduced for the 98 structures located within the 100-year flood hazard area and seven critical facilities within the 500-year flood hazard area downstream of the dams within the area of analysis under existing conditions.

5.3.2.4 Waters of the U. S. , Wetlands, and Special Aquatic Sites

No Action/FWOFI Alternative – An eventual failure of the dams would result in the lowering of the normal pool of their impoundments and a subsequent lowering of the water table in the vicinity of the impoundments. The reduced elevation of the local water table would result in lowered baseflow elevation in streams that flow into and out of the impoundments and reduce groundwater contribution to wetlands adjacent to the impoundments. Groundwater flow was identified as the primary hydrological source for wetlands that abut the impoundments at each site, and decreased groundwater inputs may result in the eventual drying-out of wetlands that are above the existing normal pool elevations of the impoundments. These wetlands would likely expand into the dewatered footprints of the reservoirs, resulting in minimal net loss of wetland and stream habitat while the reservoirs remain in a lowered state.

Preferred Rehabilitation Alternatives – At the Site 12A North and South Dams, $0.3 \pm$ acre of permanent wetland impacts and $65 \pm$ linear feet of permanent stream impact are anticipated. Under the release pulse for Site 12A, an additional $0.9 \pm$ acre of permanent wetland impacts is anticipated. The Greenville Reservoir normal pool acreage would increase from 120 acres to 123 acres, encroaching into fringe wetlands around the reservoir, thus converting palustrine wetland habitat into deepwater habitat. New palustrine wetland habitat would form around the expanded reservoir footprint.

At the Site 25B Dam, 0.53± acre of permanent wetland impacts and 75± linear feet of permanent stream impacts are anticipated.

At the Site 26 Dam, 0.27± acre of permanent wetland impacts and 95± linear feet of permanent stream impacts are anticipated.

5.3.2.5 Regional Water Resource Plans

No Action/FWOFI Alternative – Under the No Action Alternative, Site 12A would not be upgraded to provide a two-day release pulse, and the Souhegan River Water Management Plan (2013) would not be supported. During periods of prolonged drought, low flow conditions would develop in the downstream reaches of the Souhegan River. Water quality would decrease due to reduced circulation. Stream temperatures would increase, and dissolved oxygen would decrease causing stress conditions for cold water fishes. Prolonged low flow conditions could also lead to impaired in-stream migration and the disruption of aquatic life cycles. Riparian vegetation would be stressed due to decreased water levels.

Preferred Rehabilitation Alternative – The Souhegan River Water Management Plan (2013) recommends upgrading the Site 12A to include release pulse capability. The release is intended to improve water quality and support aquatic life in the downstream reaches of the Souhegan River. Under the two-day release pulse conditions for Site 12A, the Souhegan River Water Management Plan would be supported. A two-day release pulse into Richardson Brook, as recommended by the plan, is designed to mimic a precipitation event to relieve water stress and reset stream flow conditions during extreme drought conditions. The release would improve water quality and support aquatic life in the downstream reaches of the Souhegan by resetting stream flow conditions. The pulse conditions would support riparian vegetation, prevent the disruption of aquatic life cycles, and ensure continuous aquatic connections to support the movement of species up and downstream. The pulse condition would also improve water quality by increasing circulation and dissolved oxygen levels, and moderating stream temperatures.

5.3.3 Plant and Animal-Related Concerns

5.3.3.1 Endangered and Threatened Species

No Action/FWOFI Alternative– No effects to endangered or threatened species are anticipated in association with the No Action Alternative. No federal or state listed rare, threatened, or endangered species were observed within the study area during the wetland delineation and stream assessment, and the New Hampshire Natural Heritage Bureau indicated that there is no known occurrence of listed species within the project areas. Potential summer roosting habitat for listed bat species is present within the study areas of each site. Riparian habitats downstream of the dams that contain potential roost sites could be disturbed by floodwaters from an uncontrolled breach, which may result in a temporary and minimal loss of habitat.

Preferred Rehabilitation Alternative – No impacts to listed species are anticipated under the Preferred Alternative. Seasonal tree clearing restrictions would be implemented to avoid impacts to potential summer roosting habitat of protected bat species. Conservation measures have been recommended by NHDES to avoid impacts to species of concern at Sites 12A North and South and would be implemented. As designs are developed and the project is closer to implementation reviews will need to be ongoing as updates to species lists could occur or listing status.

5.3.3.2 Migratory Birds

No Action/FWOFI Alternative – Migratory birds utilizing the reservoirs as open water habitat would be displaced under the No Action Alternative during an eventual failure of the dams. Migratory birds seeking wetland, wet meadow, or riparian habitat would be attracted as these habitat types expand into the reservoir footprints.

Preferred Rehabilitation Alternative – Construction activities during the spring may temporarily affect the migration and breeding habitat of waterfowl and other migratory birds. Temporary lowering of the reservoir pools for construction and noise may disturb migratory birds. Impacts are anticipated to be minimal due to the availability of other suitable habitats nearby, such as the King Brook Reservoir and Sand Hill Road Reservoir.

5.3.3.3 Bald and Golden Eagles

No Action/FWOFI Alternative – No impacts to eagles are anticipated under the No Action Alternative. The foraging habitat for eagles would eventually change from open water habitat to wetland, wet meadow, and riparian habitat after an eventual failure of the dams.

Preferred Rehabilitation Alternative – No impacts to eagles are anticipated under the Preferred Alternative at Site 25B and Site 26 since no known Bald or Golden Eagle nests occur in the study areas. Minor impacts to Bald Eagles may occur at Sites 12A North and South due to the presence of a nest located within 0.5-miles of the study areas. Conservation measures have been recommended by NHDES to avoid impacts and would be implemented. As designs are developed and the project is closer to implementation reviews will need to be ongoing as updates to species lists could occur or listing status. Bald and Golden Eagles utilizing the sites as foraging habitat during the construction timeframe would not be likely to experience adverse effects as other potential foraging habitats are available nearby.

5.3.3.4 Ecologically Critical Areas

No Action/FWOFI Alternative – No impacts to ecologically critical areas are anticipated at Site 12A or Site 25B. The Site 26 auxiliary spillway is composed of grassland habitat categorized as Highest Ranked Habitat in the Biological Region by New Hampshire. This habitat could be temporarily impacted under the No Action Alternative due to flooding and erosive forces occurring from an uncontrolled breach of the dam. No exemplary natural communities occur at any of the sites.

Preferred Rehabilitation Alternative – No impacts to ecologically critical areas are anticipated at Site 12A or Site 25B. The Site 26 auxiliary spillway is composed of grassland habitat categorized as Highest Ranked Habitat in the Biological Region by New Hampshire. A portion of this habitat would be temporarily impacted under Preferred Alternative due to the construction of an RCC drop structure at the auxiliary spillway control section. To avoid permanent impacts, the RCC structure will be backfilled and covered with salvaged topsoil from the RCC work area. This approach would allow the native seed bank to recolonize the disturbed areas created by the installation of the RCC structure with the same beneficial grasses that were accustomed to growing in this area. There would also be temporary impacts due to construction activities. No exemplary natural communities occur at any of the sites.

5.3.3.5 Invasive Species

No Action/FWOFI Alternative – Invasive plant species are often the first species to colonize a recently disturbed area. Areas disturbed by flooding associated with an uncontrolled dam breach may be

impacted by the encroachment of invasive plants. Multiple species of invasive plants were observed at each site during the wetlands and waterways delineation efforts.

Preferred Rehabilitation Alternatives – Areas disturbed by activities associated with the Preferred Rehabilitation Alternative would be seeded with appropriate native seed mixes to reduce the chance of invasive plant species becoming established in disturbed areas.

5.3.3.6 Fish and Wildlife

No Action/FWOFI Alternative – There are minimal anticipated impacts to fish and wildlife under the No Action Alternative. The most significant potential impact would be a temporary impact to aquatic fauna utilizing the reservoirs and principal spillway channels as habitat during a dam failure. The rapid uncontrolled release of stored water within the reservoirs would transport aquatic fauna downstream. High velocity flows in the spillway may physically harm aquatic fauna, and aquatic fauna washed into the auxiliary spillway or floodplain areas may not be able to return to suitable habitat once flows recede, resulting in fish kill.

Preferred Rehabilitation Alternative – There would be minor temporary impacts to fish and wildlife from the Preferred Alternative. Construction during the spring may affect the migration and breeding habitat of waterfowl and birds that would otherwise utilize habitats found at the study areas, including the reservoirs, wetlands, streams, forest, and grasslands. Similarly, fish and aquatic species that use the reservoirs or streams for habitat would be temporarily affected during the construction season. However, fish and wildlife would likely disperse to natural cover in the surrounding area until rehabilitation is complete. Project erosion and sedimentation controls would help protect downstream aquatic habitat during construction.

5.3.3.7 Natural Areas

No Action/FWOFI Alternative – Natural areas would be minimally impacted under the No Action Alternative. The flow path of floodwaters associated with an uncontrolled breach would primarily be directed through the auxiliary spillways of the dams, which are a part of the built environment.

Preferred Rehabilitation Alternative – There are minimal impacts to natural areas associated with the Preferred Alternative. Most construction work would occur in built areas, including the dams and their appurtenances and access roads. Natural areas may be encroached into for the purpose of access and staging. These areas would be temporarily impacted and restored to previous conditions following construction.

Riparian Areas

No Action/FWOFI Alternative – Riparian areas within the flood zone associated with an uncontrolled breach may suffer habitat destruction due to erosive flows. These areas would be temporarily impacted by flood waters which may uproot vegetation. Vegetation would reestablish in these areas over time. Invasive plant species are often the first to colonize an area after disturbance, so the No Action Alternative may facilitate the development of invasive plant species within the affected riparian zones.

Preferred Rehabilitation Alternatives – Riparian areas adjacent to the principal spillway channels at each site may be temporarily impacted by construction activities. Disturbed areas would be reseeded with an appropriate native seed mix. Permanent alterations to the principal spillway conduit at the 12A

South Dam include channelizing the waterway through the new RCC auxiliary spillway, which is anticipated to permanently impact $65\pm$ linear feet of vegetated riparian area.

Forest Resources

No Action/FWOFI Alternative – No impacts to forest resources are anticipated under the No Action Alternative. The primary areas that would be impacted under the No Action Alternative are areas adjacent to and downstream of the dams and their appurtenances. The dams and their auxiliary spillways, which would carry flows from the breach events, are composed primarily of mowed grass and herbaceous wetland habitats.

Preferred Rehabilitation Alternative – Construction associated with the Preferred Alternative would be confined to the dams and their appurtenances and would minimally impact forest resources. Anticipated tree clearing at Site 12A will total $0.5\pm$ acre. Minimal tree clearing is anticipated at Site 25B. At Site 26, $0.7\pm$ acre of tree clearing is anticipated. Disturbed areas would be reseeded with appropriate native seed mixes post-construction to minimize impacts.

5.3.4 Air- Related Concerns

No Action/FWOFI Alternative – Under the No Action Alternative, the existing dams would not be rehabilitated. No pollutants would be emitted and attainment with NAAQS would not be affected.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, emissions from equipment and vehicles would occur during construction activities. However, these emissions would be short-term and would only occur during construction activities. During construction, the contractor would be required to implement BMPs and dust abatement measures to reduce emissions and fugitive dust.

5.3.5 Climate

No Action/FWOFI Alternative – Under the No Action Alternative, the existing dams would not impact current climate. However, as discussed in 3.2.5, New Hampshire has been subject to rising temperatures, and precipitation falling during heavy events is expected to increase. The No Action Alternative would not meet the purpose and need of the project to comply with current New Hampshire and NRCS dam design and safety standards and would not address climate resiliency.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, direct impacts to climate are not anticipated. The Preferred Alternative would improve climate resiliency in the study areas by reducing the risk of dam failure during heavy precipitation events.

5.3.6 Human Use- Related Concerns

5.3.6.1 Demographics

No Action/FWOFI Alternative – Under the No Action Alternative, existing population and demographic trends would continue. The dam structures would not be improved to meet New Hampshire and NRCS dam design and safety standards and the potential for dam failure would not be reduced. The No Action Alternative would have a long-term, minor impact on the populations in the study area through the elevated level of risk.

Preferred Rehabilitation Alternative – The Preferred Alternative would have a beneficial effect on study area populations by reducing the risk of dam failure. No residential or business displacements are anticipated.

5.3.6.2 Land Use/Recreation

No Action/FWOFI Alternative – Under the No Action Alternative, no direct impacts or changes to land use and recreation would occur. However, flood risk from dam failure would not be reduced. Flooding during a catastrophic rain event leading to dam failure would result in damages to land use in the inundation areas.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, no permanent changes to land use, land cover, or recreation would occur. The proposed dam rehabilitations would not require residential or business displacements or use of parkland. The Preferred Alternatives would not induce or increase the potential for future development. Recreation opportunities do not exist at the sites currently, and recreation would not be impacted.

5.3.6.3 Visual Resources

No Action/FWOFI Alternative – Under the No Action Alternative, impacts to visual resources are not anticipated.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, long term impacts to visual resources would be minimal. The Preferred Alternative would include excavation and placement of flood control structures. Top of dam elevation would be raised by less than one foot at Site 25B (0.7 feet) and Site 26 (0.4 feet). At Site 12A South, the majority of the RCC overtopping protection would be covered with topsoil and seeded to reduce visual impacts. Following construction, the project sites and surrounding areas would resemble current visual conditions.

During construction, impacts to visual resources would occur due to the presence of heavy trucks, construction equipment, and earth work at the sites. To replace spillway riser structures, reservoirs at Site 25B and 26 would be dewatered, temporarily changing visual conditions at those sites.

5.3.6.4 Transportation and Infrastructure

No Action/FWOFI Alternative – Under the No Action Alternative, impacts to transportation and infrastructure would not occur. However, roadways and infrastructure would remain at elevated risk from a catastrophic rain event of more than 16.5 inches. Roads that could be impacted by dam failure include:

- Site 12A North and South - Senator Tobey Highway/NH Route 45, East Road, an unnamed reservoir access road, Laurel Wood Drive, and Richardson Road
- Site 25B – General Miller Highway and East Road
- Site 26 – Gibbons Highway/NH Route 101, Bear Run, and Victoria Lane

Preferred Rehabilitation Alternative – Under the Preferred Alternative, direct impacts to transportation and infrastructure would not occur. The Preferred Alternative would reduce risk to transportation networks and infrastructure due to dam failure.

During construction, a temporary increase in traffic due to heavy vehicles, construction equipment, and workforce would occur on roadways near the three project sites. Each dam is estimated to take one year

to complete construction. Maintenance of traffic measures, including detours, may be required during construction.

5.3.6.5 Noise

No Action/FWOFI Alternative – Under the No Action Alternative, no project-related sound or vibrations would be produced.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, noise from equipment and vehicles would occur during construction activities. Heavy construction equipment can generate noise levels of 73 to 96 dBA at a distance of 50 feet (USEPA, 1971). However, noise would be short-term and would only occur during construction. Additionally, no residents or occupied buildings are within 400 feet of any of the proposed improvements.

During construction, the contractor would be required to adhere to the Town of Temple's Zoning Ordinances that limit construction to weekdays between the hours of 7AM and 6PM. Noise effects would also be minimized with the use of construction equipment mufflers.

5.3.6.6 Hazardous Materials

No Action/FWOFI Alternative – Under the No Action Alternative, hazardous materials and waste would not be produced or stored at any of the sites.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, no hazardous materials or waste would be produced during operation of the dams. No hazardous or solid waste sites are in the study areas according to NHDES, EPA NEPAAssist Tool, and an EDR Radius Map Report.

During construction, hazardous materials and waste such as fuel, lubricants, chemicals, and excavated material would be present in the study area. Contractors would be required to comply with local, state, and federal pollution and contamination regulations. BMPs would be implemented to handle, transport, store, and dispose of hazardous materials and waste, and precautions would be taken to avoid contaminating surface or ground water. A Spill Prevention and Response Plan may be required for Site 12A South due to its proximity to Greenville Water Treatment Plant.

5.3.6.7 Public Health and Safety

No Action/FWOFI Alternative – Under the No Action Alternative, an elevated risk of dam failure would remain. Rainfall in excess of 16.5 inches would cause a dam breach, causing flooding in areas downstream within the flood zone, impacting public health and safety. There are 144 residences, two outbuildings/garages, one church, and one school (an early learning center) in the breach inundation area.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, the risk of dam failure impacting residential and commercial structures, land, and infrastructure would be reduced, which would benefit to public health and safety.

5.3.7 Cultural Resources

5.3.7.1 Historic Resources

No Action/FWOFI Alternative – Under the No Action Alternative, NRCS finds that the no action alternative would result in "no historic properties affected" as the historic properties will be maintained

based on their current conditions. As a result no direct, indirect or cumulative effects would occur.

Preferred Rehabilitation Alternative - Under the Preferred Alternative, the character of the dam sites' use and the physical features within the dam sites' setting that contribute to their historic features would be retained. The project would not result in the removal, neglect, or transfer of ownership of the historic sites. Consultation in accordance with 36 CFR 800.11 was preformed with the New Hampshire Division of Historical Resources/State Historic Preservation Office as documented in the Record of NHPA- Section 106 Correspondence with NH Division of Historical Resources in Appendix A. The NRCS NH determined the finding of effect as "No Adverse Effect" from the thorough assessment and the recommendation provided by Preservation Company and in consultation with NH DHR (Appendix A). While the project does require modifications of the dams including demolition of sections of the earthen embankments, installation of internal seepage collection and conveyance systems, replacement or modification of some of the rise structures and principal spillway features, the dams will be reconstructed to match the existing appearance. The only exception is the dam crest of Site 12A south and the impact basin of the principal spill way. The NRCS NH finds that the project will not cause a change of character of The Souhegan River Flood Control Project Historic District's use or features as it relates to their physical setting. Additionally, the Project will not introduce visual elements that impact the property's integrity of setting and feeling. An additional explanation of eligibility and significance can be found in the Historic District Area Form in Appendix A.

5.3.7.2 Archaeological Sensitivity

No Action/FWOFI Alternative – Under the No Action Alternative, no high sensitivity areas for archaeological resources would be impacted.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, no high sensitivity areas for archaeological resources would be impacted. Ground disturbance activities could include staging and storage areas, sediment reuse and disposal, and access roads. Construction alternatives were developed to avoid areas of high sensitivity identified from the Phase IA Archaeological Sensitivity Assessment. Because of continued consultation, as documented in the Record of NHPA- Section 106 Correspondence with NH Division of Historical Resources in Appendix A, these alternatives were determined to successfully avoid areas of high sensitivity and a Phase IB investigation was no longer warranted. If limits of disturbance change and no longer avoid high sensitivity areas, a Phase IB archaeological investigation will be implemented to evaluate impacts for mitigation discussions on an adverse effect. The Phase IB investigation would consist of subsurface archaeological hand testing to locate and identify potentially significant archaeological resources in areas of proposed ground disturbances.

5.3.7.3 Tribal Land

No Action/FWOFI Alternative – Under the No Action Alternative, no tribal lands would be impacted.

Preferred Rehabilitation Alternative – Under the Preferred Alternative, no tribal lands would be impacted. During project coordination, no tribes or other consulted entities informed the NRCS that there were areas of cultural sensitivity.

Table 5. 3 provides a summary and comparison of effects on resources concerns under the No Action and Preferred Alternatives.

Table 5. 3. Summary and Comparison of Alternatives – Effects on Resource Concerns

Resource Concern	No Action Alternative	Preferred Alternative
SOILS RELATED CONCERNS		
Soil Resources	Flooding associated with an eventual failure of the dam is likely to erode soils downstream of the impoundments and adjacent to the dams.	Earth disturbances are anticipated. Permanent impacts to soil resources include the construction of RCC structures within the auxiliary spillways at Site 25B and Site 26 and inundating soils around the rims of the reservoirs under increased pool elevations.
Prime and Unique Farmland, and Farmland of Statewide or Local Importance	Flooding associated with a dam failure would be likely to erode topsoil which would result in reduced suitability of these soils for agricultural use.	Earth disturbances are anticipated. Permanent impacts to soil resources include the construction of RCC structures within the auxiliary spillways at Site 25B and Site 26 and inundating soils around the rims of the reservoirs under increased pool elevations.
WATER RELATED CONCERNS		
Water Quality	Water quality provided by the dams would continue under the No Action Alternative until a potential dam failure. The flood wave resulting from a dam failure would alter downstream channel geometry and increase sedimentation, impacting the water quality benefits provided by a stable channel and floodplain system, and the loss of the sediment pool would result in increased future downstream sedimentation rates.	The Preferred Alternative would maintain existing water resources and water quality at all sites.
Floodplain Management	Flood protection would continue under the No Action Alternative, until a potential dam failure.	Flood protection would continue under the Preferred Alternative, and the risk of dam failure would be reduced.

Waters of the U. S. , Wetlands, & Special Aquatic Sites	Temporary impacts to wetlands would occur under an eventual failure of the dam due to the lowering of the normal pool of their impoundments and subsequent lowering of the water table.	At the Site 12A North and South Dams, 0. 3± acre of permanent wetland impacts and 65± linear feet of permanent stream impact are anticipated. An additional 0. 9± acre of permanent wetland impacts are anticipated under the release pulse.
Regional Water Resource Plans	The Souhegan River Water Management Plan (2013) would not be supported.	The two-day release pulse is included for Site 12A, supporting the Souhegan River Water Management Plan.
AIR RELATED CONCERNS		
Air Quality (Clean Air Act)	No anticipated impacts to air quality under the No Action Alternative.	Emissions from equipment and vehicles would occur during construction activities. However, these emissions would be short-term and would only occur during construction.
Endangered and Threatened Species	No impacts to endangered or threatened species are anticipated.	No impacts to listed species are anticipated. Seasonal tree clearing restrictions would be implemented to avoid impacts to potential summer roosting habitat of protected bat species. Conservation measures have been recommended by NHDES to avoid impacts to species of concern.
Migratory Birds	Temporary impacts may occur during an uncontrolled breach event.	Impacts are anticipated to be minimal due to the availability of other suitable habitats nearby.
Bald and Golden Eagles	No anticipated impacts to eagles.	No impacts to eagles are anticipated. No known Bald or Golden Eagle nests occur at Site 25B and Site 26. Conservation measures have been recommended by NHDES to avoid impacts to Bald Eagles at Sites 12A.
Ecologically Critical Areas	No impacts to ecologically critical areas are anticipated at Site 12A or Site 25B. Temporary impacts at Site 26 during an uncontrolled breach of the dam are anticipated.	No impacts to ecologically critical areas are anticipated at Site 12A or Site 25B. Temporary impacts at Site 26 are anticipated during construction.

Invasive Species	Encroachment of invasive species would be anticipated in disturbed areas after a potential dam failure.	Areas disturbed would be seeded with appropriate native seed mixes to reduce the chance of invasive plant species becoming established in disturbed areas.
Fish and Wildlife	Minimal anticipated impacts to fish and wildlife. Temporary impacts to aquatic fauna utilizing the reservoirs and principal spillway channels as habitat would occur during a dam failure.	There would be minor temporary impacts to fish and wildlife. Construction during the spring may affect the migration and breeding habitat of waterfowl and birds. Fish and aquatic species that use the reservoirs or streams for habitat would be temporarily affected during the construction season but would likely disperse until construction is complete.
Natural Areas	Natural areas would be minimally impacted.	Natural areas would be minimally impacted. Natural areas may be encroached into for the purpose of access and staging but would be restored to previous conditions following construction.
Riparian Areas	Riparian areas within the flood zone associated with an uncontrolled breach may suffer habitat destruction due to erosive flows. These areas would be temporarily impacted and vegetation would reestablish overtime.	Riparian areas adjacent to the principal spillway channels at each site may be temporarily impacted by construction activities. Permanent alterations to the principal spillway conduit at the 12A South Dam would result in 65 ± linear feet of permanent impacts to the vegetated riparian area.
Forest Resources	No impacts to forest resources are anticipated.	Construction would be confined to the dams and their appurtenances and would minimally impact forest resources. Anticipated tree clearing at Site 12A will total 0.5 ± acre. Minimal tree clearing is anticipated at Site 25B. At Site 26, 0.7 ± acre of tree clearing is anticipated.

HUMANS USE RELATED CONCERNS		
Cultural Resources/ Historic Properties and Tribal Consultation	No impacts to cultural or tribal resources are anticipated. No high sensitivity areas for archaeological resources would be impacted.	The project would not result in the removal, neglect, or transfer of ownership of the historic sites. Therefore, a finding of No Adverse Effect was issued by the NRCS. The dam rehabilitations were designed to avoid high sensitivity areas identified during the Phase 1A investigation. No tribal lands would be impacted. Finding of No Adverse Effect letters were sent to The Narraganset Indian Tribe and Wampanoag Tribe of Gay Head (Aquinnah) on August 5, 2025. No response or comments were received from either of the Federally Recognized Tribes. .
Civil Rights	Existing population and demographic trends would continue.	The Preferred Alternative would have a beneficial effect on study area populations by reducing the risk of dam failure. No residential or business displacements are anticipated.
Social Issues	Existing population and demographic trends would continue.	The Preferred Alternative would have a beneficial effect on study area populations by reducing the risk of dam failure. No residential or business displacements are anticipated.
Local, Regional, and National Economy	Risk of dam failure will continue to threaten Sites 12A North and South's ability to provide drinking water to the Town of Greenville and Pilgrim Foods Manufacturing	Sites 12A North and South would continue to provide drinking water to the Town of Greenville and Pilgrim Foods Manufacturing Plant.
Public Health and Safety	An elevated risk of dam failure would remain. Rainfall in excess of 16.5 inches would	The risk of dam failure impacting residential and commercial structures, land, and infrastructure

	be expected to cause a dam breach, causing flooding in areas downstream within the flood zone, impacting public health and safety. Impacts to transportation and infrastructure would not occur. However, roadways and infrastructure would remain at elevated risk from a potential dam failure. No project-related sound or vibrations would be produced.	would be reduced, which would benefit public health and safety. Direct impacts to transportation and infrastructure would not occur. During construction, a temporary increase in traffic due to heavy vehicles, construction equipment, and workforce would occur on roadways near the three project sites. Increased noise would be temporary during construction activities.
Scenic Beauty	Impacts to visual resources are not anticipated.	Long term impacts to visual resources would be minimal. Top of dam elevation would be raised by less than one foot at Site 25B (0.7 feet) and Site 26 (0.4 feet). Majority of RCC at Site 12A would be covered with topsoil and seeded. Following construction, the project sites and surrounding areas would resemble current visual conditions.
Land Use/Recreation	No impacts to land use or recreation would occur.	No permanent changes to land use, land cover, or recreation would occur.
CLIMATE		
Climate Resiliency	The existing dams would not impact current climate, but climate resiliency would not be addressed. The dams do not meet current New Hampshire and NRCS dam design and safety standards and are at risk of failure during flood events.	Direct impacts to climate are not anticipated. Climate resiliency in the study areas would be improved by reducing the risk of dam failure during heavy precipitation events.
HAZARDOUS WASTE RELATED CONCERNS		
Hazardous Materials	Hazardous materials and waste would not be produced or stored at any of the sites.	Hazardous materials and waste would not be produced or stored during operation of the dams. However, during construction, hazardous materials and waste such

		as fuel, lubricants, chemicals, and excavated material would be present in the study area. Contractors would be required to comply with local, state, and federal pollution and contamination regulations. BMPs would be implemented to handle, transport, store, and dispose of hazardous materials and waste.
ECOSYSTEM SERVICES		
Provisioning Services	Continued risk of negative impacts to farmland of prime importance and threat to water quality & quantity in the event of a dam failure.	Risk of negative impacts to farmland of prime importance and threat to water quality & quantity in the event of a dam failure is reduced. Water quality improvements during low flow periods possible due to the conservation release.
Regulating Services	Flood control benefits provided by the dams and disease control through environmental monitoring of the water supply provided by Site 12A remains at risk from a dam failure event.	Risk to flood control benefits provided by the dams and disease control through environmental monitoring of the water supply provided by Site 12A from a dam failure event is reduced. Water filtration improvements during low flow periods possible due to the conservation release.
Supporting Services	Nutrient cycling service and species habitat service provided by the ecological resources in the study area remain at risk of disruption from a dam failure event.	Risk to nutrient cycling service and species habitat service provided by the ecological resources in the study area from a dam failure event is reduced. Nutrient cycling improvements during low flow periods possible due to the conservation release.
Cultural Services	The risk of a dam failure event continues to threaten quality of life, community cohesion and aesthetic views in the study area.	The risk of a dam failure event to the quality of life, community cohesion and aesthetic views in the study area is reduced.

6 PREFERRED ALTERNATIVE

6.1 Rationale for the Preferred Alternative

The alternatives retained for detailed study were discussed during a stakeholder alternatives meeting held on July 26, 2024. As a result of the alternatives meeting, NRCS and NHDES chose Site 12A Alternative 2C, Site 12A Release Pulse Option 1, Site 25B Alternative 1B, and Site 26 Alternative 1C as the Preferred Alternative (refer to Chapter 4 for a description of all alternatives considered). The Preferred Alternative was selected based on its ability to meet the purpose and need for the project and provide the most beneficial effects to environmental, social, and economic resources.

The Preferred Alternative brings all four dams (Site 12A North and South, Site 25B and Site 26) into compliance with current NRCS and NHDES dam safety regulations, reducing the potential for downstream economic loss and potentially loss of life in the unlikely event of a dam failure. The Preferred Alternative is also the least costly and has similar or fewer environmental impacts in comparison to the other alternatives considered.

6.2 Measures to be Installed

The Preferred Alternative includes modifications to all four dams (Sites 12A North and South, Site 25B and Site 26). The measures to be installed are summarized below for each dam:

Site 12A North:

- Maintain the existing top of dam elevation (El. 878. 6± feet).
- Strip topsoil from the downstream embankment face and install a new internal seepage collection and conveyance system in the form of a chimney and toe drain system.
- Flatten the downstream embankment face to a slope of 3H:1V or flatter.
- Extend the low-level outlet pipe (set in a concrete cradle) and toe drain system to a new concrete endwall as needed to accommodate the flattened embankment slope.
- Remove woody vegetation, including trees and tree stumps, within 25 feet of the new downstream embankment toe.

Site 12A South:

- Strip topsoil from the crest and downstream embankment face and armor the embankment crest and downstream embankment face with Roller Compacted Concrete (RCC). Set RCC on a dual aggregate drainage system which also serves as a new internal seepage collection system. Place RCC in lifts, creating a stepped face having a 3H:1V slope or flatter on the downstream embankment face and extend the RCC downstream beyond the downstream embankment toe to form a stilling basin. The stilling basin is to be founded on competent rock, or in the absence of competent rock, install a sheetpile cutoff wall at the downstream end of the stilling basin to prevent scour and undermining of the RCC system. Provide a smooth finish on the left and right sidewalls of the RCC chute to direct overtopping flow towards the stilling basin.
- Lower the dam crest to match the elevation of the existing auxiliary spillway crest (El. 872. 4± feet) and provide 280 feet (minimum) of crest length which is armored with RCC.
- Fill in the existing auxiliary spillway, creating a top of dam elevation that is no lower than the top of dam elevation of Site 12A North (El. 878. 6±).

- Remove the existing concrete impact basin and extend the principal spillway conduit through the RCC overtopping protection into the new RCC stilling basin. Configure RCC as needed to provide adequate energy dissipation for the principal spillway outfall.
- To minimize visual and cultural impacts associated with the RCC overtopping protection, cover the RCC with two feet (minimum) of topsoil. The topsoil covering is not to be provided over the RCC located on the crest of the dam or within the impact basin for the principal spillway outfall.
- Modify the two orifices in the principal spillway riser which set normal pool to accommodate a two-day release pulse into Richardson Brook during extreme drought conditions. This includes lowering the invert of each orifice by 12 inches and mounting a stop log system in front of each orifice capable of raising the normal pool of the reservoir by two feet (i. e. , from El. 860. 2 to El. 862. 2). The modifications should include a trash rack over each stop log system and the addition of a working platform or extension of the principal spillway riser top slab as needed to allow maintenance personnel to safely access each stop log system.

Site 25B:

- Raise the top of dam to contain the Freeboard Hydrograph (raise to El. 809. 0± feet).
- Strip topsoil from the downstream embankment face and install a new internal seepage collection and conveyance system in the form of a chimney and toe drain system.
- Flatten the downstream embankment face to a slope of 3H:1V or flatter.
- Extend the principal spillway conduit (set in a concrete cradle) and toe drain system to a new plunge pool set at the toe of the flattened downstream embankment.
- Replace the principal spillway riser structure with a new structure that (1) meets earthquake loading requirements, and (2) contains additional conveyance capacity within the flood retarding zone to meet the 10-day drawdown requirement.
- Move the auxiliary spillway control section downstream and add a concrete cutoff wall to interrupt potential head cutting through the auxiliary spillway. Locate the cutoff wall such that it is at or beyond the downstream embankment toe and use excavated material to extend the left training berm of the auxiliary spillway to direct spillway flows away from the dam embankment. Maintain the existing auxiliary spillway crest elevation (El. 801. 8 feet). Regrade the auxiliary spillway approach channel to slope uniformly from the new control section back into the reservoir at a one percent slope (minimum). Regrade the auxiliary spillway discharge channel to slope uniformly at an 11± percent slope from the new control section in a downstream direction to meet existing ground.

Site 26:

- Raise the top of dam to contain the Freeboard Hydrograph (raise to El. 928. 5± feet).
- Strip topsoil from the downstream embankment face and install a new internal seepage collection and conveyance system in the form of a chimney and toe drain system.
- Flatten the downstream embankment face to a slope of 3H:1V or flatter.
- Extend the principal spillway conduit (set in a concrete cradle) and toe drain system to a new plunge pool set at the toe of the flattened downstream embankment.
- Replace the principal spillway riser structure with a new structure that (1) meets earthquake loading requirements, and (2) contains additional conveyance capacity within the flood retarding zone to meet the 10-day drawdown requirement.

- Add a RCC stepped cutoff wall with a 320-foot-wide control weir will be added at the auxiliary spillway control section to interrupt potential erosion and head cutting, preventing a breach of the dam through the auxiliary spillway. Founded on bedrock, the RCC cutoff will be located below grade and will contain left and right training walls to ensure flows are directed over the structure. A RCC stepped cutoff wall is assumed due to the depth to bedrock found during the limited subsurface exploration plan performed as part of this Plan-EA. Should future subsurface exploration programs performed during preliminary/final design determine competent rock is higher in elevation, the use of conventional concrete should be evaluated to determine the most economical construction material. Disturbed areas within the auxiliary spillway will be restored to their current grades and stabilized with vegetation.

6.3 Areas of Controversy

No areas of controversy have been identified. Note that lands around the Site 26 dam and reservoir, including the auxiliary spillway, are used by the Timberdoodle Club for hunting and as outdoor recreational areas. To minimize impacts to the Timberdoodle Club, the RCC stepped cutoff wall which is proposed at the auxiliary spillway control section will be located below grade, backfilled and vegetated such that the proposed improvements will not be visible on the ground surface. Consequently, said work will not alter how the Timberdoodle Club uses this space.

6.4 Permits and Compliance

Federal, state, and local permits will be required for all sites.

Federal Permits: The following federal permits are anticipated for all sites:

- The New England District of USACE requires a New Hampshire General Permit 22 for Repair or Maintenance of Existing Currently Serviceable, Authorized or Grandfathered Dams under the authority of the Clean Water Act, Section 404. A Pre-Construction Notification (PCN) for Major Protects.
- National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for projects that disturb one or more acres of land. In New Hampshire, the U. S. EPA administers the NPDES program.

State Permits: Multiple permits approved by the NHDES are anticipated under the authority of the federal Clean Water Act, Surface Water Quality Standards (Env-Wq 1700) and Title L Water Management and Protection Chapter 485-A (RSA 485-A). These permits include the following:

- New Hampshire Alteration of Terrain Permit issued by the Alteration of Terrain (AoT) Program within NHDES and accompanying 401 Water Quality Certification.
- New Hampshire Wetland Permit issued by the Wetlands Bureau within NHDES under RSA 482-A.
- New Hampshire Shoreland Permit under the Shoreland Water Quality Protection Act (SWQPA), RSA 483-B will be required for Site 12A. This permit applies to work associated with the shoreland of waterbodies over 10 acres and 4th order or higher streams. Shoreland is defined as land within 250 feet of waterbody and a permit is required when a project proposes construction, excavation, or filling within the protected shoreland.
- Dam Safety Permit from the NHDES Dam Bureau under TSA 482 and New Hampshire Administrative Rules Env-WR 100-800.

Local Permits: Anticipated local permits include Site Plan Reviews from the Town of Wilton and the Town of Temple Planning Boards. No county-level permits are anticipated.

6.5 Mitigation of Potential Effects

The Preferred Alternative has been developed to avoid and minimize impacts to regulated features while meeting the project needs. As the Preferred Alternative is refined in the design stage, avoidance and minimization of impacts to regulated features will remain a top priority. During construction, erosion controls will be implemented to avoid secondary impacts to regulated features. Unavoidable impacts will be mitigated through the NHDES Wetland Mitigation Program.

The NHDES on-line guidance for wetland mitigation indicates that mitigation is required for projects with 10,000 square feet or more permanent impacts to freshwater wetlands. The USACE requires mitigation for unavoidable wetland impacts over 5,000 square feet according to the Compensatory Mitigation Thresholds Update for the New England District Regulatory Division published in 2024. Permanent wetland impacts are anticipated to exceed 10,000 square feet at Site 12A, Site 25B, and Site 26. Therefore, compensatory mitigation for wetland impacts is anticipated at all sites. However, the anticipated impacts to wetlands will primarily involve wetlands that have developed within the dam embankments and appurtenances, and regulatory authorities may deem that mitigation is not required. Stream mitigation is not required by NHDES or USACE because anticipated permanent stream impacts are less than 200 linear feet at each site.

Wetland mitigation options include In-Lieu Fee (ILF) Payment to the Aquatic Resources Mitigation (ARM) Fund. Payments are determined using the ARM Fund Calculator, which publishes updated rates annually. Another mitigation option is enhancement, such as through the establishment of riparian buffers to improve water quality and wildlife habitat, and through plantings or reseeded of native plants in disturbed areas. According to the New England District Compensatory Mitigation Standard Operating Procedures published by USACE in 2020, the New England District recommends contacting the Corps prior to developing a mitigation strategy and indicates a preference for ILF mitigation programs.

6.6 Cost and Cost-Sharing

Costs are shown in Section 6. 11, Economics Table 1. Economics Table 2 shows the costs by category and the distribution of how the costs would be shared by the Sponsor and NRCS for each cost item. Total annual costs are shown in Economics Table 4 along with the estimated costs for operation and maintenance. Economics Table 5 displays the average annual flood damage reduction benefits by flood damage categories, and Economics Table 6 displays a comparison of annual costs and benefits. A 2024 price base was used and amortized at 3.0 percent for the 105-year period of analysis.

The planning costs for the proposed rehabilitation measures are estimated costs only. Detailed structural designs and construction cost estimates would be prepared prior to contracting for the work to be performed. The final cost would be the low price received by competitive bidding plus or minus the amounts of contract modifications.

6.7 Ecosystem Services Benefits

The Preferred Alternative protects ecosystem services in the study area from impacts of a catastrophic breach and has the potential to enhance the provision of certain ecosystem services with the addition of a conservation release from Site 12A. It is expected to maintain/improve conditions related to five

Guiding Principles: Healthy and Resilient Ecosystems, Sustainable Economic Development, Floodplains, Public Safety, and Watershed Approach, while reducing the risk of a dam failure. Water quality related provisioning service, regulating ecosystem service of water filtration and supporting service of nutrient cycling will benefit from the conservation release during low flow conditions.

6.8 Installation and Financing

6.8.1 Installation

The project is planned for each dam to be installed in one separate construction season except for Sites 12A North and South, which would be installed in the same construction season. However, depending on weather conditions, construction could extend to a second season for any of the dams. During construction, equipment would not be allowed to operate when conditions are such that soil erosion and water, air, and noise pollution cannot be satisfactorily controlled.

If cultural resources are discovered during installation, work would cease and procedures discussed in General Manual 190-601. 29, *National Cultural Resources Procedures Handbook*, would be implemented.

6.8.2 Responsibilities

The NRCS would provide technical and financial assistance to NHDES for the design and implementation of the project. NRCS would be responsible for the following:

1. Execute a project agreement with NHDES before either party initiates work involving funds of the other party. Such agreements would set forth, in detail, the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
2. Execute a Memorandum of Understanding with NHDES to provide a framework for which cost-share funds are accredited.
3. Execute an updated Operation and Maintenance (O&M) Agreement with NHDES for the dam.
4. Provide financial assistance equal to 65% of total eligible project costs, not to exceed 100% of actual construction costs.
5. Provide engineering support and technical assistance during design and following construction of the project.
6. Certify completion of all installed measures.

NHDES would be responsible for the following:

1. Secure all needed environmental permits and land rights for installation of the rehabilitation measures.
2. Prepare updated Emergency Action Plans (EAPs) for the dams prior to the initiation of construction.
3. Execute an updated Operation and Maintenance Agreement with NRCS for the dams.
4. Execute a Memorandum of Understanding with NRCS to provide a framework within which cost-share funds are accredited.
5. Execute a project agreement with NRCS before either party initiates work involving funds of the other party. Such agreements would set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
6. Provide non-federal funds for cost-sharing of the project at a rate equal to, or greater than, 35% of the total eligible project costs.
7. Participate in and comply with applicable Federal floodplain management and flood insurance programs.
8. Enforce all associated project easements and rights-of-way.

6.8.3 Contracting

The project would be installed by means of a contract developed and agreed to by NHDES and NRCS prior to commencement or authorization of work activities. An implementation agreement would detail the work activities and financial responsibilities for involved parties.

6.8.4 Real Property Rights

Currently, NHDES owns the land surrounding the Site 12A reservoir to the east of Route 45, and according to the property deed, flowage easements are in place for lands up to El. 876. 1 (NAVD88) located to the west of Route 45 along Richardson Brook and Miller Gamble Brook. Consequently, land rights are in place for all lands located below the auxiliary spillway crest elevation except for properties owned by Marta M. and Marck C. Scott located along the eastern side of the reservoir. These properties are identified as "Conservation Easements", restricting the type and extent of development which is allowed.

Site 25B: In addition to lands owned by NHDES, Site 25B impounds water on lands owned by Lisa Beaudoin (Tax Parcel 6-59) and Timothy Fiske (Tax Parcels 6-61 and 6-62) within the Town of Temple and lands owned by the Greeley Family Trust (Tax Parcel E-6) and the Society for the Protection of New Hampshire Forests (Tax Parcel E-44) in the Town of Wilton.

With the exception of the right abutment, which is owned by NHDES, the remainder of the Site 26 dam and auxiliary spillway are located on lands owned by the Timberdoodle Club on which NHDES has an easement. The easement encompasses the dam, auxiliary spillway and sediment pool; however, at the auxiliary spillway elevation, Site 26 Dam impounds water beyond the easement on lands owned by Whitcomb & Trust, Randall H. Martin, James W. Quinn, Martin Connolly, an RT/Trust within the Town of Temple.

6.9 Operations, Maintenance, and Replacement

Measures installed as part of this plan, and previously installed measures, would be operated and maintained by NHDES with technical assistance from federal, state, and local agencies in accordance with

their delegated authority. A new Operation and Maintenance (O&M) agreement would be developed utilizing the NRCS National Operation and Maintenance Manual. The O&M agreement would be executed prior to signing the project agreement for the construction of the project. The term of the new O&M agreement would be for 100 years, after which the agreement would be renewed, or a new agreement would be developed for the remaining service life of the project. The agreement would specify responsibilities of NHDES and include detailed provisions for retention, use, and disposal of property acquired or improved with PL-106-472 cost sharing. Provisions would be made for free access of State and Federal representatives to inspect all structural measures and their appurtenances as needed.

6.10 Emergency Action Plans

Prior to construction, NHDES shall prepare updated EAPs for the dams as required by state regulations. The EAPs shall meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual, Part 500, Subpart F, Section 500. 52, and meet applicable State agency dam safety requirements. The NRCS would require that EAPs are prepared prior to the execution of fund-obligating documents for construction.

6.11 Economic Tables and Structural Tables

Table 6. 1. Estimated Installation Cost

Works of Improvement	Unit	Number (Non Federal Land)	Estimated Cost ¹		
			Public Law 83 566 Funds ²	Other Funds	Total
Dam Rehabilitation	Site 12A ³	1	\$9,858,485	\$3,894,659	\$13,753,144
Dam Rehabilitation	Site 25B	1	\$6,662,693	\$2,632,816	\$9,295,509
Dam Rehabilitation	Site 26	1	\$11,453,097	\$4,525,783	\$15,978,880
Total Project			\$27,974,275	\$11,053,258	\$39,027,533

¹Price base: 2024 U. S. Dollars.

²Federal Funds include NRCS Engineering Services and Project Administration (\$7,729,180 of \$27,974,275 Public Law Funds), which are not included when calculating eligible federal cost-share. Permit costs (\$152,053 of the \$11,053,258 Other Funds) are also not included. Therefore, federal cost share is based on Total Eligible Project Cost of \$31,146,300.

³ Site 12A includes cost estimates for both Site 12A North and South embankments.

Prepared: March 2025

Table 6. 2. Estimated Cost Distribution - Water Resource Project Measures

Works of Improvement	Installation Cost Federal Funds ^{2/}				Installation Costs Other Funds						Total Installation cost
	Construction ³	Engineering Services ⁴	Project Admin.	Total Public Law 566	Construction	Engineering Services	Real Property Rights	Required Permits	Project Admin. ⁶	Total Other Funds	
Rehabilitation of Souhegan Site 12A ⁷	\$7,134,625	\$2,373,264	\$350,596	\$9,858,485	\$3,652,939	\$0	\$0	\$52,938	\$188,782	\$3,894,659	\$13,753,144
Rehabilitation of Souhegan Site 25B	\$4,821,817	\$1,603,931	\$236,944	\$6,662,693	\$2,468,778	\$0	\$0	\$36,453	\$127,585	\$2,632,816	\$9,295,509
Rehabilitation of Souhegan Site 26	\$8,288,652	\$2,757,140	\$407,305	\$11,453,097	\$4,243,803	\$0	\$0	\$62,662	\$219,318	\$4,525,783	\$15,978,880
Total	\$20,245,095	\$6,734,335	\$994,845	\$27,974,275	\$10,365,519	\$0	\$0	\$152,053	\$535,686	\$11,053,258	\$39,027,533

¹ Price Base: 2024 U. S Dollars.

² Federal cost share for total eligible dam rehabilitation costs is 65%. Federal engineering services and project administration costs, as well as permit costs, are not included when calculating eligible federal cost share. Therefore, federal cost share for construction is based on total eligible project cost of \$31,146,300.

³Total construction cost of \$20,245,095 includes environmental mitigation costs of \$165,000.

⁴Engineering services costs are assumed to be 22% of the construction cost at each site.

⁵Project Administration was estimated at 5% of construction cost and divided between NRCS (65%) and the sponsor (35%).

⁶SLO project administration are included as in-kind contributions towards the SLO's cost-share requirement.

⁷ Site 12A includes cost estimates for both Site 12A North and South embankments.

Prepared: March 2025

Table 6. 3. Estimated Average Annual Costs

Works of Improvement	Project Outlays Totals		
	Amortization of Installation Cost ^{2/}	Operation, Maintenance and Replacement Cost	Total
Rehabilitation of Souhegan Sites 12A³, 25B, and 26	\$1,245,091	\$30,000	\$1,265,091
TOTAL	\$853,101	\$30,000	\$1,265,091

¹Price Base: 2024.
²Amortized for 100 years at 3 percent. Construction is expected to occur in study years 3, 4 and 5. Therefore, structure life begins at study year 6, assumed to last 100 years.
³ Site 12A includes cost estimates for both Site 12A North and South embankments.

Prepared: March 2025

Table 6. 4. Estimated Average Annual Flood Damage Reduction Benefits

Item	Estimated average annual damage ¹		
	Without Project (Non Agriculture Related)	With Project (Non Agriculture Related)	Damage Reduction Benefit ²
Flood Damage			
Structural Damage	\$3,643,570	\$3,598,939	\$44,631
Infrastructure	\$636,342	\$625,348	\$10,994
Insurance Administration Costs	\$31,006	\$31,006	\$0
TOTAL	\$4,279,911	\$4,224,286	\$55,625

¹ Price Base: 2024.

Prepared: March 2025

Table 6. 5. Comparison of Preferred Alternative Benefits and Costs

Works of Improvement	Total Average Annual Equivalent Non Agricultural Related Benefits	Average Annual Equivalent Costs²	Benefit Cost Ratio
Rehabilitation of Souhegan Dams 12A³,25B,26	\$460,768	\$1,265,091	0. 36
TOTAL	\$460,768	\$1,265,091	0. 36
¹ Price Base: 2024. ² From Table 4. ³ Site 12A includes cost estimates for both Site 12A North and South embankments.			
Prepared: March 2025			

An incremental analysis to determine the optimal level of flood protection was conducted. Since the four dam sites were treated as a single unit in the analysis, incremental analysis conducted considered the benefits and costs of providing a level of flood protection other than flood protection benefits from the 100 year event. Expected damages, both in singular event total and expressed as Expected Annual Damages for flood events ranging from the 2-year storm to the 500-year storm(shown in Exhibit tables D4.32, D4.33, D4.34 and D4.38 in Appendix D4, Economics) under the Without Dam (decommissioned) and the No Action conditions were the basis for calculating incremental benefits. The monetized damages were estimated for 1) Structures and Vehicles (buildings, residences, commercial, institutional), and 2) Roadways and Bridges.

The results of the analysis demonstrate the incremental benefits for flood damage reduction exceed the annualized installation cost of rehabilitation through the 100-year flood event, resulting in a benefit to cost ratio of approximately 3.2. Providing additional flood protection beyond the 100-year level was considered, but the cost to provide 500-year protection was estimated to be approximately \$53 million, or \$1,816,592 in annualized cost. This cost would exceed the additional benefits provided (\$1,046,592, the sum of the expected annual damages under Without Dam conditions for the 200- through 500-year events). As such, the optimal level of flood damage protection at the Souhegan dam sites remains the 100-year flood event.

**Table 6.66. Structural Data – Dams With Planned Storage Capacity
Souhegan Watershed, New Hampshire**

Item	Unit	Souhegan Dams 12A (North and South)	Souhegan Dam 25B	Souhegan Dam 26	Total
Class of Structure		High (Class C)	High (Class C)	High (Class C)	
Peak Ground Acceleration	g	0.69	0.69	0.69	
Uncontrolled drainage area	mi ²	5.56	5.69	4.88	
Controlled drainage area	mi ²	N/A	N/A	N/A	
Total drainage area	mi ²	5.56	5.69	4.88	
Runoff curve No. (1day) (AMC II)		69	68	68	
Time of concentration (T _c)	hours	3.17	2.87	3.65	
Elevation top dam	ft	North: El. 878.8 South: El. 878.8	El. 808.3	El. 928.1	
Elevation crest auxiliary spillway	ft	North: N/A South: El. 872.4	El. 801.8	El. 922.1	
Elevation high stage inlet	ft	North: N/A South: El. 864.3	El. 787.5	El. 903.9	
Elevation crest low stage inlet	ft	North: N/A South: El. 860.2	El. 759.6	El. 872.4	
Auxiliary spillway type		Vegetated Earth	Vegetated Earth	Vegetated Earth	

Auxiliary spillway bottom width	percent	140±	350±	320±	
Auxiliary spillway exit slope	percent	2.5	3.0	2.0	
Maximum height of dam	ft	36	64	76	
Volume of fill	yd ³	21,715	194,300	209,533	
Total Capacity ¹	acre-ft	2,390	1,224	1,132	
Sediment submerged	acre-ft	38	29	26	
Sediment aerated	acre-ft	19	18	9	
Beneficial use (identifying use)	acre-ft	731 (Water Supply)	N/A	N/A	
Flood water retarding	acre-ft	1,602	1,177	1,097	
Between high and low stage	acre-ft	505	512	395	
Surface Area					
Sediment Pool ²	acres	117	5.6	3.6	
Beneficial use pool (identify use)	acres	117	N/A	N/A	
Floodwater retarding	acres	148	63	57	
Principal spillway design					
Rainfall volume (1 day)	in	7.77	7.82	7.85	

Rainfall volume (10 day)	in	12.30	12.29	12.28	
Runoff volume (10 day)	in	8.20	8.20	8.2	
Capacity of low stage ³ (maximum)	ft ³ /s	59	65	57	
Capacity of high stage ⁴ (maximum)	ft ³ /s	118	131	144	
Dimensions of conduit	ft/in	30"	30"	30"	
Type of conduit		Reinforced Concrete	Reinforced Concrete	Reinforced Concrete	
Frequency operation auxillary spillway	percent chance	Greater than 100-Yr	Greater than 100-Yr	Greater than 100-Yr	
Auxiliary spillway hydrograph					
Rainfall volume	in	13.60	13.61	13.64	
Runoff volume	in	9.4	9.2	9.2	
Storm duration	hours	24	24	24	
Velocity of flow (V _e)	ft/s	9.6	9.7	8.5	
Max. reservoir water surface elevation	ft	El. 875.7	El. 805.0	El. 925.3	
Freeboard hydrograph					
Rainfall volume	in	30.2	24.3	24.3	
Runoff volume	in	25.4	19.4	19.4	

Storm duration	hours	24	6	6	
Max. reservoir water surface elevation	ft	El. 881.2	El. 808.9	El. 928.6	
Capacity equivalents					
Sediment volume	in	0.1	0.1	0.1	
Floodwater retarding volume	in	5.4	3.9	4.2	
Beneficial volume (identify use)	in	2.5	N/A	N/A	

¹ Crest of auxiliary spillway

² If reservoir contains beneficial storage or if sediment capacity will not store water, show area in parenthesis and footnote accordingly.

³Flow rate with reservoir at principal spillway high stage

⁴Flow rate with reservoir at auxiliary spillway crest

7 CONSULTATION, COORDINATION AND PUBLIC PARTICIPATION

7.1 Consultation

The following section describes consultation efforts that occurred during the development of this Plan-EA. Consultation began with the development of a Public Participation Plan (PPP) in September 2021. The purpose of the PPP was to provide a road map for agency and public participation throughout the decision-making process, in compliance with NRCS General Title 400, Part 400 – Public Participation Policy. The PPP identified stakeholders, outlined outreach activities, and described key points in time when agencies and the public would be invited to participate.

7.1.1 Standard requirements

7.1.1.1 Endangered Species Act Consultation

Consultation with the USFWS was conducted in accordance with the Endangered Species Act (16 U. S. C. § 1008). Resource lists were generated using the Information for Planning and Consultation (IPaC) online tool. The results of the consultation are presented in Chapter 3 Affected Environment. As designs are developed and the project is closer to implementation reviews will need to be ongoing as updates to species lists could occur, or listing status.

In addition to consultation with USFWS, consultation occurred with New Hampshire NHB utilizing the NHB DataCheck tool, on May 4, 2022, to identify any known rare species or natural communities within the study areas. Negative results were received for each of the study areas. Consultation lapsed and reopened February 3, 2026. Negative results were received for Sites 25B and Site 26. An Ecological Review was required for Site 12A North and South. As a result of the Ecological Review, NHDES recommended a number of conservation measures to avoid impacts to the species of concern identified and would be implemented. Copies of the consultation with USFWS, NHB are provided in Appendix A.

7.1.1.2 Section 106 Consultation

Consultation with the NH Division of Historical Resources SHPO was conducted in accordance with NHPA Section 106 (36 CFR § 800. 1(a)). SHPO coordination was initiated in May 2022 through a New Submittal Request for Project Review (RPR) to NH DHR, including Phase 1A Archaeological Sensitivity Assessment. Submitted by NH Division of Environmental Services (NH DES) - Dam Bureau. . In response to a Request for Project Review submitted by NHDES, SHPO requested survey of the four dams on an Area Form. The survey results identified the dams as contributing elements of a discontinuous historic district, the Souhegan River Flood Control Project. This historic district was determined to be eligible for the National Register of Historic Places under Criterion A and Criterion C. Consultation concluded with a No Adverse Effects determination by NRCS sent on August 5, 2025. Please see Chapter 5 Environmental Consequences, and Appendix A for detailed documentation on Section 106 consultation.

7.1.1.3 Tribal Consultation

Tribal consultation was conducted in accordance with the NHPA of 1966 and EO 13175. Tribal Ancestral Lands Consultation (TALC) was initiated by New Hampshire NRCS. Letters were sent to the SHPO and Native American Tribes with ancestrally affiliated lands located within the study area on October 19, 2021. A copy of the letter to the Abenaki Nation of New Hampshire can be found in Appendix A. The same

letter was sent to the tribes listed below. None of the tribes responded to initial correspondence. The following Native American Tribes may have interest in the project:

- Abenaki Nation of New Hampshire
- Golden Hill Indian Reservation
- Schaghticoke Tribal Nation
- Nulhegan Band of the Coosuk Abenaki Nation
- Eastern Pequot Reservation
- Paucatuck Eastern Pequot Tribe
- Koasek of the Koas of the Abenaki Nation
- Sovereign Abenaki Nation of Missisquoi, St. Francis/Sokoi Band
- Cowasuck Band Pennacook/Abenaki People
- Koasek (Cowasuck) Traditional Band of the Sovereign Abenaki Nation
- Koasek (Cowasuck) Traditional Band of the Abenaki Nation
- Laconia Indian Historical Association LIHA, Inc
- NH Intertribal Native American Council
- THPO, Penobscot Indian Nation
- Tribal Chief, Penobscot Indian Nation
- THPO, Wampanoag Tribe of Gay Head-Aquinnah
- Mashantucket Pequot Tribal Nation, Eastern Area Office
- Mohegan Tribal Council, Eastern Area Office
- THPO, Narragansett Indian Tribe
- THPO, Passamaquoddy Tribe

Only two federally recognized tribes have stated an interest in being included as consulting parties for projects in New Hampshire; this includes the Narragansett and Aquinnah. The other federally recognized tribes listed above were included during the scoping process; however, currently none of these tribes have stated an interest in being a consulting party for projects that occur in New Hampshire. The NRCS NH sent finding of effect consultation packages to the Narragansett Indian Tribe and Wampanoag Tribe at Gay Head (Aquinnah) on August 5, 2025. No response was received regarding NRCS NH's finding of "No Adverse Effect" (Appendix A).

7.2 Coordination

Coordination with federal, state and local agencies has been ongoing throughout the project. The following list includes persons and agencies with an interest or regulatory role in this Plan-EA with whom the project team coordinated during the planning process. Please see Section 7. 5 for a complete list of coordination letters distributed.

Table 7. 1. Coordination Efforts

Date	Agency	Communication
10/21/2021, 6/5/2024, 3/23/2026, 2/17/2026, 2/27/2026	USFWS	Coordination was initiated with a letter notifying the agency of project. IPaC online tool identified three protected species. DKeys were ran for the protected species and concurrence letters were generated with determination of effects to each species. NRCS formally requested for USFWS to provide agency input and/or consultation on the

Date	Agency	Communication
		proposed project per Pub. L. 83-566 Section 12 notification (16 U.S.C. Section 1008) and confirmation of section 7 compliance. In addition, NRCS sent a letter inviting USFWS to participate as Cooperating Agency in the Souhegan Watershed Management Plan and EA, and Endangered Species Act Section 7 and 50 CFR 402 compliance (Appendix A). Please see Chapters 3 and 5 for more information.
10/19/2021, 1/1/2022, 5/20/2022, 7/1/2022, 6/14/2023, 4/2024, 5/1/2024, 2/10/2025, 3/21/2025, 8/8/2025	SHPO	Coordination was initiated with a letter notifying the agency of project. Periodic coordination occurred related to avoidance of archaeologically sensitive areas, and to historic resources determined to be eligible for the National Register of Historic Places. Please see Cultural Resources subsections of Chapters 3 and 5, and Appendix A for further documentation. Consultation concluded with a no adverse effects determination in 2025.
10/21/2021	USACE New England District	Coordination was initiated with a letter notifying the agency of project. No response was received. During this planning stage, project design and impacts are not advanced to a level to submit a permit application for Clean Water Act Section 404 compliance. During the design stage, a pre-application meeting will be requested with USACE, and agency concerns and recommendations will be addressed prior to submission of a 404-permit application package.
10/21/2021, 5/4/2022, 2/3/2026	NH NHB	Coordination initiated with a letter notifying the agency of project. NHB DataCheck tool used to determine known rare species or natural communities in study areas. Please see Bald Eagle subsections of Chapters 3 and 5, and Appendix A for further documentation.
10/21/2021, 11/19/2021	EPA	Coordination initiated with a letter notifying the agency of project. Agency response received that project should avoid, minimize or mitigate wetland and aquatic resource impacts, avoid disproportionate impacts to minority or low-income populations if present, consider the climate resiliency of the project, and include spill prevention measures.
10/21/2021, 6/12/2024	Water Management Bureau, NHDES	Coordination initiated with a letter notifying Bureau of project. Correspondence received from C. Wayne Ives, Instream Flow Specialist, requesting rehabilitation design incorporate conservation release (see Appendix A). Project

Date	Agency	Communication
		team agreed to incorporate conservation release at June 2024 meeting with Bureau.
Table prepared: February 2025		

7.3 Public Involvement

Questions, comments, and concerns regarding the proposed action were requested from resource and regulatory agencies and stakeholders during the scoping period for the project. Outreach to the public included the following activities (additional details can be found in Appendix A).

7.3.1.1 Scoping Package and Agency Coordination Letters

A scoping package was prepared (project information, background data and mapping) to support early formal requests for comments and concerns from federal, state, and local stakeholder agencies. Agency coordination letters were prepared and distributed on October 19, 2021. This request for comments invited stakeholders to attend the virtual public scoping meeting.

7.3.1.2 Public Notice

A public notice introducing the project and inviting the public to the virtual scoping meeting was published in the Monadnock Ledger, a local newspaper, on October 21, 2021, and on the NHDES website.

7.3.1.3 Public/Interagency Scoping Meeting

A virtual public scoping meeting was held on October 28, 2021, via Webex. The meeting was recorded and posted to the NHDES website for asynchronous public access. Stakeholders and members of the public were provided the opportunity to comment on discussion items, ask questions, and offer guidance to the project team. Additional comments were accepted for 30 days following the scoping meeting. Results of the scoping process identified the concerns to be considered in the development of project alternatives and evaluation through the Plan-EA process.

Suggestions received from agency consultations, and during the scoping meeting, were evaluated and, where appropriate, incorporated into the rehabilitation plan. Additional consultations with resource agencies will be conducted as alternatives are evaluated and during the agency and public review process. These consultations are to ensure that the project effects upon resources of concern are adequately avoided, minimized, or mitigated.

The Draft Plan-EA will be made available for public review and comment prior to a final decision. Additionally, a public meeting will be held during the review period to solicit additional agency and stakeholder comments and to provide clarification, as needed, on the proposed action and environmental effects. See Appendix A for a detailed scoping summary.

7.4 Plan Development and Review

Major NEPA milestones are listed in Table 7. 2. Copies of notices and findings are found in Appendix A.

Table 7. 2. NEPA Milestones

Date	Milestone
10/28/2021	Scoping Meeting
Expected summer 2025	Draft Watershed Plan/EA available for review and comment
Expected Fall 2025	Public Meeting to solicit comments on Draft Watershed Plan/EA
Expected Fall 2025	Final Watershed Plan EA and Decision
Expected Winter 2025	Finding of No Significant Impact

7.4.1 Public Review of Plan-EA

Information to be added after public review period.

7.5 Distribution List

The following list includes persons and agencies with an interest in this Plan-EA or those consulted during the planning process.

Table 7. 3. Distribution List

Name	Organization
Stacey Clark, Town Clerk	Town of Temple Administration
Bill McDonnell, Director	Town of Temple Emergency Management
Nick Germain, Town Administrator	Town of Wilton Administration
Dave Boissonnault, Director	Town of Wilton Emergency Management
Tara Sousa, Town Administrator	Town of Greenville Administration
Ed White, Director	Town of Greenville Emergency Management
Mike Viola, Town Clerk	Town of Milford Administration
Robert H. Rowe, Commissioner	Hillsborough County Commission
Susan Thomas, Administrator	Middlesex Conservation District
Kerry Rickrode, District Manager	Hillsborough County Conservation District
Dr. Stephanie L. Simek, Executive Director	New Hampshire Fish and Game Department (NHFGD)
Project Review Coordinator	NHFGD
Steve Doyon, Chief Dam Safety Engineer	NHDES Dams
Jim Gallagher, Chief Engineer	NHDES Dams
Dan Mattaini, Chief Operations and Maintenance Engineer	NHDES Dams
Corey Clark, Chief Engineering and Construction Engineer	NHDES Dams
Bill Thomas, Program Coordinator	NHDES Dams
Katherine Zink, Watershed Specialist	NHDES Watershed-Management
Gregg Comstock, Supervisor	NHDES Watershed-Management

Name	Organization
Phil Trowbridge, LRM Manager	NHDES Wetlands
Sam Comeau, Dam Control Operator	NHDES Dams
Kevin Lucey, Coastal Habitat Program Coordinator	NHDES Coastal Zone Management
Stefanie Giallongo, Wetland Specialist	NHDES Wetland Permit Program
Sarah L. Steward, Commissioner	New Hampshire Department of Natural and Cultural Resources (NHDNCR)
Patrick D. Hackley, Director	NHDNCR
Philip Bryce, Director	NHDNCR
Benjamin Wilson, Director and State Historic Preservation Officer	NHDNCR
Nadine M. Miller, Senior Historian	NHDNCR
David W. Trubey, Historian	NHDNCR
William J. Cass, Commissioner	NHDOT Transportation
John Kallfelz, District Engineer	NHDOT District 4 Engineer
Brian Eaton, State Hazard Mitigation Officer	NH Homeland Security and Emergency Management
Robert M. Buxton, Director	Division of Homeland Security and Emergency Management
Jennifer Gilbert, Senior Planner	Office of Strategic Initiatives
Matt Brown, State Conservation Engineer	USDA NRCS
Travis Thomason, State Conservationist	USDA NRCS
Kyra Sciaudone, District Conservationist	USDA NRCS
Ken Moraff, Director	US EPA Region 1
Frederick Doucette, Regional Administrator	FEMA Region 1
Lindsey Lefebvre, Regulatory Project Manager	USACE New England District

Name	Organization
David Simmons, Assistant Supervisor, Endangered Species	USFWS New England Field Office
The Honorable Senator Jeanne Shaheen	U. S. Senate
The Honorable Senator Maggie Hassan	U. S. Senate
The Honorable Congresswoman Maggie Goodlander	U. S. House of Representatives
Governor Kelly Ayotte	Office of the Governor
Senator Denise Ricciardi	State Senate District 9
Senator Tim McGough	State Senate District 11
Senator Kevin Avar	State Senate District 12
State Representative Diane Kelley	NH House of Representatives District 25
State Representative Dennis Mannion	NH House of Representatives District 25
State Representative Jim Kofalt	NH House of Representatives District 4
State Representative Lisa Post	NH House of Representatives District 4
State Representative Jim Creighton	NH House of Representatives District 38
State Representative Stephanie Hyland	NH House of Representatives District 38
Rhonda Besaw	Abenaki Nation of New Hampshire
Moonface Bear	Golden Hill Indian Reservation
Chief Richard Velky	Schaghticoke Tribal Nation
Chief Don Stevens	Nulhegan Band of the Coosuk Abenaki Nation
Roy Sebastian	Eastern Pequot Reservation
Roy Sebastian	Paucatuck Eastern Pequot Tribe
Council of Chiefs	Koasek of the Koas of the Abenaki Nation
Chief Eugene Rich	Sovereign Abenaki Nation of Missisquoi, St. Francis/Sokoi Band

Name	Organization
Paul Pouliot	Cowasuck Band Pennacook/Abenaki People
Chief Nathan Pero	Koasek (Cowasuck) Traditional Band of the Sovereign Abenaki Nation
Chief Paul "Gwilawato" Bunnell	Koasek (Cowasuck) Traditional Band of the Abenaki Nation
Francis Howes, President	Laconia Indian Historical Association LIHA, Inc
Peter Newell, Council Chief	NH Intertribal Native American Council
Bonnie Newsome	THPO, Penobscot Indian Nation
Chief Francis	Tribal Chief, Penobscot Indian Nation
Cheryl Andrews-Maltais	THPO, Wampanoag Tribe of Gay Head-Aquinnah
Rodney Butler, Chairperson	Mashantucket Pequot Tribal Nation, Eastern Area Office
Chief Sturges	Mohegan Tribal Council, Eastern Area Office
Doug Harris	THPO, Narragansett Indian Tribe
Donald Soctomah	THPO, Passamaquoddy Tribe
Philip and Margaret Waterman	Property Owner
Martha M. and Mark C. Scott	Property Owner
Town Of Greenville	Property Owner
Town Of Temple	Property Owner
Jeremy S. Bradler	Property Owner
NHDES	Property Owner
Jay & Heidi Hadley	Property Owner
Shamar And Fiona Nixon	Property Owner
Meredith Wesby	Property Owner
Robert Gaudreau	Property Owner

Name	Organization
Edward F. Nichols IV	Property Owner
M R & DI Greeley Family Trust	Property Owner
Society For the Protection Of New Hampshire Forests	Property Owner
Catherine K. Joly	Property Owner
Barbara Thongren	Property Owner
Lisa Beaudion	Property Owner
Timothy P And Gregory Fiske	Property Owner
Fly Way Farm Llc, C/O Randel Martin	Property Owner
Byron E. Brockney	Property Owner
101 Real Est Llc, 139 Rt /Trust	Property Owner
Richard Redding & Kerry McDonald	Property Owner
Randel Martin	Property Owner
William Ezell Trustee	Property Owner

8 LIST OF PREPARERS

Name/Title	Role	Education	Experience (Years)
Natural Resources Conservation Service (NRCS)			
Matthew Brown, P. E.			27
Jesse Armfield	New England Regional Geologist	B.S. Geology M.S. Geology	10
New Hampshire Department of Environmental Services (NHDES)			
James Gallagher, P. E.			51
Kent Finemore, P. E.	Assistant Chief Engineer, Dam Bureau	B. S. Civil Engineering	40
Corey Clark, P. E.	Chief Engineer, Dam Bureau	B. S. Civil Engineering M. S. Civil Engineering	15
Gannett Fleming			
Eric Neast, P. E.			36
Katherine Sharpe, AICP, ENV SP	Deputy Project Manager	B. A. English, MPS Environmental Management	25
David Graff, PWS, CSE, CWB	Lead Natural Resource Scientist	B. S. Environmental Studies, MAEd Environmental Studies	27
Barbara Weedon, PWS	NEPA	B. S. Biological Science, M. S. Biological Science	25
Alvena Durham, AICP	NEPA	B. S. Industrial Technology	21
Tamara Pearl, P. E.	NEPA	B. S. Earth and Environmental Engineering	10
Claire Wolesslagle, ENV SP	NEPA	B. S. Geography	6
Christopher Baliey, P.E.	Geotechnical Services	B.S. Civil Engineering M.S. Civil Engineering	35

Kayla Briggs, GISP			
Emily Hegedus	Natural Resources	B. S. Geoenvironmental Studies M. S. Geoenvironmental Studies	4
Kshama Harpankar, PhD, ENV SP	Economics	B. A. Economics M. A. Economics MPhil Development and Planning PhD Applied Economics	17
Anju Ghimirey	Natural Resources	B. S. Environmental Science M. S. Fisheries and Wildlife Science	2
Samantha Hockenberry, PWS, CE	Natural Resources (2021 to 2023)	B. S. Biology M. S. Biology	13
Corey Myers	Natural Resources (2021 to 2023)	B. S. Environmental Technology Management	16

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