DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN NY 11252-6700

CENAD-PD-PP

6 November 2020

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, New England District, 696 Virginia Road Concord, MA 01742-2751

SUBJECT: Review Plan Approval for the Upper Connecticut River Watershed, Vermont Feasibility Study

1. References:

a. Memorandum, CENAE-PD dated 8 September 2020, Submission of the Review Plan for the Upper Connecticut River Watershed CSRM Feasibility Study (P2 No. 471544) for approval.

b. Memorandum, CESPD-PDP dated 17 August 2020, Review Plan Endorsement for the Upper Connecticut River Watershed Feasibility Study in Vermont.

2. The Flood Risk Management Planning Center of Expertise of the South Pacific Division is the lead office to execute the referenced Review Plan. The Review Plan does not include Independent External Peer Review, as it is not required.

3. The enclosed Review Plan is approved for execution and is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution require new written approval from the NAD Commander.

4. The point of contact is Mr. Larry Cocchieri, NAD Planning Program Manager, 347-370-4571, Lawrence.J.Cocchieri@usace.army.mil.

Encl

THOMAS J. TICKNER
Brigadier General, USA
Commanding

**DEPARTMENT OF THE ARMY**
**US ARMY CORPS OF ENGINEERS**
**NEW ENGLAND DISTRICT**
**696 VIRGINIA ROAD**
**CONCORD MA 01742-2751**

CENAE-PD

08 September 2020

MEMORANDUM FOR Commander, USACE North Atlantic Division, (CENAD-PD-X Larry Cocchieri), 301 General Lee Avenue, Fort Hamilton Community, Brooklyn, New York 11252

SUBJECT: Submission of the Review Plan for the Upper Connecticut River Watershed CSRM Feasibility Study (P2 No. 471544) for Approval.

1. References: EC 1165-2-217, Review Policy for Civil Works, 20 FEB 2018.

2. Background: The New England District developed the enclosed approved Review Plan dated 17 August 2020.

3. Request: Based on criteria detailed in EC 1165-2-217 Section 11, the New England District requests that the North Atlantic Division approves the subject Review Plan and support the Type 1 IEPR exclusion. The full analysis required by EC 1165-2-217 may be found beginning on Page 11 (section c(i)) of the enclosed Review Plan.

4. Point of Contact: Questions should be directed to Dr. Dot Lundberg, Planner/Project Manager. She can be reached at 978-318-8155.

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Encl

JOHN A. ATILANO II
COL, EN
Commanding

**REVIEW PLAN**
**8/18/2020**

**Project Name:** Upper Connecticut River Watershed Feasibility Study in Vermont
**P2 Number:** 471544
**Decision Document Type:** Feasibility Study
**Project Type:** Flood Risk Management
**District:** New England District (NAE)
**District Contact:** Plan Formulation Hydrologist/978-318-8155
**Major Subordinate Command (MSC):** North Atlantic Division (NAD)
**MSC Contact:** Civil Works Integration Division - District Support Team, 347-370-4534
**Review Management Organization (RMO):** FRM-PCX
**RMO Contact:** FRM-PCX Regional Manager for LRD/NAD, 304-399-5859

## Key Review Plan Dates

**Date of RMO Endorsement of Review Plan:** *TBD*
**Date of MSC Approval of Review Plan:** *8/17/20*
**Date of IEPR Exclusion Approval:** *N/A*
**Has the Review Plan changed since PCX Endorsement?** *No*
**Date of Last Review Plan Revision:**8*/17/20*
**Date of Review Plan Web Posting**: *TBD*
**Date of Congressional Notifications:** *TBD*

## Milestone Schedule

| | Scheduled | Actual | Complete |
|---|---|---|---|
| **Alternatives Milestone:** | June 5, 2019 | June, 5 2019 | *Yes* |
| **Tentatively Selected Plan:** | June 20, 2020 | June 26, 2020 | *Yes* |
| **Release Draft Report to Public:** | August 31, 2020 | September 11, 2020 | *No* |
| **Agency Decision Milestone:** | December 16, 2020 | | *No* |
| **Final Report Transmittal:** | June 25, 2021 | | *No* |
| **Chief's Report or Director's Report:** | November 30, 2021 | | *No* |

**Project Fact Sheet**
**August 2020**

**Project Name**: Upper Connecticut River Watershed Feasibility Study

**Location**: State of Vermont

**Authority**: Study Resolutions by the Senate Committee on Public Works on 11 May 1962 and by the Senate Committee on Environment and Public Works on 25 May 2001.

**Sponsor**: Vermont Department of Environmental Conservation

**Type of Study**: Flood Risk Management Feasibility Study

**SMART Planning Status**: 3x3x3 compliant

**Project Area**: The Connecticut River (River) is New England's great river and one of only 14 designated American Heritage Rivers. The watershed produces various benefits such as revenues and jobs, food and forest products, and ecological goods and services. It is New England's largest watershed and river, ~11,000 square-miles and 410 miles respectively. The Connecticut River flows through four states (New Hampshire, Vermont, Massachusetts, and Connecticut), connects 148 tributaries, and is New England's largest freshwater ecosystem, covering 7.2 million acres. Under typical conditions, the lower 60 miles of the river are tidal. The Connecticut River has a mean annual discharge of 19,200 cubic feet per second (cfs), the river and its 148 tributaries deliver 75% of the freshwater that enters Long Island Sound. The Connecticut River and its tributaries provide sustenance, transportation, and energy for the communities and ecosystems of New England. Intermixed among the forests are patches of agricultural (6%) and urban (9%) lands, with the highest-density population centers in the southern regions of the watershed. Vermont has eight sub-watersheds (HUC 01080107, 01080102, 01080203, 01080104, and 01080106) off the Connecticut River Watershed.

The Upper Connecticut (CT) River Watershed study focuses on the upper portion of the river that lies in Vermont. New Hampshire and Vermont share approximately 67% of the river's length, ~275 miles, as the river lies on the border between the two states. The river's depth varies from a few inches to 130 feet just below the French King Bridge in Gill, Massachusetts. The Connecticut River watershed drains ~7,000 square miles of New Hampshire and Vermont, which equates to 63% of the whole four-state watershed. The CT watershed includes 41% of Vermont's total land area and 33% of New Hampshire's total land area. The Connecticut River lies a few hundred yards south of the Canadian border at an elevation of 2,670 feet above sea level (SL) and when the river reaches the Massachusetts line, it is approximately 190 feet above SL. Within the Upper Connecticut River's watershed, 114 Vermont towns and 93 New Hampshire towns exist; of which 27 Vermont and 26 New Hampshire towns lie on the river. There are 25 dams on the Connecticut River within Vermont and hundreds of smaller dams on the tributaries throughout the Connecticut River Watershed. The watershed is home to a rich diversity of species that depend on the river for survival such as American shad, alewife, brook trout, longnose dace, fallfish, and numerous species of mammals, reptiles, raptors, and songbirds who take refuge in the floodplains. The study area is comprised of the entire Connecticut River watershed in the state of Vermont.

**Problem Statement**: The Connecticut River and its 38 main tributaries drain 41% of Vermont, a third of New Hampshire, a third of Massachusetts, and almost a third of Connecticut (Fig. 1). Flooding associated with the spring thaw can last for several weeks on the Connecticut River. When combined with rain or ice jams, snowmelt-related flooding can become long-drawn-out. Other significant flood events have been associated with hurricanes, as in the 1938 and 1955 floods, and most recently as a result of Hurricane Irene in 2011. Trends in hydrology include an increase in the frequency of flood events per year and a shift toward earlier timing of the spring snowmelt peak with temperatures rising earlier in the spring (Archfield et al. 2016). Precipitation and temperature has increased with an increasing proportion in heavy events (Horton et al. 2014), and a decreasing percentage as snow (Huntington et al. 2004). Precipitation across the Connecticut River Watershed is evenly distributed throughout the year, with mean annual accumulations around 44 inches when looking at precipitation values at Ball Mountain Dam and Union Dam from the period of 2004-2017. At higher elevations, most of the annual precipitation accumulates as snow during the winter months. After the spring freshet finishes, summer months are characterized by low stable flows interrupted by periodic storm events.

Hurricane Irene made landfall near Cape Lookout, North Carolina on 27 August 2011 as a category 1. Irene then continued north-northeastward, just offshore and made a second landfall near Brigantine Island, New Jersey, on 28 August 2011. Continuing on the north-northeastward path, Irene became extratropical when its center was near the New Hampshire/Vermont border on 29 August 2011. The storm was then absorbed on 30 August 2011 over northeastern Canada by a frontal system. Hurricane Irene was Vermont's largest impact storm event with ~8-11" of rain causing nearly every river and stream to flood, resulting in catastrophic fluvial erosion throughout the state. Irene produced record flooding and damaging winds, which resulted in numerous deaths and historical road, home, and infrastructure damage, in addition to ~73,000 customers without electricity (CVPS 2011). Intense flooding occurred in at least 10 of Vermont's 17 major river basins; as a result, major floodwaters and debris flowed through rivers and communities, affecting hundreds of municipalities. Some rivers were relatively unaffected, while some experienced catastrophic channel enlargement, deposition, and relocation. The problem to be addressed is the vulnerability of the State of Vermont to storm damage from flooding and fluvial erosion. Storms and associated flooding constitute a threat and risk of flood damages to public and private property and infrastructure. Preceding Irene storm in 2011, it had been more than 10 years since Vermont experienced a federally-declared disaster that required Individual Assistance program funding. Irene in Vermont left a historic record for the amount of applicants, individual assistance given, and number of homes sustaining major damage or destroyed. When compared against the average amount of assistance per disaster, the impact on Vermont is consistent with large states and a population of more than 20 times the size of Vermont.


Figure 1: Map showing the Connecticut River Watershed

**Federal Interest:** On September 1, 2011 President Obama issued a Major Disaster Declaration for the state of Vermont for Public (in all counties) and Individual Assistance. The federal and state assistance provided as a result of the Irene was unprecedented. Irene caused over $700 million in damage to the State of Vermont as more than 500 miles of state highways, over 2,000 municipal roads, 800 homes and businesses, 480 state and municipal bridges, approximately 960 culverts, more than 200 miles of rail and 6 bridges in the state-owned rail system were either damaged or destroyed, more than 1500 Vermont families were displaced, 17 municipal wastewater treatment facilities (WWTFs) reported compromised operations, with issues ranging from pump station overflows to incomplete processing of sewage, and 9,213 acres with trees exhibiting flood damage symptoms (Spaulding 2011). In Vermont's 251 towns and cities, 89% (223) were impacted by Irene. Forty-five municipalities were severely impacted. Hundreds of state and local roads were closed for an extended period of time, completely isolating numerous towns and limiting access to many others. This resulted in state and National Guard missions to deliver emergency supplies by ground and air. The flooding also caused the first-ever evacuation of the State Emergency Operations Center due to access difficulties and the severe impact to the buildings and support mechanism in the state office complex in Waterbury. The purpose of the study is to evaluate options for reducing the flood risk in the Vermont portion of the Upper Connecticut River watershed.

**Risk Identification:** Hurricane Irene was Vermont's largest impact storm event, causing nearly every river and stream to flood and causing catastrophic fluvial erosion in Vermont. Intense flooding occurred in at least 10 of Vermont's 17 major river basins; as a result, major floodwaters and debris flowed through rivers and communities, affecting hundreds of municipalities. The problem to be addressed is the vulnerability of the State of Vermont to storm damage from flooding and fluvial erosion. Storms and associated flooding constitute a threat to human life and increase the risk of flood damages to public and private property and infrastructure. The Vermont portion of the CT River Watershed is impacted by flooding caused from extreme storm events. The Future Without Project Conditions include increased flood risk due to rapid change in floodplain hydrology from development activities and changes in riverine geomorphology caused by stream bank erosion and channel degradation. Additionally, storms are expected to increase in frequency and intensity due to climate change. This will result in higher and more frequent storm damages and higher average annual damages.

## 1. FACTORS AFFECTING THE LEVELS OF REVIEW

**Scope of Review.**

- Will the study likely be challenging?
  Yes, due to the size of the study area and the possibility that components of this study pertaining to potential or perceived flooding impacts will contribute to the need for additional scoping time and outreach. Despite being a large study area, Vermont consists of mostly forested areas which reduces the economic benefits of most alternatives due to low economic losses during flood events.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks.
  The project is focused on towns that have had previous flood-related damages during extreme storm events. The study will investigate solutions that will reduce future flood risk in ways that support the long-term resilience and sustainability in the surrounding communities. Reducing flood risk to vulnerable populations, properties, infrastructure, and environmental and cultural resources will vary based off the magnitudes of storm events and their associated flooding impacts.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues?
  Life safety has been present in portions of the CT River Watershed but not within this study/project area. The alternatives currently being assessed are non-structural. Under both the Future Without Project Conditions and With Project Conditions the life safety risks are very low and are not utilized to justify the project.

- Has the Governor of an affected state requested a peer review by independent experts? No.

- Will it likely involve significant public dispute as to the project's size, nature, or effects?
  The study/project is not likely to involve significant public dispute as to its size, nature, or effects. The improvements being considered are not expected to significantly negatively affect the environment and would only be implemented if economically justified, environmentally acceptable, and technically feasible.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project?
  The study/project is not likely to involve significant public dispute as to the economic cost or benefit of the project. The non-Federal sponsor's eagerness reflects the community's concerns regarding storm resiliency and the importance of implementing and completing the project to protect existing infrastructure and communities.

- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices?
  The PDT anticipates using approved planning, hydrology and hydraulics, cost engineering, and environmental models. Additionally, all project designs, measures, and features are anticipated to be common and routine techniques.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule?
  No.

- Is the estimated total cost of the project greater than $200 million?
  No.

- Will an Environmental Impact Statement be prepared as part of the study?
  The level of NEPA documentation is currently an EA.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources?
  Compliance with the NHPA is ongoing and impacts to historic properties, if any, will be taken into account.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures?
  The alternatives currently being considered were determined not to have substantial adverse environmental impacts.

- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat?
  The alternatives currently being considered were determined not to have substantial adverse environmental impacts.

## 2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

**District Quality Control.** All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan.

**Agency Technical Review.** ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are identified during the study, a safety assurance review should be conducted during ATR.

**Independent External Peer Review.** Type I IEPR may be required for decision documents under certain circumstances. This is the most independent level of review, and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

**Cost Engineering Review**. All decision documents shall be coordinated with the Cost Engineering Mandatory Center of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The Review Management Office is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

**Model Review and Approval/Certification.** EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

**Policy and Legal Review.** All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

Table 1 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

**Table 1: Levels of Review**

Table listed below outlines project products, type of review, schedule, and cost. This table will be updated at each IPR and SMART Planning Milestone meeting and presented to the Vertical Team. Table will be updated following feasibility completion for future phases of the project to include design, construction, and operation and maintenance.

| Product(s) to undergo Review | Review Level | Start Date | End Date | Cost | Complete |
|---|---|---|---|---|---|
| Draft Feasibility Report and EA | District Quality Control | 8/1/20 | 8/26/20 | 20K | No |
| Draft Feasibility Report and EA | Agency Technical Review | 8/26/20 | 10/7/20 | 75K | No |
| Draft Feasibility Report and EA | Policy and Legal Review | 10/17/20 | 10/27/20 | 0 | No |
| Final Feasibility Report and EA | District Quality Control | 3/25/2021 | 4/5/21 | 20K | No |
| Final Feasibility Report and EA | Agency Technical Review | 4/15/21 | 6/5/21 | 37K | No |
| Final Feasibility Report and EA | Policy and Legal Review | 6/25/21 | 7/5/21 | 0 | No |

## a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see EC 1165-2-217, section 8.a.1). The DQC Lead should prepare a DQC Plan and provide it to the RMO and MSC prior to starting DQC reviews. Table 2 identifies the required expertise for the DQC team. While there was an initial assignment of a Geotech PDT member, the current alternatives do not have geotechnical design therefore the discipline is not included on the DQC team. Should there be a change in the alternative(s) design as the study progresses, a geotechnical engineer will be added back to the PDT and DQC roles.

**Table 2: Required DQC Expertise**

| DQC Team Disciplines | Expertise Required |
|---|---|
| DQC Lead | A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.). |
| Planning | A senior water resources planner with experience in large river watershed Flood Risk Management projects. |
| Economics | A Economics reviewer with FRM economics experience or a combination of education and experience. The Economics reviewer should have a background in developing economic simulation models and analysis for large, complex regional investigations, involving non-traditional project benefit determination. Should have extensive experience in analyzing flood risk management projects in accordance with ER 1105-2-100, the Planning Guidance Notebook. |
| Environmental Resources | Senior Environmental Specialist with experience in FRM projects. This includes experience in floodplain management, essential fish habitat and endangered species compliance. |

| | |
|---|---|
| Cultural Resources | Senior Cultural Resource Specialist with experience in Federal lands and programmatic agreements. |
| Hydrology/Hydraulic Engineering | Senior H&H Engineer with demonstrated FRM experience with 2-dimensional models and experience with climate change analysis. |
| Cost Engineering | The Cost Engineering panel member should have demonstrated experience or combined equivalent of education and experience assessing FRM projects. |
| Civil Engineering | A senior engineer and expert in the field of civil engineering. They must have a thorough knowledge of and experience with civil design products (e.g., site selection, project development, real estate, and relocations) related to flood risk management measures. |
| Real Estate | Senior Real Estate Specialist with experience in Federal lands and MOU's and preparing real estate plans. |

**Documentation of DQC:** DQC should be performed continuously throughout the study. DrChecks will be used to document all ATR comments, responses and resolutions. A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in EC 1165-2-217, on page 19 (see Figure F).

Documentation of completed DQC should be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see EC 1165-2-217, section 9).

### b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see EC 1165-2-217, section 9(h)(1)). Table 3 identifies the disciplines and required expertise for this ATR Team.

While there is a Geotechnical PDT member, the proposed TSP does not require significant design for a geotechnical engineer to review during DQC or ATR. There will be ATR of any geotechnical information used in detailed design during PED. Should the need arise during the study as noted in the DQC section, a Geotechnical Engineer will be added to the ATR team.

**Table 3: Required ATR Team Expertise**

| ATR Team Disciplines | Expertise Required |
|---|---|
| ATR Lead | A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning). |
| Planning | A senior water resources planner with experience in FRM projects. |

| | |
|---|---|
| Economics | The Economics reviewer should have extensive experience or a combination of education and experience. The Economics reviewer should have a background in developing economic simulation models and analysis for large, complex regional investigations, involving non-traditional project benefit determination. Should have extensive experience in analyzing flood risk management projects in accordance with ER 1105-2-100, the Planning Guidance Notebook. Preferred experience includes performing analysis on non-structural alternatives, and a background in riverine economics. |
| Environmental | Senior Environmental Specialist with experience in FRM projects. This includes experience in floodplain management, essential fish habitat and endangered species compliance. |
| Cultural Resources | Senior Resource Cultural Specialist with experience in programmatic agreements. |
| Hydraulic & Hydrology | Senior H&H Engineer with experience with 2-dimensional models, registered professional engineer and at least 10 years' experience. |
| Cost Engineering | The Cost Engineering panel member should have demonstrated experience assessing FRM projects. Should have direct cost engineering design or construction management experience centered around FRM. |
| Real Estate | Senior Real Estate Specialist certified for ATR with experience in preparing and reviewing real estate plans |
| Climate Preparedness & Resilience CoP | A member of the Climate Preparedness and Resiliency Community of Practice (CoP) will participate in the ATR review. |
| Risk and Uncertainty | For decision documents involving hydrologic, hydraulic, and/or coastal related risk management measures, include a subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty in accordance with ER 1105-2-101. |
| Civil Engineering | A senior engineer and expert in the field of civil engineering. They must have a thorough knowledge of and experience with civil design products (e.g., site selection, project development, real estate, and relocations) related to flood risk management measures. |

**Documentation of ATR:** DrChecks will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy. If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the EC 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see EC 1165-2-217, Section 9), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

**c. INDEPENDENT EXTERNAL PEER REVIEW –**

**(i) Type I IEPR.**

Type I IEPR is managed outside of the USACE and conducted on studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study.

**Decision on Type I IEPR.** There are no mandatory triggers as noted in section 1. The PDT has determined there would be no significantly value added in completing the IEPR Type 1. The alternatives currently being assessed are non-structural and three structural alternatives consisting of bridge redesign and two areas for channel improvements within the channel. The PDT used approved planning, hydrology and hydraulics, cost engineering, and environmental models. Additionally, all project designs, measures, and features are anticipated to be common and routine techniques. The alternatives currently being considered were determined not to have substantial adverse environmental impacts.

**(ii) Type II IEPR.**

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews are managed outside of the USACE and are conducted on design and construction for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. A Type II IEPR Panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, and periodically thereafter on a regular schedule.

**Decision on Type II IEPR.** As noted in (ii) above, this review is based on life safety. The NAE Chief of Engineering has determined that the current proposed TSP (completely non-structural) does not present a significant threat to life safety, therefore, Type II IEPR will not be conducted.

**d. MODEL CERTIFICATION OR APPROVAL**

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

**Table 5: Planning Models.** The following models may be used to develop the decision document:

| Model Name and Version | Brief Model Description and How It Will Be Used in the Study | Certification / Approval |
|---|---|---|
| GeoFDA 1.0 and HEC-FDA v 1.4.2 | GeoFDA provides point-based Hydraulic stage data used to determine flood depths at each structure within the inventory. HEC-FDA 1.4.2 performs Monte Carlo simulations to estimate stage-damage and stage probability relationships for each structure based on the hydraulic data and IWR generic depth-damage curves. | Certified |
| Regional Economic System (RECONS) | RECONS is a regional economic impact modeling tool that estimates jobs, income, sales and value added associated with Corps Civil Works and ARRA spending, as well as stemming from effects of additional economic activities. The model will be used to estimate the regional economic impacts of project implementation. | Certified |

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE-developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

**Table 6: Engineering Models.** These models may be used to develop the decision document:

| Model Name and Version | Brief Model Description and How It Will Be Used in the Study | Approval Status |
|---|---|---|
| HEC-RAS 5.0 (River Analysis System) | The software performs 1-D steady and unsteady flow river hydraulics calculations and has capability for 2-D (and combined 1-D/2-D) unsteady flow calculations. It will be used for steady flow analysis to evaluate the Future Without-Project and Future With-Project conditions. | HH&C CoP Preferred Model |
| HEC-HMS 4.3 (Hydrologic Modeling System) | The software is designed to simulate the complete hydrologic processes of dendritic watershed systems. The software includes traditional hydrologic analysis such as event infiltration, unit hydrographs, and hydrologic routing. | HH&C CoP Preferred Model |

## e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

### (i) Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will

be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences, or other vertical team meetings plus the milestone events.

- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.

- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

**(ii) Legal Review.**

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC, and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.

- Each involved Office of Counsel will determine how to document legal review input.

## ATTACHMENT 1: TEAM ROSTERS

| PROJECT DELIVERY TEAM | | | |
|---|---|---|---|
| Name | Office | Position | Phone Number |
| Dot Lundberg | NAE | Project Manager | 978-318-8155 |
| Bahman Jafari | NAE | Civil Engineer | 978-318-8073 |
| Jere Masey | NAE | Cost Engineer | 978-318-8183 |
| Marc Paiva | NAE | Cultural Resources | 978-318-8796 |
| Danielle Pruell | NAE | Economist | 978-318-8729 |
| Dave Oster/Kevin Foster | NAE | Biologist | 978-318-8205 |
| Paul Young | NAE | Geology | 978-318-8546 |
| Bryant Furtado | NAE | Hydraulics & Hydrology | 978-318-8356 |
| Maureen Davi | NAE | Real Estate | 978-318-8070 |
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| Chris Hatfield | NAE | Plan Formulation & DQC Lead | 978-318-8520 |
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| TBD | TBD | Hydraulics & Hydrology | |
| TBD | TBD | Economics & Risk | |
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| TBD | TBD | Real Estate | |
| TBD | TBD | Climate Preparedness and Resilience CoP | |

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| Pat Falcigno | NAD | Assistant Division Counsel | 347-370-4524 |
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| George Nieves | NAD | Chief Operations & Regulatory Division | 347-370-4556 |
| Ann Banitt | CPR | Civil Engineer (Hydraulics) | 651-290-5541 |

**Citations:**


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3. Huntington, T.G., G.A. Hodgkins, B.D. Keim, and R.W. Dudley. 2004. Changes in the proportion of precipitation occurring as snow in New England (1949-2000). Journal of Climate 17:2626-2636.
4. CVPS, Central Vermont Public Service. News release. "24 hours later: 39,700 of 72,300 restored." 8/29/11, http://www.cvps.com/
5. Spaulding, J., N. Lunderville, S.Minter. 2011. Presentation, "Irene recovery legislative update: I am strong Vermont." http://www.leg.state.vt.us/jfo/reports/Legislative%20Briefings/2011_11_10_Lunderville_LegislativeUpdate.pdf

**DEPARTMENT OF THE ARMY**
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CESPD-PDP (FRM-PCX) 17 August 2020

MEMORANDUM FOR Commander, New England District, U.S. Army Corps of Engineers (CENAE-PDP / Ms. Dot Lundberg)

SUBJECT: Review Plan Endorsement for the Upper Connecticut River Watershed Feasibility Study in Vermont

1. References:

a. Engineer Circular (EC) 1165-2-217, Review Policy for Civil Works, 20 February 2018.

b. Memorandum, CECW-CE, 5 April 2019, subject: Interim Guidance on Streamlining Independent External Peer Review (IEPR) for Improved Civil Works Project Delivery.

2. The Flood Risk Management Planning Center of Expertise (FRM-PCX) endorses the subject review plan, dated August 2020, for approval by the North Atlantic Division (NAD).

3. The FRM-PCX, as the assigned Review Management Organization (RMO), coordinated with the New England District (NAE) in the development of the review plan and reviewed the enclosed plan for compliance with references 1.a and 1.b. The FRM-PCX coordination and review were led by Ms. Karen Miller, FRM-PCX Regional Manager for NAD. All review comments have been satisfactorily resolved.

4. The FRM-PCX concurs with the level and scope of review identified and supported in the review plan, including the decision to not perform Type I IEPR. The project does not meet any of the mandatory triggers for performing Type I IEPR: the estimated total project cost is not greater than $200 million; the Governor of an affected state has not requested peer review by independent experts; and the project is not considered controversial due to significant public dispute over the size, nature, effects, or environmental costs or benefits of the project and does not require an environmental impact statement. Additionally, the review plan provides a risk-informed rationale supporting the decision to not perform Type I IEPR.

5. Please include this memorandum when transmitting the review plan for approval by NAD. Upon approval of the review plan, please provide a copy of the approved plan, a copy of the approval memorandum, and the link to where the plan is posted on the District website to Ms. Karen Miller.

6. Thank you for the opportunity to assist in the preparation of the review plan. Please continue to coordinate the Agency Technical Review (ATR) efforts outlined in the review plan, and any future updates to the plan, with Ms. Karen Miller.

Digitally signed by THAUT.ERIC.WILLIAM.1231631824
Date: 2020.08.17 14:05:50 -07'00'

Encl

ERIC THAUT
Deputy Director, Flood Risk Management
Planning Center of Expertise

CF:
CELRH-PM-PD (Miller)
CEMVN-PD-PER (MacInnes)
CENAE-PDP (Kennelly)